

Development of *Conversation Cards for Adolescents*[©]:
A patient-centered communication and behavior change tool for adolescents with obesity
and health care providers

by

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Abstract

Background. Given adolescents' increasing desire for independence and autonomy, there is a need for research to examine their lived experiences, including concerns, preferences, and priorities. In the context of lifestyle modification for weight management, most adolescents with obesity exhibit suboptimal lifestyle habits and adherence to treatment. To promote tailored interventions for this population, health care providers (HCPs) can benefit from effective patient-centered communication and behavior change tools to support their consultations.

Objectives. To (i) explore barriers, enablers, and recommendations for adopting healthy lifestyle behaviors among adolescents with obesity, (ii) gain insight into the delivery of health services for adolescent obesity management, and (iii) develop *Conversation Cards for Adolescents*[®] (CCAs), an adolescent-specific, patient-centered clinical and bilingual (English and French) tool designed to facilitate communication between adolescents with obesity and HCPs as well as lifestyle modifications.

Methods. This doctoral thesis was completed from 2016 to 2019 and applies a multiphase mixed-methods, cross-language, and patient-oriented research design to three studies. Study 1 was a scoping review and stakeholder consultation on barriers and enablers for adopting healthy nutrition, physical activity, sedentary behavior, and sleep habits in adolescents with obesity (objective 1). Study 2 consisted of qualitative, one-on-one interviews and focus groups with Anglophone and Francophone adolescents with obesity and HCPs (objectives 1 and 2). Study 3 involved adolescents from the second study in co-designing CCAs via a quantitative data prioritization activity and qualitative unstructured telephone interviews (objective 3).

Results. Perspectives of 571 adolescents and 31 HCPs were included across all three studies. Study 1 (n=17 articles, including 546 unique participants; n=20 stakeholders) showed that barriers to healthy nutrition and physical activity were more consistently related to individual- and interpersonal-level factors, compared with interpersonal-level factors for enablers. Knowledge gaps included information on sedentary behavior and sleep as well as environmental and policy levels of influence. Study 2 included adolescents (n=19) and HCPs (n=16) in one-on-one interviews and focus groups, respectively. Adolescents reported barriers and enablers for change, which included the degree of controllability, the impact of mental health, and social pressures related to weight management. These barriers and enablers spanned physiological mechanisms and physical health status, self-regulation for behavior change, controllability and competence beliefs, social relationships and interactions, and accessibility to and availability of opportunities for lifestyle enhancement. To facilitate healthy changes, they recommended establishing parental support, but with limits, improving accessibility and availability of ‘healthy foods’, limiting deceptive practices in food advertisements, improving accessibility and availability of varied physical activity opportunities, and adopting later school start times. Adolescents and HCPs also shared their perspectives on decision-making for weight management, noting conditions and preferences for adolescent and parental involvement. HCPs further identified strategies that they undertook to effectively deliver health services to adolescents with obesity, including discussing realistic expectations regarding weight management, personalizing weight management, and exhibiting non-biased attitudes and practices. In study 3, adolescents (n=18) rank-ordered 153 individual barriers, enablers, and potential enablers (categories) related to nutrition, physical activity, sedentariness, sleep, mental well-being, relationships, and clinical factors (suits); these factors were identified from Studies 1 and 2. A subset of adolescents (n=5) and HCPs (n=3) then

completed telephone interviews to help co-design CCAs, which represent a hard-copy deck of cards composed of the 45 top-rated factors distributed across the 3 categories and 7 suits.

Conclusions. This research adds to the literature on adolescent lifestyle behaviors and engagement in weight management services and highlights the importance of multi-level, multi-component, interventions and tailored health services delivery for lifestyle management in adolescents with obesity. CCAs were developed as a practical, evidence-based tool to facilitate communication and lifestyle behavior change during clinical encounters between adolescents with obesity and HCPs. The feasibility, user experiences, and effectiveness of using CCAs in a clinical setting for improved communication and lifestyle habits remain to be examined empirically.

Preface

This thesis is an original work by Maryam Kebbe. The research studies that form this thesis received ethics approvals from the University of Alberta Health Research Ethics Board: Study Name “Barriers to and enablers of healthy lifestyle behaviors of adolescents with obesity: a scoping review and stakeholder consultation”, Pro00067835, approved on December 9, 2016 and “Perspectives of adolescents with obesity and health care providers on health and decision behaviors”, Pro00070410, approved on June 1, 2017 and the Children’s Hospital of Eastern Ontario Research Institute: Study Name “Point de vue des adolescents et des prestataires de soins de la santé sur les comportements sains et les procédés de santé pour le traitement du surpoids pédiatrique”, CHEOREB# 17/165X, approved on December 5, 2017.

Chapter 2 of this thesis is published as Kebbe M, Damanhoury S, Browne N, Dyson MP, McHugh TLF, Ball GDC. Barriers to and enablers of healthy lifestyle behaviors of adolescents with obesity: a scoping review and stakeholder consultation. *Obes Rev* 2017; 18: 1439-53.

Chapter 3 of this thesis is published as Kebbe M, Perez A, Buchholz A, McHugh TLF, Scott SD, Richard C, Mohipp C, Dyson MP, Ball GDC. Barriers and enablers for adopting lifestyle behavior changes among adolescents with obesity: a multi-centre, qualitative study. *PLoS ONE* 2018; 13: e0209219.

Chapter 4 of this thesis is under review as Kebbe M, Perez A, Buchholz A, McHugh TLF, Scott SD, Richard C, Dyson MP, Ball GDC. Healthy lifestyle promotion among adolescents with obesity: recommendations from a multi-centre, qualitative study. *BMC Pediatr* 2019.

Chapter 5 of this thesis is under review as Kebbe M, Perez A, Buchholz A, Scott SD, McHugh TLF, Dyson MP, Ball GDC. Health care providers’ delivery of health services for obesity management in adolescents: a multi-centre, qualitative study. *BMC Health Serv Res* 2019.

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Chapter 7 of this thesis is under review as Kebbe M, Perez A, Buchholz A, McHugh TLF, Scott SD, Richard C, Dyson MP, Ball GDC. *Conversation Cards for Adolescents*[®]: a patient-centered communication and behavior change tool for adolescents with obesity and health care providers. *Health Commun* 2019.

For all chapters, alongside the mentorship of Ball GDC, I was responsible for (i) conceptualizing and designing the study, (ii) collecting and analyzing the data, and (iii) writing the first draft and revising subsequent versions of the manuscript. The manuscripts presented in chapters 2–6 of this thesis represent a provincially-funded study through the Health Outcomes Improvement Fund, Maternal Child Youth Strategic Clinical Network, Alberta Health Services.

Appendix D of this thesis is published as Kebbe M, Perez A, Ball GDC. Is there a role for shared decision-making in pediatric weight management? *Obes Res Clin Pract* 2018; 12: 246-8. Alongside Perez A and Ball GDC, I was responsible for (i) conceptualization and (ii) writing the first draft, and reviewing and revising subsequent versions, of the commentary.

Appendix E of this thesis is under review as Kebbe M, Farmer A, Dyson MP, Scott SD, McHugh TLF. Feasibility, user experiences, and preliminary effectiveness of *Conversation Cards for Adolescents*[®], a patient-centered communication and behavior change tool: protocol for a pilot randomized controlled trial. *Pilot Feasibility Stud* 2019. Alongside the mentorship of Ball GDC, I was responsible for (i) conceptualizing, designing, and refining the study and (ii) writing the first draft, and reviewing and revising subsequent versions, of the manuscript.

DEDICATION

*I dedicate this dissertation to my dear parents and caring brother
for their unconditional love,
encouragement,
enthusiasm, and
patience.*

*I give special gratitude to my supervisor
for his trust and support
every step of the way.*

*Thank you all
for your valued contributions
to my life journey.*

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I would like to recognize the staff at the Pediatric Centre for Weight and Health (Stollery Children's Hospital, Edmonton, AB), the Centre for Healthy Active Living (Children's Hospital of Eastern Ontario, Ottawa, ON), and the Northeast Community Health Centre (Alberta Health Services, Edmonton, AB), all of whom played an integral role in the completion of my research studies. I would also like to acknowledge Mses. Samantha Davies and Mikhaila Skehor for their kind administrative support.

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List of Abbreviations

5As	Ask, Assess, Advise, Agree, Assist
BMI	Body Mass Index
CCAs	<i>Conversation Cards for Adolescents</i> ®
CCs	<i>Conversation Cards</i> ®
CHAL	Centre for Healthy Active Living
HCP	Health Care Provider
MVPA	Moderate-to-Vigorous Physical Activity
NECHC	Northeast Community Health Centre
PCWH	Pediatric Centre for Weight and Health
PEP	Patient Engagement Panel
POR	Patient-Oriented Research
PtDAs	Patient Decision Aids
PWM	Pediatric Weight Management
REDCap®	Research Electronic Data Capture
RCT	Randomized Controlled Trial
SDM	Shared Decision-Making
S.M.A.R.T.	Specific, Measurable, Achievable, Realistic, Timely

Chapter 1

Introduction

My doctoral research focused on exploring the lifestyle behaviors of adolescents with obesity and the way in which health services are delivered to adolescents with obesity in multidisciplinary clinical care. My multiphase mixed-methods dissertation includes primary data collected from three studies – scoping review study (Study 1, Chapter 2), qualitative study (Study 2, Chapters 3–6), and sequential explanatory mixed-methods study (Study 3, Chapter 7). Studies 1 and 2 aimed to provide a foundation of knowledge related to lifestyle habits of adolescents with obesity and delivery of health services for weight management. Data from these studies informed Study 3, which included developing an adolescent-specific, patient-centered clinical and bilingual (English and French) tool called *Conversation Cards for Adolescents*® (CCAs).

The three original studies that comprise this paper-based dissertation generated three published manuscripts (Kebbe et al. 2017a; Kebbe et al. 2018a; Kebbe et al. 2019) and three (Chapters 4, 5, and 7) under review. Additionally, a published research letter on shared decision-making in pediatric weight management (Kebbe et al. 2018b) and a protocol paper under review on the feasibility, user experiences, and preliminary effectiveness of CCAs are included in appendices D and E.

This introductory chapter to my thesis includes (i) background literature on obesity in adolescence, (ii) the rationale for conducting the three studies that comprise my thesis, (iii) a description of the ontological, epistemological, and theoretical underpinnings employed, and (iv) the overarching objectives of the studies included in my PhD dissertation.

1.1. Background

1.1.1. Obesity etiology, prevalence, and consequences

Obesity requires immediate and wide-reaching public health attention and efforts. Obesity is often characterized by an excess of body fat that impairs health, resulting from an imbalance between energy intake and energy expenditure (Lustig 2001). Consistent with the definition of a disease that has known and unknown causes, signs and symptoms, and body abnormalities or impairments, obesity should be rightly considered a chronic, relapsing, and progressive chronic disease (Farpour-Lambert et al. 2015).

Childhood obesity has a complex, multifaceted etiology characterized by a complex set of more than 100 biological, environmental, and social variables and 304 in-between multi-level (individual to population) connections (Vandenbroeck 2007). Specifically, since the 1980s, there has been a proliferation of environmental triggers that favor an unhealthy over a healthful environment (French et al. 2001), causing a disruption in the energy intake-expenditure balance. For example, there is increased energy intake (*e.g.*, wide availability of inexpensive and highly palatable foods) and decreased energy expenditure (*e.g.*, increased accessibility to online technology favoring sedentary behavior; less active transportation causing reduced physical activity [Saelans et al. 2012]). These changes promote a “health-disrupting environment” that particularly targets those who have a genetic predisposition to gaining weight. Studies conclude that, on average, genes determine 60-70% of an individual’s risk for obesity (Schousboe et al. 2004; Maes et al. 1997); for example, observing nearly identical body mass indexes (BMI) between identical twins, regardless if together or separated, in late adulthood (Stunkard et al. 1990). This genetic influence was further evidenced by studies showing comparable weights of adopted children to their biological (vs. adopted) parents (Stunkard et al. 1986). Besides genetics and the environment, a number of studies point to the human physiology that is designed to store

fat and that may activate a series of physiological and neurological mechanisms to regain any weight lost if caloric intake is to be increased again (Greenway 2015).

Owing to dynamic development and variable heights and weights of growing children, weight status – which includes overweight, obesity, and severe obesity – is commonly defined on the basis of age- and sex-specific standards as a proxy measure of childhood adiposity (Cole et al. 2000). Based on these metrics, childhood obesity has seen a tenfold increase in its prevalence since the 1980s, with approximately one-in-three Canadian children currently classified as having overweight (BMI 85th – 94th percentile) or obesity (BMI \geq 95th percentile) (Rodd & Sharma 2016). This is of concern, for one, since pediatric obesity has been shown to have a strong association with BMI in adulthood (Simmonds et al. 2015). This continued excess weight puts individuals at an increased risk for psychosocial, cardiometabolic, cardiovascular, dermatologic, endocrine, musculoskeletal, neurologic, and pulmonary comorbidities (Barlow & Expert Committee 2007), such as a lower socioeconomic status compared to their healthy-weight counterparts (Finkelstein et al. 2005), weight-based stigmatization in the workplace (Giel et al. 2012), type 2 diabetes (Sun et al. 2008), and some types of cancer (Ebbeling et al. 2002).

In particular, adolescents are a vulnerable population that undergo a dynamic period of growth and development marked by behavioral, cognitive, physiological, and psychosocial changes. Behaviorally, in Canada, it has been shown that caloric consumption is greatest during adolescence (Garriguet 2004) and that diet quality decreases from childhood to young adulthood (Demory-Luce et al. 2004; Lytle et al. 2000). There is also decreased physical activity and sport participation, especially amongst girls (Brunet et al. 2007; Kimm et al. 2002; Molnar & Livingstone 2000), and conversely, significant increases in sedentary activity from childhood to adolescence (Hardy et al. 2007). Physiologically, adolescents experience changes in body composition, including the quantity of body fat (*e.g.*, increases in fat cell size and number) and

location (*e.g.*, higher deposition of fat in the abdominal subcutaneous region for adolescent males compared with a more peripheral distribution of fat for adolescent females) (Daniels et al. 2005; Pietrobelli et al. 2005; Dietz 1997). In addition, adolescents undergo puberty, which has been associated with a decrease in insulin sensitivity (Goran & Gower 2001; Moran et al. 1999; Amiel et al. 1986); this is important to highlight considering evidence of today's adolescents, especially girls, maturing earlier (Freedman et al. 2003). Lastly, with pubertal maturation and neurodevelopment, adolescents undergo substantial changes in their circadian patterns of activity and rest, including a delay in the onset and offset of melatonin secretion, a slower accumulation of sleep drive in response to sleep deprivation, and an interpretation of environmental time cues alternate to that of adults' internal clock (Hagenauer et al. 2009). Psychosocially, adolescents are targets for poor mental health, including higher body dissatisfaction, lower self-esteem, and high risk for depression and anxiety (Boak et al. 2018; Bearman et al. 2006). Further, they demonstrate increased detachment from parents in pursuit of a more independent lifestyle that is nonetheless dependent on support, basic needs, resources, and modelling from parents and on conformity to peer group norms.

Adverse consequences are further exasperated in adolescents with obesity. For example, compared with children with obesity, adolescents with obesity are more likely to experience less success in weight management and discontinue care prematurely (Dhaliwal et al. 2014; Wiegand et al. 2014). The distinction between children and adolescents with obesity may be due to difficulties in changing established lifestyle habits. Specifically, adolescents with obesity exhibit suboptimal adherence to lifestyle recommendations in areas of nutrition, physical activity, sedentary behavior, and sleep (Ball et al. 2008). Although moderate to strong, there is some evidence in favor of tracking of lifestyle habits in nutrition, physical activity, and sedentary behavior from childhood to adolescence and adolescence to adulthood (Craigie et al. 2011; Biddle

et al. 2010). Since adolescence is a time of developmental plasticity in which lifelong habits can still become established, it may represent an important window of opportunity for early intervention.

1.1.2. Clinical care for adolescent obesity management

Tertiary care for obesity management, including pharmacological (*e.g.*, Orlistat) and surgical (*e.g.*, bariatric surgery) interventions, is reserved for adolescent patients whose health is severely compromised and who understand potential risks (Barlow & Expert Committee 2007). Lifestyle interventions are often the first line of treatment for overweight and obesity in adolescents, with more intense interventions to be used as adjuncts. There is growing evidence to support the effectiveness of interventions that involve a combination of diet, physical activity, and behavioral components for the treatment of overweight and obesity in adolescents (Al-Khudairy et al. 2017). Regardless of any changes in weight status, the establishment of healthy lifestyle habits is important for secondary prevention (that is, prevention of further weight gain) and is a promising strategy for long-term health benefits. Ho et al. (2010) illustrated this in a systematic review of lifestyle interventions in children and adolescents, showing improvements in a number of weight and cardiometabolic outcomes.

The most recent clinical practice guidelines for pediatric obesity suggest a multidisciplinary health care team to offer intensive, age-appropriate, culturally-sensitive, family-centered lifestyle modifications (dietary, physical activity, behavioral) for BMI reductions (Styne et al. 2017). This stage of care is recommended for adolescents who have not responded to previous stages of treatment and considers their age, health risks, severity of obesity, and motivation for further care. Albeit modest improvements seen in BMI over the short-term (mean difference -1.15 kg/m²; p<0.00001) (Peirson et al. 2015), multidisciplinary care appears to be the most effective

approach of care for managing childhood obesity (Canadian Task Force on Preventive Health Care 2015). It is founded on principles of family-centered care, offers one-on-one and/or group sessions, and includes lifestyle behavior changes in areas of nutrition, physical activity, and behavior management. A number of pediatric weight management programs exist in Canada (Ball et al. 2010), all of which include multidisciplinary teams (*e.g.*, dietitian, exercise specialist, pediatrician, psychologist, nurse, social worker) that deliver lifestyle/behavior therapeutic interventions of increasing intensity and frequency. For example, and of relevance to this research, primary care providers may refer patients to multidisciplinary clinical care at the Pediatric Centre for Weight and Health (Stollery Children's Hospital, Alberta Health Services) in Edmonton, Alberta or the Centre for Healthy Active Living (Children's Hospital of Eastern Ontario) in Ottawa, Ontario.

1.1.3. Health care techniques for obesity management

Health care providers (HCPs) use a number of techniques by which to effectively deliver health services, such as cognitive behavioral therapy, motivational interviewing, collaborative goal-setting, and shared decision-making. In conducting my research studies, I focused on the latter two techniques for the following reasons. Goal-setting is a structured form of patient engagement that consists of a patient and HCP discussing and agreeing on a goal. This approach can be collaborative in nature, which has shown promise in improving a number of chronic disease behaviors and outcomes (Joosten et al. 2008). Goal-setting is also considered a key mechanism for self-management and notably an important goal of maintenance interventions (Hampl et al. 2016; Jensen et al. 2016; de Niet et al. 2012). In addition to setting S.M.A.R.T. (Specific, Measurable, Achievable, Realistic, Timely) goals, the involvement of children and adolescents in setting the goal(s) must be considered to ensure a correct representation of their lived experiences, including concerns, preferences, and priorities. Doing so has demonstrated positive outcomes in BMI z-

score, dietary intake, and physical activity changes (McDonald & Trost 2015; Nguyen et al. 2014; Latif et al. 2011; Shilts et al. 2009). The engagement of adolescents is in line with principles of patient-centered care, which follows a partnership approach to health care decision-making between the patient and HCP (Mead et al. 2000). In establishing this partnership, HCPs are encouraged to employ collaborative shared decision-making, a decisional model that encourages patients to act as managers of their own care while maintaining this partnership (Stiggelbout et al. 2012). Bartholome (1995) advocates for the inclusion of adolescents in health care decision-making to the extent of their capacity and willingness, so long their preferences are accounted for. The tool developed from this thesis research integrates collaborative goal-setting and shared-decision making principles in its use.

1.2. Rationale and perspective

1.2.1. Rationale for conducting the reported studies

As an undergraduate student at the University of Ottawa (Ottawa, Ontario), I sought a number of academic, professional, and extracurricular activities to complement my classroom learning; for example, volunteering in clinical and research settings. These activities not only contributed to my growth and development, but also confirmed and strengthened my desired career trajectory as a pediatric researcher. With my interests in *(i)* pediatrics and health research, *(ii)* health behavior change, and *(iii)* communication and languages, I chose to pursue a Master's degree in pediatric obesity. I successfully transferred to the PhD program in January 2017 (in the Department of Pediatrics, Faculty of Medicine & Dentistry, University of Alberta, Edmonton, Alberta) when I confirmed my interest in pursuing a career as an academic scientist.

In the first few months working under the supervision of Dr. Geoff Ball, I conducted a retrospective medical record review (Kebbe et al. 2017b) of *Conversation Cards*® (CCs) (Ball et

al. 2013). CCs were created in 2012 to enhance communication between parents and HCPs working in pediatric weight management. They are conversation starters designed to help parents identify the biggest challenges that they face when addressing issues related to their children's weight and health. Once parents identify their challenges, HCPs can align their counseling and interventions with the issues that are most important to families. Statements in CCs are distributed across 6 themes (communication, interpersonal relationships, nutrition, parenting, physical activity, and weight management). To date, ~300 decks of CCs have been disseminated through Obesity Canada to clinicians, domestically and internationally. My research in pediatric weight management aligns with Obesity Canada's strategic goals and Alberta has grown to be the key province within which to conduct obesity-related research through the support of the University of Alberta and Alberta's provincial health priorities.

Based on anecdotal experience from HCPs and on findings from this retrospective medical record review indicating the need to engage adolescents in discussions and making decisions about their weight and health, I recognized value in creating a version of CCs for adolescents with obesity. Further, after a preliminary examination of the literature on adolescents with obesity, I realized that they were an understudied population compared with children with obesity (Al-Khudairy et al. 2017; Mead et al. 2017) and that those seeking treatment were likely different than non-treatment seeking adolescents. For example, previous evidence indicates a higher prevalence of body image concerns in individuals with obesity who are seeking treatment in comparison to those who are not (Vieira et al. 2012; Sarwer et al. 1998). Further, studies of clinical samples typically report poorer psychological well-being and higher binge eating in treatment-seekers when compared with population-based control subjects of normal-weight or with obesity (Wardle & Cooke 2005; Fitzgibbon et al. 1993). Consequently, these issues led me to undertake doctoral

research to understand the lifestyle habits of adolescents seeking multidisciplinary clinical care for obesity management.

Further in my doctoral research, I found additional reasons for exploring perspectives of adolescents on lifestyle behavior change and health services delivery from a different lens. Specifically, in 2017, I received an Alberta Strategies in Patient-Oriented Research Graduate Studentship, which introduced me to patient-oriented research (POR) (Canadian Institutes of Health Research 2014). POR bridges the gap between researchers and patients by placing patients at the center of the research. This is important since traditional research has often been planned and conducted without consulting with the individuals at the receiving end of care. By engaging patients as partners in research and accounting for their priorities, we aim to facilitate the adoption of research findings into practice, and ultimately improve patient outcomes. This realm of research is to be conducted by multidisciplinary teams in partnership with relevant stakeholders. Accordingly, my research was informed by consultations from 25 Anglophone and Francophone adolescents with obesity coupled with insight from more than 15 research team collaborators, 25 HCPs, and 10 researchers across Canada. Adolescents were engaged as partners at multiple stages of my research as it progressed, including identifying their priorities for behavior change and weight management to develop CCAs.

1.2.2. Rationale for developing a clinical, bilingual tool

Obesity in adolescents is difficult to treat or manage successfully (Matson & Fallon 2012). HCPs have reported difficulties in effectively communicating with adolescents and families regarding obesity, observations that indicate a need to improve how obesity is addressed in the health care setting (Torre et al. 2018; He et al. 2010). Adolescents obtain their health information from a number of sources, with HCPs being high on the list of most valued sources. Therefore, HCPs are

encouraged to optimize their approach and communication skills with their adolescent patients. To enhance their day-to-day practice, HCPs have expressed a desire for clinical tools to help them support families managing obesity (He et al. 2010). For the purpose of this thesis, tools are task-related and require the user to perform a specific action. While there are a number of tools to monitor and diagnose childhood obesity (*e.g.*, Edmonton Obesity Staging System for Pediatrics [Hadjiyannakis et al. 2016]), none specifically target or are tailored for use by adolescents with obesity, which highlights an opportunity to contribute meaningfully in this area of research. Being able to identify their most pressing lifestyle concerns and priorities, adolescents can set and meet lifestyle-related goals with the help of their HCPs.

One of my personal achievements is multilingualism, which I believe is not only an asset that could be applied to professional life, but offers access to multiculturalism, lends a more global perspective, and provides novel insights into attitudes and behaviors within other cultures. I experienced these advantages first-hand when I studied abroad in Lyon, France (University of Ottawa 2012). Of note, I have always been dedicated to learning the French language and now have two accredited French diplomas (*e.g.*, DELF [Diplôme d'études en langue française] level B2, France's Ministry of National Education). Aside from creating the bilingual Drug Product Database for Health Canada to meet the needs of both English and French populations in Canada, I continuously seek opportunities to advance and apply my French language. For example, although considered an added step due to methodological considerations and complexities and time constraints, I was eager to incorporate French into my thesis research. Dr. Ball supported this initiative and ensured that appropriate collaborations were set in place for its execution (*e.g.*, collaborations with the Children's Hospital of Eastern Ontario and Obesity Canada for the design of our bilingual tool). This bilingual approach fills an important gap since to date, most tools to facilitate communication and/or lifestyle behavior change (*e.g.*, CCs) have been created in the

English language. CCAs therefore extend our national and international reach by being (i) available in Canada's two official languages, (ii) relevant to implement at different stages of care, including primary and multidisciplinary clinical care, and (iii) suited for use by different target populations, including adolescents with obesity and HCPs who continuously show interest in having tangible, sensitive tools to use in the context of obesity. Through our continued collaborations with Obesity Canada, my research results are disseminated effectively to the appropriate target audience, including 15,000+ members composed of the general public, researchers, trainees, health practitioners, industry stakeholders, and policy makers.

1.3. Ontological, epistemological, and theoretical underpinnings

Paradigms refer to one's philosophical stance as informed by a set of basic beliefs and a worldview that defines the nature of the world, including the individual's relative positioning amongst a range of possible relations to the world. My dissertation employs a multiphase mixed-methods design that uses both qualitative and quantitative methods. Mixed-methods research may receive criticism for allowing a combination of research paradigms; however, Reichardt and Cook (1979) counter this argument by suggesting that different philosophical paradigms and methods are compatible and that these two are not inherently linked. Rather, it is the researcher and research questions or objectives (vs. a philosophical position) that guide the methodology of a study (Niglas 1999 as cited in Greene & Caracelli 2003), within which particular paradigms can be considered. Given these facts, my research did not abide to traditional approaches of associating qualitative work with subjective paradigms (*e.g.*, interpretivism) and quantitative work with objective paradigms (*e.g.*, positivism). Rather, the research paradigm that guided both qualitative and quantitative components of my thesis is a constructivist generation (Guba & Lincoln 1982) of a subtle-realist (Hammersley 1992; Kirk & Miller 1986) conclusion.

The individual objectives of the studies that comprise my thesis relied on my beliefs of ontology (nature of reality) and epistemology (nature of knowledge). First, I believe that if something is known, it is true and that not everything true is known. Hence, it is untrue that knowledge is the full truth, pointing towards multiple, multifaceted realities that may arise from health research with adolescents (constructivist view of a relativist ontology) and how these realities should be studied within the explicit or surface meanings of the data with little interpretation so as to give truth to adolescents' words (*e.g.*, in using manifest content or semantic thematic analysis as was done in Study 2). Second, and in further support of constructivism, my research included perspectives of both Anglophone and Francophone adolescents with obesity in Canada. It can be argued that language is a social construction, thereby equally rendering any truth derived by means of language a social construction. While I did not revoke a subjective perception of reality, I argued that only one underlying reality is studied and represented depending on the researcher's conduct of research, rather than seeking an attainment of "the truth" (subtle-realism view of ontology). That is, my thesis employed a disseminative representation of one reality from many other unknown realities that could have arisen based on differences within a researcher (*e.g.*, timepoint) and between researchers in implementing the research objectives, data collection strategies, data analyses as well as epistemology.

Epistemologically, I believe that I played an active and integral role in shaping the research through my understanding and knowledge of the world (constructivism view of a subjective epistemology). Components to my research that are of epistemological consequence included using semi-structured interviews (for a co-constructed approach to the data), employing verbatim transcription (to give meaning to all utterances by adolescents), not using an interpreter (to minimize an added dynamic to the conversation and reliance on an outsider's perspective), member-checking (to avoid data being inappropriately close to the surface of the words), and the

addition of a midpoint in the online survey (to acknowledge adolescents' potential indifference to a statement and allow for more collaborative data collection). Further, I believe that *(i)* data are not coded in an epistemological vacuum and that researchers cannot free themselves of their theoretical and epistemological underpinnings (induction) and *(ii)* no *a priori* theory could possibly encompass the multiple realities that are likely to be encountered (deduction). As such, in my research, I employed a blend of inductive and deductive reasoning either explicitly (Study 1) or implicitly (Studies 2 and 3). For example, in Study 1, I adapted the Social Ecological Model to findings from my scoping review (abductive approach) and in Studies 2 and 3, I analyzed the data inductively, acknowledging that my data collection strategies (both qualitative and quantitative) were informed and shaped, at least implicitly, by my role and experience as a researcher with prior knowledge of existing theories.

1.4. Overarching objectives & outline of thesis

The overarching goal of my PhD research was to develop an adolescent-specific, patient-centered clinical and bilingual (English and French) tool (CCAs) to help streamline conversations between adolescents and HCPs and facilitate lifestyle behavior change through collaborative goal-setting. Study 1 (Chapter 2) was a scoping review to map the English and French literature on the lifestyle habits of adolescents with obesity. Specifically, from May 2016 to May 2017, I *(i)* explored barriers and enablers experienced by adolescents with obesity working to change their lifestyle in nutrition, physical activity, sedentary behavior, and sleep habits and *(ii)* identified gaps in the literature. As part of this review, I completed a stakeholder consultation with adolescents and HCPs to *(i)* gain their perspectives on and interpretations of our findings, *(ii)* fill in any knowledge gaps identified by our review, and *(iii)* seek additional articles of relevance.

From July 2017 to January 2018, Study 2 (Chapters 3–6) further explored issues pertaining

to lifestyle habits of adolescents with obesity and health care delivery for adolescent weight management via qualitative one-on-one interviews and focus groups with adolescents with obesity and HCPs, respectively. Specifically, the purpose was to identify *(i)* barriers, enablers, and recommendations for healthy nutrition, physical activity, sedentary behavior, sleep habits, and mental health among Anglophone and Francophone adolescents with obesity seeking multidisciplinary clinical care for weight management and *(ii)* adolescents' and HCPs' perspectives on the delivery of weight management services to adolescents with obesity, including adolescent involvement in decision-making and HCPs' strategies for effective weight management counseling. Prior to conducting interviews, in July 2017, I recruited and enrolled several adolescents with obesity to participate on a patient engagement panel. Specifically, the purpose was to explore adolescents' experiences and priorities in weight management, their perspectives on engaging adolescents in research, and their suggestions for the design and procedures of the subsequent phase. The intention was to capture a range of issues that were pertinent to adolescents as they worked to make healthy lifestyle behavior changes and to inform the development of our communication and behavior change tool for clinical practice.

Study 3 (Chapter 7) was conducted from February to March 2018 and included a quantitative component (online survey) for adolescents to prioritize barriers, enablers, and potential enablers encountered when changing lifestyle habits. It also included a qualitative component (telephone interviews) conducted in March 2018, which aimed to gather adolescents' and HCPs' thoughts on the top priorities identified from the online survey, suggestions for wording and categorization of the statements, and insight on the visual design of the cards.

Chapters 8, 9, and 10 conclude my thesis, wherein I discuss major findings, lessons learned and recommendations from my research, future directions for research and clinical practice, and practice applications.

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Chapter 2

Kebbe M, Damanhoury S, Browne N, Dyson M, McHugh TL, Ball GDC. Barriers to and enablers of healthy lifestyle behaviors of adolescents with obesity: a scoping review and stakeholder consultation. *Obes Rev* 2017; 18: 1439-53.

2.1. Abstract

Healthy lifestyle behaviors are key to successful weight management, but have proven to be challenging to attain for adolescents with obesity. The purpose of our scoping review was to (i) describe barriers and enablers that adolescents with obesity encounter for healthy nutrition, physical activity, sedentary behavior, and sleep habits and (ii) identify gaps in the literature. We adhered to established methodology for scoping reviews. Six databases were searched (1980–June 2016) for original articles published in English or French that focused on lifestyle behaviors of 13- to 17-year-olds in pediatric weight management. Following screening and data extraction, findings of selected articles were synthesized thematically using a social ecological framework. Stakeholder consultation (n=20) with adolescents with obesity and health professionals was completed to enhance methodological rigor. Our search yielded 17 articles for inclusion, including 546 unique participants. Barriers to healthy nutrition and physical activity were more consistently related to individual-level and interpersonal-level factors; enablers tended to be linked with interpersonal-level factors. Knowledge gaps identified related to sedentary behavior and sleep as well as environmental and policy levels of influence. Our review revealed that some barriers and enablers were unique to adolescents with obesity, which were either within or beyond their control. These findings highlight the importance of multi-level interventions to enable healthy lifestyle behaviors for weight management.

2.2. Introduction

The high prevalence (Ogden et al. 2016) and adverse health risks (Small & Aplasca 2016; Skinner et al. 2015) of obesity are well-documented. Pediatric obesity can be difficult to manage successfully, further adding to its recognition as a global health concern. Adolescents, in particular, undergo physiological and behavioral alterations coupled with psychosocial adjustments, all of which can lead to a heightened risk of developing obesity and its complications. In Canada, caloric consumption and a low diet quality reach their peak in adolescence (Alberga et al. 2012). Further, whereas physical activity and sports participation, especially amongst girls, decline from childhood to adolescence, significant increases in sedentary behaviors are observed (Alberga et al. 2012). Poor health behaviors may therefore be likely contributors to the existing disparity between children and adolescents, whereby adolescents exhibit lower rates of success (Wiegand et al. 2014) and higher rates of discontinuation (Dhaliwal et al. 2014) in weight management.

Obesity most likely persists into adulthood (Simmonds et al. 2015) as do nutrition, physical activity, and sedentary behavior habits (Craigie et al. 2011; Biddle et al. 2010), which together with sleep, influence body weight regulation (Craigie et al. 2011; Biddle et al. 2010; Fatima et al. 2015). More specifically, the sleep-wake cycle and circadian rhythm are associated with lifestyle (*e.g.*, nutrition [Wheaton et al. 2013; Garaulet et al. 2011], physical activity [Stone et al. 2013], sedentary behavior [Garaulet et al. 2011]), and environmental (*e.g.*, electronic media [Gamble et al. 2014]) influences. There is also evidence to support that the timing of the decline of physical activity (Corder et al. 2015; Troiano et al. 2008) and increase in sedentary behavior (Corder et al. 2015; Arundell et al. 2013) during adolescence corresponds to changes in the sleep-wake cycle (Carpenter et al. 2015), highlighting not only complex interactions between lifestyle behaviors, but also the rightful consideration of sleep as a key element to successfully manage weight.

Collectively, these points underscore the importance of encouraging and supporting healthy lifestyle behaviors prior to becoming well-established with the transition into adulthood.

Adolescents with obesity exhibit suboptimal lifestyle behaviors related to nutrition, physical activity, sedentary behavior, and sleep (Tremblay et al. 2015; Ball et al. 2008), likely owing to factors that either negatively (*barriers*) or positively (*enablers*) influence their choices. To our knowledge, no review has yet synthesized the evidence in relation to lifestyle behaviors of adolescents with obesity seeking weight management. Based on the above issues and gaps, learning about barriers to and enablers of establishing and maintaining healthy lifestyle behaviors from the perspectives of adolescents with obesity may optimize their success in managing weight and inform health services and novel interventions to guide their treatment. Accordingly, the purpose of this scoping review and stakeholder consultation was to identify (*i*) barriers and enablers experienced by adolescents with obesity to adopt healthy lifestyle behaviors in areas of nutrition, physical activity, sedentary behavior, and sleep and (*ii*) potential gaps in the literature.

2.3. Methods

Based on an adaptation of the Arksey and O'Malley (Arksey & O'Malley 2005; Levac et al. 2010) methodological framework for scoping reviews, we completed the following six stages:

Stage 1: Identify the scope of objectives and inquiry

Research questions

Our review aimed to address the following research questions:

1. What is the extent of the literature on barriers and enablers experienced by adolescents with obesity working to change their lifestyle behaviors? What barriers and enablers are reported by adolescents with obesity?

2. Are barriers and enablers distributed differently across the four lifestyle areas of nutrition, physical activity, sedentary behavior, and sleep?
3. What are the current gaps in the literature related to barriers to and enablers of healthy lifestyle behaviors as reported by adolescents with obesity?

Study design

Our scoping review was completed between May 2016 and May 2017. It was conceptualized (MK, GDCB) and reviewed by individuals with content and methodological expertise (MPD, TLFM). For the purpose of this review, healthy lifestyle behaviors were operationalized according to (i) nutrition – consumption of fewer unhealthy and more healthy foods; reduction of disordered eating, eating speed, number of servings, or portion sizes; and regularization of timing of dietary intake, (ii) physical activity – participation in structured (*e.g.*, exercise, sports) or unstructured (*e.g.*, walking, cycling) activities, (iii) sedentary behavior – reduction in screen time (*e.g.*, video games) or seated time (*e.g.*, reading), and (iv) sleep – appropriate quality and duration. In the context of the aforementioned healthy lifestyle behaviors, we defined a barrier as “a circumstance or obstacle that [...] prevents progress” (Oxford Dictionaries 2017) (*e.g.*, having limited access to fruits and vegetables due to financial limitations) and an enabler as “a person or thing that makes something possible” (Oxford Dictionaries 2017) (*e.g.*, living near a recreation facility or park as a support for physical activity).

Inclusion and exclusion criteria

We included articles that (i) were published in English or French, (ii) focused on pediatric weight management, (iii) included 13–17-year-olds with a body mass index [BMI] $\geq 85^{\text{th}}$ percentile who were enrolled in clinics, interventions, and/or programs that were designed to treat or manage

obesity, and (iv) contained information on barriers and/or enablers that adolescents with obesity encountered in relation to nutrition, physical activity, sedentary behavior, and/or sleep. No restrictions were placed in regards to study setting (*e.g.*, clinic, community, home, school), but study type was limited to primary research (*e.g.*, qualitative studies, trials). Articles were excluded if the prior criteria were not met (*e.g.*, barriers and enablers provided from the perspectives of parents or health care providers) and if adolescents presented with intellectual and/or developmental disabilities.

Stage 2: Identify relevant studies

Primary searches were conducted (MK) from 1980 to June 17, 2016. Six electronic databases (CINAHL, EMBASE, MEDLINE, PsycINFO, ProQuest Dissertations and Theses, and Scopus) were searched with assistance from a research librarian at the University of Alberta (Edmonton, AB) using both controlled vocabulary (*e.g.*, “Attitude to Health”) and specific keywords (*e.g.*, *adolescen**, *challenge**, *enabler**, *perspective**). Search terms were adapted for each database and combined using Boolean operators to narrow the results. A sample search strategy is presented in Table 2.1. Reference lists from full-text articles that met our inclusion criteria were searched (MK) to identify any additional articles of relevance.

Stage 3: Select studies

All references were exported to Mendeley Desktop (v1.16.3, Glyph & Cog, LLC 2008) and duplicates were removed (MK). Screening was initially done by titles and abstracts by two independent reviewers (MK, SDS). As a preliminary step, a 10% (n=140) sample of articles was screened to ensure consistency between reviewers; upon confirmation of consistency, the remaining articles were assessed. The secondary step included full-text reviews by two

independent reviewers (MK, NB); any discrepancies were discussed and resolved with a third independent reviewer (GDCB).

Stage 4: Chart the data

The data elements we included were chosen through discussion between team members (MK, MPD, GDCB) and were revised iteratively. Identifiers and variables included author(s) and year of publication, setting, study samples and characteristics (*e.g.*, mean age and/or age range, sex, weight status, and sample size), and aim(s) of the study. The data charting form was completed by one reviewer (MK) with 30% of articles (n=5) extracted by an independent reviewer (NB); any differences were resolved through discussion. Authors of studies were contacted (MK) for additional information, when necessary (*e.g.*, for mean ages).

Stage 5: Collate, summarize, analyze, and report the results

Descriptive, numerical summaries were calculated. All data underwent an abductive approach to thematic synthesis (Thomas and Harden 2008); the researchers followed the stages of familiarization (MK), generation of initial codes (MK), organization of codes into related areas to construct descriptive themes and sub-themes (MK), development of analytical themes based on the chosen theoretical framework (MK, GDCB), and sharing and discussing key themes, sub-themes, and exemplar quotes with team members (MPD, TLFM, GDCB). The Social Ecological Model is a framework that aims to understand the multifaceted and dynamic effects of personal and broad factors that determine behaviors (Sallis et al. 2008). It was used as a theoretical lens for presenting our findings, with the following levels of influence: individual, interpersonal, environmental, and policy. Study quality of included articles was appraised for descriptive purposes using the Mixed Methods Appraisal Tool, which can be applied to qualitative,

quantitative, and mixed-methods study designs (Souto et al. 2015; Pluye et al. 2009). Two independent reviewers (MK, NB) completed this process; any differences were resolved through discussion.

Stage 6: Consult with stakeholders

We aimed to enhance methodological rigor of this review through a stakeholder consultation, with a purpose of sharing and gaining insight on our findings (Arksey & O'Malley 2005; Levac et al. 2010). Specifically, adolescents with obesity ('adolescent stakeholders') were surveyed to (i) determine barriers and enablers experienced by adolescents in weight management corresponding with or additional to those retrieved by our review and (ii) implicitly fill in any knowledge gaps not identified by our review via the first objective (Appendix A). We also sought input from a group of researchers and health care providers ('professional stakeholders') with expertise in adolescent obesity to (i) gain their perspectives on and interpretations of our findings and (ii) seek additional articles of relevance. More specifically, the main research questions for professional stakeholders were asked from their professional/clinical perspectives, and spanned (i) common barriers to and enablers of healthy lifestyle behaviors experienced by adolescents with obesity in weight management, (ii) preconceived notions associated with our topic, and (iii) views on our findings, including relevance to practice (Appendix A).

Purposive sampling was used to recruit adolescent stakeholders who had been active in a local multidisciplinary pediatric weight management clinic for ≥ 3 months. This restriction was set to ensure that adolescents have had sufficient clinical time to reflect on their lifestyle behaviors. Potential participants were contacted for recruitment in-person or by telephone. Professional stakeholders (≥ 1 year experience in pediatric obesity) were sampled purposefully and using snowball sampling. The first author (MK) approached professional stakeholders in-person at a

national pediatric obesity conference, which was complemented by email recruitment through our team's network of clinical and academic colleagues. Both expert groups were invited to complete an online survey (duration: ~10 minutes) that included open- and closed-ended questions in REDCap® (Research Electronic Data Capture; Women and Children's Health Research Institute, University of Alberta), a secure, online data collection and management platform. Themes and interpretations of our findings were finalized after consultation with stakeholders. For this stage, ethics approval was obtained by the Human Research Ethics Board (University of Alberta, Edmonton, AB) and operational approvals from Alberta Health Services (Stollery Children's Hospital, Edmonton, AB) and the Covenant Health Research Centre (Misericordia Community Hospital, Edmonton, AB).

2.4. Results

Study selection and characteristics

After removing duplicates from the original sample (n=2,594), 1,401 citations were retrieved for title and abstract screening, 69 articles were reviewed in full, and 17 met our eligibility criteria and were included in this review. Inter-rater reliability for the inclusion of full-text articles between the two independent reviewers (MK, NB) was excellent (Cohen's kappa=0.91). See Figure 2.1 for a flowchart of the article selection process and Table 2.2 for details on the included articles.

All articles were published in English, which included qualitative (n=11, 64.7%), mixed-methods (n=4, 23.5%), and quantitative (n=2, 11.8%) designs. Our search of the grey literature yielded no articles. Several articles (n=4, 23.5%) were identified by reviewing reference lists of included articles. Of the included articles (n=17; 100%), 94.1% (n=16) and 88.2% (n=15) contained barriers to and/or enablers of at least one of the four lifestyle areas, respectively. For barriers, an equal number of articles pertained to nutrition (n=11, 64.7%) and physical activity

(n=11, 64.7%). For enablers, 47.1% (n=8) contained information on nutrition and physical activity compared to 17.6% (n=3) on sedentary behavior. No barriers or enablers were retrieved for sleep. In regards to the setting, 41.2% (n=7) took place in a clinic and/or in the community, 17.6% (n=3) in the school, and 5.9% (n=1) at the home. Over half (n=9, 52.9%) of the studies were conducted in the United States, followed by the United Kingdom (n=3, 17.6%), Canada (n=2, 12.5%), Denmark (n=2, 12.5%), and Belgium (n=1, 5.9%). With respect to our quality assessment, four stars (out of four) were assigned to 35.3% (n=6) of articles, three stars to 52.9% (n=9), and two stars to 11.8% (n=2); a higher number of stars reflected a higher quality study. Inter-rater reliability for the study quality appraisal between the two independent reviewers was good (Cohen's kappa=0.79).

Thematic synthesis

Barriers to and enablers of healthy lifestyle behaviors are presented under corresponding categories and thematic and sub-thematic headings (Figures 2.2 & 2.3).

Barriers – Nutrition:

Individual

Autonomy and behavior control

Adolescents with obesity perceived a lack of control over the food that they purchased and ate. More specifically, purchasing unhealthy foods and/or binge eating was driven by a number of factors, including temptation and a lack of impulse control (Porter et al. 2010), forgetfulness regarding long-term goals (*e.g.*, weight loss) for behavior change (Lindelof et al. 2010), and being away from home and their parents (Lindelof et al. 2010).

“I wish I didn’t do it [eat unhealthy food], but I just forget everything about losing weight when I’m buying it.” (Lindelof et al. p. 5)

Biological and psychological factors

Emotional eating was considered a barrier to adopting healthy food habits by adolescents with obesity in a number of studies (Lindelof et al. 2010; Reece et al. 2015; DeSmet et al. 2014; Lane-Tillerson et al. 2005), some of whom engaged in disordered eating behaviors when faced with upsetting or emotional circumstances (Reece et al. 2015). In particular, adolescents reported that anxiety (Reece et al. 2015), loneliness (DeSmet et al. 2014), sadness (Lindelof et al. 2010; Reece et al. 2015; DeSmet et al. 2014), and being upset (Reece et al. 2015) influenced the quantity and/or quality of the food that they consumed.

“I think one of the reasons why I probably, I comfort eat a lot and there’s like stuff going on, well used to be stuff going on at home which kind of like used to upset me a lot and I used to comfort eat.” (Reece et al. p. 5)

Mindless eating (*e.g.*, not consciously considering the type of food consumed in the moment [Reece et al. 2015]) also interfered with eating healthfully. This behavior was common (Porter et al. 2010; Reece et al. 2015; Lane-Tillerson et al. 2005; Watts et al. 2015), although some adolescents recognized that eating mindlessly or when bored could contribute to weight gain (Reece et al. 2015). Others associated the use of screens (*e.g.*, computer, television) and studying with unhealthy eating (Watts et al. 2015), a link that was strengthened by procrastination and perceived stress related to academics (Watts et al. 2015).

“I actually eat a lot more when I’m using my computer than I do [otherwise]. [I usually eat] stuff that I probably shouldn’t, like small snacks and stuff that tend to build up... like crackers or chips.” (Watts et al. p. 3283)

Simply, feelings of hunger also presented as a barrier (Hoerr & Nelson 1988). For example, adolescents reported feeling hungry after school (Watts et al. 2015), which increased their food intake and tended to include eating alone (Lindelof et al. 2010). To satisfy hunger, individual palates determined food selection, whereby some adolescents disliked the flavour of more nutritious foods (Porter et al. 2010).

Logistics

Adolescents with obesity reported that their busy schedules and a lack of time prevented them from preparing healthy meals (Porter et al. 2010).

Interpersonal

Family and social network

Adolescents with obesity found it difficult to make and maintain healthy food choices without family support. Based on adolescents’ reports, there was a high level of uncertainty among their family on how to positively shift health practices, and this was linked to a lack of awareness from parents (Reece et al. 2015). Although family members held negative views of their adolescents’ health behaviors (Pratt et al. 2015) and perceived them as having little willpower (Alm et al. 2008), adolescents blamed their parents for their unhealthy diets (Lindelof et al. 2010). More specifically, adolescents with obesity experienced challenges to eating healthfully because their families consumed large portion sizes (Pratt et al. 2015) and unhealthy foods (Watts et al. 2015; Pratt et al.

2015), were not actively trying to improve their own diets (Watts et al. 2015; Pratt et al. 2015; Alm et al. 2008), or were satisfying other family members' requests for less healthy foods (Watts et al. 2015). Competition between siblings also dictated adolescents' food choices (Watts et al. 2015).

"I know I want to get to it before [my brother] does 'cause I know I won't get any if he's there first. So it's kind of, 'overdo it to the max' because I know he will too." (Watts et al. p. 3283)

Adolescents also reported feeling pressured by their peers (Porter et al. 2010; Alm et al. 2008), and their healthy weight counterparts in particular, for making unhealthy food choices (Alm et al. 2008).

"I don't want the salad when my friends are eating Big Macs and French fries. It's just not cool. They'd make fun of me." (Alm et al. p. 281)

Due to this preoccupation with self-image, adolescents believed that eating healthy foods would indicate to their peers that they were dieting or attempting to manage their weight, which made them feel self-conscious (Curtis et al. 2008).

"I'm more self-conscious when I'm eating healthily than when I'm not, I feel like people look at me like you know because you're fat you're going to eat unhealthily but if you're eating healthy, I think, I don't know, I just, just feel it's more of a big deal that you're eating an apple or something, they like look and wonder why." (Curtis, p. 414)

Special occasions (Watts et al. 2015) (*e.g.*, eating out at restaurants [Porter et al. 2010; Pratt et al. 2015], family celebrations [Pratt et al. 2015], holiday gatherings [Pratt et al. 2015], get-togethers with peers [Lindelof et al. 2010]) and specific family members (*e.g.*, grandmothers [Pratt et al. 2015]) were also viewed as challenging since they often included or promoted predominantly unhealthy foods, which made it difficult for adolescents to make healthy food choices.

“Like this time we were going to have fruit, but then [our company] brought a cake and we didn’t want to be rude. So we ate it.” (Watts et al. p. 3283)

Environmental

Home environment

In the home environment, adolescents described how their parents purchased (Lindelof et al. 2010), prepared (Porter et al. 2010), and served (Lindelof et al. 2010) unhealthy foods (*e.g.*, frozen pizza, crackers [Watts et al. 2015]). For instance, adolescents reported a lack of control and influence over dinnertime meals (Watts et al. 2015). This made it difficult for them to eat healthy foods and could be attributed, at least in part, to resources (*e.g.*, limited finances [Porter et al. 2010]).

“If you’re just having something for dinner and it’s... healthy or not healthy... it’s not like you can change it necessarily because if that’s what... is made at home, then that’s what you’re going to eat.” (Watts et al. p. 3282)

In addition to abundant unhealthy foods, some households had limited availability of healthy foods; the former were hard to resist, especially when adolescents had limited time to eat

and were in a negative emotional state (Porter et al. 2010; Watts et al. 2015), and their visibility in the home increased mindless eating (Woolford et al. 2011).

Barriers – Physical activity:

Individual

Autonomy and behavior control

Adolescents with obesity de-prioritized non-structured physical activities (e.g., cycling, playing, walking), which appeared to coincide with their increased autonomy as they grew and developed (Lindelof et al. 2012).

“When I was younger, my mom sometimes forced me to ride my bike to school, but now ... I can decide for myself now and I really don’t like riding my bike, so I catch the bus.”

(Lindelof et al. p. 117)

Biological, cognitive, and psychological factors

Adolescents with obesity acknowledged the desire to lose weight; however, mental factors and physical challenges presented as barriers to engage in physical activity. For instance, self-consciousness about excess weight and dissatisfaction with physical appearance had negative impacts on adolescents’ participation in physical activity (Reece et al. 2015; Alm et al. 2008; Zabinski et al. 2003). Further, medical conditions (Porter et al. 2010), excess weight (Zabinski et al. 2003), fatigue (Peeters et al. 2012; Daley et al. 2008), injury (Lindelof et al. 2012; Peeters et al. 2012; Trout & Graber 2009), physical discomfort (e.g., joint pain, shortness of breath) (Zabinski et al. 2003; Daley et al. 2008; Trout & Graber 2009), and a lack of energy (Porter et al. 2010) limited physical activity. Some adolescents believed that physical activity was too hard (Zabinski

et al. 2003) and that exercise was boring (Daley et al. 2008), whereas others stated not being in the mood (Peeters et al. 2012). Many lacked the motivation to exercise (Porter et al. 2010; Lindelof et al. 2010; DeSmet et al. 2014; Zabinski et al. 2003; Peeters et al. 2012; Daley et al. 2008) and derived little pleasure from being physically active (Porter et al. 2010; Lindelof et al. 2010; DeSmet et al. 2014; Lindelof et al. 2012; Zabinski et al. 2003).

“It’s difficult to explain, I just don’t like it (physical activity).” (Lindelof et al. p. 118)

Learned helplessness was a common barrier to being physically active (Trout et al. 2008); negative experiences from participating in sports during childhood shaped adolescents’ perceptions of and decisions to participate in sports in later years (Lindelof et al. 2012). For instance, many adolescents stopped making an effort because they had previous failures (Curtis 2008) or were traumatized from previous experiences (Trout & Graber 2009). Similarly, adolescents believed that they would perform poorly in physical education class due to their weight, which led them to exert lower efforts in this setting (Trout & Graber 2009).

“I think the weight caused [failure in physical education class]. Because I was overweight, I didn’t want to make an effort. I didn’t want to try because I knew I wouldn’t be good at it.” (Trout & Graber p. 283)

This perceived lack of competence and skill in physical activity (Lindelof et al. 2010; Lindelof et al. 2010; Zabinski et al. 2003; Daley et al. 2008) led to changes in the types of activities that they performed (Lindelof et al. 2012). Others simply reported that they did not prefer to be

physically active, describing themselves as inactive (Lindelof et al. 2012) and lazy (Reece et al. 2015; Lindelof et al. 2012; Dalet et al. 2008).

“I’m doing nothing (physical activity), well I walk up the stairs at home but we live on the ground-floor, so, it’s only 3 steps.” (Lindelof et al. p. 117)

Some adolescents appeared to relate physical activity with exercise specifically (e.g., going to the gym or for a run) vs. general activities (e.g., bike riding, walking) (Lindelof et al. 2010), so they were less likely to engage in such activities. This lack of knowledge extended to exercise initiation in general (Alm et al. 2008; Zabinski et al. 2003).

“I want to start exercising, but I don’t know what exercises to do.” (Alm et al. p. 282)

Logistics

Adolescents with obesity claimed that a lack of time limited their participation in physical activity (Lindelof et al. 2012; Zabinski et al. 2003; Peeters et al. 2012). They indicated a number of factors were responsible, including academic commitments (Zabinski et al. 2003; Peeters et al. 2012; Daley et al. 2008), difficulties with exercising after school (Daley et al. 2008), and jobs and household chores (Peeters et al. 2012). However, some adolescents disclosed that they reported a ‘lack of time’ as an excuse (Daley et al. 2008).

“It’s not opportunity. I probably could, somehow, fit it in, but it’s just, I really can’t be bothered. I want to, but actually, I don’t at the same time. It’s like, I must go to the gym, and then I don’t bother.” (Daley et al. p. 815)

Interpersonal

Family and social network

Parents' unsupportive behavior (*e.g.*, lack of appropriate role modelling) (Lindelof et al. 2010; Lindelof et al. 2012) appeared to discourage adolescents with obesity from being physically active, as did the former's lack of active participation (Alm et al. 2008).

Adolescents' behaviors were also influenced negatively by their peers (Alm et al. 2008); many of their friends were not physically active (Zabinski et al. 2003), were absent in the neighborhood (Alm et al. 2008), or had unhealthy exercise habits that they did not want to emulate (Alm et al. 2008). Both previously (in childhood) and currently (in adolescence), adolescents reported being bullied and teased by their peers while participating in sports (Lindelof et al. 2010; DeSmet et al. 2014; Curtis 2008; Zabinski et al. 2003), which discouraged their participation (DeSmet et al. 2014) or led them to change activities (Lindelof et al. 2010) or hold negative perceptions of physical education at school (Curtis 2008).

Being visible to others while physically active emerged as a factor that limited physical activity (Zabinski et al. 2003; Trout & Graber 2009). For instance, adolescents revealed greater concern about being seen by their peers than they did about the type of activity or their performance, which they felt put their weakness (*e.g.*, lack of skills, slowness) and weight status on display for others to judge (Curtis 2008; Trout & Graber 2009). They were uncomfortable changing clothes in front of their leaner peers because they felt that they would be ridiculed for their appearance (Trout & Graber 2009). Girls, in particular, reported being embarrassed about wearing revealing workout clothing (*e.g.*, shorts), especially around males (Alm et al. 2008). For these reasons, adolescents avoided crowded gyms (Peeters et al. 2012) and physical education classes, which they considered too public (Trout & Graber 2009). In lieu of being active in more public settings, adolescents favored exercising in private or with a friend (Trout & Graber 2009).

“I don’t really go to gyms. At my mom’s house, I have a basketball court. When I work out and I do stuff, I usually like to do it with my cousin or by myself... because then I don’t have to prove nothing to nobody. I do what I can do.” (Trout & Graber, p. 279)

Logistics

Parents’ busy work schedules limited the time that they spent on exercise with their adolescents (Porter et al. 2010), who also had social obligations (*e.g.*, obligations to family/friends [Peeters et al. 2012; Daley et al. 2008], social activity [Peeters et al. 2012]) that deterred them from being physically active.

Environmental

Access and resources

In the exercise context, adolescents with obesity considered the lack of access to specialized equipment (Lindelof et al. 2012; Zabinski et al. 2003) a barrier. A lack of transportation options, especially in relation to parental support and assistance, limited adolescents’ access to gym facilities and impeded their participation in exercise (Porter et al. 2010). Those with limited financial resources had difficulties securing a membership to the local gym, which resulted in less structured physical activity (Alm et al. 2008).

Natural environment

In a number of studies, there was a perceived decreased engagement in physical activity due to poor weather (*e.g.*, rain, heat) (Lindelof et al. 2012; Zabinski et al. 2003; Peeters et al. 2012; Daley et al. 2008).

School environment

While some adolescents with obesity believed that insufficient time was dedicated to physical education in school (Alm et al. 2008), others viewed physical education as detrimental to their social and emotional health due to concern about visibility by peers (Trout & Graber 2009).

Social environment

A lack of convenient places to be active (Zabinski et al. 2003) was reported as a barrier to exercising. Comparably, a major reason for not exercising, especially for girls, was a perceived lack of neighborhood safety (Porter et al. 2010; Alm et al. 2008).

“I need someone to walk with me. My mom doesn’t want me walking around by myself. She says that she doesn’t trust the guys in the neighborhood.” (Alm et al. p. 281)

Enablers – Nutrition:

Individual

Biological and cognitive factors

Adolescents with obesity considered taste before consuming healthy foods and claimed that healthy foods need to be tasty to enable healthy eating (Watts et al. 2015).

Interpersonal

Family, professional, and social network

Adolescents with obesity desired dietary support provided by their families to be multifaceted. On the one hand, some adolescents preferred emotional, motivational, or verbal support from family members, including parents and siblings (Watts et al. 2015; Pratt et al. 2015; Alm et al. 2008),

while others described a preference for active participation by family members to enable healthy eating (Watts et al. 2015; Pratt et al. 2015; Alm et al. 2008). In addition to healthy food modelling, enablers of change included asking adolescents for input on foods to purchase and family meals (Watts et al. 2015; Pratt et al. 2015), cooking at home (Pratt et al. 2015), and eating together (Pratt et al. 2015). Restrictions imposed by parents around eating were favorable in limiting consumption of less healthy food (Watts et al. 2015). Some adolescents were inclined to eat better following parental cues (*e.g.*, triggering feelings of guilt through comments or facial expressions) (Watts et al. 2015).

“My mom will walk up and... sigh and make stupid faces at me... my parents, they make it quite obvious that I’m not healthy, so it’s sort of a negative way of pushing me to eat well.”
(Watts et al. p. 3282)

Enrollment in a weight management program or intervention was considered helpful by adolescents. The support that they received increased their awareness of the quantity and quality of the foods that they ate (Reece et al. 2015; Lane-Tillerson et al. 2005; Daley et al. 2008), calories (Lane-Tillerson et al. 2005), as well as other food-related behaviors including frequency of, speed of, and compulsive eating (Hoerr & Nelson 1988).

“... my mom and coach believe in me. They are great and supportive. I need the support to keep me going.” (Alm et al. p. 281)

Within the context of text messages that were a part of a weight management program, adolescents’ favorite messages related to meal suggestions and recipe ideas (Woolford et al. 2016).

Delivering this information in this manner helped them to remember to make healthy choices and a maintained focus on weight management (Woolford et al. 2016).

Two studies described active participation by peers as an enabler to healthy eating (Pratt et al. 2015; Alm et al. 2008). More specifically, adolescents valued adopting healthy eating practices with others, such as helping with portion control and sharing food (Pratt et al. 2015).

Environmental

Home environment

Having readily available healthy food choices at home (e.g., hard-boiled eggs, pre-cut fruits and vegetables) were considered convenient by adolescents with obesity (Lindelof et al. 2010; Watts et al. 2015; Alm et al. 2008), as were home-cooked meals (Watts et al. 2015).

“Most of what’s in there is relatively healthy on purpose. So when we look for something to eat, we’ll get... vegetables or... fruits are on the table already. Like, as I said earlier... it’s faster... than to try and find something that’s not as healthy.” (Watts et al. p. 3282)

Enablers – Physical activity:

Individual

Cognitive factors

In one study (Peeters et al. 2012), some adolescents with obesity were driven to be physically active by enjoyment, the desire to achieve their goals, and intrinsic motivation.

“I could see the benefits, like my heart rate going down, things like that, it was good to know that it was making me more healthy and I enjoyed it really.” (Daley et al. p. 814)

Interpersonal

Family, professional, and social network

Active participation (*e.g.*, exercising together) (Pratt et al. 2015; Alm et al. 2008) by and support (*e.g.*, encouragement, motivation to exercise) (Lindelof et al. 2010; Pratt et al. 2015; Peeters et al. 2012) from family members facilitated physical activity for adolescents with obesity.

Support from professionals was viewed as an enabler to engage in physical activity (Reece et al. 2015). Adolescents benefited from both direct guidance (*e.g.*, realizing that they underestimated their physical activity capabilities) (Daley et al. 2008) and the structure of weight management programs that were led by professionals (*e.g.*, engaging in specific amounts of exercise, increasing exercise) (Lane-Tillerson et al. 2005).

One study described active participation by peers (*e.g.*, exercising together) as an enabler to physical activity (Alm et al. 2008). In another, adolescents had specific criteria as to whom they desired active participation from; for example, while some disliked being active with their leaner peers, others had more positive perceptions of doing activities with their peers who also had excess weight or with older individuals (Trout & Graber 2009). When asked about how they thought their peers at the weight loss camp perceived them, one participant said:

“Everybody here’s like family.... They always push each other [when running on the track] because we all know how it was to be made fun of.... If the world could be like this, I’d love it.” (Trout & Graber, p. 280)

Environmental

Access and resources

Because of their inability to drive, adolescents with obesity indicated practical support from parents to be helpful, such as providing transportation to a gym facility (Pratt et al. 2015; Peeters et al. 2012).

School environment

In contrast to some adolescents with obesity who mentioned that negative experiences in physical education left a harmful influence on their emotional health, others said that they enjoyed physical education because they learned new activities and acquired new skills, which made them eager to become better in sports (Trout & Graber 2009).

Policy

Access and resources

Adolescents with obesity touched on policy in only one study, where they explicitly stated that having a free gym membership would help them to be more physically active (Peeters et al. 2012).

Enablers – Sedentary behavior:

Individual

Cognitive factors

In a study by Porter *et al.* (2010), adolescents with obesity described a preference for sedentary activities, including playing video games, using the computer, and watching television (Porter et al. 2010), all of which were barriers to being physically active (Peeters et al. 2012).

“... If I get home and change and watch TV or go on the internet, like there’s no way I’m going to the gym.” (Peeters et al. p. 655)

This partiality towards sedentary behavior was portrayed in one study (Lindelof et al. 2010), where adolescents were readily inclined to be sedentary at the mention of potential benefits of sedentary behavior (*i.e.*, the number of calories burnt while watching television). Similarly, adolescents seemed to also believe that only vigorous activity was useful for weight management (Lindelof et al. 2012). This misperception may have reinforced adolescents' sedentariness.

"I know it would be better if I rode my bike to school, but I rarely raise my pulse rate on these rides... The gym or a run is much better if I want to lose weight." (Lindelof et al. p. 117)

Consultation with adolescent and professional stakeholders

A total of 5 adolescents with obesity and 15 professionals (n=11 health care providers; n=4 researchers) completed our survey. All professionals agreed with the framework used to present our findings, and none recommended any additional studies for inclusion in our review. In line with our review, professionals highlighted the importance of the family unit and peers in the management of obesity and noted that they could either be barriers or enablers to a healthy lifestyle depending on the circumstances. Further, they cited a lack of motivation as a barrier to leading a healthy lifestyle and emphasized the importance of acknowledging and addressing mental health issues before attempting to make lifestyle changes. Interestingly, another key point that emerged from our consultation was the normalization of overweight and obesity in today's society as a barrier to achieving a healthy lifestyle. Healthy sedentary behaviors and sleep habits were only mentioned by a minority of professionals as contributors to a healthy lifestyle for adolescents.

In contrast to professionals' views and to findings from our review, most adolescent stakeholders considered their social network (*e.g.*, peers) as only barriers to having a healthy

lifestyle. In agreement with our review, mindless eating and the appeal of junk food inhibited most adolescents from having a healthy diet, while family support was considered by all as an enabler to living a healthy lifestyle. The availability of media (*e.g.*, Internet, video games) was also reported by all adolescents as an enabler to sedentariness. Lastly, sleep was again an unpopular point of discussion; only one adolescent related difficulty sleeping to her mental state and time spent on the computer.

2.5. Discussion

Our scoping review aimed to provide a comprehensive summary of the perspectives of adolescents with obesity regarding barriers to and enablers of undertaking or sustaining healthy lifestyle behaviors related to nutrition, physical activity, sedentary behavior, and sleep. Our synthesis of 17 studies, including qualitative, quantitative, and mixed-methods study designs, identified factors primarily related to nutrition and physical activity behaviors at several levels of influence. Across studies, barriers to healthy nutrition (*e.g.*, emotional and mindless eating, family influential behavior) and physical activity (*e.g.*, lack of motivation, physical challenges, concern about visibility) were mainly linked with individual and interpersonal factors, compared with enablers (*e.g.*, family, social, and professional support) that were concentrated at the interpersonal level. According to our review, there is a knowledge gap with respect to the perspectives of adolescents with obesity on barriers and enablers related to sedentary behavior and sleep as well as environmental and policy levels of influence.

Our findings are generally aligned with the literature on barriers and enablers affecting lifestyle behaviors of healthy-weight adolescents (Shepherd et al. 2006; Jenkins & Horner 2005), which suggests that while certain factors may be potentially exasperated by obesity, similarities in lifestyle behaviors also subsist across the weight spectrum. Notably, emotional and mindless

eating, which were found to be common barriers to healthy eating across studies included in our review, were not identified in studies of healthy-weight adolescents. This highlights the effects that excess weight may have on psychosocial well-being (Small & Ablasca 2016), and potentially, disordered eating behaviors (Hebebrand & Herpertz-Dahlmann 2008), which are known to be a compensatory mechanism triggered by difficult situations (Parsons et al. 1999).

In contrast with adolescents who were more likely to associate healthy foods with the family and fast foods with pleasure and their social circle (Shepherd et al. 2006), adolescents with obesity were in agreement with the latter, but often commented that the family environment was a hindrance to their success in behavior change. This was due to unhealthy dietary practices implemented at home, suggesting parental adaptation to the macroenvironment. Naturally, data have shown that adolescents, albeit more independent, consume approximately 60% of their diet at home (Advisory Committee 2015). Adolescents' developed responses to particular foods and their food intake patterns also stem from familiarity, which is largely a reflection of the home environment. Justifiably, support derived from the family was perceived as necessary for both populations to enable healthy eating (DeSmet et al. 2014; Alm et al. 2008; Shepherd et al. 2006). Given that the family is considered the food provider and has the ability to influence food-related behaviors (*e.g.*, attitudes, preferences, values), the family's role of mediating adolescents' dietary patterns is pivotal to undertake and sustain healthy lifestyle behaviors (Story et al. 2002), especially in the early ages.

Although the social network exerts its uttermost influence in the context of conformity to group norms during adolescence (Steinburg 1996), as reciprocated by adolescents included in our review, empirical evidence has not revealed strong association between peer influence and dietary behaviors (French et al. 1999). This could be explained by adolescents' positioning between two opposing ends (refutation of exterior influence due to supposed independence), which may render

peers' influence on dietary patterns indirect rather than direct (Story et al. 2002). Nonetheless, healthy role modelling by the peers is certainly invaluable for adolescents with obesity to practice healthy habits in the social environment, and effective measures and resources (*e.g.*, a support network) are needed to support this adaptation. Two recent reviews on barriers to physical activity (Martins et al. 2015; Rees et al. 2006) showed that some barriers were not limited to adolescents with obesity, but were also experienced by non-overweight adolescents, namely a lack of motivation (Martins et al. 2015; Rees et al. 2006), a perceived lack of skills (Rees et al. 2006), body self-consciousness (Martins et al. 2015; Rees et al. 2006), concern about visibility (Martins et al. 2015; Rees et al. 2006), conflicting interests (Martins et al. 2015; Rees et al. 2006), family and social influences (Martins et al. 2015), and negative perceptions about or experiences in PE (Martins et al. 2015; Rees et al. 2006). Others factors, however, such as physical discomforts (*e.g.*, knee pain, shortness of breath) were not generalizable to the healthy-weight adolescent population, highlighting the impact that excess weight can have on the body and its tolerance to activity.

Some enablers to physical activity among healthy-weight adolescents corresponded with findings from our review; for instance, family and social support (Martins et al. 2015; Rees et al. 2006). In contrast, some of these healthy-weight adolescents considered physical activity as a medium by which to enjoy their time (Martins et al. 2015; Rees et al. 2006), feel accomplished and confident (Martins et al. 2015), receive social benefits (Martins et al. 2015; Rees et al. 2006), relieve stress (Rees et al. 2006), improve general health (Martins et al. 2015), and show off their skills (Rees et al. 2006). These enabling factors were not experienced by most adolescents with obesity in this review whose psychosocial vulnerability is magnified and who may not view health status as highly.

In studies included in our review, some comments stated by adolescents with obesity stemmed from a lack of knowledge; for example, their belief that an inactive lifestyle does not

have a strong influence on weight compared with vigorous exercise. Previous research has shown that knowledge alone is arguably not causative of behavior change (Fabrigar et al. 2006). This is supported by multiple behavior theories (*e.g.*, Theory of Planned Behavior [Ajzen 1985], Social Cognitive Theory [Bandura 1998]), where knowledge is merely a minor instigative factor in the behavior change pathway. Nonetheless, knowledge remains necessary to underpin behavior change, and can be especially effective when combined with behavior change strategies such as goal-setting and motivational interviewing.

In addition to individual factors, it is proposed that the process of behavior change initiation-maintenance is cued by environmental stimuli (Mackenbach et al. 2014). The environment encompasses required resources by an individual and can influence active self-regulation; if not conducive, behavior change is less likely to be maintained (Mackenbach et al. 2014), so interventions at the environmental and policy levels are of value in the behavioral context of change. Our review did not retrieve substantial information relating to factors positively or negatively affecting behavior change at these levels. This is likely owing to the fact that individuals tend to not delve into macro-level factors on all facets of behavioral determinants (Gee 1999; Patton 1990). Further, aside from the one adolescent in our stakeholder consultation, we did not retrieve any articles commenting on barriers to and enablers of healthy sleep patterns from the perspectives of adolescents with obesity. Since sleep is intertwined with other lifestyle factors, its impact on weight cannot be disregarded. With these gaps in mind, future research on the corresponding barriers and enablers is needed, allowing external parties (*e.g.*, health care personnel, policy makers) to eliminate barriers and capitalize on enablers.

Limitations of this review must be acknowledged. First, our findings are dependent on information obtained from individual studies, each of which have their own methodological characteristics (*e.g.*, different BMI measures, studies with exclusively female participants) and

potential drawbacks (*e.g.*, insufficient reflexivity by authors leading to lower study quality, lack of specificity in results). For authors of qualitative studies, it is recommended to follow the COREQ standards of reporting (*e.g.*, making the interview guide available) (Tong et al. 2007) to facilitate the understanding and synthesis of the data. Second, as with all reviews, retrieved studies were defined by our search criteria, which if too sensitive, may have reduced precision by not capturing all relevant studies or omitted certain article selections (*e.g.*, published, but non-indexed articles in Medline). Third, although we included studies in which participants' mean ages coincided with our age range criteria limits, this does not guarantee that some barriers or enablers were not reported by children. Lastly, since this review focused on treatment-seeking adolescents with obesity, it is unknown whether our findings are fully generalizable to the unengaged obese population.

2.6. Conclusions

In conclusion, adolescents with obesity reported barriers and enablers at and beyond their control. This underscores the value of multi-level approaches (*e.g.*, acknowledging external sources of influence in addition to individual factors when designing behavior interventions) to help eliminate barriers, enhance enablers, and support adolescents in living a healthy lifestyle. Because some barriers and enablers were unique to adolescents with obesity, it is important for these approaches to be tailored and targeted to adolescents with obesity. Lastly, the literature was scarce in relation to sedentary behavior and sleep as well as environmental and policy levels of influence on lifestyle behaviors. These knowledge gaps will be explored qualitatively in future research with adolescents with obesity in weight management.

Table 2.1. Search strategy for Medline (Ovid)

#	Searches
1	exp Overweight/
2	(overweight OR obes*).ti,kw. OR overweight.ab. /freq=2 OR obes*.ab. /freq=2
3	1 OR 2
4	(adolescen* OR teen* OR high school OR youth OR (young adj2 (people OR person* OR boy OR boys OR girl*))).ti,ab,kf.
5	3 AND 4
6	limit 3 to “adolescent (13 to 18 years)”
7	5 OR 6
8	Weight Reduction Programs/
9	Weight Loss/ OR (weight adj3 (loss OR lose OR manag* OR reduc* OR control)).ti,ab,kf.
10	(program* OR clinic OR clinics OR school OR schools OR community OR communities).ti,ab,kf.
11	9 AND 10
12	8 OR 11
13	(barrier* OR obstacle* OR hurdle* OR hindrance* OR impediment* OR preventer* OR challenge* OR disincentive* OR incentive* OR motivat* OR enabler* OR facilitator* OR belief* OR perception* OR perceiv* OR perspective* OR view* OR attitude*).ti,ab,kf.
14	exp Attitude to Health/
15	13 OR 14
16	7 AND 12 AND 15
17	limit 16 to yr=”1980-Current”
18	limit 17 to (english or french)

Table 2.2. Descriptive characteristics of the studies included in our scoping review (n=17)

Author(s), year of publication	Setting	Study samples & characteristics¹	Study design & data collection method	Aim(s) of the study	Study quality
Alm et al. 2008	Clinical	<i>Mean age:</i> 15.3±1.3 years <i>Sex:</i> male and female <i>Weight status:</i> obese <i>Sample size:</i> 18	Qualitative; semi-structured individual interviews	To examine the reasons for managing weight, to explore the barriers and enablers to attaining behavior goals, and to evaluate the role of a behavior coach in goal-setting among obese inner-city adolescents in a weight management program	***
Curtis 2008	School	<i>Age range:</i> 10–17 years <i>Mean age:</i> ~13–14 years <i>Sex:</i> male and female <i>Weight status:</i> obese <i>Sample size:</i> 18	Qualitative; closed- and open-ended focus groups and individual interviews	To explore how the focus on healthy eating, physical activity, and emotional health and bullying within an obesity intervention program impacts adolescents with obesity	****
Daley et al. 2008	School	<i>Age range:</i> 11–16 years <i>Mean age:</i> 13.0±1.7 years <i>Sex:</i> male and female <i>Weight status:</i> obese <i>Sample size:</i> 25	Qualitative; semi-structured interviews	To explore the experiences of adolescents with obesity participating in an exercise therapy intervention	***
DeSmet et al. 2014	Clinical	<i>Age range:</i> 11–18 years <i>Mean age:</i> 15.3±1.7 <i>Sex:</i> male and female <i>Weight status:</i> severe obesity <i>Sample size:</i> 102	Quantitative, case-control and cross-sectional; closed-ended questionnaires	To assess the influence of traditional and cyber-victimization on psychosocial distress and barriers to healthy lifestyles among adolescents with severe obesity	****
Hoerr & Nelson 1988	School	<i>Age range:</i> 12–15 years <i>Mean age:</i> 13.6±1.0 years	Mixed-methods, longitudinal; closed- and open-ended evaluations at 2 time	To develop, implement, and evaluate a weight control intervention program for adolescents with obesity	***

		Sex: female Weight status: obese Sample size: 12	points (following intervention and at follow-up)		
Lane-Tillerson et al. 2005	Clinical	Age range: 13–17 years Mean age: 15 years Sex: female Weight status: overweight and obese Sample size: 18	Mixed-methods; pre- and post-intervention measurements, open-ended questionnaires	To evaluate the effectiveness of a behavior modification weight loss/management nursing intervention from the perspectives of adolescents with obesity and their mothers and to test the theory that effective nursing is likely since nurse-client interactions lead to the attainment of goals	**
Lindelof et al. 2012	Community	Age range: 14–16 years Sex: male and female Weight status: overweight and obese Sample size: 15	Qualitative, longitudinal; participant observations and semi-structured group interviews at 3 time points (beginning, middle, end)	To longitudinally explore attitudes toward physical activity of adolescents with obesity and to investigate the origins behind these attitudes as well as their influence leading an active lifestyle	****
Lindelof et al. 2010	Community	Age range: 14–16 years Sex: male and female Weight status: obese Sample size: 15	Qualitative; field observation and semi-structured group interviews	To explore the views of adolescents with obesity (and their parents) on their condition and on weight loss barriers and motivational factors	****
Peeters et al. 2012	Community	Age range: 14–18 years Mean age: 16.7±1.6 years Sex: male and female Weight status: overweight and obese Sample size: 44	Qualitative, longitudinal randomized controlled trial; semi-structured individual interviews at 3 time points (beginning, middle, end)	To examine the experiences of adolescents with obesity on program components, outcomes, and preferences	***

Porter et al. 2010	Clinical	<i>Age range:</i> 11–18 years <i>Mean age:</i> 13.7 years <i>Sex:</i> male and female <i>Weight status:</i> obese <i>Sample size:</i> 135	Qualitative; semi-structured individual interviews	To explore the psychosocial well-being of adolescents with obesity, the barriers they encounter in regards to exercise and nutrition, and to determine whether the previous factors are associated with level of compliance in the program	***
Pratt et al. 2015	Community	<i>Mean age:</i> 13.2±1.7 years <i>Sex:</i> female <i>Weight status:</i> obese <i>Sample size:</i> 10	Mixed-methods; questionnaires and focus groups	To assess the views of African-American female adolescents with obesity in regards to healthy lifestyle and obesity factors impacted by parents and family associations	***
Reece et al. 2015	Community	<i>Age range:</i> 11–16 years <i>Mean age:</i> 14.0 years <i>Sex:</i> male and female <i>Weight status:</i> overweight and obese <i>Sample size:</i> 12	Qualitative; semi-structured individual interviews and focus groups	To explore the experiences of adolescents with obesity and their perspectives towards obesity treatment	***
Trout & Graber 2009	Community	<i>Age range:</i> 13–18 years <i>Mean age:</i> 15.2 years <i>Sex:</i> male and female <i>Weight status:</i> overweight (according to CDC labels in 2009) <i>Sample size:</i> 12	Qualitative; open-ended individual interviews	To explore the perceptions and experiences of adolescents with overweight or obese in the context of physical education from geographically diverse regions	****
Watts et al. 2015	Home	<i>Age range:</i> 11–17 years <i>Mean age:</i> 14.0±1.9 years <i>Sex:</i> male and female <i>Weight status:</i> overweight and obese <i>Sample size:</i> 22	Qualitative; Photovoice and semi-structured individual interviews	To explore barriers and enablers to healthful eating in the home environment of adolescents with overweight or obesity	***
Woolford et al. 2011	Clinical	<i>Age range:</i> 11–19 years	Qualitative; focus groups	To explore the perspectives of adolescents with obesity on message	****

		<i>Mean age:</i> 14.3 years <i>Sex:</i> male and female <i>Weight status:</i> obese <i>Sample size:</i> 24		content of weight-related tailored text messages	
Woolford et al. 2010	Clinical	<i>Age range:</i> 12–18 years <i>Mean age:</i> 14 years <i>Sex:</i> male and female <i>Weight status:</i> obese <i>Sample size:</i> 20	Mixed-methods; questionnaires, surveys, and semi-structured individual interviews	To test the feasibility and acceptability of tailored text messages among adolescents with obesity	**
Zabinski et al. 2003	Clinical and community	<i>Age range:</i> 13–16 years <i>Sex:</i> male and female <i>Weight status:</i> overweight and obese <i>Sample size:</i> 44	Quantitative; questionnaires	To examine and compare overweight and non-overweight children’s perceived barriers and enablers towards physical activity	***

¹In articles with multiple studies, only data of participants meeting eligibility criteria are included; weight status was based on the terms and definitions used in each study.

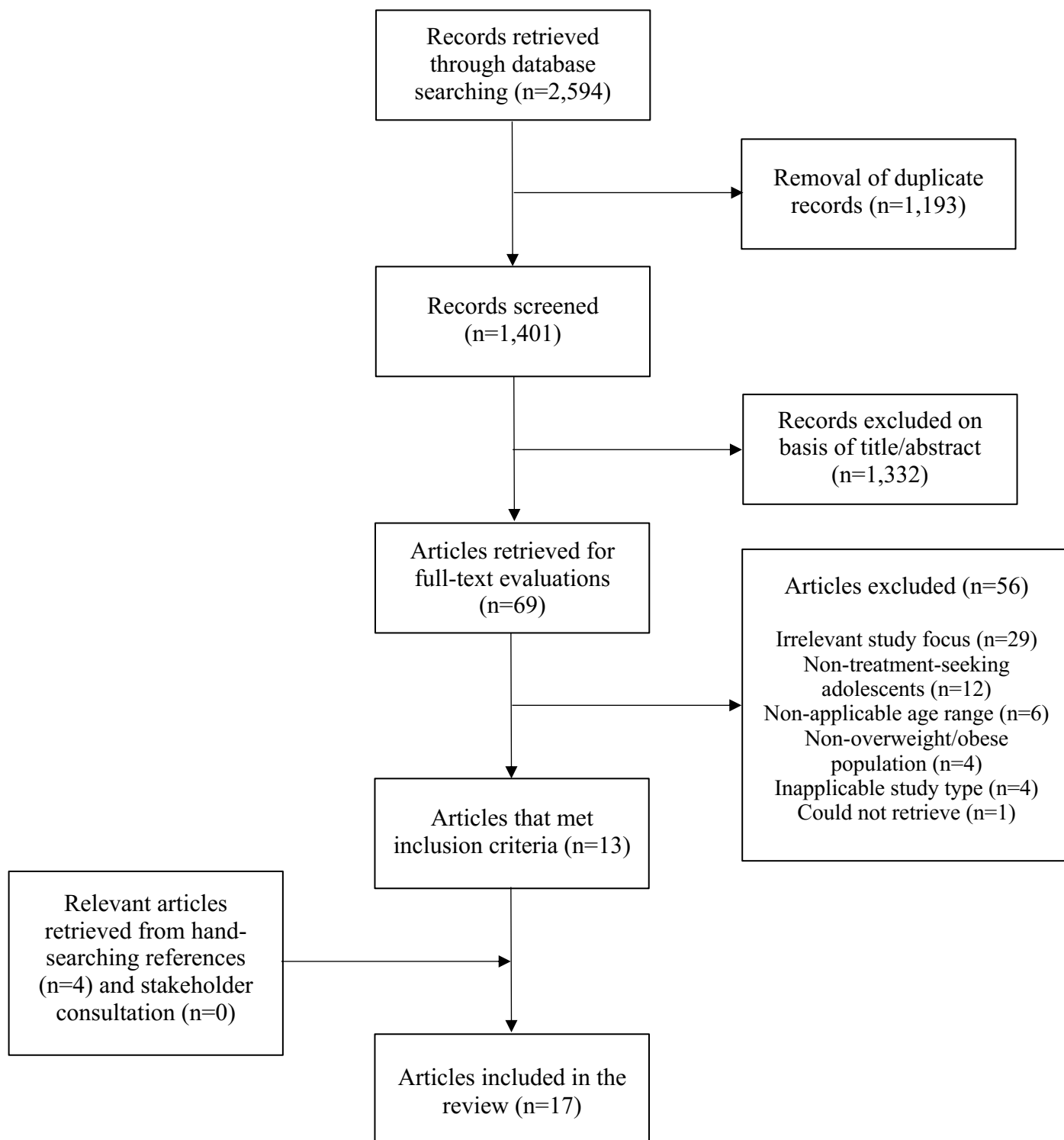


Figure 2.1. Flow diagram illustrating article selection process

Nutrition



Barriers

- | | | |
|--|---|--|
| <ul style="list-style-type: none">• Autonomy and behavior control• Biological and psychological factors• Logistics | <ul style="list-style-type: none">• Family and social network | <ul style="list-style-type: none">• Home environment |
|--|---|--|

Enablers

- | | | |
|--|--|--|
| <ul style="list-style-type: none">• Biological and cognitive factors | <ul style="list-style-type: none">• Family, professional, and social network | <ul style="list-style-type: none">• Home environment |
|--|--|--|

Figure 2.2. Barriers to and enablers of healthy nutrition

Physical Activity



Barriers

- | | | |
|--|---|--|
| <ul style="list-style-type: none">• Autonomy and behavior control• Biological, cognitive, and psychological factors• Logistics | <ul style="list-style-type: none">• Family and social network• Logistics | <ul style="list-style-type: none">• Access and resources• Natural environment• School environment• Social environment |
|--|---|--|

Enablers

- | | | | |
|---|--|---|--|
| <ul style="list-style-type: none">• Cognitive factors | <ul style="list-style-type: none">• Family, professional, and social network | <ul style="list-style-type: none">• Access and resources• School environment | <ul style="list-style-type: none">• Access and resources |
|---|--|---|--|

Figure 2.3. Barriers to and enablers of healthy physical activity

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Chapter 3

Kebbe M, Perez A, Buchholz A, McHugh TLF, Scott SD, Richard C, Mohipp C, Dyson MP, Ball GDC. Barriers and enablers for adopting lifestyle behavior changes among adolescents with obesity: a multi-centre, qualitative study. PLoS ONE 2018; 13: e0209219.

3.1. Abstract

Background. Many adolescents with obesity do not meet recommendations for nutrition, physical and sedentary activities, and sleep habits, all of which can influence weight management.

Objective. To explore barriers and enablers that influenced the adoption of lifestyle behavior changes among adolescents receiving multidisciplinary clinical care for pediatric weight management.

Methods. In this multi-center, qualitative description study, we used purposeful sampling to recruit 13–17-year-olds (body mass index [BMI] $\geq 85^{\text{th}}$ percentile) enrolled in one of two pediatric weight management clinics in Edmonton and Ottawa, Canada. Adolescents participated in one-on-one, in-person, semi-structured interviews in English or French. Interviews lasted 30–60 minutes, were audio-recorded, transcribed verbatim, and managed using *NVivo 11*. Data were triangulated using transcripts, field notes, and memos and analyzed by two independent researchers using inductive, semantic thematic analysis.

Results. In total, 19 adolescents (12 Anglophone and 7 Francophone; 15.1 ± 1.7 years old; 3.5 ± 0.6 BMI z-score; n=11 female; n=13 Caucasian) participated. Adolescents reported diverse barriers to and enablers of healthy nutrition, physical and sedentary activities, and sleep habits, which we organized into the following themes: physiological mechanisms and physical health status, self-regulation for behavior change, controllability and competence beliefs, social relationships and interactions, and accessibility to and availability of opportunities for lifestyle enhancement. Across these themes and lifestyle areas, we identified three shared barriers and/or enablers, including the

degree of controllability, the impact of mental health, and social pressures related to weight management.

Conclusions. This research provides evidence that can be used to tailor interventions and health services delivery, including a focus on psychosocial well-being, to support adolescents with obesity in making and maintaining lifestyle behavior changes.

3.2. Introduction

Recent international data point to a ten-fold increase in the prevalence of pediatric obesity over the last four decades (Abarca-Gómez et al. 2017). The complexity of obesity is particularly apparent during adolescence; adolescents with obesity tend to experience a variety of psychological and social problems, including increased risk for depression (Mannan et al. 2016) and low self-esteem and quality of life (Griffiths et al. 2010) as well as difficulties finding a partner (Dotson 2014) and delayed childbearing in adulthood (Frisco and Weden 2013). Adolescent obesity is also concerning because it is associated with a higher risk of developing long-term adverse health consequences such as type 2 diabetes and cardiovascular disease (Skinner et al. 2015) and is likely to be maintained in adulthood (Simmonds et al. 2015). This extended exposure to obesity can have a negative impact on individuals as well as families, the health care system, and society.

Adolescents can derive health benefits from making healthy lifestyle and behavior changes to prevent and manage obesity (Styne et al. 2017). To help achieve these outcomes, adolescent-specific lifestyle recommendations have been developed, which include 6 to 8 daily servings of fruits and vegetables (Health Canada, 2016), 60 minutes of daily moderate-to-vigorous physical activity (Canadian Society of Exercise Physiology, 2016), no more than 2 hours of daily leisure-time sedentary activity (Prauthi et al. 2016), and 8 to 10 hours of sleep per night (Paruthi et al. 2016). In Canada, a number of weight management programs exist (Ball et al. 2011) in which multidisciplinary teams deliver lifestyle and behavior therapeutic interventions using a variety of behavior change techniques (*e.g.*, motivational interviewing [Pujalte et al. 2017], cognitive behavioral therapy [Wilfley et al. 2011]). There is growing evidence to support the effectiveness of lifestyle-based interventions for positive changes in weight, especially those that combine behavioral, diet, and physical activity components (Al-Khudairy et al. 2017). Regardless of any weight change, adopting and maintaining a healthy lifestyle is a good outcome since it has been

shown to lead to meaningful improvements in cardiometabolic risk factors, including low-density lipoprotein cholesterol, triglycerides, fasting insulin, and blood pressure (Ho et al. 2012). Despite the advantages, many adolescents with obesity do not meet lifestyle behavior recommendations (Ball et al. 2008) and are at higher risk than their younger peers to drop out of weight management interventions (Dhaliwal et al. 2014). This may be a result of experiencing less success in weight management (Wiegand et al. 2014). A guiding principle in pediatric weight management includes family centeredness (Ball et al. 2011), which acknowledges the consistent role played by parents in supporting adolescents' health and wellbeing. However, adolescents' perspectives may sometimes go unnoticed or be taken for granted (Kebbe et al. 2019), so to meet the needs of adolescents with obesity in weight management, it is imperative to gain a better understanding of their experiences in trying to change their lifestyle behaviors, especially with respect to the barriers and enablers that influence their ability to make changes.

In a recent review, we synthesized adolescents' barriers to and enablers of lifestyle behavior changes to manage pediatric obesity (Kebbe et al. 2017). We identified and mapped a range of barriers and enablers for nutrition and physical activity habits across the Social Ecological Model; however, evidence is still limited. For example, most studies included in this review *(i)* were limited to adolescents living in the United States, *(ii)* included perspectives of Anglophones exclusively, *(iii)* focused on nutrition and physical activity with little attention given to other habits known to influence weight and health, including sedentary activity and sleep, and *(iv)* seldom examined impeding and enabling factors of lifestyle changes within multidisciplinary clinical settings designed to help adolescents in weight management. To address these knowledge gaps, we designed our study to explore barriers to and enablers of adopting lifestyle behavior changes. We sought to address the following question: which barriers and enablers exist for healthy nutrition, physical and sedentary activities, sleep habits, and mental health among Anglophone and

Francophone adolescents with obesity seeking multidisciplinary clinical care for weight management?

3.3. Methods

Study design

This multi-center, qualitative study was conducted from July 2017 to January 2018. We adhered to principles of patient-oriented research, a continuum of research that engages patients as partners and focusses on patient-identified priorities, with an overarching goal of translating knowledge to the point of care to improve patient outcomes (Strategy for Patient-Oriented Research 2014). It was also guided by qualitative description, a method that draws on components of naturalistic inquiry, which is well-suited to behavior research and does not require detailed interpretive interference; rather, it gathers direct, practical insights from participants to develop a description of a phenomena and stay close to the data and surface of participants' words (Sandelowski 2010). We conducted this study in Canada's two official languages to gain a better representation of adolescent experiences from both Anglophone and Francophone populations. Since we believe language to be a social construction, we followed a constructivist paradigm (Guba and Lincoln 1994), which views reality as being socially constructed and multifaceted (relativist ontology) and places the researcher in an active role for generating data dependent on their understanding and knowledge of the world (subjective epistemology). We operationalized barriers and enablers as factors that, according to adolescents, prevented or supported the implementation (defined as *initial adoption*) and maintenance (defined as *continued adoption*) of lifestyle behavior changes. Ethical and operational approvals were granted by human research ethics boards from study sites in Edmonton and Ottawa, namely the University of Alberta, Alberta Health Services, and the Children's Hospital of Eastern Ontario.

Preliminary step – Patient engagement panel

Before initiating data collection, we convened a patient engagement panel (PEP; see Appendix C for agenda and contract) with five adolescents with obesity. Adolescents were purposefully sampled from a local pediatric weight management clinic (Pediatric Centre for Weight and Health [PCWH]; Stollery Children’s Hospital, Edmonton, AB) and invited to attend a ~2h group discussion. Led by MK, the purpose of the PEP was to explore adolescents’ experiences in weight management, generate ideas, and gather feedback on elements of our study, including the scope, interview guide, study material, and logistic factors. Following this consultation process, we finalized several decisions in planning our study, including exploring adolescents’ mental health in relation to lifestyle behavior changes, adopting a more lay approach to our interview guide, providing gift cards with widespread use (*i.e.*, Visa), and not placing a limit on interview length to allow adolescents to express themselves freely.

Participants and recruitment

We completed main data collection for this study at two sites: the PCWH and the Centre for Healthy Active Living (CHAL; Children’s Hospital of Eastern Ontario, Ottawa, ON). Both of these clinics are located in urban areas in Canada, offer long-term, patient- and family-centered, and multicomponent behavioral, dietary, and physical activity clinical care to families of children and adolescents with obesity via multidisciplinary teams composed of pediatricians, dietitians, exercise specialists, nurses, psychologists, and social workers. We used purposeful sampling to recruit adolescents who were (*i*) 13–17 years of age with a body mass index (BMI) $\geq 85^{\text{th}}$ percentile and (*ii*) receiving weight management for ≥ 3 months at the PCWH or CHAL, which helped to ensure that they had spent some time reflecting on their lifestyle behaviors and working with health care providers (HCPs) on weight management. We excluded adolescents presenting with known

developmental disabilities as their experiences in changing their lifestyle habits may have been impacted by their condition(s); to better represent this group of adolescents, there is value in conducting individual research to gain a comprehensive understanding of their perspectives. To help recruit our sample, we displayed recruitment posters at each of the clinic waiting rooms (Appendix B). In addition, administrative, clinical, and research staff identified eligible adolescents and their families from clinic databases, who were then approached by MK or CM in-person or by telephone to gauge interest. We offered interested adolescents a range of dates and times to choose from to participate in our study. All adolescents who completed the interview received a \$25 gift card as a token of appreciation; we chose this monetary amount based on positive anecdotal experience from previous research conducted by our team. To ensure adolescents did not feel coerced to participate in our research, they were made aware of the possibility to withdraw from the study at any point without affecting the treatment they receive at the clinic or their compensation.

Data collection

We invited adolescents to participate in individual, semi-structured interviews (30–60 minutes in length) in either English (PCWH) or French (CHAL). The interview guide (Table 3.1) was informed by current literature and refined with input of the PEP and from members of our research team. The first author (MK) conducted all interviews since she is fluent in English and French and formally trained in qualitative research; she first explained the aims of the study to adolescents, highlighted the right to not answer questions that they did not feel comfortable with, and provided an opportunity for questions. Interviews were digitally-recorded, uploaded to an online and secure file sharing platform (*LabKey*) maintained by the Women and Children’s Health Research Institute (UAlberta), and transcribed verbatim by the *Translation Agency of Alberta*, a group that offers

transcription services in both English and French. In addition to maintaining an audit trail to document study progress, MK prepared field notes and memos immediately after each interview to capture observations beyond those from audio-recordings and aid with theme generation and integration between categories. These data, along with interview transcripts, provided a comprehensive overview of the interview and assisted with triangulation, whereby data were collected from more than one source, coded by two independent researchers, and discussed internally with team members. We collected self-reported demographic and objectively measured anthropometric data of adolescents from medical records before or after the interviews. We also collected in-person self-reported demographic, sociodemographic, and anthropometric data from their parents (for descriptive purposes) before the interviews (Appendix B). We obtained written and informed written consent or assent from parents and adolescents prior to data collection (Appendix B).

Data analysis

We collected and analyzed data on an ongoing basis, informing additional data collection such as the addition and removal of specific probing questions. Once transcribed, we de-identified and checked transcripts for accuracy. In our interviews, we provided adolescents with the opportunity to select their own pseudonyms; otherwise, we selected names that would resonate with them (Grinyer et al. 2002). Pseudonyms over characteristics of sex and age-range were chosen to facilitate following individual narratives (Saunders et al. 2015). We imported and managed our data using *NVivo 11* (QSR, Melbourne, Australia), which we analyzed using inductive, semantic thematic analysis (Braun & Clarke 2006); that is, we identified themes within the explicit meanings of the data. MK and AP independently read and re-read the first five transcripts for familiarization with the data. Both authors independently developed a coding scheme for barriers and enablers,

then applied a refined version to the entire data set with new codes developed iteratively when necessary. The coding tree was organized by topic (*e.g.*, barriers, enablers), root codes (*e.g.*, nutrition, physical activity), and code names (*e.g.*, motivation for change). Codes referring to the same barriers and enablers were grouped into themes and exemplar quotes were chosen to illustrate the developed categories. MK and AP held regular meetings to review and compare codes, themes, and quotes, which were finalized through discussions and refinements with other research members (CR, GDCB). Any discrepancies were resolved by consensus.

Methodological rigor

We used several strategies to ensure methodological rigor, including investigator responsiveness (*e.g.*, ongoing analysis), methodological coherence (*e.g.*, congruence between the research question and method), sampling adequacy (*e.g.*, data saturation), and theoretical thinking (*e.g.*, reconfirming ideas emerging from data in new data) (Morse et al. 2002). MK also examined her own role as a researcher through an ongoing critical reflection, including personal reflexivity (identity, interests, and values), functional reflexivity (nature of the study), and disciplinary reflexivity (field of inquiry) (Wilkinson 1988), and how these characteristics may have shaped the research process and influenced data collection and analysis. For example, MK's own professional orientation and personal interests in health research and life and nutritional sciences may have created certain biases that were brought forth when listening to adolescents' accounts of changing their lifestyle habits. Further, while she empathized with adolescents and was able to diminish power dynamics and establish rapport due to unimportant age differences (*insider* perspective), MK is of normal-weight (*outsider* perspective), which may have hindered her ability to fully understand the efforts required by those with excess weight to adopt healthy lifestyle behaviors.

As she became more immersed in the interviews, however, she progressively gained a better understanding of adolescents' experiences surrounding lifestyle.

We undertook recommended processes for translation in cross-language studies (van Nes et al. 2010; Chen & Boore 2010; Santos Jr et al. 2015; Birbili 2000). First, MK acknowledged how her identity and linguistic stance may have affected study processes and analyses, so once she translated study documents, including consent/assent forms, recruitment scripts, and interview guides, another team member and Francophone health researcher (CR) reviewed and refined these materials. To avoid potential mistranslations for data analysis, MK *(i)* analyzed interview data in the source language, *(ii)* discussed (with CR) decisions made related to data analysis in the source language, and *(iii)* confirmed accuracy of back-translation of concepts, categories, and quotes into the source language (TAA); those involved in the translation processes (MK, CR) reached consensus by discussion. We translated data from French to English to ensure concepts and categories matched between PCWH and CHAL sites and because we planned to publish our results in an English-language journal.

3.4. Results

A total of 19 adolescents participated in our study. Most adolescents were female, Anglophone, Caucasian, lived with severe obesity, and had parents who met criteria for overweight and obesity (Table 3.2). No appreciable differences in regards to interview data were observed across clinics, so we grouped the reported barriers and enablers across lifestyle areas in nutrition, physical and sedentary activities, and sleep; issues related to mental health cut across the other lifestyle areas and themes. Themes included physiological mechanisms and physical health status, self-regulation for behavior change, controllability and competence beliefs, social relationships and interactions, and accessibility to and availability of opportunities for lifestyle enhancement. Across these

themes and lifestyle areas, we identified three common factors that had a positive or negative impact on making healthy lifestyle behavior changes, including the degree of controllability, the impact of mental health, and social pressures.

Nutrition

Self-regulation for behavior change

Adolescents described finding it difficult to change established behaviors. As one adolescent stated, *“I know I wouldn’t make healthy food myself [...] If I made my own food it would just be a bunch of junk food.”* – Bill

Difficulties in healthy eating were especially present for those who reported having anxiety related to food or eating disorders (bulimia nervosa). For example, one adolescent described enjoying food in the moment, which was followed by vomiting either foods or drinks (both more and less healthy options) to avoid weight gain: *“It’s not that it’s like, the having healthy food choices, like a hard thing for me. It’s just the fact that food is a hard thing for me [...] I just think it’s like bad to eat, I guess.”* – Nixy

This can be contrasted with some adolescents whose upbringing focused on healthy eating, predisposing them to preferring the taste of healthier foods. One adolescent described the process of behavior regulation as follows: *“If you grew up from a life of like, just eating junk food and not a lot of healthy food, it’s pretty hard to adjust, and you got to maybe like, you got to do stuff you don’t like, and you have to know you’re not going to like it, but you still have to do it.”* – Bill

Controllability and competence beliefs

A common barrier to a healthy diet was a perceived lack of controllability over eating patterns and preferences (e.g., taste, portion control, mindless eating). As one adolescent stated, *“It’s easier to*

make healthy food choices if you like the food choice. You shouldn't like, force anything into your mouth just to be healthy.” – Bill

Adolescents shared numerous examples to suggest that intrinsic motivation was a common enabler of a healthy diet. Most adolescents shared that change had to come from within themselves, and reported a number of factors that enhanced their motivation, including adequate knowledge of health and nutrition, likeability of the food, setting realistic and gradual goals, and not viewing change as dieting. The following example illustrates this: *“Not thinking of it as a diet because if I think of it as a diet and try to restrict myself, it's like I want it so bad because you're trying to convince yourself in a diet, but if you're in a diet it just makes you want the thing more.” – Daniel*

Social relationships and interactions

Social barriers to healthy eating included a lack of parental involvement in behavior change, low perceived parental confidence in adolescents' ability to change eating habits, and negative parental judgments about adolescents' eating behaviors. For example, some adolescents reported feeling pressured to eat unhealthy foods in response to their parents' or peers' practices and expectations. One adolescent shared her experience: *“Um, I don't like, my Mom is kind of always trying to do her own thing for being healthy eating, so she kind of just switches from like different diets or like plans or whatever and then she like will go and like random baking sprees where she'll bake like all of this unhealthy stuff that's just like packed with sugar and then she won't eat any of it. She just wants everyone else to eat it and you can't not eat it because then she'll get offended.”* She continued: *“My mom a lot, like it bothers me, like bugs me a lot about what I eat, like how much of it I'm eating, and so like, I already kind of like, struggle with those issues myself, like kind of like beating up on myself for it [...] so that like makes it really difficult because then it kind of just*

makes me feel bad and then also creates spite, and so then I end up eating more anyways in order to like spite her.” – Courtney

Adolescents were also subject to direct or indirect peer pressure to conform to social expectations in relation to eating. For example, while some described feeling pressured to eat unhealthy foods in social outings as a means of conformity, others reported being bullied for attempting to eat healthy foods: *“Um, things that are stopping me they’re like sometimes people like to make, uh, fun of me for trying to like eat healthy. They’re like what are you doing? You’re never going to actually be able to eat healthy. Just do it the way you’re doing it right now. And whenever I try to confront someone after they keep telling me to start eating healthy, they tell me it’s nonsense and that they’re never do that to me. So that’s kind of, people are what is stopping me kind of.” – Dipti*

Social enablers of healthy eating included interpersonal support from family members, peers, and HCPs. This support came in the form of encouragement, active participation (*e.g.*, role modeling), availability (*e.g.*, abundance of healthy foods, limited access to unhealthy foods), and accommodation (*e.g.*, premade foods). One adolescent shared the value of home visits as an example in helping to navigate the aforementioned factors: *“Um, we like the one thing that really, really helps is when the dietician and the physical activity nurse who helps you, she when they come to home and because they do home visits as well, so that really helps to manage our time and like that way I don't skip my school and things like those.” – Zaid*

Accessibility to and availability of opportunities for lifestyle enhancement

The affordability, availability, and convenience of unhealthy foods in different settings (*e.g.*, home, school, restaurants) were highlighted as barriers to healthy eating. At the home, some adolescents described being challenged by the availability of unhealthy foods and the lack of

availability of healthy foods. Unhealthy foods were dictated by family member preferences, which adolescents reported having no control over. This visibility of unhealthy foods, coupled with an insufficient abundance of healthy foods at the home, the increased cost of healthy foods, and the presence of unhealthy foods in their surroundings (e.g., school cafeteria, workplace, restaurants) further added to the challenge of healthy eating. This is demonstrated by the following quote: “*So it’s harder to like go to the store, buy an apple, if we don’t have any, and pay for it than it is to just like, I’m just going to grab a bag of chips because they’re about the same price and they taste better or just as good.*” – Daniel

In some households, parents of adolescents ensured that a system was set in place for healthy eating. Adolescents described valuing this approach, which included availability of healthy premade foods at the home and the unavailability of unhealthy foods.

Physical and sedentary activity

Physiological mechanisms and physical health status

Adolescents described multiple reasons for limited physical activity. For instance, adolescents experienced physical discomfort due to a number of factors (e.g., knee pain, feeling tired / lack of sleep, medications taken for mental health). As quoted: “*I think, because I’ve always been bigger, like even when I was younger, I was skinny, but I was well-built. Like, I have big... I’ve got wide shoulders, broad hips, and all that. So, I don’t know. I find running uncomfortable and I’m busy, so when I run it’s uncomfortable.*” – Eliza

Self-regulation for behavior change

Many adolescents attributed their low levels of physical activity to preferential factors (e.g., dislike of organized sports, especially running), and commented broadly on their behavioral regulation:

“Now I realize it’s not really my family stopping me. It’s me. So even though it’s like a bit easier now that I can, I have some opportunities it’s just kind of me stopping myself from going.” – Dipti

When not active, adolescents described a preference to sedentary activity, especially using digital technology, including social media. Adolescents also attributed their sedentary behaviors to their upbringing, lack of parental monitoring, feeling bored, and immediate gratification and enjoyment.

Some adolescents shared numerous examples to suggest that they practiced self-regulation, where they established a set routine for their physical activity, avoided excessive sedentary time, and heightened their chances of participating in physical activity. As one adolescent stated: *“Routine really plays a big role because once you maintain one thing, it stays with you for the rest of your life so yeah.” – Zaid*

Controllability and competence beliefs

In addition to logistical (*e.g.*, lack of time and practice) and personal (*e.g.*, perceived lack of skills) factors, adolescents shared not having control over their mental health, which was reported to be a major barrier to being active. The following quotes reflect this reality:

“Um, anxiety and, uh, kind of just feeling down, it’s, um, kind of plays a huge role I know, because I’m always nervous, I’m always paranoid. That’s the main thing stopping me from going out. And then there’s the depression, which makes me tired all the time and then it makes me lose my reason to do anything. And, um, yeah it kind of just, um, traps me to doing nothing, just staying inside.” – Dipti

“School isn’t really that bad anymore, I guess [...] It just, every day, it seems to get worse for some reason. I don’t really know why, it’s just kind of in my brain.” – Dipti

“Just anxiety in general because sometimes it just makes me not want to get out of bed because the world is a mess and that kind of thing.” – Ace

According to adolescents, and as can be seen by the following quotes, they further lacked control on how to handle their anxiety and depression due to dismissal from parents:

“Um, I have a really low self-esteem so I don’t really, um, love myself that much and I don’t feel loved by others that much, either. So that kind of ties into depression and anxiety because no one loves me anymore, is just kind of screaming in the back of my mind [...] They don’t have the time for me anymore and if I try to tell them [parents] something, they always brush it off like it’s nothing, so.” – Dipti

“I try to bring up the thought of me maybe having anxiety too, really, when ‘it’s nothing, get over it, just stop things for a bit’ and I was like cool! Ha-ha! No.” – Ace

Adolescents also described a perceived lack of control over their sedentary activity, which refers to not realizing the amount of time spent being sedentary, as can be seen in the quotes below:

“I lose track of time when I’m playing [video games]. It’s kind of hard for me to stop.” – Dipti

“You start playing [video games], and because you’re playing, you become tired. When you get to bed, you can’t sleep. You get up, you play again to make yourself tired again, but with this, you can be here for like 11 hours, 12 hours. You can stay here for an entire evening.” – Dominic

Motivation was described by some adolescents as an important enabling factor of being physically active. They explained how they were motivated either by instant (*e.g.*, enjoyment, feeling energized, relieving stress and anger) or delayed (*e.g.*, avoiding long-term health consequences, losing weight) gratification. For example: *“If it’s fun, like... if it’s not fun, I don’t think that I would be interested, I won’t really try to do it.” – Abdi*

Social relationships and interactions

Many adolescents described barriers to physical activity experienced in social settings related to mental health problems and interpersonal relationships. For example, adolescents described how they avoided physical activity in public for concerns of feeling watched, judged, and embarrassed if unfamiliar with the sport or equipment. Adolescents shared how these feelings were sometimes driven by learned helplessness; that is, previous negative experiences with Physical Education teachers threatening to lower grades when wearing baggy clothes, and peer judgments. Further, some adolescents indicated that the lack of peer and parental involvement in physical activity discouraged them from being physically active. For example: *“A lot of my friends have very high metabolism, so it’s like they don’t have to exercise or anything, so we’ll just sit around and watch Netflix so that doesn’t help and that’s pretty much it.” – Chloe*

For numerous adolescents, use of digital technology was seen as an escape from reality and an alternative to social interaction. As one adolescent stated: *“Yeah, I really don’t like to think*

about what is going on in real life sometimes, so I have a better life in video games than this one.”

– Dipti

Whereas some adolescents discredited verbal encouragement from family and peers regarding food and nutrition, they explained that they benefited from verbal encouragement and support for physical activity. For example, when adolescents were encouraged to commit to organized programs or plans, especially those that were more challenging and competitive, they explained that they were more likely to be motivated to persist with their activities. As one adolescent shared: *“If someone told me, go to the gym every second day, I’d be like, why? Then, if someone told me, come to the gym every second day, get help with a personal trainer, and push your limits, that sounds a lot more fun.”* – Daniel

Accessibility to and availability of opportunities for lifestyle enhancement

In addition to having to depend on parents for transportation, some adolescents noted that the lack of safety of their neighborhood prevented them from performing activities by the home. The weather, with temperatures ranging across the spectrum, was also considered a barrier to being active. For example: *“Even though I really don’t because then I complain about it being too cold out because I don’t really like putting all these winter clothes on and having to take them back off, so it’s like even in the winter if the sun is out, it’s not, it’s just I hate the sun. Like I look at it and I shame it, I won’t look at it whatsoever.”* – Nixy

Those who had more facilitated means for physical activity (e.g., equipment at home, school gymnasiums) commented that it was advantageous in helping them be active.

Sleep

Self-regulation for behavior change

Adolescents shared examples to suggest a lack of structure was dependent on their schedules (e.g., flexibility during non-school periods or work commitments) or their parental involvement (e.g., limit-setting). As one adolescent admitted: *“I just stayed up and was like on my phone and reading some books and watching TV and then all of a sudden it was three a.m. and I was like oh, I guess I should go to sleep.”* – Courtney

Many adolescents described being aware of the influence of screen time on sleep with advice from their HCPs. These adolescents described following a regular sleep schedule by outlining a specific sleep time and digital curfew. Other suggested contributors to better sleep included coping mechanisms via medications or audio books or next-day commitments. For example: *“People think I’m completely irresponsible, but it’s summer right now. My parents can’t really make that excuse that I have to wake up early and I have really nothing to worry about, but then when it’s school, I really have a lot of things to worry about, so I try to go to sleep. It’s just one less thing.”* - Dipti

Controllability and competence beliefs

Adolescents described not having control over their sleep time (e.g., poor bladder control during sleep, anxiety, depressive thoughts, emotional distress). As one adolescent shared: *“My sleeping is okay, although sometimes I got like, I wake up and I stay up a few hours, but I think that’s kind of normal [...] I stayed up a bit later. That’s not really a problem because it’s kind of what everyone does.”* – Dipti

Social relationships and interactions

Adolescents also reported social barriers to sleep, including the use of technology before bed to connect with their social circle or not having any parental restrictions, leading to poor sleep quality

and duration. This is demonstrated by the following quote: *“Because I don’t, like my parents don’t force me to go to bed so I can just do what I want. I mean they don’t force me to go to bed now because I just tell them that I stuff to do.” – Nixy*

This reality is compared with other households, where parents were said to have a more supportive role in reminding adolescents of their commitments and the need for sleep to be energized.

3.5. Discussion

In our multi-center, qualitative study, adolescents receiving multidisciplinary clinical care for pediatric weight management identified numerous barriers to and enablers of adopting lifestyle behavior changes related to nutrition, physical and sedentary activities, and sleep. These spanned the following themes: physiological mechanisms and physical health status, self-regulation for behavior change, controllability and competence beliefs, social relationships and interactions, and accessibility to and availability of opportunities for lifestyle enhancement. Among the range of barriers and enablers that adolescents reported, we identified three common factors that positively or negatively influenced adolescents’ ability to adopt lifestyle behavior changes, including the degree of controllability, impact of mental health, and social pressures related to weight management. Our findings show that these issues that may not be traditionally considered primary for adolescents’ efforts in weight management were highly prevalent. The experiences shared by adolescents provide concrete examples of considerations for successful weight management.

Our findings are in line with previous reports highlighting that nutrition and physical activity changes among adolescents with obesity occur within or beyond their perceived and actual control (Kebbe et al. 2017); importantly, our findings enrich our existing body of literature on lifestyle to include information on sedentary behavior and sleep. For example, many adolescents

expressed intentions or efforts to adopt healthy lifestyle behavior changes and recognized that their active involvement and motivation were necessary for success in behavior change. However, adolescents reported that their behaviors were equally influenced by external factors, including support and active participation by their social networks, ready access to inexpensive, energy dense foods, and technologies designed for entertaining and minimizing energy expenditure. These results may be supported by numerous behavior change theories, particularly the Social Cognitive Theory (Bandura 1986). This theory aids the conceptual understanding of behavior change via a triadic reciprocal causation in which behavior (*e.g.*, skills, self-efficacy), cognitive and other personal factors (*e.g.*, knowledge, expectations), and environmental events (*e.g.*, social norms, accessibility) operate interactively (Bandura 1986); these interactive effects may explain why adolescents' individual efforts to adopt lifestyle behavior changes had limits, particularly within a sociocultural environment that can hinder the adoption of healthy lifestyle habits.

Mental health is a priority area for individuals living with obesity (Rand et al. 2017), a finding that was expressed frequently by adolescents in our study and that intertwined with the lifestyle areas that we explored. Specifically, several adolescents described how they felt emotionally distressed from time to time and the negative impact that these emotions had on managing their weight. For example, many avoided physical activity and/or used digital technology to 'escape' their real lives; others had disordered or unhealthy eating habits, which represented 'avoidance coping' (Carver et al. 2011). Some adolescents also reported that these behaviors, in turn, exerted a negative influence on their sleep, placing them in a vicious cycle that made it challenging to manage their weight successfully. Chronic and poorly managed mental health conditions including anxiety and depression can negatively affect successful weight management (Anderson et al. 2006; Luppino et al. 2010); therefore, addressing the psychological, emotional, and social well-being in obesity should precede or complement behavior change efforts.

HCPs have an important role to play in addressing mental health issues in adolescents. In the treatment of pediatric obesity, expert recommendations (Barlow & Expert Committee 2007) point towards the use of cognitive behavioral therapy, a psychological intervention technique with an emphasis on changing unhealthy attitudes, behaviors, and emotions (Wilfley et al. 2011). Beyond tailoring the treatment approach to the individual patient, adolescents' social networks, including family members, peers, and other important individuals in their life, are important components of any intervention strategy designed to address healthy lifestyle habits (Wilfley et al. 2007). To date, most interventions designed for managing obesity in adolescents have included a measure of obesity as the primary outcome. When included, psychosocial health is often ranked as a secondary outcome. Given adolescents' reports in our study, the difficulty in achieving successful weight loss over the long-term, and the increasing academic, clinical, and real-world recognition of broader concepts regarding health and well-being, lifestyle-based interventions for behavior change should evolve to emphasize outcomes beyond weight status to include mental health as a primary intervention focus and outcome (Bridger et al. 2014).

While some adolescents in our study had a positive social network, others lacked support and felt judged negatively or pressured by family members and peers. Adolescents reported how others (especially family members) made unsolicited direct or indirect comments on their behaviors, which led to feelings of shame and exacerbated unhealthy lifestyle choices they made (*e.g.*, pressures to eat unhealthy foods, avoid physical activity, and delay bed times to be present on social media). A number of studies have demonstrated consistently that weight-based stigmatization, perceived or real, can worsen unhealthy eating habits (Douglas & Varnado-Sullivan 2016), cause negative attitudes about sports (Faith et al. 2002), and lower participation in physical activity (Bauer et al. 2004). Weight-based stigmatization affects the emotional well-being of individuals living with obesity (Lewis et al. 2011) and contributes to poor body image and

impaired psychosocial functioning (Puhl & Heuer 2009). This may help to explain why many adolescents in our study used digital media as their primary means of interacting with others. Treatment options that address adolescents' use of and interest in technology may be of value in this context. Indeed, reduced anxiety, depression, and stress have all been observed among adolescents participating in interventions delivered using technology (Rathbone & Prescott 2017). Of note, in delivering treatment options using technology, HCPs, researchers, and parents alike can benefit by gaining a better understanding of the risks and potential harms of social media, including privacy issues (Li et al. 2013).

Our study has some limitations to acknowledge. For example, most participating adolescents were of Caucasian origin; however, transferability of our findings was strengthened by including both Anglophone and Francophone participants from two geographically diverse provinces in Canada. Further, as a cross-language study that included data collection in both English and French, the language transformation process may raise some methodological concerns. To optimize rigor, we adhered to recommendations (van Nes et al. 2010; Chen & Boore 2010; Santos Jr et al. 2015; Birbili 2000) to ensure that no meaning was lost and provided a detailed description of the translation process we applied. Given the qualitative nature of our study, adolescents may also have been limited in their ability to remember (recall bias) or articulate some of their experiences because of limited diction or cognitive development. To minimize this possibility, the interviewer provided adolescents with numerous probes and opportunities to refine or expand on their answers at multiple time points during the interview. Finally, while we strived to adopt an inductive approach to data analysis, we acknowledge that data are not coded in an epistemological vacuum and that researchers cannot completely free themselves of their theoretical and epistemological commitments; the researcher who conducted the interviews made note of these matters in her reflexive accounts.

3.6. Conclusions

Our results describe a range of barriers and enablers that may affect adolescents' ability to adopt healthy lifestyle behavior changes. Through our research, we hope to promote specific avenues for the development and delivery of interventions, such as tailored treatment and inclusion of a focus on psychosocial well-being which may be irrefutable in managing obesity in adolescents. However, governmental intervention in addressing barriers or capitalizing on enablers in the lifestyle areas explored is still needed for any important changes to occur.

Table 3.1. Interview guide exploring barriers to and enablers of adopting healthy lifestyle behavior changes by adolescents with obesity

Introduction

1. Describe what a typical day looks like for you.

Nutrition

2. Tell me what you eat or drink on a typical day.
3. What comes to mind when I say ‘healthy and unhealthy foods’?
4. Are there things that make it easy for you to eat healthy?
5. What about things that make it hard for you to eat healthy?

Physical Activity

6. Tell me about any physical activities that you do throughout the day.
7. What comes to mind when I say ‘physical activity’?
8. Are there things that make it easy for you to be physically active?
9. What about things that make it hard for you to be physically active?

Sedentary Activity

10. Tell me about the things that you do during the day when you are not physically active.
11. What comes to mind when I say ‘inactivity’?
12. Are there things that make it easy for you to be inactive?
13. What about things that help you not be inactive?

Sleep

14. Tell me about your sleep habits.
15. What comes to mind when I say ‘healthy sleep’?
16. Are there things that make it easy for you to have better sleep?
17. What about things that make it hard for you to have good sleep?

Mental Health

18. Some teens have told me that they like to come to the clinic to learn how to address certain issues like anxiety, depression, or family conflicts. Does this apply to you at all?
19. Are there things that have helped you talk and learn about or address these issues?
20. What about things that have made it hard for you to talk about and address these issues?

Summary

21. Is there anything that you’d like to add to what we talked about?
-

Table 3.2. Demographic, anthropometric, and sociodemographic characteristics of adolescents and their parents

	Adolescents (n=19)	Parents (n=19)
Age (y)	15.1±1.7	49.5±9.0
Sex (n; %)		
<i>Female</i>	11; 57.9	13; 68.4
<i>Male</i>	8; 42.1	6; 31.6
Ethnicity, (n; %)		
<i>Caucasian</i>	13; 68.4	13; 68.4
<i>Non-Caucasian</i>	6; 31.6	6; 31.6
Education (at least college or university) (n; %)	-	10; 52.6
Household Income (>\$50,000/y CDN) (n; %)	-	13; 72.2 ^a
Height (cm)	164.7±7.0	164.9±11.0
Weight (kg)	103.8±16.7	83.7±14.4
Weight Status (n; %)		
<i>Normal Weight</i>	-	1; 5.3
<i>Overweight</i>	-	10; 52.6
<i>Obesity</i>	4; 21.2	6; 31.6
<i>Severe Obesity</i>	15; 78.9	2; 10.5
Body Mass Index (BMI; kg/m ²)	37.9±4.1	30.8±5.2
BMI Percentile	99.9±0.001	-
BMI Z-Score	3.5±0.6	-

Data presented as mean ± standard deviation unless otherwise specified.

^an=18; one parent chose ‘prefer not to say’.

3.7. References

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Chapter 4

Kebbe M, Perez A, Buchholz A, McHugh TLF, Scott SD, Richard C, Dyson MP, Ball GDC. Healthy lifestyle promotion among adolescents with obesity: recommendations from a multi-centre, qualitative study. *BMC Pediatr* 2019.

4.1. Abstract

Background. Lifestyle interventions represent the first line of treatment in obesity management; however, many adolescents with obesity do not meet established lifestyle recommendations. Given that healthy lifestyle modification interventions and promotion efforts often fail to include adolescents' first-hand perspectives, our purpose was to explore adolescents' recommendations to create an environment conducive to healthy lifestyle changes.

Methods. Conducted from July 2017 to January 2018, this study adhered to a qualitative, cross-language, patient-oriented design. We recruited 13–17-year-old adolescents (body mass index [BMI] $\geq 85^{\text{th}}$ percentile) seeking multidisciplinary treatment for obesity at two centers in Edmonton and Ottawa, Canada. Adolescents participated in one-on-one, in-person, semi-structured interviews in English or French. Interviews were audio-recorded, transcribed verbatim, managed using *NVivo 11*, and analyzed using manifest content analysis by two independent researchers.

Results. In total, 19 adolescents (12 Anglophone and 7 Francophone; 15.1 ± 1.7 years old; 3.5 ± 0.6 BMI z-score; n=11 female; n=13 Caucasian) participated. Adolescents provided a range of recommendations to create a more healthful environment, which were organized into the following categories: (i) establish parental support, but with limits, (ii) improve accessibility and availability of 'healthy foods', (iii) limit deceptive practices in food advertisements, (iv) improve accessibility and availability of varied physical activity opportunities, and (v) adopt later school start times.

Conclusions. Adolescents' recommendations highlighted multi-level, multi-component factors that influenced their ability to lead healthy lifestyles. These recommendations can help to inform the design of healthy lifestyle interventions and policy-level decisions to maximize their potential value for adolescents with obesity to make and maintain healthy lifestyle habits.

4.2. Introduction

Pediatric obesity is recognized as a public health priority because it is often accompanied by physical, physiological, and psychological health risks (Small & Aplasca 2016; Skinner et al. 2015). Adolescents, especially, represent a vulnerable group since excess weight in adolescence (Simmonds et al. 2015), as well as unhealthy lifestyle habits (Craigie et al. 2011; Biddle et al. 2010) are likely to persist into adulthood. Specifically, there is a strong positive association between high childhood BMI and adult obesity [odds ratio 5.21, 95% confidence interval 4.50 to 6.02] (Simmonds et al. 2015), nutrition (food groups and energy yield macronutrients) and physical activity (frequency, intensity, and duration) track at moderate to strong levels (Craigie et al. 2011), and sedentary behaviors persist at low to moderate levels, with the strongest tracking shown for TV viewing (Biddle et al. 2010).

Healthy lifestyle habits are key to managing obesity in adolescents. To help in making healthy lifestyle and behavior changes, adolescent-specific lifestyle recommendations have been developed, which include 6 to 8 daily servings of fruits and vegetables (Health Canada 2016), 60 minutes of daily moderate-to-vigorous physical activity (Canadian Society of Exercise Physiology 2016), no more than 2 hours of daily leisure-time sedentary activity (Paruthi et al. 2016), and 8 to 10 hours of sleep per night (Paruthi et al. 2016). Yet, many adolescents with and without obesity do not meet these recommendations (Ball et al. 2008; Tremblay et al. 2015). Adolescents report that many barriers influence their ability to make and maintain healthy lifestyle habits, such as the convenience of unhealthy foods, negative experiences in physical education classes in school, and sleep difficulties (Kebbe et al. 2017).

Previous research has focused on adult involvement in the policy making process for a range of health care issues (Degeling et al. 2015; Hubbard et al. 2007). When intervention recipients are involved, policy-making processes show increased legitimacy, justifiability, and

feasibility over policies designed through more traditional, top-down methods (Degeling et al. 2015). Adolescents, however, may often be excluded from the process of designing lifestyle interventions that could inform healthy lifestyle promotion efforts via policy-making processes. In turn, this minimizes their concerns, needs, preferences, and priorities and may explain why they are a challenging group to engage in obesity prevention and management initiatives (*e.g.*, low recruitment and initiation, high attrition) (Dhaliwal et al. 2014). Since recommendations made by end-users could be a decisive factor in the success and uptake of healthy lifestyle interventions and policies, the purpose of this study was to explore recommendations from Canadian Anglophone and Francophone adolescents with obesity to create an environment conducive to healthy lifestyle changes.

4.3. Methods

Design

This qualitative, cross-language, patient-oriented study was completed between August 2017 and January 2018 and is part of a larger study designed to understand the factors that play a role in implementing and maintaining treatment goals by adolescents with obesity. Our report employs a qualitative description lens as described by Sandelowski (2000). We also completed a preliminary step consistent with principles of patient-oriented research (Canadian Institutes of Health Research 2014) to engage patients (as partners) in the design and planning of the study (please see Kebbe et al. 2018 for details). This study was approved by human research ethics boards and received operational approval for study sites in Edmonton, AB and Ottawa, ON, including the University of Alberta, Alberta Health Services, and the Children's Hospital of Eastern Ontario.

Participants and recruitment

Adolescents (13–17 years of age, body mass index [BMI] $\geq 85^{\text{th}}$ percentile) were sampled purposefully from one of two multidisciplinary weight management clinics: Anglophones from the Pediatric Centre for Weight and Health (PCWH; Stollery Children’s Hospital, Edmonton, AB) and Francophones from the Centre for Healthy Active Living (CHAL; Children’s Hospital of Eastern Ontario, Ottawa, ON); this allowed us to gain a better representation of adolescent experiences from Anglophone and Francophone communities in Canada that may vary by language and culture. Adolescents were eligible to participate if they *(i)* had been active for ≥ 3 months at the corresponding clinic to ensure that they completed initial assessments and gained some experience in working towards a healthy lifestyle and *(ii)* did not present with known developmental disabilities. Adolescents were informed about the study using recruitment posters (Appendix B) displayed in clinic waiting rooms or approached by clinical and research staff members in-person or by telephone. We scheduled interviews at the respective clinics according to participant availability. We offered Adolescents a \$25 Visa gift card as a token of appreciation.

Data collection

The first author (MK) conducted one-on-one, in-person, semi-structured in-depth interviews (30–60 minutes in length) with adolescents in either English (in Edmonton) or French (in Ottawa). The interview guide was conceptualized (MK) and reviewed by team members with methodological and/or content expertise (AB, SDS, TLFM, GDCB, PEP); it consisted of probing questions to gain a comprehensive view of adolescents’ perspectives, including a final round of open-ended discussion for feedback on interview quality and content (Table 4.1). We also asked adolescents to select their own pseudonyms over characteristics (*i.e.*, gender, age) to help the reader follow individual narratives (Saunders et al. 2015); if participants were indifferent, we chose names we

thought would resonate with their identity (Grinyer 2002). Prior to data collection, we obtained informed and written consent and assent from parents and adolescents, respectively (Appendix B), and collected adolescents' demographic (*e.g.*, date of birth, gender) and anthropometric (*e.g.*, height, weight) data from medical records for descriptive purposes. MK documented field notes and memos immediately after the interviews. All interviews were digitally-recorded and uploaded to an online and secure file sharing platform (*LabKey*) maintained by the Women and Children's Health Research Institute (UAlberta).

Data analysis

Data were transcribed verbatim (*Translation Agency of Alberta*), translated (if applicable – please see Kebbe et al. 2018 for details), and verified for completeness and accuracy (MK) for analysis. We used *NVivo 11* (QSR, Melbourne, Australia) to manage the data. Analyses of de-identified transcripts were completed independently by two research team members (MK and AP) using manifest content analysis (Elo and Kyngäs 2008), with input from CR on French data. We used several verification strategies to enhance rigor of our study, including investigator responsiveness, methodological coherence, sampling adequacy, and theoretical thinking (Morse et al. 2002).

4.4. Results

A total of 19 adolescents participated, most of whom were female, Anglophone, Caucasian, lived with severe obesity, and had parents who met criteria for overweight and obesity (Table 4.2). No appreciable differences in regards to interview data were observed across clinics, which varied by both geography and language, so adolescents' recommendations were grouped together. Issues discussed were related to parenting, nutrition, physical and sedentary activities, and sleep. We grouped adolescents' recommendations within the following categories: (*i*) establish parental

support, but with limits, (ii) improve accessibility and availability of ‘healthy foods’, (iii) limit deceptive practices in food advertisements, (iv) improve accessibility and availability of varied physical activity opportunities, and (v) adopt later school start times. Overall, some adolescents expressed a perceived lack of control over making the changes they recommended.

Establish parental support, but with limits

Adolescents perceived their parents as key players in helping them make lifestyle changes. They recommended less family conflict and for their parents to actively support their attempts for a healthier lifestyle in relation to nutrition (e.g., preparing healthy leftovers and pre-packaged meals), physical (e.g., providing encouragement) and sedentary (e.g., permitting digital technology while exercising on the treadmill) activities, and sleep (e.g., providing bed time reminders). For example, Daniel explained, “*I need an internet connection and a phone because then I can watch YouTube while I’m walking [basement treadmill].*” and recommended his parents facilitate and support this combined activity.

Even though adolescents described a value to parental support, they described not feeling comfortable with authoritarian-style parenting. Dominic shared that within a family, “*You can’t always control what is happening, but you can try to give your opinion, but it won’t really work. It’s the adults that come first, you’re forced to listen to them.*” and Chloe expanded on this by recommending less constrained parental involvement: “*Like, my Mom’s constantly breathing down my neck and I’m like, give me some space sort of thing.*”

Improve accessibility and availability of ‘healthy foods’

Most adolescents recommended lowering the cost of healthy foods to help them make healthier choices more often, particularly when purchasing foods. As Dominic confirmed, “*It’s just making*

a change to our tax and it's this or having sales or things like that, it will just help us, but it's still expensive. It's really expensive to buy fruits and all that. It's less expensive to buy chips or something else other than fruits." Some adolescents went further to recommend that healthy foods, such as fruits and vegetables, not be taxed. This can be seen in the following quote where Nicholas discussed taxes and healthy foods: *"And then, I find that it's good that the government is putting a Carbon tax, but they could remove tax on what is healthy and organic, what's good for us. So, meats, vegetables and so, they could remove tax on that since it would promote a healthier life that would give better health to people."*

Adolescents shared that practical classes at school (e.g., home economics) and resources (e.g., recipe books) focused on healthy eating would be helpful to build their knowledge and skills. Further, adolescents described how they were not allowed to bring food into their classrooms. Some adolescents like Abdi shared negative views around this issue: *"At school, in my classes... in my English and art classes, we're not allowed to bring food, even if we're hungry, they say no and then, I think it's stupid, because if I'm hungry, I will eat. So..."* Adolescents reported that this restriction negatively affected their eating later in the day and recommended that schools do more to accommodate students in this regard.

Several participants commented on how supermarkets tended to promote junk food in numerous aisles or in attractive places like near cash registers; they recommended having greater availability of healthy foods that they could eat in different settings and on the go, reflecting their busy lives. In the school setting, adolescents commented on the unhealthy food options available and recommended healthier alternatives. For instance, Nicholas explained, *"The cafeteria isn't really healthy either, they're 'fast-food' cafeterias, it's pizza, it's small noodles that you freeze, it's sandwiches, small wraps, it's not necessarily healthy. You can have healthier options, you can have salad, you can have... it's pretty much all, you can just have salad that is good. So, there*

needs to be a big change at school, but school can't do anything because it's the Minister [of Education] and then, the minister doesn't want to change." These adolescents, however, acknowledged that this change might be a costly one for schools to make, as Dominic expanded: *"My cafeteria has changed so often. When I started in 9th grade, way before it was all poutines, pizza, fatty things. After, it changed to be healthy, salad, chicken, things like that. After, it changed again and they re-added the things [unhealthy foods] to make money, because everyone was buying that. But now, they put a mix of both. I mean it's good for health, there's other things [than unhealthy foods], but it's hard to change things at school [for the better]. There's still vending machines, there's still things like that, but to change things at school [for the better], they try each year and it doesn't work."*

Limit deceptive practices in food advertisements

Adolescents highlighted the need to change the food environment to facilitate dietary changes. As Michel stated: *"We should do something. It's [unhealthy food environment] made too easy."* Specifically, adolescents commented on the influential role of food advertisements, including the digital editing of fast food advertisements to make them look more appealing. As Dominic noted: *"They always want to increase their revenue, they want to show how food is. It's not always like in the picture. They show you a picture, it's not really that, I mean..."*

In addition, adolescents reported being aware of other tactics used in advertising, such as airing a higher proportion of unhealthy than healthy food commercials on TV and social media sites (e.g., YouTube). Adolescents' recommendations included airing more commercials of healthy foods and banning commercials of unhealthy foods. As stated by Amber, *"Always, when they show the commercial, usually every single commercial is about junk food. And then you'll see the one or two like special like good foods for you. That's pretty much it. They should fix that."*

Improve accessibility and availability of varied physical activities opportunities

Adolescents recommended physical activity opportunities to be more accessible, citing issues related to cost, distance, and knowledge promotion efforts. Adolescents shared strong feelings about improving affordability of physical activity programs, recreation centers, and exercise equipment. As Abdi mentioned, *“If someone is trying to lose weight and you sell them something [sport equipment, gym membership] for \$50, it’s not right.”* Further, adolescents, especially those who lived in remote areas, noted that most activities were not always close by to where they lived: *“Everything else is in the city. Tennis, squash, I’m thinking of what else... swimming. It’s all in the city.”* (Nicholas). They reported that this would deter them from being physically active, even if they had a way to travel there: *“It’s a drive [gym], I could bike there if I wanted to, but it’s a no.”* (Chloe). Although some adolescents seemed aware of available physical activity opportunities in their communities, others lacked information and recommended that opportunities be better disseminated to reach more adolescents.

In schools, adolescents described limited access to facilities during non-supervised times. Their recommendations in this regard were two-fold: (i) allow flexibility in access during non-supervised times and (ii) limit the degree of monitoring being done by authority figures during supervised times. Of note, while adolescents recommended removing supervision in some cases (e.g., parents monitoring their after-school activities), it was not for other types of supervision, such as coaching by a fitness instructor.

Adolescents recommended having physical activity opportunities tailored to different ages, religions, and interests. For example, in the school setting, most adolescents shared positive aspects about available physical activity opportunities. However, most favored sports (e.g., volleyball) over physical education (i.e., focus on fitness and running). Several adolescents recommended merging the two classes. *“I went for the other one [Sport Performance], but the only thing to*

change is to just put the two together. Do both, workout [Physical Education] and gym [Sport Performance] together, you don't always have to play a sport, you can do both. This is what I would change.” (Dominic).

Limited choices and variety also appeared evident in community settings to which adolescents recommended offering more activities that were appropriate for their age. Adolescents discussed how the currently available physical activity programs were mostly designed for younger boys and girls: *“And so, I would add more physical activity programs that are not only accessible for the community, and kids, but also teens. Because right now, it's programs that are for kids.” (Nicholas).* One adolescent shared experiences of her parents not allowing her to join organized physical activities with religious components: *“Um, it would be cool if there were some more like uh teen programs that weren't religion-based.” (Courtney).*

Adopt later school start times

When discussing sleep, adolescents described favoring later school start times to better match their sleep schedules. Adolescents commented on how a lack of sleep may have a negative influence on their other lifestyle habits. In particular, adolescents described making unhealthy dietary (*e.g.*, skipping breakfast) and physical activity (*e.g.*, decreased participation) choices due to feeling fatigued as a result of waking up early for school. As such, adolescents made specific recommendations to delay school start times to 9:00 AM, if applicable. As Nixy stated simply, *“I just, like, I want more sleep.”*

4.5. Discussion

This multi-centre, qualitative, cross-language, patient-oriented study explored recommendations made by Anglophone and Francophone adolescents with obesity to create an environment

conducive to healthy lifestyle changes. Our findings suggest that parenting style, accessibility and availability of ‘healthy foods’, the quantity and type of physical activity opportunities, and sleep duration were perceived as key factors influencing a healthy lifestyle. Recommendations covered a variety of topics for multiple settings and stakeholders, which highlights the need for system-oriented multi-level interventions to potentially impact adolescent health behaviors.

In our study, adolescents recommended a supportive home environment with less parental conflict. Studies and reviews have shown links between youth weight and household organization, including sleep, screen time, and family meal routines (Bates et al. 2018; Halliday et al. 2014), highlighting the role of the family in facilitating change. Specifically, adolescents wanted their parents to act as role models by implementing healthy lifestyle changes in nutrition and physical and sedentary activities. In recent work, Berge et al. (2013) characterized the home environment’s influence on adolescents’ food behaviors; they found that adolescent girls were less likely to diet, binge eat, and attempt to control their weight in unhealthy ways if their parents engaged in healthy eating. While adolescents with obesity value their parents’ efforts to act as positive role models for both healthy nutrition and physical activity changes, they may be more receptive of encouraging comments for adopting healthy physical activity than nutrition habits (Kebbe et al. 2018). This may be explained by previous studies in which adolescents reported a lack of motivation as a main barrier to engaging in physical activity (Bailey et al. 2018; Kebbe et al. 2017), which may not be transferable across lifestyle habits for which adolescents may perceive an individual responsibility over making changes.

The school is an attractive setting to implement healthy lifestyle interventions since it is where adolescents spend the majority of their day. Although many adolescents may bring food from home, up to 40% of adolescents’ calories are consumed at school, so the quality of foods and beverages available in this setting is crucial in ensuring support for a healthy lifestyle (Glickman

et al. 2012). As noted by adolescents in our study, school cafeterias tend to offer unhealthy food options to students. Indeed, compared with home cooked meals, foods such as those typically offered in school cafeterias tend to be more energy dense and come in larger portions (Ledikwe et al. 2005), which may affect total energy intake (Diliberti et al. 2014) and body weight (Poppitt and Prentice 1996). It follows that some jurisdictions are considering healthier changes for foods served in schools, including eliminating trans fats, limiting saturated fat, and decreasing total sugar content (Williams 2010), all of which are consistent with the 2019 Canada Food Guide.

School environments can also promote or limit healthy physical activity for adolescents. Based on recommendations made by adolescents in our study in the school context, there remains room for improvement. Interventions have shown increased physical activity levels in adolescents in schools once barriers were minimized or removed (Christian et al. 2016), but as with any intervention, these may suffer in their sustainability. Since public health initiatives normally target individuals in isolation of their surrounding social context (Bahr et al. 2009), expanding public health efforts across ecological contexts can likely increase sustainability of behavior change over time by helping shift community and organizational norms. Further, adolescents should be involved in the design and implementation of interventions to account for their insights and preferences. Previous research has shown positive outcomes of engagement of youth in the development of health care research interventions for both the research (*e.g.*, better understanding of ethical considerations and economic consequences of the interventions) and stakeholders involved (*e.g.*, development of interpersonal and team working skills, empowerment, and empathy, understanding, and satisfaction) (Phelps et al. 2017; Morton et al. 2017). Stakeholder engagement is consistent with patient-oriented research principles (CIHR 2014), and regardless of any changes to intervention effectiveness, remains of intrinsic value.

Adolescents made several recommendations for policymakers regarding food advertisements. Our food environment has been influenced dramatically by food advertisements (French et al. 2001). More than \$1 billion USD is spent annually on food and beverage marketing that targets adolescents specifically (Powell et al. 2013) with very little spent on nutrient-rich products (Kunkel et al. 2009). Adolescents in our study commented on the imbalance between unhealthy and healthy food advertisements and shared their concerns surrounding this issue. In an attempt to counter the influence of advertisements on dietary intake, government health agencies have established recommendations for parents to limit screen time, including television viewing, to minimize exposure to advertisements (Chapman and Maclean 1993). Since this approach may not be to adolescents' preferences, other measures may be more suitable. For example, several countries have established regulations regarding food-related TV advertisement content directed towards children (Chapman and Maclean 1993), including advertising bans to children in Quebec (Québec 2012). Yet, adolescents in Canada remain exposed to junk food advertisements while awaiting approval of a new Health Canada legislation to prohibit marketing of unhealthy food to children and adolescents under the age of 17 (Open Parliament 2018).

Our study has some limitations to acknowledge. For example, most participating adolescents were of Caucasian origin; however, transferability of our findings was strengthened by including both Anglophone and Francophone participants from two geographically diverse provinces in Canada. Given the qualitative nature of our study, adolescents may have been limited in their ability to articulate some of their experiences because of limited diction and language abilities. Adolescents may also not have had adequate experience to delve into macro-level factors. To minimize these possibilities, the interviewer provided adolescents with numerous probes and opportunities to refine or expand on their answers at multiple time points during the interview.

4.6. Conclusions

In conclusion, our findings indicate that adolescents' recommendations may not be adequately reflected in health-promoting lifestyle initiatives and interventions. Identified stakeholders should consult and involve adolescents in designing interventions and initiatives to be more responsive of their needs. Acknowledging the recommendations made by adolescents in our study can improve the uptake, sustainability, and overall success of planned projects.

Table 4.1. Interview guide exploring recommendations from adolescents with obesity to adopt healthy lifestyle behaviors

-
1. Do you ever feel like there are external factors that aren't in your control that influence your lifestyle choices?
 2. What kinds of changes can we make to help teens have a healthy lifestyle?

Family setting

3. Some teens say that their family affects their lifestyle (like in the way you eat, exercise, sleep, and emotionally feel). Would you say the same about yours? (*If yes*) What changes do you think your family could make to help?

School setting

4. What about your school? Is there anything that schools can do to help you make healthy lifestyle choices?

Community setting

5. In terms of the place where you live, what do you think that your community and city can do to help you make healthy lifestyle choices?

*Clinical setting**

6. You've been receiving care for your health and weight at this clinic. What's it like to come here? Is there anything that you like?
7. Is there anything that you don't like about going/coming to this clinic?
8. How can we change things at this clinic to help you better?

**Note: clinical setting recommendations by adolescents with obesity were all in relation to decision-making preferences and were beyond the scope of this report.*

Table 4.2. Demographic, anthropometric, and sociodemographic characteristics of adolescents and their parents

	Adolescents (n=19)	Parents (n=19)
Age (y)	15.1±1.7	49.5±9.0
Sex (n; %)		
<i>Female</i>	11; 57.9	13; 68.4
<i>Male</i>	8; 42.1	6; 31.6
Ethnicity, (n; %)		
<i>Caucasian</i>	13; 68.4	13; 68.4
<i>Non-Caucasian</i>	6; 31.6	6; 31.6
Education (at least college or university) (n; %)	-	10; 52.6
Household Income (>\$50,000/y CDN) (n; %)	-	13; 72.2 ^a
Height (cm)	164.7±7.0	164.9±11.0
Weight (kg)	103.8±16.7	83.7±14.4
Weight Status (n; %)		
<i>Normal Weight</i>	-	1; 5.3
<i>Overweight</i>	-	10; 52.6
<i>Obesity</i>	4; 21.2	6; 31.6
<i>Severe Obesity</i>	15; 78.9	2; 10.5
Body Mass Index (BMI; kg/m ²)	37.9±4.1	30.8±5.2
BMI percentile	99.9±0.001	-
BMI z-score	3.5±0.6	-

Data presented as mean ± standard deviation unless otherwise specified.

^an=18; one parent chose ‘prefer not to say’.

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Chapter 5

Kebbe M, Perez A, Buchholz A, Scott S, McHugh TLF, Dyson M, Ball GDC. Health care providers' delivery of health services for obesity management in adolescents: a multi-centre, qualitative study. *BMC Health Serv Res* 2019.

5.1. Abstract

Background. Current clinical practice guidelines outline strategies for providing dietary and physical activity interventions in pediatric obesity. Perspectives of providers on strategies for effective delivery of health services in adolescent obesity management are lacking. Our purpose was to explore HCPs' perspectives on the strategies they use to deliver effective health services for managing obesity in adolescents.

Methods. We used purposeful sampling to recruit experienced HCPs in adolescent obesity management from multidisciplinary, pediatric weight management clinics in Edmonton and Ottawa, Canada. Data were collected using audio-recorded focus groups (4–6 participants/group; 60–90 minutes in length). We applied inductive, semantic thematic analysis and the congruent methodological approach to analyze our data, which included transcripts, field notes, and memos.

Results. Data were collected through three focus groups that included 16 HCPs (n=10 Edmonton; n=6 Ottawa; 93.8% female; 100.0% Caucasian), including dietitians, exercise specialists, nurses, pediatricians, psychologists, and social workers. Three main themes emerged from the data, including (i) *discuss realistic expectations regarding weight management* (shift focus from weight to health; ensure family cohesiveness; foster delayed vs. instant gratification), (ii) *personalize weight management* (address personal barriers to change; consider developmental readiness), and (iii) *exhibit non-biased attitudes and practices* (emphasize social over individual causes of obesity; avoid making assumptions about lifestyle behaviors based on weight).

Conclusions. HCPs' approaches to pediatric weight management may be useful in shifting attitudes regarding health and weight and maximizing the adoption of lifestyle behavior changes to help adolescents and their families effectively manage obesity.

5.2. Introduction

Obesity in adolescents is of concern given its high prevalence (Ogden et al. 2016) and adverse physical, social, and emotional health consequences (Skinner et al. 2015; Small & Ablasca 2016; Strauss & Pollack 2003). Additionally, managing pediatric obesity is a challenging task that poses a considerable financial burden on families and the health care system, including direct medical costs and indirect productivity losses (Hamilton et al. 2017). These costs persist into adulthood since ~70% of adolescents with obesity become adults with obesity (Simmonds et al. 2015). These data provide strong justification for effective approaches to prevent and manage unhealthy weight gain early in life.

In the short-term, multidisciplinary, family-based behavioral interventions can be effective (albeit modestly) for managing obesity in adolescents (Al-Khudairy et al. 2017). Notwithstanding other therapeutic options (*e.g.*, bariatric surgery), the successful management of obesity depends largely on the extent to which lifestyle behavior changes are adopted and maintained. Adolescents, however, experience challenges in adopting healthy lifestyle habits (Kebbe et al. 2018); while some require higher organizational and policy changes (*e.g.*, food advertisements to adolescents), microlevel factors (*e.g.*, addressing mental health issues) are amenable to change by health care providers (HCPs) and families.

HCPs seek to provide high quality care for obesity management in adolescents and are valued sources from whom adolescents obtain health information. As multidisciplinary interventions are characterized by HCPs who deliver intensive approaches to care, including frequent office visits and long durations of follow-up (Barlow & Expert Committee 2007), their role is instrumental to facilitate the adoption of lifestyle behavior changes, particularly during the initial stages of treatment. To our knowledge, despite HCPs' front-line experiences in delivering effective weight management services to adolescents, their perspectives have not been described

in the literature, with clinical practice guidelines largely centered on dietary and physical activity (vs. delivery) strategies to help adolescents manage their obesity (Styne et al. 2017). The purpose of this study was to explore HCPs' perspectives on the strategies they use to deliver effective health services for managing obesity in adolescents.

5.3. Method

Study design

Conducted from July 2017 to January 2018, our multi-center, qualitative study was informed by the qualitative description method, which provides a straightforward conceptual summary of the study phenomenon based on the manifest content of the data collected, making it well-suited to behavior research (Sandelowski 2010). We received research ethics and operational approvals from the University of Alberta (Edmonton, AB), Alberta Health Services (Edmonton, AB), and Children's Hospital of Eastern Ontario (Ottawa, ON) prior to study commencement.

Participants and recruitment

Using purposeful sampling, we recruited HCPs from two pediatric weight management clinics (Pediatric Centre for Weight and Health [PCWH], Stollery Children's Hospital, Edmonton, AB; Centre for Healthy Active Living [CHAL], Children's Hospital of Eastern Ontario, Ottawa, ON). To be included in our study, HCPs (*e.g.*, dietitians, mental health professionals, nurses, pediatricians) had to have ≥ 6 months experience in weight management for adolescents with obesity to ensure that they had gained clinical insight and experience working with that age group. We scheduled focus groups with HCPs at each site and obtained written, informed consent prior to each focus group. All HCPs were offered a \$25 Amazon gift card as a token of appreciation.

Data collection

We held three semi-structured focus groups (60–90 minutes in duration; two in Edmonton [including one pilot] and one in Ottawa). The focus group interview guide was developed by MK, informed through discussions with team members who have content (obesity) and methodological (qualitative inquiry) expertise (AP, TLFM, SDS, GDCB), and refined following the pilot focus group. We asked HCPs (4–6 per focus group) open-ended questions regarding their experiences in delivering care to adolescents. MK and/or AP moderated the focus groups, debriefed afterwards, and documented field notes and memos. Focus groups were audio-recorded, uploaded to an online and secure file sharing platform called *LabKey* (Women and Children’s Health Research Institute, University of Alberta), and transcribed verbatim (*Translation Agency of Alberta*). Following the focus groups, we collected descriptive and demographic information from HCPs using a password-protected survey disseminated via email.

Data analysis

MK verified the de-identified transcripts for completeness and accuracy, which were imported to *NVivo 11* (QSR, Melbourne, Australia). Data were analyzed independently and iteratively by MK and AP; we did not observe appreciable differences across clinics regarding HCPs’ perspectives on strategies used to deliver effective health services for obesity management, so all three focus groups, including our pilot focus group, were combined for analysis. Both authors followed established steps by Braun & Clarke (2006) for thematic analysis and Duggleby (2005) for the congruent methodological approach, including reading and re-reading the transcripts for data familiarization, developing a coding scheme (organized by topic, root codes, and code names), and having team discussions (MK, AP, GDCB). Any discrepancies were resolved by consensus.

Methodological rigor

We used several strategies to ensure methodological rigor, including investigator responsiveness, methodological coherence, sampling adequacy, and theoretical thinking (Morse et al. 2002). MK also examined her own role as a researcher through an ongoing critical reflection, including personal, functional, and disciplinary reflexivity (Wilkinson 1988), and how these characteristics may have shaped the research process and influenced data collection and analysis.

5.4. Results

A total of 16 HCPs participated in our study, most of whom were female, Caucasian, and had 6 months to 15 years of experience providing weight management services to adolescents with obesity (see Table 5.1). Findings were represented by three themes that summarized HCPs' perspectives regarding effective weight management delivery for adolescents with obesity, including: *(i)* discuss realistic expectations regarding weight management, *(ii)* personalize weight management, and *(iii)* exhibit non-biased attitudes and practices. Since HCPs shared similar descriptive characteristics, we chose to remove identifiers (*e.g.*, profession) from the quotes below to ensure anonymity.

Discuss realistic expectations regarding weight management

HCPs described how adolescents and their parents can present with misunderstandings on the types of services offered at the respective clinics or with unrealistic or no expectations from adolescents. Particularly, while HCPs described adolescents and parents as often being focused on weight loss, all agreed that weight management should be motivated by a focus on health as opposed to weight, as can be seen by the following quote: *“We are willing to help people develop healthy behaviors and actually decrease weight [loss] gratification. So, that's why we're not always having that*

conversation necessarily and it's tricky because you kind of want to validate and acknowledge how they are feeling about their weight and their bodies, but at the same time, you don't want to be over-focusing on it.”

HCPs also highlighted the need for realistic expectations between adolescents and parents. Some described how adolescents were held to high standards by their parents in their efforts to manage obesity regardless of the parents’ involvement. HCPs reported that this was due to the perceived independence of the adolescent by their parents due to familial and social disengagement (‘normal’ life) and increased influence by, and time spent on, technology (‘virtual’ life). As one HCP stated: *“She [patient] is embedded in a fairly strong family system in some ways even though that, once again, this family is still pointing the finger at her and saying you're still the one that has to really make the change because her parental lifestyle and changing up patterns of behavior like that deeply rooted in brain – it’s extremely difficult to change that up.”*

HCPs emphasized the value of clarifying the speed at which changes to weight and health outcomes may be seen and commented on the concept of instant gratification. As one HCP expressed: *“I think [...] people are looking for weight loss, and dramatic [speed and weight changes] [...] The idea of the biggest loser, so when [adolescents and parents] come in and they don't see this dramatic weight loss change, then they surrender any kind of effort that they're already doing. So kind of what is a person's expectations, what is it that they want, what is their own goal in terms of their personal health, and I think that that's part of the conversation that maybe has to happen a little bit more.”*

Regarding the rate of change, HCPs described how our society contributes to forming unrealistic expectations, which is carried over to weight management and behavior change expectations formed by adolescents. For example, as one HCP stated: *“It's a little bit challenging, and it feeds into where our culture is at. I'd say kind of teen generation, is where they are getting*

information so quickly and things are coming at them and they are processing things very quickly. The perception of taking time to change or process a body of information or make long term decisions is off the radar.”

Personalize weight management

HCPs noted that behavior change efforts should be determined based on individual characteristics of the adolescent and family. For example, HCPs shared numerous barriers that families may often face to effectively manage weight, including individual (*e.g.*, a lack of readiness for change, high use of technology), interpersonal (*e.g.*, influence of the social network, poor family mental health), and environmental (*e.g.*, accessibility to cheap junk food and sugar-sweetened beverages) factors. While some HCPs reported that a low self-esteem and lack of confidence influenced making healthy lifestyle behavior changes, others provided another rationale: *“I think one of things that makes it hard for teens to make those changes is they want to be doing what everybody else is doing, so they don't want to be seen as the person who's having the healthy meal at lunchtime. You don't know how many times I get a kid say ‘Well, everybody else is doing it, everybody else takes their phone to bed, everybody else is answering, I'm the only kid in the school that doesn't do that’.”* Some HCPs commented on a lack of family engagement in helping adolescents to make healthy lifestyle behavior changes, but added that in addition to placing ownership on the adolescent, some families may not be supportive for other reasons: *“It's not a willingness to place ownership on a teen, there's a big barrier to families not being able to provide that support for their own emotional health reasons [...] So that doesn't make it easier for a teen to make that change, right, when the family can't help them the way that they would want to be helped.”* HCPs shared these as examples of barriers that influenced how they delivered their weight management services to families.

There was consensus that the earlier the behavior change attempts, the higher the probability for success without having to resort to more intensive forms of care. One HCP stated: *“I find the younger the parents can structure this [gradual lifestyle changes], the more success they have. So, if we're talking 13, they might have a bit more success with that [lifestyle change] than when the kids are 17 and a half.”* Another participant shared how she tailors her messages based on an adolescent’s developmental capacity: *“It [expectations for change] depends on their developmental growth file, their cognitive ability, where they are at. Like a thirteen-year-old will understand it very differently from a sixteen-year-old [...] So I use different wording to illustrate that, but for the sixteen-year-old, most sixteen-year-olds that are cognitively kind of in a normal range, I get the sense that they say that there is this light bulb that goes off: ‘Oh, okay, this isn't going to make me into like Mr. Muscle by next week’.”* Some HCPs attributed the inability of some adolescents to understand ‘cause and effect’, or the long-term consequences of excess weight, and how this factors into the often-witnessed initial focus on weight vs. health by adolescents implementing behavior changes. This can be seen in the following quote: *“We're asking a lot of these teens when they're coming here. And I always try and fit myself into their shoes; like, what would I have said when I was 14 if somebody was asking this question, because they're actually quite difficult questions if you think about them.”*

Exhibit non-biased attitudes and practices

While some HCPs mentioned that adolescents may not perceive anything wrong with their lifestyles due to established habits, others discussed how some adolescents may not perceive themselves as ‘normal’. Specifically: *“It's a social problem that becomes individual and people feel guilty about themselves, but this isn't down to be questioned, but the society.”* HCPs described the pressure for adolescents to meet social expectations: *“There is also the social pressures*

whether it's from your friends or whoever they see on the social media to look a certain way, be a certain way, and act a certain way.” HCPs also described the prevalence of unhealthy lifestyle habits among adolescents of normal-weight, and how only adolescents with obesity are subject to the societal stereotypes associated with an unhealthy lifestyle, thus influencing the way they may perceive themselves. As one HCP commented, to which others agreed: *“When you look at the lifestyle of our teens, it's not that much of a different lifestyle of teens who don't have obesity. So, they have very similar lifestyles as their peers and we're asking them to change their lifestyle, to sort of go against, the bit of a norm out there [...] If the messages were more universal, that would be really helpful for our kids and families.”* Another HCP expanded on this viewpoint to discuss the normalization of weight: *“I can't disagree enough with that position [negatively viewing the normalization of weight] and I've heard it many times. If you are looking to motivate an individual, you need to work on making someone feel good and accepted and safe. Taking that position is creating an environment where it is far from that and that, in my mind, has perpetuated our weight management issues in North America. That type of thinking and policy that has no evidence. If anything, the science contradicts that completely and it's upsetting to me. It really does harm. It does harm. It's done more harm to our kids and families. It's got to stop.”* HCPs highlighted the value of nurturing a positive self-image regardless of weight status and not form assumptions about adolescents’ lifestyle habits and undermine efforts for weight management as well as promote the adoption of healthy lifestyle behavior changes.

HCPs also agreed that some adolescents felt worried that they will be judged when they first present to the clinic for weight management services: *“They don't want to say too much, that's what I always feel like. They are just worried whether because they've heard it at home, from school, or other physicians, that they are going to get judged by what their answers are, so the beginning might shape their answers a little bit differently.”* They reported how they worked to

ensure a judgment-free clinical environment to help alleviate these concerns; however, they shared inconsistent experiences with this approach. As one HCP stated: *“I think they learn that it's a safe place to be, that's my sense. That anxiety that is there initially gets lessened; exceptionally it doesn't [...] We've had very few drop it [weight management services] as a result of not feeling safe or feeling judged.”*

5.5. Discussion

In this qualitative study, we sought perspectives of HCPs on strategies used to deliver effective multidisciplinary health services for obesity management in adolescents. These included discussing realistic expectations regarding weight management, personalizing weight management, and exhibiting non-biased attitudes and practices. The perspectives shared by HCPs provide important considerations for helping adolescents and their families to adopt lifestyle behavior changes for managing obesity.

All HCPs highlighted families' expectations of weight loss as a primary goal. While BMI reduction is in line with current clinical practice guidelines (Styne et al. 2017), HCPs' outlook on success in our study was often related to health improvement. In some cases, such as when a comorbidity was caused by excess body weight (Kumar & Kelly 2017), it may be appropriate to recommend weight loss. Given the well-documented challenges of losing and maintaining weight loss over time (Polidori et al. 2016) that result from the complex causes and consequences of obesity (Vandenbroek et al. 2007), HCPs in our study described encouraging adolescents to reach their *best weight*, that is, a weight that can be achieved while living the healthiest lifestyle that adolescents can enjoy (Sharma & Freedhoff 2010). This approach helps families shift their attention from a singular focus on weight loss to lifestyle and behavior changes that can improve broader health outcomes and weight-related conditions (Avis et al. 2014). Of note, adolescents'

goals are often unrealistic compared to the typical outcomes achieved with lifestyle behavior modification (Rhodes et al. 2017). For example, in a recent study on expectations for treatment in pediatric weight management, adolescents reported a median weight loss of 50 pounds (compared with 20 pounds by parents); adolescents who had a desired weight loss above the median for the group (50% above the median vs. 28% below the median) experienced greater attrition ($p=0.02$) (Rhodes et al. 2017). Therefore, HCPs can explain to families the value in aiming for realistic, gradual changes in the context of biological predisposition to weight gain and regain (Polidori et al. 2016; Vandebroek et al. 2007). Delivering this information is particularly important since some parents may hold their adolescents responsible for their weight, which can be a response to parental feelings of guilt or shame for their adolescent's obesity (Kyle et al. 2018).

Our findings are consistent with clinical practice guidelines (Styne et al. 2017) that recommend HCPs to prescribe and support age-appropriate, family-centered lifestyle modifications. Being family-centered care is inclusive of the needs of individual family members, it has the potential to improve adolescent and family outcomes, experiences, and satisfaction with care as well as augment effective use of health care resources. However, the evidence for the effectiveness of parent-adolescent interventions remains limited (McGovern et al. 2008). Compared to established literature on parental influence on childhood obesity interventions (Loveman et al. 2015), there are currently no reviews exclusively on parent-only and parent-adolescent interventions for managing obesity; existing studies tend to group children and adolescents together (McGovern et al. 2008; Janicke et al. 2008), which may lead to an inconclusive evidence base. For example, most up-to-date randomized controlled trial data on 8-14-year-olds support parent-only interventions as a viable and effective alternative to family-based treatment (Janicke et al. 2008). Adolescents, especially those who have the developmental capacity for and interest in being involved in independent decision-making, should be included in their care.

In a recent systematic review, older adolescent age was associated with greater adolescent responsibility for the decision to lose weight ($p=0.002$), the weight loss approach ($p=0.007$), and food choices ($p<0.001$), and for each additional year of age, adolescents perceived less parental involvement in their weight loss (Rancourt et al. 2018). It follows that regardless of any direct changes, adolescents' inclusion in their own care is of intrinsic value.

HCPs noted the role of stigmatization on adolescents' efforts to change lifestyle behaviors. They described the need for a "universal messaging system" for adolescents with obesity, where their lifestyle habits are not subject to scrutiny because of their weight status. Indeed, blame and shame can prevent adolescents and their parents from seeking health services and worsen obesity by creating additional barriers to lifestyle behavior change, such as increased binge eating and decreased exercise and physical activity (Pont et al. 2017). Contrary to popular belief, weight-based stigma can de-motivate individuals from living a healthy lifestyle, so efforts need to be undertaken to reduce weight stigma and empower adolescents with obesity to adopt healthful changes. This can begin with HCPs modelling non-biased practices and behaviors in the clinic, including acknowledging the complex etiology of obesity, using people-first language, helping families understand current and future health risks, ensuring a safe and welcoming space, and assessing all aspects of therapy (cognitive, affective, behavioral, and social) (Pont et al. 2017).

Our study has some limitations to acknowledge. For example, most participating HCPs were female and Caucasian, so some of our findings may be less applicable to samples with other descriptive characteristics. Further, while we strived for data saturation by enhancing the quality of our data (*e.g.*, recording interviews) and narrowing our study scope, saturation may have been impacted by our sample of 16 HCPs and two sites in Canada. Finally, group dynamics may have been influenced by competition for dominance and potential conformity to answers. To address these issues and enhance meaning in our focus groups, moderators leading the focus groups had

experience in leading efficient discussions, were conscious of self-HCP and HCP-to-HCP interactions and inclusive of all members, conducted multiple focus groups from multiple sites, and ensured internal and external homogeneity in data analysis.

5.6. Conclusions

Our study emphasizes the role of HCPs in improving how health services are offered to adolescents with obesity and their families working to adopt healthy lifestyle and behavior changes. Since HCPs are at the forefront of delivering obesity health services to adolescents and their families, their perspectives and first-hand experiences provided us with valuable insight into the current multidisciplinary obesity management landscape. Specifically, HCPs are encouraged to approach delivery of weight management services to adolescents with obesity by being mindful of both internal (*e.g.*, considerations at the clinic level) and external (*e.g.*, societal attitudes) contexts for lifestyle behavior change and weight management. Our findings may be considered for inclusion in the next iteration of clinical practice guidelines. Given the lack of evidence on associations between HCPs' individual philosophies to addressing obesity and adolescent affective-cognitive, behavioral, and health outcomes, further research should be conducted to guide practice.

Table 5.1. Demographic and sociodemographic characteristics of health care providers

	HCPs (n=16)
Age (y)	43.1±10.4
Sex (n; %)	
<i>Female</i>	15; 93.8
<i>Male</i>	1; 6.3
Ethnicity (n; %)	
<i>Caucasian</i>	16; 100.0
<i>Non-Caucasian</i>	0; 0.0
Time practicing pediatric weight management (y)	5.3±4.7

Data presented as mean ± standard deviation unless otherwise specified.

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Chapter 6

Kebbe M, Perez A, Buchholz A, Scott SD, McHugh TLF, Richard C, Dyson MP, Ball GDC. Adolescents' involvement in decision-making for pediatric weight management: a multi-centre qualitative study on perspectives of adolescents and health care providers. *Patient Educ Couns* 2019; 102: 1194-202.

6.1. Abstract

Objective. To explore adolescents' and health care providers' (HCPs) perspectives on adolescents' involvement in decision-making within multidisciplinary clinical care for pediatric weight management.

Methods. In this multi-center, qualitative description study, we purposefully recruited 13–17-year-olds with overweight or obesity and HCPs from two pediatric weight management clinics in Edmonton and Ottawa, Canada. Participants completed one-on-one, in-person, semi-structured interviews (adolescents) or focus groups (HCPs), which were audio-recorded, transcribed verbatim, and managed using *NVivo 11*. Data were analyzed by two independent researchers using inductive thematic analysis and the congruent methodological approach for group interactions.

Results. A total of 19 adolescents and 16 HCPs participated. Three themes were identified in relation to adolescents' decision-making for weight management, including (i) conditions for adolescent involvement, (ii) preferences for adolescent involvement, and (iii) extent of parental involvement.

Conclusions. Although adolescents and HCPs positively valued adolescents' involvement in making decisions regarding their weight and health, the extent to which adolescents wished to be involved in the decision-making process varied between individuals and families.

Practice Implications. HCPs are encouraged to include adolescents and families in their health services delivery, including consulting individually with adolescents and tailoring care to their expectations regarding decision-making.

6.2. Introduction

Data from a recent systematic review indicated that approximately 30% of American and Canadian adolescents and 22-25% of European adolescents met the criteria for overweight or obesity (Biblionni et al. 2013). Compared to their younger peers with obesity, adolescents are more likely to live with obesity (Simmonds et al. 2015), discontinue interventions and health services designed for weight management (Dhaliwal et al. 2014), and be unsuccessful in achieving clinically significant weight loss (Wiegand et al. 2014). These data are concerning since pediatric obesity has several adverse cardiometabolic (Skinner et al. 2015), psychosocial (Small & Aplasca 2016), and social (Strauss & Pollack 2003) consequences and may lead to long-term health consequences, such as type 2 diabetes (Small & Aplasca 2016).

Setting appropriate and attainable treatment goals using a family-centered approach is at the core of lifestyle interventions for pediatric weight management. While this approach supports the inclusion of parents in the decision-making process, it also recognizes the importance of patient participation, which tends to increase from childhood to adolescence (Eichner et al. 2012). In general, most patients want to be included in their care to some extent, which we believe is highly relevant to adolescents with obesity (Kebbe et al. 2018; Bartholome 1995). However, children and youth are still only engaged in less than 20% of the communication in a typical medical care visit (Vigilante et al. 2015; Meeuwesen & Kaptein 1996). Adolescents feel marginalized when they are excluded from conversations about their own health (Young et al. 2003), which may deter them from being engaged and interested in their own health care (Carcone et al. 2016). Ensuring effective patient-provider communication has been linked to patient satisfaction with health care and health care providers (HCPs) (Bredart et al. 2005; Stein et al. 2005); it is equally important for better patient adherence to treatment recommendations (Zolnierek & DiMatteo 2009; Matthews et al. 2009; Nagelkerk et al. 2006; Aikens et al. 2005; Maddigan et al. 2005; Schillinger et al. 2003;

Piette et al. 2003; Heislet et al. 2002; Street et al. 1993) and improved patient outcomes (Carcone et al. 2016). For example, a number of adolescent weight management studies demonstrated positive changes in body mass index (BMI) z-score, dietary intake, and physical activity when adolescents set lifestyle goals themselves (McDonald & Trost 2015; Nguyen et al. 2014; Latif et al. 2011; Shilts et al. 2009). Given that a lack of involvement in one's own care may lead to dissatisfaction with care (Coulter et al. 2008), adolescents are likely to benefit and be empowered by voicing their opinions and participating actively in the decision-making process, especially when decisions consider their values, preferences, and circumstances.

Physician attitudes on shared decision-making in clinical practice are well-documented across a range of conditions (*e.g.*, anaesthesia, cancer) (Pollard et al. 2015). While patients ≥ 12 years old are capable of participating in decision-making (Hein et al. 2015; Hein et al. 2015; Hein et al. 2014), studies exploring adolescents' roles in decision-making often rely on parental reports, despite the fact that parents may be unreliable proxy reporters (Lipstein et al. 2015) and have suboptimal communication with HCPs (Torke et al. 2012). To our knowledge, perspectives of adolescents and HCPs regarding adolescent decision-making in pediatric weight management (PWM) have yet to be explored. Therefore, understanding both adolescents' and HCPs' experiences and preferences in setting lifestyle and behavior goals (as a proxy for decision-making) in PWM may help to improve adherence to goal-setting and treatment outcomes. The purpose of our study was to describe perspectives of adolescents and HCPs related to the involvement of adolescents in decision-making in multidisciplinary clinical care for managing obesity.

6.3. Methods

Study design

This multi-center, qualitative study was conducted from July 2017 to January 2018. Informed by patient-oriented research (Canadian Institutes of Health Research 2014) and the qualitative description method as described by Sandelowski (2010) (Sandelowski et al. 2010), this study sought to provide direct, practical insights on our study topic from the perspectives of adolescents and HCPs by staying close to the data and surface of the words. We conducted this study in Canada's two official languages to gain a better representation of adolescent experiences from Anglophone and Francophone communities that may vary by language and culture. Per the World Health Organization, we defined overweight, obesity, and severe obesity as $>+1$, $>+2$, and $\geq+3$ BMI SD units, respectively (World Health Organization 2006). We obtained research ethics and operational approvals from the University of Alberta (Edmonton, AB), Alberta Health Services (Edmonton, AB), and the Children's Hospital of Eastern Ontario (Ottawa, ON).

Participants and recruitment

We used purposeful sampling to recruit adolescents with obesity and HCPs from the Pediatric Centre for Weight and Health (PCWH; Stollery Children's Hospital, Edmonton, AB) and the Centre for Healthy Active Living (CHAL; Children's Hospital of Eastern Ontario, Ottawa, ON), both of which are located in urban areas in Canada and offer long-term, patient- and family-centered multidisciplinary clinical care in English and/or French to families of children and adolescents with obesity. Adolescents were eligible to participate if they were (i) 13–17 years of age with a BMI $\geq 85^{\text{th}}$ percentile, (ii) receiving care for pediatric weight management for ≥ 3 months at one of the two sites to ensure that they had spent some time reflecting on their health behaviors and working with HCPs on weight management, and (iii) fluent in English or French. In addition

to recruitment posters displayed at each site (Appendix B), MK and the CHAL research coordinator (CM) obtained a list of adolescents who met our inclusion criteria from clinical registries and called or met families in-person to explain the study and gauge interest. We excluded adolescents with known developmental disabilities because this group may experience obesity management differently and may benefit from independent research. Adolescent interviews were scheduled based on availability; interested participants were given the option to receive reminder calls, texts, or emails the day prior to the scheduled interview. HCPs were eligible to participate if they provided care to adolescents for PWM for ≥ 6 months, which ensured that they had sufficient clinical experience working with that age group. We scheduled focus groups with interested HCPs (dietitians, exercise specialists, nurses, pediatricians, psychologists, and social workers) at the corresponding site. All participants *(i)* provided informed and written consent (parents, HCPs) and/or assent (adolescents) on site prior to initiating study procedures (Appendix B) and *(ii)* were offered \$25 (CDN) gift cards as tokens of appreciation upon study completion.

Data collection

MK conducted one-on-one, in-person, semi-structured in-depth interviews (30–60 minutes in duration) with adolescents in either English (PCWH) or French (CHAL) at the participating clinics. We asked adolescents to share their perspectives on their experiences and preferences in decision-making at the clinic, including how they viewed their parents' and HCPs' roles (see Table 4.1 for interview questions). Details regarding the development and refinement of the interview guide are described elsewhere (Kebbe et al. 2018). We collected demographic (*e.g.*, date of birth, gender) and anthropometric (*e.g.*, height, weight) information from adolescents and their parents (for descriptive purposes) either in-person or from medical records.

We conducted three semi-structured focus groups (60–90 minute in duration; two in Edmonton [including one pilot] and one in Ottawa). Before the first session was held, the focus group interview guide was developed (MK) and refined through discussions with team members who had content and methodological expertise (AP, TLFM, SDS, GDCB) as well as following the pilot focus group. We asked HCPs (4–6 per focus group) open-ended questions regarding how they approached and included adolescents in clinical discussions and decision-making (*e.g.*, goal-setting) (see Table 6.1 for focus group questions). The sessions were moderated and notes were recorded by members of the research team (MK, AP) who debriefed immediately following the focus group sessions. Following the focus groups, we collected descriptive and demographic information from HCPs using a password-protected survey disseminated via email.

Interviews with adolescents and focus groups with HCPs were audio-recorded, uploaded to an online and secure file sharing platform (*LabKey*) maintained by the Women and Children's Health Research Institute (UAlberta), and transcribed verbatim by an Alberta-based group (*Translation Agency of Alberta*) for analysis. MK documented field notes and memos immediately after the interviews. These data, along with interview transcripts, provided a comprehensive overview of the interview and assisted with triangulation, whereby data were collected from more than one source, coded by two independent researchers, and discussed internally with team members.

Data analysis

MK verified the de-identified transcripts for completeness and accuracy, which were imported to and managed in *NVivo 11* (QSR, Melbourne, Australia), then analyzed thematically and independently by two members of the research team (MK, AP). Because the information we collected from our pilot focus group with HCPs did not differ substantially from the subsequent

two focus groups, data from all three were combined for analysis. MK and AP followed the steps outlined by Braun and Clarke (2006) for thematic analysis, including: (i) reading and re-reading the transcripts for familiarization, (ii) discussing key ideas and themes arising from the data, (iii) drafting a coding scheme and finalizing it at the point of saturation, and (iv) coding the data according to common themes (Braun & Clarke 2006). The coding tree was organized by topic (e.g., decision-making), root codes (e.g., conditions, preferences), and code names (e.g., lack of confidentiality). Themes and exemplar quotes were then shared and confirmed with members of the research team (CR, GDCB), which led to subsequent refinements (e.g., organization of data, confirmation of theme titles). We adhered to the congruent methodological approach while analyzing group interactions in our focus group data, including making judgments in relation to frequency, extensiveness, intensity, specificity, and level of agreement in the discussion (Duggleby 2005). Details regarding translation processes from French to English are described elsewhere (Kebbe et al. 2018).

Methodological rigor

Several strategies were used to ensure methodological rigor, including investigator responsiveness (e.g., ongoing analysis), methodological coherence (e.g., congruence between the research question and method), sampling adequacy (e.g., data saturation), and theoretical thinking (e.g., reconfirming ideas emerging from data in new data) (Morse et al. 2002). MK also examined her own role as a researcher through an ongoing critical reflection, including personal (identity, interests, and values), functional (nature of the study), and disciplinary (field of inquiry) reflexivity (Wilkinson 1988), and how these characteristics may have shaped the research process and influenced data collection and analysis.

6.4. Results

A total of 19 adolescents and 16 HCPs participated in our study. Most adolescents were female, Anglophone, Caucasian, lived with severe obesity, and had parents who met criteria for overweight and obesity, while most HCPs were female and Caucasian (see Table 6.2). No appreciable differences were observed across clinics regarding perspectives of adolescent involvement in decision-making in PWM; consequently, we grouped our data-generated themes, which included (i) conditions for adolescent involvement in decision-making for weight management, (ii) preferences for adolescent involvement in decision-making for weight management, and (iii) extent of parental involvement in decision-making for weight management.

Conditions for adolescent involvement in decision-making for weight management

HCPs shared considerations in relation to the decision-making process with adolescents, including providing support, rapport-building, and the individuality of the adolescent. First, HCPs described their duty in helping adolescents and their families make decisions surrounding their health and lifestyle and commented on the processes that they typically followed in their medical visits. An example is included below:

“Often, if I was just meeting the family, I would review what I had heard from them, say where I felt there were some areas of need, and give some suggestions on how those areas could be tweaked with letting them know I was completely open to them, and asking them where they wanted to start working and what were some ideas they had for goals and work from there.”

HCPs described using a strengths-based approach in their health care delivery. This included components of active listening and reflection, and was sometimes strengthened by using specific tools or strategies to engage adolescents, as quoted below.

“So the problem with teens is that you put them on the spot to talk is hard. So you're usually better with teens if you are in a moment of doing things [...] A lot of kids. they just shrug, 'I don't know, not sure, I don't know, not sure'. So, you know, in psychology, there are many ways and tools and things that you can do with kids.”

“It depends on where they are in their decision-making. If they are already there that they want to do lifestyle changes, then I don't need motivational interviewing, I think, because it's more about a back and forth. So, I feel it's more about working with the goals and what they want to do and work on.”

HCPs emphasized the importance of developing mutual trust and rapport with adolescents. HCPs explained that in addition to family consultations, practicing confidential care (*i.e.*, private consultation with adolescents excluding parents) was essential to explore adolescents' thoughts, preferences, and readiness for behavior change as a means of strengthening rapport and progressing with care in a collaborative manner. As some HCP affirmed:

“I think that's key – if they open up. So, a lot of the first couple appointments for us is just rapport building, like not really goal-setting, not really getting into what you are hoping to support them with. It's just building that rapport in order to get them to open up.”

“I find that just that empowerment and that engagement with the teen directly is really important because I get a lot of stuff from the teens that I would not otherwise get with the parents in the room.”

In addition, HCPs described adolescents presenting with different backgrounds, including language and cultural differences, levels of competency, and problem-solving skills and how decision-making was tailored to these characteristics. As one HCP stated:

“Different teens come with different levels of competency; a fourteen-year-old can be very mature and very capable of making those decisions and then you get an older child where you feel like you’re going to need a bit more.”

Preferences for adolescent involvement in decision-making for weight management

Most adolescents were interested in making decisions related to their care. Some expressed a desire for complete and autonomous involvement, while others wanted to share responsibilities and decision-making with their parents. For example, some valued feedback on their decision-making, but preferred to make the ultimate decision.

“I want a little bit more involvement, but not of course in every meeting because I don’t think I could emotionally handle that, but I would like a little bit more in decision-making so I can like kind of be like ‘I think this is going good and this isn’t, and I kind of want to do this, but I don’t want you to do this, please’.”

“I like how they can thoroughly talk about what's possibly going wrong in my system or what I can do to improve myself. They talk about it thoroughly, but in the end, it's my choice, right? But I do like that they can show me the different options of what I can do and then let me decide sort of thing.”

Adolescents attributed this desire to several reasons, such as their increased independence, control over their own body and life, and differing priorities from parents and HCPs. As one adolescent stated:

“You feel proud because it's your idea.”

Conversely, other adolescents preferred that their parents or HCPs made the final decision in order to feel more obligated to commit to making the change. This was described by one adolescent:

“I actually rather like the person making the goal because it feels – myself, like I know if I make my own goal, I'm not going to do it. If it's another person, like if they say we should do this goal and then next time you tell me all about it and then I have to reach it, so I can tell them all about what happens and explain that.”

Like adolescents, some HCPs described adolescents who were dependent on their parents to act as proxies in their clinical decision-making, while others reported that some adolescents preferred a non-paternalistic approach to care.

“Each teen is very different, some will go directly to their parents and say ‘Uh, I don't know’ and some will speak up freely on their own and more so when the family's out.”

“The teens do not respond well to prescriptive directive. They just shut down when their parents are asking for that way [...] There is a disagreement in how [the partnership should go].”

HCPs agreed with adolescents that adolescence is a period of increased independence and autonomy from parents and that adolescents can best identify their own priorities. As some HCPs expressed:

“I find sometimes parents are like ‘I know my child, this is what is best for them’, but no one knows what is really good for you, other than you.”

“It's very interesting because as a clinician, I try to really put the emphasis on their life. They are the master of their life, they should decide what is important, what they want to change, and what is the more realistic, so it can be sustainable.”

Extent of parental involvement in decision-making for weight management

A number of adolescents described limitations to what and how much they could share during their clinical appointments due to their parents' presence, which raised concerns of privacy and confidentiality. As one adolescent expressed:

“Yeah or trying not to say a lot of things in front of your parents, but at the same time, because you don’t want them to get upset or after they ask you questions when you get home, I mean it’s easier when they’re not here, you can really say what you want to say, no need to be careful.”

Adolescents expanded that they felt incapable of having their voices heard by HCPs due to their parents’ dominance over the clinical discussion. Specifically, adolescents recounted times when HCPs considered parents’ priorities over theirs.

“Yeah, I like when I’m all alone with [clinicians] first, because I don’t know, I find that my parents have their own opinion, and sometimes, it like pushes mine down, if that makes sense. Like, I’m talking, and then my mom or my dad will say something over me, and then whatever I said is gone, like it’s irrelevant, and so here I am trying to [be equally heard].

Some adolescents described having a healthy relationship with their parents and wanted them to contribute to decision-making and the clinical encounter. For example, when asked about the presence of parents during clinical consultations, one adolescent stated:

“Yeah because I might lie, and my dad usually keeps me in check and it’s pretty nice like that.”

Similarly, HCPs commented that the extent of decision-making done by adolescents varied family to family. As quoted:

“Sometimes, parents are great, and then there are the few that just want to be the one running the show.”

“I think it depends on the relationship that the child has with the parent. There are kids who when their parents are in the room will not speak at all. There are kids who ask for their parents to not be in the room and then potentially share goals after [...] but they feel a little bit freer to talk to us without the parent sort of jumping in.”

HCPs further described how some parents expected their son or daughter to make decisions and be responsible for their own health behavior changes. A few HCPs shared their thoughts on these expectations:

“In some cases, I think there's some even bullying, a little bit, in terms of parents saying ‘This is what we're going to do’. So, I think we try to determine early on whether or not we can have the two of them together in the room, especially if it's that parent who is ‘You need to do it, you need to do it’ and sits there and says, ‘See, see [taps loud on table]’.”

“So they don't necessarily have the support from the parents and the expectations the parents have for them is that you are responsible, you're old enough, you should be making these decisions on your own without support from parents, and I think that makes it hard.”

On the other hand, HCPs noted that some parents preferred a prescriptive approach to care (*i.e.*, being told what to do). In these cases, HCPs emphasized that their approach to supporting adolescents and families was family-centered, highlighting the key role played by parents in

making and maintaining behavior changes while being mindful of adolescents' preferences. As one HCP shared:

“Often, you can see, they’re like, ‘But tell me what I need to do’. They want the expertise of the clinician, but at the same time, we’re trying to really work as a collaboration.”

6.5. Discussion

In this qualitative study, we explored decision-making from adolescents' and HCPs' perspectives in the context of multidisciplinary clinical care for weight management in adolescents with obesity. Overall, there were both similarities and differences between the views and attitudes expressed by adolescents and HCPs. The perspectives shared by adolescents and HCPs provided practical and important insights into goal-setting for lifestyle change as a proxy for decision-making in pediatric weight management.

Adolescents' involvement in health care decisions can take many forms, from general opinion-sharing to expressing a firm decision (McCabe 1996; Miller & Harris 2012). The degree of involvement of adolescents depends largely on age and maturity (Lipstein et al. 2015). Unlike research on other chronic conditions has shown (Duncan et al. 2014), HCPs in our study delivered care that was adapted to families' characteristics, circumstances, and needs. HCPs also acknowledged preferences regarding adolescent independence and autonomy, including dedicating alone time for consultations with adolescents.

To that end, our findings are aligned with other studies indicating that adolescents show an increased desire for independence (Grootens-Wiegers 2017) marked by distancing from parents (Banfield et al. 2016) and differing priorities in health care (Nobles et al. 2016; Savage & Callery 2005). It follows that almost all adolescents in our study described a preference for being included

in treatment decision-making with respect to setting their goals; although, this included varying levels of preference for individual and third party (parents/HCPs) involvement, which others have also reported (Grootens-Wiegers et al. 2017). Aligned with principles and practice of patient- and family-centered care, this approach emphasizes a partnership between patients, families, and HCPs.

The influence of parenting behaviors and parenting styles on adolescent outcomes is well documented in the literature (Hoskins 2014). Parenting typologies differ by behavior and include authoritative (high responsiveness, high control), authoritarian (low responsiveness, low control), permissive (high responsiveness, low control), and uninvolved (low responsiveness, low control) parenting styles (Hoskins 2014). From descriptions provided by adolescents and HCPs in our study, it appears that parents of adolescents existed on a spectrum of parent typologies. While parents with an authoritarian parenting style are low in responsiveness, highly demanding, exhibit low levels of trust and engagement toward their adolescent, and discourage open communication, parents with a permissive and uninvolved parenting style provide more opportunity for adolescent inclusion in decision-making (Hoskins 2014). All three approaches, however, are characterized by negative effects on adolescent outcomes, including low self-esteem, school misconduct, and depressive symptoms during adolescence (Milevsky et al. 2008; Querido et al. 2002; Simons et al. 2002; Ginsburg & Bronstein, 1993; Maccoby & Martin 1983). Normally, adolescents are subject to lesser parental involvement than children. This is consistent with authoritative-style parenting, where parental monitoring decreases across adolescence, acknowledging adolescents' increasing demand for independent decision-making (Luyckx et al. 2011). This parenting style is also most often associated with positive adolescent outcomes (Hoskins, 2014; Simons et al. 2007). For example, in a study on adherence to diabetes management and quality of life, Mlynarczyk (2013) found that parents who were perceived to be authoritative by their adolescents had better adherence

to their prescribed treatment plan as well as better perceived quality of life (Mlynarczyk 2013). Nevertheless, adolescents' capacity to decide on their own care is frequently questioned. This concern is not entirely unfounded and may justify obesity prevention and management recommendations that encourage HCPs to focus on family-centered care (Styne et al. 2017), including motivational interviewing to assess different levels of readiness for change between parents and adolescents (Pujalte et al. 2017). To ensure that parents do not withhold attempts for adolescent inclusion on the basis of perceived authority and lack of rights to adolescent participation, Sisk et al. (2017) presents the 'arbitrative model' to help HCPs in navigating decisional discord that may arise, including (i) maintaining family cohesiveness, (ii) respecting parental authority, and (iii) acknowledging developing autonomy of adolescents (Sisk et al. 2017). This model may be considered within health care interactions for adolescent weight management.

Our study has some limitations that need to be acknowledged. First, most adolescents were Caucasian and had severe obesity; most HCPs were female and Caucasian. While some perspectives may be experienced universally, others may be less applicable to other demographic and anthropometric groups. Second, we interviewed adolescents who were enrolled in publically-funded, multidisciplinary clinical programs, so the decision-making experiences of adolescents with obesity who do not initiate or terminate care prematurely may be different. Further, as is inherent in qualitative research using focus groups, inter-personal dynamics may have been influenced by competition for dominance and potential conformity to answers. To address these issues and enhance meaning in our focus groups with HCPs, the moderators leading the focus groups had experience in group facilitation and sought to provide opportunities for all members to share their perspectives. Finally, as a cross-language study that included data collection in both English and French, the language transformation process may raise some methodological questions. To remain true to the original source data, we adhered to established recommendations

(Santos Jr et al. 2015; van Nes et al. 2010; Chen & Boore 2010; Birbili 2000) to ensure that no meaning was lost. A detailed description of the translation process is described elsewhere (Kebbe et al. 2018).

6.6. Conclusions

Adolescents and HCPs alike valued adolescents' participation in decision-making for pediatric weight management, including one-on-one discussions without parental presence to reflect adolescents' preferences for independence and autonomy in their clinical decision-making regarding goal-setting for weight management. The extent to which adolescents wished to be involved in the decision-making process varied by individuals and families.

6.7. Practice implications

We suggest HCPs continue to implement recommended strategies for clinical management of obesity while considering adolescents' preferences in decision-making regarding managing their weight and health. HCPs may wish to engage children of all ages (as early engagement may foreshadow later engagement), inform adolescents about the reasons for and the importance of being engaged, consider adolescents' cognitive levels, and adhere to individualized measures to adolescent decision-making, all the while establishing realistic and achievable goals for target behaviors. Adolescents' degree of openness and disclosure is likely to depend on the extent of rapport that they have with their HCPs, which may be facilitated by acknowledging adolescents' desire for independence, exuding a non-judgmental and safe clinical environment, and providing one-on-one consultations. In doing so, HCPs may wish to consult Sandra Petronio's Communication Privacy Management Theory (Petronio & Durham 2008), including reflecting on privacy boundaries and encouraging adolescents to achieve a suitable balance of privacy and

disclosure (Arora & McHorney 2000). Behavior change techniques, including motivational interviewing (Pujalte et al. 2017), and appropriate tools and resources (*e.g.*, CCs [Ball et al. 2013]), can be used to augment discussions and foster rapport-building with adolescents and family members.

Table 6.1. Interview guide exploring involvement of adolescents in decision-making for pediatric weight management

Adolescent one-on-one interviews

1. Do your parents usually go/come with you to your clinical appointments?
2. We hear from other teens that, sometimes, their parents don't know the full story and so, sometimes, they don't have much of a say during appointments. Does this apply to you? Please tell me more.
 - a. Do you find that your clinicians or parents tend to make the decisions for you?
 - b. Would you prefer going to your appointments alone?
 - c. Do you think going alone to your appointments would help you better express yourself? Be more in charge?
3. Would you prefer to be more involved in making decisions about your own care or would you rather your parents/clinicians take charge? Please tell me more.
 - a. Do you usually stick with the goals that you make?
 - b. Do you think if you were more involved, you'd want to make more effort to stick to the plan you personally made?

Health care provider focus groups

1. Describe teens' involvement in making decisions in relation to their care.
 - a. How important do you think it is for (i) teens, (ii) parents, and (iii) clinicians to be involved in decision-making?
 - b. What are the characteristics of most involved teens? What are challenges of involving teens in decision-making?
 - c. What information do teens need to successfully make decisions?
 2. How do you involve teens in decision-making? Do you use goal-setting in your practice?
 - a. How do you go about setting goals with families?
 - b. How are teens involved when using this technique?
 - i. Do they set their own goals or are they set by parents or care providers?
 - ii. Do they tend to stick with set treatment goals?
 - c. What works? What doesn't work?
 3. Overall, what are your thoughts on using goal-setting for pediatric weight management?
-

Table 6.2. Demographic, anthropometric, and sociodemographic characteristics of adolescents and their parents and health care providers

	Adolescents (n=19)	Parents (n=19)	HCPs (n=16)
Age (y)	15.1±1.7	49.5±9.0	43.1±10.4
Sex (n; %)			
<i>Female</i>	11; 57.9	13; 68.4	15; 93.8
<i>Male</i>	8; 42.1	6; 31.6	1; 6.3
Ethnicity (n; %)			
<i>Caucasian</i>	13; 68.4	13; 68.4	16; 100.0
<i>Non-Caucasian</i>	6; 31.6	6; 31.6	0; 0.0
Education (at least college or university) (n; %)	-	10; 52.6	-
Household Income (>\$50,000/y CDN) (n; %)	-	13; 72.2 ^a	-
Time practicing pediatric weight management (y)	-	-	5.3±4.7
Height (cm)	164.7±7.0	164.9±11.0	-
Weight (kg)	103.8±16.7	83.7±14.4	-
Weight Status (n; %)			
<i>Normal Weight</i>	-	1; 5.3	-
<i>Overweight</i>	-	10; 52.6	-
<i>Obesity</i>	4; 21.2	6; 31.6	-
<i>Severe Obesity</i>	15; 78.9	2; 10.5	-
Body Mass Index (BMI; kg/m ²)	37.9±4.1	30.8±5.2	-
BMI Percentile	99.9±0.001	-	-
BMI Z-Score	3.5±0.6	-	-

Data presented as mean ± standard deviation unless otherwise specified.

^an=18; one parent chose ‘prefer not to say’.

6.8. References

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Chapter 7

Kebbe M, Perez A, Buchholz A, McHugh TLF, Scott SD, Richard C, Dyson MP, Ball GDC. *Conversation Cards for Adolescents*[®]: a patient-centered communication and behavior change tool for adolescents with obesity and health care providers. Health Commun 2019.

7.1. Abstract

Background. Health care providers (HCPs) report barriers to effectively communicate with adolescents with obesity surrounding lifestyle behavior change, and may benefit from tailored health communication tools to complement their consultations.

Aims. To describe the conceptualization, development, production, and dissemination of *Conversation Cards for Adolescents*[®] (CCAs), a patient-centered, bilingual (English and French) tool intended to facilitate adolescent-HCP communication as well as lifestyle and behavior changes among adolescents with obesity.

Methods. Our multiple mixed-methods, cross-language, and patient-oriented research comprised three interrelated phases from 2016 to 2018 and was conducted with a variety of stakeholders (adolescents with obesity and professionals, including HCPs). These included scoping the literature and consultation activities (Phase 1); 1-on-1 interviews, focus groups, and data prioritization activities (Phase 2); and designing, refining, and disseminating CCAs in collaboration with Obesity Canada (Phase 3).

Results. A total of 571 adolescents and 31 HCPs were included across the three phases. From Phases 1 and 2, we identified and prioritized 153 barriers, enablers, and potential enablers (categories) related to the adoption of healthy lifestyle behaviors among adolescents with obesity. In Phase 3, we designed CCAs, a hard copy deck of 7 suits and 45 cards equally distributed across the three categories.

Conclusions. Our research generated a practical, patient-centered, bilingual tool that may optimize clinical communication and tailored messaging for lifestyle behavior change among adolescents with obesity.

7.2. Introduction

“The basic premise behind tailored health communication is that information that is customized to an individual (rather than a group) will be viewed as more personally relevant, will be more likely to be read and cognitively processed, and ultimately will have a better chance of stimulating behavioral change.” – Noar, Harrington, Van Stee, & Aldrich (2011)

Health care providers (HCPs) are uniquely positioned to communicate medical information to patients and support health promotion initiatives, including initiating conversations surrounding lifestyle behaviors of individuals with obesity. Meta-analyses indicate that effective communication by HCPs, including empathy, question-asking, and establishing rapport, can lead to meaningful improvements in patient adherence to care (Zolnieriek & DiMatteo 2009) and more positive patient experiences and health outcomes such as improved self-efficacy (Doyle et al. 2013). However, HCPs experience challenges in effectively communicating with pediatric patients and families regarding obesity and weight management, a reality influenced by perceptions of lack of training, limited time, low competence/knowledge about obesity, and weight-related sensitivities (Bucher Della Torre et al. 2018; He et al. 2010). HCPs have also been shown to engage in less patient-centered communication when they believe their patients to be non-adherent (Street et al. 2007) and with members of stigmatized groups, including individuals with obesity (Gudzune et al. 2013). This contradictory approach to care may lead to avoidance of healthcare settings, lower ratings of care, negative mental health, and poor adherence among patients (Vartarian & Novak 2011; Penner et al. 2010).

Research concerning the interaction process between adolescents with obesity and HCPs is still scarce, but available studies point at the importance of adolescent engagement in decision-

making for their own care and the influence of parental presence during the medical encounter on adolescents' participation in discussions (Kebbe et al. 2019; Kebbe et al. 2018b). Particularly important in the adolescent-HCP relationship is adolescents' ability to voice their preferences and concerns as a collaborative act with HCPs' decisions (Britten et al. 2000). Therefore, defining adolescents' health-related problems as experienced in their everyday life and the ways in which these influence their normal functioning alongside parents' narratives and HCPs' biomedical perspectives may minimize the often-evident discrepancy in the views and orientations of all parties involved.

Our research builds on the ways in which HCPs can grasp the nuances of health communication and provide opportunities for adolescents with obesity to participate in goal-setting for lifestyle behavior change as a proxy for decision-making. Lifestyle interventions in adolescents with obesity have been shown to be effective in improving cardiometabolic risk factors, including improvements in low-density lipoprotein cholesterol, triglycerides, fasting insulin, and blood pressure (Ho et al. 2012). However, adherence to recommended nutrition, physical activity, sedentary behavior, and sleep habits is low among adolescents with obesity (Tremblay et al. 2015; Ball et al. 2008). Emphasizing the importance of healthy lifestyle behaviors as opposed to weight loss may allow for better experiences by providing a less threatening healthcare environment, thereby increasing the likelihood of adolescents to adopt healthy lifestyle changes (Lewis et al. 2010; Yancey et al. 2006). This creates a need for evidence-based, effective approaches to promote overall health and well-being in adolescents and address associated health risks and complications of obesity (Small & Aplasca 2016; Skinner et al. 2015).

Our team developed *Conversation Cards for Adolescents*[©] (CCAs), a patient-centered, bilingual (English and French) tool that may help to streamline adolescent-HCP communication and help adolescents with lifestyle behavior change. CCAs were designed with two key principles:

(1) message tailoring and (2) behavioral theories. Message tailoring is a very promising line of research for lifestyle behavior change (Noar et al. 2011) and has been found to be effective in increasing comprehension of information and addressing health disparities (Freimuth & Wuinn 2004; Resnicow et al. 1998). As such, CCAs were developed with the purpose of customizing messages to an individual adolescent with obesity while simultaneously implementing cultural competence, or responsiveness to adolescents' beliefs, health practices, and linguistic and cultural needs as well as communication preferences. Further, tailoring literature is persuasive as it has often been driven by one or more behavioral theories (Noar et al. 2011). The use of theories allows for the uniform operationalization of variables that may explain why and how individuals perform behavior. Guided by the Social Ecological Model (Sallis et al. 2008) and the Social Cognitive Theory (Bandura 1986), CCAs consider the influence of micro- (e.g., self-regulation) and macro- (e.g., weight stigma) level factors on lifestyle behaviors and the importance of human agency in the pursuit of long-term goals. The purpose of this report was to describe the conceptualization, development, production, and dissemination of CCAs.

7.3. Methods

Conducted from May 2016 to December 2018, our research adopted a multiple mixed-methods research design, which was adapted from previous similar studies to develop health communication, decision-making, and priority-setting cards (Matteson et al. 2014; Ball et al. 2013; Brown et al. 2013), and included cross-language and patient-oriented research principles.

Cross-language research. To improve the quality of care provided by HCPs, there is a need for qualitative research to be linguistically and culturally representative of study participants (Esposito 2011; Yach 1992). Cross-language studies – research involving two or more languages – may

bridge the gap between language and culture, offering an understanding of the cultural context of individuals from varied backgrounds. We conducted our study in Canada's two official languages (English and French) to account for cultural diversity and better represent Canada's population of Anglophone and Francophone adolescents with obesity in the conceptualization, development, production, and dissemination of our tool.

Patient-oriented research. Patient-oriented research engages patients as partners (*vs* participants) in research, focuses on patient-identified priorities, and aims to improve healthcare systems and practices (Canadian Institutes of Health Research 2014). Patient-oriented research encourages an ethical approach to clinical research since it accounts for a high level of transparency in researchers' agendas (Solomon et al. 2016). Importantly, since the experiences and priorities of partners are integrated in the research, it is of intrinsic value regardless of any direct changes or improvements to the health outcomes of patients (Amirav et al. 2017). Patients can be engaged on a spectrum, from informing them about the research (level 1) to empowering them to make independent research decisions (level 5) (Amirav et al. 2017). The research we carried out was reflective of level 3, or *involve*, on the IAP2 (International Association for Public Participation) spectrum of patient engagement. In designing our research, we integrated all patient-oriented research principles by involving adolescent patients with obesity in the design, planning, interpretation, and dissemination of our research as well as establishing partnerships with relevant stakeholders (*e.g.*, Obesity Canada personnel, HCPs) in multidisciplinary settings to improve healthcare practices through the knowledge earned.

We mapped our studies across three sequential phases and steps (Figure 1). Described below, phases include Phase I: Conceptualization; Phase II: Development; and Phase III: Production and Dissemination. Ethical and operational approvals were granted by human research

ethics boards from study sites in Edmonton and Ottawa, namely the University of Alberta (Pro00067835; Pro00070410), Alberta Health Services (#33476; #36627), and the Children's Hospital of Eastern Ontario (#7697).

Phase I: Conceptualization

Phase I of our research had an overarching goal of providing a foundation of knowledge related to lifestyle behaviors of adolescents with obesity. This phase also informed our qualitative and quantitative studies described in Phase II. Healthy lifestyle behaviors were defined based on perceived indicators (*e.g.*, meeting lifestyle recommendations) and dimensions (*e.g.*, emotional, social, physical). These included, but were not limited to, (*i*) nutrition – consumption of fewer unhealthy and more healthy foods; reduction of disordered eating, eating speed, number of servings or portion sizes; and regularization of timing of dietary intake, (*ii*) physical activity – participation in structured (*e.g.*, exercise and sports) or unstructured (*e.g.*, walking and cycling) activities, (*iii*) sedentary behaviour – reduction in screen time (*e.g.*, video games) or seated time (*e.g.*, reading), and (*iv*) sleep – appropriate quality and duration.

Step 1 – Scoping review and stakeholder consultation

From May 2016 to May 2017, we conducted a scoping review to map the English and French literature on the lifestyle behaviors of adolescents with obesity (n=17 articles; n=546 adolescents) (Thomas & Harden 2008). Specifically, we (*i*) explored barriers and enablers experienced by adolescents with obesity working to change their lifestyle in nutrition, physical and sedentary activities, and sleep habits and (*ii*) identified gaps in the literature. As part of this review, we completed a stakeholder consultation with adolescents with obesity (n=5) and HCPs (n=15) using purposeful and snowball sampling to (*i*) gain their perspectives on and interpretations of our

findings, *(ii)* fill in any knowledge gaps identified by our review, and *(iii)* seek additional articles of relevance. We employed an abductive approach to thematic analysis (Thomas & Harden 2008) using the Social Ecological Model (Sallis et al. 2008) to synthesize findings from our review and content analysis (Elo & Kyngäs 2008) to analyze information gained through our stakeholder consultations.

Step 2 – Engagement panel

In July 2017, we involved adolescents with obesity (n=5) as part of a patient engagement panel at the Pediatric Centre for Weight and Health (PCWH; Stollery Children’s Hospital, Edmonton, AB) (Kebbe et al. 2018b). Specifically, our purpose was to explore adolescents’ experiences and priorities in weight management, their perspectives on adolescent engagement in research, and their suggestions for the design and procedures of the subsequent phases. Our intention was to capture a range of issues that were pertinent to adolescents as they worked to make healthy lifestyle behavior changes as well as inform the development of our tool.

Phase II: Development

Phase II of our research had an overarching goal of identifying and prioritizing factors related to the adoption of healthy lifestyle behaviors among adolescents with obesity. This phase also informed the development of our tool described in Phase III. All participants provided informed and written consent or assent and were offered \$25 to \$50 (CDN) gift cards as tokens of appreciation upon study completion.

Step 1 – Data generation

From July 2017 to January 2018, we interviewed adolescents with obesity and HCPs to further

explore issues pertaining to lifestyle behaviors and health care delivery for adolescent weight management (Kebbe et al. 2019; Kebbe et al. 2018b). Specifically, our purpose was to identify *(i)* barriers and enablers in the context of healthy nutrition, physical and sedentary activities, sleep habits, and mental health among Anglophone and Francophone adolescents with obesity seeking multidisciplinary clinical care for weight management, *(ii)* adolescents' recommendations for an environment conducive to healthy lifestyle changes, and *(iii)* adolescents' and HCPs' perspectives on the delivery of weight management services to adolescents with obesity, including adolescent involvement in decision-making and HCP strategies for effective weight management counseling. We used purposeful sampling to recruit participants from the PCWH and the Centre for Healthy Active Living (Children's Hospital of Eastern Ontario, Ottawa, ON). We interviewed a total of 19 adolescents and 16 HCPs, and analyzed our findings using content (Elo & Kyngäs 2008) or thematic (Thomas & Harden 2008) analysis. We reported our findings, which were organized into separate reports (Kebbe et al. 2019; Kebbe et al. 2018b; two under review), according to the consolidated criteria for reporting qualitative studies (Tong et al. 2007).

Step 2 – Data prioritization

The purpose of this step was to involve adolescents with obesity in prioritizing barriers, enablers, and potential enablers encountered when changing lifestyle behaviors. Data generated from our previous phases and steps informed the creation of an online survey (REDCap®, Women and Children's Health Research Institute, University of Alberta). The content and logic of our survey was reviewed by three team members (MK, AP, GDCB) and three colleagues for feedback. From February to March 2018, the adolescents (n=19) were *(i)* provided with a list of barriers, enablers, and potential enablers identified from those steps and *(ii)* instructed to score the importance of each reported barrier, enabler, and potential enabler using a scale of 1-9, with a score of 1 being

the least critical or low importance and 9 being the most critical or high importance. Adolescents were invited to suggest additional barriers, enablers, and potential enablers that did not emerge from our scoping review (Kebbe et al. 2017b) and qualitative study (Kebbe et al. 2019; Kebbe et al. 2018b).

The statements included in the online survey were generated by MK by reviewing all scoping review and interview data line by line. Another researcher (AP) who was involved in data collection and analysis reviewed the statements for content verification and wording. The wording of the barriers, enablers, and potential enablers was kept authentic to the phrasing used by adolescents in the original studies (*e.g.*, common terms such as soda, pop, and exercise *vs* sugar-sweetened beverages and physical activity, respectively). English and French statements were generated separately, translated, and merged to form two independent lists, one in English and the other in French. Translation included an independent forward translation by MK and the Translation Agency of Alberta (Edmonton, AB), a compare and contrast activity to reach consensus, as well as back translations. This process has been applied similarly in previous studies (Regmi et al. 2016; Scholl et al. 2012; Kriston et al. 2010).

To reduce response bias and patient partner burden, we paid attention to question wording (*e.g.*, neutral and clear), survey structure (*e.g.*, ability to save and complete at a later stage, adding a progress bar with encouraging statements, breaking questions into multiple pages), styling and coloring (*e.g.*, using adolescent-friendly radio bullets), and personalization (*e.g.*, data-derived statements) of our survey (Regmi et al. 2016). Descriptive analyses (means) were conducted to identify the highest ranked statements.

Phase III: Production and dissemination

Step 1 – Tool co-design

After identifying adolescents' top priorities, we aimed to gather adolescents' and HCPs' thoughts on the generated list of statements, suggestions for wording and categorization of the statements, and visual design of our tool. In March 2018, we invited a sub-set of participating adolescents (n=5) and HCPs (n=3) using 'facilitated matching' (a type of purposeful sampling specific to patient-oriented research) to involve them in co-designing our tool. We sent the list of top statements electronically to participants a few days prior to scheduled one-on-one (adolescents) and group (HCPs) unstructured telephone interviews, which lasted between 15 minutes and 1 hour in length.

Step 2 – Tool refinements

From April to December 2018, our tool underwent three rounds of refinements by group members (MK, GDCB) and two rounds of proofs (MK). Examples included revising graphics, typographical emphases, background colors, and white space as well as ensuring consistency within the deck (*e.g.*, same placement of graphics) and between decks (*e.g.*, capitalizing the same words in the English and French decks, if applicable). In refining our tool, we were mindful of a number of issues related to effective patient education materials, including content, wording, graphics, layout and typography, and cultural relevance (Clayton 2010). CCAs (see Figure 2 for a sample) were designed by The Burke Group (Edmonton, AB) in collaboration with Obesity Canada.

7.4. Results

Adolescents included in our primary research were mostly female, Anglophone, Caucasian, and lived with severe obesity, while most HCPs were female and Caucasian.

Phase I: Conceptualization

Detailed results from Phase I (*Steps 1 and 2*) can be found elsewhere (Kebbe et al. 2018b; Kebbe et al. 2017b). In summary, results from our review on lifestyle behavior change spanned the Social Ecological Model (Sallis et al. 2008), however were limited in relation to sedentary behavior and sleep habits, environmental and policy levels of influence, and Canadian and Francophone adolescents with obesity seeking multidisciplinary clinical care.

Phase II: Development

Step 1 – Data generation

Detailed results from Phase II (*Step 1*) can be found elsewhere (Kebbe et al. 2019; Kebbe et al. 2018b). In summary, results from our interviews and focus groups helped to supplement our review and address the identified knowledge gaps. First, barriers to and enablers of healthy nutrition, physical and sedentary activities, sleep habits, and mental health were organized into the following themes: physiological mechanisms and physical health status, self-regulation for behavior change, controllability and competence beliefs, social relationships and interactions, and accessibility to and availability of opportunities for lifestyle enhancement. Adolescents' recommendations to create an environment conducive to a healthy lifestyle included establishing parental support, but with limits, improving accessibility and availability of 'healthy foods', limiting deceptive practices in food advertisements, improving accessibility and availability of varied physical activity opportunities, and adopting later school start times. Decision-making for weight management was also relevant in changing lifestyle behaviors, whereby adolescents and HCPs positively valued adolescents' involvement in making decisions regarding their weight and health. However, the extent to which adolescents wished to be involved in the decision-making process varied between individuals and families and depended on parental involvement. In

addition to decision-making, HCPs identified a number of strategies that they use to deliver effective health services for managing obesity in adolescents, including discussing realistic expectations regarding weight management, personalizing weight management, and exhibiting non-biased attitudes and practices. In line with principles of patient-oriented research, the print, card format of CCAs was chosen based on feedback from all adolescents who participated and engaged in our research.

Step 2 – Data prioritization

Card selection trends. Using data generated from our individual studies (*i.e.*, scoping review, interviews, focus groups), we identified 153 statements that act as barriers, enablers, or potential enablers (categories) for adolescents with obesity in making healthy lifestyle changes. Out of these, eighteen adolescents (~95% response rate) prioritized 72 cards in the barriers category, 54 cards in the enablers category, and 27 cards in the potential enablers category. The five most top-rated statements included enablers and potential enablers for healthy nutrition and physical activity habits (Table 1).

Card selection. The prioritized cards were reduced to the top 15 statements per category of barriers, enablers, and potential enablers to include a total of 45 cards per deck. The means of both English and French statements were combined since there were negligible differences between them (Cronbach's alpha >0.9).

Phase III: Production and dissemination

Step 1 – Tool co-design

HCPs' feedback and suggestions. From our telephone discussions, HCPs noted the differing

priorities identified by adolescents from those of parents outlined in the original deck of CCs, but found that the most popular statements reflected the issues that they encountered in their day-to-day practices. HCPs also commented on the lack of applicability of some statements to their area of practice and expertise, especially issues that related to policies, and noted the higher number of physical activity to nutrition and mental health statements.

Adolescents' feedback and suggestions. Adolescents provided suggestions for wording (*e.g.*, avoiding stigmatized words such as 'mental health', ensuring lay terminology such as online instead of virtual), categorization of selected statements (*e.g.*, color-coding the card suits), and CCA design (*e.g.*, using bright colors, emoticons for icons, and a legend for the deck). Both HCPs and adolescents agreed that statements that spanned several lifestyle areas should not be limited to a single lifestyle area, which they thought would detract from the complexity of lifestyle behavior change and weight management.

Card sorting and prioritization. Within each of the three categories CCAs are organized into the following seven suits: nutrition, physical activity, sedentariness, sleep, mental well-being, relationships, and clinical factors. Cards in the barriers and enablers categories are more reflective of individual and social efforts for lifestyle behavior change (*e.g.*, I have nothing else to do so I go online or play video games; it's helpful to start small and gradually work up when making lifestyle changes) whereas those in the potential enablers category are more linked to environmental and policy influences (*e.g.*, I would like there to be more healthy foods at my home; I would like school to start later so I can get more sleep).

Step 2 – Tool refinements

Production and dissemination. Following refinements and proofs between team members and Obesity Canada, CCAs were printed in January 2019 (500 English decks; 200 French decks). In addition to publishing a blog post on Dr. Sharma's Obesity Notes (Dr. Sharma's Obesity Notes 2019) to share our research with HCPs and the public, outcomes of our research and tool development were also shared directly with our stakeholders (*e.g.*, participating adolescents and HCPs) and multiple media outlets in a number of formats (*e.g.*, infographics, a webinar). Further, to complement CCAs, we created resources that may be of practical use for adolescents and HCPs, such as Frequently Asked Questions and a template for including CCA-related information in adolescents' medical records (Obesity Canada 2019).

7.5. Discussion

From our multiple mixed-methods, cross-language, and patient-oriented research, we found that adolescents with obesity identified a diversity of barriers, enablers, and potential enablers that influenced their ability to have a healthy lifestyle. Topics spanned numerous lifestyle areas and impacted adolescents' lives at different levels of influence (from individual to societal). CCAs were developed with the intention to direct conversations (either in English or French) between adolescents and HCPs, to help set tailored realistic goals for lifestyle behavior change, and importantly, to address adolescents' immediate needs, which may influence their weight management directly or indirectly. Therefore, our work in developing a patient-centered, bilingual tool for adolescents with obesity and HCPs fills an important clinical and cultural linguistic gap.

Message tailoring for behavior change

Behavioral health interventions can communicate tailored information to provide individuals with the adequate knowledge, skills, and motivation to change targeted health behaviors and improve

overall health-related outcomes (Contento et al. 2010). The lack of health services offered in an individual's first language is impeding to the delivery of care and may contribute to low health literacy, in which low health literate individuals have compromised ability to access, understand, and act on health information (Institute of Medicine 2004). Specifically, linguistic barriers negatively impact access to healthcare, adherence to treatment, healthcare costs, and patient confidentiality (Webster 2018). Adaptation of health services to an individual's language and culture may help to drive behavior change, which underscores the importance of tailored and clear health communication strategies like CCAs.

Equally important for behavior change is a hypothesized mechanism by which an intervention is expected to achieve its results. Given that goal-setting is a mechanism for self-regulation and self-efficacy (Bandura 1986), both of which are often used to close the intention to action gap, CCAs are intended to be used within a collaborative goal-setting framework. Indeed, in studies where treatment was individualized and adolescents set goals themselves, adolescents observed positive outcomes in weight, physical activity and/or dietary intake (McDonald & Trost 2015; Nguyen et al. 2014; Latif et al. 2011; Shilts et al. 2009). CCAs capitalize on goal-setting via multiple regulatory and motivational mechanisms, such as eliciting adolescents' interests, encouraging adolescent engagement via shared decision-making in recognition of their growing independence and autonomy, and identifying barriers to change, reframing obstacles, and setting realistic goals alongside HCPs. In using CCAs, these strategies may further translate into a positive healthcare environment for adolescents with obesity and mitigate potential biases contributing to weight stigma by guiding HCPs towards *(i)* understanding the complex web of causality to obesity, *(ii)* employing a biopsychosociocultural perspective to help address outcome expectations, and *(iii)* shifting the treatment focus from weight to encouraging feasible lifestyle behaviors that aim to improve health and well-being.

In the context of collaborative goal-setting, the family is important in helping adolescents to make and maintain healthful changes as it is recognized as a constant unit of support in an adolescent's life. Since CCAs were created for and with adolescents, we expect their narratives to differ from their parents' (Kebbe et al. 2019; Nobles et al. 2016; Savage et al. 2005). For example, our team previously synthesized the literature on family-HCP relations in pediatric weight management (Farnesi et al. 2012), from which we had created an independent deck of *Conversation Cards*® (CCs) identifying primarily distinct priorities of parents (*e.g.*, more logistics surrounding lifestyle change, detailed accounts of healthcare visits) (Ball et al. 2013). Further, from our qualitative work, we received feedback from adolescents that some issues may be too sensitive to address, especially in the presence of parents (Kebbe et al. 2019). Previous research on health communication cards for adults with obesity also revealed participants' mixed feelings about using the cards with family and friends (Matteson et al. 2014). For example, participants reported that doing so would emphasize their weight and struggles amidst otherwise regular-weight family and friends. Participants also expressed a desire for increased self-efficacy to address issues listed on the cards, which highlighted the role of the cards in eliciting personal and sensitive issues that would have perhaps not been amenable to online use or digital applications. Of note, adolescents' top five priorities in our research were in relation to enablers of change. This may suggest adolescents' vulnerability around discussing challenges and identifying enablers as a coping mechanism to focus on the positives of their lifestyle. While HCPs can reinforce healthy lifestyle behaviors and strengthen rapport with adolescents by validating their strengths, they may also benefit from encouraging self-reflection among adolescents, including having individual consultations to further build a degree of trust and rapport. This is a critical step for encouraging adolescents to feel comfortable enough to disclose latent sensitive issues and discuss the realities of their experiences related to their health and weight.

Limitations

Our research had limitations to acknowledge. First, most participating adolescents were of Caucasian origin and had severe obesity, and most HCPs were female and of Caucasian origin. As such, our findings may be less applicable to groups with other demographic and anthropometric characteristics. Second, since we interviewed adolescents who were actively enrolled in multidisciplinary care, our findings may not be transferable to adolescents in the initial stages of care, to those who discontinue or terminate care for pediatric weight management, or to those seeking other forms of care. Further, as cross-language studies that included data collection in both English and French, the language transformation process may raise some methodological concerns; however, to optimize rigor, we adhered to recommendations (Santos Jr et al. 2015; Chen & Boore 2010; Van Nes et al. 2010; Birbili 2000) to ensure that no meaning was lost and provided a detailed description of the translation process we applied (Kebbe et al. 2018b). Finally, we identified the top 15 statements ranked by adolescents with obesity per category to achieve a balance in numbers for our tool, so statements with a higher ranking per lifestyle area may have been excluded. While other quantitative analyses (*e.g.*, Principal Component Analysis) could have been used, we chose a more practical, patient-oriented approach rather than a data-driven mode.

Practice applications

HCPs raised questions about how best to use CCAs in clinical practice and queried how they could be incorporated into their consultations. To address some of HCPs' potential questions, we refer the reader to our list of frequently asked questions about using CCAs (Obesity Canada 2019). HCPs are encouraged to determine how CCAs can be incorporated into their own clinical practice; some may prefer to incorporate CCAs as an icebreaker activity prior to meeting with adolescents whereas others may choose to use the cards with adolescents during their consultations. HCPs may

be inclined to tailor the deck of cards to their areas of expertise; however, we encourage them to use the entire deck in their work to reflect the diversity of issues experienced by adolescents in weight management, many of which are inter-related. Unfortunately, the reality is that HCPs receive limited instruction time on issues related to obesity and weight management (Bucher Della Torre et al. 2018; He et al. 2010), so they may lack the necessary knowledge and skills to address all obesity-related issues or they may work independently or in rural/remote areas that require them to maintain a more general practice. To this end, practicing clinicians can benefit from complementary resources (*e.g.*, 5As of obesity management [Vallis et al. 2013]) and training in obesity (*e.g.*, courses through the Strategic Centre for Obesity Professional Education [World Obesity 2019]) to help expand their knowledge and skills and build their confidence. The original deck of CCs may complement CCAs in instances where parents desire more involvement in setting an adolescent's care plan. In the event that agreement cannot be achieved in relation to priorities identified by adolescents and parents, the skills and experiences of HCPs can help to reconcile differences of opinion, along with identifying ways for parents to support their adolescents even when they disagree about priorities for change. Should adolescents select cards not related to HCPs' area of specialty, HCPs are encouraged to validate adolescents' experiences and seek support and information from a colleague(s) to assist them or refer adolescents to another HCP or service to address the support needed.

As with the original deck of CCs, we anticipate that some adolescents may choose a large number of cards, in which cases HCPs can instruct adolescents to select their top 3 and explain to them that this helps in performing personalized care and to not feel overwhelmed with identifying a number of issues to address. For example, setting unrealistic goals for weight loss that are unlikely to be achieved with lifestyle behavioral modification (Rhodes et al. 2017) can lead to frustration and hinder behavior change. As a result, HCPs may benefit from explaining to

adolescents the value in aiming for realistic, gradual changes in the context of the biological predisposition to weight gain and regain (Polidori et al. 2016; Finegood et al. 2010). In doing so, HCPs should ensure that adolescents understand the positive impact of engaging in more healthy behaviors on health risks, metabolic variables, and quality of life independent of attainment of weight changes, and how this approach may be more amenable to change than weight goals per se (Avis et al. 2014; Bridger & Wareham 2014).

7.6. Practical implications, conclusions, and future directions

To optimize delivery of care, promote behavior change in patients, and improve patient outcomes, HCPs have expressed a desire for tools and resources to help better support families for weight management (He et al. 2010). Best practices for obesity management encourage the use of appropriate tools and resources to augment weight-related discussions, in addition to the use of collaborative goal-setting as a means to engage relevant stakeholders (McPherson et al. 2017). CCAs were developed based on our experiences in using CCs with families in a clinical setting (Kebbe et al. 2017a; Ball et al. 2013) and on an informal needs assessment from HCPs to develop an adolescent-specific, bilingual (English and French) deck of CCs. CCAs may help to optimize communication between adolescents and HCPs, moving beyond a didactic and simplistic conversation about healthy behaviors. In line with patient-centered care, engaging adolescents in conversations and decisions regarding their own health is key and may empower them to make healthy changes (Kebbe et al. 2019). Further, being able to identify their most pressing concerns and priorities, adolescents' overall experience in care may be improved such that they better adhere to their established goals of interest. Future research is ongoing to determine the user experience, feasibility, and preliminary effectiveness of CCAs for goal-setting and lifestyle behavior change in health care settings.

Table 7.1. The five most top-rated statements across the deck

Statement	Category	Lifestyle Area	Rating
It's easier for me to be active when I genuinely enjoy the activity.	Enabler	Physical Activity	8.11
It's easier to be active with people I know.	Enabler	Physical Activity and Relationships	7.39
It's easy for me to eat healthy foods if they taste good.	Enabler	Nutrition	7.33
We have enough money to afford healthy foods.	Enabler	Nutrition	7.22
I would like tax to be removed from healthy foods.	Potential enabler	Nutrition	7.17

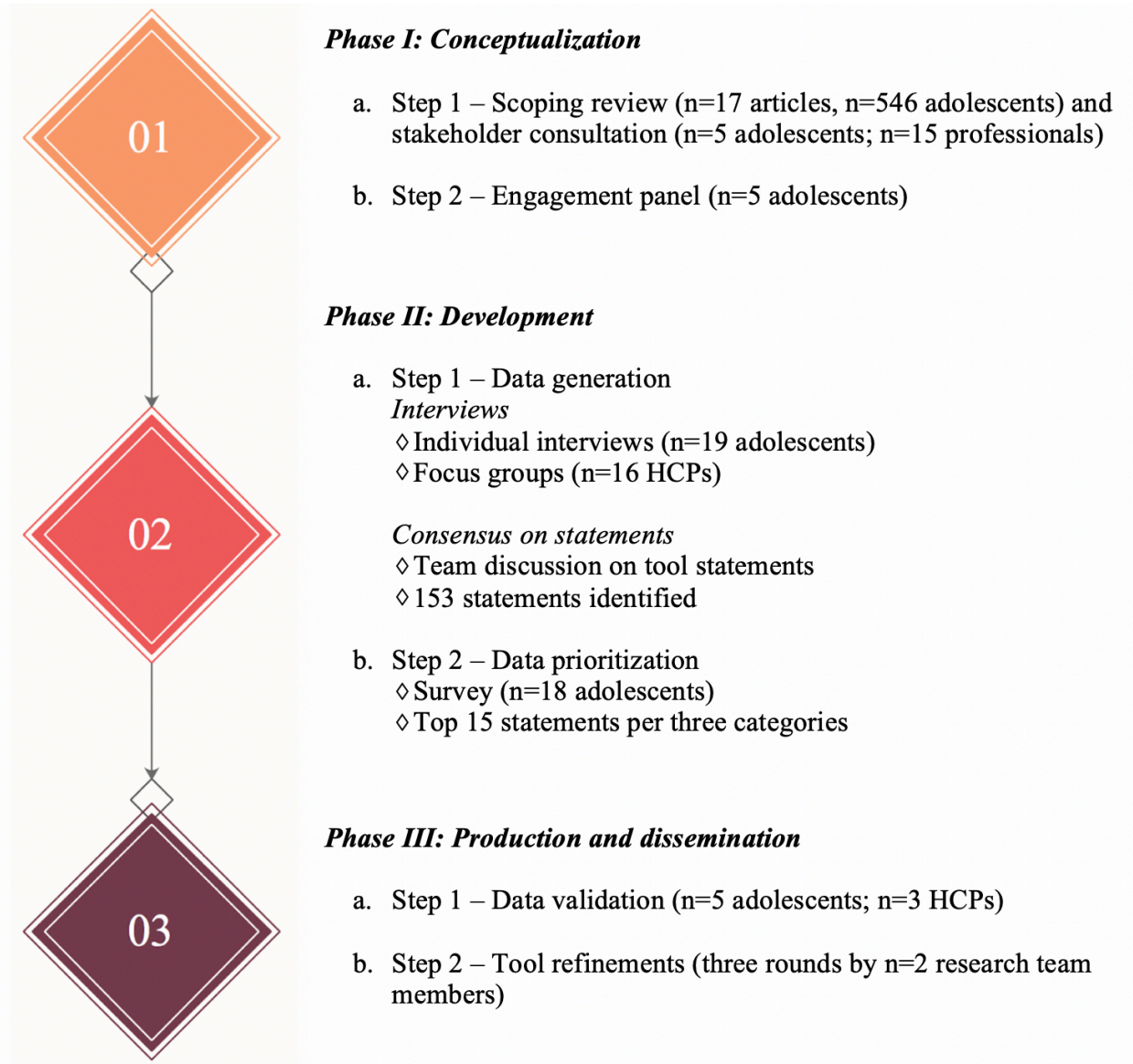


Figure 7.1. Flow map of the phases and steps used to generate *Conversation Cards for Adolescents*®



Figure 7.2. Example cards per category in *Conversation Cards for Adolescents*®

7.7. References

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Chapter 8

Overview of Findings and Conclusions

8.1. Overview of findings

From the research that comprised this thesis, I developed CCAs, a patient-centered clinical and bilingual (English and French) tool designed to facilitate communication and lifestyle behavior change through collaborative goal-setting and shared decision-making among adolescents with obesity and HCPs. Study 1 provided a scoping review of the literature in relation to barriers and enablers for nutrition and physical activity that spanned individual- and interpersonal-level factors. This review also revealed that limited barriers and enablers have been documented on sedentary behavior and sleep as well as environmental and policy levels of influence for all lifestyle areas. Additional knowledge gaps identified from this review included studies being Anglophone-based, limited to adolescents with obesity living in the United States, and not being contextualized within a multidisciplinary clinical setting.

Given these knowledge gaps, I conducted Study 2 among Anglophone and Francophone adolescents with obesity seeking multidisciplinary clinical care for weight management and HCPs to explore their perspectives on a number of issues. These included barriers, enablers, and recommendations for adopting a healthy lifestyle as well as clinical considerations for weight management, such as insight into adolescents' decision-making for weight management and effective strategies for health services delivery. First, barriers to and enablers of healthy nutrition, physical and sedentary activities, sleep habits, and mental health (a key area of consideration for successful weight management noted by adolescents with obesity in our engagement panel) were organized into the following themes: physiological mechanisms and physical health status, self-regulation for behavior change, controllability and competence beliefs, social relationships and interactions, and accessibility to and availability of opportunities for lifestyle enhancement. Across

these themes and lifestyle areas, I identified three shared barriers and/or enablers, including the degree of controllability, the impact of mental health, and social pressures related to weight management. Adolescents' recommendations to create an environment conducive to a healthy lifestyle included establishing parental support, but with limits, improving accessibility and availability of 'healthy foods', limiting deceptive practices in food advertisements, improving accessibility and availability of varied physical activity opportunities, and adopting later school start times. Decision-making for weight management was also relevant in changing lifestyle habits, whereby adolescents and HCPs positively valued adolescents' involvement in making decisions regarding their weight and health. However, the extent to which adolescents wished to be involved in the decision-making process varied between individuals and families and depended on parental involvement. In addition to decision-making, HCPs identified a number of strategies that they use to deliver effective health services for managing obesity in adolescents, including discussing realistic expectations regarding weight management, personalizing weight management, and exhibiting non-biased attitudes and practices.

In Study 3, adolescents prioritized 153 factors (barriers, enablers, and potential enablers) related to lifestyle habits and clinical delivery that emerged from Studies 1 and 2. This activity, paired with telephone interviews with adolescents with obesity and HCPs, informed the design of CCAs (*e.g.*, layout, graphics, content), which were developed in collaboration with Obesity Canada. CCAs are a hard-copy deck of cards with the 45 top-rated factors distributed over 7 suits (nutrition, physical activity, sedentariness, sleep, mental well-being, relationships, and clinical factors) and 3 categories (barriers, enablers, and potential enablers).

8.2. Concluding remarks

Structure, delivery, and content are central components of health services delivered for adolescent weight management. This puts a large emphasis on improving the adolescent-HCP relationship and encouraging adolescent engagement in care, including a focus on individualized lifestyle interventions for obesity management. A number of barriers, enablers, and potential enablers may affect adolescents' nutrition, physical and sedentary activities, sleep, and mental health, most of which tend to be contextualized within the broader determinants of health to account for multi-level (*e.g.*, individual, policy) and multi-context (*e.g.*, clinic, school) influences. An understanding of the factors that influence effective lifestyle modifications in adolescents with obesity is therefore important in devising relevant, tailored interventions and supporting patient-centered care. In delivering their health services, HCPs are encouraged to use tools like CCAs to help engage and streamline conversations with adolescents with obesity for the purposes of personalizing lifestyle modifications. Further studies are needed to empirically demonstrate the feasibility, user experiences, and effectiveness of CCAs as a communication and behavior change tool.

Chapter 9

Lessons Learned and Recommendations

In this section, I highlight 10 conceptual, clinical, methodological, and practical lessons learned throughout my doctoral research program. From these lessons learned, I propose recommendations that can help to optimize the design and implementation of lifestyle modification interventions and health services to improve the health and well-being of adolescents with obesity.

9.1. Conceptual and clinical

1. Interventions and health services for managing adolescent obesity should address both lifestyle and psychosocial factors.

From my scoping review on barriers and enablers for healthy lifestyle habits among adolescents with obesity, the literature focused (primarily) on nutrition and physical activity, with limited examination of sedentary behavior and sleep. Many adolescents with obesity do not meet minimum lifestyle recommendations for nutrition and physical activity as well as sedentary behavior and sleep (Ball et al. 2008). This is of concern since each of these lifestyle behaviors has been associated with adverse health consequences, including mental health outcomes (Biddle and Asare 2011; Hoare et al. 2016; O’Neil et al. 2014; Zhang et al. 2017). Mental health issues are on the rise for adolescents with obesity, with the prevalence being almost twice as high as in adults aged 25 to 44 years (Center for Behavioral Health Statistics and Quality 2018). In addition to being more likely to experience depression than normal-weight peers (Goldfield et al. 2010), a higher number of adolescents with obesity are excluded from social networks compared to normal-weight peers (Strauss and Pollack 2003). Therefore, consistent with the complex etiology of obesity (Finegood et al. 2010) and clinical practice guidelines on obesity management (Styne et al. 2017), comprehensive interventions and health services accounting for sedentary behavior, sleep, and

mental health alongside nutrition and physical activity should be delivered by a multidisciplinary team to provide adolescents with optimal support.

2. Understanding lifestyle changes for obesity management should move beyond individual- and interpersonal-level factors to include environmental and policy levels of influence.

While some individuals have a genetic predisposition to obesity, the increase in the prevalence of obesity in the 1980's was too rapid to be attributed to a genetic shift; rather, it must have been a result of environmental changes that favored energy intake over energy expenditure. From Studies and 2 of my doctoral research, adolescents often reported individual- (*e.g.*, lack of motivation) and interpersonal- (*e.g.*, family support) level factors that influenced their ability to maintain healthy lifestyles. Individuals play an important role in shaping their health and well-being (Norman & Paul 2005). However, a number of factors beyond individuals' control can influence their choices, including food availability (large portion sizes), decreased physical activity (low non-structured physical activity), increased sedentary behavior (high availability of screen time), negative sleep patterns (poor sleep quality), and mental health issues (obesity-related stigma). The Social Ecological Model has often been used to describe the complex etiology of obesity and in promotion efforts for obesity prevention (Ohri-Vachaspati et al. 2015; Kellou et al. 2014; Hamre et al. 2006). In a similar approach, lifestyle modifications for obesity management can be better understood when viewed through a social ecologic lens, which appreciates that lifestyle choices are influenced by individual, interpersonal, environmental, and policy factors.

3. Lifestyle behavior change for managing pediatric obesity should be better defined.

It is important to differentiate between *implementing* and *maintaining* lifestyle changes for weight management, both of which can be encompassed by *adoption*. Implementation refers to the *initial*

adoption of a lifestyle change; that is, the intention and planning of making a change that can be facilitated by HCPs during a clinic visit. Maintenance refers to the *continued adoption* of a lifestyle change, which often relies on individual efforts and commitment for change that are influenced by external factors. To my knowledge, these distinctions have not been proposed before for pediatric obesity. Implementation and maintenance are both needed to adopt healthy lifestyle habits, although several factors can negatively influence this translation from intention to action (Ajzen 1991). Specifically, while different, similar dimensions apply to these issues (implementation, maintenance), including *end-goal* (e.g., weight loss), *category of influence* (e.g., barriers or enablers), *target group* (e.g., children or adolescents), and *lifestyle habit* (e.g., nutrition or physical activity). From my research, I learned that regarding the implementation of lifestyle habits (issue), adolescents with obesity required different levels of support from their parents and HCPs (target group) and often had different priorities (end-goal). Implementation was influenced by barriers, enablers, or potential enablers regardless of the lifestyle habit of interest. These dimensions can also serve as a guide for the issue at hand. For example, to enhance implementation of lifestyle habits (e.g., via goal-setting with HCPs), some dimensions (e.g., end-goal) may be more important than others. Within the *end-goal* dimension, it was important for the second independent researcher involved in Study 1 and I to differentiate between barriers and enablers for *lifestyle change* compared with barriers and enablers for *weight loss*. Whereas weight loss may be a goal for which lifestyle changes are made, the two terms are not interchangeable, and several studies screened did not make this distinction when discussing barriers and enablers.

9.2. Methodological

1. Researchers should engage patients as partners while adhering to the appropriate level of patient engagement for their research purposes.

The Canadian Institutes of Health Research has endorsed POR, with an overarching vision of providing direct benefits to patient health outcomes and enhancing health care systems (Canadian Institutes of Health Research 2014). More specifically, this process emphasizes the goal of providing the right patient with the right intervention at the right time and relies on engaging patients as partners, where they are key members of the research team. While proponents of POR may argue that it is superior to traditional models of clinical research that are normally founded on outcome measures most important to researchers, HCPs, and/or regulators, this approach remains novel and not yet well-integrated in the health research culture (Patrick et al. 2018). However, research based on principles of POR has numerous benefits. For one, because patients are experts on their own unique experiences with their condition and the health care system, working in partnership with them can provide new insights that may lead to innovative discoveries (Canadian Institutes of Health Research 2014). I witnessed this first-hand in my research, where adolescents shared the importance of exploring mental health issues to inform the design and implementation of interventions and health services for obesity management.

Second, engaging patients in the research process is compelling ethically since it accounts for a higher level of transparency by making decisions openly and engaging partners in the discussion. The International Association for Public Participation spectrum for patient engagement in health research includes *learn/inform*, *consult*, *involve*, *collaborate*, and *empower/lead* (Amirav et al. 2017). To ensure meaningful patient engagement, which refers to active patient engagement that is mutually beneficial for all parties, it is important for researchers to familiarize themselves with the components, drawbacks, and challenges of each level. For example, being mindful of effort and commitment levels required by researchers and patients, the knowledge needed for meaningful engagement, and time and money considerations, researchers can choose the ideal level of engagement for their research. For my research, I recognized that motivations, interests,

and skills may vary between members of the research team and adolescents with obesity. Therefore, I chose to *involve* adolescents, which allowed me to explore and consider their concerns, preferences, and priorities while also making researcher-led methodological decisions.

2. Engaging adolescents as partners and participants in health research requires special considerations.

Engaging adolescents in research can be both rewarding and challenging. Procedures on how to effectively engage patients, including adolescents, in health research are under-described (Domecq et al. 2014). Shippee and colleagues (2013) outlined an evidence-based framework for patient engagement that was divided into two parts: (i) patient initiation, reciprocal relationships, co-learning, and re-assessment and feedback that comprise integral *components* of patient engagement and (ii) preparatory, execution, and translational that represent *phases* with specific *stages* of patient engagement. From my experience, several strategies can help to effectively engage adolescents in research, including strategically selecting adolescent partners (*e.g.*, including adolescents of varying characteristics), tailoring methods of engagement to adolescents (*e.g.*, offering flexible activities), establishing rapport with adolescents (*e.g.*, practicing empathy), striving to minimize power dynamics (*e.g.*, co-learning with adolescents), and seeking evaluations on the engagement process (*e.g.*, debriefing directly with adolescents).

3. Different methods and modes of data collection should be used to gain a rich description of a particular phenomenon from adolescents with obesity.

To date, qualitative and quantitative obesity research has studied adolescents' perspectives on their lifestyle habits by relying on interview data and/or surveys. While this research is valuable, it is limited in contextualizing adolescents' perspectives within the wider determinants of health. For

example, despite direct probes in semi-structured interviews, study participants may be unable to identify and articulate macro-level factors responsible for their health decisions. Gee (1999) and Patton (1990) explained that it may be challenging for some individuals to report key details, sensitive issues, or contextual factors, such as the industry's influence on making nutritious choices, such as the industry's influence (*e.g.*, increased portion size, accessibility to quality foods) on making nutritious choices (French & Story 2001). These challenges may be particularly relevant in POR whereby patients share their personal stories and lived experiences with less emphasis on external factors that shape their decisions. As such, triangulating data from a number of sources (*e.g.*, observations, field notes, memos), as was done in my research, can portray a more accurate and representative picture of participants' accounts.

To engage adolescents in health research, it is also important to consider modes of communication and the associated benefits and challenges that can inform one's data collection strategies (Merves et al. 2015; Bassett et al. 2008; Sacks & Westwood 2003). For example, at the onset of my research, I benefited from meeting adolescents in-person to orient them on my research, discuss and learn from their experiences, and establish rapport. As my research progressed, I was flexible in selecting different modes of data collection, including online surveys and one-on-one telephone discussions with adolescents. These choices were based on practical and methodological reasons surrounding my objectives and desired outcomes.

4. Cross-language studies and ethnographic research may be mutually exclusive based on the desired research outcome.

Culture includes the customs and achievements of a particular nation, people, or other social group. According to Mitchell (1995), culture is a social imposition and does not carry an ontological status; rather, like language, it is manifested geographically following the historical development

of the *idea* of culture by which we order and define our world. Cultural differences have an influence on adolescent development, including morals (*e.g.*, different value sets reflecting different moral standards, such as some cultures accepting lying in order not to hurt others' feelings), autonomy (*e.g.*, degree of dependence or independence of the adolescent, such as attending clinical appointments alone), ego (*e.g.*, being seen as strong-willed in Hispanic families if you defend yourself, favoring pride for the group as a sense of self-pride in Japanese), and identity (*e.g.*, how adolescents identify themselves, such as with their families or peer group due to mainstream culture).

Cross-language studies attempt to understand how individuals from various cultures perceive their situations and act within their own cultural context. A common limitation of interventions is a lack of cultural tailoring and sensitivity; that is, the extent to which cultural characteristics, experiences, norms, and values of a certain population are incorporated into the design, delivery, and evaluation of interventions. As such, there is a need for qualitative, cross-language studies to ensure a linguistic and cultural representation of study participants with the aim of optimizing the care that they receive from HCPs (Esposito 2001; Yach 1992). Compared with ethnography that studies the lived experiences and patterns of behavior of individuals within a particular cultural setting, cross-language studies attempt to understand how individuals from different cultures perceive their situations through language. Informed by several individual studies, the ultimate goal of my research was to develop a bilingual (English and French), clinical communication and behavior change tool (*Conversation Cards for Adolescents*®, CCAs) as opposed to understanding actions within their own cultural context. I collaborated with academic colleagues who lead a pediatric weight management clinic in Ottawa, Canada, which offered me an opportunity to include Francophone adolescents with obesity. Although this center alone may

not have provided a complete cultural representation of Francophones in Canada, CCAs can be used to individualize care across different communities while being culturally-sensitive.

5. Translation in cross-language studies is ambiguous and should be well-researched a priori.

A number of translation strategies that vary by cost, timeliness, and quality are available for researchers to choose from. For example, while Regmi et al. (2010) advocated for translating the entire data set for interviews, Strauss and Corbin (1998) acknowledged the difficulty in translating interviews for practical and methodological reasons, but did not describe how to achieve accuracy when translating data due to the unique components of different languages. Instead, they advised for minimal translations, as did van Nes et al. (2010), who recommended staying in the source language for as long as possible to avoid potential mistranslations. For my research, I completed translation from French to English for data collected from Francophone participants at the post-analysis stage since (i) qualitative research is considered credible when the distance between expressed and interpreted meanings are as close as possible (Polkinghorne 2007) and when *conceptual equivalence*, a technically and conceptually accurate translation of spoken words by study participants (Jandt 2003), is achieved and (ii) translation is an interpretive act in its own, and the qualitative description method that informed my research requires low interpretive inferences. I also followed recommendations by Santos et al. (2015) in collaborating with a co-researcher who was a native French speaker to discuss decisions made regarding data analysis in the source language. In translating statements in my research to inform the creation of the French version of CCAs, I used two approaches: (i) forward translations conducted by the study coordinator from the source to the target language and (ii) forward translation followed by back translation and discussions with a native co-researcher to validate the technical and conceptual accuracy of the translation (Squires, In Press). Both versions were compared and contrasted, but no major

differences were observed. Researchers' theoretical or philosophical approaches are important in the translation process and may be different than those of translators (damson & Donovan 2002; Kapborg & Berterö 2002; Temple & Young 2004). Therefore, adding a research collaborator who is fluent in and familiar with the culture of the source and target language to conduct data collection may be a viable option that leads to rigorous results while using fewer resources.

9.3. Practical

1. Activity-based tools are needed for adolescents in obesity management.

When communicating with adolescents and their families about obesity and weight-related topics, all stakeholders should be considered and discussions can be enhanced with appropriate tools and resources (McPherson et al. 2017; Styne et al. 2017). A number of tools for pediatric weight management exist, such as the BMI growth charts and the *Edmonton Obesity Staging System for Pediatrics* (Hadjiyannakis et al. 2016); however, these tools tend to be diagnostic, highlighting the need for activity-based tools to engage patients. As my research suggests, adolescents, in particular, can have different priorities from their parents, so tailored (adolescent-specific), activity-based tools should be developed, evaluated, and implemented to fit their needs. One may consider combining various tools for optimized health services delivery. For example, in a pilot study implementing a standardized framework for Obesity Canada's 5As (ask, assess, advise, agree, assist) that combines the Canadian Obesity Guidelines, hand-out material, and an online tutorial (Obesity Canada 2019; Lau et al. 2006), the authors noted improved quality of counseling and provider-patient communication in the short-term. In the pediatric context, it is important to acknowledge parents' role as receivers of health care and a constant unit of support in an adolescent's life, indicating a value in combining several tools (*e.g.*, CCs for parents, CCAs, 5As of pediatric obesity management) to foster cooperation between all stakeholders involved.

2. Behavior modification strategies are integral to helping adolescents with obesity to change their lifestyle habits.

In their review, McPherson et al. (2017) advocated for using collaborative goal-setting to engage family members in their clinical encounters with HCPs. This is consistent with behavior change theories (*e.g.*, Social Cognitive Theory) and the most up-to-date Cochrane systematic review on effective lifestyle modification in adolescents with obesity (Al-Khudairy et al. 2017), which highlight the importance of incorporating well-established behavioral strategies (*e.g.*, goal-setting, stimulus control) for pediatric weight management. Consequently, the development of tools for this group should be guided by evidence whereby lifestyle changes are enabled by behavioral strategies. This was the notion by which CCAs were developed, which is complemented by a S.M.A.R.T. goal-setting activity for adolescents and shared decision-making principles to collaboratively set goals with their HCP. Overall, behavioral tools should enhance the likelihood of adolescents identifying, implementing, and sustaining a change in their lifestyle habits.

9.4. Conclusions

This section reviewed 10 conceptual, practice, methodological, and practical recommendations for maximizing the design and implementation of lifestyle modification interventions and health services for adolescent obesity management. Although these lessons learned were derived from research conducted with adolescents seeking multidisciplinary clinical care for weight management, they likely have relevance for diverse stakeholders, including parents, researchers, and policymakers. Recommendations can inform intervention design and implementation features across clinical, community, and educational settings to facilitate healthy lifestyle behavior changes.

Table 9.1. Conceptual, clinical, methodological, and practical lessons learned and recommendations for designing and implementing lifestyle interventions and health services for managing obesity in adolescents

	Design	Implementation
Conceptual and clinical		
<i>1. Interventions and health services for managing obesity should address both lifestyle and psychosocial factors.</i>	x	x
<i>2. Understanding lifestyle changes for obesity management should move beyond individual- and interpersonal-level factors to include environmental and policy levels of influence.</i>	x	x
<i>3. Lifestyle behavior change for managing pediatric obesity should be better defined.</i>	x	
Methodological		
<i>1. Researchers should engage patients as partners while adhering to the appropriate level of patient engagement for their research purposes.</i>	x	
<i>2. Engaging adolescents as partners <u>and</u> participants in health research requires special considerations.</i>	x	
<i>3. Different methods and modes of data collection should be used to gain a rich description of a particular phenomenon from adolescents with obesity.</i>	x	

4. Cross-language studies and ethnographic research may be mutually exclusive based on the desired research outcome.

x

5. Translation in cross-language studies is ambiguous and should be well-researched a priori.

x

Practical

1. Activity-based tools are needed for adolescents in obesity management.

x

x

2. Behavior modification strategies are integral to helping adolescents with obesity to change their lifestyle habits.

x

x

9.5. References

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Chapter 10

Future Directions and Practice Applications

10.1. Research future directions

There are several future directions stemming from my doctoral research. First, an important next step includes adapting CCAs to different target groups and populations.

Target population 1: adolescents with obesity from different cultures. It is ideal to replicate my qualitative research across geographies. While translation to different languages, including validity and reliability testing, may be an option, doing so may omit potential cultural differences related to barriers, enablers, and potential enablers for lifestyle behavior change.

Target population 2: adolescents with obesity presenting with disabilities. My research excluded adolescents presenting with developmental disabilities as I believed that their experiences in changing their lifestyle habits may be influenced by their conditions. Thus, they may benefit from separate research investigating their perspectives in this area.

Target population 3: parents of adolescents with obesity. My research excluded parents of adolescents with obesity; current evidence is available for parent-child vs. parent-only interventions, showing similar effectiveness between both groups (Ewald et al. 2013). Considering adolescents' differing needs from children in leading a more autonomous lifestyle, a future systematic review can focus on parent-adolescent vs. parent-only interventions.

Target population 4: non-treatment-seeking adolescents with obesity. CCAs focus on lifestyle modification with perspectives derived from adolescents seeking multidisciplinary clinical care for obesity. Since we have data in support of those seeking multidisciplinary care for weight management presenting with unique characteristics (Vierira et al. 2012; Sarwer et al. 1998), interviews conducted across settings (*e.g.*, primary care) and therapeutic options (*e.g.*, perspectives on pharmacotherapy) may be of value.

Target population 5: adolescents without obesity. As health researchers, our aim is to improve individual and population health, either through primary prevention or management. The longstanding debate of “prevention is better than cure” has received criticism in the area of health habits with an argument that it is challenging to change well-established behaviors. However, some experiences over the past four decades, such as a decrease in smoking levels (Centers for Disease Control and Prevention 2018), contradict this assertion. This was possible with the help of no-smoking policies in workplaces, increased taxation on cigarettes, bans on advertising, and a reversal of social norms of smoking being considered “cool” and a rite of passage for adolescents. While similar important changes for promotion of healthy lifestyle habits need to take effect, developing CCAs within a disease prevention vs. management context may also reap benefits.

Second, there is a need for more primary qualitative studies exploring perspectives of adolescents with obesity on barriers and enablers for changes related to sedentary behavior, sleep, and mental health, including exploration within a social ecological lens; that is, delving beyond individual- and interpersonal-level factors to probing for macro-level factors such as environmental and policy influences. Once our knowledge base has been enriched in this area, a

more up-to-date scoping review or multiple, lifestyle-specific systematic reviews can be conducted. Similarly, given that the literature on tools designed for adolescents has not been synthesized, and similar tools to CCAs may be in development, a scoping review can be conducted to identify currently available tools and areas to which future researchers can make contributions.

Lastly, future directions of this research that I intend to complete beyond the scope of this thesis include evaluating CCAs for feasibility, user experiences, and preliminary effectiveness as part of a randomized controlled trial within a real-world setting. This study design will especially help in determining the *(i)* feasibility of CCAs in a clinical setting, *(ii)* user experiences of CCAs from an adolescent and provider point-of-view, *(iii)* preliminary effectiveness of CCAs on satisfaction with care and lifestyle behavior change, and *(iv)* potential for scale up and spread of CCAs as part of a full-scale trial, which may differ based on available resources and priority areas across different settings.

10.2. Potential practice applications

In this sub-section, I offer two potential clinical practice applications in the use of CCAs. First, upon testing CCAs as part of a pilot RCT, I hope to identify optimal ways by which CCAs can be integrated within clinical consultations. From there, I foresee CCAs being incorporated into an independent activity in the clinic waiting room, whereby adolescents screen the tool, select their priorities, and proceed to their appointment with their health professional to collaboratively set a S.M.A.R.T. goal. This can be of particular value within a primary care or consultation setting since it represents the entry point of 90% of children and adolescents into the health care system (Nordin et al. 2010), is an opportunity for early intervention, and based on empirical research, is a setting in which children with obesity are 1.5 times more likely to schedule a visit than their normal-weight peers (Estabrooks & Shetterly 2007).

Second, to effectively use CCAs, health professionals should complete shared decision-making and collaborative, S.M.A.R.T. goal-setting training (*e.g.*, courses through the Society for Medical Decision Making or the Centre for Collaboration Motivation & Innovation). Similar to obesity education, these areas may not be adequately covered as part of the medical school (or other professional school) requirements. Therefore, health professionals should be encouraged to seek these trainings to fulfill their continuing education or professional development requirements.

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Appendices

Appendix A.

Chapter 2: Study 1

The following appendix contains documents used for our scoping review and stakeholder consultation, including:

- 1. Adolescent stakeholder consultation survey and associated scoping review details*
- 2. HCP stakeholder consultation survey and associated scoping review details*
- 3. Study infographics*

What Makes It Easy or Hard to Make Healthy Lifestyle Changes?

Recently, we completed a research study about the lifestyle habits of teenagers. Now, we want the opinion of teens like you on what we learned. Specifically, we want to learn about the factors that make it easy or hard for you to make healthy diet and physical activity choices. This survey will take you about 5–10 minutes to finish.

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NOTE: Your participation in this study is completely voluntary. You can skip any questions you'd prefer not to answer. Your answers to the questions on the following pages will be kept confidential and will only be used for our research project. No one outside of our research team will have access to this information. Information from this survey will be stored electronically for 5 years at the Faculty of Medicine and Dentistry at the University of Alberta and can only be accessed by our research team with a password. Your IP address is automatically collected by the secure survey platform server; however, our research team will not have access to this information. If you would like to withdraw your answers after submitting the survey, please feel free to contact us.

There are no direct risks or benefits involved with completing this survey.

This study was approved by the University of Alberta Human Research Ethics Board on December 9, 2016. If you have any concerns about this study, you may contact the Health Research Ethics Board (University of Alberta) at 780-492-2615. This office is not linked with the study researchers.

Enter ID: _____

Do you agree to participate in this survey?

Yes

No (*If 'No', survey terminates.*)

Please download the PDF document below. It will help you to answer the questions on the following pages.

This document includes a list of the factors that can make it easier or harder for teens to have healthy lifestyle habits. The darker the color shade, the more common the factor. The lighter the color shade, the less common the factor.

Questions:

1. **Based on your experience, what are the top 5 factors that make it HARDER for teens to have healthy lifestyle habits?**
2. **Based on your experience, what are the top 5 factors that make it EASIER for teens to have healthy lifestyle habits?**
3. **What makes it HARD for you to be physically active (e.g., going to the gym, playing a sport, walking to school)?**
4. **What makes it EASY for you to be physically active (e.g., going to the gym, playing a sport, walking to school)?**
5. **What makes it EASY for you to be physically inactive (e.g., using the computer/Internet, playing video games, watching TV)?**
6. **What makes it HARD for you to make healthy food choices (e.g., less fast food, more fruits and vegetables, smaller portion sizes)?**
7. **What makes it EASY for you to make healthy food choices (e.g., less fast food, more fruits and vegetables, smaller portion sizes)?**
8. **Are there any other things that make it HARD for you to have a healthy lifestyle?**
This can include diet, physical activity, physical inactivity, and/or sleep.
9. **Are there any other things that make it EASY for you to have a healthy lifestyle?**
This can include diet, physical activity, physical inactivity, and/or sleep.
10. **May we contact you about participating in future research studies about the lifestyle habits of teenagers?**

*Thank-you very much for taking this survey. We appreciate your help!
You will receive an email confirmation shortly.*

Table 1. Factors that make it HARD to make healthy lifestyle changes



GENERAL	NUTRITION	PHYSICAL ACTIVITY	INACTIVITY
-	-	Not being motivated	-
-	-	Physical factors (e.g., tired, in pain)	-
-	Eating when upset, sad, etc. Negative family influence (e.g., unhealthy foods and less healthy foods at home, no control over home meals, eating out, unhealthy cooking)	Bullying/teasing Concern about being seen (e.g., in change rooms, while exercising)	-
	Not realizing what/how much you're eating (e.g., when bored)	Not enjoyable Not having the skills	
	Being hungry Events (e.g., birthday parties, family reunions)	Bad weather Not having transportation	-
	Peer influence (e.g., friends disapproving, eating unhealthy, watching what you eat)		

Family influence (e.g., discouraging and judging you, not knowing how to make healthy changes, not supportive)	Family influence (e.g., not participating with you, eating unhealthy)	Family influence (e.g., not participating with you, being inactive and unsupportive)	
	Hard to control what you buy/eat	Finding exercise boring/uninteresting	
	No time	Feeling lazy/prefer to be inactive	
		No time	-
		Other commitments	
		Peer influences (e.g., friends not into exercising or not in neighborhood to play with)	
		Tried activity before with no luck, discouraged to try again	
		Unsafe neighborhoods	
Boredom	Being more independent	Being more independent	
Chaotic home	Eating during screen time (e.g., watching TV, studying on laptop)	Being insecure about appearance	
Laziness	Not liking the taste of healthy food	Can't bring yourself to exercise	
Not setting goals properly	No quick and easy to grab healthy foods	Not enough gym time at school	-
Peer influence (e.g., disapproval, lack of support)	Not enough money (e.g., to buy healthy food)	Not enough money (e.g., to register in gym)	
	Mention of unhealthy food	Not having proper equipment	
	Seeing unhealthy food	No time by parents	

Table 1. Factors that make it EASY to make healthy lifestyle changes



GENERAL	NUTRITION	PHYSICAL ACTIVITY	INACTIVITY
-	Support from family, program, and friends	-	-
Support from family (e.g., participating with you in making changes, not judging you) and program support	-	-	-
-	-	Support from family, program, and friends	-
-	-	-	-
Setting goals properly	-	-	-
Bullying			
Good home atmosphere	-	-	-
Not liking your body and appearance	Foods that are easy to prepare	Being motivated	Liking to be inactive
	Healthy foods at home	Exercising with overweight friends or older people (non-friends) or in private	Someone mentioning that being inactive can be beneficial
	Healthy food that is tasty	Free gym membership	

Home cooked meals

Gym class at school

Thinking that not being inactive
does not have the same effect on
weight as actual exercise

Suggestions for recipes/
meal ideas

BARRIERS TO HEALTHY LIFESTYLE BEHAVIORS



Most Common

Least Common

Table 1. Barriers to healthy lifestyle behaviors (NUTRITION)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	-	-	-
-	-	-	-
Emotional eating	-	Family influence (availability of unhealthy foods and less healthy foods, lack of control over home meals, eating out, unhealthy cooking)	-
Mindless eating			
Hunger	Peer influence (disapproval, surveillance, unhealthy eating patterns)	-	-
	Social events or commitments		
Lack of time	Family influence (lack of participation, unhealthy eating patterns)	-	-
Lack of willpower			
Autonomy	Mention of unhealthy food	Financial limitations	
Dislike of taste of healthy food		Having unhealthy food in sight	
Screen time		Less quick and easy to grab healthy foods	-

Table 2. Barriers to healthy lifestyle behaviors (PHYSICAL ACTIVITY)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
Lack of motivation	-	-	-
Physical complaints (injury, fatigue)	-	-	-
Lack of/ underestimation of skills	Concern about visibility	-	-
Limited pleasure/ antipathy	Victimization (bullying/teasing)		
-	-	Transportation (mainly in relation to parents)	-
		Weather	
Lack of interest/ boring	Family influence (lack of participation, sedentary behavior, physical activity not valued, unsupportive)	Unsafe neighborhoods	
Lack of time	Peer influence (unhealthy exercise patterns, lack of peers in neighborhood)		-
Learned helplessness	Social commitments		
Perceived inactivity (laziness, preference for sedentary activity)			

Autonomy

Lack of parental time

Financial limitations

Insecurity about appearance

Insufficient Physical Education
time commitment in schools

Lack of willpower

Need for specialized equipment

Table 3. Barriers to healthy lifestyle behaviors (GENERAL)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	Family influence (discouragement, judgments, lack of awareness and support)	-	-
Boredom	Peer influence (disapproval, lack of support)	Chaotic and unstructured lifestyle	-
Perceived inactivity (laziness)			
Setting vague goals			

ENABLERS OF HEALTHY LIFESTYLE BEHAVIORS



Most Common

Least Common

Table 1. Enablers of healthy lifestyle behaviors (NUTRITION)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	Family, professional, and social support	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
Easiness in preparation	Suggestions for recipes/ meal ideas	-	-
Tastiness of healthy food		-	-

Table 2. Enablers of healthy lifestyle behaviors (PHYSICAL ACTIVITY)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	-	-	-
-	-	-	-
-	Family, professional, and social support	-	-
-	-	-	-
-	-	-	-
-	-	-	-
Motivation	Exercising with overweight peers or older people (non-peers) or in isolation	Enrollment in Physical Education	Free gym membership

Table 3. Enablers of unhealthy lifestyle behaviors (SEDENTARY BEHAVIOR; PHYSICAL INACTIVITY)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
Enjoyment	Mention of potential benefits		
Underestimation of weight loss effects compared to vigorous physical activity		-	-

NOTE: No barriers related to sedentary behavior (inactivity) were identified in our review.

Table 4. Enablers of healthy lifestyle behaviors (GENERAL)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	-	-	-
-	Family (active participation, non-judgment about laziness or lack of motivation) and professional (tailored, direct, long-term) support	-	-
-	-	-	-
-	-	-	-
-	Setting clear goals	-	-
-	Bullying	Pleasant home atmosphere	-
Dissatisfaction of body image and physical appearance	-	-	-

Barriers to and Enablers of Healthy Lifestyle Behaviors of Adolescents with Obesity: A Stakeholder Consultation

Adolescents are an understudied group in pediatric weight management. Because adolescents with obesity face a number of challenges to achieving successful weight management, we believe it is important to learn about the factors that make it easy or difficult for them to make healthy lifestyle choices, including nutrition and physical activity.

This survey is the final step of a scoping review we recently completed regarding barriers to and enablers of healthy lifestyle behaviors in adolescents (13–17 years old) with obesity, including nutrition, physical activity, sedentary behavior, and sleep.

At this point, we would like to gain expert perspective and validation of our findings from professionals like you. Concurrently, we are completing a similar consultation with adolescents with obesity to gain their input as well. Based on our pilot testing, this survey should take you approximately 5–10 minutes to complete.

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NOTE: Your participation in this survey is completely voluntary. You may choose to skip question you would prefer left unanswered. Any personal information you provide will remain confidential. Your answers will not be connected to your personal information and will be used solely for the purpose of this research project. Our data file will be stored (for 5 years) on a secure network server, which is maintained by MedIT within the Faculty of Medicine and Dentistry at the University of Alberta. The data will only be accessible to our research team through a password-protected portal. Your IP address is automatically collected by the secure survey platform server; however, our research team will not have access to this information. If you would like to withdraw your answers after submission, please feel free to contact us. To the best of our knowledge, there are no direct risks or benefits to participating.

This study was approved by the University of Alberta Human Research Ethics Board on December 9, 2016. If you have any concerns about this study, you may contact the Health Research Ethics Board (University of Alberta) at 780-492-0302. This office has no connection with the study researchers.

Enter ID: _____

Do you consent to participate in this survey?

Yes

No (*If 'No', survey terminates.*)

Please download the two PDF files below. They will help you to answer the survey questions on the following pages.

PDF 1:

This file includes a list of the barriers to and enablers of achieving healthy lifestyle behaviors by adolescents with obesity that we retrieved from our review. The darker the color shade, the more commonly reported the barrier/enabler was across *articles* and vice versa. Please download and review this file to help you answer questions 1–7.

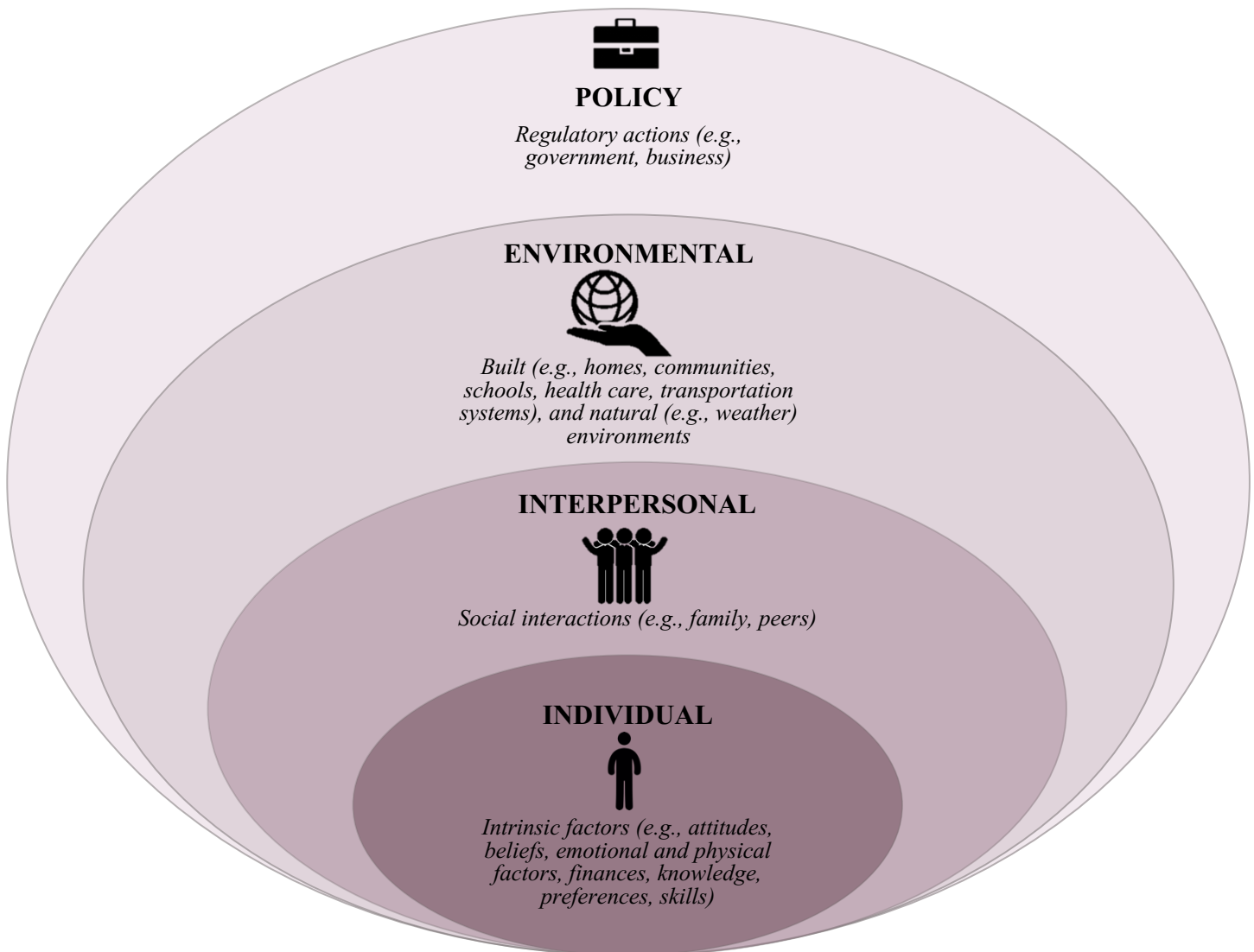
PDF 2:

This file contains information about the inclusion and exclusion criteria for our review; it also includes a list of all of the articles (n=16) that we included. Please download and review this file to help you answer question 8.

Questions:

Please refer to PDF 1 for questions 1–7.

In analyzing our findings, we grouped the barriers and enablers that made it easy or difficult for adolescents to have healthy lifestyle habits under the following themes, which were based on an *adaptation* of the Social Ecological Model:



1. Do you believe that the framework/themes listed above represent an appropriate way to organize our findings?
2. In your professional/clinical experience, what are the 5 most common barriers that influence adolescents' lifestyle habits?

3. In your professional/clinical experience, what are the 5 most common enablers that influence adolescents' lifestyle habits?
4. Based on your professional/clinical experience, did any of our findings surprise you?
5. Based on your professional/clinical experience, did any expect to see any of our findings?
6. What aspects of our findings are relevant to your professional/clinical work?
7. What aspects of our findings are not relevant to your professional/clinical work?

Please refer to PDF 2 for question 8.

8. In your professional/clinical experience, do you believe that we missed any studies that could be included in our review? If yes, which?
9. May we contact you about participating in future research studies about the lifestyle habits of adolescents with obesity?

*Thank-you very much for completing this survey. We really appreciate your time and assistance!
You will receive an email confirmation shortly.*

BARRIERS TO HEALTHY LIFESTYLE BEHAVIORS



Most Common

Least Common

Table 1. Barriers to healthy lifestyle behaviors (NUTRITION)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	-	-	-
-	-	-	-
Emotional eating	-	Family influence (availability of unhealthy foods and less healthy foods, lack of control over home meals, eating out, unhealthy cooking)	-
Mindless eating	-	-	-
Hunger	Peer influence (disapproval, surveillance, unhealthy eating patterns)	-	-
-	Social events or commitments	-	-
Lack of time	Family influence (lack of participation, unhealthy eating patterns)	-	-
Lack of willpower	-	-	-
Autonomy	Mention of unhealthy food	Financial limitations	-
Dislike of taste of healthy food	-	Having unhealthy food in sight	-
Screen time	-	Less quick and easy to grab healthy foods	-

Table 2. Barriers to healthy lifestyle behaviors (PHYSICAL ACTIVITY)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
Lack of motivation	-	-	-
Physical complaints (injury, fatigue)	-	-	-
Lack of/ underestimation of skills	Concern about visibility	-	-
Limited pleasure/ antipathy	Victimization (bullying/teasing)		
-	-	Transportation (mainly in relation to parents)	-
		Weather	
Lack of interest/ boring	Family influence (lack of participation, sedentary behavior, physical activity not valued, unsupportive)	Unsafe neighborhoods	
Lack of time	Peer influence (unhealthy exercise patterns, lack of peers in neighborhood)		-
Learned helplessness	Social commitments		
Perceived inactivity (laziness, preference for sedentary activity)			

Autonomy

Lack of parental time

Financial limitations

Insecurity about appearance

Insufficient Physical Education
time commitment in schools

Lack of willpower

Need for specialized equipment

Table 3. Barriers to healthy lifestyle behaviors (GENERAL)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	Family influence (discouragement, judgements, lack of awareness and support)	-	-
Boredom	Peer influence (disapproval, lack of support)	Chaotic and unstructured lifestyle	-
Perceived inactivity (laziness)			-
Setting vague goals			

ENABLERS OF HEALTHY LIFESTYLE BEHAVIORS



Most Common

Least Common

Table 1. Enablers of healthy lifestyle behaviors (NUTRITION)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	Family, professional, and social support	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
Easiness in preparation	Suggestions for recipes/ meal ideas	-	-
Tastiness of healthy food		-	-

Table 2. Enablers of healthy lifestyle behaviors (PHYSICAL ACTIVITY)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	-	-	-
-	-	-	-
-	Family, professional, and social support	-	-
-	-	-	-
-	-	-	-
-	-	-	-
Motivation	Exercising with overweight peers or older people (non-peers) or in isolation	Enrollment in Physical Education	Free gym membership

Table 3. Enablers of unhealthy lifestyle behaviors (SEDENTARY BEHAVIOR; PHYSICAL INACTIVITY)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
Enjoyment	Mention of potential benefits		
Underestimation of weight loss effects compared to vigorous physical activity		-	-

NOTE: No barriers related to sedentary behavior (inactivity) were identified in our review.

Table 4. Enablers of healthy lifestyle behaviors (GENERAL)

INDIVIDUAL	INTERPERSONAL	ENVIRONMENTAL	POLICY
-	-	-	-
-	Family (active participation, non-judgement about laziness or lack of motivation) and professional (tailored, direct, long-term) support	-	-
-	-	-	-
-	-	-	-
-	Setting clear goals	-	-
-	Bullying	Pleasant home atmosphere	-
Dissatisfaction of body image and physical appearance	-	-	-

DETAILS REGARDING OUR SCOPING REVIEW

A. Eligibility Criteria

Inclusion criteria:

Study type: any

Location: any

Language: English or French

Timeframe: 1980 (inclusive) – June 17, 2016

Population: 13–17-year-olds (or mean age within this range) adolescents with obesity

Setting: weight management clinic, program, or intervention

Focus: perspective of adolescents on barriers to and/or enablers of making healthy lifestyle changes, including nutrition, physical activity, sedentary behavior, and sleep

Exclusion criteria:

Population: non-relevant subjects (*e.g.*, non-obese adolescents, parents, health care providers) and special populations (*i.e.*, adolescents with intellectual and/or developmental complications)

B. Studies Included in Our Review

1. Alm M, Soroudi N, Wylie-Rosett J et al. A qualitative assessment of barriers and facilitators to achieving behavior goals among obese inner-city adolescents in a weight management program. *Diabetes Educ* 2008; 34: 277-84.
2. Curtis P. The experiences of young people with obesity in secondary school: some implications for the healthy school agenda. *Health Soc Care Community* 2008; 16: 410-8.
3. Daley AJ, Copeland RJ, Wright NP, Wales JKH. 'I can actually exercise if I want to; it isn't as hard as I thought': a qualitative study of the experiences and views of obese adolescents participating in an exercise therapy intervention. *J Health Psychol* 2008; 13: 810-9.
4. DeSmet A, Deforche B, Hublet A, Tanghe A, Stremersch E, De Bourdeaudhuij I. Traditional and cyberbullying victimization as correlates of psychosocial distress and barriers to a healthy lifestyle among severely obese adolescents – a matched case-control study on prevalence and results from a cross-sectional study. *BMC Public Health* 2014; 14: 224.
5. Lane-Tillerson C, Davis BL, Killion CM, Baker S. Evaluating nursing outcomes: a mixed-methods approach. *J Natl Black Nurses Assoc* 2005; 16: 20-6.
6. Lindelof A, Nielsen CV, Pedersen BD. A qualitative, longitudinal study exploring obese adolescents' attitudes toward physical activity. *J Phys Act Health* 2012; 10: 113-21.
7. Lindelof A, Nielsen CV, Pedersen BD. Obesity treatment—more than food and exercise: a qualitative study exploring obese adolescents' and their parents' views on the former's obesity. *Int J Qual Stud Health Well-Being* 2010; 5: 5073.
8. Hoerr SL, Nelson RA. Treatment and follow-up of obesity in adolescent girls. *J Adolesc Health Care* 1988; 9: 28-37.
9. Peeters C, Marchand H, Tulloch, H et al. Perceived facilitators, barriers, and changes in a randomized exercise trial for obese youth: a qualitative inquiry. *J Phys Act Heal* 2012; 9: 650-60.

10. Porter JS, Bean MK, Gerke CK, Stern M. Psychosocial factors and perspectives on weight gain and barriers to weight loss among adolescents enrolled in obesity treatment. *J Clin Psychol Med Settings* 2010; 17: 98-102.
11. Pratt KJ, McRitchie S, Collier DN, Lutes LD, Sumner S. Parent & family influences on adopting healthy weight-related behaviors: views and perceptions of obese African-American female adolescents. *J Natl Med Assoc* 2015; 107: 74-9.
12. Reece LJ, Bissel P, Copeland RJ. 'I just don't want to get bullied anymore, then I can lead a normal life'; Insights into life as an obese adolescent and their views on obesity treatment. *Health Expect* 2015; 19: 897-907.
13. Trout J, Graber KC. Perceptions of overweight students concerning their experiences in physical education. *J Teach Phys Educ* 2009; 28: 272-92.
14. Watts AW, Lovato CY, Barr SI, Hanning RM, Mâsse LC. Experiences of overweight/obese adolescents in navigating their home food environment. *Public Health Nutr* 2015; 18: 3278-86.
15. Woolford SJ, Barr KL, Derry HA et al. OMG do not say LOL: obese adolescents' perspectives on the content of text messages to enhance weight loss efforts. *Obesity* 2011; 19: 2382-7.
16. Woolford SJ, Clark SJ, Strecher VJ, Resnicow K. Tailored mobile phone text messages as an adjunct to obesity treatment for adolescents. *J Telemed Telecare* 2016; 16: 458-61.



LIFESTYLE HABITS OF TEENS IN WEIGHT MANAGEMENT

Information below are highlights from a review we recently published:
<http://onlinelibrary.wiley.com/doi/10.1111/obr.12602/fullcom>

WHAT **STOPS** TEENS IN WEIGHT MANAGEMENT FROM LIVING A HEALTHY LIFESTYLE?



DIET



**PHYSICAL
ACTIVITY**



**PHYSICAL
INACTIVITY**

Individual, interpersonal, and environmental factors prevented teens from having a healthy lifestyle.

DIET

Individual

Emotional state

Intrinsic control

Logistics

Physiology

Preferences

Family and social circle

Home environment

Interpersonal

Environmental

Individual	Interpersonal	Environmental
Emotional state	Family and social circle	Access and resources
Intrinsic control	Logistics	Natural environment
Lack of knowledge	Victimization	School environment
Logistics	Visibility	Social environment
Physiology		

**PHYSICAL
ACTIVITY**

Lack of knowledge

Preference to be inactive

**PHYSICAL
INACTIVITY**



LIFESTYLE HABITS OF TEENS IN WEIGHT MANAGEMENT

Information below are highlights from a review we recently published:
<http://onlinelibrary.wiley.com/doi/10.1111/obr.12602/fullcom>

WHAT HELPS TEENS IN WEIGHT MANAGEMENT TO LIVE A HEALTHY LIFESTYLE?



DIET



PHYSICAL ACTIVITY

Individual, interpersonal, environmental, and policy factors helped teens to have a healthy lifestyle.



- 1 Dietary preferences
- 2 Healthy family environment
- 3 Family, professional, and social support

PHYSICAL ACTIVITY

Family, professional, and social network all supported teens in being physically active.

Accessibility (e.g., transportation, gym memberships) were helpful for teens to be physically active.



TAKE-HOME MESSAGES

Highlighted factors...

- ✓ Revolved mostly around diet and physical activity compared with physical inactivity and sleep.
- ✓ Were either within or beyond teens' control.
- ✓ Spanned multiple areas, emphasizing the importance of various sources of support.

For more information, please contact:

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Appendix B.

Chapters 3–6: Study 2

The following appendix contains documents used for our qualitative study, including:

- 1. Patient engagement panel agenda and contract*
- 2. Information sheets and assent and consent forms for adolescents, parents, and health care providers at the PCWH and the CHAL*
- 3. Recruitment posters for the PCWH and the CHAL*
- 4. Interview overview for adolescents*
- 5. Parent sociodemographic survey*
- 6. Study infographics*

Department of Pediatrics
Faculty of Medicine & Dentistry
University of Alberta

Pediatric Centre for Weight and Health
Stollery Children's Hospital

Edmonton, AB, CANADA



Teens in Weight Management and Research

Co-Design Working Group Guide

Location: Pediatric Centre for Weight and Health, Edmonton, Alberta

Date: Saturday, July 29th, 2017

Time: 11:00 am to 1:00 pm

Overarching Objectives:

1. Explore experiences and preferences of teens in weight management
2. Identify perspectives of teens on research
3. Guide the study design and procedures of TEENSAID

11:00am

Introductions

- ◆ Introductions from researcher and participants
- ◆ Explain of a research study and its processes
- ◆ Establish ground rules
- ◆ Answer any questions

11:10am

Experiences and Research Ideas

So I guess we could start by going a bit back in time.

- ◆ And if I can ask if you know who referred you to this clinic?
- ◆ What were your thoughts when you learned that you were being referred here?
- ◆ Did you guys have any expectations?
- ◆ What about now that you do come here, do you have different thoughts or expectations?

Post-referral:

So the main reason we're here today, is because I'd like to hear about some research project ideas that would be of interest to you.

- ◆ So, if you could try to think of a worry or concern, anything about weight management or coming to the clinic that would be your top priority, what would that be?
- ◆ What do you think we can do to help you with that?
- ◆ After we do address it, what kind of outcomes would like to see? So what would you like to come out of the research?

Pre-referral:

- ◆ Is that any different from when you didn't used to come to this clinic yet? So when you were still with your family physician/nurse, did you have any different priorities that you would've liked to address?
- ◆ What do you think would've helped you the most with that then?
- ◆ Outcomes?

What are your experiences overall, though, coming here? Do you like it?

Noon Provide Lunch

12:10pm

Co-Design of TEENSAID

- ◆ Go through interview guide with teens
 - Language
 - Length
 - Order
 - Content

- ◆ Go over study procedures
 - Recruitment
 - Parents vs. teens
 - How can we optimize this? (convincing strategies)
 - Follow-up
 - Text/call/email
 - Logistics
 - Location of interview
 - Group discussion vs. one-on-one
 - Types of incentives
 - Dissemination
 - Best ways to share with you and others

- ◆ Tool preferences
 - Mode (electronic, print)
 - Design (build your own adventure, CCs, brochure)

12:40pm

Patient engagement

- ◆ What do you think of when you're approached for research? Do you prefer this kind or the kind where you're on the other side?

- ◆ How can we identify patients that would want to be involved in research? (How do we advertise it/approach you? What would motivate you?)

- ◆ How can we best engage patients in research?
 - In what stages would you want to participate?
 - i. Preparation: agenda setting
 - ii. Execution: study design & procedures, study recruitment, data collection, data analysis
 - iii. Translation: dissemination, implementation, evaluation

- Method of engagement:
 - ◆ Focus groups, interviews, surveys, study board/advisory council
 - ◆ Would it defer depending on the stage of research?

12:55pm

Summarize and Wrap up

- ◆ Did you enjoy this meeting? What did you think of it?
- ◆ Continued Interest and opportunities to participate

Thank you for your time and contributions today!

TEENSAID's Patient Engagement Panel *for Teens in Pediatric Weight Management*

TEENSAID Project

TEENSAID is a research project meant to help us understand teens' views related to lifestyle habits and health care. With this information, we can work to improve health services we provide teens and their families.

TEENSAID Purpose

You are the experts of your own lives, experiences, and priorities. We want and need to learn from you to improve the care we provide all teens and families. As a member of our patient engagement panel (PEP), we will ask you to share your thoughts about clinical and research issues related to weight management.

You can expect to:

- ◆ Share your experiences in weight management
- ◆ Develop research questions that you think are important and interesting to you
- ◆ Share suggestions on how studies should be conducted

Why join our PEP?

By joining our PEP, you will:

- ◆ Gain experience in planning and conducting health research
- ◆ Help plan research projects that meet your interests and needs
- ◆ Work with researchers from the University of Alberta to help other teens like you

Ground Rules

As part of our PEP, we expect you to:

- ◆ Attend and participate in scheduled meetings (in-person or telephone)
- ◆ Show respect for all other members
- ◆ Share your views, even if they differ from other members
- ◆ Be open-minded to others' experiences, views, and priorities

**We really value your participation.
To show our appreciation, you will receive
a \$25 gift card.**



ONE-ON-ONE INTERVIEWS & DELPHI STUDY

INFORMATION SHEET & ASSENT FORM FOR TEENS

Study Title: Perspectives of Adolescents and Health Care Providers on Health Behaviors and Processes in Pediatric Weight Management

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What is a research study?

A research study is a way to find out new information about something. Teens do not need to be in a research study if they don't want to.

Why are you being asked to be part of this research study?

We are asking you to be in this study because we believe you can help us learn more on our research topic, which is mainly about the lifestyle habits of teens who attend clinics to help with weight management. About 40 children will be in this study.

What information will we ask from you?

In Part 1 of this study, we want to learn from you about the things that make it easy or hard to make healthy lifestyle changes to your diet and activity. We are also interested in what changes you would make in different settings like clinics, communities, home, and schools to make it easier to have a healthy lifestyle. Because you attend a clinic to help with your health and weight, we also want to hear your thoughts on setting goals and making decisions with your clinicians and if there are any educational tools and resources that would help you to improve your health and weight.

In Part 2 of this study, we will ask you to complete an online survey. This survey will let you organize a list of factors that make it easy or hard to make healthy lifestyle changes. The issues included in the survey will be taken from the information we collect from you and all other teens (~40) in Part 1. Results from both parts of our study will help us to learn more about teens and what they think will help them to improve their health and weight.

If you join this study, what will you have to do?

If you agree to join this study, you will take part in a ~1h audio-recorded 1-on-1 interview (Part 1 of our study). After we analyze the interview data, we would like to share our results with you to confirm accuracy, which could be done in-person or by telephone (~5 minutes). A few months after your interview, you will complete the online survey (Part 2 of our study), which is shorter (~15 minutes), but we will ask you to complete 3 surveys over a few weeks. In total, Part 1 and Part 2 will take about 2 hours to complete. You can choose to complete either Part 1 or both parts.

Will this study help you or others?

This study will help your clinicians be aware of the things that make it easy or hard for teens to make healthy lifestyle changes, and will be able to better help you in your treatment plans.

Is there any harm to join this research study?

We do not believe that there are any risks to you in participating in our study. If we ask you questions during the study that you don't want to answer, that is fine. You don't have to answer any question if you don't want to.

Who will see the information collected about you?

Your answers will be anonymized and confidential. Only the research team will know your responses. We may share results of our study with other researchers or health professionals. If we do, we will only share information about the group, so no individual teens will be named or identified.

Do you have to be in this study?

Joining this study is up to you. You can agree now and change your mind later; all you have to do is let us know.

Do your parents know about this study?

This study was explained to your parents and they said that we could ask you if you want to be in it. You can talk this over with them before you decide.

What do you get for being in this study?

As a participant in this study, you will be offered a \$25 Visa gift card for Part 1 and another \$25 Visa gift card for part 2, even if you withdraw. We offer gift cards to all teens as a way to show our appreciation for participating in our study.

What If you have any questions?

Before you decide **'yes' or 'no'** to participating in this study, feel free to ask any questions you may have. If you join the study, you can also ask questions at any time. The researchers listed on the first page of this form will be happy to answer your questions.

If you agree to join this study, please complete the section below.

Yes, I agree to be in this research study.

No, I don't want to be in this study.

Teen's Name

Teen's Signature

Date (dd/mm/yyyy)

Researcher's Name (Obtaining Assent)

Researcher's Signature

Date (dd/mm/yyyy)

ONE-ON-ONE INTERVIEWS & DELPHI STUDY

INFORMATION SHEET FOR PARENTS

Study Title: Perspectives of Adolescents and Health Care Providers on Health Behaviors and Processes in Pediatric Weight Management

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Why is this study needed?

We've heard from parents of teens in weight management that their teens tend to not share their thoughts enough and that they should be more involved in health care discussions. So, it is important to explore teens' perspectives and role in weight management, especially in relation to having a healthy lifestyle, which is essential for successful weight management.

What is the purpose of this study?

The main goals of this study are to:

1. Explore and prioritize the factors that make it easy or hard for teens to have a healthy lifestyle in areas of nutrition, physical activity, sedentary behavior, sleep, and mental health
2. Learn about teens' role in weight management to help develop appropriate tools and/or resources that would help them to improve their health and weight

What information is collected?

There are two parts to this study. In **Part 1**, we will ask teens about (i) the factors that make it easy or hard to have healthy nutrition, physical activity, sedentary, sleep, and mental health habits, (ii) changes they would like to see at clinics, communities, home, and schools that would make it easier to have a healthy lifestyle, (iii) their role in setting goals and making health care decisions, and (iv) the content and types of tools and/or resources that they would like to use in weight management. In **Part 2**, we will ask teens to prioritize the factors identified in part 1 (anonymized) that make it easy or hard to have a healthy lifestyle.

How is information collected?

Demographic and anthropometric characteristics will be collected by the project coordinator from children's medical records, as will sociodemographic characteristics for parents (via a brief questionnaire) for descriptive purposes only.

Part 1 of this study includes a 1-on-1 interview (~1h) between the project coordinator and the teen. Interviews will take place in a private room at the Pediatric Centre for Weight and Health (PCWH; Stollery Children's Hospital, Edmonton, AB), will be audio-recorded (may request to be turned off) and uploaded to an online, secure file sharing platform (*LabKey*) maintained by the Women and Children's Health Research Institute (University of Alberta), and transcribed verbatim by an Alberta-based company (*Translation Agency of Alberta*). After we analyze the interview data, we would like to share our results with your teen to confirm accuracy, which could be done in-person or by telephone (~5 minutes). **Part 2** of this study includes the teen completing a maximum of three online surveys (~15 minutes each) on this topic a few months following the interview.

Are there any possible benefits from this study?

Using data from this study, both teens and health professionals will be made aware of the factors that make it easy or hard for teens to have a healthy lifestyle, and so treatment can be tailored to specific individuals. We will also share our findings with policy makers who can help to address the factors mentioned by teens. Lastly, we will develop a tool based on our findings that can help teens in weight management be more involved in their care (*e.g.*, setting goals).

Are there any possible risks from this study?

We do not believe that there are any risks for your teen to participate in our study. We will let your teen know that they can skip any questions that they do not want to answer and that they may stop at any time if they feel uncomfortable.

How is information kept confidential and anonymous?

Answers will be de-identified and confidential; each teen will be assigned a number, and names/other identifying information will be removed for analysis. Only the research team will know about teens' answers. We may share results of our study with other research or health professionals. If we do, we will only share information about the group, so no individual teens will be named or identified.

Any information on a computer will be protected with a password and saved on a secure server (maintained by MedIT, Faculty of Medicine & Dentistry, University of Alberta). Hard-copy documentation will be securely stored at the PCWH in a locked filing cabinet. After completing the study, all information will be kept for a minimum of five years, after which time it will be destroyed.

Can I withdraw from this study?

Participation in this study is voluntary. Completion of the parent survey is optional. Your teen may choose to participate in part 1 or both parts. If you or your teen decide that you do not want to be involved in this study, it is completely fine. You may stop the study at any time; but, please notify us if that is the case. If you decide to stop or not take part in this study, it will not affect the care you and your teen receive at the PCWH, or elsewhere.

Is there any reimbursement for taking part in this study?

As participants in this study, teens will be offered a \$25 Visa gift card per part for a total of \$50. Teens are still entitled to this upon early withdrawal. This is a way to show our appreciation for teens who participate in our study.

Is there an independent office I can contact if I have concerns about this study?

If you have any concerns about this study, you may contact the Health Research Ethics Board (University of Alberta) at (780) 492-2615. This office has no connection with the study researchers.

ONE-ON-ONE INTERVIEWS & DELPHI STUDY

CONSENT FORM FOR PARENTS

Study Title: Perspectives of Adolescents and Health Care Providers on Health Behaviors and Processes in Pediatric Weight Management

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Please select your answers:

- | | | |
|--|-----|----|
| Do you understand that you and your teen have been asked to participate in a research study? | Yes | No |
| Have you received and read a copy of the attached Information Sheet? | Yes | No |
| Do you understand the benefits and risks involved in taking part in this study? | Yes | No |
| Do you understand who will have access to your teen’s medical records, including personally identifiable health information? | Yes | No |
| Have you had a chance to ask questions and discuss this study with the researchers? | Yes | No |
| Do you understand that your teen is free to refuse to participate or withdraw from the study at any time? Refusing to participate or withdrawing from the study will not affect the medical care your teen and family receive. | Yes | No |
| Have the topics of confidentiality and anonymity been explained to you? | Yes | No |

I agree for my teen to take part in this study: YES NO

Parent’s Name Parent’s Signature Date (dd/mm/yyyy)

Researcher’s Name Researcher’s Signature Date (dd/mm/yyyy)

FOCUS GROUP INTERVIEWS

INFORMATION SHEET FOR HEALTH CARE PROVIDERS

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Why is this study needed?

Patient involvement is key to patient-centered care. Often times, however, adolescents are not involved in making personal treatment plans in pediatric weight management. As such, it is important to explore the patient-provider relationship in this setting.

What is the purpose of this study?

The primary goals of this study are to explore health care providers' (HCP) perspectives in relation to lifestyle behaviors of adolescents with obesity and their stance on health care processes in pediatric weight management.

What information is collected?

From HCPs, we will explore their *(i)* perspectives on the lifestyle behaviors of adolescents with obesity in relation to nutrition, physical activity, sedentary behavior, sleep, and mental health and *(ii)* outlook on adolescents' involvement in health care processes (*e.g.*, goal-setting, shared decision-making).

How is information collected?

Data will be collected via ~45-minute focus group interviews consisting of a multidisciplinary clinical team, including pediatricians, dietitians, exercise specialists, and psychologists. Interviews, which will take place in a private room at the Pediatric Centre for Weight and Health (PCWH; Stollery Children's Hospital, Edmonton, AB) will be audio-recorded, uploaded to an online, secure file sharing platform (*LabKey*) maintained by the Women and Children's Health Research Institute (University of Alberta), and transcribed verbatim by an Alberta-based group (*Translation Agency of Alberta*).

Are there any possible benefits from this study?

Data from this research study (which also includes interviewing adolescents with obesity) will inform the development of a tool that will encourage adolescents to (i) prioritize lifestyle area(s) in which they would like to make changes and identify barriers/enablers that they experience in the corresponding area(s) and (ii) increase proactive behavior in setting goals for weight management. Thus, findings from our research study will be transferred directly into the services offered to adolescents in weight management.

Are there any possible risks from this study?

There are no unusual risks associated to participating in this study.

How is information kept confidential and anonymous?

Answers are anonymized and confidential; however, we cannot guarantee that others in the group will maintain the confidentiality of what is discussed in the group. Each study participant will be assigned a number and names and other identifying information will be removed for analysis. Any information shared with others will be done at the group-level, so no individual HCPs will be named or identified.

Any information on a computer will be protected with a password and saved on a secure server (maintained by MedIT, Faculty of Medicine & Dentistry, University of Alberta). Hard-copy documentation will be securely stored at the PCWH in a locked filing cabinet. All information will be kept for a minimum of five years upon completion of the study, after which time it will be destroyed. The results of this study will be published in scientific journals and presented at conferences, however no names or identifying information will be communicated.

Can I withdraw from this study?

Participating in this study is voluntary. You may choose to stop participating in the study at any time; however, please notify us if that is the case.

Is there any reimbursement for taking part in this study?

As a participant in this study, you will be offered a \$25 gift card to Amazon. This is a way to show our appreciation for HCPs who participate in our study.

Is there an independent office I can contact if I have concerns about this study?

If you have any concerns about this study, you may contact the Health Research Ethics Board (University of Alberta) at (780) 492-2615. This office has no connection with the study researchers.

FOCUS GROUP INTERVIEWS

CONSENT FORM FOR HEALTH CARE PROVIDERS

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Please select your answers:

- | | | |
|---|-----|----|
| Do you understand that you have been asked to participate in a research study? | Yes | No |
| Have you received and read a copy of the attached Information Sheet? | Yes | No |
| Do you understand the benefits and risks involved in taking part in this study? | Yes | No |
| Have you had a chance to ask questions and discuss this study with the researchers? | Yes | No |
| Do you understand that you are free to refuse to participate or withdraw from the study at any time? There is no penalty to this. | Yes | No |
| Do you understand who will have access to the information you provide? | Yes | No |
| Have the topics of confidentiality and anonymity been adequately explained? | Yes | No |

I agree to taking part in this study: YES NO

Participant's Name

Participant's Signature

Date (dd/mm/yyyy)

Researcher's Name

Researcher's Signature

Date (dd/mm/yyyy)

FICHE D'INFORMATION ET FORMULAIRE D'ASSENTIMENT POUR LES ADOLESCENTS

Titre de l'étude : Point de vue des adolescents et des prestataires de soins de la santé sur les comportements sains et les procédés de santé pour le traitement du surpoids pédiatrique

Annick Buchholz, PhD

Chercheur de site (Ottawa)
Centre hospitalier pour enfants de l'Est de l'Ontario
Centre des saines habitudes de vie
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Qu'est-ce qu'une étude de recherche ?

Une étude de recherche est un moyen de découvrir de nouvelles informations sur un sujet. Les ados ne sont pas obligés de participer à une étude de recherche s'ils ne veulent pas.

Pourquoi est-ce qu'on te demande de participer à cette étude de recherche ?

Nous croyons que tu peux nous aider à en apprendre davantage sur le mode de vie des ados qui fréquentent les cliniques de gestion du poids corporel (qui est notre sujet de recherche). Environ 40 enfants participeront aussi à cette étude.

Quelles informations allons-nous te demander ?

Dans la première partie de cette étude, nous voulons en apprendre davantage sur le mode de vie des ados, incluant les facteurs qui rendent facile ou difficile d'apporter des changements sains, les changements potentiels à apporter dans l'entourage, la prise de décisions concernant les plans de traitement à la clinique et les outils et / ou ressources qu'on pourrait utiliser à la clinique pour améliorer la santé et la gestion de poids corporel. Dans la deuxième partie de cette étude, nous te demanderons de prioriser les facteurs identifiés dans la première partie en ordre d'importance.

Si tu décides de participer à cette étude, que dois-tu faire ?

Si tu acceptes de participer à cette étude, tu participeras à un entretien (1 à 1) d'environ 1 heure (pour la partie 1 de notre étude) avec la coordinatrice de ce projet. Quelques semaines après ton entretien, nous te demanderons de remplir l'enquête en ligne (pour la partie 2 de notre étude), qui sera plus courte (environ 15 minutes). Nous te demanderons de compléter une version modifiée de la première enquête trois fois dans l'espace de quelques semaines. Au total, la partie 1 et la partie 2 prendront environ 2 heures à remplir. Tu peux choisir de participer à la première ou aux deux parties.

Cette étude t'aidera-t-elle ou aidera-t-elle d'autres jeunes ?

Tes médecins prendront conscience des facteurs qui facilitent ou empêchent les ados à faire des changements de mode de vie sain et pourraient t'aider dans tes plans de soins futur.

Est-ce qu'il y a des risques possibles à participer à cette étude ?

Nous ne pensons pas qu'il y ait de risques à participer à cette étude. Dans le cas où tu ne veux pas répondre à une question, faite-le nous savoir et on peut la sauter.

Qui verra l'information recueillie à tes propos ?

Tes réponses seront anonymisées et confidentielles. Seul l'équipe de recherche connaîtra tes réponses. Nous pouvons partager les résultats de notre étude avec d'autres chercheurs ou professionnels. Dans ce cas, nous ne partagerons que des informations à propos du groupe, de sorte qu'aucun individus ne sera nommé ou identifié.

Est-ce que tu es obligé de participer à cette étude ?

Non, la participation est volontaire. Tu peux aussi accepter maintenant et changer d'avis plus tard sans problème ; tout ce que tu dois faire est de nous faire savoir que tu veux te retirer de l'étude.

Est-ce que tes parents sont au courant de cette étude ?

Cette étude a été expliquée à tes parents et ils ont accepté qu'on te demande si tu aimerais y participer. Tu peux parler avec eux avant de décider.

Que gagnes-tu si tu participes à cette étude ?

En tant que participant à cette étude, tu recevras une carte-cadeau Visa de 25 \$ pour la partie 1 et une autre carte-cadeau de 25 \$ pour la deuxième partie, même si tu te retires de l'étude. Nous offrons des cartes-cadeaux à tous les ados afin de vous remercier.

Avec qui communiquer si tu as des questions ?

Avant de décider « oui » ou « non » de prendre part à cette étude, n'hésites pas à nous poser tes questions. Si tu te joins à l'étude, tu peux également poser des questions à tout moment. Les chercheurs mentionnés à la première page du formulaire seront heureux d'y répondre.

Si tu acceptes de participer à cette étude, veuilles remplir la section ci-dessous.

Oui, j'accepte de participer à cette étude.

Nom de l'adolescent(e)

Signature de l'adolescent(e)

Date (jj/mm/aaaa)

Nom du chercheur
(Obtenant l'Assentiment)

Signature du chercheur

Date (jj/mm/aaaa)

FICHE D'INFORMATION POUR LES ADOS

Titre de l'étude : Point de vue des adolescents et des prestataires de soins de la santé sur les comportements sains et les procédés de santé pour le traitement du surpoids pédiatrique

Annick Buchholz, PhD

Chercheur de site (Ottawa)
Centre hospitalier pour enfants de l'Est de l'Ontario
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Maryam Kebbe, BSc

Coordinatrice de projet (doctorant)
Département de pédiatrie, UAlberta
(613) 890-8901 (ph)
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Tu es invité(e) à participer à une étude à propos du mode de vie des ados. Avant d'accepter de prendre part à cette étude, il est important de prendre le temps de lire et de bien comprendre ce projet de recherche.

Qu'est-ce qu'une étude de recherche ?

Une étude de recherche est un moyen d'acquérir de nouvelles informations sur un sujet spécifique. Ceux invités à y participer ont le choix d'accepter ou de refuser.

Pourquoi est-ce qu'on te demande de participer à cette étude de recherche ?

Tu es invité(e) à participer à cette étude puisque tu fréquentes le Centre des saines habitudes de vie (CSHV). Nous croyons que tu peux nous aider à en apprendre davantage sur les habitudes de vie des ados qui fréquentent les cliniques de gestion du poids corporel (qui est notre sujet de recherche).

Pourquoi cette étude est-elle nécessaire ?

Certains ados ont mentionné qu'ils aimeraient être plus impliqués dans la prise de décisions concernant leur santé. Ainsi, il est important d'explorer les perspectives et le rôle des ados dans la gestion de leur poids ; surtout en ce qui a trait au mode de vie sain, un élément essentiel à la gestion du poids corporel.

Quel est le but de cette étude ?

Les objectifs principaux de cette étude sont les suivants :

1. Explorer et prioriser les facteurs reliés à la nutrition, l'activité physique, les comportements sédentaires, le sommeil et la santé émotionnelle qui rendent facile ou difficile l'adoption d'un mode de vie sain pour les ados.
2. En apprendre davantage sur le rôle des ados dans la gestion de leur poids corporel pour être en mesure de développer des outils et ressources appropriés qui les aidera à améliorer leur santé et à faciliter la gestion de leur poids.

Combien d'individus participeront ?

Au CSHV, nous envisageons avoir 20 participants et d'effectuer le recrutement et les entretiens sur une période d'un mois.

Quelles informations allons-nous te demander ?

Dans la partie 1 de cette étude, nous voulons en apprendre davantage sur les facteurs qui font en sorte que c'est plus facile ou difficile d'apporter des changements sains à ton mode de vie incluant l'alimentation et l'activité physique. Nous voulons aussi en apprendre davantage sur les changements potentiels à apporter dans l'entourage, c'est-à-dire dans les cliniques, les communautés, les écoles et à la maison, qui pourraient faciliter l'adoption d'un mode de vie sain. Nous sommes aussi intéressés à connaître ton niveau d'implication dans la détermination des objectifs de leur plan de traitement à la clinique et de la prise de décisions entourant ce processus. Finalement, nous aimerions connaître s'il y a des outils et des ressources qui t'aideraient à améliorer ta santé et ta gestion de poids corporel.

Dans la partie 2 de cette étude, nous te demanderons de prioriser les facteurs identifiés dans la première partie en ordre d'importance ; c'est-à-dire quels facteurs facilitent ou nuisent le plus à apporter des changements dans ton mode de vie.

Si tu décides de participer à cette étude, que dois-tu faire ?

Si tu acceptes de participer à cette étude, tu participeras à un entretien (1 à 1) d'environ 1 heure (pour la partie 1 de notre étude) avec la coordinatrice de ce projet. Les entretiens auront lieu dans une salle privée au CSHV. Après avoir analysé les données de l'entretien, nous aimerions communiquer les résultats avec toi pour confirmer de l'exactitude de notre analyse ; cette partie sera faite par courriel. Quelques semaines après ton entretien, nous te demanderons de remplir une enquête en ligne (pour la partie 2 de notre étude), qui sera plus courte (environ 15 minutes). Nous te demanderons de compléter une version modifiée de la première enquête trois fois dans l'espace de quelques semaines. Au total, la partie 1 et la partie 2 prendront environ 2 heures à compléter. Tu peux choisir de participer à la partie 1 ou aux deux parties.

Est-ce qu'il y a des risques possibles à participer à cette étude ?

Nous ne pensons pas qu'il y ait de risques à participer à cette étude. Dans le cas où tu ne veux pas répondre à une question, faite-le nous savoir et on peut la sauter.

Cette étude t'aidera-t-elle ou aidera-t-elle d'autres jeunes ?

Les résultats de cette étude nous aideront à en apprendre davantage sur la perception des ados et ce qu'ils pensent les aideraient le plus à améliorer leur santé et leur poids corporel. Les médecins prendront conscience des facteurs qui facilitent ou empêchent les ados à faire des changements de mode de vie sain et pourraient les aider dans leurs plans de soins futur.

Que gagnes-tu si tu participes à cette étude ?

En tant que participant à cette étude, tu recevras une carte-cadeau Visa de 25 \$ pour la partie 1 et une autre carte-cadeau de 25 \$ pour la deuxième partie, même si tu te retires de l'étude. Nous offrons des cartes-cadeaux à tous les ados afin de montrer notre reconnaissance.

Est-ce que tu es obligé de participer à cette étude ?

Non, la participation est volontaire. Tu peux aussi accepter maintenant et changer d'avis plus tard sans problème ; tout ce que tu dois faire est de nous faire savoir que tu veux te retirer de l'étude.

Qui verra l'information recueillie à ton sujet ?

Toute information restera strictement confidentielle, sauf si la loi l'exige ou l'autorise (ex. toute information qui indiquerait qu'un ado a été blessé ou risque de subir un tel préjudice ne serait pas confidentielle et devrait être divulguée au besoin aux autorités responsables). Tes identifiants personnels seront gardés dans un document qui relie cette information à un identifiant de participant pour l'étude qui s'appelle une liste maîtresse. L'identifiant sera utilisé dans tous les autres documents de recherche au lieu de tes informations personnelles pour protéger ta vie privée. La liste maîtresse sera enregistrée séparément des autres données de recherche. En ce qui concerne les réponses aux questions d'entretien, elles seront anonymisées et confidentielles ; chaque participant à l'étude recevra un identifiant « fictif ».

Le site principal de cette étude se trouve à l'Université de l'Alberta, Edmonton, AB. Toute information sur un ordinateur sera protégée par un mot de passe et enregistrée sur un serveur sécurisé (maintenu par MedIT, Faculté de médecine et de dentisterie, Université de l'Alberta). Les documents papier seront stockés en toute sécurité dans un classeur verrouillé au CSHV. Toute information partagée avec d'autres sera effectuée au sein du groupe, de sorte qu'aucun individu ne sera nommé ou identifié. Toutes les informations seront conservées pendant au moins sept ans après la fin de l'étude, après quoi elles seront détruites. Les résultats de cette étude seront publiés dans des revues scientifiques et présentés lors des conférences ; aucun nom ou information d'identification ne sera communiqué.

Et si j'ai des questions ?

Si tu as des questions concernant ta participation à cette étude, tu peux contacter la coordinatrice de ce projet. Cette étude a été révisée et approuvée par le conseil d'éthique de la recherche du Centre hospitalier pour enfants de l'est de l'Ontario. Si tu as des inquiétudes au sujet de cette étude, tu peux communiquer avec le bureau de l'éthique et de l'intégrité de la recherche (Institut de recherche) au (613) 737-7600 x 3272. Ce bureau n'a aucun lien avec les chercheurs de l'étude.

Consentement à partir des signatures

En signant ce formulaire de consentement, j'accepte que :

- Je consens de mon plein gré de participer à cette étude ;
- Je comprends l'information dans ce formulaire de consentement ;
- Je comprends que mes informations seront stockées à l'Université de l'Alberta et au CSHV ;
- Les avantages et les risques inhérents à la participation à cette étude m'ont été expliqués ;
- Toutes mes questions ont été adressées ;
- Je n'abandonne pas mes droits en signant ce formulaire.

Signatures

Nom de l'adolescent (e)

Signature de l'adolescent

Date (jj/mm/aaaa)

Nom du chercheur

Signature du chercheur

Date (jj/mm/aaaa)

FICHE D'INFORMATION ET FORMULAIRE DE CONSENTEMENT POUR LES PARENTS

Titre de l'étude : Point de vue des adolescents et des prestataires de soins de la santé sur les comportements sains et les procédés de santé pour le traitement du surpoids pédiatrique

Annick Buchholz, PhD

Chercheur de site (Ottawa)
Centre hospitalier pour enfants de l'Est de l'Ontario
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Maryam Kebbe, BSc

Coordinatrice de projet (doctorant)
Département de pédiatrie, UAlberta
(613) 890-8901 (ph)
kebbe@ualberta.ca

Vous êtes invités à participer à une étude à propos du mode de vie des adolescents. Vous êtes invités à participer à cette étude puisque vous fréquentez le Centre des saines habitudes de vie (CSHV). Avant d'accepter de prendre part à cette étude, il est important de prendre le temps de lire et de bien comprendre ce projet de recherche.

Pourquoi cette étude est-elle nécessaire ?

Certains parents ont mentionné que leurs adolescents ont tendance à ne pas partager leurs pensées suffisamment concernant leur santé. De même, certains adolescents ont mentionné qu'ils aimeraient être plus impliqués dans la prise de décisions concernant leur santé. Ainsi, il est important d'explorer les perspectives et le rôle des adolescents dans la gestion de leur poids ; surtout en ce qui a trait au mode de vie sain, un élément essentiel à la gestion du poids corporel.

Quel est le but de cette étude ?

Les objectifs principaux de cette étude sont les suivants :

1. Explorer et prioriser les facteurs reliés à la nutrition, l'activité physique, les comportements sédentaires, le sommeil et la santé émotionnelle qui rendent facile ou difficile l'adoption d'un mode de vie sain pour les adolescents.
2. En apprendre davantage sur le rôle des adolescents dans la gestion de leur poids corporel pour être en mesure de développer des outils et ressources appropriés qui les aidera à améliorer leur santé et à faciliter la gestion de leur poids.

Combien d'individus participeront ?

Au CSHV, nous envisageons avoir 20 participants et d'effectuer le recrutement et les entretiens sur une période d'un mois.

Quelles informations sont recueillies ?

Il y a deux parties à cette étude. Nous recueillerons des identifiants personnelles (ex. âge, taille, poids, origine ethnique) des parents et des adolescents uniquement à des fins descriptives. Dans la partie 1 de cette étude, nous voulons en apprendre davantage sur les facteurs qui font en sorte que c'est plus facile ou difficile d'apporter des changements sains au mode de vie incluant l'alimentation et l'activité physique chez les adolescents. Nous voulons aussi en apprendre davantage sur les changements potentiels à apporter dans l'entourage, c'est-à-dire dans les cliniques, les communautés, les écoles et à la maison, qui pourraient faciliter l'adoption d'un mode de vie sain. Nous sommes aussi intéressés à connaître le niveau d'implication des adolescents dans la détermination des objectifs de leur plan de traitement à la clinique et de la prise de décisions entourant ce processus. Finalement, nous aimerions connaître s'il y a des outils et des ressources qui aideraient les adolescents à améliorer leur santé et la gestion de leur poids corporel.

Dans la partie 2 de cette étude, nous demanderons aux adolescents de prioriser les facteurs identifiés dans la première partie en ordre d'importance ; c'est-à-dire quels facteurs facilitent ou nuisent le plus à apporter des changements dans leur mode de vie.

Comment les informations sont-elles recueillies ?

Les identifiants personnels seront recueillis à partir des dossiers médicaux des adolescents et d'une enquête remplie par les parents. Dans la **partie 1** de cette étude, les adolescents participeront à un entretien (1 à 1) d'environ 1 heure avec la coordinatrice de ce projet. Les entretiens auront lieu dans une salle privée au CSHV et seront enregistrés en audio, téléchargés sur une plate-forme de partage de fichiers sécurisée en ligne (*LabKey*) maintenue par l'Institut de recherche en santé des femmes et des enfants (Université de l'Alberta) et transcrits par un groupe basé à l'Alberta (*Translation Agency of Alberta*). Dans la **partie 2** de cette étude, nous demanderons aux adolescents de remplir une enquête en ligne (environ 15 minutes). Nous leur demanderons de compléter une version modifiée de la première enquête trois fois dans l'espace de quelques semaines. Au total, la partie 1 et la partie 2 prendront environ 2 heures à compléter.

Est-ce qu'il y a des risques possibles à participer à cette étude ?

Nous ne pensons pas qu'il y ait de risques à participer à cette étude. Dans le cas où vous ne voulez pas participer à cette étude, simplement faites-le nous savoir.

Est-ce qu'il y a des avantages possibles à participer à cette étude ?

Les résultats des deux parties de notre étude nous aideront à en apprendre davantage sur la perception des adolescents et ce qu'ils pensent les aideraient le plus à améliorer leur santé et leur poids corporel. Leurs médecins prendront conscience des facteurs qui leur facilitent ou empêchent à faire des changements de mode de vie sain et pourraient les aider dans leurs plans de soins futur.

Est-ce qu'il y a un remboursement pour participer à cette étude ?

En participant à cette étude, les adolescents recevront une carte-cadeau Visa de 25 \$ par partie pour un total de 50 \$, même s'ils se retirent de l'étude. Nous offrons des cartes-cadeaux à tous les ados afin de montrer notre reconnaissance.

Puis-je retirer de cette étude ?

La participation à cette étude est volontaire. Votre adolescent peut choisir de participer soit à la partie 1 soit aux deux parties. Vous pouvez aussi accepter maintenant et changer d'avis plus tard sans problème ; tout ce que vous devez faire est de nous faire savoir que vous voulez vous retirer de l'étude. Si vous décidez d'arrêter ou de ne pas participer à cette étude, cela n'affectera pas les soins que vous et votre adolescent recevoient au CSHV ou ailleurs.

Comment l'information est-elle confidentielle et anonyme ?

Toute information restera strictement confidentielle, sauf si la loi l'exige ou l'autorise (ex. toute information qui indiquerait qu'un ado a été blessé ou risque de subir un tel préjudice ne serait pas confidentielle et devrait être divulguée au besoin aux autorités responsables.

Vos identifiants personnels seront gardés dans un document qui relie cette information à un identifiant de participant pour l'étude qui s'appelle une liste maîtresse. L'identifiant sera utilisé dans tous les autres documents de recherche au lieu de votre information personnelle pour protéger votre vie privée. La liste maîtresse sera enregistrée séparément des autres données de recherche. En ce qui concerne les réponses aux questions d'entretien, elles seront anonymisées et confidentielles ; chaque participant à l'étude recevra un identifiant « fictif ».

Le site principal de cette étude se trouve à l'Université de l'Alberta, Edmonton, AB. Toute information sur un ordinateur sera protégée par un mot de passe et enregistrée sur un serveur sécurisé (maintenu par MedIT, Faculté de médecine et de dentisterie, Université de l'Alberta). Les documents papier seront stockés en toute sécurité à CHAL. Toute information partagée avec d'autres sera effectuée au sein du groupe, de sorte qu'aucun individu ne sera nommé ou identifié. Toutes les informations seront conservées pendant au moins sept ans après la fin de l'étude, après quoi il sera détruit. Les résultats de cette étude seront publiés dans des revues scientifiques et présentés lors des conférences, mais aucun nom ou information d'identification ne sera communiqué.

Et si j'ai des questions ?

Si vous avez des questions concernant votre participation à cette étude, veuillez contacter la coordinatrice de ce projet. Cette étude a été révisée et approuvée par le conseil d'éthique de la recherche du Centre hospitalier pour enfants de l'est de l'Ontario. Si vous avez des inquiétudes au sujet de cette étude, vous pouvez communiquer avec le bureau de l'éthique et de l'intégrité de la recherche (Institut de recherche) au (613) 737-7600 x 3272. Ce bureau n'a aucun lien avec les chercheurs de l'étude.

Consentement à partir des signatures

En signant ce formulaire de consentement, j'accepte que :

- Je consens de mon plein gré de participer à cette étude ;
- Je comprends l'information dans ce formulaire de consentement ;
- Je comprends que mes informations seront stockées à l'Université de l'Alberta et CHAL ;
- Les avantages et les risques inhérents à la participation à cette étude m'ont été expliqués ;
- Toutes mes questions ont été adressées ;
- Je n'abandonne pas mes droits en signant ce formulaire.

Signatures

Nom du parent

Signature du parent

Date (jj/mm/aaaa)

Nom du chercheur

Signature du chercheur

Date (jj/mm/aaaa)

FOCUS GROUP INTERVIEWS

INFORMATION SHEET AND CONSENT FORM FOR HEALTH CARE PROVIDERS

Study Title: Perspectives of Adolescents and Health Care Providers on Health Behaviors and Processes in Pediatric Weight Management

Annick Buchholz, PhD
Ottawa Site Investigator
Children's Hospital of Eastern Ontario
Centre for Healthy Active Living
(613) 260-1477 x 224 (ph)
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Maryam Kebbe, BSc
Project Coordinator (PhD Student)
Department of Pediatrics, UAlberta
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kebbe@ualberta.ca

You are invited to participate in a research study about adolescents in weight management. Please take the time to read and understand this document before agreeing to participate in the study.

Why is this study needed?

Involving patients in their own care has been shown to have many clinical benefits. Adolescents, in particular, can benefit from increased involvement as they start to show more independence in relation to their personal life, including creating their own treatment plans.

Why is this study being done?

This study is being done because we hope to find out more about adolescents' through health care providers' (HCP), specifically in relation to lifestyle behaviors of adolescents with obesity, their preferences in weight management discussions and decision-making, and clinical tools.

How many people will participate?

We will ask eight HCPs from the Centre for Healthy Active Living (CHAL; Children's Hospital of Eastern Ontario, Ottawa, ON) to participate. Ten HCPs have already participated at our primary site in Edmonton.

How is information collected?

Information will be collected via a ~1-hour focus group interviews consisting of a multidisciplinary clinical team, including pediatricians, dietitians, exercise specialists, and psychologists. Interviews, which will take place in a private room at CHEO's CHAL will be audio-recorded, uploaded to an online, secure file sharing platform (*LabKey*) maintained by the Women and Children's Health Research Institute (University of Alberta), and transcribed verbatim by an Alberta-based group (*Translation Agency of Alberta*).

Are there any possible risks to participating?

There are no known risks associated with taking part in this study.

Are there any possible benefits to participating?

If you decide to participate, you may or may not benefit from participating in this study; however, using data from this research study (which also includes interviewing adolescents with obesity), we will develop a tool that adolescents and HCPs can use in their appointments. This tool aims to facilitate conversation and decision-making for adolescents. As such, findings from our research study will be transferred directly into the services offered to adolescents in weight management.

Will I be paid to participate?

We will provide you with some compensation (\$25 Amazon gift card) in recognition of your time and effort.

Can I withdraw?

You can withdraw from the study at any time without any impact to your current or future position at CHEO. Please discuss with the project coordinator if you would like to withdraw. If you withdraw your consent, the project coordinator will no longer collect, and disclose your health information for the purpose of this study. Information that was already collected will still be used, unless otherwise indicated.

Will I be told about new information?

We will inform you of any new information that might change your decision to continue to participate in this research project. We will ask you again if you still want to be in the study.

You can receive a copy of the study results at the end of the study. Please let the study team know if you like to receive a copy.

What about confidentiality and privacy?

Answers are anonymized and confidential; however, we cannot guarantee that others in the group will maintain the confidentiality of what is discussed in the group. Each study participant will be assigned a number and names and other identifying information will be removed for analysis. Any information shared with others will be done at the group-level, so no individual HCPs will be named or identified.

Any information on a computer will be protected with a password and saved on a secure server (maintained by MedIT, Faculty of Medicine & Dentistry, University of Alberta). Hard-copy documentation will be securely stored at CHAL in a locked filing cabinet. All information will be kept for a minimum of seven years upon completion of the study, after which time it will be destroyed. The results of this study will be published in scientific journals and presented at conferences, however no names or identifying information will be communicated.

Is there an independent office I can contact if I have concerns about this study?

This study has been reviewed and approved by the CHEO Research Ethics Board. The CHEO Research Ethics Board is a committee of the hospital that includes individuals from different professional backgrounds. The Board reviews all human research that takes place at the hospital. Its goal is to ensure the safety of people taking part in research. If you have any concerns about this study, you may contact the Children’s Hospital of Eastern Ontario Ethics Board at (613) 737-7600 ext 3752. This office has no connection with the study researchers.

Consent form Signatures

By signing this consent form, I agree that:

- I am voluntarily agreeing to participate in this research study;
- I understand the information within this consent form;
- All of the risks and benefits of participation have been explained to me;
- All of my questions have been answered; and
- I do not give up my legal rights by signing this form.

A copy of the signed Information Sheet and/or Consent Form will be provided to me.

Participant’s Name

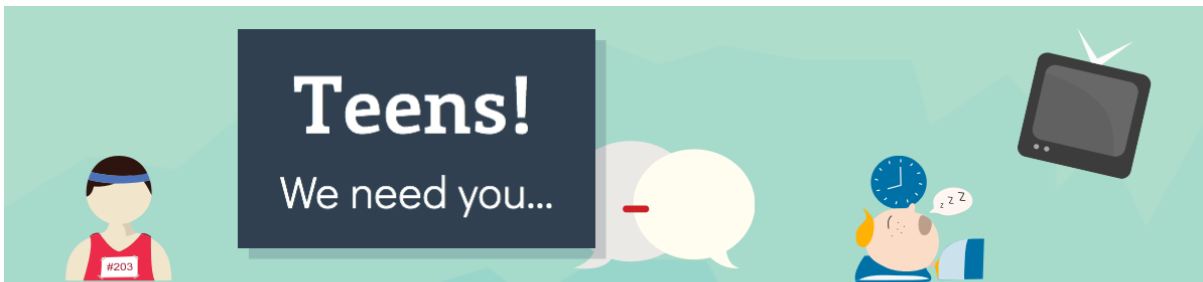
Participant’s Signature

Date (dd/mm/yyyy)


Researcher’s Name

Researcher’s Signature

Date (dd/mm/yyyy)



... to participate in a new research study.




Looking for teens who are 13 – 17 years old



Pediatric Centre for Weight and Health, Stollery Children's Hospital (Edmonton, AB)

Want to share your thoughts on?



Challenges to a healthy lifestyle



Making changes in your surroundings



Information or support that could help

Teens who participate in the study will receive a \$50 Visa gift card.

Please contact Maryam Kebbe (Project Coordinator, PhD Student)
Email: kebbe@ualberta.ca
Phone: (613) 890-8901

Les Ados!

Nous avons besoin de vous...



... pour participer à une nouvelle étude de recherche.



Nous cherchons des adolescents de 13 à 17 ans



Centre des saines habitudes de vie, le Centre hospitalier pour enfants de l'est de l'Ontario (Ottawa, ON)

Avez-vous envie de partager vos pensées au sujet des?



Défis à un mode de vie sain



Changements dans vos alentours



Infos ou soutiens qui pourraient vous aider

Les ados qui participeront à cet étude recevront un carte-cadeau Visa de \$50.

SVP contactez Maryam Kebbe (Coordinatrice de Project, doctorant)

Courriel: kebbe@ualberta.ca

Téléphone: (613) 890-8901



General	Lifestyle	Changes	Health Care	Research
I N T R O	Diet	Family	Experiences	Tool
	Physical Activity	School	Role	Verification
	Inactivity	Community	Goals	Surveys
	Sleep	Clinic	Decision-making dynamics	
	Emotional Health			

Date of Completion (dd/mm/yyyy): _____

PARENTS: GENERAL INFORMATION

For each of the following questions, please circle the number that corresponds to your response or fill in the blank as appropriate.

1. What sex were you assigned at birth on your original birth certificate?

- Male
- Female

2. What is your date of birth?

e.g.
 (day) (month) (year)
 01 Feb 1969

3. How tall are you without shoes on?

_____ (feet) _____ (inches) **OR** _____ (cm)

4. How much do you weigh?

_____ (pounds) **OR** _____ (kg)

5. What is your relationship to the teen?

- Biological mother or father
- Adoptive mother or father
- Other (Please specify): _____

6. What is your highest level of education?

- Less than high school
- Completed high school
- Some college, technical school, or university
- Completed college, technical school, or bachelor's degree
- Completed graduate or professional degree

7. Which of the following best describes your ethnic/cultural background?

- Aboriginal
- Arab
- Black
- Filipino
- Japanese
- Korean
- Latin American
- Southeast Asian (e.g., Cambodian, Indonesian, Laotian, Vietnamese, etc.)
- South Asian (e.g., Sri Lankan, etc., not including East Indian or Pakistani)
- West Asian (e.g., Afghan, Iranian, etc.)
- White
- Other (Please specify): _____

8. What was your total household income (from all sources) before taxes last year?

- Less than \$30,000
- \$30,000 to \$49,999
- \$50,000 to \$79,999
- \$80,000 to \$99,999
- \$100,000 or more
- Prefer not to say
- Don't know

Thank you for completing this survey!

Date d'achèvement (dd/mm/aaaa): _____

PARENTS : INFORMATION GÉNÉRALE

Pour chacune des questions suivantes, veuillez encerclez le numéro qui correspond à votre réponse ou complétez le blanc, le cas échéant.

9. Quel sexe étiez-vous assigné à la naissance sur votre certificat de naissance original ?

- Homme
- Femme

10. Quelle est votre âge ? _____

11. Quelle est votre taille sans chaussures ?

_____ (pieds) _____ (pouces) **OR** _____ (cm)

12. Combien pesez-vous ?

_____ (livres) **OR** _____ (kg)

13. Quelle est votre relation avec l'adolescent ?

- Mère ou père biologique
- Mère ou père adoptif
- Autre (veuillez préciser) : _____

14. Quel est votre plus haut niveau d'éducation ?

- Moins que le diplôme d'études secondaires
- Diplôme d'études secondaires
- Études postsecondaires (collège, université, école technique)
- Diplôme postsecondaire (collège, université, école technique)

15. Lequel des choix suivants décrit le mieux votre origine ethnique / culturelle ?

- Amérique latine
- Arabe
- Asie de l'Ouest (e.g., Afghan, Iranien, etc.)
- Asie du Sud (e.g., Sri Lankaise, etc., non compris les Indiens de l'Est ou les Pakistanais)
- Asie du Sud-Est (e.g., Cambodgien, Indonésien, Laotien, Vietnamien, etc.)
- Autochtone
- Blanc
- Coréen
- Japonais
- Noir
- Philippin
- Autre (veuillez préciser) : _____
- Je préfère ne pas répondre

16. Quel était votre revenu total du ménage (de toutes les sources) avant taxes l'année dernière ?

- Moins de \$30,000
- \$30,000 à \$49,999
- \$50,000 à \$79,999
- \$80,000 à \$99,999
- \$100,000 et plus
- Je préfère ne pas répondre
- Je ne sais pas

Merci d'avoir complété cette enquête !

What factors influence adolescents' lifestyle habits?

We interviewed adolescents with obesity from weight management clinics in Edmonton (Anglophone) and Ottawa (Francophone), Canada.



19 adolescents answered questions about the factors that make it easy or hard to have a healthy lifestyle.

Three common barriers and enablers



Degree of controllability



Impact of mental health



Social pressures related to weight management

What adolescents had to say



Factors that were either within or beyond their control (e.g., preference for physical activity, presence of palatable foods) both played key roles.

Poor mental health and being judged were barriers to adopting a healthy lifestyle.

Interpersonal support helped them in having a healthy lifestyle.

Clinicians are encouraged to personalize treatment for adolescents based on barriers and enablers regarding lifestyle habits, with a focus on psychosocial well-being. ←

PLOS ONE

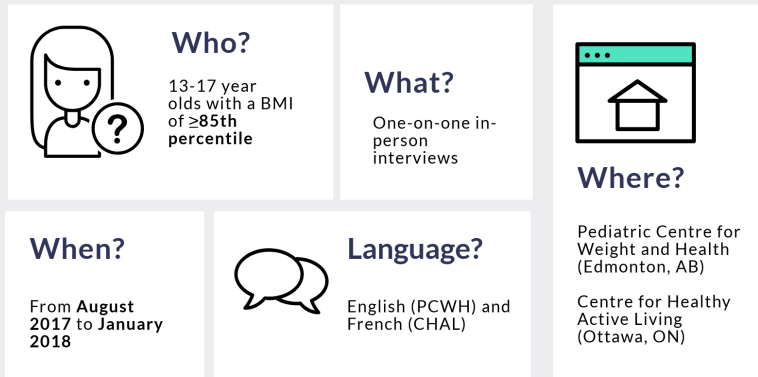
Barriers and enablers for adopting lifestyle behavior changes in adolescents with obesity: A multi-centre, qualitative study

Maryam Pehle¹, Araceli Perez¹, Anvika Buchholz¹, Sara Leigh F. Strickland², Shannon S. Sieff³, Caroline Richard⁴, Catherine Mergel⁵, Melissa P. Syrett⁶, Gadi D. C. Ball^{1*}, ...

Contact kebbe@ualberta.ca or gdball@ualberta.ca for more details.

Adolescents' recommendations for healthy lifestyle changes

Process



Adolescents' recommendations included:

- 01 Establish parental support, but with limits
- 02 Improve accessibility and availability of 'healthy foods'
- 03 Limit deceptive practices in food advertisements
- 04 Improve accessibility and availability of varied physical activity opportunities
- 05 Adopt later school start times

Key Takeaways

Adolescents' recommendations highlighted factors at family, school, community, and industry levels.

These data highlight the potential value of multi-level, multi-component interventions to help adolescents manage obesity.

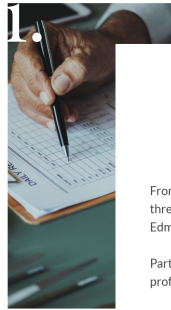
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Geoff Ball
Professor
gdball@ualberta.ca

[WWW.link to publication.com](#)

What strategies do clinicians use to deliver effective health services for managing obesity in adolescents?






Process

Who, When, Where?

From August 2017 to January 2018, we interviewed clinicians using three focus groups at two centres (the iatric Centre for Weight and Health in Edmonton, AB and Centre for Healthy Active Living in Ottawa, ON).

Participants included 16 dietitians, exercise specialists, mental health professionals, nurses, pediatricians, and social workers.

- A.  Discuss realistic expectations regarding weight management
- B.  Personalize weight management
- C.  Exhibit non-biased attitudes and practices



3.

HIGHLIGHTS

A.

Clinicians shared the importance of shifting focus from weight to health and fostering delayed vs. instant gratification.

B.

Clinicians commented that addressing barriers to change, including developmental readiness, was key for change.

C.

Clinicians emphasized recognizing social over individual causes of obesity and avoiding making assumptions about lifestyle behaviors based on weight.

Key Takeaways. Clinicians' approaches to pediatric weight management may be useful in shifting attitudes regarding health and weight and maximizing the adoption of lifestyle behavior changes to help adolescents and their families effectively manage obesity.



Contact

Maryam Kebbe, BSc, PhD Candidate | kebbe@ualberta.ca

Geoff Ball, PhD, RD, Professor | gball@ualberta.ca

www.linktopublication.com

Adolescents' involvement in decision-making for weight management

Process



We interviewed adolescents and clinicians in Edmonton and Ottawa, Canada.



19 adolescents answered questions about their preferences in making clinical decisions.



16 clinicians answered questions about their experiences involving adolescents in decision-making.



What adolescents and clinicians had to say

Three main themes



Conditions for adolescent involvement



Preferences for adolescent involvement



Extent of parental involvement

- A collaborative, confidential, individualized, and trusted approach to decision-making is necessary.
- Adolescents preferred to be involved in decision-making at varying levels.
- Parents either positively or negatively influenced the decision-making process.



Key Takeaways

- Adolescents should be involved in decision-making depending on their willingness and capability.
- Adolescents may benefit from individual consultations with clinicians to assert their independence.



Adolescents' involvement in decision-making for pediatric weight management: A multi-centre, qualitative study on perspectives of adolescents and health care providers

Maryam Kebbe^a, Anaisa Perez^a, Jessica Macchibah^b, Shannon D. Scott^c, Tara-Leigh F. McHugh^d, Caroline Richard^e, Michele F. Dwyer^f, Geoff D.C. Ball^g

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Appendix C.

Chapter 7: Study 3

The following appendix contains documents used in the development of our CCAs, including:

- 1. Adolescent prioritization survey*
- 2. Telephone discussion material for adolescents and HCPs (preliminary results of prioritization survey)*
- 3. Chart Note for CCAs*

Prioritization Survey Introduction (English)

Thanks again for participating in part 1 of this study. Now, we want to know the top factors that make it easy or hard for teens like you to have a healthy lifestyle. This is the first of three surveys. We think it will take you about 10-15 minutes to finish. Remember - your answers are completely confidential!

Once the 3 surveys are complete, the top factors will be included in the tool we develop for teens and clinicians to talk about healthy lifestyles.

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NOTE: Your participation in this study is completely voluntary. Your answers to questions on the following pages will be kept confidential and will only be used for our research project. No one outside of our research team will have access to this information. Information from this survey will be stored for 5 years at the Faculty of Medicine and Dentistry at the University of Alberta. Only our research team can access study information, which requires a password. Your IP address is automatically collected by the secure survey platform server, but our team will not have access to this information.

If you wish to withdraw your answers after submitting the survey, please feel free to contact us. There are no direct risks or benefits involved with completing this survey. This study was approved by the University of Alberta Human Research Ethics Board on June 1, 2017. If you have any concerns about this study, you may contact the Health Research Ethics Board (University of Alberta) at 780-492-2615. This office is not linked with the study researchers.

**List of statements retrieved from Studies 1 and 2 provided and divided by categories (barriers, enablers, and potential enablers) for ranking on a scale of 0-9.*

Prioritization Survey Introduction (French)

Merci encore d'avoir participé à la partie 1 de cette étude. Maintenant, nous voulons connaître les principaux facteurs qui rendent facile ou difficile pour les ados comme vous d'avoir un mode de vie sain. Ceci est la première de trois enquêtes. Nous pensons qu'il vous faudra environ 10-15 minutes pour la terminer. Rappelez-vous - vos réponses sont complètement confidentielles !

Une fois les trois enquêtes terminées, les principaux facteurs seront inclus dans l'outil que nous développons pour les ados et les cliniciens afin de parler de modes de vie sains.

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NOTE : Votre participation à cette étude est complètement volontaire. Vos réponses aux questions sur les pages suivantes resteront confidentielles et ne seront utilisées que pour notre projet de recherche. Personne en dehors de notre équipe de recherche n'aura accès à cette information. L'information tirée de cette enquête sera conservée pendant cinq ans à la Faculté de médecine et de médecine dentaire de l'Université de l'Alberta. Seule notre équipe de recherche peut accéder aux informations d'étude, ce qui nécessite un mot de passe. Votre adresse IP est automatiquement collectée par le serveur de la plateforme de sondage sécurisé, mais notre équipe n'aura pas accès à cette information.

Si vous souhaitez retirer vos réponses après la soumission du sondage, n'hésitez pas à nous contacter. Il n'y a pas de risques ou d'avantages directs à remplir ce sondage. Cette étude a été approuvée par le Human Research Ethics Board de l'Université de l'Alberta le 1er juin 2017. Si vous avez des inquiétudes à propos de cette étude, vous pouvez contacter le Health Research Ethics Board (Université de l'Alberta) au 780-492-2615. Ce bureau n'est pas lié aux chercheurs de l'étude.

**List of statements retrieved from Studies 1 and 2 provided and divided by categories (barriers, enablers, and potential enablers) for ranking on a scale of 0-9.*

Conversation Cards for Adolescents (CCA) / Cartes de conversation pour les adolescents (CCA)

Nutrition / Nutrition

Physical Activity / Activité physique

Inactivity / Sédentarité

Sleep / Sommeil

Mental Well-Being / Bien-être mental

Relationships / Relations

At the Clinic / À la clinique

What stops you from having a healthy lifestyle?

1. I enjoy using technology, especially when I'm bored.
2. My parents are on my case about my eating habits.
3. It's hard for me to be active at the end of the day when I'm tired.
4. I feel like I'm being watched or judged when doing physical activity in public.
5. It's hard to get back on track when I haven't been active for a while.
6. I tend to choose technology over being active.
Examples: gaming, social media
7. My parents tend to take over the conversation during appointments with my clinicians.
8. My parents feel the need to fix everything.
9. Unhealthy foods get especially tempting during special occasions and holidays.
10. I'm rewarded with unhealthy food on some occasions.
11. I feel like I have no control over my sleep.
Examples: how fast to fall asleep
12. My parents and I have different priorities.
13. I have a hard time falling asleep because of my anxiety or nonstop thinking.
14. Sometimes my weight makes me feel like I don't fit in.
15. I have nothing else to do so I go online or play video games.

Qu'est-ce qui t'empêche d'avoir un style de vie sain ?

1. J'aime utiliser la technologie, surtout quand je m'ennuie.
2. Mes parents me questionnent souvent sur mes habitudes alimentaires.
3. Il est difficile pour moi d'être actif(ve) à la fin de la journée quand je suis fatigué(e).
4. J'ai l'impression d'être observé(e) ou jugé(e) lorsque je fais de l'activité physique en public.
5. Il est difficile de me remettre en forme si je n'ai pas été actif(ve) pendant un certain temps.
6. J'ai tendance à choisir la technologie plutôt que d'être actif(ve).
Par exemple : les jeux, les médias sociaux
7. Mes parents ont tendance à monopoliser les conversations lors des visites chez mes cliniciens.
8. Mes parents ressentent le besoin de toujours tout arranger.
9. Les aliments malsains paraissent particulièrement tentants pendant les occasions spéciales et les vacances.
10. Je suis récompensé(e) avec de la nourriture malsaine à certaines occasions.
11. J'ai l'impression de n'avoir aucun contrôle sur mon sommeil.
Par exemple : à quelle vitesse je m'endors

12. Mes parents et moi avons des **priorités différentes**.
13. **J'ai de la difficulté à m'endormir** à cause de mon anxiété ou parce que je réfléchis sans arrêt.
14. J'ai parfois l'impression de ne pas pouvoir m'intégrer à cause de mon poids.
15. **Je n'ai rien d'autre à faire alors je vais en ligne ou je joue à des jeux vidéo.**

What helps you to have a healthy lifestyle?

1. It's easier for me to be active when I genuinely enjoy the activity.
2. It's easier to be active with people I know.
3. It's easy for me to eat healthy foods if they taste good.
4. We have enough money to afford healthy foods.
5. It's helpful to start small and gradually work up when making lifestyle changes.
6. I'm committed to losing weight to look better.
7. It helps that my friends believe in me.
8. I feel energized after being active.
9. Some activities help me to relieve stress.
10. Having a ride to my activities helps me be active.
11. I'm more inclined to be active when the weather is nice.
12. I'm more likely to be active when someone is motivating me.
13. It helps when I have someone be active with me.
14. I fall asleep quickly after a long day.
15. Talking with my friends (online or in-person), family, or clinicians helps with my anxiety or depression.

Qu'est-ce qui t'aide à avoir un style de vie sain ?

1. Il est plus facile d'être actif(ve) quand je m'amuse vraiment lors de l'activité.
2. Il est plus facile d'être actif(ve) avec des gens que je connais.
3. Il est facile pour moi de manger des aliments sains s'ils ont bon goût.
4. Nous avons assez d'argent pour acheter des aliments sains.
5. Il est utile de commencer petit à petit et d'avancer graduellement lorsqu'on fait des changements dans notre mode de vie.
6. Je m'engage à perdre du poids pour des raisons de santé.
7. Cela m'aide beaucoup quand mes amis(es) croient en moi.
8. Je me sens énergisé(e) après avoir été actif(ve).
9. Certaines activités m'aident à soulager le stress.
10. Avoir quelqu'un qui me conduit à mes activités m'aide à rester actif(ve).
11. Je suis plus enclin à être actif(ve) quand il fait beau.
12. Je suis plus enclin à être actif(ve) lorsque quelqu'un me motive.
13. Cela m'aide beaucoup quand j'ai quelqu'un pour faire des activités physiques avec moi.
14. Je m'endors rapidement après une longue journée.
15. Parler avec mes amis(es) (en ligne ou en personne), ma famille ou mes cliniciens m'aide à gérer mon anxiété ou ma dépression.

What could help you to have a healthy lifestyle?

1. I would like taxes to be removed from healthy foods.
2. I would like school to start later so I can get more sleep.
3. I value privacy between myself and my clinician.
4. It's my body, so I should make the final decision about my treatment plan.
5. I would like my parents to make healthy changes with me. *all colors
6. I would like physical activity programs to be better advertised so I know what's available.
7. I would like packaging of unhealthy food to not look so fancy and appealing.
8. I would like my parents to stop criticizing and judging me.
9. I would like to be able to bring food into class.
10. I would like to have kids my age in my neighborhood to be active with.
11. I would like my dietitian to share healthy recipe ideas with my family.
12. I want to have more control over my clinical appointments than my parents
Examples: talk more, be involved in decision-making
13. I would like more varied physical activity options in my community.
14. I'm old enough to come to my clinical appointments without my parents.
15. I would like there to be more healthy foods at my home.

Qu'est-ce qui pourrait t'aider à avoir un style de vie sain ?

1. Je voudrais que les taxes sur les aliments sains soient retirées.
2. J'aimerais que l'école commence plus tard pour que je puisse dormir plus longtemps.
3. J'apprécie la confidentialité entre moi et mon clinicien.
4. Il s'agit de mon corps, alors je devrais prendre la décision finale concernant mon plan de traitement.
5. Je voudrais que mes parents fassent des changements sains avec moi. *toutes les couleurs
6. J'aimerais que les programmes d'activité physique soient mieux annoncés et publicisés pour que je sache ce qui est à ma disposition.
7. Je voudrais que les emballages d'aliments malsains soient moins chics et moins attrayants.
8. J'aimerais que mes parents cessent de me critiquer et me juger.
9. J'aimerais pouvoir apporter de la nourriture en classe.
10. J'aimerais pouvoir jouer avec des enfants de mon âge dans mon quartier pour être actif(ve).
11. J'aimerais que ma diététiste partage des idées de recettes santé avec ma famille.
12. J'aimerais avoir plus de contrôle sur mes rendez-vous cliniques que mes parents.
Par exemple : parler davantage, participer à la prise de décision
13. J'aimerais avoir des programmes d'activité physique plus variés dans ma communauté.
14. Je suis assez vieux(vieille) pour aller à mes rendez-vous cliniques sans mes parents.
15. J'aimerais qu'il y ait plus d'aliments sains à la maison.

Date (dd/mm/yyyy): _____ / _____ / _____

Name: _____

Please insert a check mark near your TOP priorities.

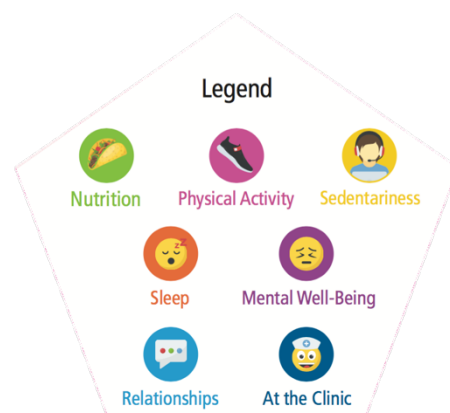


What STOPS you from having a healthy lifestyle?

- ___ *I enjoy using technology, especially when I'm bored.* ●
- ___ *My parents are on my case about my eating habits.* ●●
- ___ *It's hard for me to be active at the end of the day when I'm tired.* ●
- ___ *I feel like I'm being watched or judged when doing physical activity in public.* ●●
- ___ *It's hard to get back on track when I haven't been active for a while.* ●
- ___ *I tend to choose technology over being active (examples: gaming, social media).* ●●
- ___ *My parents tend to take over the conversation during appointments with my clinicians.* ●●
- ___ *My parents feel the need to fix everything.* ●
- ___ *Unhealthy foods get especially tempting during special occasions and holidays.* ●
- ___ *I'm rewarded with unhealthy food on some occasions.* ●
- ___ *I feel like I have no control over my sleep (example: how fast to fall asleep).* ●
- ___ *My parents and I have different priorities.* ●●
- ___ *I have a hard time falling asleep because of my anxiety or nonstop thinking.* ●●
- ___ *Sometimes my weight makes me feel like I don't fit in.* ●●
- ___ *I have nothing else to do, so I go online or play video games.* ●

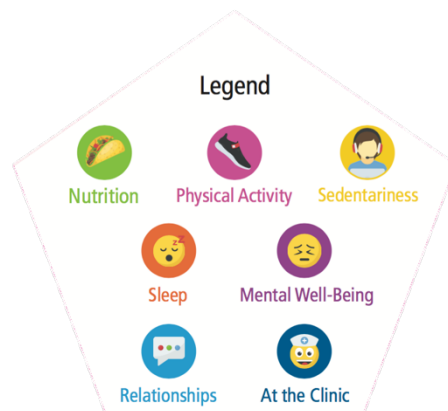
What HELPS you to have a healthy lifestyle?

- ___ *It's easier for me to be active when I genuinely enjoy the activity.* ●
- ___ *It's easier to be active with people I know.* ●●
- ___ *It's easy for me to eat healthy foods if they taste good.* ●
- ___ *We have enough money to afford healthy foods.* ●
- ___ *It's helpful to start small and gradually work up when making lifestyle changes.* ●
- ___ *I'm committed to losing weight to look better.* ●
- ___ *It helps that my friends believe in me.* ●
- ___ *I feel energized after being active.* ●
- ___ *Some activities help me to relieve stress.* ●●
- ___ *Having a ride to my activities helps me be active.* ●
- ___ *I'm more inclined to be active when the weather is nice.* ●
- ___ *I'm more likely to be active when someone is motivating me.* ●●
- ___ *It helps when I have someone be active with me.* ●●
- ___ *I fall asleep quickly after a long day.* ●
- ___ *Talking with my friends (online or in-person), family, or clinicians helps with my anxiety or depression.* ●●



What COULD HELP you to have a healthy lifestyle?

- ___ *I would like taxes to be removed from healthy foods.* ●
- ___ *I would like school to start later so I can get more sleep.* ●
- ___ *I value privacy between myself and my clinician.* ●●
- ___ *It's my body, so I should make the final decision about my treatment plan.* ●
- ___ *I would like my parents to make healthy changes with me.* ●●●●●
●●●●
- ___ *I would like physical activity programs to be better advertised so I know what's available.* ●
- ___ *I would like packaging of unhealthy food to not look so fancy and appealing.* ●
- ___ *I would like my parents to stop criticizing and judging me.* ●
- ___ *I would like to be able to bring food into class.* ●
- ___ *I would like to have kids my age in my neighborhood to be active with.* ●
- ___ *I would like my dietitian to share healthy recipe ideas with my family.* ●
- ___ *I want to have more control over my clinical appointments than my parents (examples: talk more, be involved in decision-making).* ●
- ___ *I would like more varied physical activity options in my community.* ●
- ___ *I'm old enough to come to my clinical appointments without my parents.* ●
- ___ *I would like there to be more healthy foods at my home.* ●



Appendix D.

The following appendix contains a commentary on shared decision-making in pediatric weight management.

Kebbe M, Perez A, Ball GDC. Is there a role for shared decision-making in pediatric weight management? *Obes Res Clin Pract* 2018; 12: 246-8.

Abstract

Shared decision-making (SDM) is central to personalizing health and medical decisions. This decisional model pushes patients to act as managers of their own care while maintaining a partnership with health professionals. Although applied to some conditions, SDM has been used infrequently in pediatric weight management (PWM). Herein, we highlight the applicability and usefulness of SDM in making several important decisions related to PWM, including referral-making to different levels of care and treatment initiation and implementation. We conclude by describing possible challenges that may arise in the implementation of this model and suggest corresponding navigation strategies to optimize the use of SDM in PWM.

Shared decision-making (SDM) is a decisional model in which patients and clinicians share expertise to identify and make decisions in a collaborative manner (Charles et al. 1997). Clinicians share evidence-based, clinical information about health conditions (*e.g.*, etiology, consequences) and treatment options, while patients assess the risks and benefits of different therapies based on the information provided and their own beliefs, preferences, and values. SDM is useful when a range of therapeutic options exist, the available evidence does not point to a clearly superior option, and patients must assess the risks and benefits of available options (Charles et al. 1997). Although suggested to support decision-making in pediatric health care, to our knowledge, this model has been used infrequently in pediatric weight management (PWM) specifically.

Given that most children referred for PWM do not enroll in care (Shaffer et al. 2016), clinicians can use SDM with families at the ‘front end’ to discuss excess weight and potential value of a referral. Consistent with expert recommendations (Barlow & Expert Committee 2007), once a primary care provider establishes that a child’s weight may compromise his or her health, several therapeutic services could be offered. The stage of care most suitable to families can be explored using SDM. The following clinical scenario highlights this example:

Sammy is a 10-year-old boy who continues to gain weight despite his parents’ attempts to address this issue on their own. His parents are concerned about his weight gain and decide to visit his physician, who believes that he might benefit from multidisciplinary care. She summarizes the issue and describes the option of referring Sammy for PWM at the local children’s hospital. After ensuring that Sammy and his parents understand the referral’s potential value, the physician shares the pros and cons of this option considering their preferences, values, motivation, and resources. Once both parties agree on the best option for Sammy, the physician is recommended to follow-up to query whether the family acted on the referral and explore Sammy’s progress over time.

Lifestyle and behavioral interventions are foundational to PWM across different levels of care (Barlow & Expert Committee 2007); however, their delivery can vary substantially across areas of focus, frequency, duration, modes, and target groups. With uncertainties regarding the ‘best’ approach to take, SDM can help families and clinicians make decisions related to their personal care pathway. As with implementation, effectiveness of lifestyle and behavior modifications can vary; different therapeutic approaches may be desired when success is limited. Consider Sammy who is now a 17-year-old adolescent with severe obesity enrolled in multidisciplinary care. After two years of weight stabilization and modest improvements in cardiometabolic risk factors, Sammy’s physician suggests their local surgical program for which he is eligible, and provides information regarding potential benefits and harms of undergoing surgery. Specifically, she mentions that adolescents at his weight can lose ~75% of their excess body weight (Stegater et al. 2013) and that careful follow-up is required by a multidisciplinary team (Nicole et al. 2016) after the surgery is performed. Asked about his interest, Sammy assesses the situation and replies: “The weight I could lose is tempting, but there are some side effects, too. It’s a big decision. I need some time to talk to my parents about it”. These examples illustrate the process of SDM and outline key steps to follow, including seeking a partnership with patients, identifying alternatives, evaluating and presenting the evidence, assessing patients’ preferences and values, and reaching a decision.

With the potential for success of SDM in PWM comes challenges. In pediatrics, patients usually include more than one family member, all of whom can hold different preferences and values, lending to different perspectives on particular decisions. Although children’s attitudes towards SDM in PWM remain to be explored empirically, empowerment via SDM may be particularly relevant to adolescents who show (*i*) increased autonomy, higher cognitive

development, and capacity for abstract thought but (ii) lower rates of success in PWM [Wiegand et al. 2014) compared with children.

There is value in developing and testing patient decision aids (PtDAs) tailored to cognitive development and information needs of different audiences; however, no PtDAs have been developed for and tested in PWM. PtDAs, which act as adjuncts to clinical counseling, can facilitate the SDM process (especially when decisions are *preference sensitive*) by clarifying values, outlining alternative routes of treatment and associated outcomes, and framing decisions (International Patient Decision Aid Standards Collaboration, 2005). PtDAs have also been shown to improve rapport and communication with clinicians (Brown and Deighton, 2013), who often find it difficult to address obesity with families due to stereotyping, blame/shame, and guilt. Since some families may agree to recommended courses of action to cope with unpleasant feelings or stress, PtDAs may help alleviate ambivalence and tension in PWM by acknowledging obesity's complexity.

Despite challenges, SDM has the potential to improve referral-making and treatment enrollment and adherence, all of which are necessary to optimize outcomes for children and adolescents with obesity. Research is warranted to assess acceptability, feasibility, efficacy, and effectiveness of SDM in PWM.

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Appendix E.

The following appendix contains a protocol paper in relation to our ongoing pilot randomized controlled trial on CCAs.

Kebbe M, Farmer A, Dyson MP, Scott SD, McHugh TLF, Islam B, Jacoby L, Ladha T, Nasir F, Rajani H, Talwar K, Zhang M, Ball GDC. Feasibility, user experiences, and preliminary effectiveness of *Conversation Cards for Adolescents*[®], a patient-centered communication and behavior change tool: Protocol for a pilot randomized controlled trial. Pilot Feasibility Stud 2019.

Abstract

Background. Providers can benefit from practical tools to assist adolescents with changing lifestyle habits for obesity management. We created *Conversation Cards for Adolescents*® (CCAs), a patient-centered communication and behavior change tool for providers to use in their clinical practice. The purpose of our study is to (i) assess the feasibility of CCAs in a real-world, practice setting to inform full-scale trial procedures, (ii) assess user experiences of CCAs, and (iii) determine the preliminary effectiveness of CCAs on changing behavioral and affective-cognitive outcomes for adolescents with obesity.

Methods. Starting in early 2019, this prospective study is a mixed-methods, pragmatic, theory-driven, pilot randomized controlled trial with a goal to enroll 50 adolescents with obesity (13–17 years old; body mass index [BMI] $\geq 85^{\text{th}}$ percentile) and 9 providers practicing at the Northeast Community Health Centre in Edmonton, Alberta, Canada. Adolescents in the experimental group (n=25) will use CCAs and goal-setting to collaboratively set one S.M.A.R.T. (Specific, Measurable, Attainable, Realistic, Timely) goal with their provider to work on over a 3-week period. Those randomized to the control group (n=25) will set one collaborative S.M.A.R.T. goal with their provider without using CCAs. Outcome assessments at baseline and follow-up (3-weeks post-baseline) will include behavioral, affective-cognitive, and process-related outcomes.

Discussion. In examining the feasibility, user experiences, and preliminary effectiveness of CCAs, our study will add contributions to how adolescent obesity is managed in a real-world, practice setting as well as inform the scalability of our approach for a full-scale effectiveness randomized controlled trial on behavior change.

Trial registration. NCT03821896 (clinicaltrials.gov). Registered on 30 January 2019,
<https://clinicaltrials.gov/ct2/show/NCT03821896>

Introduction

Adolescent obesity is a serious and complex health problem that is likely to persist into adulthood (Simmonds et al. 2015), representing a substantial economic burden to the health care system (Hamilton et al. 2017). Patient-centered care may decrease health care costs since patients play a more active role in their own health care to collaboratively reach a correct diagnosis and create personalized treatment plans with their providers. For example, a randomized study by Bertakis and Azari (2011) showed that a higher average amount of patient-centered primary care visits was associated with significant decreases in the annual number of specialty-care visits, hospitalizations and diagnostic services, and laboratory and diagnostic test charges.

Primary care settings normally only allow for low-intensity interventions of <25 hours of provider contact; these are typically spread over 3-6 months and have been shown to result in behavior change (Sargent et al. 2011). A characteristic of effective patient-centered weight management interventions is the utilization of behavior change techniques such as shared decision-making (SDM) and goal-setting, which is consistent with national guideline recommendations (Styne et al. 2017). SDM is a patient-centered technique that can help patients prioritize treatment options for improved care. SDM promotes patient engagement in the treatment decision-making process by taking on a more active role in evaluating treatment options (Stiggelbout et al. 2012), and shows promise when used by patients with chronic diseases for goal-setting (Joosten et al. 2008). Brief, patient-centered tools that incorporate goal-setting may be useful additions to providers' menu of consultation services to enhance their skill and self-efficacy in weight-related communications (McPherson et al. 2017; Tucker et al. 2017). Further, these may encourage families to engage in and reflect on their health and lifestyle and potentially serve as a stepping stone to more intensive interventions for improved metabolic outcomes (Sargent et al. 2011).

Indeed, patients are more likely to make behavior changes for weight loss when their providers discuss the issue with them during clinical visits (Rose et al. 2013). While providers recognize the problem in pediatric obesity and acknowledge their responsibility in addressing weight and lifestyle (Tucket et al. 2017; Reed et al. 2016; Tanda et al. 2014), weight loss counseling occurs infrequently during regular well-child visits (Kahan 2018; Kushner 1995). This is likely due to a combination of factors, including high practice workload, a lack of training (Jay et al. 2015; Sargent et al. 2011; Barlow et al. 2002; Story et al. 2002) and competency (van Gerwen et al. 2009), or counterproductive behavior (Walker et al. 2007; Jelalian et al. 2003; Whitaker et al. 2003). For example, in the United States, only 4.3% of physicians reported receiving specialty training in obesity (Jelalian et al. 2003), and providers feared triggering or fueling eating disorders in children and alienating families due to obesity being a sensitive and emotional topic to raise (Redsell et al. 2011; Edvardsson et al. 2009; Pagnini et al. 2009; Perrin et al. 2005; Walker et al. 2007). Providers are also limited in the number of programs and tools that enable effective, sensitive, and patient-centered conversations surrounding lifestyle changes within shorter, regular clinics visits (Davoli et al. 2013).

Given these points, our team developed a bilingual (English and French) communication and behavior change tool, *Conversation Cards for Adolescents*® (CCAs). We believe that CCAs may have value in supporting providers in delivering health services for adolescents with obesity, providing a novel, patient-centered tool to encourage productive conversations about weight and healthy lifestyle behavior changes. The feasibility of intervention-based programs for the treatment of childhood and adolescent overweight and obesity remains in question (O'Connor et al. 2017; Anand et al. 2010). Our aim in conducting this pilot RCT is to (i) assess the feasibility of CCAs in a clinical setting to inform full-scale trial procedures, (ii) assess user experiences of CCAs, and (iii) determine the preliminary effectiveness of CCAs on changing behavioral and affective-

cognitive outcomes for adolescents with obesity. Specifically, our primary objective is to assess the feasibility of using CCAs in a real-world, practice setting to inform full-scale randomized controlled trial (RCT) procedures, including time needed to train providers, acceptability of the proposed design, acceptability and completeness of recruitment and data collection methods, participation and attrition levels, collaborative goal-setting with adolescents via CCAs, barriers to maintaining delivery of implementation over the trial period, and sample size estimation. Secondary objectives include assessing user (adolescents and providers) experiences related to CCAs and determining the preliminary effectiveness of CCAs on changing clinical and behavioral health outcomes for adolescent with obesity.

Methods

Study design

Our study, which will start in spring 2019, is a mixed-methods, pragmatic, theory-driven, pilot RCT (Arnold et al. 2009; Schwartz & Lellouch 2009) involving adolescents with obesity (13–17 years old) and providers. In reporting our trial, we will follow recommendations for reporting of treatment fidelity in behavior interventions to manage pediatric obesity (JaKa et al. 2016) and the Consolidated Trials of Reporting Trials (CONSORT) extension for pragmatic trials (Zwarenstein et al. 2008). The Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) checklist for this protocol paper is included in Additional File 1.

Rationale for a mixed-methods, pragmatic trial

Attempting to mimic real-world settings as closely as possible, pragmatic RCTs are an excellent approach to maximize trial validity and usefulness in health care settings other than the one they are conducted in. Our trial will incorporate the following pragmatic components: use of an existing

clinic practice, minimal patient selection criteria, use of real-world adolescent patients, and use of existing practices for recruitment, eligibility assessment, and follow-up procedures. Further, adopting a mixed-methods approach will allow us to assess intervention components and how they interact with one another.

Setting

We will establish collaborations with the Northeast Community Health Centre (NECHC, Alberta Health Services, Edmonton, Alberta, Canada). The NECHC offers an academic primary and secondary clinical care setting, here-in referred to as an “early-intervention setting”. Staff at the NECHC include administrative support, nurses, a social worker, and consulting physicians. All physicians are pediatricians who offer general and specialty clinical services to infants (1–3 months old), children (2–12 years old), adolescents (12–18 years old), and their families, many of whom are refugees and new Canadians living in urban areas of Edmonton. The clinic contains the main clinic space with a waiting area and 5 exam/counseling rooms and offers in-person and telehealth services.

Inclusion/exclusion criteria

Adolescents will be eligible to participate if they are 13–17 years old and have an age- and sex-specific body mass index [BMI] $\geq 85^{\text{th}}$ percentile (World Health Organization 2006). Adolescents must have the developmental capacity to complete our intervention (English literacy and comprehension) and be interested in setting a lifestyle/behavior goal related to improving diet, physical and sedentary activities, sleep, or mental health. These eligibility requirements will be confirmed by our research team members during recruitment when adolescents and their parents will be asked about adolescents’ capabilities and motivation. All providers delivering care to adolescents with obesity at the NECHC will be eligible and invited to participate.

Sample and recruitment

We will follow recommended sample sizes for pilot trials (Whitehead et al. 2016); that is, we will recruit 25 adolescents per trial arm for a total of 50 adolescents, which gives the main trial a 90% power, effect size at 0.2, and two-sided 5% significance. Assuming ~85% recruitment of our sample of 50 adolescents, we estimate a margin of error of $\pm 10\%$ for a 95% confidence interval; this recruitment percentage is derived from similar RCTs conducted in a primary care setting related to pediatric obesity (Byrne et al. 2018; Duggins et al. 2010).

As per existing practice at the NECHC, nurses will complete reminder telephone calls with families two days before their scheduled clinic appointments; if reachable, they will be informed of our research at that time. Nurses will liaise with the study coordinator (MK) to provide contact information, including appointment date and time, for families who verbally consent to learn more about the study. On the day of their medical appointment, clinic staff will measure adolescents' height and weight before they see their provider; these anthropometric data will determine their initial study eligibility. If eligible based on BMI and interested, MK will determine developmental and language eligibility, and complete informed consent and assent procedures with families. Providers will be recruited by email or verbal invitation through existing relationships with research team members. Providers will be free to accept or decline participation following a brief description of the proposed study.

We will adhere to a number of evidence-based strategies to recruit and retain families (Robinson et al. 2007), including *(i)* clearly describing study expectations and commitments to families at the time of enrollment, *(ii)* using families' preferred mode of contact (*e.g.*, telephone, text message) for correspondence, *(iii)* ensuring families understand the distinction between research and their clinical care, *(iv)* confirming families' understanding of the value of their study participation, *(v)* establishing an ongoing mutual understanding of study expectations,

commitments, and progress to administrative/clinical staff, and (vi) offering gift cards as tokens of appreciation (\$25 Visa gift cards for adolescents; \$25 Amazon gift cards for providers and admin/clinical staff).

Randomization and allocation procedures

Adolescents will be randomly allocated to one of two groups (experimental or control) with a 1:1 allocation ratio and using randomly varied permuted blocks of 2 and 4. Participant randomization will be performed in REDCap[®] (Research Electronic Data Capture) using allocation tables that were generated by the Data Coordinating Centre statistician from the Women and Children's Health Research Institute (UAlberta). REDCap[®] maintains an automated audit trail, which includes the assigned study identification number, treatment allocation, and date and time of the transaction. The study coordinator (MK) will have access to REDCap[®] onsite to randomize and will provide corresponding allocations to adolescents; allocation concealment will be ensured as the randomization service does not release the code for the randomization and the allocator (MK) will have no prior knowledge about the random sequence.

Trial interventions

Provider training

To ensure a comparable level of understanding and communication skills, research team members (MK, GDCB) will hold two in-person orientation sessions (duration: 1h/each) with participating providers that include discussions and decisions related to the study protocol such as intervention design, process, and logistics. We will also hold one in-person training session (duration: 2h) with providers on intervention delivery, including shared decision-making principles and S.M.A.R.T. (specific, measurable, attainable, realistic, time-based) goal-setting (Williams et al. 2012).

Toolkit and documentation (experimental group)

The toolkit includes CCAs as well as a CCA chart note and a goal-setting sheet (Additional File 2).

Conversation Cards for Adolescents. The development of CCAs is described elsewhere (Kebbe et al. 2019). Briefly, CCAs are a hard-copy deck of 45 cards that are organized into three categories, including: *What STOPS you from having a healthy lifestyle?* *What HELPS you to have a healthy lifestyle?* and *What COULD HELP you to have a healthy lifestyle?* Each category contains an individual statement pertaining to one or more of following suits: nutrition, physical activity, sedentariness, sleep, mental well-being, relationships, and clinical factors. Please see Figure 1 for CCA card examples. The CCA activity consists of adolescents examining the deck of cards and independently selecting the Top 3 factors that resonate most with them in changing their lifestyle habits.

CCA Chart Note. After completing the CCA activity, adolescents will record their top 3 choices on a chart note. Adolescents will leave the CCA deck with the study coordinator (MK) and bring the chart note with them into their clinical appointment. Following their appointment, MK will photograph the chart note using a study-specific iPad for documentation purposes. Adolescents will keep the hard-copy chart note with them as a frame of reference for the priorities of change they had identified.

Goal-Setting Sheet. Adolescents will be given a S.M.A.R.T. goal-setting sheet template to bring with them into their clinical appointment. Following the appointment, the study coordinator (MK) will take a photo of the goals sheet using the study-specific iPad for documentation purposes.

Adolescents will keep the hard-copy goal-setting sheet with them as a frame of reference for the changes they planned to make with their provider.

Administration

The entire administration process for both experimental and control groups, which will take place during scheduled clinical appointments after providers address the primary health concern, should take no more than 25–30 minutes to perform. This is a 5–10 minute addition to regular clinical visit length, which is to test the feasibility of the goal-setting process in a real-world, practice environment.

Experimental group. Adolescents randomized to the experimental group will be asked to complete the CCA activity in a quiet, private room at the clinic 15 minutes before their clinical appointment. Adolescents will review their choices (as indicated on the CCA Chart Note) with their provider, who will help them set a S.M.A.R.T. goal for their primary priority. Adolescents will be advised to make one goal, which will be documented on the goal-setting sheet, to ensure that achievement over our 3-week follow-up period is feasible.

Control group. Adolescents in the control group will attend their scheduled clinical appointment with their provider, including any education, information, or additional consultations as deemed necessary by their provider. Control group adolescents will not complete the CCA activity or any tool-related outcome measures; however, they will set one S.M.A.R.T. lifestyle goal with their provider.

In addition to collaborative goal-setting, providers will use shared decision-making principles with both groups to maximize patient-centered care. We will debrief with each provider after their first

experimental and first control clinical appointments to solicit feedback, reinforce intervention fidelity, and make any necessary modifications to intervention procedures. Please see Additional File 3 for the detailed intervention procedures for providers.

Demography, anthropometry, clinical, and intervention data

For efficiency, we will collect demographic data (*e.g.*, date of birth, sex) verbally from adolescents. We will obtain measured height and weight data at the point of eligibility screening; existing equipment at the NECHC will be used to measure this data based on established protocols established (Johnson et al. 2010). We will also document clinical (*e.g.*, provider name, primary health concern) and intervention-related (*e.g.*, appointment duration, top 3 priorities) data. This information will be documented on a data file separate from a master file containing participants' IDs and names. Providers will complete a sociodemographic survey (hard-copy or electronic), which will document variables such as date of birth, year of graduation from terminal degree, and number of years in providing care to adolescents. We will document this information on a password-secure Excel spreadsheet and perform source document verification to ensure consistency between the data collected and entered.

Psychometric data

Primary outcome

We will measure feasibility metrics and thresholds of success outlined in Table 1, as well as process, resource, management, and scientific assessments. These evaluations were informed by a modified version of the framework described by Tickle-Degnen (2013) and will either have specific quantifiable thresholds or will be evaluated through direct observation and experiences from the trial.

Process assessment

1. What is the expected:
 - a. number of eligible members of the targeted population?
 - b. recruitment proportion?
 - c. refusal proportion for participation and for randomization?
 - d. retention and follow-up proportions as the participants move through the trial?

2. How feasible and suitable are:
 - a. eligibility criteria? Are criteria clear and sufficient or too inclusive or restrictive?
 - b. data collection assessments? Do participants understand the questions and other data collection methods? Do they respond with missing or unusable data?
 - c. data collection procedures? Do the participants have enough time and capacity to complete data collection procedures? Does the overall data collection plan involve a reasonable amount of time, or does it create a burden for the participants?

Resource assessment.

1. Does the clinical environment have the:
 - a. physical capacity to handle the number of participants (*e.g.*, private room to complete CCAs)?
 - b. time to conduct each stage and aspect of the protocol? What are the time frames, and how do they coordinate with other responsibilities? How long does it take to connect with a participant?
 - c. equipment (*e.g.*, CCAs, iPad) in the correct place at the correct time? What equipment is needed, and is it available when needed?

- d. ability to deal with broken, lost, or stolen equipment and materials? Are there backup plans for obtaining needed equipment and materials?
- e. adequate software to capture and use data? What software is available for conducting the research?
- f. clinical site's willingness, motivation, and capacity to carry through with study-related tasks and to support researchers' time and effort? What administrative services are in place for research at this level?
- g. documented evidence indicating that these centers abide by their commitments? What are the challenges in fulfilling research support commitments?
- h. access to services, such as printing, copying, and technology (*e.g.*, WIFI for on-site randomization)?

Management assessment.

1. What are the challenges and strengths of:
 - a. the investigators' administrative capacity to manage the planned RCT?
 - b. research investigator and staff capacities, expertise, and availability for the planned research activities?
 - c. formats and structures of forms that document participant progress through the trial?
 - d. accurate data entry into the computer? Are data lost, forgotten, or entered incorrectly? How are data files organized, named, and dated? Who is in charge of tracking the latest data entry and the quality of entry?
 - e. matching of data to participants from different sources (*e.g.*, allocation group with corresponding outcome assessments)?

- f. management of the ethics of the research? To what extent do staff comply with the approved research protocol? How effectively are adverse events (*e.g.*, feeling overwhelmed from working on lifestyle) during implementation identified, documented, and reported? What happens if a participant experiences a clinical emergency or if family abuse is identified during the trial?

Scientific assessment.

1. What is the level of safety of the procedures in the intervention or interventions?
2. What is the level of safety and burdensomeness of the frequency, intensity, and duration of the intervention? Can these and other elements be standardized in a protocol without loss of a patient-centered, individualized focus?
3. What are the reliability, validity, and trustworthiness of the assessments for the targeted population for this specific intervention? Do the assessments capture individual participants' needs and measure their responsiveness to these needs?
4. What values constitute clinically meaningful differences on assessment procedures?
5. What is the expected degree of change (*i.e.*, responsiveness) of the participants?
6. What are the estimates of the intervention effect and the variance of that effect across the planned population?

Secondary outcomes

We will use a range of questionnaires to examine behavioral, affective-cognitive, and process evaluation outcomes. Adolescents and providers will be given the option to complete the instruments outlined below using paper-based copies or online using a study iPad. We selected several reliable and validated patient-reported outcome measures on collaborative goal-setting and

tool user experiences, or researcher-developed questionnaires/interview guides on the degree of and effort made for goal achievement, outcome prioritization, and tool likeability, usefulness, feasibility, and usability. For providers, we will explore tool user experiences, tool acceptance and adoption, tool likeability, usefulness, feasibility, and usability, and appointment duration. When different reliable and validated questionnaires on the same topic were available in the literature, we chose ones that were most relevant to our study and did not require any adaptations. Please see Additional File 4 for the questionnaires and interview guide.

Technology Acceptance Model. This questionnaire uses a 7-point scale and includes 11 items representing perceived usefulness and perceived ease of use of a technology (David 1989).

User Experience Questionnaire. This questionnaire uses a 7-point scale to represent participants' agreement on 26 contrasting attributes that may apply to a product (Laugwitz et al. 2008).

Tool Likeability, Usefulness, Feasibility, and Usability. To assess these constructs, we will use open- and closed-ended researcher-developed questions modified for both adolescents and providers.

Patient Perception of Collaborative Goal-Setting. This questionnaire uses a 5-point scale and includes five factors: listen and learn from each other; share ideas; caring relationship; agree on a measurable objective; support for goal achievement (Morris et al. 2017).

Appointment Duration. The study coordinator (MK) will time the duration of the clinical appointments for both experimental and control groups using a timer on the study-specific iPad.

Telephone Interview. The study coordinator (MK) will call adolescents (duration: ~15 minutes) to inquire about their participation (*e.g.*, using a 0-9 scale researcher-developed questions for the degree of changes made to achieve the set goal) and engagement (*e.g.*, study procedures, including ranking the outcome measures used for this study in order of importance).

Schedule of assessments

There are three data collection time points, each of which will not exceed 15 minutes. At time zero (T0), measurements will occur immediately *before* the clinical appointment; at T1, measurements will occur immediately *after* the clinical appointment; and at T2, a follow-up assessment will take place 3 weeks after the scheduled clinical appointment. Outcome measures collected at the three time points are indicated in Tables 2 and 3.

Data analysis

As per recommendations for pilot studies, our analysis will be primarily of a descriptive nature on feasibility outcomes (Lancaster et al. 2004). Adolescent and provider characteristics will be summarized using descriptive statistics. Proportions and between-group differences for quantitative secondary outcome measures completed by adolescents will be examined using descriptive statistics or independent samples T-tests, respectively, as conducted by the blinded Data Coordinating Centre statistician from the Women and Children's Health Research Institute (UAlberta); the analysis will adhere to the intention-to-treat principle in that none of the enrolled (randomized) adolescents will be excluded from the analysis and all patients will be analyzed according to the randomization scheme. Qualitative data will be audio-recorded, transcribed verbatim using *The Comma Police*, managed using *NVivo 11*, and analyzed by two independent reviewers using content analysis (Elo & Kyngäs 2008); field notes and memos will be documented.

Evaluation of implementation

We will use the Centers for Disease Control and Prevention Framework for Program Evaluation for a qualitative evaluation of our intervention (Centers for Disease Control and Prevention 1999). This framework is suitable and relevant to how providers practice clinically day-to-day, and includes engaging stakeholders, describing the interventions, focusing the evaluation design, gathering credible evidence, justifying conclusions, and ensuring use and sharing lessons learned. This evaluation is not linear; however, earlier steps (*e.g.*, engaging providers in the design of the trial) provide the foundation for subsequent steps (*e.g.*, ensuring the trial procedures are clinically relevant). The purpose of this qualitative evaluation is to understand the impact and implementation of our interventions (*e.g.*, advantages, disadvantages) and facilitate its integration and sustainability at the NECHC and similar health care settings (*e.g.*, by identifying barriers and enablers). Program evaluations are best completed in a team approach; we will plan an end-of-study evaluation team meeting (~1h) to discuss feasibility metrics between the principal investigator (GDCB), study coordinator (MK), providers, and administrative/clinical staff.

Project management considerations

Data management

We will use Microsoft® Excel and REDCap®, a secure, online data collection and management platform. REDCap® is hosted and supported by the Women and Children's Health Research Institute at the University of Alberta.

Clinical trial registration

We will register our trial on clinicaltrials.gov prior to patient recruitment and iteratively make note of any prospective changes to our study. Protocol amendments will be made on an as-needed basis.

Research ethics considerations

We will obtain ethics approval from the Human Research Ethics Board at the University of Alberta and operational approval from Alberta Health Services (Edmonton, AB). Participants may experience psychosocial adverse events in relation to making lifestyle changes. All adolescents, parents, and providers enrolled in our trial will provide written informed assent and/or consent.

Confidentiality

Confidentiality will be explained to participants as part of the consent process. We will only collect personal health information relevant for this study. To protect identity, participants will be assigned a number and names and other identifying information will be removed for analysis. Further, any information shared outside of our research team will be done at the group-level, so no individuals will be named or identified. Any information on a computer will be protected with a password and saved for five years on a secure server (maintained by MedIT, Faculty of Medicine & Dentistry, UAlberta). Hard-copy documentation will also be securely stored for five years at the Edmonton Clinic Health Academy (UAlberta) in a locked filing cabinet.

Knowledge translation, exchange, and dissemination

Our primary aim in evaluating the feasibility of CCAs is to improve adolescent-provider communication related to shared decision-making and goal-setting for pediatric obesity. We will use a collaborative approach of integrated knowledge translation (Harrison & Graham 2012) to engage our end-users (adolescents, providers) throughout the study; this will ensure that outputs are relevant and practice to specific audiences (Bowen & Graham 2013; Harrison & Graham 2012; de Santis-Moniaci & Altshuler 2007). For example, in qualitatively exploring adolescents' priorities in the context of their clinical encounter as well as providers' study conceptualizations

and evaluations on the intervention implementation, we can help ensure future applications of CCAs are relevant and actionable in the practice setting. In addition to disseminating our findings via peer-reviewed publications and conference presentations, we plan to create infographics detailing the development and evaluation of CCAs; these will be shared internally with team members and our research participants as well as externally through various social media platforms (e.g., study blog: <http://www.teensaid.wordpress.com>).

Discussion

A complex set of biological, social, and environmental factors contribute to the high prevalence of obesity in children. The complexity of obesity is especially apparent in adolescents who undergo a number of physical, physiological, and psychosocial changes as they grow and develop. Early-intervention settings currently lack novel and developmentally-appropriate tool for providers to address adolescent obesity, with existing lifestyle interventions only showing minimal effectiveness. With this in mind, we have a compelling case for developing and evaluating our clinical, bilingual tool as a means of targeting and tailoring management approaches for adolescent obesity.

Our research will contribute to real-world clinical settings for obesity management while emphasizing patient-centered care. This approach to health care decision-making fosters the invaluable role that adolescents are encouraged to assume in their own health care. In doing so, it recognizes increasing adolescent autonomy and posits that adolescents present with unique experiences, needs, and priorities that may not otherwise be captured in traditional models of care. In addition to providing early interventions, we chose the NECHC based on expressed interest from on-site providers in expanding their scope of practice beyond clinical care exclusively to include clinical and health services research that aligns with their approach to pediatric and family

health. During our study design phase, we undertook consultations with relevant stakeholders, including physicians, nurses, administrative/clinical staff, and researchers. This was to ensure that the study design and procedures were acceptable to all parties involved, for example, by ensuring relevance to the way in which providers deliver their clinical services to further support study implementation.

Education and knowledge alone are insufficient to change behavior. Behavior modification as it pertains to the management of pediatric obesity often includes specific tasks including self-monitoring, stimulus control, and goal-setting (de Santis-Moniaci & Altshuler 2007; Robinson 1999), with the latter being one of the most widely used in behavior change (Ross et al. 2010). Goal-setting is a structured form of patient engagement that is characterized by a collaborative approach to care between adolescents and providers as a proxy for decision-making; this health care technique may therefore be an effective strategy to facilitate lifestyle change across a range of behaviors in adolescents. Using S.M.A.R.T. goal-setting is consistent with recommendations outlined in a recent review of childhood obesity by Kumar and Kelly (2017). Because adolescents often set unrealistic goals (Rhodes et al. 2017), S.M.A.**R**.T. goals can be an effective way in which providers encourage adolescents to strive for healthy lifestyle changes. S.M.A.R.T. is especially relevant to short- vs. long-term goals, and is consistent with our chosen 3-week follow-up period.

In addition to examining experiences in using CCAs, our trial will support assessment and decision-making for a future full-scale RCT. Examining feasibility as the primary outcome of this study will inform necessary modifications in regards to the full study design and procedures. The planning, conduct, and reporting of our research is in alignment with a recent *Pediatric Obesity* issue showcasing and emphasizing the importance of novel and methodologically rigorous RCTs focused on preventing and managing pediatric obesity (Ball & Kebbe 2018). The progression of this pilot RCT to an effectiveness RCT will provide an evidence base of an approach to manage

adolescent obesity that is appealing to diverse stakeholders, including providers, adolescents, and caregivers. If effective, CCAs will offer benefits in adolescent-provider communication, adolescent experiences in care, and improved lifestyle habits among adolescents with obesity.

Table 1. Feasibility metrics and thresholds of success

Feasibility metric	Measure of success
Practicality	Time: <ul style="list-style-type: none">• 15 minutes to complete tool activity in waiting room• Same appointment length (experimental <i>vs</i> control)• 15 minutes to complete outcome measures post-appointment Commitment: <ul style="list-style-type: none">• Recruitment: Willingness of staff to help recruit adolescents; $\geq 85\%$ recruited ('n' enrolled / 'n' screened and eligible for enrollment)• Attrition: $\leq 15\%$
Implementation	$\geq 95\%$ completion of tool activity by adolescents $\geq 95\%$ completion of goal-setting sheet by adolescents and providers
Demand	Expressed interest or intention by clinic staff to use the tool post-study
Randomization protocol	<ul style="list-style-type: none">• $\geq 85\%$ adolescents willing to be randomized• 100% accuracy of randomization procedures
Measurement protocol	100% and $\geq 85\%$ assessment completed by adolescents at baseline and 3-weeks follow-up, respectively

Table 2. Outcome measures and assessment time points for adolescents

Variables	Measure	Instrument	Assessment Interval	
			Baseline	Follow-Up
Primary outcome	Feasibility metrics and thresholds documented continually			
Secondary outcomes – Behavioral and affective-cognitive outcomes	Collaborative goal-setting	Patient Perception of Collaborative Goal Setting	T1	
	Degree of and effort made for goal achievement	Researcher-developed question		T2
Secondary outcomes – Process evaluation items (experimental group only)*	Tool user experience*	User Experience Questionnaire	T0	
	Tool likeability, usefulness, feasibility, and usability*	Researcher-developed questionnaire	T1	
	Priorities for outcome measures	Researcher-developed question		T2

Table 3. Outcome measures and assessment time points for PCPs

Variable	Measure	Instrument	Assessment Interval	
			Baseline	Follow-Up
Primary outcome	Feasibility metrics and thresholds documented continually.			
Secondary outcomes – Process evaluation items	Tool user experience	User Experience Questionnaire	T0	
	Tool acceptance and adoption			T2
	Tool likeability, usefulness, feasibility, usability	Technology Acceptance Model Researcher-developed questionnaire		T2



Figure 1. Example cards per category and suit in *Conversation Cards for Adolescents*®

Additional Files

Additional File 1. SPIRIT 2013 Checklist: Recommended items to address in a clinical trial protocol and related documents	376
Additional File 2. <i>Conversation Cards for Adolescents</i> ® toolkit	382
Additional File 3. Intervention procedures for providers	391
Additional File 4. Outcome measure instruments and interview guides	394



STANDARD PROTOCOL ITEMS: RECOMMENDATIONS FOR INTERVENTIONAL TRIALS

Section/item	Item No	Description	Addressed on page number
Administrative information			
Title	1	Descriptive title identifying the study design, population, interventions, and, if applicable, trial acronym	1
Trial registration	2a	Trial identifier and registry name. If not yet registered, name of intended registry	2
	2b	All items from the World Health Organization Trial Registration Data Set	N/A
Protocol version	3	Date and version identifier	N/A
Funding	4	Sources and types of financial, material, and other support	22
Roles and responsibilities	5a	Names, affiliations, and roles of protocol contributors	1
	5b	Name and contact information for the trial sponsor	1
	5c	Role of study sponsor and funders, if any, in study design; collection, management, analysis, and interpretation of data; writing of the report; and the decision to submit the report for publication, including whether they will have ultimate authority over any of these activities	22
	5d	Composition, roles, and responsibilities of the coordinating centre, steering committee, endpoint adjudication committee, data management team, and other individuals or groups overseeing the trial, if applicable (see Item 21a for data monitoring committee)	22

Introduction

Background and rationale	6a	Description of research question and justification for undertaking the trial, including summary of relevant studies (published and unpublished) examining benefits and harms for each intervention	3-5
	6b	Explanation for choice of comparators	3-5
Objectives	7	Specific objectives or hypotheses	4-5
Trial design	8	Description of trial design including type of trial (eg, parallel group, crossover, factorial, single group), allocation ratio, and framework (eg, superiority, equivalence, noninferiority, exploratory)	5

Methods: Participants, interventions, and outcomes

Study setting	9	Description of study settings (eg, community clinic, academic hospital) and list of countries where data will be collected. Reference to where list of study sites can be obtained	6
Eligibility criteria	10	Inclusion and exclusion criteria for participants. If applicable, eligibility criteria for study centres and individuals who will perform the interventions (eg, surgeons, psychotherapists)	6
Interventions	11a	Interventions for each group with sufficient detail to allow replication, including how and when they will be administered	8-11
	11b	Criteria for discontinuing or modifying allocated interventions for a given trial participant (eg, drug dose change in response to harms, participant request, or improving/worsening disease)	N/A
	11c	Strategies to improve adherence to intervention protocols, and any procedures for monitoring adherence (eg, drug tablet return, laboratory tests)	8
	11d	Relevant concomitant care and interventions that are permitted or prohibited during the trial	N/A
Outcomes	12	Primary, secondary, and other outcomes, including the specific measurement variable (eg, systolic blood pressure), analysis metric (eg, change from baseline, final value, time to event), method of aggregation (eg, median, proportion), and time point for each outcome. Explanation of the clinical relevance of chosen efficacy and harm outcomes is strongly recommended	11-16
Participant timeline	13	Time schedule of enrolment, interventions (including any run-ins and washouts), assessments, and visits for participants. A schematic diagram is highly recommended (see Figure)	16

Sample size	14	Estimated number of participants needed to achieve study objectives and how it was determined, including clinical and statistical assumptions supporting any sample size calculations	6-7
Recruitment	15	Strategies for achieving adequate participant enrolment to reach target sample size	6-7

Methods: Assignment of interventions (for controlled trials)

Allocation:

Sequence generation	16a	Method of generating the allocation sequence (eg, computer-generated random numbers), and list of any factors for stratification. To reduce predictability of a random sequence, details of any planned restriction (eg, blocking) should be provided in a separate document that is unavailable to those who enrol participants or assign interventions	8
Allocation concealment mechanism	16b	Mechanism of implementing the allocation sequence (eg, central telephone; sequentially numbered, opaque, sealed envelopes), describing any steps to conceal the sequence until interventions are assigned	8
Implementation	16c	Who will generate the allocation sequence, who will enrol participants, and who will assign participants to interventions	7-8
Blinding (masking)	17a	Who will be blinded after assignment to interventions (eg, trial participants, care providers, outcome assessors, data analysts), and how	16
	17b	If blinded, circumstances under which unblinding is permissible, and procedure for revealing a participant's allocated intervention during the trial	N/A

Methods: Data collection, management, and analysis

Data collection methods	18a	Plans for assessment and collection of outcome, baseline, and other trial data, including any related processes to promote data quality (eg, duplicate measurements, training of assessors) and a description of study instruments (eg, questionnaires, laboratory tests) along with their reliability and validity, if known. Reference to where data collection forms can be found, if not in the protocol	11-16
	18b	Plans to promote participant retention and complete follow-up, including list of any outcome data to be collected for participants who discontinue or deviate from intervention protocols	7,18

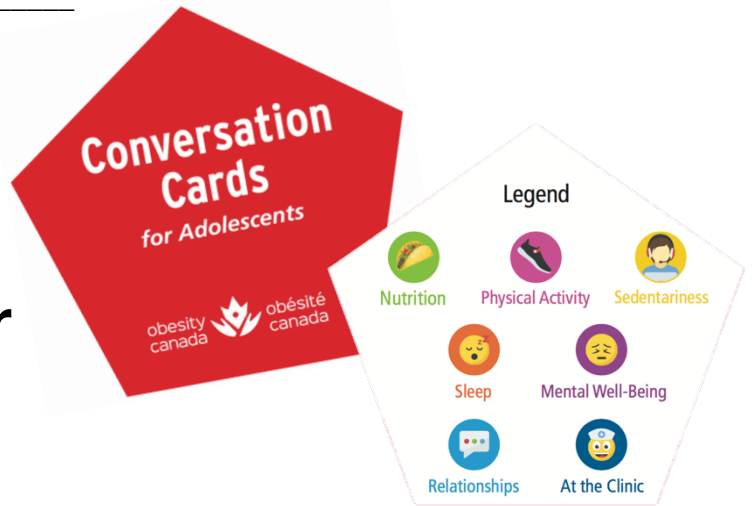
Data management	19	Plans for data entry, coding, security, and storage, including any related processes to promote data quality (eg, double data entry; range checks for data values). Reference to where details of data management procedures can be found, if not in the protocol	11,17
Statistical methods	20a	Statistical methods for analysing primary and secondary outcomes. Reference to where other details of the statistical analysis plan can be found, if not in the protocol	16
	20b	Methods for any additional analyses (eg, subgroup and adjusted analyses)	N/A
	20c	Definition of analysis population relating to protocol non-adherence (eg, as randomised analysis), and any statistical methods to handle missing data (eg, multiple imputation)	16
Methods: Monitoring			
Data monitoring	21a	Composition of data monitoring committee (DMC); summary of its role and reporting structure; statement of whether it is independent from the sponsor and competing interests; and reference to where further details about its charter can be found, if not in the protocol. Alternatively, an explanation of why a DMC is not needed	N/A
	21b	Description of any interim analyses and stopping guidelines, including who will have access to these interim results and make the final decision to terminate the trial	N/A
Harms	22	Plans for collecting, assessing, reporting, and managing solicited and spontaneously reported adverse events and other unintended effects of trial interventions or trial conduct	14
Auditing	23	Frequency and procedures for auditing trial conduct, if any, and whether the process will be independent from investigators and the sponsor	N/A
Ethics and dissemination			
Research ethics approval	24	Plans for seeking research ethics committee/institutional review board (REC/IRB) approval	18,21
Protocol amendments	25	Plans for communicating important protocol modifications (eg, changes to eligibility criteria, outcomes, analyses) to relevant parties (eg, investigators, REC/IRBs, trial participants, trial registries, journals, regulators)	17
Consent or assent	26a	Who will obtain informed consent or assent from potential trial participants or authorised surrogates, and how (see Item 32)	7,18

	26b	Additional consent provisions for collection and use of participant data and biological specimens in ancillary studies, if applicable	N/A
Confidentiality	27	How personal information about potential and enrolled participants will be collected, shared, and maintained in order to protect confidentiality before, during, and after the trial	18
Declaration of interests	28	Financial and other competing interests for principal investigators for the overall trial and each study site	21-22
Access to data	29	Statement of who will have access to the final trial dataset, and disclosure of contractual agreements that limit such access for investigators	N/A
Ancillary and post-trial care	30	Provisions, if any, for ancillary and post-trial care, and for compensation to those who suffer harm from trial participation	N/A
Dissemination policy	31a	Plans for investigators and sponsor to communicate trial results to participants, healthcare professionals, the public, and other relevant groups (eg, via publication, reporting in results databases, or other data sharing arrangements), including any publication restrictions	18-19
	31b	Authorship eligibility guidelines and any intended use of professional writers	22
	31c	Plans, if any, for granting public access to the full protocol, participant-level dataset, and statistical code	N/A
Appendices			
Informed consent materials	32	Model consent form and other related documentation given to participants and authorised surrogates	N/A
Biological specimens	33	Plans for collection, laboratory evaluation, and storage of biological specimens for genetic or molecular analysis in the current trial and for future use in ancillary studies, if applicable	N/A

Date (dd/mm/yyyy): _____ / _____ / _____

Name: _____

**Please insert a
check mark near your
TOP priorities.**

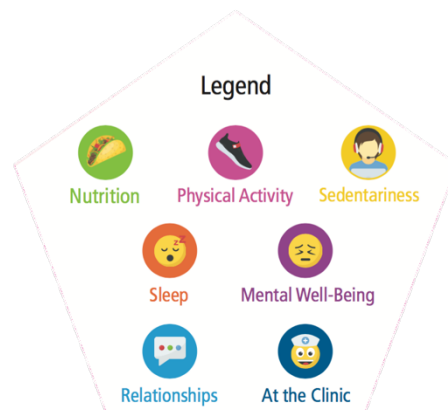


What STOPS you from having a healthy lifestyle?

- ___ *I enjoy using technology, especially when I'm bored.* ●
- ___ *My parents are on my case about my eating habits.* ●●
- ___ *It's hard for me to be active at the end of the day when I'm tired.* ●
- ___ *I feel like I'm being watched or judged when doing physical activity in public.* ●●
- ___ *It's hard to get back on track when I haven't been active for a while.* ●
- ___ *I tend to choose technology over being active (examples: gaming, social media).* ●●
- ___ *My parents tend to take over the conversation during appointments with my clinicians.* ●●
- ___ *My parents feel the need to fix everything.* ●
- ___ *Unhealthy foods get especially tempting during special occasions and holidays.* ●
- ___ *I'm rewarded with unhealthy food on some occasions.* ●
- ___ *I feel like I have no control over my sleep (example: how fast to fall asleep).* ●
- ___ *My parents and I have different priorities.* ●●
- ___ *I have a hard time falling asleep because of my anxiety or nonstop thinking.* ●●
- ___ *Sometimes my weight makes me feel like I don't fit in.* ●●
- ___ *I have nothing else to do, so I go online or play video games.* ●

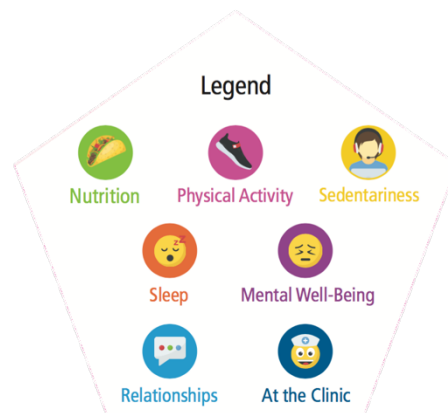
What HELPS you to have a healthy lifestyle?

- ___ *It's easier for me to be active when I genuinely enjoy the activity.* ●
- ___ *It's easier to be active with people I know.* ●●
- ___ *It's easy for me to eat healthy foods if they taste good.* ●
- ___ *We have enough money to afford healthy foods.* ●
- ___ *It's helpful to start small and gradually work up when making lifestyle changes.* ●
- ___ *I'm committed to losing weight to look better.* ●
- ___ *It helps that my friends believe in me.* ●
- ___ *I feel energized after being active.* ●
- ___ *Some activities help me to relieve stress.* ●●
- ___ *Having a ride to my activities helps me be active.* ●
- ___ *I'm more inclined to be active when the weather is nice.* ●
- ___ *I'm more likely to be active when someone is motivating me.* ●●
- ___ *It helps when I have someone be active with me.* ●●
- ___ *I fall asleep quickly after a long day.* ●
- ___ *Talking with my friends (online or in-person), family, or clinicians helps with my anxiety or depression.* ●●



What COULD HELP you to have a healthy lifestyle?

- ___ *I would like taxes to be removed from healthy foods.* ●
- ___ *I would like school to start later so I can get more sleep.* ●
- ___ *I value privacy between myself and my clinician.* ●●
- ___ *It's my body, so I should make the final decision about my treatment plan.* ●
- ___ *I would like my parents to make healthy changes with me.* ●●●●
●●●
- ___ *I would like physical activity programs to be better advertised so I know what's available.* ●
- ___ *I would like packaging of unhealthy food to not look so fancy and appealing.* ●
- ___ *I would like my parents to stop criticizing and judging me.* ●
- ___ *I would like to be able to bring food into class.* ●
- ___ *I would like to have kids my age in my neighborhood to be active with.* ●
- ___ *I would like my dietitian to share healthy recipe ideas with my family.* ●
- ___ *I want to have more control over my clinical appointments than my parents (examples: talk more, be involved in decision-making).* ●
- ___ *I would like more varied physical activity options in my community.* ●
- ___ *I'm old enough to come to my clinical appointments without my parents.* ●
- ___ *I would like there to be more healthy foods at my home.* ●



Frequently Asked Questions:

How can I help a teen who selected cards beyond my area of comfort or expertise?

Given the range of issues included, it would be surprising if you felt confident and competent in all areas. Along with validating teens' experiences, as with other topics that emerge in your clinical interactions that are beyond your expertise, it is completely reasonable to seek support and information from a colleague(s) to assist you or to refer your patient to a clinician or service so they can receive the support they seek.

What if teens aren't comfortable selecting some cards in the presence of their parents?

As with any clinical appointments with teens, it is important for them to know your role and how you can best support them. Sometimes, this may include meeting with them individually, without their parents; however, when teens are ready, willing, and able to make healthy lifestyle and behavioural changes, the support of their parents or other important adults in their lives is very important in helping them to make and maintain healthful changes.

What if teens select cards that do not align with their parents' priorities?

Conversation Cards for Adolescents were created for and with teens, so their priorities may differ from those of their parents. Ideally, areas of focus that both teens and parents can work on as a family may lead to the greatest likelihood of success. In the event that agreement can't be achieved, your skill and experience as a clinician are important to help reconcile differences of opinion, along with identifying ways for parents to support their teens even when they disagree about their priorities.

INTERVENTION TECHNIQUES

Conversation Cards for Adolescents – A Pilot RCT

Decision-Making Principles:

1. Develop a partnership with adolescents
2. Review adolescents' preference for role in decision-making
3. Explore and respond to adolescents' ideas, concerns, and expectations
4. Identify/discuss choices (top 3 priorities selected)
5. Make or negotiate a decision (top 1 of 3 priorities selected) with the adolescent
6. Agree on an action plan (set S.M.A.R.T. goal collaboratively – *see below*)

S.M.A.R.T. Goals:

Specific Goals: Set specific objectives and goals, such as establishing a start date or agreeing on an explicit behavior change step.

Measurable Goals: Weight and behavior change goals should be measurable, such as aiming for a 10-minute walk after lunch on weekdays.

Achievable Goals: Over time, unrealistic goals can reduce motivation. Achievable weight loss goals, such as aiming to lower calorie intake by 300 calories per day, rather than overly restrictive diet goals, may improve success.

Relevant Goals: Goals should align with priorities. For one adolescent, losing weight to help her move more or better is meaningful; another adolescent may be more energized after exercising with a friend.

Time-sensitive Goals: A mutually-agreed upon timeline for achieving a specific goal helps motivation. Ask adolescents – What is reasonable to achieve today? This week? This month?

Let's make "I will exercise more this year" into a S.M.A.R.T. goal.

1. **Specific** – The activity I want to do is running. Because of the cold weather, I will go to my nearest gym.
2. **Measurable** – I will run for 15 minutes on Tuesdays, Thursdays, and Saturdays.
3. **Achievable** – Since I haven't ran in a while, I will start slow and gradually increase the duration over the indicated time period.
4. **Relevance** – I prefer cardio to weights, so I will choose running as my activity.
5. **Time**-bound – I will start this goal on Tuesday, March 5th, and re-evaluate it in 3 weeks to see if I need to increase or decrease the amount of time running or the frequency of runs to make sure my resolution remains possible and effective.

NEW GOAL

"Starting March 5th, I will run for 15 minutes 3 times each week (Tues, Thurs, Sat) for the next 3 weeks at my nearest gym."

	1	2	3	4	5	6
	WAYS I CAN IMPROVE MY LIFESTYLE – WHAT?	WHAT WILL STOP YOU?	HOW MUCH?	HOW OFTEN?	WHEN?	WHERE?
SET YOUR GOAL	<p>Be more physically active</p> <p>Activity: Running</p>	Weather	15 minutes per day	Three times per week	<p>Tuesdays, Thursdays, and Saturdays</p> <p>Starting March 5th</p>	At my nearest gym
FINAL	<p>Starting March 5th, I will run for 15 minutes 3 times each week (Tues, Thurs, Sat) for the next 3 weeks at my nearest gym.</p>					

	1	2	3	4	5	6
	WAYS I CAN IMPROVE MY LIFESTYLE – WHAT?	WHAT WILL STOP YOU?	HOW MUCH?	HOW OFTEN?	WHEN?	WHERE?
SET YOUR GOAL						
FINAL						

INTERVENTION PROCEDURES

Conversation Cards for Adolescents – A Pilot RCT

After teens are informed of the study, complete the informed consent forms, get randomly assigned to 1 of 2 groups (experimental vs control), and complete some study processes, pediatricians' interactions with teens enrolled in the study will include:

1. Experimental Group (n=25 teens; estimated time: 25-30 min/teen)

*Teens will be given a goal-setting sheet &
a Conversation Cards chart note before their appointment*

STEP 1 – Acknowledge the research study

Suggested wording: “I see you agreed to participate in the research study and you completed the activity with the Conversation Cards. Thanks for participating! We’ll go over the next part of the study together, but first, let’s talk about why you’re here to see me today.”

STEP 2 – Discuss and address primary health concern for visit

STEP 3 – Briefly describe the research study

Suggested wording: “OK, back to the Conversation Cards. As Maryam explained before, the cards were created for teens like you to help them make healthy lifestyle changes. As you know, it’s important for teens to eat healthy, be physically active, and get enough sleep. These are some of the topics included in the cards.”

STEP 4 – Complete the Conversation Card task and set one S.M.A.R.T. goal

Suggested wording:

1. “What did you think of the cards?”
2. “What were your top 3 choices ^{***MD to refer to chart note***}? Why did you choose these?”

3. *“And of these 3, which is the one that you would most want to work on?”*
4. *“Since this issue was most important to you, I’d like to work with you to set a goal related to this issue.”*
 - a. *“What kind of goal do you think would help you with this issue?” (**MD to refer to S.M.A.R.T. goal-setting sheet to discuss and finalize the goal**)*

STEP 5 – Discuss next steps

Suggested wording: *“You can keep this goal-setting sheet with you to help you remember your goal for the next 3 weeks. Maryam should be waiting for you in the waiting room with some surveys to complete before you go and the next steps for the study. It was great seeing you today!”*

2. Control Group (n=25 teens; estimated time: 25-30 min/teen)

Teens will be given a goal-setting sheet before their appointment.

STEP 1 – Acknowledge the research study

Suggested wording: *“I see you agreed to participate in the research study. Thanks for participating! We’ll go over the next part of the study together, but first, let’s talk about why you’re here to see me today.”*

STEP 2 – Discuss and address primary health concern for visit

STEP 3 – Briefly describe the research study

Suggested wording: *“OK, back to the research study. As Maryam likely mentioned before, it’s very important for all teens to eat healthfully, be physically active, and get enough sleep.”*

STEP 4 – Set S.M.A.R.T. goal

Suggested wording: *“Let’s set a goal for you to work on over the next 3 weeks.”*

- a. *“Is there a specific part of your lifestyle that you would want to work on related to food, exercise, sleep or something else?”*
- b. *“What kind of goal do you think would help you with this issue?” (**MD to refer to S.M.A.R.T. goal-setting sheet to discuss and finalize the goal**)*

STEP 5 – Discuss next steps

Suggested wording: *“You can keep this goal-setting sheet with you to help you remember your goal for the next 3 weeks. Maryam should be waiting for you in the waiting room with some surveys to complete before you go and the next steps for the study. It was great seeing you today!”*

User Experience Questionnaire (Providers)

Please make your evaluation now.

For the assessment of *Conversation Cards for Adolescents* (CCAs), please fill out the following questionnaire. The questionnaire consists of pairs of contrasting attributes that may apply to the product. The circles between the attributes represent gradations between the opposites. You can express your agreement with the attributes by ticking the circle that most closely reflects your impression.

Example:

Attractive ◻ ◼ ◻ ◻ ◻ ◻ Unattractive

This response would mean that you rate CCAs as more attractive than unattractive.

Please decide spontaneously. Don't think too long about your decision to make sure that you convey your original impression.

Sometimes you may not be completely sure about your agreement with a particular attribute or you may find that the attribute does not apply completely to the particular product. Nevertheless, please tick a circle in every line.

It is your personal opinion that counts. Please remember: there is no wrong or right answer!

	1	2	3	4	5	6	7		
annoying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	enjoyable	1
not understandable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	understandable	2
creative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	dull	3
easy to learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	difficult to learn	4
valuable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	inferior	5
boring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	exciting	6
not interesting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	interesting	7
unpredictable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	predictable	8
fast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	slow	9
inventive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	conventional	10
obstructive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	supportive	11
good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	bad	12
complicated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	easy	13
unlikable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasing	14
usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	leading edge	15
unpleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasant	16
secure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	not secure	17
motivating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	demotivating	18
meets expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	does not meet expectations	19
inefficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	efficient	20
clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	confusing	21
impractical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	practical	22
organized	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	cluttered	23
attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unattractive	24
friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unfriendly	25
conservative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	innovative	26

Evaluation Questionnaire (Providers)

The following questions ask about your experience in using Conversation Cards for Adolescents (CCAs).

I. Likeability

1. I was **satisfied** with using CCAs.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

2. CCAs were **relevant** for me to use in my clinical consultations.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

3. What did you **like** the most about CCAs?

4. What did you **dislike** the most about CCAs?

5. Are there too many cards, not enough, or just the right amount?

II. Usefulness

1. CCAs **improved** my rapport with my adolescent patients.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

2. CCAs **improved** my communication with my adolescent patients.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

3. CCAs **helped** me to involve my adolescent patients in making decisions about their health and/or weight.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

4. In what other way(s) were CCAs **helpful**?

III. Feasibility

1. Adolescents had enough **time** to complete the CCAs activity before their appointment.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

2. I had enough **time** to incorporate CCAs into my clinical consultations.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

3. I had enough **time** to complete the goal-setting activity during my scheduled appointments.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

IV. Usability

1. I **intend to use** CCAs again in my future appointments.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

2. I would have to **change my behavior** significantly to attain the potential benefits of CCAs.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

3. Using CCAs would allow me to do things that I can't **easily do** now.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

4. I would **recommend** other *providers* to use CCAs with their adolescent patients.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

5. I would **recommend** *adolescents* to use CCAs.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

6. Do you have any feedback on how CCAs are **used**?

Technology Acceptance Model

Please rate each statement using the scale shown below (please select one response per row).

1. Using *Conversation Cards for Adolescents* in my job would enable me to accomplish tasks more quickly.

Extremely likely Quite likely Slightly likely Neither Slightly unlikely Quite unlikely Extremely unlikely

2. Using *Conversation Cards for Adolescents* would improve my job performance.

Extremely likely Quite likely Slightly likely Neither Slightly unlikely Quite unlikely Extremely unlikely

3. Using *Conversation Cards for Adolescents* would enhance my effectiveness on the job.

Extremely likely Quite likely Slightly likely Neither Slightly unlikely Quite unlikely Extremely unlikely

4. Using *Conversation Cards for Adolescents* would make it easier to do my job.

Extremely likely Quite likely Slightly likely Neither Slightly unlikely Quite unlikely Extremely unlikely

5. I would find *Conversation Cards for Adolescents* useful in my job.

Extremely likely Quite likely Slightly likely Neither Slightly unlikely Quite unlikely Extremely unlikely

6. Learning to operate *Conversation Cards for Adolescents* would be easy for me.

Extremely likely Quite likely Slightly likely Neither Slightly unlikely Quite unlikely Extremely unlikely

7. I would find it easy to get *Conversation Cards for Adolescents* to do what I want it to do.

Extremely likely Quite likely Slightly likely Neither Slightly unlikely Quite unlikely Extremely unlikely

8. My interaction with *Conversation Cards for Adolescents* would be clear and understandable.

Extremely likely Quite likely Slightly likely Neither Slightly unlikely Quite unlikely Extremely unlikely

9. I would find *Conversation Cards for Adolescents* to be flexible to interact with.

Extremely likely Quite likely Slightly likely Neither Slightly unlikely Quite unlikely Extremely unlikely

10. It would be easy for me to become skillful at using *Conversation Cards for Adolescents*.

Extremely likely Quite likely Slightly likely Neither Slightly unlikely Quite unlikely Extremely unlikely

11. I would find *Conversation Cards for Adolescents* easy to use.

Extremely likely Quite likely Slightly likely Neither Slightly unlikely Quite unlikely Extremely unlikely

User Experience Questionnaire (Adolescents)

This survey was designed to examine how people think about *Conversation Cards for Adolescents (CCAs)*. The questionnaire includes opposing words that may apply to CCAs. The circles between the words represent the range for what you think of CCAs. For each pair of words, please ticking the circle that most closely reflects your impression of the cards.

Example:

Attractive ◻ ◻ ◻ ◻ ◻ ◻ Unattractive

This answer means that you think CCAs are more 'attractive' than 'unattractive'.

When you complete the survey, don't think too long about your answers. We want to know your first impression, even if you aren't 100% sure about your answers. There are no right or wrong answers!

	1	2	3	4	5	6	7		
annoying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	enjoyable	1
not understandable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	understandable	2
creative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	dull	3
easy to learn	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	difficult to learn	4
valuable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	inferior	5
boring	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	exciting	6
not interesting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	interesting	7
unpredictable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	predictable	8
fast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	slow	9
inventive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	conventional	10
obstructive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	supportive	11
good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	bad	12
complicated	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	easy	13
unlikable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasing	14
usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	leading edge	15
unpleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pleasant	16
secure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	not secure	17
motivating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	demotivating	18
meets expectations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	does not meet expectations	19
inefficient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	efficient	20
clear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	confusing	21
impractical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	practical	22
organized	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	cluttered	23
attractive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unattractive	24
friendly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unfriendly	25
conservative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	innovative	26

Patient Perception of Collaborative Goal Setting (Adolescents)

Please rate each statement using the scale shown below (please select one response per row).

5-point scale: strongly disagree (1) – disagree (2) – neutral (3) – agree (4) – strongly agree (5)

Factor 1: Listen and learn from each other

1. I asked my doctor any questions I had
2. My doctor asked me if I had any concerns
3. My doctor explained the reasons for the goal
4. I learnt important things from my doctor
5. My doctor and I discussed the reasons for the goal
6. I listened to what my doctor had to say
7. I told my doctor important things about me
8. I told my doctor about any concerns I had
9. My doctor gave me the opportunity to ask any questions I had

Factor 2: Share ideas

10. I made sure my doctor knew about things that were important to me
11. I told my doctor about important things in my life
12. My doctor shared his/her ideas with me
13. I was interested in my doctor's ideas
14. My doctor provided important medical information to me
15. I shared my ideas with my doctor
16. I felt confident my doctor understood what was important to me

Factor 3: Caring relationship

17. My doctor treated me as a person
18. I respected my doctor's opinions
19. My doctor showed he/she cared about me as a person
20. My doctor respected my opinion
21. My doctor was honest with me
22. My doctor spent enough time with me
23. I showed my doctor that I care about achieving the goal
24. I was honest with my doctor

Factor 4: Agree on a measurable objective

25. I felt good about the goal
26. My doctor helped me understand what the specific goal is
27. I had confidence that I could achieve the goal
28. My doctor and I agreed on the specific goal that was set
29. My doctor and I discussed the potential specifics of the goal

Factor 5: Support for goal achievement

- 30. My doctor gave me information I could take home about the goal
- 31. I told my doctor and I discussed strategies for achieving the goal
- 32. I was comfortable discussing any challenges I might have achieving the goal
- 33. My doctor made me feel like I could achieve the goal
- 34. My doctor and I came up with a strategy for how to achieve the goal
- 35. My doctor checked to make sure I understood the goal
- 36. My doctor described how to achieve the goal

Evaluation Questionnaire (Teens)

The following questions ask about your experience using Conversation Cards for Adolescents (CCAs).

I. Likeability

6. I was **satisfied** with using CCAs.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

7. CCAs were **relevant** for me to use in the clinic.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

8. What did you **like** the most about CCAs?

9. What did you **dislike** the most about CCAs?

10. Are there too many cards, not enough, or just the right amount?

II. Usefulness

1. CCAs **improved** my rapport with my clinician.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

2. CCAs **improved** my communication with my clinician.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

3. CCAs **helped** me to make decisions about my health and/or weight with my clinician.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

4. CCAs **helped** me to take an active role in managing my health and/or weight.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

5. CCAs **helped** me to identify different factors that influenced my lifestyle habits.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

11. In what other way(s) were CCAs **helpful**?

III. Feasibility

1. I had enough **time** to complete the CCAs activity before my appointment.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

IV. Usability

1. I would **use** CCAs again in a future appointment.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

2. I would **recommend** other teens to use CCAs as well.

Strongly disagree Disagree Somewhat disagree Neutral Somewhat agree Agree Strongly agree

3. Do you have any feedback on how CCAs are **used**?

INTERVIEW GUIDE

[Introductions and interview/ethical guidelines and considerations]

Patient as a participant

1. When you met with your doctor, you set a lifestyle goal to work on over these past 3 weeks.
 - a. Do you remember what your goal was?
 - b. Did you achieve this goal?
 - i. On a scale of 0 to 9, to what degree did you achieve this goal (0 = did not achieve this goal at all; 9 = entirely achieved this goal)?
 - ii. On a scale of 0 to 9, how much effort did you make to achieve your goal (0 = did not make any effort; 9 = made a lot of effort)?

2. About your experience in working towards your goal, did you:
 - a. Experience anything that made it difficult to achieve your goal?
 - b. Experience anything that made it easier to achieve your goal?
 - c. Have recommendations for anything that would make it easier to achieve your goal?

3. In the future:
 - a. Do you plan to continue (or re-try) working on the goal you made? If no, perhaps work on another lifestyle area/goal? Query for details.
 - b. Do you plan to share this goal with your doctor the next time you meet? Why or why not? What about the goal do you plan to discuss?
 - i. *Probe:* How did/can other lifestyle habits fit in with the goal that you set?

Patient as a partner

4. As a reminder, after your appointment, you completed a survey about goal-setting with your doctor (this was about listening and learning from each other, sharing ideas, agreeing on a goal, and achieving your goal). We asked you to complete this survey because we want to test whether teens who used the *Conversation Cards for Adolescents* had different experiences and conversations with their doctors compared to teens who did not use the cards.
 - a. (*Only for experimental group*) Can you tell me if using the cards affected your medical appointment?
 - i. *Probe:* If you go back to when you used the cards in your appointment, did they help you or change things for you in any way (e.g., independency, interaction, involvement, motivation, rapport with your doctor)?
 - b. Which of these do you think are most important? Why?
5. Now, I would like to ask you some questions about the way we designed our study.
 - a. Do you think working on one goal only was realistic? Why or why not?
 - b. Do you think the 3-week time period to achieve your goal was realistic? Why or why not?
 - c. What do you think about including parents in this study? Should they have been included more or less? Please explain.
 - d. Is there anything about the study that you would change?
 - i. *Probe:* Completing the surveys on an iPad vs hard-copy, completing the tool activity alone in a separate room, choosing to keep the CC chart note, gift cards amount and source, randomized vs non-randomized design?
6. Those are all of the questions I wanted to ask you. Was there anything you wanted to talk with me about that we haven't discussed already?

Thank you so much again for being a part of this study.

Your input was really helpful and appreciated!

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