Perceived Racial Discrimination, Resilience, and Oral Health Behaviours of Adolescents with Immigrant Backgrounds

by

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ABSTRACT

Background- Canada boasts one of the world's highest annual immigration rates, with around 500,000 newcomers each year, amounting to nearly 8.3 million immigrants constituting about 23% of the population by 2021. Among these newcomers, adolescents form a considerable part, facing the intricate challenges of adapting to new cultures, social structures, and peer dynamics. Studies on the oral health of immigrant-background adolescents reveal their unmet dental care needs, but there remains a gap in understanding the determinants of their oral health behaviours. To address oral health concerns in this vulnerable group, it is essential to study the risk factors influencing their oral health behaviours and identify the factors aiding immigrants in navigating post-immigration challenges. Thus, this study aimed to explore the interplay between perceived racial discrimination and oral health behaviours in immigrant-background adolescents, while also investigating whether resilience moderates this association.

Methods- The ethics approval for this study was obtained from the University of Alberta Research Ethics Board (Ethics approval # Pro00119608). First, we conducted a systematic review to explore the existing body of literature about the correlation between perceived racial discrimination and oral health. Further to study the association between perceived racial discrimination and oral health behaviours among adolescents with immigrant backgrounds we designed a cross-sectional study. The participants were 12 to 18-year-old immigrant adolescents recruited through nine community organizations working with immigrant populations. After obtaining active parental consent and adolescent assent, participants completed a questionnaire. The questionnaire gathered data on demographic characteristics, six oral health behaviours as dependent variables,

and the independent variables (Perceived racial discrimination and resilience) using validated scales. Descriptive statistics were used to summarize the categorical and continuous variables. Univariate and multivariate logistic regression analyses were used to examine the association between the dependent and independent variables, controlling for confounding factors. Additionally, the potential moderating role of resilience was explored by examining the interaction of resilience and the independent variables in the regression analysis.

Results- The systematic review included 21 studies. These Studies were mainly based in the United States (38 %), Australia (28%), and other countries including Canada (14%), Brazil (14%), and Korea (4%). Perceived racial discrimination was assessed by using validated scales in 11 studies, the others assessed discrimination by including one or two items in the questionnaire. The outcomes assessed in these studies were oral health problems, oral health-related quality of life, dental care utilization, oral health behaviors, and self-rated oral health. Overall, a negative association was found between perceived racial discrimination and oral health outcomes.

The cross-sectional study included 316 participants with an average age of 15.3 (±1.9) and a median age of 15 years (IQR-12-18). Among the participants, 56% were female, 45% were born in Canada, 62.9% had dental insurance, and 76% reported experiences of discrimination. The statistical analysis showed that, after adjusting for confounding factors, an increase of one unit in the total discrimination distress score was associated with 51% less likelihood of categorizing self-rated oral health as good (OR=0.49, 95% CI: 0.29-0.81). The odds of brushing teeth more than twice a day, as opposed to once a day, decreased by 58% with a one-unit increase in the total discrimination distress score (OR=0.42, 95% CI: 0.25-0.71). The odds of visiting the dentist for an urgent procedure instead of a regular check-up were 2.3 times higher with a one-unit increase in

the total discrimination distress score (OR=2.3: 95% CI:1.3-4.0) Resilience did not moderate the association between perceived racial discrimination and oral health behaviours.

Conclusion- This study contributes to the growing literature on the link between perceived racial discrimination and oral health outcomes. The findings reveal a negative association between perceived racial discrimination and oral health behaviours. However, the study did not find supportive evidence for the moderating effect of resilience in this context.

PREFACE

This thesis is an entirely original work authored by Priyanka Saluja. The research project, to which this thesis contributes, received ethical clearance from the University of Alberta Research Ethics Board under the project titled: "Perceived Racial Discrimination, Resilience, and Oral Health of Adolescents with Immigrant Backgrounds," with approval reference Pro00119608, granted in May 2022.

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TABLE OF CONTENTS

Contents

LIST OF TABLES

LIST OF FIGURES

1. CHAPTER ONE: INTRODUCTION

In this chapter, the social determinants contributing to the oral health disparity observed among adolescents with immigrant backgrounds will be outlined, and an examination of potential moderating influences will also be addressed. Subsequently, the problem statement will be introduced, followed by a presentation of the research objectives.

1.1 Background

1.1.1 Social Determinants of Health

Social determinants of health refer to factors outside of medical care that affect how healthy people are. They include the situations people are born into, where they grow up, their jobs, where they live, and how they age. These factors are influenced by many things in society and influence the overall conditions of people's lives (CDC, 2022). Understanding and addressing these social determinants is essential for developing effective strategies to improve health outcomes. Researchers and healthcare professionals are increasingly recognizing the importance of understanding how social and institutional environments influence individuals' experiences. Aspects such as employment, housing, living conditions, access to food and social services, and legal status are acknowledged to significantly impact an individual's well-being.

The U.S. Department of Health and Human Services categorizes social determinants of health into five domains (Figure 1.1).

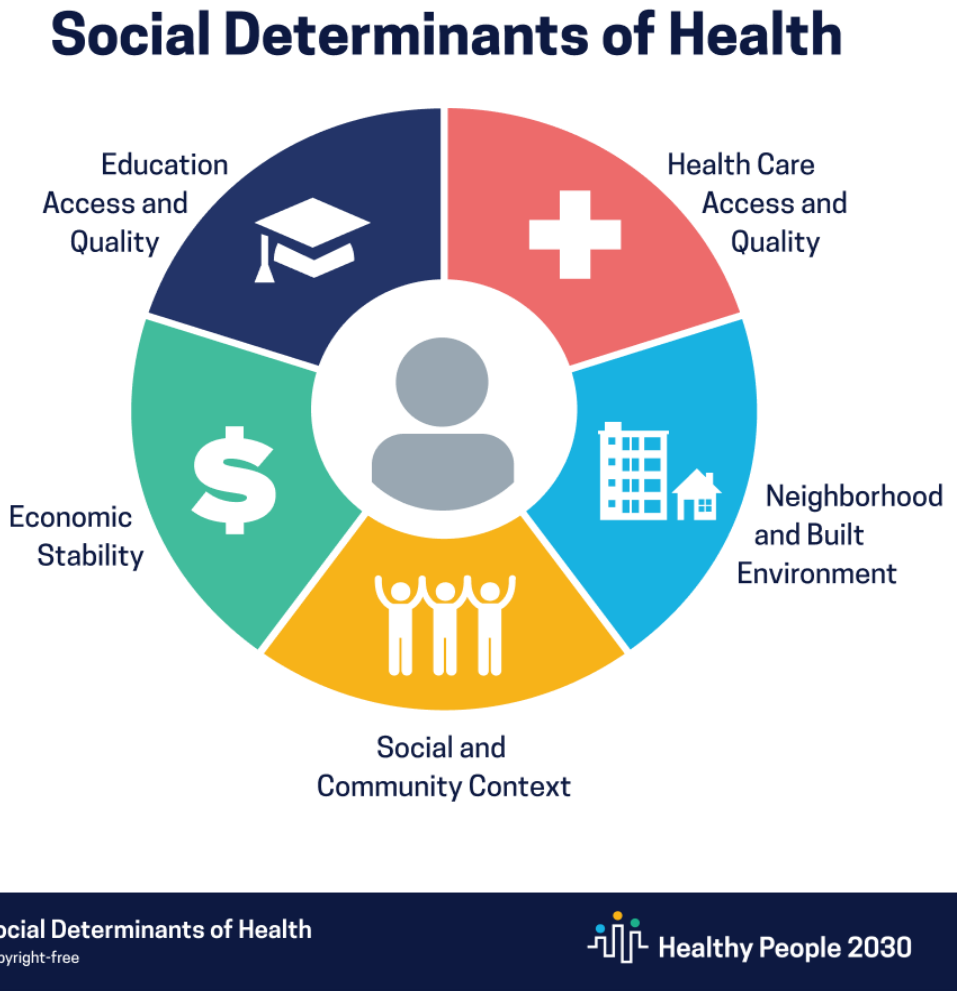

Figure 1.1. Five Domains of Social Determinants of Health

Source- (Social Determinants of Health - Healthy People 2030 | Health.Gov, n.d.)-

Education significantly influences health outcomes. Individuals with higher levels of education often experience better health as they are more inclined to make informed health-related choices, access improved job prospects, and possess the necessary knowledge and skills to lead healthier lifestyles (The Lancet Public Health, 2020). Healthcare access and quality are vital social determinants of health, representing an individual's capability to acquire timely and cost-effective healthcare services. Factors such as health insurance, healthcare facilities,

providers, transportation, socioeconomic status, and cultural factors influence healthcare access and the overall well-being of individuals (McGibbon et al., 2008).

Economic stability is another crucial factor. Higher income and socioeconomic status are generally associated with better health. People with higher incomes tend to have access to better housing, education, and healthcare. They can also afford healthier food and have less stress related to financial issues (Braveman & Gottlieb, 2014). Social and community context plays a pivotal role in maintaining health. Maintaining robust social support networks, which encompass family, friends, and community connections, has a pivotal impact on one's health. It contributes to emotional well-being, stress reduction, and the promotion of healthy behaviours (Umberson & Montez, 2010). Neighbourhood and built environment also significantly impact overall health. The environment, encompassing access to fresh air, clean water to drink, wholesome food, and a safe house has a big impact on overall health. Poor environmental conditions can lead to various health problems (Rolfe et al., 2020).

These social determinants are intricately connected and considered dynamic and subject to modification. The most important modifiable determinants are education, socio-cultural influences, and socioeconomic and environmental factors (Latif, 2020). When we study these determinants and try to understand their impacts on health, it's crucial to recognize the modifying factors or conditions that have the potential to alter these social determinants of health.

Global events such as conflicts, refugee crises, or health pandemics like COVID-19 can upheave entire societies, causing shifts in social determinants such as healthcare access and employment (Green et al., 2021). Government policies or interventions that focus on healthcare

access, education, employment, and social welfare can significantly influence social determinants of health. For instance, changes in minimum wage laws, healthcare access policies, or housing regulations can impact income, education, and housing stability (*Addressing the Social Determinants of Health Upstream | Institute for Health Policy Leadership*, 2021)

Migration patterns can influence the distribution of social determinants across different regions and communities. The World Health Organization (WHO) acknowledges immigration as one of the determinants of health for immigrants due to its significant impact on the physical, mental, and social well-being of refugees and migrants (*Module 3- Tackling the Social Determinants of Health and Workers and Occupational Health and Safety*, 2023). The International Organisation of Migration (IOM) also considers immigration as a social determinant of health for immigrants (*IOM Media Centre*, 2022). Therefore, immigration represents a process that is both shaped by these determinants and can, in turn, bring about changes in each of those domains (Castañeda et al., 2015).

Understanding the interplay between these modifying factors and social determinants of health is essential for developing effective policies and interventions aimed at improving health equity and overall population health.

1.1.1.1 Immigration and Health

Rising migration stands out as a prominent and impactful facet of globalization, with an increasing multitude of individuals relocating within nations and traversing borders in pursuit of improved job prospects and enhanced quality of life (Programme, 2001). As of 2020, the prevailing global approximation suggests that about 281 million international migrants exist

worldwide, accounting for approximately 3.6% of the global population (*Interactive World Migration Report 2022*, 2022). Presently, Canada experiences an annual influx of approximately 500,000 new immigrants, marking one of the most substantial rates per population across the globe. In 2022, the count of permanent residents with immigrant status residing in Canada surpassed 8.3 million, constituting approximately 23% of the overall Canadian population (Government of Canada, 2022b).

Immigrants have been identified as a vulnerable population. In general, they tend to have lower rates of health insurance, utilize healthcare services less frequently, and receive healthcare of lower quality compared to native-born populations (Derose et al., 2007). A comprehensive analysis comparing healthcare service usage between immigrant and native populations revealed that immigrants typically show lower overall utilization of healthcare services (Sarría-Santamera et al., 2016).

The "healthy immigrant effect" is a phenomenon where immigrants initially have better health than the native population. However, as they live in the host country longer, their health tends to decline (Brabete, 2017). This decrease is influenced by substandard health factors such as housing, income, education, and service accessibility. Additionally, language barriers, cultural differences, legal obstacles, and other factors exacerbate these issues, impacting an individual's health progressively and resulting in unfavourable health outcomes (*WHO Report Shows Poorer Health Outcomes for Many Vulnerable Refugees and Migrants - PAHO/WHO | Pan American Health Organization*, n.d.).

1.1.1.2 Immigration and Oral Health

Oral health is defined as encompassing a multitude of dimensions, including the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions with confidence and without pain, discomfort, or disease of the craniofacial complex (Glick et al., 2020). Clinical measures like the caries index or periodontal index are commonly utilized to quantify oral health status. However, self-rated oral health, oral health-related quality of life, and oral health behaviours are other parameters used to assess oral health in survey-based research. Self-perceived oral health serves as a valuable measure in population research, offering insights into individuals' subjective experiences and attitudes toward their oral health status. Its ease of collection through surveys enables large-scale studies, although it's important to consider potential biases in self-reporting.

Oral health behaviour plays a pivotal role as determinant of oral health outcomes. These encompasses a multifaceted interplay of factors that influence individual oral health outcomes, including oral hygiene practices, dietary choices, and utilization patterns of dental services (Kirch, 2008). Oral Health-Related Quality of Life (OHRQoL) encompasses various dimensions such as subjective oral health evaluation, functional and emotional well-being, satisfaction with care, and self-perception, making it a valuable construct for both survey and clinical research with broad applicability (Sischo & Broder, 2011). These holistic approaches offer valuable insights into individuals' subjective experiences, attitudes, and behaviours, contributing to a comprehensive understanding of oral health and facilitating tailored interventions for improved outcomes.

Similar to overall health, studies investigating the oral health of immigrant communities have indicated that these populations might encounter discrepancies in oral health outcomes compared to the native population. These disparities can stem from various sources, such as

economic constraints, lack of dental insurance, unfamiliarity with the local healthcare system, and exposure to new dietary patterns. A systematic review focusing on Migrants' oral health from middle and low-income countries in Europe, revealed that immigrants displayed a higher occurrence of dental caries, inferior periodontal health, and encountered more challenges accessing dental care services in comparison to the non-migrant population (Lauritano et al., 2021).

In a scoping review examining the oral health of immigrant and refugee children in North America, findings indicated that children from immigrant families often showed less favourable oral health outcomes than those from non-immigrant backgrounds (Reza et al., 2016). This group encounters hurdles related to language, culture, and financial constraints, which ultimately hinder their ability to access and utilize dental services (Reza et al., 2016). However, the literature on oral health specifically among immigrants is limited.

While immigration can influence both general and oral health, evident through the disparities observed among immigrants, it is essential to acknowledge that the influence of immigration on health is a complex interplay of various social determinants, including social support, education, employment, discrimination, and more. Understanding these social factors is essential, as they can significantly shape the health and oral health outcomes of immigrants. Among the many challenges immigrants face, discrimination, as a social determinant of health, remains an area that has not received full exploration, especially in the oral health domain.

1.1.1.3 Discrimination

According to Canadian Human Rights, discrimination refers to an action or decision that mistreats an individual or a group based on factors like race, age, or disability (Branch, 2023). Discrimination can manifest in diverse forms, such as racial, gender, socioeconomic, age, disability, religious, LGBTQ+, language, weight-based, and mental health discrimination. These biases and disparities can hinder access to quality care and negatively impact health outcomes. Encountering discrimination in healthcare settings can obstruct healthcare utilization (Yuan, 2007). A literature review on the health of LGBTQ individuals highlighted that discrimination served as a barrier to accessing healthcare among LGBTQ people (Hafeez et al., 2017). In another study exploring perceived age discrimination, a negative association was found with mental health, and it was observed that a sense of control mitigated this association (Yuan, 2007).

The 2014 General Social Survey (GSS) data highlights that within the immigrant community, the predominant perceived cause of reported discrimination was attributed to their ethnicity or cultural background, with 54% of respondents identifying it as the primary factor. This was closely followed by race or skin color, cited by 47% of those surveyed. This report underscores that discrimination based on cultural background and racial attributes is particularly widespread among immigrants, emphasizing the importance of addressing and combatting such discrimination to promote health outcomes.

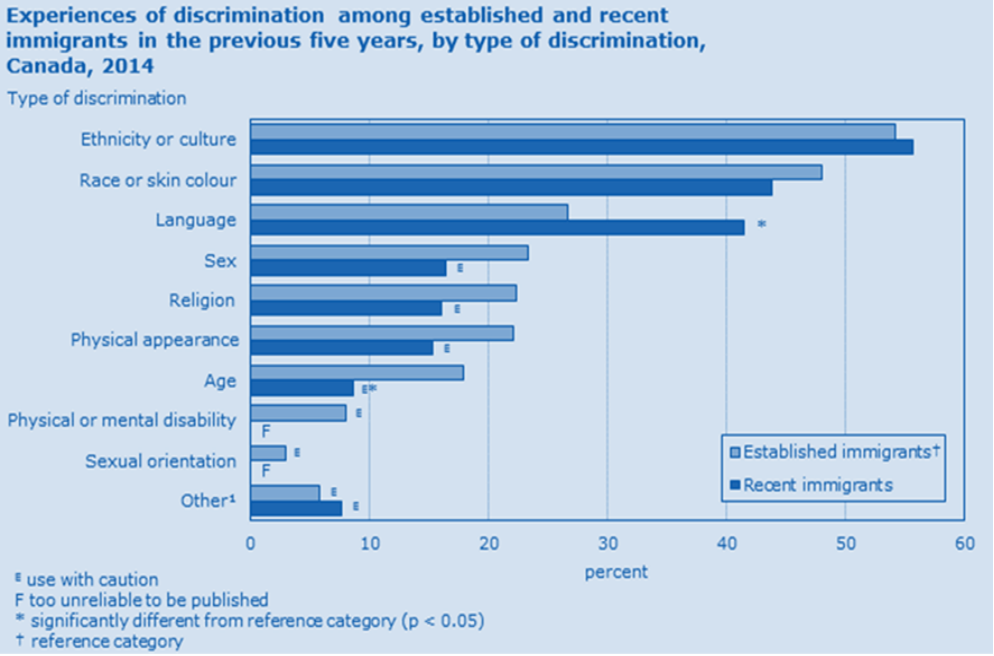

Figure 1.2 Experiences of Discrimination of New and Recent Immigrants in Canada

SOURCE: STATISTICS CANADA, GENERAL SOCIAL SURVEY

1.1.1.3.1 Racial Discrimination

The terms racism and racial discrimination have been interchangeably used in literature; however, these are two different concepts that need to be understood and defined clearly. Racism is a broader term, it refers to prejudicial beliefs that attribute distinct characteristics to racial groups, often deeming some inferior to others. It encompasses negative emotions, acceptance of stereotypes, and discriminatory actions, sometimes escalating to violence. (*APA Dictionary of Psychology*, n.d.). Racism can manifest at three levels-Systemic, Interpersonal, and internalized. Systemic racism pertains to policies and practices deeply ingrained within established institutions, that can result in the marginalization or promotion of certain groups (Banaji et al., 2021). Interpersonal racism refers to discriminatory actions, behaviours, or interactions between individuals or small groups based on racial biases or prejudices. It involves

the mistreatment, marginalization, or exclusion of individuals from certain opportunities or social interactions because of their race. Internalized racism refers to the acceptance and internalization of negative stereotypes, beliefs, and attitudes about one's own racial or ethnic group. It occurs when individuals from marginalized racial groups adopt societal messages of inferiority, which can impact their self-esteem, identity, and behaviour (Flanagin et al., 2021).

Racial discrimination represents the behaviour manifestation of prejudice, involving the negative treatment of members of marginalized groups (*APA Dictionary of Psychology*, n.d.). The United Nations describes that racial discrimination is treating someone differently based on race, ethnicity, color, origin, or nationality that prevents or invalidates the exercise of constitutional rights and liberties, including politics, economics, social, or cultural matters (*International Convention on the Elimination of All Forms of Racial Discrimination*, n.d.). While 'race' typically denotes a categorization of people based on physical characteristics, ancestry, or language; 'ethnicity' refers to a shared cultural heritage, nationality, ancestry, language, and traditions among a group of people. Ethnic groups can encompass a wide range of characteristics beyond physical appearance, such as cultural practices, religion, and social customs. However, both race and ethnicity are largely social constructs and do not have a biological basis. In other words, it's more about how society perceives and categorizes people (*APA Dictionary of Psychology*, n.d.).

1.1.1.3.2 Perceived Racial Discrimination

Perceived racial discrimination is characterized as the subjective perception by members of minority groups of unjust treatment directed at racial or ethnic groups, stemming from racial prejudice and ethnocentrism (Jackson et al., 1998). Research indicates that perceived

discrimination can lead to chronic stress, negative emotions, and unhealthy coping behaviours, contributing to adverse health effects (Pascoe & Richman, 2009). This subjective perception can affect a broader range of people and communities, making it a key focus in understanding and addressing health disparities. Measuring this concept is crucial because discrimination's impact can vary based on a person's privileges and identities, leading to subjective meanings and outcomes (Schmitt et al., 2002). Therefore, measuring perceived racial discrimination is essential, as opposed to solely measuring obvious acts of discrimination, due to the potential impacts of such incidents.

As per the 2019 General Social Survey (GSS) on Canadians' Safety, almost half (46%) of individuals aged 15 and above who identify as Black reported encountering at least one instance of discrimination within the previous 5 years (Government of Canada, 2022a). According to a Harvard Public Health survey in 2018, in the United States, 51% of Black Americans report personal experiences of people using racial slurs against them (Avenue et al., 2018). A study examining the perceptions of immigrant children regarding ethnic discrimination and social exclusion in Canada unveiled that around a quarter of these children encountered discrimination from their peers, both within and outside of school, due to their ethnic identity (Oxman-Martinez et al., 2012).

1.1.1.3.2.1 Perceived Racial Discrimination and Health

Perceived racial discrimination can profoundly impact an individual's health across multiple dimensions. Firstly, discrimination contributes significantly to mental health challenges, precipitating conditions such as anxiety, depression, and diminished self-esteem. Experiences of

discrimination are correlated with changes in hypothalamic–pituitary–adrenal (HPA) axis activity (Busse et al., 2017). Chronic activation of the HPA axis due to persistent discrimination can dysregulate cortisol levels, contributing to the allostatic load.(Miller et al., 2021) Various studies have underscored the association between the perception of discrimination and a range of mental health effects, including the manifestation of depressive symptoms and heightened levels of psychological distress among affected individuals. (Davis et al., 2016), (Giuliani et al., 2018). Discrimination can trigger a cascade of physiological responses within the body, including elevated blood pressure and inflammation, which, over time, can significantly compromise long-term health outcomes (Forde et al., 2021) and obesity (Stepanikova et al., 2017).

Furthermore, individuals coping with discrimination may resort to unhealthy behaviours as maladaptive coping mechanisms. These behaviours often include smoking, excessive alcohol consumption, or overeating, which not only exacerbate existing health issues but also increase the risk of developing new ones. The perception of discrimination has been linked to the adoption of health-harming behaviours, including substance abuse (Paradies, 2006), (Zapolski et al., 2019). Additionally, discrimination can pose barriers to accessing quality healthcare services, perpetuating unaddressed health problems among affected individuals. Fear of discrimination may deter individuals from seeking timely medical or dental care, leading to the exacerbation of health issues and the progression of underlying conditions. (Pollock et al., 2012).

1.1.1.3.2.2 Perceived Racial Discrimination and Oral Health

Much like its influence on overall health, perceived racial discrimination can also have repercussions on oral health. Research has shown that perceived discrimination is linked to a decreased likelihood of attending preventive dental care, as evidenced by a study conducted in

Brazil (Junior et al., 2020). Moreover, studies have highlighted how the fear of discrimination serves as a barrier to accessing both medical and dental services, particularly among immigrant populations (Pollock et al., 2012). In a Canadian study focussing on the oral health behaviour of adolescents, racial discrimination was found to have a significant link with the frequency of sugar consumption (Amin et al., 2021). Few studies have delved into the association of perceived racial discrimination with oral health behaviours.

Shifting our focus from the adverse health consequences of perceived racial discrimination, we now turn our attention to protective factors that can mitigate these effects. These factors serve as buffers, shielding individuals from discrimination's impact on health, shedding light on strategies that enhance well-being among affected individuals, and contributing to a broader understanding of how they navigate such challenges, ultimately promoting health equity.

1.1.2 Protective Factors

A protective factor is a characteristic found at biological, psychological, familial, or communal levels, encompassing factors related to peers and culture. It's associated with lowering the probability of negative outcomes or works to alleviate the detrimental effects of a risk factor on these outcomes. (*Preventing Mental, Emotional, and Behavioral Disorders Among Young People*, 2009). Protective factors are pivotal elements that contribute to positive health outcomes among immigrants, helping to counterbalance the challenges and stressors often associated with the process of migration and adaptation to a new country. These elements are crucial in promoting

the well-being of immigrants and shaping their overall quality of life, facilitating their successful integration into host societies.

The significance of social support as a protective factor has been documented in numerous studies. Social support has consistently shown a substantial inverse association with anxiety and depression scores (Held et al., 2022). Perceived control is another protective factor, that has frequently been associated with the association between perceived discrimination and health. It has been identified as both a moderator and a mediator in this association (Douglass et al., 2017; Watkins et al., 2011). Few studies have reported how self-esteem has a buffering effect on the association between perceived racial discrimination and mental health outcomes (Fischer & Shaw, 1999).

In a study conducted among Black Americans, it was found that a strong racial identity might buffer the association of perceived racial discrimination on health (Tavares, 2023). Active coping strategies can moderate the connections between race-related stress, and depressive symptoms among adult African American women (L. K. Hill & Hoggard, 2018). The significance of resilience as a protective factor has been documented in some studies for instance resilience has shown a significant moderating effect on the association of perceived discrimination with anxiety and depression scores (Farahani et al., 2021; Mao et al., 2021).

Understanding and nurturing these protective factors is integral to promoting the health and well-being of immigrants. By acknowledging and leveraging the strengths of immigrants, promoting cultural sensitivity, and tackling structural obstacles, societies can play a pivotal role in establishing a nurturing and inclusive environment that optimizes the likelihood of positive health outcomes and overall success for immigrants in their adopted countries.

1.1.2.1 Resilience

As per the American Psychological Association, Resilience is the ability to effectively navigate and prosper in response to challenges, adversity, trauma, tragedy, threats, or considerable stressors, including issues within family and relationships, severe health concerns, or pressures in the workplace and finances. It encompasses the capacity to recover and rebound from demanding experiences (*Resilience*, n.d.).

Resilience has been investigated as a moderator in studies exploring the association between discrimination and health. Among the existing literature exploring the moderating influence of resilience on the connection between discrimination and health outcomes, a few have highlighted significant effects. A study among Chinese college students revealed resilience's moderating effect on perceived discrimination and self-esteem (Liu et al., 2023). In another study on American adults, resilience was found to moderate the relationship between discrimination and well-being (Cook et al., 2023). Similarly, in a study on the Norwegian indigenous population, resilience was reported as a moderator between discrimination and mental health and well-being (Friborg et al., 2017). However, there hasn't been research exploring how resilience might moderate the connection between perceived racial discrimination and oral health behaviours specifically among adolescents.

1.1.3 Oral Health of Adolescents with Immigrant Backgrounds

Adolescence is a developmental period characterized by significant physical, emotional, and social transformations, presenting an ideal opportunity to instill lifelong oral health habits and behaviours. Adolescents often experience a shift in responsibilities, gaining a greater degree of

independence and decision-making power (Christie & Viner, 2005). This newfound autonomy can impact their oral health behaviours, as they navigate factors such as dietary choices, oral hygiene routines, and dental care utilization. Instilling good oral hygiene practices during this period is crucial because the habits developed at this stage can significantly influence oral health throughout their adult lives. The influence of social determinants of health, parental actions, and peer pressure significantly affects the oral health of adolescents in manners that remain inadequately comprehended ("Oral Health Across the Lifespan," 2021).

In addition to the above-mentioned general challenges, immigrant adolescents also contend with issues such as acculturation, language barriers, and limited healthcare access (Toppelberg & Collins, 2010). They balance adopting new cultural norms with preserving their heritage, affecting oral health behaviours. These factors affect their diet, oral hygiene, and dental care (Dahlan et al., 2019). An Ontario study comparing dental caries in Canadian adolescents found that immigrant children were five times more likely to experience dental caries than those born in Canada (Locker et al., 1998). A similar study on immigrants in Spain noted that socio-family vulnerability and deprivation among immigrant adolescents were significant factors contributing to the high prevalence of untreated dental caries in this specific population (Almerich-Silla & Montiel-Company, 2007). Language and cultural barriers hinder communication with healthcare providers, impacting oral health understanding and care importance. Limited familiarity with local healthcare and finances worsens access to dental care, resulting in unmet needs (Doucette et al., 2023).

Socially, forming new peer relationships and cultural adaptation influence oral health behaviours. Peers and norms affect choices regarding tobacco, alcohol, and substance abuse

(Varela & Pritchard, 2011). Discrimination adds stress for immigrant adolescents and can affect their overall well-being, including oral health (Szaflarski & Bauldry, 2019).

Moreover, it is important to note that the challenges do not end with the first generation. Adolescents belonging to the second and subsequent waves of migrants, often referred to as the second generation, face a unique set of difficulties. They are born or raised in a new country and may undergo a process of acculturation as they balance their family's cultural heritage with the culture of their new home. This complex interplay can lead them to be more susceptible to adopting unhealthy behaviours, including substance use, as they navigate the dual pressures of cultural identity and social integration (Hamilton et al., 2009).

In both cases, addressing the general and oral health and well-being of immigrants, regardless of their generational status, is crucial to promoting healthier and more successful transitions into their new communities.

1.2 Problem Statement

To address the unmet oral health needs of adolescents with immigrant backgrounds, it is essential to study the role of social determinants of oral health behaviours. Perceived racial discrimination is a social determinant that has not been fully explored regarding its association with oral health behaviours, specifically in the adolescent population. Equally important is to identify protective factors that can help reduce adversity on health outcomes. Resilience is a protective factor that has been investigated in relation to general health but the evidence about oral health is very limited, specifically in the adolescent population.

In conclusion, there is a gap in knowledge regarding the association between perceived racial discrimination and oral health behaviours in adolescents with immigrant backgrounds. Addressing this gap will enhance our theoretical understanding of these dynamics and contribute to the development of practical interventions and policies aimed at enhancing the overall health and well-being of this vulnerable population.

1.3 Objectives

The primary objectives of this study were to comprehensively explore and analyse the correlation between perceived racial discrimination and oral health behaviours among adolescents with immigrant backgrounds. The study also explored the moderating role of resilience in this correlation.

1.3.1 Specific Objectives:

- To systematically review the available literature on the association of perceived racial discrimination with oral health status and/or behaviours.
- To assess the association of perceived racial discrimination with oral health behaviours of adolescents with immigrant backgrounds.
- To explore the potential moderating role of resilience in the relationship between perceived racial discrimination and oral health behaviours.

2. CHAPTER TWO: PERCEIVED RACIAL DISCRIMINATION AND ORAL HEALTH- A SYSTEMATIC REVIEW

In this chapter, I first provide a background, and then explain the objectives of conducting this systematic review, Further, I discuss the methodology, results, and synthesis of the findings in the context of relevant literature. In the end, I address the limitations of the review, and finally, the chapter closes with a summary of the conclusions.

2.1 Introduction

Racism refers to prejudicial beliefs that attribute distinct characteristics to racial groups, often deeming some inferior to others. It encompasses negative emotions, acceptance of stereotypes, and discriminatory actions, sometimes escalating to violence (*APA Dictionary of Psychology*, n.d.). Racism can manifest at three levels- systemic, interpersonal, and internalized. Systemic racism pertains to policies and practices deeply ingrained within established institutions, that can result in the marginalization or promotion of certain groups (Banaji et al., 2021). Interpersonal racism refers to discriminatory actions, behaviours, or interactions between individuals or small groups based on racial biases or prejudices. It involves the mistreatment, marginalization, or exclusion of individuals from certain opportunities or social interactions because of their race. Internalized racism refers to the acceptance and internalization of negative stereotypes, beliefs, and attitudes about one's own racial or ethnic group. It occurs when individuals from marginalized racial groups adopt societal messages of inferiority, which can impact their self-esteem, identity, and behaviour (Flanagin et al., 2021).

Racial discrimination represents the behaviour manifestation of prejudice, involving the negative treatment of members of marginalized groups. According to the United Nations, racial discrimination is treating someone differently based on race, ethnicity, color, origin, or nationality that prevents or invalidates the exercise of constitutional rights and liberties, including politics, economics, social, or cultural matters (*International Convention on the Elimination of All Forms of Racial Discrimination*, n.d.).

While 'race' typically denotes a categorization of people based on physical characteristics, ancestry, or language; 'ethnicity' refers to a shared cultural heritage, nationality, ancestry, language, and traditions among a group of people. Ethnic groups can encompass a wide range of characteristics beyond physical appearance, such as cultural practices, religion, and social customs (*APA Dictionary of Psychology*, n.d.). However, both race and ethnicity are largely social constructs and do not have a biological basis. In other words, it's more about how society perceives and categorizes people (*APA Dictionary of Psychology*, n.d.).

This societal perception is pivotal in understanding perceived racial discrimination characterized as the subjective perception by members of minority groups of unjust treatment directed at racial or ethnic groups, stemming from racial prejudice and ethnocentrism (Jackson et al., 1998). In accordance with the General Social Survey for 2019 - Canadians' Safety, 46% of black Canadians experienced racial discrimination or unjust treatment in the previous five years (Government of Canada, 2022a). In the United States, almost 35% of Asian Americans have encountered disrespectful or sensitive remarks or stereotypes about their racial background, while 51% of black Americans have experienced racial discrimination (Avenue et al., 2018).

Health inequalities have been reported among racial and ethnic groups. The statistics from the 2021 American Community Survey highlight significant disparities in healthcare access and health outcomes among different racial and ethnic groups in the United States. For instance, black individuals, as indicated by the American Community Survey, have an uninsured rate of 9.6%, while Hispanic or Latino individuals have a higher uninsured rate of 17.7%, compared to white individuals at 5.7% (Bureau, 2021). Similarly, data from the National Centre for Health Statistics reveal disparities among racial/ ethnic groups in various health conditions such as obesity, cancer, high blood pressure, asthma, and others (L. Hill et al., 2023).

Race and ethnicity have also been implicated in oral health inequalities (Bastos et al., 2018). Children of immigrants have a five-fold higher risk of having caries than native-born children, according to a Canadian study (Lawrence et al., 2009). Similarly, Black children in the US have about twice as much caries prevalence as White children, and their untreated caries are 2.6 times more prevalent than that of White children (Han, 2019).

A critical review focussing on racial inequalities in oral health examined the concepts associated with race, racism, and racial discrimination in dentistry. The researchers critically reviewed the historical influence of race on orofacial development, highlighting a shift in the literature toward acknowledging sociocultural context in contemporary studies. However, it urged a more comprehensive approach by incorporating systemic racism and sociological concepts for effective policy interventions in addressing oral health disparities (Bastos et al., 2018). Another similar literature review reported discrimination as the most common manifestation of race-based oppression in the included studies (Bastos et al., 2020). This review provided a critical analysis of the methodology of the included studies but did not synthesize the

correlation reported between race-based oppression and oral health outcomes. In a recent review published in 2023, all studies addressing the correlation between racism, oppression, and discrimination with oral health were compiled, it also included studies that reported discrimination in healthcare due to reasons other than racism (Fleming et al., 2023). This review highlights the necessity of addressing systemic factors impacting oral health outcomes, emphasizing the need for a broader understanding beyond implicit racial bias among dental providers to effectively address oral health inequities and advocate for remedies rooted in social science concepts.

While these critical reviews evaluated the available literature, analysed their methodology, and explored the implications of their results, a systematic review stands out by synthesizing existing literature on a specific topic in structured methods. This approach enables the minimization of bias by providing objective evidence in a transparent and replicable process. As racial discrimination remains the most perceived manifestation of racism, a systematic review is needed to collate the current knowledge on perceived racial discrimination and oral health, by systematically synthesizing the available literature and focusing on the oral health outcomes. Therefore, the objectives of this review were to 1) examine the pre-existing data assessing the association of perceived racial discrimination with oral health, 2) describe important characteristics of the included studies, and 3) determine the association between perceived racial discrimination and oral health.

2.2 Methods

2.2.1 Protocol

This systematic review was carried out in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) statement on reporting systematic reviews The PRISMA statement includes a checklist of items to guide the reporting of systematic reviews.

2.2.2 Inclusion Criteria

We included quantitative studies that: 1) reported the association of perceived racial discrimination with oral health behaviours (such as toothbrushing, flossing, dental care utilization, diet), oral health status (such as periodontitis, dental caries), or Oral Health Related Quality of Life (OHRQoL); 2) measured perceived racial discrimination using well-defined questions or validated scales; 3) were written in the English language. Literature reviews, qualitative studies, conference abstracts, and editorials were not included in this review.

2.2.3 Search Strategy

The search strategy was developed using the three keywords- “racial discrimination”, “oral health”, and “racial and ethnic groups”. A health sciences librarian at the University of Alberta assisted with the formulation of the search terms. Initially, we developed search terms; then these search terms were modified for various electronic databases. Using six electronic bibliographic databases, a thorough search was carried out up to July 12, 2023: Ovid MEDLINE (1946–2023), Scopus (1970–2023), Ovid Psych Info (1806–2023), Embase (1974–2023), and CINAHL (1989–2023), Global health (1910-2023)). The list of the search terms and all the combinations applied to the six databases are listed in Table 2-1.

Table 2-1 Search Strategy and results from different electronic databases.

DATABASE	KEYWORDS	RESULTS
Ovid Medline (1946-June,2022)	"discrim*.mp. OR bias*.mp. OR exp Prejudice/ or prejud*.mp. OR exp Hostility/ or hostil*.mp.OR harass*.mp. OR "unfair treat*".mp. OR racis*.mp.AND tooth disease*. OR exp tooth diseases or OR dental caries.mp. or exp Dental Caries/ OR periodontal diseases.mp. or exp Periodontal Diseases/ OR tooth pain.mp. OR dental care utili?*.mp. OR dental health*.mp. OR dental clinic*.mp. OR oral health*.mp OR tooth brushing. mp. OR eating habits .mp. AND racial*.mp. OR ethnic*.mp. OR cultur*.mp. OR migrant*.mp.OR immigra*.mp.OR refugee*.mp. OR Indigenous .mp.OR first nation s.mp. OR inuit*.mp. OR metis.mp.OR blacks. mp.OR African American*.mp. or exp African Americans/ OR African Canadian*.mp.OR "People of colors".mp. OR "People of colours".mp. OR Asian*.mp. OR East Indian*.mp.OR Hispanic*.mp. or exp "Hispanic or Latino"/ OR Asian American*.mp. or exp Asian Americans/ OR Aboriginal*.mp"	659
Ovid Embase (1974 to June 2022)	"discrim*.mp. OR bias*.mp. OR exp Prejudice/ or prejud*.mp. OR exp Hostility/ or hostil*.mp.OR harass*.mp. OR "unfair treat*".mp. OR racis*.mp.AND tooth disease/ or dental diseases.mp OR dental caries.mp. or exp Dental Caries/ OR periodontal diseases.mp. or exp Periodontal Diseases/ OR tooth pain.mp. or exp tooth pain/ . OR dental care utili?*.mp. OR dental health*.mp. OR dental clinic*.mp. OR oral health*.mp OR tooth brushing.mp. OR eating habits.mp. AND racial*.mp. OR ethnic*.mp. OR cultur*.mp. OR migrant*.mp.OR immigra*.mp.OR refugee*.mp. OR Indigenous.mp. OR first nations.mp. OR inuit*.mp. OR metis.mp.OR blacks.mp.OR exp African American/ or African American*.mp OR African Canadian*.mp.OR "People of colors".mp. OR "People of colours".mp. OR Asian*.mp. OR East Indian*.mp.OR exp Hispanic/ or Hispanic*.mp. OR exp Asian American/ or Asian American*. OR Aboriginal*.mp"	547
CINAHL (EBSCO) (1970 to June 2022)	"(MH "Discrimination, Employment") OR "discrim*"0R bias*OR "prejud*" OR hostil*OR"harass*"OR(MH "Refusal to Treat") OR (MH "Treatment Refusal+") OR "unfair treat* " OR (MH "Racism+") OR "racis*" AND (MH "Tooth Diseases+") OR "tooth disease*" OR "dental disease*" OR (MH "Dental Caries") OR "dental caries" OR (MH "Periodontal Diseases+") OR "periodontal diseases" OR "tooth pain" OR "dental care utili#*" OR "dental health*" OR(MH "Dental Clinics") OR "dental clinic*" OR (MH "Oral Health") OR "oral health*" OR(MH "Toothbrushing") OR "tooth brushing" OR (MH "Eating Behavior+") OR "eating habits" AND "racial" OR(MH "Ethnic Groups+") OR "ethnic*" OR "cultur*" OR "migrant*"OR ""immigra*"" OR "refugee*" OR "Indigenous" OR "first nations" OR "inuit*" OR "metis" OR"blacks" OR (MH "African Americans") OR "african american*"OR "African Canadian*"OR ""People of colors"" OR ""People of colours"" OR(MH "Asians+") OR "Asian*"OR "East Indian*"OR""Hispanic*" OR "Asian American*" OR Aboriginal*""	416
Scopus (1970 to June 2022)	"(discrim* OR bias* OR prejud* OR hostil* OR harass* OR {unfair treat*} OR racis*) AND ({tooth disease*'} OR {dental disease*} OR {dental caries} OR {periodontal diseases} OR {tooth pain} OR {dental care *} OR {dental health*} OR {dental clinic*} OR {oral health*} OR {tooth brushing} OR {eating habits}) AND (racial* OR ethnic* OR cultur* OR migrant* OR immigra* OR refugee* OR Indigenous OR {first nations} OR inuit* OR metis OR blacks OR {African American} OR { african-canadian*} OR {People of colors} OR {People of colours} OR asian* OR {East Indian*} OR hispanic* OR {Asian American*} OR Aboriginal*))"	104

Ovid Psycinfo (1806 to 2022)	“discrim*.mp. OR bias*.mp. OR prejud*.mp. OR exp Hostility/ or hostil*.mp. OR harass*.mp. OR "unfair treat*".mp. OR racis*.mp. AND tooth disease*.mp. OR dental disease*.mp. OR dental caries.mp. OR periodontal diseases.mp. OR tooth pain.mp. OR dental care utili?*.mp.OR dental health*.mp.OR dental clinic*.mp.OR oral health*.mp. OR tooth brushing.mp. OR eating habits.mp. AND racial*.mp.OR ethnic*.mp. OR cultur*.mp. OR migrant*.mp. OR immigra*.mp.OR refugee*.mp.OR Indigenous.mp. OR first nations.mp. OR inuit*.mp.OR metis.mp.OR blacks.mp.OR African American*.mp.OR African Canadian*.mp.OR "People of colors".mp.OR "People of colours".mp.OR Asian*.mp.OR East Indian*.mp.OR Hispanic*.mp.OR Asian American*.mp.OR Aboriginal*.mp.”	56
Global Health (1910 to June 2022)	“discrim*.mp. OR bias*.mp. OR prejud*.mp. OR hostil*.mp. OR harass*.mp OR "unfair treat*".mp. OR racis*.mp. AND tooth disease*.mp.OR Dental disease*.mp. or tooth diseases.sh.OR dental caries.mp. or dental caries/ OR periodontal diseases.mp. or periodontal diseases/ OR tooth pain.mp.OR dental care utili?*.mp.HOR dental health*.mp. OR dental clinic*.mp. OR oral health*.mp OR tooth brushing.mp. OR eating habits.mp. AND racial*.mp OR ethnic*.mp. OR cultur*.mp. OR migrant*.mp. OR immigra*.mp. OR refugee*.mp. OR Indigenous.mp. OR first nations.mp. OR inuit*.mp. OR metis.mp. OR blacks.mp. OR African American*.mp. or African Americans.sh.OR African Canadian*.mp. OR "People of colors".mp. OR "People of colours".mp. OR Asian*.mp. OR East Indian*.mp. OR Hispanic*.mp. or Hispanics/ OR Asian American*.mp. OR Aboriginal*.mp”	215
Total		1997
Duplicates		1270
Final		727

2.2.4 Study Selection

According to the inclusion criteria, two reviewers independently evaluated the titles and abstracts to identify potentially relevant studies. When the abstracts were found to be informationally lacking, the full text was reviewed based on the selection criteria. If there was a difference of opinion, the two reviewers discussed it until they came to a consensus.

2.2.5 Data Extraction

The two reviewers extracted data from the included studies on the following items: host country, backgrounds and age of the participants, sampling method, sample size, study design, measure of racial discrimination, oral health measure, and associations with oral health outcomes. The two reviewers discussed and settled any discrepancies.

2.2.6 Risk of Bias

The Newcastle-Ottawa scale was used to assess the methodological quality of the included studies, focusing on three main criteria: group selection, comparability, and results (*Ottawa Hospital Research Institute*, n.d.). In terms of group selection, a study can receive up to five stars, comparability can receive a maximum of two star, and outcome categories can receive three stars. The maximum score of 10 indicates the highest level of methodological excellence. Studies were classified as being of poor quality if they received a score of three or less, medium quality if they received a score between three and eight, and high quality if they received a score of eight or above.

2.2.7 Synthesis of Findings

Due to the diversity of the included research, the results were analysed descriptively. A meta-analysis could not be performed.

2.3 Results

2.3.1 Study Selection

An extensive search of six databases produced 1997 studies, after removing duplicates we had 727 records. Articles were given further consideration for inclusion if their titles and abstracts stated that they presented quantitative data relating racial discrimination to oral health. After initial screening, 28 papers met the requirements for full-text review, and 21 of them satisfied our inclusion criteria. The reporting of discrimination based on factors other than racism was the main reason for exclusion. The selection process for the included research is outlined in Figure 2-1.

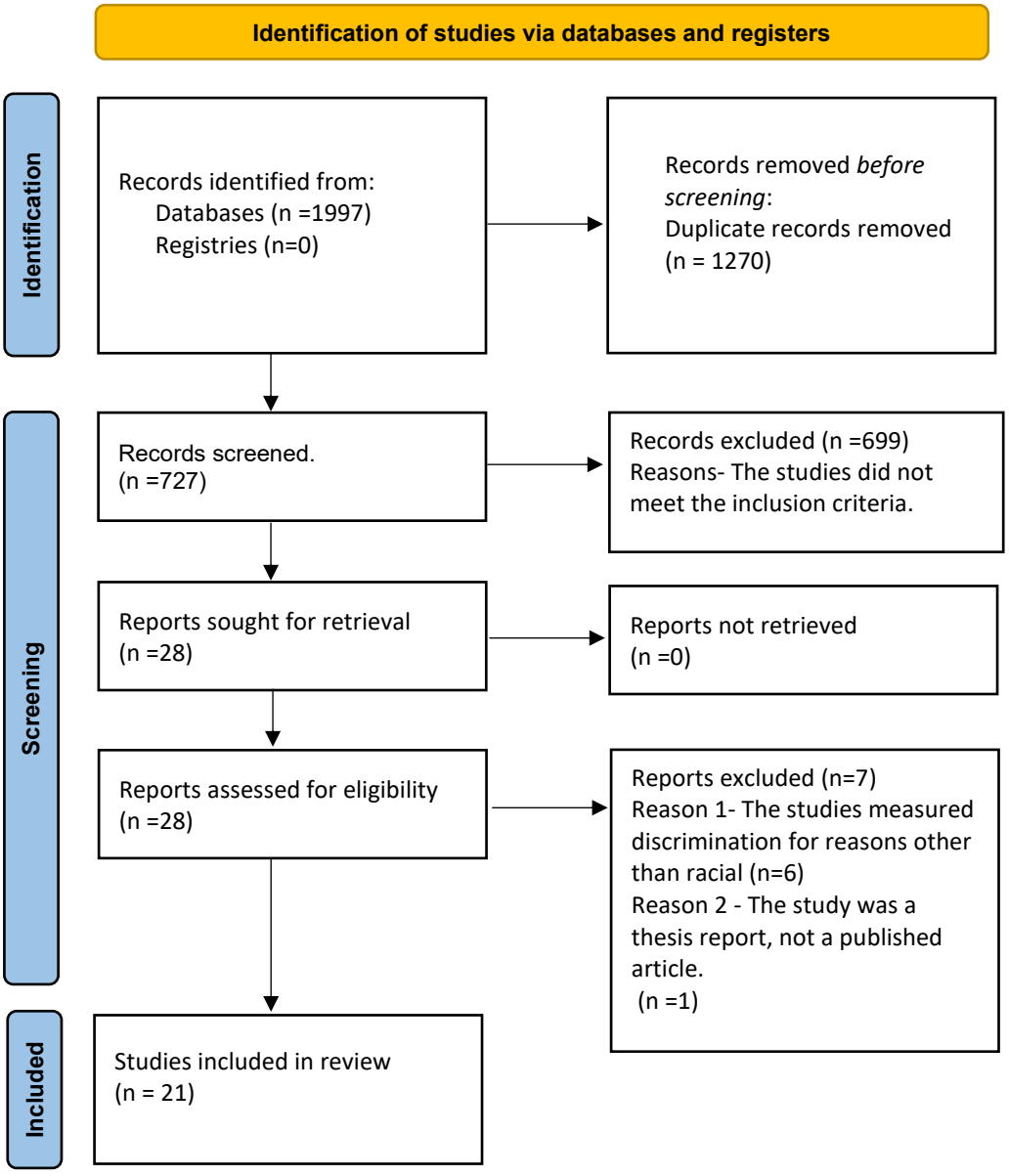

Figure 2.1 Flow diagram of literature search according to PRISMA statement

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. DOI: 10.1136/BMJ.n71

2.3.2 Study Characteristics

Out of the included studies, 20 were cross-sectional, with one being longitudinal. Predominantly, these studies were conducted in the United States (38%), Australia (28%), Canada (14%), Brazil (14%), and Korea (4%). Table 2-2 lists the important features of these studies. The studies that were included had sample sizes that ranged from 156 to 60,202 participants. Six studies focused on Indigenous peoples, five on ethnic minority groups like African Americans and Hispanics, three on immigrants, and seven on the general population. Three studies were conducted on adolescents (11 or 12 to 14 or 18 years of age) one on late adolescence (16 to 20 years of age), and one study focused on older adults (60 years and older).

Table 2-2 Characteristics of included studies.

AUTHOR YEAR	*Ali et al - 2021*(Ali et al., 2021a)	*Amin et al -2021* (Amin et al., 2021)	*Ben et al -2014* (Ben, Paradies, et al., 2014)	*Ben et al -2014*(Ben, Jamieson, et al., 2014)
HOST COUNTRY AND PARTICIPANTS	*Australia-885 Indigenous Australians*	*Canada-252 Adolescents*	*Australia-365 Pregnant Aboriginal Australian*	*Australia-365 Pregnant Aboriginal Australian*
AGE	*18 and above*	*12 -18*	*14 and above*	*14 and above*
STUDY TYPE AND SAMPLE	*Cross-sectional Convenience*	*Cross-sectional Convenience*	*Cross-sectional Convenience*	*Cross-sectional Convenience*
RACIAL DISCRIMINATION MEASURE	*An adapted version of Measure of Indigenous Racism Experiences (MIRE) instrument*	*Measured using one item- "Have you ever been treated unfairly or discriminated against based on your race?"*	*An adapted version of the Measure of Indigenous Racism Experiences (MIRE) instrument*	*An adapted version of the Measure of Indigenous Racism Experiences (MIRE) instrument*
ASSOCIATION WITH ORAL HEALTH	*Oral health-related quality of life (OHRQoL)*	*Oral health behaviours, dental care utilization*	*Oral health problem (Toothache)*	*Oral health behaviour (Toothbrushing)*
RESULTS	*-racial discrimination (-)OHRQoL*	*racial discrimination (+) sugar intake frequency (0) frequency of dental brushing(0) utilization of dental services*	*-racial discrimination (+) Oral health problems (Toothache)*	*racial discrimination (-) Oral health behaviour (tooth brushing)*

AUTHOR YEAR	*Calvasina et al-2015*(Calvasina et al., 2015)	*Celeste et al-2013*(Celeste et al., 2013)	*Finlayson et al-2018* (Finlayson et al., 2018)	*Mc Glumphy et al-2019* (McGlumphy et al., 2019)
HOST COUNTRY AND PARTICIPANTS	*Canada- 3976 Non-refugee immigrants*	*Brazil-2791 Civil servants*	*U.S- 12750 Hispanic/Latino adults*	*U.S-156 African American adolescents* -
AGE	*20-50*	*22-82*	*18-65*	*11-18*
STUDY TYPE AND SAMPLE	*Longitudinal cohort Random*	*Cross-sectional Convenience*	*Cross-sectional Random*	*Cross-sectional Convenience*
RACIAL DISCRIMINATION MEASURE	*Measured using one item: "Since your arrival in Canada, have you experienced discrimination or been treated unfairly by others because of your ethnicity, culture, race or skin color, language or accent, or religion?"*	*An adapted version of everyday discriminatio n scale.*	*Measured using two items – "How often they have seen friends (others) treated unfairly and how often people treat them (self) unfairly because they are Hispanic/ Latino.?"*	*Adolescent Discrimination Distress Index (ADDI)*
ASSOCIATION WITH ORAL HEALTH	*Oral health problems*	*Self-reported tooth loss*	*Periodontitis*	*Perceived Oral Health (POH)*
RESULTS	*-racial discrimination (+) self-reported dental problems*	*-racial discriminatio n (0) self-reported tooth loss*	*-Perceived unfair treatment towards self (-) periodontitis -Perceived unfair treatment towards others (+) periodontitis.*	*-Racial discrimination (-) perceived oral health*

AUTHOR YEAR	*Gioda Noronha et al-2023*(Noronha et al., 2023)	*Jamieson et al-2013* (L. M. Jamieson et al., 2013)	*Jamieson et al-2023* (L. Jamieson et al., 2023)-*2023*	*Junior et al-2020*(Junior et al., 2020)
HOST COUNTRY AND PARTICIPANTS	*Brazil-429 Adolescent*	*Australia-336 Aboriginal Australian*	*Australia- 1011 Aboriginal Australian*	*Brazil-60,202 Brazilian adults*
AGE	*11-14*	*16-20*	*18 and above*	*19 and above*
STUDY TYPE AND SAMPLE	*Cross-sectional Random*	*Cross-sectional Random*	*Cross-sectional Convenience*	*Cross-sectional Random*
RACIAL DISCRIMINATION MEASURE	*Measured using one item "Somebody insulted me because of my color or race"*	*Measured using one item- "Have you been treated unfairly or discriminated against because you are Aboriginal?"*	*Measure of Indigenous Racism Experiences (MIRE) instrument.*	*Measured using ten sequential questions- "If they had faced discrimination in health care, by a doctor or other health professional regarding the following aspects: lack of money, social class, race, type of working occupation, type of disease, sexual preference, religion, sex, age or any other reason."*
ASSOCIATION WITH ORAL HEALTH	*Oral health-related quality of life (OHRQoL)*	*Dental care Utilization.*	*Self-rated oral health (SROH), Oral health-related quality of life (OHRQoL)*	*Preventive dental attendance*
RESULTS	*racial discrimination (-) Oral health-related quality of life OHRQoL*	*-Self-reported discrimination (+) never visited a dentist before.*	*racial discrimination (-) SROH (-) Oral health-related quality of life OHRQoL*	*-racial discrimination (0) preventive dental attendance*

AUTHOR *YEAR*	*Lawrence et al -2016*(Lawrence et al., 2009)	*Mao et al-2021* (Mao et al., 2021)*)*	*Muralikrishnan et al -2021* (Muralikrishnan & Sabbah, 2021)
HOST COUNTRY AMD PARTICIPANTS	*Canada- 541* *Aboriginal pregnant women*	*U.S-3054* *Foreign-born older Chinese Americans*	*U.S-4858* *American adults*
AGE	*18 and above*	*60 and above*	*18-44*
STUDY TYPE AND SAMPLE	*Cross-sectional* *Random*	*Cross-sectional* *Convenience*	*Cross-sectional* *Random*
RACIAL DISCRIMINATION MEASURE	*An adapted version of Measure of Indigenous Racism Experiences (MIRE) instruments*	*9-item Experiences of Discrimination instrument*	*Measured using 3 items- "1. Whether they were treated at work worse, the, same or better than those from other races. 2. Whether they were treated worse, same or better than those from other races while seeking health care 3. Whether participants felt emotionally upset as a result of how they were treated because of their race"*
ASSOCIATION WITH ORAL HEALTH	*Oral health status* *Oral health-related quality of life* *Perceived need for and access to dental care* *Preventive oral health care behaviours* *Self-rated oral health*	*Oral health-related quality of life (OHRQoL)*	*Tooth loss*
RESULTS	*--racial discrimination (+) wearing dental prosthesis (-) oral health-related quality of life (+) perceived need for preventive dental care(0) access to dental care(+) asked to pay for dental service(+) dental fear(+) flossing (0) self-rated oral health*	*racial discrimination (-) Oral health-related quality of life OHRQoL*	*-racial discrimination in healthcare (+) tooth loss* *-Emotional impact of discrimination (+) tooth loss* *-discrimination at work (+)tooth loss*

AUTHOR YEAR	*Novrinda et al-2022*(Novrinda & Han, 2022)	*Sabbah et al-2019*(Sabbah et al., 2019)	*Schuch et al-2021*(Schuch et al., 2021)
HOST COUNTRY AND PARTICIPANTS	*South Korea-248 Indonesian migrant workers*	*U.S-11950 American adults*	*Australia-2798 Australian adults*
AGE	*20 and above*	*18 and above*	*18 and above*
STUDY TYPE AND SAMPLE	*Cross-sectional Convenience*	*Cross-sectional Random*	*Cross-sectional Random*
RACIAL DISCRIMINATION MEASURE	*Measured using one item- "Since your arrival in Korea, have you experienced discrimination or been treated unfairly by others because of your ethnicity, culture, race, skin color, language or accent, or religion?*	*Measured using 2 items- "1. Within the past 12 months when seeking healthcare, do you feel your experiences were worse than, the same as, or better than people of other races? 2. Within the past 30 days, have you felt emotionally upset, for example angry, sad, or frustrated, as a result of how you were treated based on your race?"*	*A modified subscale of the Measure of Indigenous Racism Experiences (MIRE)*
ASSOCIATION WITH ORAL HEALTH	*Self-rated oral health (SROH)*	*Dental service Utilization.*	*Oral health impairment*
RESULTS	*- racial discrimination (-) SROH among lower-income Indonesian migrant workers*	*-discrimination (-) dental visit last oner -emotional impact of discrimination (-) dental visit last oner*	*-racial discrimination had (+) oral health impairment (toothache, discomfort because of mouth appearance, and food avoidance due to oral health problems)*

AUTHOR YEAR	*Singhal et al-2022*(Singhal & Jackson, 2022)	*Sokoto et al-2022(*(Sokoto et al., 2022)	*Watson et al-2008*(Watson et al., 2008)
HOST COUNTRY AND PARTICIPANTS	*U.S-33925 Hispanic, non-Hispanic White, non-Hispanic Black*	*U.S-268 Black/African American women*	*U.S-812 Hispanics, non-Hispanic blacks, and non-Hispanic whites.*
AGE	*18 and above*	*18 and above*	*18 and above*
STUDY TYPE AND SAMPLE	*Cross-sectional Random*	*Cross-sectional Convenience*	*Cross-sectional Random*
RACIAL DISCRIMINATION MEASURE	*Measured using one item- "In the past 12 months when seeking health care, do you feel your experiences were worse than, the same as, or better than for people of other races?"*	*Everyday Racial Discrimination in Dental Care Scale*	*Everyday discrimination scale*
ASSOCIATION WITH ORAL HEALTH	*Dental utilization and oral health Problems*	*Dental utilization Dental fear*	*Self-rated Oral health*
RESULTS	*-racial discrimination (-) dental utilization among Hispanics (+) tooth loss among non-Hispanic Blacks*	*- racial discrimination (+) dental fear/ anxiety -dental fear/anxiety (-) dental utilization*	*-racial discrimination (0) self-rated oral health*

2.3.3 Perceived Racial Discrimination Measure

Perceived racial discrimination was measured by using validated scales in 11 studies; the other studies used one or two items in the questionnaire. Five studies used a modified version of the Measure of Indigenous Racism Experiences (MIRE) scale, which measured racial discrimination in nine different settings (Ali et al., 2021b; Ben, Jamieson, et al., 2014; Ben, Paradies, et al., 2014; L. M. Jamieson et al., 2013; Lawrence et al., 2009). One study used a modified subscale of MIRE instrument, that assessed racial discrimination across 10 settings (Schuch et al., 2021). A 9-item Everyday Discrimination Scale (adapted version) was used in two studies (Celeste et al., 2013; Watson et al., 2008). Everyday Racial Discrimination in Dental Care Scale, a 7-item scale adapted from the Everyday Discrimination scale was used in another study (Sokoto et al., 2022). Experiences of Discrimination instruments was used as a measure of racism in one study (Mao et al., 2021). Adolescent Discrimination Distress Index (ADDI), a 15-item scale designed specifically to measure racism in adolescents was used in one study (McGlumphy et al., 2019). All the included studies assessed perceived racial discrimination as reported by the participants, eight studies referred to it as perceived racial discrimination, six as self-reported racism, and four as the experiences of discrimination.

2.3.4 Study outcomes

2.3.4.1 Dental Care Utilization

Of the six studies exploring racial discrimination and the usage of dental services, four found a significant negative correlation (L. M. Jamieson et al., 2013; Sabbah et al., 2019; Singhal & Jackson, 2022; Sokoto et al., 2022). An exploratory research among Australian Aboriginals found

that self-reported racism was correlated with under-utilization of dental care (L. M. Jamieson et al., 2013). Similarly, a study on American adults found that participants who reported the emotional impact of a racially discriminatory experience in healthcare settings were less likely to utilize dental care (Sabbah et al., 2019). A US study also found that dental utilization among Hispanics was influenced by racial discrimination (Singhal & Jackson, 2022). Among Black African American women, the association between racial discrimination and dental care utilization was mediated by dental fear/anxiety (Sokoto et al., 2022). Unlike these four studies, a Canadian study on pregnant Aboriginal women reported a positive correlation and a threshold effect. Participants in this study who had experienced high levels of racism (experiences of racism in 4 to 9 settings) indicated a greater need for preventive dental care, but there was no correlation with low levels of racial discrimination (experiences of racial discrimination in 1-3 settings) (Lawrence et al., 2016). In a Brazilian study, preventive dental attendance was linked to perceived discrimination in healthcare due to other reasons such as social position, occupation, and lack of money, but no significant association was observed with racism (Junior et al., 2020).

2.3.4.2 Oral Health Problems

Seven studies explored the correlation between racial discrimination and oral health problems such as periodontitis, toothaches, and tooth loss; of them, six reported a significant positive correlation (Ben, Paradies, et al., 2014; Schuch et al., 2021; Singhal & Jackson, 2022; Calvasina et al., 2015; Muralikrishnan & Sabbah, 2021; Finlayson et al., 2018). In a US study, it was found that racial discrimination had a protective effect on the prevalence of periodontitis, although periodontitis was more prevalent among participants who had witnessed racial discrimination

towards other people (Finlayson et al., 2018). Another US study reported race-ethnic inequalities in tooth loss among non-Hispanic Black people influenced by perceived racial discrimination (Singhal & Jackson, 2022). The emotional effects of discrimination were also linked to tooth loss (Muralikrishnan & Sabbah, 2021). In a study of pregnant Aboriginal women in Australia, a sense of control acted as a mediator between self-reported racial discrimination and toothache, a threshold effect was also reported as this association was observed only for high levels of racism (racism experiences in 4-9 settings) and not for low levels of racism (racism experiences in 1-3 settings) (Ben, Paradies, et al., 2014).

An Australian study reported a correlation between racial discrimination and oral health impairment among the low socioeconomic status group (Schuch et al., 2021). They also observed a graded correlation between oral health problems and a number of incidences of discrimination. Study on immigrants in Canada also reported an increase in oral health problems with time, and this increase was linked to sex, receiving social assistance, income, and perceived racial discrimination (Calvasina et al., 2015). In contrast, the significant association reported between racial background and tooth loss in a Brazilian study was explained by socioeconomic factors rather than self-reported discrimination (Celeste et al., 2013).

2.3.4.3 Self-rated Oral Health

Five studies assessed the association of perceived racial discrimination with self-reported oral health; among them, three found a significant negative association (L. Jamieson et al., 2023; McGlumphy et al., 2019; Novrinda & Han, 2022). Poor self-reported oral health and perceived racial discrimination were significantly correlated among low-income Indonesian migrant

workers (Novrinda & Han, 2022). A similar association was also reported among African American adolescents even after accounting for age, sex, sugar intake, frequency of tooth brushing, and frequency of dental visits (McGlumphy et al., 2019). In a study on Aboriginal Australians, the combined effects of racial discrimination and negative life events were examined. It was found that participants who had both encountered racial discrimination and one or more negative life events were more likely to self-report fair or poor oral health than those who had not (L. Jamieson et al., 2023). In contrast, no correlation between self-rated dental health and racism was reported among Hispanics and non-Hispanics in a US study, even though racism was found to be significantly correlated with general health (Watson et al., 2008). Similarly, in a study among pregnant Canadian Aboriginal women, no correlation was found between self-reported racial discrimination and self-rated oral health (Lawrence et al., 2016).

2.3.4.4 Oral Health-Related Quality of Life (OHRQoL)

The relationship of racial discrimination with the OHRQoL was investigated in five studies; four found a significant negative relationship (Ali et al., 2021a; L. Jamieson et al., 2023; Mao et al., 2021; Noronha et al., 2023). Experience of discrimination was associated with poor OHRQoL among foreign-born older Chinese immigrants and this association was found to be partially mediated by resilience (Mao et al., 2021). Similarly, Indigenous Australians showed a negative correlation between interpersonal racial discrimination and OHRQoL, and this correlation was stronger for those who had encountered racism in four or more contexts (Ali et al., 2021a). Another study on Aboriginal Australians looked at the cumulative effect of racism and negative life events on OHRQoL. It found that participants who had encountered racism and one or more

negative life events were more likely to have poor OHRQoL than their counterparts (L. Jamieson et al., 2023). A study on adolescents conducted in Brazil reported that individuals who experienced racism had poorer OHRQoL and this association was also moderated by Sense of Coherence (Noronha et al., 2023). However, among pregnant Canadian Aboriginal women, high level of racism (racism experiences in four to nine settings) was significantly associated with OHRQoL scores, but this association became insignificant after adjusting for covariates such as age, psychological stress, alcohol use (Lawrence et al., 2016).

2.3.4.5 Oral Health Behaviours

Three studies looked at how perceived racial discrimination affected oral health behaviours; two of them found a negative correlation (Amin et al., 2021; Ben, Jamieson, et al., 2014). In a Canadian study, the frequency of sugar consumption was relatively higher in adolescents who experienced racial discrimination and perceived social support had no buffering effect on this association (Amin et al., 2021). Similarly, perceived racial discrimination was found to be linked to non-optimal toothbrushing behaviours among pregnant Aboriginal Australian women (Ben, Jamieson, et al., 2014). Additionally, a threshold effect was reported because this association was only seen for high levels of self-reported racial discrimination (racial discrimination experiences in 4-9 settings) and not for low-level ones (racial discrimination experiences in 1-3 settings). On the contrary, the increased flossing frequency was correlated with self-reported experiences of racial discrimination among Canadian Aboriginal pregnant women (Lawrence et al., 2016).

2.3.4.6 Mediators

Some of the included studies assessed the role of mediators to explain the association between perceived racial discrimination and oral health outcomes. Psychological stress in Aboriginal Australians was reported to mediate the impact of self-reported racial discrimination on tooth brushing (Ben, Jamieson, et al., 2014), but not toothache (Ben, Paradies, et al., 2014). Two studies also looked at the direct impact of perceived stress on oral health (Watson et al., 2008; McGlumphy et al., 2019), and one of them reported a significant association (Watson et al., 2008). The association between racial discrimination in oral healthcare with dental care utilization was mediated by Dental fear/anxiety (Sokoto et al., 2022). The role of sense of control as a mediator was assessed in two studies. Sense of control mediated impact of perceived racial discrimination on toothache (Ben, Paradies, et al., 2014), but not tooth brushing (Ben, Jamieson, et al., 2014). Another study conducted among foreign-born older Chinese immigrants reported resilience to partly mediate the association between perceived racial discrimination and OHRQoL (Mao et al., 2021).

2.3.4.7 Moderators

Social support as a moderator was reported in three studies, but none of those could establish a buffering effect of social support on the association between perceived racial discrimination and oral health (Amin et al., 2021; Ben, Jamieson, et al., 2014; Ben, Paradies, et al., 2014). Sense of Coherence was assessed as a moderator in one study, and it was reported to moderate the impact of perceived racial discrimination on OHRQol (Noronha et al., 2023).

2.3.4.8 Risk of Bias in Included Studies

The assessment of the methodological quality of the studies is presented in Table 2-3. Based on the overall rating each study earned for the sample selection, group compatibility, and outcome evaluation (*Ottawa Hospital Research Institute*, n.d.), all of the included studies attained medium methodological quality.

Table 2-3 Critical appraisal of quantitative studies.

Author year	Selection (max 5 stars)				Comparability (Max 2 stars)	Outcome (Max 3 stars)		Total
	1. Representativeness of the sample	2. Sample size	3. Non–respondents	4. Discrimination tool	1. Participants in outcome groups are comparable	1. Assessment of the outcome	2. Statistical test	
	a) Truly representative of the average in the target population. (All participants or random sampling) * b) Somewhat representative of the average in the target population. (non-random sampling) * c) No description of the sampling strategy	a) Justified and satisfactory. * b) Not justified.	a) Comparability between respondents' and non-respondents' characteristics is established, and the response rate is satisfactory. * b) The response rate is unsatisfactory, or the comparability between respondents and nonrespondents is unsatisfactory. c) No description of the response rate or the characteristics of the responders and the non-responders	a) Validated measurement tool. ** b) Non-validated measurement tool, but the tool is available or described. * c) No description of the measurement tool	a) The study controls for the most important factor (select one). * b) The study control[s] for any additional factor. **	a) Independent masked. ** b) Self-report. * c) No description.	a) Clearly described and appropriate, and the measurement of the association is presented, including confidence intervals and the probability level (p-value). * b) The statistical test is not appropriate, and not described	

Ali et al-2021(Ali et al., 2021a)	b*	*	c	**	**	*	*	8
Amin et al-2021(Amin et al., 2021)	b*	b	c	*	**	*	*	6
Ben et al-2024(Ben, Paradies, et al., 2014)	b*	b	c	**	**	*	*	7
Ben et al-2014(Ben, Jamieson, et al., 2014)	b*	b	c	**	**	*	*	7
Calvasania et al-2014(Calvasina et al., 2014)	a*	*	c	*	**	*	*	7
Celeste et al-2013(Celeste et al., 2013)	b*	*	c	**	**	*	*	8
Finlayson et al-2018(Finlayson et al., 2018)	a*	*	c	*	**	**	*	8
McGlumphy et al-2019(McGlumphy et al., 2019)	b*	b	c	**	**	*	*	7
Gioda Noronha et al-2023(Noronha et al., 2023)	a*	*	c	**	**	*	*	8
Jameison et al-2013(L. M. Jamieson	a*	b	c	*	**	*	*	6

et al., 2013)								
Jameison et al-2023(L. Jamieson et al., 2023)	a*	*	c	**	**	*	*	8
Junior et al-2020(Junior et al., 2020)	a*	*	c	*	**	*	*	7
Lawrence et al-2016(Lawrence et al., 2016)	a*	*	c	**	**	*	*	8
Mao et al-2021(Mao et al., 2021)	b*	*	c	**	**	*	*	8
Murlikishan et al-2020(Muralikrishnan & Sabbah, 2021)	a*	*	c	*	**	*	*	7
Novrinda et al-2022(Novrinda & Han, 2022)	b*	b	C	*	**	*	*	6
Sabbah et al-2022(Singhal & Jackson, 2022)	a*	*	c	*	**	*	*	7
Schuch et al(Schuch et al., 2021)-2020	a*	*	c	**	**	*	*	8

Singhal et al-2022(Singhal & Jackson, 2022)	a*	*	c	**	**	*	*	8
Sokoto et al-2022(Sokoto et al., 2022)	b*	b	c	**	**	*	*	7
Watson et al-2008(Watson et al., 2008)	a*	*	c	**	**	*	*	8

A study can be awarded one star
"*" or a maximum of two stars
"**" (representing "yes") for each numbered item within the selection, comparability, and outcome categories

2.4 Discussion

This systematic review draws attention toward a growing body of literature that explores the association between perceived racial discrimination and oral health and offers convincing evidence that perceived racial discrimination is a significant factor affecting oral health and should be acknowledged and addressed as such. This review found strong and persistent associations between perceived racial discrimination and oral health behaviours, problems, and oral health-related quality of life across different age groups, racial/ethnic backgrounds, and settings. The literature on perceived racial discrimination and oral health is quite limited when compared to research on general health. While through an extensive systematic search, we found only 21 articles, all published between 2008 and 2023, a review on racial discrimination and general health published in 2015 found 293 studies on this topic (Paradies et al., 2015a). Therefore, the correlation between perceived racial discrimination and oral health is an emerging area of investigation.

There are several mediators that may mediate the association of perceived racial discrimination with various aspects of health such as psychological stress, sense of personal control, official language proficiency, and acculturation (Polanco-Roman et al., 2016; Seawell et al., 2014). Investigating these mediators contributes to a better understanding of the mechanisms through which perceived racial discrimination may impact health. A negative psychological stress reaction might result from the experiences of perceived racial discrimination, and stress has been reported to mediate the perceived racial discrimination health outcome pathway. Studies have suggested that stress mediates the association between racial discrimination and health (Sellers et al., 2003; Williams et al., 1997). Stress can also lead to

changes in behaviour and the uptake of unhealthy behaviours (Schneiderman et al., 2005). In one study, psychological stress served as a mediator between perceived racial discrimination and smoking (Guthrie et al., 2002). The mediating effect of acculturation has also been reported for racial discrimination and general health (Urzúa et al., 2021). In our review, a significant mediating role was reported for a sense of control and psychological stress, dental fear, and resilience when the associations between perceived racial discrimination and oral health were explored.

Another covariate commonly examined with perceived racial discrimination is social support. In certain studies, it has been found that social support has a moderating effect on the associations between racial discrimination and health. However, though it has been reported in a few studies, the moderating effect of social support is not a very consistent finding. Some studies have not been able to detect a significant social support buffering effect on the association between racial discrimination and health (Y. Chen et al., 2021). In this review among the three studies assessing the role of social support as a moderator, none reported a significant correlation (Calvasina et al., 2015). Our results are consistent with those of another systematic review that examined the effects of perceived racial discrimination on health and found insufficient data to determine whether social support has a buffering effect on the correlation between perceived racial discrimination and health (Pascoe & Richman, 2009).

Few studies in our review reported a dose-response relationship with a threshold effect. A threshold effect shows a link between a risk factor and a specified outcome over the threshold value but none below it, meaning that the more contexts in which racial discrimination was observed, the more prevalent the outcome. This is consistent with other studies that have reported a threshold effect between the association of racial discrimination and health. In a

systematic review exploring the impact of racial discrimination on health, the dose-response relationship was reported in eight studies (Paradies, 2006). A dose-response relation has been reported between perceived discrimination and blood pressure (Din-Dzietham et al., 2004), as well as self-reported racial discrimination and low-birth-weight deliveries (Mustillo et al., 2004).

Among the scales used in the included studies, MIRE, EDS, and EOD scales have both been widely used in health research, and they have been shown to have good construct validity and internal reliability (Bastos et al., 2010). EDS and EOD scales have been validated across diverse ethnic groups. The 9-item EDS has been shown to have good validity and reliability (Cronbach's alpha 0.82-0.84)(Greenfield et al., 2021). The EOD scale also had good reliability (Cronbach's alpha 0.79)(Greenfield et al., 2021). ADDI scale is specifically designed for adolescents, it accesses experiences of discrimination and also measures the distress related to these experiences. The ADDI scale has also shown good reliability in previous studies (Cronbach's alpha 0.71-0.86) (Benner & Graham, 2011; McGlumphy et al., 2019). The Everyday Racial Discrimination in Dental Care Scale has been validated and has shown good internal reliability in previous studies (Cronbach's alpha 0.88-0.94) (Bird & Bogart, 2001; Peek et al., 2011)

Understanding the significance of geographic origin and regionalization linked to racial and ethnic classifications is crucial while planning research on racial and ethnic groups. Race and Ethnicities vary across different countries, reflecting diverse cultural landscapes and historical influences. For instance, studies included in this review that were based in the US focused on African American and Hispanic groups while Australian based studies were mainly on indigenous populations, and Canadian original studies involved both indigenous and immigrant populations. This diversity underscores the importance of considering local contexts and understanding the

nuanced dynamics of race and ethnicity when studying these populations and developing research and policies.

In this review, the studies examined participants' perceptions of racial discrimination, with terminology varying across the included literature. While eight studies referred to it as "perceived racial discrimination," six used "self-reported racism," and four described it as "experiences of discrimination." Additionally, terms such as "racism," "racial discrimination," "racial inequalities," and "racial bias" have also been used interchangeably in the literature. This variability in terminology reflects diverse perspectives on defining and operationalizing concepts related to racial discrimination, which may stem from disciplinary backgrounds, cultural contexts, or theoretical frameworks. However, achieving clarity in terminology while recognizing the multifaceted nature of discrimination is paramount for advancing scholarly discourse and effectively addressing racial inequality in both research and practice.

This review has certain limitations that must be acknowledged. First, the restriction to English excludes studies published in other languages. This may result in an incomplete representation of research findings, particularly from regions where publications are primarily in languages other than English. Secondly, due to the diversity of the included research, a meta-analysis could not be performed. Despite the limitations, the result of this systematic review aligns with existing research in general and mental health, contributing valuable empirical evidence on the association between perceived racial discrimination and oral health. While the nature of observational studies limits predicting causal relationships, the observed correlations underscore the significance of considering perceived racial discrimination as a social determinant of health. Consequently, there is a compelling need to institute anti-discriminatory policies that

address discrimination and racism in healthcare, medical education, and society at large. These policies are essential for fostering equity, dismantling systemic barriers, and ultimately enhancing public health outcomes. Future Research should delve into psychosocial pathways linking racial discrimination to oral health disparities while conducting longitudinal studies to gauge its long-term effects across diverse populations, fostering interdisciplinary collaborations for tailored interventions and policies to promote oral health equity.

2.5 Conclusions

In this systematic review, dental care utilization and oral health problems were the most addressed oral health outcomes in association with perceived racial discrimination. Oral health problems were positively correlated with perceived racial discrimination and dental care utilization was negatively correlated with perceived racial discrimination. Comparatively, fewer studies looked at the association of perceived racial discrimination with oral health behaviours, self-rated oral health, and oral health-related quality of life, most of them reported an inverse relationship. While existing studies demonstrate an association, understanding the underlying mechanisms is crucial for identifying effective interventions. Therefore, future research should prioritize elucidating these mechanisms to inform targeted interventions that address the root causes of disparities in oral health outcomes related to perceived racial discrimination.

3. CHAPTER THREE: PERCEIVED DISCRIMINATION, RESILIENCE, AND ORAL HEALTH BEHAVIOUR OF ADOLESCENTS WITH IMMIGRANT BACKGROUNDS

In this chapter, I will present a brief background of the literature exploring the association between racial discrimination and oral health. I will then describe the methodology of this quantitative study; this will be followed by the results. Finally, the chapter closes with a discussion of the results and the conclusion of the study.

3.1 Background

The annual immigration rate in Canada is approximately 500,000 - one of the highest per capita rates globally (*Immigration in Canada: Statistics & Facts | Statista*, n.d.). In 2021, Canada had a total of almost 8.3 million immigrants - nearly 23 percent of the population (Government of Canada, 2017). Statistics Canada projects that by 2041, about 52.4% of the population will be immigrants (Government of Canada, 2022b). Adolescents make up a substantial population of newcomers in Canada (Government of Canada, 2022b). Adolescence is an important developmental period that involves new challenges and transitions for adolescents' mental, physical, and social-emotional well-being (Sawyer et al., 2012). When immigration and acculturation collide with developmental challenges, several complicated psychodynamic processes such as forming an integrated identity, or finding coping mechanisms emerge that may affect adolescents. These processes can provide a significant developmental challenge, putting adolescents at risk for mental health problems or may lead to their resiliency, and psychological growth (Rothe et al., 2011).

Immigrant adolescents struggle with compounded challenges such as language barriers, and social integration as they adapt to a new culture, with different social structures and new peer relationships. Acculturation stress encompasses the mental and emotional difficulties individuals encounter while adapting to a new culture. The documented role of acculturation stress on the mental well-being of immigrant children and adolescents highlights its detrimental effects (Rogers-Sirin et al., 2014). Immigration stress is the psychological strain individuals experience in response to challenges associated with adapting to a new country. Immigration stress can inhibit mental well-being and identity development in adolescence (Tummala-Narra et al., 2016). First-generation immigrants are at increased risk of emotional symptoms and psychological stress. Adolescents who are second-generation immigrants and subsequent waves of migrants are also more prone to adopting unhealthy behaviours, including substance use (Hamilton et al., 2009).

A scoping review on the oral health of adolescents with immigrant backgrounds in North America reported that they often experience poorer oral health compared to their non-immigrant counterparts (Reza et al., 2016). They face limitations in accessing dental services due to language, cultural, and financial barriers (Reza et al., 2016). An Ontario study found that immigrant adolescents in Canada were five times more prone to dental caries compared to those born in the country (Locker et al., 1998). A study on immigrant adolescents in Spain highlighted socio-family vulnerability and deprivation among immigrant adolescents as factors contributing to the high prevalence of untreated dental caries in this group (Almerich-Silla & Montiel-Company, 2007). To improve oral health in adolescents with immigrant backgrounds, it is essential to study the determinants of oral health behaviours and plan intervention strategies

that target these determinants of health behaviours (Reza et al., 2016). Perceived racial discrimination is a psychosocial determinant of health, which has not been adequately investigated in relation to oral health behaviours among adolescents.

Perceived racial discrimination is characterized as the subjective perception among minority groups of unfair treatment based on race or ethnicity, often stemming from prejudice and ethnocentrism. It can occur on individual, structural, or institutional levels (Jackson et al., 1998). A study examining the perceptions of immigrant children regarding ethnic discrimination and social exclusion in Canada unveiled that around a quarter of these children encountered discrimination from their peers, both within and outside of school, due to their unique ethnic identity (Oxman-Martinez et al., 2012). According to an exploratory study of immigrants to Canada, the prevalence of racial discrimination experienced in Canada over the years 2011 to 2016 was 15.3% (Du Mont & Forte, 2016).

Perceived racial discrimination has been correlated with several mental health problems like depression, psychological distress, and anxiety, and physical health problems like hypertension, obesity, substance abuse, and self-reported poor health (Berg et al., 2011; Davis et al., 2016; Giuliani et al., 2018), and physical health problems like hypertension, obesity, substance abuse, and self-reported poor health (Forde et al., 2021; Pascoe & Richman, 2009; Stepanikova et al., 2017; Zapolski et al., 2019). Perceived racial discrimination has also been negatively associated with oral health. A Brazilian study on adults reported that perceived racial discrimination negatively correlated with preventive dental attendance (Junior et al., 2020). Fear of discrimination can hinder access to both medical and dental care among immigrants (Pollock

et al., 2012). In a study focussing on Aboriginal Australian adults, perceived racial discrimination was found to be negatively correlated with tooth-brushing and toothache (Ben, Jamieson, et al., 2014; Ben, Paradies, et al., 2014). In a study focused on Chinese adults in the US, there was an observed negative relationship between experiences of racial discrimination and oral health-related quality of life (Mao et al., 2021). Similarly, a study in Canada on adolescents reported a positive correlation between perceived racial discrimination and sugar consumption frequency (Bohlouli et al., 2023).

The theory of risk and resilience underscores the significance of identifying factors that can mitigate the negative impacts of stress and adversity on healthy development (Borucka & Ostaszewski, 2008). Resilience refers to individuals' capability to use external and personal strengths to foster growth when facing adversity. Factors that boost resilience during childhood and adolescence include having involved and caring caregivers, supportive family dynamics, and strong peer connections (Kisiel et al., 2017), religion (Revens et al., 2021), and personal characteristics such as self-regulation (Artuch-Garde et al., 2017), and coping skills (Girgis, 2020). In the context of adversity, limited promotive or protective factors can increase an individual's risk of developing psychiatric problems, depression, anxiety, and behavioural disorders (Virupaksha et al., 2014). Resilience has a significant protective role in life satisfaction and general health among immigrants (Novara et al., 2021; Wu et al., 2020). (Liu et al., 2023). In another study on American adults, resilience moderated the association between discrimination and well-being. (Cook et al., 2023). A Brazilian study on adults also revealed a positive relationship between resilience and how individuals rated their own oral health (Martins et al., 2011). In

another study of adolescents and adults in Nigeria, resilience played a significant role in moderating the link between anxiety symptoms and oral health problems (Ibigbami et al., 2023).

Adolescents with immigrant backgrounds often face unmet oral health needs, as highlighted by various studies (Bissar et al., 2007; Calvasina et al., 2014; Portero de la Cruz & Cebrino, 2020). However, there remains a significant gap in understanding what factors influence oral health behaviours within this specific population. To address this gap, our study examines the association between perceived racial discrimination and oral health behaviours in adolescents from immigrant backgrounds. Additionally, we investigate the role of resilience as a potential moderator in this connection. Understanding these dynamics can help identify the risks impacting oral health practices and shed light on the factors aiding migrants in navigating challenges post-immigration.

3.2 Methods

3.2.1 Study Setting

For this cross-sectional study, participants were recruited through community organizations closely engaged with immigrant communities, utilizing the snowball sampling technique. The study focused on adolescents aged 12 to 18 with immigrant backgrounds who could read English. Both parents and adolescents were introduced to the study by either the researcher or community workers during various community events hosted by these organizations. Prior to data collection, active consent was obtained from parents, along with assent from the adolescent participants. To ensure accessibility, the questionnaire was available in both print and online

formats. This study protocol was granted ethical approval from the University of Alberta's ethics board. (Ethics approval # Pro00119608).

3.2.2 Data Collection and Procedure

The questionnaire administered to participants included four distinct sections. The first section gathered demographic details about the adolescents and their families. The second section centered on six specific oral health behaviours, serving as the study's outcome or dependent variables. The third section assessed perceived racial discrimination and lastly, the fourth section assessed resilience.

3.2.3 Outcome Variables

In this study, outcome variables included participants' oral health behaviours and self-rated oral health. Oral health behaviours were assessed by questions asking about the participant’s use of dental services (last year), the pattern for dental attendance, tooth brushing frequency, sugar consumption frequency, and smoking. Self-rated oral health condition was assessed with a single question asking participants to rate their oral health from "very good" to "good," "fair," and "poor."

3.2.4 Independent Variables

The assessment of perceived racial discrimination utilized the Adolescent Discrimination Distress Index (ADDI), a validated 15-item questionnaire (Fisher et al., 2000). This tool gauges adolescents' stress responses linked to discrimination across peer, educational, and institutional settings. Participants were asked whether they encountered specific incidents related to race or ethnicity

and then rated their level of distress on a Likert scale from 1 (not at all) to 5 (extremely). The overall discrimination distress score was derived by totalling the item scores of all items and then dividing by 15. This gives a mean discrimination distress index for each participant ranging from 1(no distress) to 5 (extreme distress). A typical item in this scale involved scenarios such as “you were given a lower grade than you deserved”, followed by a question that how often they experienced it due to race or ethnicity.

Resilience was assessed using the Brief Resilience Scale (BRS), a validated tool consisting of six items (Smith et al., 2008). Designed to measure the perceived ability to bounce back from stress, this scale includes both positively and negatively worded statements, aiming to capture an overall sense of resilience. For instance, one item states: "I tend to recover rapidly after facing challenges." Participants rated their level of agreement using a scale from 1 (strongly disagree) to 5 (strongly agree) for positively worded items (1, 3, 5), and from 1 (strongly agree) to 5 (strongly disagree) for negatively worded items (2, 4, 6). The Resilience score was computed by totalling the item scores of all items and then dividing by 6. Scores on the BRS could range from 1 (indicating low resilience) to 5 (suggesting high resilience) (Smith et al., 2008).

3.2.5 Data Analysis

Categorical variables were depicted as percentages, while continuous variables were summarized using means, standard deviations, and ranges when applicable. T-tests were employed for continuous variables (e.g., age), and chi-square tests for categorical variables to assess the significance of demographic variables in relation to reported racial discrimination. Based on the type of variable, different types of correlation methods were used to assess the

correlation of oral health behaviour with demographics and discrimination distress score. Multivariate logistic regression, employing purposeful selection of potential confounding factors, was used to examine the association between outcomes and independent variables. An interaction model of regression analysis was utilized to explore the potential moderating effect of resilience. Statistical analysis was performed using Stata-17, and statistical significance was determined by a 95% confidence interval, with p-values less than 0.05 considered significant.

3.3 Results

3.3.1 Demographics

A total of 316 participants were recruited between June 2022 and August 2023 for this study. The participants had a mean age of 15.3 years (SD = 1.9), with a median age of 15 years (IQR: 12-18), and 56.01% of them were female. No statistically significant age difference was observed between boys and girls (p-value <0.05). Approximately 45% of the participants were born in Canada and 62.97% possessed dental insurance. According to the adolescents, 72.78% of mothers and 71.52% of fathers had a college or university education. The racial/ethnic composition comprised Indians (31.96%), Filipino (23.42%), Chinese (15.19%), Nepalese (12.34%), African (11.39%), and Others (5.70%). A comprehensive overview of participant demographics is presented in Table 3-1.

Table 3-1 Demographic characteristics of the participants (N=316)

Characteristics	n (%)	With racial discrimination (n=241)	Without racial discrimination (n=75)	p-value
Age-Mean (SD) Median (Range)	15.3(1.9) 15(12-18)	15.5(1.9)	14.7(1.9)	<0.05
Gender Female Male Prefer not to disclose	 177 (56.01) 136(43.04) 3(0.95)	 136(56.43) 102(42.32) 3(1.24)	 41(54.67) 34(45.33) 0(0.00)	>0.05
Born in Canada No Yes	 174(55.06) 142(44.94)	 137(56.85) 104(43.15)	 37(49.33) 38(50.67)	>0.05
Ethnicity Indian Filipino Chinese Nepali African Others	 101(31.96) 74(23.42) 48(15.19) 39(12.34) 36(11.39) 18(5.70)	 74(30.71) 59(24.48) 39(16.18) 22(9.13) 31(12.86) 16(6.64)	 27(36.00) 15(20.00) 9(12.00) 17(22.67) 5(6.67) 2(2.67)	<0.05
Living status Both parents Single Others	 268 (84.81) 39(12.34) 9(2.85)	 200(82.99) 33(13.69) 8(3.32)	 68(90.67) 6(8.00) 1(1.33)	>0.05
Father's education High school /less College/university Don't know	 52(17.09) 216 (71.52) 36 (11.39)	 47(19.50) 165(68.46) 29(12.03)	 7(9.34) 61(81.33) 7(9.33)	>0.05
Mother's education High school /less College/university Don't know	 66 (20.89) 230(72.78) 20 (6.33)	 53(21.99) 172(71.37) 16(6.64)	 13(17.34) 58(77.33) 4(5.33)	>0.05
Dental Coverage Yes No Don't know	 199 (62.97) 97 (30.70) 20 (6.33)	 149(61.83) 81(33.61) 11(4.56)	 50(66.67) 16(21.33) 9(12.00)	<0.05

3.3.2 Oral Health Outcomes

Analysis of oral health behaviour revealed that 45.57% of participants had a dental visit in the past year, with 65.53% of these visits being regular check-ups. Around 62% of participants brushed their teeth twice or more daily, and 73.42% consumed high-sugar foods or beverages between main meals at least once a day. More than half of the participants (57.28%) self-assessed their oral health as good. The specifics of participants' oral health behaviour are outlined in Table 3-2.

Table 3-2 Dependent and independent variables.

VARIABLES	n (%)
Utilization of dental services (last year)	
Within 12 months	144 (45.57%)
Over one year	172 (54.43%)
Pattern for dental attendance	
Regular check-up	192 (65.53%)
Dental problem	101 (34.47%)
Toothbrushing frequency (per day)	
Once or Less	120(37.97%)
Twice or More	196 (62.03%)
Sugar intake within main meals	
Never or less than every day	84 (26.58%)
Once a day or more	232(73.42%)
Self-rated oral health	
Good	181(57.28%)
Not Good	135 (42.72%)
Smoke	
No	307(97.15%)
Yes	9(2.85%)
Racial discrimination	
Yes	241(76.27%)
No	75(23.73%)
	M[SD][Range]
Total Discrimination Distress score	1.40 (0.47) (1.00-3.40)
Peer Discrimination Distress Score	1.49 (0.64) (1.00-4.20)
Educational Discrimination Distress Score	1.42 (0.60) (1.00-4.40)
Institutional Discrimination Distress Score	1.31 (0.49) (1.00-4.00)
Resilience	3.10(0.55) (1.50-4.30)

3.3.3 Perceived Racial Discrimination and Resilience

The ADDI scale was used to gauge discrimination distress. Cronbach alpha for Peer Discrimination distress, Educational Discrimination distress, and Institutional Discrimination Distress were 0.71, 0.75, and 0.76 respectively and an overall Cronbach alpha was 0.87, this indicated that the internal consistency of the set of these items being a reliable measure to measure discrimination distress scores. The prevalence of reporting racial discrimination was approximately 76%. Notably, the mean (*SD*) scores for Peer Discrimination distress, Educational Discrimination distress, and Institutional Discrimination Distress were 1.49 (0.64), 1.42 (0.60), and 1.31 (0.49) respectively (Table 2). For assessing resilience, the BRS scale was used and the mean (*SD*) scores for resilience were 3.10 (0.55). Cronbach alpha of 0.68, indicating questionable reliability of these items as a measure of resilience. (Table 3-2).

3.3.4 Oral health outcomes and demographics: univariate analysis

Table 3-3 outlines the correlation between oral health behaviours and demographic factors. Self-rated oral health exhibited a significant correlation with living status, fathers' education, and dental coverage (p-value <0.05) while tooth brushing frequency was significantly associated with living status, dental coverage, and father's education (p-value <0.05). Sugar consumption between meals demonstrated a significant correlation with, being born in Canada, living status, dental coverage, and mother's education (p-value <0.05). Furthermore, the pattern for dental attendance showed significant correlations with ethnicity, being born in Canada, father's education, mother's education, and dental coverage (p-value <0.05).

Table 3-3 Correlation of demographics and oral health behaviour.

Oral Health behaviour	Age	Gender	Ethnicity	Living with both parents	Born in Canada	Higher Mothers' education level	Higher Fathers Education level	Having Dental Coverage
Self-reported Oral Health	.05	.12	.17	.14*	.01	.09	.18*	.27*
Tooth brushing Frequency	.00	.15	.10	.18*	-.01	.09	.18*	.22*
Sugar consumption between meals	.00	.07	.27*	.18*	.12*	.13	.11	.17*
Utilization of dental services (last year)	.03	.04	.33*	.08	-.01	.09	.05	.09
Pattern for dental attendance	-.02	.14	.32*	.06	-.13*	.25*	.30*	.29*

**Significant correlation ($p < 0.05$)*

3.3.5 Perceived Racial Discrimination and Demographics: Univariate Analysis

In the univariate analysis, perceived racial discrimination exhibited a significant association with age, ethnicity, and dental coverage. Among all participants, 241 individuals reported experiencing discrimination, with a mean (SD) age of 15.5 (1.9) years, which was 1.2 years older than those who did not report discrimination (p-value <0.05). Additionally, discrimination was significantly correlated with ethnicity, with African participants reporting the highest rate at approximately 86%, followed by Chinese participants at 80.9%, while Nepalese participants reported the lowest rate at 56% (p-value <0.05). Moreover, discrimination showed a significant correlation with dental coverage. Among the 199 participants with dental coverage, approximately 75% reported discrimination, whereas among the 97 participants without dental coverage, about 84% reported discrimination (p-value <0.05).

3.3.6 Resilience and Demographics: Univariate Analysis

In the univariate analysis, resilience exhibited a significant association with ethnicity. The Resilience score was 0.23 more in Chinese as compared to Indians (p-value <0.05). The Resilience score was 0.17 less in Filipinos as compared to Indians (p-value <0.05). The Resilience score was 0.33 more in Filipinos as compared to Nepalese (p-value <0.05). The Resilience score was 0.40 more in Chinese as compared to Filipinos (p-value <0.05). Resilience was also significantly associated with the level of father's education. The Resilience score was 0.22 higher in participants whose fathers had college/university level of education as compared to participants

whose father had a high school or less level of education (p-value <0.05). Furthermore, resilience showed a significant association with discrimination. The Resilience score was 0.26 less in participants who reported discrimination as compared to those who did not report to have experienced discrimination (p-value <0.05).

3.3.7 Oral Health Outcomes and Perceived Racial Discrimination: Univariate Analysis

As shown in Table 3-4, all discrimination distress scores exhibited statistically significant correlations with oral health outcomes in the univariate analysis (p-value <0.05). Educational discrimination distress scores also had significant correlations with the pattern for dental attendance, tooth brushing frequency, and self-rated oral health. (p-value <0.05). Peer discrimination distress score demonstrated significant correlations with sugar consumption frequency, tooth brushing frequency and self-rated oral health. (p-value <0.05). Institutional discrimination distress score demonstrated significant correlations with self-rated oral health, tooth brushing frequency, and the pattern for dental attendance (p-value <0.05).

Table 3-4 Correlation of discrimination distress score and oral health behaviours.

Outcome variables	Peer Discrimination Distress score	Educational Discrimination Distress score	Institutional Discrimination Distress score
Self-rated Oral Health	-.13*	-.14*	-.17*
Tooth brushing	-.15*	-.16*	-.20*
Sugar consumption	.12*	.07	.09
Utilization of dental services	.01	-.07	.00
Pattern for dental attendance	.10	.14*	.16*

**Significant correlation ($p < 0.05$)*

3.3.8 Oral Health Outcomes and Perceived Racial Discrimination: Multivariate Analysis

The adjusted odds ratios of oral health behaviours in relation to discrimination distress are presented in Table 3-5. After accounting for dental coverage, the analysis demonstrated that self-rated oral health had a significant association with peer and institutional discrimination distress. In adjusted analysis, the odds of categorizing self-rated oral health as good decreased by 51% with one unit increase in the total discrimination distress score, after adjusting for dental coverage (OR=0.49, 95% CI: 0.29-0.81). Tooth brushing frequency also exhibited a significant association with peer, educational, and institutional discrimination distress. After adjusting for the father's education and living status, the odds of brushing teeth more than twice a day decreased by 58% with one unit increase in the total discrimination distress score (OR=0.42, 95% CI: 0.25-0.71).

Sweet consumption was significantly correlated with peer discrimination distress in univariate analysis. However, after adjusting for covariates, it was not significantly associated with the discrimination scores. In the adjusted analysis, the pattern for dental attendance was significantly associated with peer, educational, and institutional discrimination distress scores. Overall, the odds of visiting the dentist for an urgent procedure rather than a regular check-up was 2.3 times higher with one unit increase in total discrimination distress (OR=2.30: 95% CI:1.30-4.00,) after adjusting for ethnicity, Canada-born, coverage, and fathers' education.

Table 3-5 Adjusted odds ratio of oral health behaviour and discrimination distress score: multivariate analyses.

Oral health behaviors	**Peer discrimination distress** Odds ratio (95% CI)	**Educational discrimination distress** Odds ratio (95% CI)	**Institutional discrimination distress** Odds ratio (95% CI)	**Total discrimination distress** Odds ratio (95% CI)
Self-rated oral health*[a]	0.67(0.46-0.96) *	0.67(0.45-1.02)	0.49(0.29-0.81) *	0.49(0.29-0.81) *
Tooth brushing frequency*[b]	0.60(0.42-0.87) *	0.61(0.41-0.90) *	0.44(0.26-0.73) *	0.42(0.25-0.71) *
Sugar consumption frequency	1.50(1.01-2.50)	1.30(0.82-2.01)	1.70(0.89-3.22)	1.90(0.98-3.41)
Utilization of dental services	1.04(0.74-1.47)	0.78(0.54-1.13)	1.0(0.64-1.57)	0.93(0.58-1.47)
Pattern for dental attendance*[c]	1.50(1.03-2.50) *	1.60(1.06-2.50) *	2.20(1.30-2.70) *	2.30(1.30-4.00) *

*Significant association

[a] adjusted for coverage

[b] adjusted for fathers' education, living status.

[c] adjusted for ethnicity, Canada-born, coverage, and fathers' education.

3.3.9 Oral Health Outcomes and Resilience: Multivariate Analysis

As presented in Table 3-6 resilience showed a positive association with some of the oral health behaviours. The odds of categorizing self-rated oral health as good increased 3.3 times with every one-unit increase in the resilience score after adjusting for dental coverage (OR=3.30, 95% CI: 2.10-5.30). The odds of brushing teeth more than twice a day increases 2.2 times with every one unit increase in the resilience score, after adjusting for the father's education, and living status (OR=2.20, 95% CI: 1.40-3.40). The odds of visiting a dentist for an urgent procedure rather than a dental check-up were decreased by 56 %, with every one unit increase in the resilience score, after adjusting for ethnicity, Canada-born, coverage, and fathers' education. (OR=0.44, 95% CI: 0.26-0.73).

Table 3-6 Adjusted Odds ratio of oral health behaviour and resilience: multivariate analysis.

Oral health behaviors	Odds ratio (95% CI)
Self-rated oral health*[a]	3.30(2.10-5.30) *
Tooth brushing frequency*[b]	2.20(1.40-3.40) *
Sugar consumption frequency	0.66(0.41-1.06)
Utilization of dental services	1.50(0.95-2.60)
Pattern for dental attendance*[c]	0.44(0.26-0.73) *

*Significant association

[a] adjusted for coverage

[b] adjusted for fathers' education, living status.

[c] adjusted for ethnicity, Canada-born, coverage, and fathers' education.

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3.3.10 Moderation Analysis

The moderation analyses aimed to investigate how resilience influenced the association between distress from discrimination and oral health behaviours and it was conducted using resilience both as a continuous and categorical variable. In our multivariate analysis, perceived racial discrimination showed significant associations with self-rated oral health, tooth brushing frequency, and reasons for dental visits. However, our findings did not support the expected buffering effect of resilience on the association between perceived racial discrimination and oral health behaviours. The odds ratios for the interaction between perceived racial discrimination and resilience were not significant. For self-rated oral health, the odds ratio was 0.98 (95% CI: 0.33–2.90), for the tooth-brushing frequency it was 1.5 (95% CI: 0.53–4.40), and for the pattern of dental attendance, it was 0.75 (95% CI: 0.23–2.40). These results indicate that resilience did not demonstrate a significant moderating effect on the connection between perceived racial discrimination and oral health behaviours in our study.

3.4 Discussion

The primary objective of this study was to explore the association between perceived racial discrimination and oral health behaviours in adolescents while exploring the potential moderating role of resilience. Among the six oral health outcomes assessed, we found that higher levels of perceived racial discrimination was associated with reduced toothbrushing frequency, poorer self-rated oral health, and specific patterns in dental attendance. However, no significant associations emerged between perceived racial discrimination and sugar consumption or the utilization of dental services in the past year. These findings offer support to the notion that

elevated perceived racial discrimination corresponds to poorer oral health outcomes, following a pattern similar to how it negatively influences overall health (Paradies, 2006). However, our findings did not provide support for the idea that resilience acts as a moderator in the association between perceived racial discrimination and oral health behaviours.

Self-rated oral health assessments are commonly employed in research when conducting clinical examinations is not feasible for participants. This measurement is reported to be broadly associated with clinical evaluations of dental health (Heaton et al., 2017). The results of our study align with several other studies reporting that increased perception of racial discrimination was associated with a decline in self-rated oral health (Cozier et al., 2023; L. Jamieson et al., 2023). Given that experiences of racial discrimination are linked to chronic stress (Williams, 2018) and perceived stress has been linked to poorer self-rated oral health (Vasiliou et al., 2016), these results further underscore the intricate interplay between psychosocial factors and oral well-being.

Perceived racial discrimination has been consistently linked to reduced engagement in health-promoting behaviours (Brodish et al., 2011; Corral & Landrine, 2012). Our study echoed this trend, indicating that individuals who reported experiencing racial discrimination were less likely to adhere to twice daily toothbrushing habits. This outcome is in alignment with another study carried out among pregnant Aboriginal women in Australia, which highlighted that high self-reported racial discrimination associated with suboptimal tooth brushing habits; perceived stress mediated this relationship (Ben, Jamieson, et al., 2014). Not only, has decreased adoption of healthy behaviours been observed, but perceived racial discrimination has also been

associated with increased adoption of unhealthy behaviours. Several studies have demonstrated connections between perceived racial discrimination and behaviours such as smoking, alcohol consumption, and substance use (Zapolski et al., 2019). The existing body of literature suggests that individuals resort to both adaptive and maladaptive health behaviours as coping strategies when faced with the stress of discrimination (Corral & Landrine, 2012). We included smoking, as an outcome variable in our study to assess this association, but due to the limited number of participants who reported smoking in our sample, we were not able to examine this association.

The frequency of sweet consumption was significantly associated with peer discrimination distress in univariate analysis, but after adjusting for covariates, the correlation did not remain as significant. The link between perceived racial discrimination and dietary habits among adolescents shows mixed evidence in existing studies. While some studies demonstrate a negative association (Bohlouli et al., 2023; Rodrigues et al., 2022), others fail to find a clear connection (Kelly et al., 2020; Nadimpalli et al., 2017). The reason for this inconsistency is not known currently. In our sample about three quarter of the participants reported that their sugar intake between meals was once or more than once a day, but this did not correlate with racial discrimination. The lack of a significant association with perceived racial discrimination may be attributed to the influence of numerous other factors that play a more substantial role in shaping the dietary habits of adolescents (Dolatabadi et al., 2022; Neumark-Sztainer et al., 1999).

In our study, we observed no association between the utilization of dental services in the past year and experiences of racial discrimination among adolescents. It is noteworthy that

parents often bear the responsibility for ensuring their adolescents' dental attendance. Therefore, it is not surprising that we found no discernible link between adolescents' perceived experiences of racial discrimination and their utilization of dental services. Notably, existing research consistently indicates a negative association between caregivers' encounters with racial discrimination and the utilization of healthcare services for their children (Paine et al., 2018). The complex relationship between perceived racial discrimination and healthcare utilization underscores the necessity for tailored interventions that should address not only the individual experiences of caregivers but also the systemic factors that sustain health disparities. Such insights contribute to a more informed approach to healthcare policy, aiming to ensure equitable healthcare access and outcomes for all children, irrespective of their caregivers' experiences with racial discrimination.

The pattern of dental attendance in our study exhibited a significant association with perceived racial discrimination. This finding contradicts the results of another study conducted with adolescents, which failed to report a similar association (Amin et al., 2021). However, our findings align with previous research on general health. A US study reported that individuals who perceive racial discrimination are less likely to receive preventive health services (Trivedi & Ayanian, 2006). Demographically, the presence of dental insurance showed a significant association with their pattern of dental attendance. Participants with dental insurance were found to be more likely to visit the dentist for routine procedures. This observation aligns with previous studies that highlight the lack of insurance as a substantial barrier to accessing healthcare services. (Horst, n.d.; Ravichandiran et al., 2022).

While studies on racial discrimination and health have predominantly focused on risk factors, limited attention has been directed towards protective factors. In our research, we explored the potential moderating influence of resilience on the connection between perceived racial discrimination and oral health outcomes. However, our findings did not reveal any evidence of a moderating effect. The existing literature on the moderating and mediating role of resilience in the relationship between racial discrimination and health outcomes presents inconsistent findings. Some studies demonstrate these effects, such as one noting that cultural resilience mediated the adverse impact of racial discrimination on stress (Spence et al., 2016). In a Canadian study, resilience partially mediated the correlation between perceived racial discrimination and psychosomatic symptoms (Cénat et al., 2022). Similarly, resilience was reported as a partial mediator in the association between perceived racial discrimination and oral health-related quality of life among adult Chinese immigrants (Mao et al., 2021). Conversely, other studies have not found evidence of this moderating effect (Cano et al., 2023; Teixeira et al., 2015). However, it should be noted that the studies reporting the moderating effect of resilience were conducted with the adult population. Moreover, the lack of significant results in our study might be attributed to the utilization of a brief resilience assessment, which potentially did not fully capture the intricate facets of this concept. To enhance the understanding of such relationships, future investigations could consider employing more comprehensive and detailed measures of resilience (Luthar et al., 2000). The cross-sectional design may also limit the exploration of moderation/mediation effects (Maxwell et al., 2011).

Even though resilience didn't show a moderating effect in the relationship between perceived racial discrimination and oral health behaviour, our study revealed a positive

association between resilience and oral health outcomes. This aligns with findings from other research that also highlight positive associations between resilience and health outcomes (Mesman et al., 2021; Musich et al., 2022). According to a another study, children who were bullied or faced negative emotions were less resilient (Hinduja & Patchin, 2017). Similarly, in our study, we found that adolescents who reported experiencing racial discrimination were less likely to be resilient. The findings from the literature suggest that resilient children possess emotional, social, and behavioural abilities that enable them to effectively handle life's difficulties (Mesman et al., 2021). Therefore, emphasis should be laid on fostering resilience in children's development. Resilience training programs have emerged as a valuable resource that can contribute to the cultivation of resilience attributes in the younger generation (Pinto et al., 2021). These initiatives are based on cognitive-behavioural therapy and Mindfulness-based interventions that employ a diverse range of methodologies designed to effectively instil resilience traits in children like an open discussion, role plays, practical exercises, and psychoeducation elements (Joyce et al., 2018).

Our study has some limitations that need to be acknowledged. First, the cross-sectional nature of our data collection introduces constraints on our ability to explore the sequence of events and make causal inferences. Additionally, the reliance on a self-reported questionnaire for gathering data on most variables introduces the possibility of recall and desirability biases influencing the accuracy of responses. Furthermore, relying solely on self-reported data for evaluating oral health could introduce bias, and the absence of clinical measurements for oral health parameters is noteworthy. To enhance the precision of data collection in future research, integrating monitoring tools like toothbrushing and dietary charts could offer more accurate

records of toothbrushing and sugar intake frequencies. In addition, including robust clinical measures, encompassing dental caries, periodontal conditions, and other pertinent variables, would provide researchers with a more comprehensive picture of oral health.

3.5 Conclusion

Our study adds valuable evidence to the expanding pool of literature exploring the link between experiences of racial discrimination and oral health behaviours among adolescents. While perceived racial discrimination was negatively associated with self-rated oral health, toothbrushing frequency, and the pattern for dental attendance, no association was found with the sugar consumption frequency and utilization of dental services (last year). The moderating effect of resilience was not supported by our results. Further research is necessary to comprehensively investigate various dimensions of oral health, aiming to attain a more comprehensive understanding of how perceived racial discrimination intricately impacts the overall oral health behaviours of adolescents.

4. CHAPTER FOUR: DISCUSSION AND CONCLUSION

In this chapter, I first provide a summary of the study, and then discuss the interpretation and synthesis of the findings in the context of relevant literature. In the end, I address the limitations of the study, its implications, and future directions. The chapter concludes with a summary of the findings.

4.1 Discussion

The study had three main objectives: firstly, to systematically review literature exploring the association between perceived racial discrimination and oral health; secondly, to examine the association between perceived racial discrimination and oral health behaviours in adolescents from immigrant backgrounds; and finally, to examine whether resilience moderates the association between perceived racial discrimination and oral health behaviours.

Initially, we executed an extensive systematic review, meticulously scrutinizing the existing body of literature. This rigorous examination encompassed academic papers, research studies, and relevant publications to establish a robust foundation of knowledge regarding the association between perceived racial discrimination and oral health. Subsequently, we strategically designed a cross-sectional study to empirically evaluate and quantify the association between perceived racial discrimination and the oral health behaviours of immigrant adolescents and assess the moderating effect of resilience.

4.1.1 Oral Health Behaviours

An examination of the oral health behaviours among participants in our study revealed that a substantial 65.5% had undergone dental check-ups within the past year, aligning with findings from other studies highlighting the prevalence of regular check-ups among adolescents (Bohlouli et al., 2023; Dahlan et al., 2022). Additionally, approximately 62% of participants adhered to the recommended practice of brushing their teeth twice or more daily. Notably, tooth brushing frequency exhibited significant associations with living status, dental coverage, and father's education, consistent with prior research indicating a link between adolescents' tooth brushing habits and socio-demographic factors (L. Chen et al., 2020; Grado et al., 2021; Vaktskjold, 2019).

The study also brought to light that 73.4% of participants consumed high-sugar foods or beverages between main meals at least once a day. This behaviour demonstrated significant correlations with living status, dental coverage, and the mother's education. These findings echo similar trends observed in various studies on adolescents, where factors such as parental sugar intake, parental educational level, and adolescents' knowledge of health risks influenced sugar consumption (Bjelland et al., 2011; Watts et al., 2014; Zhang et al., 2022).

More than half of the participants self-assessed their oral health as good, and this perception was significantly correlated with their living status and dental coverage. The interplay between oral health behaviours and the living status of the child, whether they reside with a single parent or both parents, aligns with previous research suggesting that family composition indeed impacts the oral health behaviours of children (Kumar et al., 2017; Listl, 2011).

Overall, our analysis sheds light on the multifaceted nature of oral health behaviours among adolescents, emphasizing the interconnection between sociodemographic factors and

oral hygiene practices. Understanding these associations is crucial for developing targeted interventions aimed at promoting better oral health outcomes in this age group.

4.1.2 Perceived Racial Discrimination

The reported prevalence of racial discrimination was approximately 76%. Our racial discrimination instrument measured discriminatory experiences across three distinct contexts-peer, educational, and institutional. Remarkably, the distress score associated with peer discrimination was more than that of institutional discrimination. This pattern aligns with the findings of a comparable US study involving immigrant adolescents, where discrimination by peers exceeded that by adults (Tummala-Narra & Claudius, 2013). In our study, the prevalence mirrors this trend, underscoring the pervasive nature of peer-related racial discrimination.

Furthermore, our study revealed significant correlations between perceived racial discrimination and participants' age and ethnicity. A parallel Canadian study on immigrant adolescents also reported similar correlations of experiences of discrimination, age, and ethnicity (Bohlouli et al., 2023). These converging outcomes underscore the need for nuanced interventions addressing the multifaceted impact of perceived racial discrimination on youth. Our findings not only echo prior research but also emphasize the imperative for targeted strategies to mitigate the prevalence and ramifications of perceived racial discrimination among this vulnerable population.

4.1.3 Resilience

In our study, we used the Brief Resilience Scale to assess resilience. What caught our attention was the correlation between resilience and fathers' education levels. It was intriguing to see that children whose fathers had higher education tended to exhibit higher resilience. This sheds light on the significant role parents play in shaping their children's ability to tackle life's difficulties. Several studies support this notion, emphasizing the impact of parental influence on adolescent resilience ((Cheraghian et al., 2023; Kaniušonytė & Laursen, 2022).

Another noteworthy association emerged in our study: the relationship between resilience and experiences of discrimination. The Resilience score was less in participants who reported discrimination as compared to those who did not report to have experienced discrimination. This implies that individuals with better resilience skills are more adept at handling unfair treatment. This aligns with another study that discovered a similar trend: children who were bullied or faced negative emotions demonstrated lower levels of resilience (Hinduja & Patchin, 2017).

Overall, these findings echo a common theme present in the existing literature: resilient children possess emotional, social, and behavioural strengths that equip them to face life's challenges effectively (Mesman et al., 2021). It underscores the significance of parental influence and the development of specific skills in fostering resilience among individuals, offering valuable insights into how we can better support and nurture resilience in children and adolescents.

4.1.4 Perceived Discrimination and Oral Health Behaviours

Through our research, we concluded that the primary oral health outcomes that received substantial attention in relation to perceived racial discrimination were dental care utilization

and oral health problems. Notably, in the existing literature, there was a positive association observed between perceived racial discrimination and oral health problems, indicating that individuals who experienced perceived racial discrimination tended to have more oral health issues. This finding aligns with the findings of another systematic review that reports a similar correlation between perceived racial discrimination with mental health problems like anxiety, depression, and psychological stress (Paradies et al., 2015b). Perceived racial discrimination has also been reported to be positively correlated with physical health problems like hypertension and obesity (Dolezsar et al., 2014; Thorpe et al., 2017).

Conversely, a negative correlation was observed between perceived racial discrimination and dental care utilization, suggesting that those who encountered racial discrimination were less likely to seek dental care. This is similar to the findings of another systematic review on perceived racial discrimination and healthcare utilization reporting that experiences of racial discrimination are linked to healthcare disparities, including delays in seeking care and non-adherence to treatment plans (Ben et al., 2017). However, in our study, utilization of dental services among immigrant adolescents was not associated with the experiences of racial discrimination. Parents are primarily responsible for ensuring their adolescents' dental appointments; therefore, it is not surprising if a significant association was not found between adolescents perceived racial discrimination and their utilization of dental services.

A small number of studies in our systematic review reported a negative association between perceived racial discrimination and oral health behaviours (Amin et al., 2021; Ben, Jamieson, et al., 2014). The results of our cross-sectional study also showed a negative association between perceived racial discrimination and toothbrushing frequency. A similar

negative association of racial discrimination with health behaviours; however, has been explored and reported in several studies (Gibbons & Stock, 2017; Sims et al., 2016). Not only has decreased adoption of healthy behaviours been observed, but perceived racial discrimination has also been associated with increased adoption of unhealthy behaviours (Zapolski et al., 2019). While previous studies reported a significant association between sugar consumption frequency and perceived racial discrimination (Bohlouli et al., 2023), our analysis did not find such an association. The absence of a significant association maybe attributed to the influence of various confounding factors that have an impact on the eating habits of adolescents (Dolatabadi et al., 2022; Neumark-Sztainer et al., 1999).

Our systematic review revealed a negative association between perceived racial discrimination and self-rated oral health as well as oral health-related quality of life. In our cross-sectional study, we also found that perceived racial discrimination was negatively associated with self-reported oral health among adolescents. Notably, not only racial discrimination but also perceived discrimination based on physical appearance and disability has been associated with adverse impacts on self-reported health in a Canadian study (Du Mont & Forte, 2016). Likewise, a study on migrants in Switzerland reported that discrimination, regardless of the reason, is linked to self-reported health (Wanner & Pecoraro, 2023).

Overall, we found that perceived racial discrimination has a significant connection to self-reported oral health and oral health behaviours. People who experienced discrimination tended to report poor self-rated oral health. We also saw a link between perceived racial discrimination and unhealthy oral behaviours, like less frequent toothbrushing. Interestingly, those facing discrimination were less likely to seek routine dental care Our findings stress the need to address

discrimination's impact on oral health behaviour and encourage better access to dental care for everyone, regardless of their experiences with discrimination.

4.1.5 Role of Mediators and Moderators

When studying the effects of social determinants on health, it is essential to consider mediators and moderators. A mediator is a variable that intervenes or comes in between the independent variable and the dependent variable, aiming to explain the association between them (D. MacKinnon, 2012). On the contrary, a moderator is a variable that influences the direction and/or strength of the relationship between an independent variable and a dependent variable. (Baron & Kenny, 1986). Exploring both mediators and moderators can provide information on the pathways underlying associations between constructs and for whom or under what circumstances these associations may hold (D. P. MacKinnon & Luecken, 2008).

Through our systematic review, we found that psychological stress, sense of control, perceived stress, dental fear/anxiety, and resilience have been reported to mediate the association between perceived racial discrimination and oral health (Ben, Paradies, et al., 2014; Mao et al., 2021; Sokoto et al., 2022; Watson et al., 2008). Sense of coherence, however, was the only moderator found in this association (Noronha et al., 2023). Intriguingly, our findings from the cross-sectional study did not support the moderating influence of resilience in this context, despite resilience being positively correlated with oral health behaviours. This highlights the role of other confounding factors like family dynamics, peer pressure, academic pressure, or bullying that we cannot control in such observational studies (Albert et al., 2013; Dubey et al., 2022; Hosseinkhani et al., 2020; Langton & Berger, 2011). Also, it signifies the complex relationship that

exists between the social determinants and health, and the importance of addressing mediators and moderators in such studies to understand the pathways among these associations.

This research underscores the association between perceived racial discrimination and oral health behaviours of adolescents with immigrant backgrounds. The observed association closely resembles the relationship found between racial discrimination and general health (Pascoe & Richman, 2009), and racial discrimination and mental health (Fischer & Shaw, 1999). The results highlight the importance of exploring the social determinants like perceived racial discrimination to better understand the oral health disparity observed in the immigrant population.

4.2 Limitations of the Study

Our research has certain limitations that should be acknowledged. Firstly, the use of self-reported questionnaires introduces the potential for recall bias and social desirability bias, which could impact the accuracy of responses. To enhance data precision in future research, incorporating monitoring tools like tooth brushing and dietary records could provide more accurate information on tooth brushing and sugar consumption frequencies. Furthermore, the absence of clinical assessments for oral health parameters is another limitation of our study. Incorporating robust clinical measures encompassing dental caries, periodontal health, and other relevant variables would also offer a more comprehensive understanding of oral health.

Despite the aforementioned limitations, our study offers robust empirical evidence of the correlation between perceived racial discrimination and oral health behaviours. Our study contributed to the limited pool of literature available in this context, highlighting the significance

of examining social determinants of health in the realm of immigrants' oral health behaviours to enhance outcomes in this vulnerable population.

4.3 Implications

4.3.1 Research

Future research on perceived racial discrimination and oral health can explore several implications to advance our understanding of its impact on oral health disparities. Conducting longitudinal studies is essential to establish causal relationships and track the long-term association of perceived racial discrimination on oral health outcomes. This would provide insights about the trajectory of oral health disparities and the potential buffering role of resilience over time. Research should encompass diverse racial and ethnic populations to account for cultural variations in experiences of discrimination and resilience factors. It's important to recognize the unique challenges and strengths within different communities.

4.3.2 Policies

The research on perceived racial discrimination and oral health among immigrant adolescents has several important implications for policies and interventions that aim to address health disparities and promote oral health equity. Policies should promote and require cultural competency training for oral healthcare providers to ensure that they are better equipped to understand and address the unique needs and experiences of immigrant adolescents. This training should encompass sensitivity to issues related to perceived racial discrimination and its potential impact on oral health. Policies should focus on improving access to affordable and

culturally sensitive dental care services for immigrant adolescents. This may involve expanding public health insurance programs to cover dental services or offering dental care in schools.

Implementing school-based oral health programs can provide preventive and educational services to immigrant adolescents, it can be an effective strategy to foster good oral health practices. These programs should be culturally tailored and reach students from diverse backgrounds. Policies should support community-based organizations in their efforts to educate immigrant communities about oral health, the importance of regular dental check-ups, and how to access dental care services. These initiatives can help reduce barriers to care. Implement and enforce anti-discrimination policies in schools, healthcare settings, and other institutions that interact with immigrant adolescents. These policies should promote inclusivity and zero tolerance for discrimination based on race, ethnicity, or other factors.

4.3.2 Practice

The research findings on the impact of perceived racial discrimination on the oral health of immigrant adolescents have several important implications for clinics and healthcare providers serving this demographic. Clinics should prioritize delivering culturally competent care, which entails training staff in cultural sensitivity and increasing awareness of how discrimination can affect oral health. Healthcare providers should be equipped to handle these issues with sensitivity. Incorporate regular oral health assessments as part of standard healthcare visits for immigrant adolescents. Identifying oral health issues early can prevent more severe problems down the line.

Clinics should actively conduct community education and outreach initiatives to increase awareness about the significance of oral health and facilitate access to dental services, with a specific focus on immigrant communities. Collaborate closely with community-based organizations and support networks that can provide additional resources and assistance to immigrant adolescents. This includes information on available dental services and strategies for coping with discrimination. Ensure that clinic staff undergo continuous training to remain sensitive to the unique needs and challenges faced by immigrant adolescents. Staying updated on the latest research and best practices for addressing health disparities related to racial discrimination is essential. By implementing these recommendations, clinics can strengthen their ability to deliver culturally sensitive and effective care to immigrant adolescents, ultimately leading to improved oral health outcomes and overall well-being in this population.

4.4 Conclusions

This study enhanced our understanding of the association between perceived racial discrimination and the oral health behaviours of adolescents from immigrant backgrounds. Overall, perceived racial discrimination was found to be negatively associated with oral health behaviours. Resilience did not moderate this association. To deepen our comprehension of this complex relationship, future research should employ validated scales, integrating monitoring tools like toothbrushing and dietary charts, robust clinical measures encompassing dental caries, and periodontal conditions, longitudinal study design, and investigate other potential mediators and moderators. Further research is imperative to unveil how perceived racial discrimination

intricately influences the overall oral health of adolescents, paving the way for targeted interventions to mitigate these detrimental effects.

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Appendices

APPENDIX 1: ETHICS APPROVAL

Notification of Approval

Date:	May 19, 2022
Study ID:	Pro00119608
Principal Investigator:	Priyanka Saluja
Study Supervisor:	Maryam Sharifzadeh-Amin
Study Title:	Perceived racial discrimination, resilience, and Oral health of adolescents with immigrant backgrounds
Approval Expiry Date:	May 18, 2023

Thank you for submitting the above study to the Research Ethics Board 2. Your application has been reviewed and approved on behalf of the committee.

Approved Documents:

Letter of Initial Contact

Information letter clean

Consent Forms

Consent form CLEAN

Assent Forms

ASSENT FORM CLEAN

Questionnaires, Cover Letters, Surveys, Tests, Interview Scripts, etc.

QUESTIONNAIRE CLEAN

Protocol/Research Proposal

Research Proposal

Any proposed changes to the study must be submitted to the REB for approval prior to implementation. A renewal report must be submitted next year prior to the expiry of this

approval if your study still requires ethics approval. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

Approval by the REB does not constitute authorization to initiate the conduct of this research. The Principal Investigator is responsible for ensuring required approvals from other involved organizations (e.g., Alberta Health Services, Covenant Health, community organizations, school boards) are obtained, before the research begins.

Sincerely,

Theresa Garvin, Ph.D, MUA, BA
Chair, Research Ethics Board 2

Note: This correspondence includes an electronic signature (validation and approval via an online system).

APPENDIX 2: ETHICS RENEWAL

Notification of Approval (Renewal)

Date:	Friday, April 21, 2023
Renewal ID:	Pro00119608_REN1
Principal Investigator:	Priyanka Saluja
Study ID:	Pro00119608
Study Title:	Perceived racial discrimination, resilience, and Oral health of adolescents with immigrant backgrounds
Supervisor:	Maryam Sharifzadeh-Amin
Sponsor/Funding Agency:	University of Alberta Faculty of Medicine and Dentistry FOMD

RSO-Managed Funding:

Project ID	Title	Grant Status	Sponsor	Project Start Date	Project End Date	Purpose	Other Information
RES0061009	"Perceived Racial Discrimination, Resilience, and Oral Health of Adolescents with Immigrant Backgrounds"	Submitted		9/1/2022	3/31/2025	Grant	

Approval Expiry Date: Friday, April 19, 2024

Thank you for submitting this renewal application. Your application has been reviewed and approved.

This re-approval is valid for one year. If your study continues past the expiration date as noted above, you will be required to complete another renewal request. Beginning at 30 days prior to the expiration date, you will receive notices that the study is about to expire. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

Approval by the REB does not constitute authorization to initiate the conduct of this research. The Principal Investigator is responsible for ensuring required approvals from other involved organizations (e.g., Alberta Health Services, Covenant Health, community organizations, school boards) are obtained, before the research begins.

Sincerely,

Claire Trottier, REB Specialist, on behalf of

Dr. Ubaka Ogbogu, LLB, BL, LLM, SJD
Chair, Research Ethics Board 2

APPENDIX 3: INFORMATION LETTER

INFORMATION LETTER

STUDY TITLE: - PERCEIVED RACIAL DISCRIMINATION, RESILIENCE, AND ORAL HEALTH BEHAVIOURS OF ADOLESCENTS WITH IMMIGRANT BACKGROUNDS.

INVESTIGATOR- Dr. Maryam Amin

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Background

- Your child is asked to be a part of this study because he/she is 12 to 18 years old with an immigrant background.
- Adolescents with an immigrant background have more oral health problems as compared to native children, it can be attributed to a number of factors. In this study, we will observe the effect of perceived racial discrimination(subjective perception of unfair treatment based on race/ ethnicity) on the oral health behaviour of children
- Perceived discrimination can be associated with anxiety that can be stressful for children and this can affect their oral health behaviours like brushing frequency, sugar consumption
- We will also determine if resilience which is the coping ability of a child in a stressful situation, reduces the effect of perceived discrimination on oral health behaviours.
- Based on our results, we can plan intervention programs to enhance resilience in the children who have less resilience.

Purpose

- The purpose of our study is to assess the effect of perceived discrimination (subjective perception of unfair treatment based on race/ ethnicity) on oral health behaviours of adolescents with an immigrant background and also examine if resilience (coping ability) moderates the effect of perceived discrimination on oral health behaviours.

Procedure

- Your child is being asked to complete a questionnaire that has four sections.
- The first section will ask the child about his/her demographic information like age, sex.
- The second section will ask the child about his/her oral health behaviours like brushing frequency, frequency of sugar consumption.
- The third section will ask questions about subjective perception of unfair treatment based on race/ ethnicity.
- The fourth section will ask questions to assess their coping ability in face of adversity.

Benefits

- Your child will become aware of their oral health behaviours while answering the questionnaire.
- They would receive a $10 Tim Horton's gift card for participating in the survey.

Risks

- Participating in this study does not carry any risk or known danger for your child.
- Your child might experience some kind of discomfort while completing the third and fourth sections of the survey. The investigator will assure the participant about the confidentiality of the survey.

Voluntary participation

- Your participation as well as your child's participation in this survey is voluntary, and you may say "no" to the participant or leave the study at any time without penalty. You can also choose not to answer specific questions if you wish.
- You can withdraw from the study after 72 hours of completion of the survey by contacting the PI or student researcher. Your information will then be removed if you decide to withdraw, you would still receive the gift card, even if you withdraw midway through or after completion of the survey.
- If you choose not to participate in the study or not to answer some questions, your decision will not have any penalties for you or your child.

Confidentiality

- Your name and your child's name will not be revealed in any reports such as research papers or presentations from this study.

- Code numbers will identify documents from this study and the researchers listed above will only know these code numbers.
- Data will be kept in a safe place for a minimum of 5 years after completion of the research project and electronic data will be encrypted and when appropriate destroyed in a way that ensures privacy and confidentiality.
- You can receive a copy of a report of the research findings; you can contact any of the above- mentioned researchers if you are interested in receiving such materials.
- We may use the data we get from this study in future research, but if we do this it will have to be approved by a Research Ethics Board.

Further Information

- If you have any questions or concerns, please contact Dr. Amin at maryam.amin@ualberta.ca.
- A Research Ethics Board at the University of Alberta has reviewed the plan for this study to ensure it adheres to the ethical guidelines. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office at reoffice@ualberta.ca or call at 780-492-2615.

APPENDIX 4: ASSENT FORM

Study Title: Perceived racial discrimination, resilience, and oral health behaviors among adolescents with immigrant backgrounds

Investigators: Dr. Maryam Amin
EMAIL maryam.amin@ualberta.ca
Phone number 780-492-7354
ADDRESS: 5-513 Edmonton Clinic Health Academy, University of Alberta, Edmonton, AB, T6G 1C9

Research student: Priyanka saluja
EMAIL saluja1@ualberta.ca
Phone number 780-952-7582

What is a research study?

A research study is a way to find out new information about something. Children 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?

You are being asked to take part in this research study because we are trying to learn more about factors that affect the oral health of adolescents with immigrant backgrounds. About 380 children will be in this study.

If you join the study what will happen to you?

You are being asked to complete a questionnaire about the factors that may affect your oral health. It will take about 10 to 15 minutes to complete the questionnaire. This is only one-time participation.

Will any part of the study hurt?

This study doesn't cause any pain for you. You may feel some discomfort while answering some of the questions. If it happens, please let us or your parents know and we will help you.

Will the study help others?

This study might help create awareness about the oral health behaviours of the child.

You will find out about oral health behaviours.

Do you have to be in the study?

You do not have to be in the study. It's up to you. No one will be upset if you don't want to do this study. If you join the study, you can change your mind and stop being part of it at any time. All you have to do is tell us. It's okay, the researchers and your parents won't be upset.

What choices do you have if you say no to this study?

This study is extra, so if you don't want to do it *nothing else will change.*

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.

Who will see the information collected about you?

The information collected about you during this study will be kept safely locked up. Nobody will know it except the people doing the research.

The information about you in the questionnaire will not be given to your parents. The researchers will not tell your friends or anyone else.

You and your parents will find out about your oral health behaviors.

What if you have any questions?

You can ask any questions that you may have about the study. If you have a question later that you didn't think of now, either you can contact or have your parents contact Dr. Amin at maryam.amin@ualberta.ca.

Other information about the study:

- If you decide to be in the study, please write your name below.
- You will be given a copy of this paper to keep.
- In case you are able to give informed consent during the study based on your age, you will be asked for signing it.

,

Yes, I will be in this research study. No, I don't want to do this.

Child's name	Signature	Date
Person obtaining Assent	Signature	Date

- *"If the child is not able to read the assent form, and verbal assent is obtained using the content in the assent form, the person obtaining assent should place in the chart or research record a statement with the following content.*

I have discussed this research study by ..... using language which is understandable and appropriate for the participant. I believe that I have fully informed him/her of the nature of the study
and its possible risks and benefits. I believe the participant understood this explanation and assent to participate in this study.

Person obtaining Assent Signature Date

APPENDIX 5: CONSENT FORM

CONSENT FORM

Title of Project: PERCEIVED RACIAL DISCRIMINATION, RESILIENCE, AND ORAL HEALTH BEHAVIOURS OF ADOLESCENTS WITH IMMIGRANT BACKGROUNDS

Principal Investigator: Dr. Maryam Amin
EMAIL: maryam.amin@ualberta.ca
Phone number 780-492-7354
ADDRESS: 5-513 Edmonton Clinic Health Academy, University of Alberta, Edmonton,
AB, T6G 1C9
Research student- Priyanka Saluja
EMAIL: saluja1@ualberta.ca
PHONE: 780-952-7582

(To be completed by the parent of the child participant):

Yes No

Do you understand that you and your child have been asked to participate in a research study? ☐ ☐

Have you read and received a copy of the attached Information Sheet? ☐ ☐

Do you understand the benefits and risks involved in taking part in this research study? ☐ ☐

Have you had an opportunity to ask questions and discuss this study? ☐ ☐

Do you understand that you are free to withdraw from the study
Within 72 hours after completion of the questionnaire without having to give a reason?

☐ ☐

Has the issue of confidentiality been explained to you? ☐ ☐

Who explained this study to you? _

Your _____ Name

Your _____ child's Name _

I agree my child can participate in this study YES ☐ NO ☐

Signature/:___ Date & Time _____ _

(Printed Name)_____

Signature of Witness__ Date & Time _____ _

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate in the research.

Signature of Investigator or Designee _ _ _ _ _ _ _ _ _ _ _ _ _ Date & Time _____ _

A COPY OF THIS CONSENT FORM MUST BE GIVEN TO THE PARTICIPANT.

APPENDIX 6: QUESTIONNAIRE

Part 1: Demographic Data (Adolescents)

1. Date of birth: ____/____/_____ (mm/dd/yyyy)
2. Which grade are you in? Grade _____
3. Sex assigned at birth: □ Male □ Female □ intersex □ prefer not to disclose
4. Were you born in Canada? □ Yes □ No
5. When did your family arrive in Canada? _____ (YEAR) □ I don't know
6. What is your family race/ethnicity background? _____
7. Are you living with? □ Both parents □ Single parents □ Other, specify _____
8. What is your mother's education level?

□ Less than high school □ High school □ College/University □ I don't know

9. What is your father's education level?

□ Less than high school □ High school □ College/University □ I don't know

10. Do you have a dental coverage? □ Yes □ No □ I don't know

Part 2: Oral Health Behaviors

1. How do you think your oral health is?

□ Very good □ Good □ Fair □ Not good □ Poor

2. When was the last time you visited a dentist or dental hygienist?

□ Within the last 12 months □ Over one year □ Never had one

3. If you had a dental visit, what was (were) the reason(s)? (Check all that apply)

□ Regular check-up □ Non-urgent dental problems □ Urgent dental problems

□ Others (please specify) _____

4. How many times a day do you brush your teeth?

□ Less than once a day □ Once □ Twice □ More than twice

5. How often do you consume foods or drinks (for example juice, pop, candies, cookies, etc.) high in sugar?

□ Never □ Less often than everyday □ Once a day □ Twice day
□ Three times a day or more often

6. Do you smoke? □ Yes □ No

Part 3: Adolescent Discrimination Distress Index

Number	Questions	Have you experienced this because of race or ethnicity?	If you had experienced this, did it upset you?				
			Not at all	Slightly	Moderately	Considerably	Extremely
1	You were discouraged from joining an advanced-level class.	Yes / No	1	2	3	4	5
2	You were wrongly disciplined or given after-school detention.	Yes / No	1	2	3	4	5
3	You were given a lower grade than you deserved.	Yes / No	1	2	3	4	5
4	You were discouraged from joining a club.	Yes / No	1	2	3	4	5
5	Others your age did not include you in their activities.	Yes / No	1	2	3	4	5
6	People expected more of you than they expected of others your age.	Yes / No	1	2	3	4	5
7	People expected less of you than they expected of others your age.	Yes / No	1	2	3	4	5
8	People assumed your English was poor.	Yes / No	1	2	3	4	5
9	You were hassled by police.	Yes / No	1	2	3	4	5
10	You were hassled by a store clerk or store guard.	Yes / No	1	2	3	4	5
11	You were called racially insulting names.	Yes / No	1	2	3	4	5
12	You received poor service at a restaurant or store.	Yes / No	1	2	3	4	5
13	People acted as if they thought you were not smart.	Yes / No	1	2	3	4	5

14	People acted as if they were afraid of you.	Yes / No	1	2	3	4	5
15	You were threatened	Yes / No	1	2	3	4	5

Part 4: BRIEF RESILIENCE SCALR (BRS)

Please respond to each item by marking <u>one box per row</u>		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
BRS 1	I tend to bounce back quickly after hard times	1	2	3	4	5
BRS 2	I have a hard time making it through stressful events.	5	4	3	2	1
BRS 3	It does not take me long to recover from a stressful event.	1	2	3	4	5
BRS 4	It is hard for me to snap back when something bad happens.	5	4	3	2	1
BRS 5	I usually come through difficult times with little trouble.	1	2	3	4	5
BRS 6	I tend to take a long time to get over setbacks in my life.	5	4	3	2	1

APPENDIX 7: PERMISSION TO USE VALIDATED SCALE