Health Literacy: Knowledge and Experiences of Iranian Registered Nurses

by

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Abstract

Background: Health literacy is a robust determinant of an individual's health status which in turn influences population health and the healthcare system. Based on Social Cognitive Theory (SCT) limited health literacy (LHL) is a source of health disparity if healthcare providers are not able to manage it appropriately. Almost 70% of Iranian adults over 18- year old have LHL skills. Nurses make up the largest group of healthcare professionals that have the greatest potential to decrease the adverse effects related to LHL including health disparity. The purpose of this study was to examine Iranian registered nurses' knowledge and experience of health literacy applying quantitative measures.

Methods & Materials: This study applied a cross-sectional design providing a quantitative or numerical description. The target population for the study was all the registered nurses with baccalaureate nursing degrees or master's degrees currently practicing in university hospitals and community health centers affiliated with Tehran University of Medical Science in Tehran, the capital city of Iran. Data was collected using the self-administered Health Literacy Knowledge and Experience Survey (HL-KES). The HL-KES was developed originally in the United States to examine knowledge of and experience with health literacy in the nursing profession. In this study the HL-KES was adapted and validated for the Iranian context, using the guideline on cross-cultural adaptation in health research. The adapted HL-KES was delivered through either Survey Monkey or in person to registered nurses working in hospitals and community health centers affiliated with the Tehran University of Medical Science, Tehran, Iran. In the current study, internal consistency reliability was assessed and reported using Cronbach's alpha.

Findings: Total samples of 190 Iranian registered nurses were included in the final analysis. Data analysis was completed using SPSS software. Univariate analysis showed that Iranian registered nurses have limited knowledge about health literacy, most noticeably in these areas: standards for written healthcare information and common screening tools to measure health literacy. The participants also demonstrated limited experience in using health literacy screening tools, evaluating the written healthcare materials, and employing technologies in providing healthcare information. Bivariate analysis identified that there is a weak negative association between participants' knowledge and experience with health literacy. To identify the factors which could predict Iranian registered nurses' knowledge of health literacy, multivariate analysis was used. A multiple linear regression analysis indicated that 0.9% of the variation in Iranian registered nurses' knowledge of health literacy was explained by the frequency of their interaction with healthcare professionals for personal reasons.

Conclusion: Although the factors for limited knowledge and experience with health literacy were not assessed in this study, nurses' limitation should not be considered as individual weakness without considering the Iranian healthcare system capacities to support healthcare professionals with health literacy activities. Some recommendations, mostly at administrative levels, were proposed to close the gap, based on the existing information; however, more investigations must be designed to shed light on barriers and facilitators for nurses to improve their knowledge and experience with health literacy.

Preface

This dissertation developed based on an original work of Maryam Nesari. The study was commenced after receiving ethics approval from the University of Alberta, Edmonton, Canada and Tehran University of Medical Sciences, Tehran, Iran. In the University of Alberta, this study titled *"Iranian Registered Nurses Knowledge and Experience with Health Literacy"*, no Pro00056363, was approved on July 29, 2015 and in Tehran University of Medical Sciences, under the same title, no 94-02-28-29020-1, the study was approved on May 05, 2015. I, Maryam Nesari, was responsible for data collection, and data analysis. Dr. Joanne Olson and Dr. Beverly Williams, as supervisors, gave me supervisory inputs during all phases of the project including writing of the dissertation. Dr. Beverly Williams retired in July 2016; Dr. Joanne Olson remains in her position as supervisor. Dr. Alireza Nikbakht Nasrabadi from Tehran University of Medical Sciences, Tehran, Iran supported me with obtaining ethics approval from Tehran University of Medical Sciences and the process of data collection.

Dedication

This dissertation is dedicated to my mother (Afagh) and my brother (Ahmad) for all their support and encouragement through my entire life which enabled me to pursue my dreams and successfully reach my goals.

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Chapter 1: Introduction

Introduction

In an attempt to consider people as partners in their healthcare, several initiatives have been developed and tested to support people so that they can make informed decisions. Healthcare initiatives such as self-management programs and empowerment strategies are designed to enable people to manage their illnesses, feel more control over their health and experience improved health outcomes. Despite this, as healthcare systems have become more complex, barriers to quality care and patient involvement in healthcare decision making have grown. However, limited literacy and, in particular, inadequate health literacy, have been recognized as modifiable barriers. Reducing these barriers will help people to function within the healthcare system, self-manage their illnesses and serve as an active agent in managing their illnesses (DeWalt, Berkman,Sheridan, Lohr, & Pignone, 2004).

Health literacy was originally defined as a "constellation of skills including the ability to perform basic reading and numerical tasks required to function in the healthcare environment" (American Medical Association Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999, p 553). It should be noted that the terms "literacy" and "health literacy" might be used interchangeably in some literature. However, health literacy is considered as the application of literacy skills in the health context. Consequently, three types of health literacy have been defined to describe practical applications of the different levels of literacy skills: functional health literacy, interactive health literacy and critical health literacy. Functional or basic health literacy refers to applying basic reading, writing and numerical tasks to function in the healthcare system (American Medical Association Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999). Interactive health literacy refers to using more advanced literacy and social skills to interact with multiple sources of health information and then use them in the process of making health decisions. Critical health literacy incorporates advanced cognitive and social skills to critically analyze obtained information; this will help individuals to change existing circumstances and feel more control over their health situation (Kwan et al., 2006; Nutbeam, 2008).

The early definition of health literacy presented the concept as a quality of an individual (American Medical Association Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999), while recently it has been considered a shared function of the

individual and the healthcare systems (Baker, 2006; Nielsen-Bohlman, Panzer, & Kindig, 2004; Nutbeam, 2008). Initially health literacy was considered a relatively stable individual quality which can be improved by education or can decline due to cognitive deficiency (Baker, 2006). However, later it was acknowledged that health literacy is the product of interaction between the individual and the healthcare context. The value for health literacy, in this case, varies across different healthcare settings based on the complexity of the context and communication skills of the healthcare professionals (Al Sayah & Williams, 2012; Kwan, Frankish, & Rootman, 2006; Nielsen-Bohlman et al., 2004; Nutbeam, 2008).

In this study, health literacy is considered to be an outcome of the interaction between healthcare professionals and individuals. From this perspective, health literacy is not limited to the ability to make an appointment with a care provider or reading medication labels. Health literacy is considered a developing quality enabling individuals to interact with healthcare professionals in order to obtain and understand health care information and make health care decisions.

 Based on this, the primary focus in the healthcare system to tackle the ever-increasing crisis of limited health literacy should target health care providers. Nurses, the largest group of healthcare professionals who spend the most time with clients, are well positioned to contribute to improving health literacy. It is imperative to increase nurses' awareness of the magnitude of the issue of limited health literacy and improve their ability to evaluate people's level of health literacy and utilize appropriate strategies for working with people with low health literacy. Assessing and improving individuals' ability to access, understand, and interpret health information to make informed decisions needs to be considered a crucial part of health promotion and healthcare measures in both acute and chronic care.

North America was a pioneer in the initiation of this movement by conducting studies examining nurses' and other health care professionals' knowledge of health literacy (Speros, 2011). More than half (55 percent) of adults in Iran have inadequate health literacy (Tehrani Banihashemi et al., 2007). As a result, they face debilitating challenges when being cared for by healthcare providers who are not prepared to offer appropriate written material and oral communication (Knight, 2011). To my knowledge, there is no study that examines nurses' knowledge of and experience with health literacy in Iran.

Purpose of the Study

The purpose of this study was to examine Iranian nurses' knowledge of and experience with health literacy using the HL-KES.

Statement of the Problem

Health literacy is a robust determinant of individual's health status and mortality (DeWalt et al., 2004). It is a stronger indicator of health status than usual predictors such as age, ethnicity, and socioeconomic status (Parker, Ratzen, & Lurie, 2003). Limited health literacy can be debilitating and a potent source of health disparity, especially when individuals encounter healthcare providers who are not prepared to recognize and manage limited health literacy in their clients (Knight, 2011).). Health literacy needs to be optimal in order to reduce health disparity (Logan, 2007; Nutbeam, 2000, Logan et al., 2015). More than 55% of Iranian adults aged 16 years and over have inadequate health literacy (Tehrani Banihashemi et al., 2007); for the elderly (over 65 years), the figure is reported to be 79.6% (Javadzade, Sharifirad, Radjati, Mostafavi, Reisi, & Hasanzade, 2012). Considering that health literacy in a society is a shared responsibility of both individuals and the healthcare system, it is imperative to explore nurses' knowledge of health literacy.

Significance of the Study

Healthcare systems worldwide are becoming more complex and are changing dramatically. More responsibility is being placed on the public to self-manage their illnesses and navigate complex healthcare systems. These modifications require people to have advanced literacy and cognitive skills to be able to access and understand health information to make informed decisions. A person's health literacy is ultimately contingent upon the individual's capacities, the complexity of the healthcare system and also on the quality of information received from healthcare providers (Baker, 2006; Paasche-Orlow & Wolf, 2007). Improving population health literacy requires the involvement of several sectors of society, including early education, adult education and healthcare providers (Nutbeam, 2008). The result of this study have implications in practice, research and policy:

Practice implications. The information acquired through this study will be useful to inform Iranian registered nurses and nursing managers of their educational needs related to health literacy in five content areas: basic facts on health literacy, consequences associated with low health literacy, health literacy screening, guidelines for written health care materials, and

evaluation of the effectiveness of health care. This study will be the first step in taking initiatives to address the educational needs of Iranian nurses related to health literacy.

Research implications. Since the field of health literacy is in the early stages of development in Iran, one of the initial steps should be evaluating healthcare providers' knowledge of health literacy. This study has generated baseline information for future research on health literacy. It will contribute as a first step to eventually mitigating the outcomes of limited health literacy in Iran.

Policy implications. Understanding Iranian nurses' educational needs in the field of health literacy is the foundation for any interventions aiming to enhance their knowledge and skills in the area of health literacy for the general population. These interventions might be established at the university level by changing the nursing curriculum or incorporating health literacy in continuing education programs for nurses.

Research Questions

The following research questions were addressed in this cross-sectional study, using a quantitative self-reporting survey:

1. What is the level of health literacy knowledge among Iranian registered nurses as measured by the Health Literacy Knowledge and Experience Survey?

2. What are the health literacy experiences of Iranian registered nurses as measured by the Health Literacy Knowledge and Experience Survey?

3. Does a relationship exist between the level of health literacy knowledge and the health literacy experiences of Iranian registered nurses?

4. Is there any variation in the health literacy knowledge level of Iranian registered nurses? If there is a variation, which of the following variables can explain that, Iranian registered nurses' age, gender, level of nursing education, years of nursing practice , areas of practice, prior work experience (other than nursing) in the healthcare system, and frequency of interaction with healthcare providers for personal needs.

Assumptions

      This study was conducted based on the following assumptions:

- Iranian registered nurses would respond to the survey honestly and reflect their actual health literacy knowledge and experiences.

- Iranian registered nurses would understand the study instrument and provide appropriate responses.

- Iranian registered nurses would respond to the health literacy knowledge questions without using health literacy reference materials.

Limitations

      The findings of this study are limited to information gathered by The Health Literacy Knowledge and Experience Survey (Cormier, 2006) and to information gathered from registered nurses practicing in hospitals and community health centers in Tehran. Therefore, generalizing the findings to the entire population of Iranian registered nurses should be exercised with caution.

Definition of Terms

<u>**Literacy**</u> is "the ability to use printed and written information to function in society" (Kutner, Greenberg, Jin, & Paulsen, 2006).

<u>**Health Literacy**</u> "represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand, and use information in ways that promote and maintain good health" (Nutbeam, 1998, p. 10).

<u>**Limited Health Literacy (inadequate or poor health literacy)**</u> is health literacy below level three in the National Adult Health Literacy Survey (Williams et al., 1995). This level does not include skills which are necessary to obtain, process, and understand health care information and utilize it to make health decisions.

<u>**Iranian Registered Nurses**</u> are individuals who have graduated from a four-year baccalaureate nursing program and are employed as registered nurses in hospitals and community health centers in Iran.

Health Outcomes are indicators which provide a quantitative basis of measurement for clinicians, organizations, and planners who want to improve patient care and the processes by which it is provided (Mainz, 2003).

Health Status is a concept that includes more than the presence or absence of any disease. It includes measures of functioning, as well as physical and mental wellbeing (Australian Institute of Health and Welfare, 2015).

Health Disparity or Health Inequality is used to describe differences in health status or inequality in the distribution of determinants of health between diverse population groups: for instance, the difference in the mortality rate among people from different social classes (World Health Organization, 2015).

Summary

In the current, fast-evolving healthcare system, limited health literacy has been recognized as an impediment for people trying to improve their health status and maintain good health. Inadequate health literacy skills influences both an individual's health indicators and the healthcare system by increasing hospitalization rates and healthcare costs. Also inadequate health literacy can lead to health disparity if healthcare providers are not aware of how to manage it. Nurses, as the largest healthcare professional group who spend the most time in direct contact with their clients, have the potential to improve health literacy levels and decrease the impacts of limited health literacy.

This study was designed to examine Iranian nurses' knowledge of and experiences with health literacy. Chapter 1 has presented an introduction to the study topic. Chapter 2 provides a review on the relevant literature. Chapter 3 explains the study methods. Chapter 4 includes the study findings and Chapter 5 is a discussion of the findings.

Chapter 2: Literature Review

Introduction

This chapter presents an introduction to general literacy; a review of the current literature about health literacy history and definitions, low health literacy prevalence and the associated factors; the consequences associated with low health literacy; health care professionals' knowledge of health literacy with a focus on the nursing profession; and the theoretical framework underpinning this study. It also provides information about the study context in relation to the Iranian healthcare system, and nursing and patient education in Iran.

General Literacy

For nearly two decades, limited general literacy has been correlated with poor self-reported health status (Billek-Sawhney & Reicherter, 2005), and difficulty in understanding health information, the latter of which leads to insufficient health knowledge and frustration in navigating the healthcare system (Andrulis & Brach, 2007). Limited general literacy is defined as an individual's inability to read, write and speak, and process basic math calculation at the level required to function in society (Kirsch, 2001) and is presented as a "silent disability" affecting all nations (Erlen, 2004). Limited general literacy, which was once considered an individual problem, is now recognized as a concern in terms of its implications on society (Kirsch et al., 1993) and in particular, in healthcare. More than 50% (90 million) of the adult population in the United States (US) were identified at the lowest level of proficiency (level 1 and 2) in prose, document, and quantitative literacy in the US 1991 National Adult Literacy Survey (NALS), showing that they are less likely to be able to handle challenging literacy tasks required to function in daily life. Surprisingly, the majority of participants in these categories described themselves as being able to read and write English well.

The NALS, funded by the US Department of Education, provided the most detailed report on literacy levels in that country. The study expanded the traditional view of an individual's literacy as a dichotomous variable (illiterate/ literate) and applied a novel approach to measuring literacy skills. The national panel of experts assembled for NALS offered a comprehensive and multi-faceted definition of literacy: "Using printed and written information to function in society, to achieve one's goals, and develop one's knowledge and potential"

(Kirsch et al., 1993, p. 2). This definition undermines the notion of determining an individuals' literacy level by considering their years of school or grade level scores.

In an attempt to describe the level of English literacy proficiency needed to function in society, the project measured study participants' performances on a wide range of tasks using the types of materials people encounter during their daily lives. The study adopted three scales to measure prose literacy, document literacy and quantitative literacy; in each category participants were scored between 0 and 500. Prose literacy includes knowledge and skills needed to comprehend and use continuous text, such as brochures and instructional information. Document literacy refers to knowledge and skills needed to understand and apply non-continuous text, such as job application forms, transportation schedules, tables and graphs. Quantitative literacy signifies knowledge and skills related to performing computation (Kirsch et al., 1993).

The results of this project drew the attention of policy makers in education sectors and the healthcare community. There was a sense that people with inadequate general literacy are less likely to function in a healthcare system, as basic general literacy is required for health literacy. It can also be concluded that limited health literacy can affect a high percentage of any population, when people face the complex and fast-evolving healthcare systems (Kwan et al., 2006). The efforts to assess and mitigate the consequences of limited general literacy in healthcare accelerated in 2006, when the results of the second NALS report showed no improvement in US literacy levels. The results of these national assessments of the US adult literacy in 1991 and 2003 were consistent in that they reported a direct correlation between an individual's years of education and literacy levels (Kirsch et al., 1993; Kutner, Greenburg, & Baer, 2006). Nevertheless, 13% of high school graduates participating in the survey in 2003 were identified as not having basic skills in prose and document literacy. This data suggests that it is not valid to assume that because a person has x number of years of education, they will have the ability to function proficiently in the healthcare system (Cormier, 2006).

Health Literacy History and Definitions

The term "health literacy" appeared in the literature for the first time in 1974 (Ratzan, 2001). However, it became an area of investigation, as a major health problem, after dissemination of the results of the 1992 National Adult Literacy Survey (NALS) in the United States (US). The survey indicated that 40-44 million American adults (16 years old and over) were categorized at the lowest level of literacy, not being able to function in society (Kirsch,

Jungeblut, Jenkins, & Kolstad, 1993). The implications of the NALS findings in the healthcare area prompted numerous scholarly works that defined, conceptualized and measured health literacy in the US population. The research was based on the assumption that more sophisticated literacy and cognitive skills are required for individuals to function in highly technical and rapidly evolving healthcare environments. This movement was initiated by the work of Williams et al. (1995), who assessed health literacy of patients in two hospitals. This study was followed by endeavours from various sources to develop a comprehensive definition of health literacy and to further develop the concept.

Health literacy is a relatively new concept which has been evolving in scope and depth during the last three decades (Baker, 2006). It is an appealing subject of research, particularly in the area of health promotion and self-management in chronic illnesses. It is evident that health literacy is a stronger indicator of a person's health status than usual predictors such as age, ethnicity, and socioeconomic status (Williams, Baker, Parker, & Nurss, 1998; Parker, Ratzen, & Lurie, 2003), and level of education (Baker et al., 2007). There is some evidence showing direct and indirect associations between individuals' health literacy skills and the knowledge of their diseases, the amount of effort they put into changing their lifestyles, their overall health outcomes, and their medical costs (Baker, 2006). Those with poor health literacy have limited knowledge of chronic diseases (Paasche-Orlow & Wolf, 2007), limited access to health information, less ability to self-manage illness (De Walt et al., 2004). They also acquire higher medical costs (Howard, Gazmararian & Parker, 2005), and have a higher mortality risk (Paasche-Orlow & Wolf, 2007).

Health literacy has drawn even more attention since the US Department of Health and Human Services (DHHS) presented improving people's health literacy levels as a part of the actions of "Healthy People 2010" (Sebelius, Frieden, & Sondik, 2012). Inaugurated in November 2000, "Healthy People 2010" was an initiative to realize improved health for all US citizens. Addressing health inequality was one of the two objectives of "Healthy People 2010" for which the improvement of health literacy skills was a defined action. Among other social determinants of health, health literacy was presented as a central factor that needed to be improved as part of the overall effort to address the issue of health inequality in the US (Nutbeam, 2008; WHO Commission on the Social Determinants of Health, 2007).

There is a massive body of literature about measuring health literacy, examining its association with health outcomes, exploring interventions aimed to improve this variable and estimating the cost of low health literacy on healthcare systems. Nevertheless, there is still noticeable debate about defining the concept, and measuring and determining the main domains of the concept. This leads to confusion in translating research findings into practice (Pleasant et al., 2016). This discrepancy is partly due to the natural process of concept evolution (Baker, 2006). However, looking at health literacy from different perspectives could change the way it is conceptualized and operationalized (Nutbeam, 2008).

The concept of health literacy was first used in health education literature in 1974 (Simonds, 1974). However, health literacy studies were not initiated in the US until the early 1990s (Speros, 2011), after the publication of the NALS results showing that a high percentage of US citizens lack adequate literacy skills to function in society. The initial health literacy studies were grounded on the original definition of this concept. This definition, known as functional health literacy, presented health literacy as a set of individuals' basic reading and computational competencies needed to perform health-related tasks (Williams et al., 1995) such as reading and comprehension of prescriptions labels, appointment cards, directions for home self-care, and other health-related materials. Building on the definition of functional health literacy the most common measurement tools are the Test of Functional Health Literacy in Adults (TOFHLA) and the Rapid Estimate of Adult Literacy in Medicine (REALM). TOFHLA assesses vocabulary and REALM assesses numeracy. Although the tests use two distinct domains to quantify health literacy their results are highly correlated (Baker, 2006).

Ratzan and Parker (2000) offered new insight into the concept of health literacy, which resulted in more debate. They presented the health literacy as "the degree to which individuals have the capacity to obtain, process and understand basic health information and services needed to make appropriate health decisions" (p. 4), which is equivalent to the definition of "interactive health literacy" given by Nutbeam (2000). This definition, that is the most cited one, has adopted by the Institute of Medicine's report Health Literacy: A Prescription to End Confusion (IOM, 2004) and department of Health and Human Services in 2000 to be used in Healthy People 2010. Based on this definition, individuals are supposed to possess more complex cognitive capacities and communication skills in order to extract health information from different resources and

process them. By doing this individuals would be able to change their existing health situations rather than try to adhere merely to the given prescriptions.

This definition still focuses only on individual capacities in shaping health literacy. However, from the interactive nature of the process through which individuals gain access to and process health information, it is implied that health literacy level is contingent on not only the cognitive functions of individuals, but on the communication skills of both individuals and healthcare professionals. Further, as Baker (2006), Paasche-Orlow and Wolf (2007) and Nutbeam (2008) argued, if health literacy is the ability to perform within "the healthcare environment" it should depend on both individual's capacities and healthcare characteristics. In fact, health literacy is a multidimensional concept, and it depends on individuals' abilities, as well as the context demands and complexities. The individuals are patients and their family members, and the context might be health care providers, protocol developers, insurance organizations, pharmaceutical companies, and other health related systems (Pleasant et al., 2016). Accordingly, an individual's health literacy is a "dynamic state" which differs across the variety of health care settings, health issues with which, and healthcare providers with whom individuals interact. Consequently, in the model of health literacy offered by Baker (2006), Paasche-Orlow and Wolf (2007), and Al Sayah and Williams (2012), healthcare characteristics were considered as a factor influencing individual's health literacy ability.

The new definition of health literacy, which is broader in scope, questioned the adequacy of the most common measurement tools such as TOFHLA and REALM, which assess only selected domains of reading and vocabulary, while ignoring individual communication skills. Given the definition of health literacy offered by IOM, Baker (2006) further challenges the existing health literacy measurement tools for their focus only on individual capacities. He noted that if health literacy is a capacity to function in the healthcare environments, the final outcome depends on both the characteristics of the person and the healthcare system. Looking from this view, the existing measurement tools overlooked the variables related to the complexity of healthcare system that impose direct and indirect communication demands on individuals. Baker also raised the question of whether assessment of the individuals' prior knowledge about their health issues is required as a part of the individual`s health literacy.

To address these issues, Baker (2006) offered a conceptual model through which he illustrated the relationship between individual's capacities (reading fluency and prior

knowledge), health related oral and print literacy and health outcomes. Accordingly, he elucidated how health literacy depends on both the individual and the healthcare system characteristics, and can lead to greater self-efficacy to obtain health-related knowledge, a positive attitude, and more effective health behaviors. However, the debate became complicated when it came to choosing comprehensive measurement tools which cover all the domains of health literacy mentioned in the Baker model. Acknowledging that health literacy is a complex construct, Baker concluded that although there is a need to create a more comprehensive and user-friendly tool, those studies which used current measurement tools such as TOFHLA and REALM should not be ignored. There is some evidence showing that these tools have the capacity to predict individual knowledge, individual behaviors and health outcomes (Institute of Medicine, 2004; Wolf, Gazmararian, & Baker, 2005)

Another definition of health literacy which was offered by World Health Organization (WHO) extended the practical applications of the concept beyond the health care system: "Health literacy represents the cognitive and social skills which determine the motivation and ability of individuals to gain access to understand and use information in ways which promote and maintain good health." (Nutbeam, 1998, p. 357). This definition describes health literacy as a set of skills enabling individuals to influence determinants of health at the individual, healthcare system, and societal levels in order to maintain good health. The definition refers to "critical health literacy" and is crucial for patient empowerment (Nutbeam, 2000) at both personal and social levels.

Critical health literacy encompasses an individual's ability to access and understand health information which is presented through a variety of methods. Within the modern world, these methods include electronic websites, telephone services, and interaction with health care providers (Norman & Skinner, 2006). This raises the significance of "e-health literacy," defined as using information technology to improve health (Eng, 2001). However, as Norman and Skinner (2006) explained in the e-health literacy model, functional and interactive health literacy are required elements supporting individuals to be able to use e-health resources. Regarding the high percentage of inadequate functional health literacy. the first step to improve people's e-health literacy is to strengthen their functional and interactive health literary skills.

In Canada, delegates who attended the Conference on Literacy and Health in October 2004 responded to a call for improving health literacy by forming an expert panel on health

literacy. The panel was inaugurated in 2006. The 14 members of this panel, led by the Canadian Public Health Association (CPHA), aimed to address low health literacy in Canada, in particular in vulnerable groups such as immigrants, people living with chronic illness, seniors and low income populations. As the initial step, members of the panel offered a definition of health literacy as: "the ability to access, understand, evaluate and communicate information as a way to promote, maintain and improve health in a variety of settings across the life-course" (Rootman & Gordon-El-Bihbety, 2008, p. 11) Using this definition, the Canadian expert panel on health literacy stressed the idea that "accessing and understanding" health information is mediated not only by individuals' education, culture and language, but also by health care professionals' communication skills, health care setting characteristics and the quality of the educational materials that the professionals provide (Rootman & Gordon-El-Bihbety, 2008, p. 11). In addition, the definition presents a broader scope for health literacy as a requirement to empowerment, which is in agreement with the work on health literacy offered by Nutbeam (2000).

The magnitude of the health literacy issue in Canada was not clear until the development of a health literacy scale for the International Adult Literacy and Skills Survey (IALSS). Through this survey, Statistics Canada in partnership with international survey organizations tested 23000 Canadians' health literacy level. The measurement tool used by this survey was developed using 191 items from the US adult literacy survey and 230 items from the 2003 Canadian survey. These items cover health activities, such as health promotion, health protection, disease prevention, and healthcare navigation, making this scale more comprehensive in measuring health literacy while respecting the latest definition of health literacy offered by the Canadian expert panel. Competence on the scale was defined at five levels, with the level of 3 as a minimum proficiency. Based on the survey, 55% of working adults (16- 65 years age) and 88% of seniors (over 65 years age) had less than adequate (level 3) health literacy skills (Canadian Council on Learning, 2008).

The concept of health literacy has evolved in the last two decades from its basic definition as a contributing factor to improve patients' adherence to health care professionals' recommendations, to its conceptualization as a means of empowering people to affect determinants of health. In addition to the evolution in depth and scope of this concept, there are two approaches to health literacy. These approaches originate from different disciplines and

influence the way that health care professionals respond to this variable. Two approaches toward health literacy include considering it as a risk factor or as an asset (Nutbeam, 2008).

When it is viewed as a risk factor leading to poor health outcomes, health literacy needs to be assessed and improved through the application of strategies by healthcare providers. This approach is expected to mitigate the negative impact of poor health literacy on health outcomes by increasing a person's adherence and compliance with the given prescription. From this perspective, poor health literacy is defined as an individual's deficiency that needs to be resolved by healthcare providers. If considered as an asset, health literacy is a quality to be built on through interaction between healthcare professionals and individuals in the process of health education. Using health education to improve health awareness involves enabling people to obtain knowledge and to utilize the knowledge in making health decisions. Consequently individuals feel greater power regarding their health situation, which is in agreement with empowerment principles.

Low Health Literacy Prevalence and Associated Factors

According to the earlier definition, health literacy is "the skills needed to perform basic reading and numerical tasks required to function in the health care environment" (American Medical Association Ad Hoc Committee on Health Literacy for the Council on Scientific Affairs, 1999, p. 553). Based on this definition and using data from the 2003 National Assessment of Adult Literacy (NAAL), 53% of the US population (16 years and older) had intermediate health literacy, 22% had basic, and 14% had inadequate health literacy. The prevalence of limited health literacy in adult Canadians (over 16 years old) is 60%. The limited health literacy percentage varies significantly across provinces and different population subgroups (Canadian Council on Learning, 2008). These figures are higher in developing countries (Nutbeam, 2008) and also among vulnerable groups such as the elderly and those with chronic illness (Wolf et al., 2005).

There has been no large-scale assessment of health literacy in Iran; however, using the results of a study which examined health literacy in five provinces, it could be estimated that 56.5% and 15.3 % of Iranian adults over 18 years old have inadequate and borderline health literacy levels respectively (Tehrani Banihashemi et al., 2007). Inadequate health literacy among Iranian seniors (over 65 years old) was estimated at 79.6% (Javadzade et al., 2012). Figures indicating limited health literacy in Iran could now be even higher, given the growing

complexity of the healthcare system and the tendency to go beyond the basic definition of health literacy.

Regarding the factors associated with inadequate health literacy skills among Iranian seniors (over 65 years age), Gazmararian et al. (1999) indicated that the rate of inadequate and marginal health literacy among study participants varied according to the study location, as well as participants' race, language, level of formal education, age, occupation, cognitive status, and if they had a history of "blue collar work." Gazmararian et al. (1999) also noted that individuals' reading skills diminished with age even after adjusting for the participants' education levels and cognitive impairments. Studies conducted in Iran associated a lower level of health literacy with a lower level of formal education (Javadzade et al., 2012) and a lower socioeconomic status (Tehrani Banihashemi et al., 2007). Javadzadeh et al. (2012) also reported that women had a lower level of health literacy than men.

Consequences Associated with Low Health Literacy

An increasing aging population, rising prevalence of chronic illnesses, and growing dependence of healthcare delivery on technology have been widening the gap between individuals with different levels of health literacy and their ability to utilize healthcare services. All these factors create health disparity. Individual health literacy is a central determinant of health based on the model offered by Pawlak (2005) and can affect individual and population health, as well as the healthcare system in general.

At the individual level, low health literacy determines the quality of communication between people and their health care providers, as well as their ability to navigate in the healthcare system. People with inadequate health literacy skills are less likely to give a detailed report of their illnesses (Hahn et al., 2015) and to understand healthcare recommendations (Pawlak, 2005). They have inadequate knowledge of their condition and treatment options (Agre, Stieglitz, & Milstein, 2006). Also, the stigma attached to low health literacy prevents them from asking questions (Safeer & Keenan, 2005; Wolf, Davis, Tilson, Bass, & Parker, 2006). Erlen (2004) labelled low health literacy as a "silent disability" which leads to ineffective communication between people and health care professionals. Inadequate health literacy hampers individual attempts to navigate in a complex and technologically based healthcare system; it affects an individual's ability to find the level of care matched to his or her health concerns (Pawlak, 2005).

Limited health literacy has also been linked to individual failure in utilizing preventive measures (Gazmararian, Williams, & Baker, 2002). Individuals with limited health literacy might not be able to recognize signs and symptoms of the disease; therefore will not seek healthcare assistances (Richey, 2012). People with inadequate health literacy have lower satisfaction with treatment and the quality of care (Paasche-Orwel & Wolf, 2007). Health literacy is critical to people's involvement in their plan of care and in applying self-management strategies in order to live with their chronic conditions (Kanj & Mitic, 2009). Therefore, low levels of health literacy are correlated with increased risk of non-adherence (Kripalani et al., 2015) and hospitalization, as well as poorer health status (Board on Neuroscience and Behavioral Health, Institute of Medicine, 2004; DeWalt et al., 2004), and an increased mortality rate (Baker et al., 2007).

Health literacy is located at the center of Pawlak's model (2005) as a population determinant of health. Health literacy can be considered a population health concern, which is influenced by an individual's age, language, cognitive capacity, ethnicity, level of education, employment, socioeconomic status, access to technology, and physical ability to use available technology. As Pawlak (2005) emphasized, there is a great variance in peoples capacity to access and understand healthcare information when making decisions about their health. These variations create great disparity in health care. This disparity is magnified when healthcare providers do not understand how to interact with people with limited health literacy. Improving individual health literacy skills can improve population health indicators. As Nutbeam (2000) asserted, improving health literacy not only results in personal benefits, but also contributes to generating community health actions, resulting in improved social health.

At the healthcare system level, low health literacy leads to an individual inability to follow recommended treatments which result in higher cost of the healthcare system. Limited Health literacy in the elderly population in the US accounts for 11.4 % of hospitalizations (Quirk, 2000). The annual healthcare costs of an individual with limited health literacy are estimated to be higher than those of the general population (Weiss & Palmer, 2004). Although there are limited studies linking low health literacy and higher health care costs, Baker et al. (2007) linked higher rates of hospitalization for people with limited health literacy to higher health care costs for this population.

Health Care Professionals' Knowledge of Health Literacy

Improving health literacy is a shared responsibility of the individual, the healthcare system, and the educational system (IOM, 2004); the issue of limited health literacy will not be addressed unless actions are taken in these three areas. Consequently, individuals, the population at large, the healthcare system, and educational systems will benefit from improving societal health literacy (Neal, 2007). Therefore, WHO strongly encourages healthcare systems around the world to assess and develop their own health literacy capacity which is defined the ways through which healthcare professionals, services, and products makes healthcare information accessible and understandable for all people with different levels of health literacy skills (WHO, 2015). Investing merely on individuals through education programs to boost health literacy may fail if system-level interventions in healthcare systems are not implemented (Greenhalgh, 2015). Within the healthcare system, nurses are on the front line in providing health care information; thus, they must be proficient in communication and health education. Health care providers tend to overestimate people's health literacy levels; therefore, low health literacy has been perceived as the exception in daily contact within the healthcare system. Nevertheless, during the last two decades, increasing the awareness of the magnitude of limited health literacy in all nations has led to applying strategies such as adopting universal precautions to ensure that all cases of limited literacy are recognized (Volandes & Paasche-Orlow, 2007) and treated in an appropriate way. All nurses must be able to conduct basic health literacy assessments using health literacy measurement tools.

In order to mitigate the outcomes of limited health literacy, the use of plain language and avoidance of medical jargon are highly recommended. Most of the existing written healthcare information is too advanced for people with inadequate health literacy (Safeer & Keenan, 2005); nurses are supposed to provide people with simplified forms of written materials (Neals, 2007). To enhance people's understanding of health information, healthcare providers' communications need to be supplemented by offering written materials, using images and videos (Murphy, Chesson, Walder, Arnold, & Chesson, 2000). Moreover, to develop people's comprehension of educational materials, it is imperative to promote a patient-centered approach, one in which a single strategy is not assumed to fit the health education needs of all people (Paasche-Orlow, Schillinger, Greene, & Wagner, 2006). Applying the teach-back strategy is highly advocated to ensure that people understand the health information being conveyed (Baker, 2006; Schloman,

2004; Schwartzberg, 2002; Weiss, 2003). Through this strategy, educators seek confirmation of learner comprehension by asking "show-me" or "teach-back" (Kountz, 2009).

The first NALS in the US reported that 48% of the adult population does not have adequate literacy skills to function in society (Kirsch et al., 1993). Williams et al. (1995), using TOFLAH, conducted a cross-sectional project to assess care recipients' health literacy levels in two urban hospitals in the US. They reported that 35.1% of English-speaking patients and 61.7% of Spanish-speaking patients had inadequate or marginal functional health literacy. These figures were higher in older adults (age $\geq$ 60 years), 81.3% and 82.6% in English-speaking and Spanish-speaking patients respectively. This study was a basis upon which health literacy projects were developed. These projects included creating instruments to routinely assess people's health literacy levels and examining interventions to be used by healthcare professionals in dealing with people with limited health literacy. Recently, empirical evidence has been published about the readiness of healthcare professionals to manage limited health literacy and improve this variable in health care settings. In the following sections those studies will be reviewed.

Cormier and Kotrlik (2009) assessed the health literacy knowledge and experiences of 361 senior baccalaureate nursing students at state universities in Louisiana. As a measurement tool for this study, they used the Health Literacy Knowledge and Experience Survey (HL-KES) developed and validated by Cormier (2006). This tool consists of two sections to evaluate the knowledge of and experience with health literacy in the nursing profession. The HL-KES has been applied in several studies in different parts of the US, examining the knowledge of and experience with health literacy among different groups in nursing, such as nurse practitioners and registered nurses. Cormier and Kotrlik (2009) found that senior baccalaureate nursing students were able to recognize that people with low socioeconomic status were at high risk for low health literacy. These students also had knowledge about the consequences of limited health literacy, as well as an awareness of the effective strategies used to evaluate patients' understanding of health education. However, they were not prepared to screen patients for health literacy or use existing guidelines to prepare suitable written health information.

Knight (2011) examined the health literacy knowledge and experience of 141 registered nurses, with at least three years of nursing practice experience, using the self-administered HL-KES as a measurement tool. In this study, the five content areas of nurses' knowledge included basic facts about health literacy, consequences of limited health literacy,

health literacy screening procedures, guidelines to prepare written health education materials, and an evaluation of health literacy interventions. Participants showed inadequate knowledge in the areas of health literacy screening procedures and using guidelines to prepare written health education materials. Nevertheless, the nurses expressed having significant experience in using written materials and video tapes in health education.

Cafiero (2013) studied nurse practitioners practicing in outpatient health settings in New York. She examined nurse practitioners 'knowledge, experience, and intention to use health literacy strategies. Cafiero used the HL-KES, developed and validated by Cormier (2006), to assess nurse practitioners' knowledge and experience of health literacy. To access nurse practitioners' attitudes, beliefs, and behavioral intention to use health literacy strategies, she developed the Health Literacy Strategies Behavioral Intention Questionnaire (HLSBI) using the theory of planned behavior as a framework (Azjen, 1985; Fishbein & Ajzen, 2010). The findings showed that nurse practitioners' overall knowledge of health literacy is low. In particular, there was a knowledge gap in using screening tools to identify people with limited health literacy skills, as well as in evaluating educational materials. However, the nurse practitioners indicated a strong intention to use health literacy strategies in future practice.

Torres and Nichols (2014) assessed the health literacy knowledge and experience of 391 nursing students working toward their associate degrees, at the Borough of Manhattan Community College (BMCC) in New York City. They applied the HL-KES as measurement tool. Through this cross-sectional study, the investigators recruited nursing students in the associate degree program, regardless of their level of college training, assuming that all the students should have a basic knowledge of health literacy. Reliability of the HL-KES was determined to be 0.82 in the study context. In this study participants demonstrated inadequate knowledge in the content area of basic understanding of health literacy. Although the investigators found a downward trend in health literacy knowledge and experience scores obtained by students in all fourth semesters of the program, the difference was not statistically significant.

Schlichting et al. (2007) conducted a survey in 100 community health centers in 10 midwestern states of the US to assess care providers' perceptions of limited health literacy. As a measurement tool, they applied a survey developed by the MidWest Clinicians' Network research committee members, including clinicians, administrators, clinician-researchers from

health centers, and researchers from the University of Chicago. Among the participants, some members were experienced in conducting research, working with vulnerable populations, statistics, and community-based participatory research. The survey included 22 items in six domains: perceived scope of limited health literacy issues, strategies the providers apply to people with limited health literacy, awareness of the formal programs in health literacy initiated by their health centers, barriers to implementing these programs, the provider's perception of the usefulness of the program, and demographic information. According to the study results, participants' perception of prevalence of the limited health literacy was similar to the report of the National Assessment of Adult Literacy in 2003. It showed that participants have an accurate estimation of these figures. The majority of the participants were aware of the formal programs running at their health centers to address limited health literacy, with 6% reporting the presence of a limited health literacy specialist in their centers. In answering the question regarding barriers to implementing limited health literacy programs, limited time and financial resources, as well as not considering limited health literacy as a high priority issue, were reported. Providers in this study believed in the effectiveness of both formal and some simple strategies, such as preparing simplified reading materials, in dealing with limited health literacy.

Jukkala, Deupree and Graham (2009) examined 230 health care providers' knowledge of the impact of limited health literacy on patients' outcomes and healthcare systems in an academic health centre located in Alabama, US. Using an investigator-developed questionnaire, which contained eight multiple choice questions, the researchers asked all individuals attending a university-sponsored presentation on health literacy whether they were interested in completing a questionnaire before the presentation. Content validity of the questionnaire was determined by experts from nursing, medicine and health literacy fields. The instrument's reliability was not examined by the investigators noting that the questionnaire is not a scale. The findings showed that 37% of the care providers in the study reported "not having heard" the term "health literacy". Nurses account for the largest number of participants in that category. Most participants (92%) were aware of the relationship between the individual's level of education and health literacy, yet the majority (88%) did not have knowledge about the prevalence of limited health literacy in the US.

McCleary-Jones (2012) studied nursing students entering a baccalaureate program. She examined the effect of a pharmacology course on their knowledge of health literacy, assuming

that the pharmacology course was the students' first exposure to pharmacology and learning about their role in administration of medications, and health literacy. Through this comparative study, the investigator assessed the students' knowledge of health literacy before and after the implementation of an online pharmacology course. The study measurement tool was an investigator-developed questionnaire consisting of two parts: demographic questions and five items related to students' knowledge, comprehension, and application of health literacy. Content validity for the questionnaire was determined using a test blueprint. The Cronbach α showed that the reliability in the study context was .73. Study findings revealed that there was a significant improvement when post-test scores were compared with pre-test scores.

Hartman (2014) conducted a quasi-experimental study to examine the effectiveness of a "formal course of education and learning theory" in an undergraduate nursing program on nursing students' knowledge of health literacy. Study participants were 322 senior baccalaureate nursing students (control group= 147, experiment group= 177) from a multi-campus private undergraduate school of nursing in southern California. The control group included students who had not taken the target course. The experiment group included students who had passed the target course. Measurement tools were the HL-KES to measure students' knowledge and experience of health literacy, and the 63-item Baccalaureate Nursing Student Teaching Learning Self- Efficacy Questionnaire, developed and validated by Goldenberg, Andrusyszyn and Iwasiw (2005), to determine students' level of self- efficacy related to health education. Hartman (2014) did not mention whether reliability measures were established for the two questionnaires in this study. Findings of the study showed that when the experiment group was compared to the control group, a higher score for the HL-KES questionnaire was obtained; however, the difference was not statistically significant. Nevertheless, the experiment group demonstrated a statistically significant higher score of self-efficacy related to health education.

Scheckel, Emery and Nosek (2010) used an interpretive phenomenology approach to describe undergraduate nursing students' experiences providing patient education and addressing limited health literacy. Eight undergraduate nursing students in their final semester of the program were recruited as study participants. Data were collected during 60-90 minute unstructured interviews and analysed using a hermeneutic approach. The result of this qualitative study disclosed student competency regarding improving care recipients' health literacy through health education, which was in contrast to the previous quantitative studies showing a lack of

proficiency in nursing students. Three themes emerged from the qualitative data showing the participants' understanding of health literacy: respecting languages, helping patients understand, and promoting engagement. The study participants articulated that to improve care recipients' understanding of educational materials, nurses involved in health education need to respect the care recipients' language and avoid using medical jargon. Using teaching strategies and teaching technologies when they are appropriate can promote care recipient understanding. Further, adjusting health education materials to the care recipient context and being sensitive to the care recipients' responses to nurse recommendations will facilitate their engagement in the care plan.

Agho, Deason and Rivers (2011), using a qualitative approach, assessed care providers perceptions of the nature and scope of the low health literacy problem in India. Data were collected through organizing two focus groups, each consisting of 13 participants. Participants were recruited, using a convenience sampling technique, from 13 local health care organizations, churches, and community-based organizations. The study participants pointed out that their clients with inadequate health literacy tend to have poorer knowledge about their health conditions; lower adherence rates; lower use of preventive measures; less ability to understand prescription instructions, food labels, and consent forms; and less intention to participate in health promotion activities. The study also identified barriers to improving their clients' health literacy, such as client cultural beliefs, physician omnipotence, and poverty, as well as access to insurance, community programs, and transportation. In order to tackle the "epidemic of low health literacy" in the Indian population, the study participants alluded to a multi-dimensional approach to address the aforementioned barriers.

Theoretical Framework

A theoretical framework is the central part of a research study which provides the investigators with the structure and boundaries of their investigations (Ennis, 1999). In this study, the theoretical framework is used to guide the research questions. As individuals' level of health literacy is influenced by not only their idiosyncratic characteristics, but also the cumulative impact of social, economic and environmental factors, applying a theoretical framework provides a detailed picture of the phenomenon for researchers in health literacy studies (Nutbeam, 2000). Looking at health literacy from a reductionist point of view, which emphasizes only an individual's skills, we ignore the broader array of healthcare systems and social factors that influence this variable (Ross, Culbert, Gasper, & Kimmey, 2009). Indeed,

improving people's level of health literacy necessitates applying comprehensive theory-based approaches that acknowledge both individual and contextual factors including social determinants and healthcare systems' characteristics (Nutbeam, 2000).

As improving people's health literacy level is considered an approach to facilitate adopting health-related behaviors, it should be viewed alongside other factors that influence an individual's behavior. Ross et al. (2009) and Weld, Padden, Ramsey, & Bibb (2008) cited a number of theories to guide health behaviors. These theories included the Health Belief Model (HBM) (1950), which conceptualizes that health behaviors are adopted as a result of an individual's awareness of negative health concerns (Rosenstock, Strecher, & Becker, 1988) ; Social Cognitive Theory (SCT) (1986), which explains determinants of health behaviors; the Theory of Planned Behavior (Ajzen & Fishbein, 1980), which predicts an individual's intention to engage in a behavior at a specific time; and the Trans Theoretical Model (1993), which focuses on stages of readiness to behavioural changes (Moore, 2005). These theories overlap on some of the main concepts; however, it should be acknowledged that they differ in their specific applications to behavioral changes (Bandura, 1998). Among them, the HBM and SCT have been applied as theoretical foundations to health literacy studies (Weld et al., 2008).

Although the HBM is being used in health literacy research (Davis, Williams, Marin, Parker, & Glass, 2002), Weld et al. (2008) argued that it cannot be used as an appropriate theory in this area for two reasons. First, the HBM focuses, primarily, on individual factors to change health behaviours, while in health literacy the focus is not just the individual. Second, the HBM does not consider anything other than the individual's characteristics; therefore it does not look at culture, socioeconomic state, and previous experience. Unlike the HBM, which focuses on explaining health-related behaviors, SCT addresses both the essential determinants of health behaviours and the methods to promote behavioral change (Glanz, Rimer, & Lewis, 2002). It thus provides a more compatible framework for health literacy as an essential determinant of health. It should be acknowledged that some recently published conceptual models, such as the ZPG model and Health Literacy Framework (IOM, 2004) focus specifically on health literacy (Zarcadoolas, Pleasant, & Greer, 2006). However, a lack of published studies which used these models as frameworks precludes me from selecting them. Therefore, SCT was chosen as the theoretical framework for this study.

SCT, which is located under the broader category of cognitive psychology theories of change, tries to provide a comprehensive understanding of the determinants of an individual's behaviors. SCT was first introduced as social learning theory by Bandura of Stanford University (1977). It was renamed SCT after integrating some concepts from cognitive psychology. The SCT also embraced some concepts from sociology, political science and humanistic psychology (Bandura, 1986). This theory posits that an individual's behaviours and environmental determinants are in bidirectional interaction (McAlister, Perry, & Parcel, 2008).

Figure 1: Depicts relationships among these components within the SCT framework.
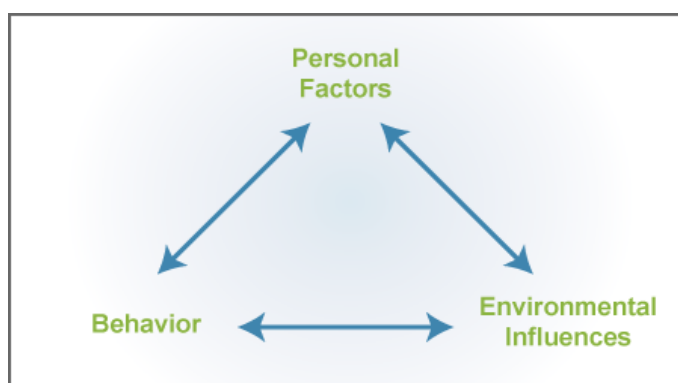
In general, SCT contemplates both individual and socio-structural factors which control human's competencies affecting their psychological and physical well-being (Bandura, 1998). SCT is unique in emphasizing a multi-layered causal structure in which perceived self-efficacy refers a belief in one's capability to accomplish a course of actions. In the area of healthcare, SCT provides a basis for studies focusing on changing health-related behavior using an inclusive approach which considers both individual characteristics and social systems' practices. Based on this theory, perceived self-efficacy affects individual motivation and action to change health-related behaviors directly and indirectly through influencing socio-structural determinants of health. SCT is being adopted in health education studies, as it is relevant to health communication (Glanz et al., 2002).

By the time SCT was introduced, environmental factors had been recognized as having the ability to shape human behaviors. However, SCT suggested a bidirectional interaction

between an individual's behaviors and her or his environments. Through this interaction an individual has the potential to work with social organizations to modify social determinants of health and make them fit to her or his purpose (McAlister et al., 2008). This reflects health promotion's goal of improving people's well-being by enabling individuals to increase their control over personal, environmental, and social factors (Bandura, 1998).

The main concepts of SCT, as clarified by Glanz et al. (2002), fall into five categories: "psychological determinants of behavior," "observational learning," "environmental determinants of behavior," "self-regulation," and "moral disengagement." The concepts in each category are briefly described in the following section.

Psychological determinants of behavior. Under this category, two concepts, *self-efficacy* and *outcome expectations,* are explained.

Self- efficacy. Perceived self-efficacy has a pivotal regulatory role in the suggested causal structure of SCT. Bandura (1998) defined it as individuals' "beliefs in their own capability to organize and execute a course of action required to produce a given level of attainment" (p. 3). Personal efficacy influences a variety of processes, including individual motivation, thought processes, patterns of behavior and emotional state. Bandura (1997) asserts that a strong sense of efficacy, which refers to an individual's belief in creating "desired effects" through an action, is the original incentive leading a person to engage in behavioural change and preserve it against all obstacles. Introducing self-efficacy as the basis for human actions, SCT maintains that other motivators are secondary to perceived self-efficacy. An individual's perceived capability to accomplish an action determines the goal-setting process and the individual's resilience in the face of challenging circumstances (Bandura, 1998).

Self-efficacy has a considerable influence on human health by reducing negative emotions and depression at the biological and affective levels and also through direct impact on achieving and maintaining health-related behaviors. An individual's perceived self-efficacy to achieve a specific behavior can be improved through four processes: experience mastery, vicarious experience, social personation, and positive mood enhancement (Glanz et al., 2002).

Outcome expectations. Human behaviors are regulated by their outcomes; positive outcomes encourage people to adopt and preserve behaviors, while negative outcomes are discouraging. Outcomes include both observed outcomes and perceived ones. Individuals can alter their behaviours by observing successes and mistakes experienced by others as well as by themselves (Bandura, 1986). The motivation to achieve health-related behaviours is determined by an individual's beliefs about the likelihood and value of the behaviors' outcomes (Glanz et al., 2002).

Observational learning. Humans have the capacity to develop learning new behaviors from mass media through the processes of attention, retention, production and motivation. This mode of learning, called observational learning, can be facilitated by some factors: attention will be facilitated by individuals' access to media and a social network; cognitive retention depends on an individual's cognitive capacity such as reading skill; production is contingent on an individual's communication skills, physical capacity and self- efficacy; and motivation is regulated by outcome expectations (Glanz et al., 2002).

Environmental determinant of behavior. SCT emphasizes a reciprocal relationship between human behaviors and environmental factors. People might learn about new health-related behaviors through observational learning. However, for people to actualize changes in their lives, their environment needs to support the changes (Bandura, 2002). The environment can modify people's behaviors through two separate approaches: incentive motivation or facilitation. Incentive motivation and behavioral changes are promoted through the provision of reward and punishment systems. Glanz et al. (2002) referred to increasing taxes on tobacco as a punitive public policy to reduce smoking behavior. Alternatively, providing financial incentives for those who start smoking cessation is an example of a reward from the environment to facilitate this healthy behaviour.

Environmental factors can also facilitate human behavioral change through supporting people to overcome recognized barriers. Adopting this approach, policy makers aim to empower people to develop health-related behaviors and maintain these behaviors by eliminating the barriers (eg: smoking in public places). This is different from the former approach, which is being used to exert control over people's behaviors (Bandura, 1998). One example of the empowering policies to promote healthy behavior, cited by Glanz et al. (2002), is providing sex

workers with the resources and training in jewelry-making and marketing to boost the effects of an HIV risk-reduction program among this population.

Self-regulation. Self-regulation is based on the idea that individuals have the capacity to change their health behaviors in the same way they would change other peoples' behaviors. SCT supports the philosophy of self-regulation that humans have the potential to endure short-term pains in order to achieve long term goals. However, SCT emphasizes that successfully initiating a new behavior and maintaining the change does not depend on only the individual's will. The individual develops a set of skills that can be used to manage the change process: self-monitoring; goal setting; feedback; self-reward; self-instruction; enlistment of social support (Bandura, 1997).

Moral disengagement. On a daily basis, people adopt standards of right and wrong which lead them to engage in moral behaviors. Through a self-regulatory process, individuals monitor both their behaviours and the situation in which they engage in the behaviors, review the behaviors in relation to moral standards, and adjust their behaviors based on the consequences. *Self-sanction* is a process that keeps individual behaviors in line with moral standards. Nevertheless, this process does not work as a fixed internal regulator of human behaviors. SCT hypothesizes an "interactionist" perspective to morality based on which moral actions are the products of reciprocal interaction among cognitive, affective and social influence (Bandura, 2002). Individuals need to adhere to moral standards when managing the process of behaviour change. To do this, SCT describes four common mechanisms which should be avoided. These mechanisms fall under the category of moral disengagements. Moral disengagement that leads to an increase in the likelihood of harmful actions includes *dehumanization, euphemistic labeling, diffusion of responsibility, and perceived moral justification (*Glanz et al., 2002*)*.

When planning for health promotion activities, it is imperative to consider all the individual's factors, organizational and political elements affecting human well-being in order to conduct comprehensive and multilevel interventions (Raingrurber, 2014). SCT provides a comprehensive view of the factors affecting an individual to initiate behaviour change process and maintain the change. In the area of health promotion it offers a well-supported theoretical framework for the studies which aim to promote health-related behaviors. SCT is instrumental in developing interventions to promote health-related behaviors by manipulating modifiable

elements affecting the behavior-change process (Glanz et al., 2002). In summary, according to this theory, human behaviors are the production of a person's learning history, environmental factors and intellectual and physical capacities (Glanz et al., 2002). Therefore, to develop healthy behaviors, healthcare providers need to provide people with new learning experiences through education, adjusting environmental factors, and supporting individuals to enhance their physical and cognitive capacities.

In order to explain how health literacy fits in SCT, I refer to the definition of health literacy offered by the WHO, "health literacy represents cognitive and social skills which determine the motivation and ability of an individual to gain access to, understand and use information in ways which promote and maintain health" (Nutbeam, 1998, p. 10). Accordingly, health literacy is not only contingent on an individual's cognitive development but also the methods of health education and, in general, health communication. An individual's response to these variables is mediated by his or her social skills and level of self-efficacy (Nutbeam, 2000). This is in line with SCT, which offers a bidirectional interaction between an individual's behaviors and his or her environments. Through this interaction individuals have the potential to work with social organizations and modify social determinates of health (McAlister et al., 2008).

Therefore, using SCT as a theoretical foundation for health literacy studies offers the perspective that improving this prominent determinant of health requires involvement of multilayers of society, including individuals, healthcare providers, policy makers, and the educational system. Nurses, as the largest healthcare professional group who spend the most time in direct contact with their clients, have the potential to improve peoples' health literacy levels and decrease the health impacts of LHL. Thus, awareness of the magnitude of LHL and strategies to combat this issue need to be part of the nursing curriculum and continuing education for nurses (Dunn, 2010).

Context of the Study

A thorough understanding of participants in this study, Iranian registered nurses, necessitates describing the context in which these nurses work. The information about their context will be reviewed in terms of Iran as a country, Iran's healthcare system, nursing in Iran, and patient education in this country including the Iranian population level of health literacy. Each of these contexts is influenced by Iranian socio-historical structure and political factors.

Iran as a country. With 5000 years of history, Iran is the home of one of the oldest civilizations. Iran is situated in the Middle East, a region between Asia, Europe and Africa. Iran spread over 1,648,195 square km and has a population of population of more than 76 million (Global Health Observatory Data Repository, 2013) which makes it the 18th largest and 17th most populous country in the world. It shares borders with Armenia and Azerbaijan in the northwest, Kazakhstan and Russia across the Caspian Sea in the north, Turkmenistan in the northeast, Afghanistan and Pakistan in the east, and Turkey and Iraq in the west. Tehran, the capital city, is one of the most populated cities in the world, with more than 14 million people, 41.8% of whom are between 30 and 70 years old. However, with the current population growth rate of 1.3% per year, the percentage of elderly is increasing (Global Health Observatory Data Repository, 2013).

More than 95% of Iran's population is Muslim of different sects, with the majority being Shi'as. Iran's population consists of seven ethnic groups and seven dialects are spoken. However, Farsi is the national language for instructional purposes in the education system, and in professional institutions as well as for commercial, legal, and official businesses. In terms of administrative structure, policies for education and health care are created at the federal level, but implementation of the policies is the responsibility of each provincial government.

Iran consists of 30 provinces with different levels of socioeconomic development. Nearly 69.1% percent of the population lives in urban areas (Global Health Observatory Data Repository, 2013). The per capital gross national income for Iran, in US $, was reported to be $7,000 and $5,000 in 2012 and 2013, respectively, which is much lower than developed countries such as Canada ($42,270), yet comparable with Iran's neighboring countries such as Azerbaijan ($7,900), Turkmenistan ($7,800), and Iraq ($6, 710). Social classes in Iran, based on the most recent sources, are divided into the upper class (23%), middle class (32%) and working class (45%). There was a rise in the percent of the middle class after the Islamic revolution, due to upward social promotion through education (Tyranny of Numbers, 2011). Although the poverty line is considered as a method to compare the incidence of poverty in different regions, as well as to study economic improvement in an area over time, there is a temptation to use it as a "political tool" and present unfair information (Tyranny of Numbers, 2011). In searching for the percentage of the Iranian population living below the poverty line, an inconsistency was noted in findings from different resources. Nevertheless, according to the Central Intelligence

Agency (2007), almost 18.7% of the Iranian population lives below the poverty line, and there has been a downward trend since 2002 (40% in 2002 vs 18.7 % in 2007).

Iran healthcare system. Healthcare services in Iran are offered by the public and private sectors. The Ministry of Health and Medical Education (MOHME) is responsible for planning, monitoring and supervising all health activities in both the public and private sectors; however, the implementation of the policies is delegated to medical universities in each province. Since 1986, the provision of secondary education in all healthcare professions has been part of MOHME's responsibilities; this integration facilitates more coordination between healthcare provision and healthcare professional education (Mehrdad, 2009).

 The public health system offers a variety of health services at the primary, secondary and tertiary levels through a nationwide network. This network is based on a referral system, starting from basic health units (health houses) located in each village or in a group of villages. These health units offer primary health care. The next level is district health centres that offer secondary level health care. Finally, teaching hospitals serve as referral units and are mainly located in major cities; they are designed to provide tertiary care (National & Tehran University of Medical Science [TUMS] Health Systems, 2014). However, due to insufficient public health facilities, members of the middle and upper classes tend to use private health settings which operate mainly in urban areas and offer fast-track services at the secondary and tertiary health care level in urban area. Also, there are non-governmental organizations (NGOs), which focus primarily on such health conditions as diabetes, breast cancer, and thalassemia (Mehrdad, 2009).

In terms of health status, Iran, as a developing country, has fairly acceptable health indicators. For instance, more than 98.4 % of the population living in rural areas has access to primary healthcare services. The infant mortality rate is 27 per 1,000 live births, the under-five mortality rate is 19.93 per 1,000, and the maternal mortality rate is 24.1 per 100,000 live births. Polio immunization (or vaccination) coverage in rural areas is 100%. More than 95.3 percent of Iran's rural population has access to safe drinking water with the majority (80 percent) having access to sanitary facilities. Compared to the region's other developing countries such as Egypt, Saudi Arabia, Syria, and Pakistan, health indicators in Iran improved significantly from 2004 to 2008 (Goudarzi, Kameli, & Hatami, 2011).

Despite these improvements, however, Iran's healthcare system has not been developed along with the rapid changes in population growth rate and the changes in disease demographics

during recent decades. More than three-quarters (76%) of total annual deaths are reported to be related to chronic illnesses; for example, cardiovascular diseases account for 48% of the mortality of both sexes (WHO, 2014). Although non-communicable diseases, such as cardiovascular, cancer and road injuries, are the main health burdens, infectious diseases still remains a concern in some parts of the country (Bagheri Lankarani, Alvani, & Peymani, 2013). Remote rural areas are not fully covered by health services, and health centers in some parts are struggling with a lack of sufficient supplies and personnel. Moreover, the current registry system covers a limited number of communicable and non-communicable diseases, and offers only a limited number of records pertaining to rates of immunization, births, and mortality. The lack of an integrated health information system makes it difficult to evaluate the healthcare system (Mehrdad, 2009).

Nursing in Iran. Nursing education in Iran is similar to that in other developing countries, evolving during the last century from traditional care delivered by non-professional women to a university-based profession. This transformation was initiated by western missionaries who offered medical services to local people, as well as training sessions for small groups of women in each area to provide care for sick and poor people. In addition to Iran, these missionaries offered similar services in other developing countries, such as Taiwan, China, and Lebanon (Tabari Khoramian & Deans, 2007). It is believed that modern nursing in Iran was launched in 1916 after an American missionary group established a three-year nursing program (Salsali, 1999). The significant change in the nursing system during the last century, similar to that in other countries, was initially due to the healthcare system's efforts to achieve a global mandate of providing quality healthcare, as well as nursing leaders' efforts toward professionalism. However, in Iran, the context of evolution in the nursing system was influenced by numerous sociocultural, economic, and political changes resulting from the Islamic revolution (1979) and the Iran-Iraq war (1980-88) (Salsali, 1999).

Initially, having recognized nursing as a woman's profession, the majority of applicants for modern nursing schools were females. However, after the Islamic revolution, as a result of sociopolitical changes, the enrolment of males in nursing schools increased dramatically. This was credited to the policy which requires Iran's healthcare system to offer care to patients by nurses from the same sex, according to Islamic principles. In addition, the health burdens of the Iran-Iraq war were instrumental in increasing the percentage of male nursing students by 50% in

1986 (Nikbakht Nasrabadi, Lipson, & Emami, 2004). The increasing demand for nursing staff during the Iran- Iraq war was a driving force for the Iranian government to increase the number of nursing schools across the country and to offer a two-year university-based nursing program temporarily, along with a four-year baccalaureate nursing program, to fulfill the demand (Tabari Khoramian & Deans, 2007).

Currently, 184 nursing schools in Iran offer a four-year baccalaureate program. This program encompasses three years of theoretical education, followed by one year of clinical practice (Cheraghi, Salasli, & Ahmadi, 2008). Upon completion of this program, graduates are recognized as registered nurses and are allowed to practice. Eighteen universities offer masters' programs and 11 offer Ph.D. programs in nursing. The curriculum for each of these programs is developed and modified by MOHME; thus, all nursing students in Iran receive the same type of education and a consistent curriculum (Cheraghi, Salasli, & Safari, 2010).

 Iran's healthcare system includes over 90,026 nursing staff who provide nursing care in both public and private sectors, with hospitals as the main work place (Zarea, Negarandeh, Dehghan-Nayeri, & Rezaei-Adaryani, 2009). Those who qualify to practice are registered nurses who have graduated from a four-year baccalaureate nursing program and are recognized as professional nurses. Also there are auxiliary nurses, required to complete a three-year vocational program and work under the supervision of registered nurses (Nikbakht Nasrabadi et al., 2004).

Iranian nurses confront the same challenges, in different degrees, as nurses around the world. These challenges include nursing shortages, poor job satisfaction, poor social image of nursing, the gap between theory and practice, and the insufficient community nursing care (Benton, 2013). The current nurse–bed ratio is 0.5:1, versus the standard ratio of 1.8:1. This shortage causes some nurses to work extra hours, reaching up to 150 hours in addition to their 192 required hours monthly (Fakher Movahedi, Salsali, Negarandeh, & Rahnavard, 2011). Nevertheless, the shortage is recognized as a consequence of insufficiency in the nursing staff recruitment process rather than an actual shortage of nursing staff (Zarea, et al., 2009). Based on MOHME's report (2008), the average number of graduates from Iranian nursing schools between 1999 and 2007 was 6400 each year. According to a nationwide study conducted by Monjamed et al. (2005), 78.2% of Iranian nurses reported only a medium level of job satisfaction, which was mostly related to job insecurity and the fact that nursing is not a well-paid job (Zarea et al., 2009).

The recently recognized issue of a knowledge-practice gap in the Iranian nursing system is due to a lack of competence in both clinical nurses and nursing instructors, divergence between nursing services and nursing education, an unstructured staff evaluation system in both the practice and educational environments (Cheraghi et al., 2010), and an unsupportive management system (Adib-Hajbaghery, 2007).

Patient education in Iran. In Iran's healthcare system, patient education has recently been identified as one criteria of good quality of care in general practice. The implications of this acknowledgment can be recognized by looking at polices made at the MOHME level and the organizational level, as well as changes occurring in professional values of health care providers, in particular nursing staff. At the policy level, patient education has been identified as a quality criterion in accreditation procedure of health settings and has become part of the main role of nurses. At the organization level, one patient education co-ordinator has been assigned for each hospital. This person's role is to supervise and facilitate the implementation of patient education activities done by nursing staff. The creation of this role, at personal level, contributed to changing nurses' professional values from focusing on only technical aspects of nursing care toward paying attention to communication and counselling skills required for patient education (Ghorbani,Soleimani, Zeinali, & Davaji, 2014).

An extensive number of research studies have been conducted in the Iranian context in recent years. These studies focus on teaching people living with chronic illness and they reported the effectiveness of patient education in improving patient outcomes (Baradaran, Shams-Hosseini, Noori-Hekmat, Tehrani-Banihashemi, & Khamseh, 2010; Zamanzadeh, Valizadeh, Howard, & Jamshidi, 2013). Some of these studies compared different current approaches in patient education (Shariati, Faiazi, Sori, & Goudarzi, 2002). Yet, there is a significant gap between what these studies identify as a quality patient education and what nurses perform in practice. It should be noted that Iran is at an experimental stage of development regarding patient education and formalizing it as an official part of the professional profile of healthcare providers.

Although both nursing students and nursing staff express a positive attitude toward patient education and accept that as part of their role, they mention a variety of barriers, such as lack of time, limited educational facilities, and limited communication skills (Ghorbani et al., 2014; Vahdani & Montazeri, 2003) when they are asked if they engage in patient education in practice. Montazeri, Vahdani, Haji Mahmoodi, Jarvandi, & Ebrahimi (2002) reported that while

97% of people diagnosed with cancer expressed interest in receiving education about their diagnosis and treatment, 91% had not received even written materials about either subject.

As described, patient education is a part of the empowerment process through which healthcare professionals try to support those receiving care to make informed decisions. Iranian nurses' attitudes toward patient education, as Motamed-Jahromi, Abbaszadeh, Bohrani, & Zahr (2012) reported, was "fairly positive." Also in a qualitative study with the aim of defining patient advocacy from the Iranian nurses' perspective, participants emphasized that patient education is a part of the advocacy role of nursing (Negarandeh, Oskouie, Ahmadi, & Nikravesh, 2008). Nevertheless, both patients and nurses have identified healthcare professionals' limited communication skills as a serious shortcoming. (Farahani, Sahragard, Carroll, & Mohammadi, 2011). In identifying possible factors that might interfere with nurses' patient-education activities and hamper the effectiveness these efforts some studies pointed out some cultural beliefs. These believes includes the concealment of the diagnosis from patients, strong faith in nutritional values of Iranian traditional foods which are high in fat and salt, and making connections between diseases and sins (Farahani, Mohammadi, Ahmadi, Maleki, & Hajizadeh, 2008).

Searching for other variables affecting patient education activities, we identified the following possible factors: care recipients' health literacy level and nurses' knowledge of these variables. Improving Iranians' level of health literacy is part of MOHME's long-term plans; however, given the fact that health education is a new phenomenon in Iran, few studies have been conducted in this area.

Knowing that there is no nation-wide assessment of the Iranian population's health literacy level, regional studies are presented which assessed health literacy levels mostly using TOFHLA. Tehrani Banihashemi et al. (2007) examined 1086 participants' health literacy in five provinces (Boushehr, Mazandaran, Tehran, Ghazvin and Kermansh), and reported that 56.5% and 15.3 % of citizens over 18 years old have inadequate and borderline health literacy levels, respectively. This study also noted that there is a positive association between health literacy levels and an individual's socioeconomic status. The most recent study which measured the health literacy of older adults in one of the most populated provinces (Isfahan) in the central part of Iran, reported 79.6% inadequate health literacy among people over 65 years of age; those with inadequate health literacy were mainly women who had less education and a lower income. Also, this study reported that health literacy associates negatively with hospitalization and

outpatient visits (Javadzade et al., 2012). Peiraviani et al. (2014) used a Single-Item Literacy Screener (SILS) developed by Morris, Maclean, Chew and Littenberg (2006), and asked 11,04 participants in the Qazvin province, "How often do you need to have someone help you when you read instructions, pamphlets, or other written material from your doctor or pharmacy?" They found that 30.3% of the participants had inadequate medication health literacy. However, while searching for the current literature in health literacy I did not come across the study that looked at Iranian nurses' knowledge of health literacy in Iran.

Summary

Health literacy, recognized as one of the most prominent determinants of health, has been evolving in depth and scope during the last two decades. Improving health literacy has been set forth in the US by "Healthy People 2010" as a priority to eliminate health disparity and realize the vision of health for all Americans. More than 53% of Americans, 60% of Canadians, and 70 % of the Iranian adults over 16 years of age were identified as having inadequate health literacy skills to function in their respective healthcare systems. The increasing complexity of healthcare delivery systems is widening the gap among individuals with different levels of health literacy in utilizing healthcare services. LHL affects not only an individual's health status, but also population health and the healthcare system as a whole. Improving health literacy is therefore a shared responsibility of the individual, healthcare systems, and educational systems; the issue of LHL will not be addressed unless actions are taken in these three areas.

Within the healthcare system, nurses as the largest group of healthcare professionals and those who spend the most time communicating with people requiring healthcare, have a special opportunity to contribute toward promoting societal health literacy and mitigating the outcomes of inadequate health literacy. However, the results of studies, conducted mostly in North America, show that nurses lack adequate knowledge of and experience with communication strategies to reduce the adverse consequences of LHL. To the best of my knowledge, there is no published study in the Iranian context which has assessed Iranian nurses' knowledge of and experience with health literacy. To address this gap, this study examines Iranian nurses' knowledge of and experience with health literacy.

Chapter 3: Methods

Introduction

  This chapter provides information on the research methods that were used to conduct this study. This includes information about the research questions, research design, study population , setting, data collection, the study instrument, sample size, data analysis, ethical considerations, and dissemination of study findings.

  Health literacy is recognized as a robust determinant of an individual's health status when compared to other indicators such as age, income, employment status, education level, and race (Schillinger et al., 2002). However, 60% of adult Canadians still do not have adequate health literacy skills (Canadian Council on Learning, 2008). The prevalence of limited health literacy (LHL) is even higher in developing countries (Nutbeam, 2008) such as Iran and also among vulnerable populations such as the elderly (Wolf et al., 2005). It has been estimated that more than 70% of Iranians over 18 years old (Tehrani Banihashemi et al., 2007) and 79.6% Iranians over 65 years old have inadequate health literacy skills (Javadzade et al., 2012). Differences in levels of health literacy among members of a society can be a source of health disparity (Pawlak, 2005). The crisis of limited health literacy creates an agenda for the nursing profession as the largest segment of health professionals in the healthcare system; there is a real need for this group of health professionals to take action in improving people's health literacy. The purpose of this cross-sectional study is to examine Iranian registered nurses' knowledge of and experience with health literacy.

Research Questions

  Social Cognitive Theory (SCT) guided the development of the research questions in this study. The following research questions were addressed in this cross-sectional study, using a quantitative self-report survey**:**

1. What is the level of health literacy knowledge among Iranian registered nurses as measured by the Health Literacy Knowledge and Experience Survey?

2. What are the health literacy experiences of Iranian registered nurses as measured by the Health Literacy Knowledge and Experience Survey?

3. Does a relationship exist between the level of health literacy knowledge and the health literacy experiences of Iranian registered nurses?

4. Is there any variation in the health literacy knowledge level of Iranian registered nurses? If there is a variation, which of the following variables can explain that, Iranian registered nurses' age, gender, level of nursing education, years of nursing practice , areas of practice, prior work experience (other than nursing) in the healthcare system, and frequency of interaction with healthcare providers for personal needs.

Study Design

The current study applied a cross-sectional design providing a quantitative or numerical description (Creswell, 2014) of Iranian registered nurses' knowledge of and experience with health literacy. A quantitative design was used as a way to examine health literacy knowledge and experience of a large sample of the Iranian registered nurses in a cost effective way. A comprehensive literature search revealed that the HL-KES was validated instrument already used in several US studies to measure nurses' knowledge of and experience with health literacy in a numerical way. Using this instrument in the current study was a logical next step. Furthermore, the items within the HL-KES are related to functional and interactive health literacy which are the focus of this study.

Study Population and Study Setting

The target population for the study is all the registered nurses with baccalaureate nursing degrees or master's degrees currently practicing in university hospitals and community health centers affiliated with Tehran University of Medical Science in Tehran, the capital city of Iran. Tehran has a population of 8.3 million and more than 14 million in the wider metropolitan area. It is the largest city in Iran and the largest in western Asia. This city is the home of a very diverse population coming from all over the country. There are four major medical science universities in the city: Tehran University of Medical Science, Iran University of Medical Science, Islamic Azad University Medical Branch of Tehran and Shahed University. Potential participants were selected from only registered nurses who work in the hospitals and community health centers affiliated with Tehran University of Medical Science because the nursing program in each university has been standardized by the Ministry of Health.

Data Collection

    Recruitment. The nursing office at Tehran University of Medical Science provided information about the number and names of the hospitals and community health centres with which it is affiliated and also the number of nurses practicing in each hospital and community health center. According to this information, there are currently 3413 nurses working in 16 hospitals and three community health centers affiliated with Tehran University of Medical Science. Initially, the university's nursing office used its email list to email all the nurses working at the hospital. The script that was used in the email is in Appendix A. The information letter in Appendix B was attached to this email, and a link included to the Survey Monkey containing the adapted version of the Health Literacy Knowledge and Experience Survey (HL-KES) in Appendix F. Potential participants received two reminder emails, sent at one-week intervals after the initial email is delivered.

    However, as only 15 nurses responded to the online version of HL-KES, the researcher decided to approach the potential participants in person through the following procedure: in each hospital and community health center a brief presentation was delivered by two research assistants, after which the survey package was distributed to the attendees. Also, in order to increase the response rate, those nurses who were not able to fill out the survey immediately were asked to mail the completed survey to the Iranian Scientific Nursing Association using an enclosed, prepaid, self-addressed envelope. At this stage, 192 registered nurses participated in the study. Completion of the questionnaire constitutes consent to participate in the study. Appendix C contains the script that was read during the presentation.

    Instrument. In this study, data collection was conducted using the HL-KES, after obtaining written permission from the developer (Appendix E). This self-administered survey was developed by Cormier (2006), as a part of her doctoral dissertation, to examine health literacy knowledge of and experience with health literacy in the nursing profession. It has since been used in a variety of nursing contexts such as the final year of baccalaureate degree programs (Cormier & Kotrlik, 2009), and for registered nurses (Knight, 2011), nurse practitioners (Cafiero, 2013), and nursing students in associate degree programs (Torres & Nichols, 2014). The HL-KES consists of three parts: items related to nurses' health literacy knowledge (29 items), items related to nurses' health literacy experiences (9 items), and demographics (7 items). As a part of the instrument adaptation process, the investigator made

slight modifications to the demographics section to make it relevant to the study target population. For instance, two questions in the original HL-KES, one related to ethnicity, and one related to employment status have been omitted. In addition, the investigator added two questions, one about how long the participant have been practicing nursing, and one about where the participant practices (at an acute care or community health center). The self-administered one-time survey took approximately 15-20 minutes to be completed; therefore, participant burden was considered minimal.

The first section, Health Literacy Knowledge items, contains 29 multiple-choice questions to test the participant's knowledge in five content areas: basic facts on health literacy (six items: 1,2,3,4,5 and 17), consequences associated with LHL (four items: 6, 7, 8 and 9), health literacy screening (six items: 10, 11, 12, 13, 14 and 15), guidelines for written health care materials (11 items: 18, 19, 20, 21, 22, 23, 24, 25, 26, 27 and 28), and evaluating the effectiveness of healthcare information (two items: 16 and 29). The score for each content area is sum of the correct answers within the area. Each correct answer is worth one point, so a total score for this section is between 0 and 29. The mean score for each content area and total score was calculated. Additionally, proportions were calculated for the correct answers to each item within each content area. Throughout the second section, Health Literacy Experience, participants are directed to rate the frequency of their participation in nine learning activities related to health literacy using the following scale: 1 = *never,* 2 = *sometimes,* 3 = *frequently,* and 4 =*always.* Each item in this section focuses on a unique learning experience related to health literacy. Proportions were calculated for each response within each item. Also, using the score assigned for each response (1 = never, 2 = sometimes, 3 = frequently, and 4 =always), a mean score was reported for individual participants.

The demographic section, which consists of seven items, focuses on characteristics such as age, gender (male & female), level of nursing education (undergrad degree and master's degree), years of nursing experience, area of practice (acute care and community health center), prior work experience (other than nursing) in the healthcare system, and frequency of interaction with healthcare providers for personal needs.

Cormier (2006) used the three of Bloom's six cognitive levels (Krathwohl, 2010) to categorize the Health Literacy Knowledge items of the HL-KES; these levels include knowledge, comprehension, and application. Accordingly, from the 29 items included in the first section of

the HL-KES two items, which evaluate the effectiveness of health care information, are classified under the application cognitive level; four items related to the consequences associated with LHL categorized at the comprehension cognitive level; four out of six items of basic facts on health literacy are classified under the knowledge category and the other two items are related to the comprehension level ; from the eleven items associated with guidelines for presenting written health care information five items are classified under the knowledge cognitive level, two items are classified under the comprehension level and four items are categorized under the application level; from the six items related to health literacy screening, two items are classified under the knowledge level, two items are under the comprehension level and two items are classified at the application categories.

  Instrument validity and reliability. The HL-KES has been validated by the developer (Cormier 2006); it was evaluated by five experts in the area of health literacy in terms of the content validity. Subsequently, a Content Validity Index (CVI) for each of the items was calculated. Overall CVI score for the whole instrument (Rubio, Berg- Weger, Tebb, Lee, & Rauch, 2003), a quantitative approach indicating agreement among the five experts on content validity, was reported to be 0.98 (Cormier & Kotrlik, 2009). The CVI for this instrument is quite acceptable in comparison with the standard CVI of 0.80 (Polit- O Hara& Beck, 2006). Reviewing the published studies indicates that there is no other validated instrument which measure nurses' knowledge of and experience with health literacy; thus, the HL-KES was used in this study. Reliability measures for the HL-KES reported by different studies are varied; Cronbach's alpha is reported at 0.81 (Knight, 2011), 0.82 (Torres & Nichols, 2014), and 0.57 (Cafiero, 2013) in three different studies. In the current study, internal consistency reliability was assessed and Cronbach's alpha coefficient for the scale part of the HL-KES (section 3) was evaluated to be 0.85 which indicates a good internal consistency for the tool.

  Instrument adaptation. The HL-KES was originally developed by Cormier (2006) to assess the health literacy knowledge and experiences of senior level baccalaureate nursing students enrolled at state universities in Louisiana in the United States. The HL-KES was adapted by Knight (2011) to examine the health literacy knowledge and experience of the registered nurses in Georgia in the US. This adapted version of the HL-KES was utilized to collect the data in the current study. However, the instrument was adapted again in this study to assess Iranian registered nurses' knowledge of and experience with health literacy. The process

of the adaptation is based on the assumption that the instrument's psychometric properties, such as validity and reliability across the different cultures, will be consistent (Beaton, Bombardier, Guillemin, & Bosi Ferraz, 2000). Through the process of cross-cultural adaptation, the study investigator tried to develop an instrument which fits with Iranian culture/language and also is equivalent to the original instrument created in the US for that culture/language. In doing so, the researcher followed the guidelines published by Sousa and Rojjanasrirat (2011) on cross-cultural adaptation in health research. Based on this guideline, in order to adapt the HL-KES to be used in Iranian culture/language the following six steps were followed:

Step I (Initial translation): Two independent translators translated the HL-KES from English to Farsi, the official language in Iran. The translators are bilingual (Farsi is their mother language). One translator was familiar with the field of the study, while the other was a general translator without any knowledge of the study topic.

Step II (Synthesis of the translations): The two translators and the study investigator met and synthesize the results of the translations.

Step III (Back translation): The product of Step II was back translated to English by one translator.

Step IV (Expert committee review): An expert committee consisting of the study investigator, two other experts in nursing and the translators (forward and back translators) compared the back translation to the source HL-KES with the aim of creating the pre-final survey version that was tested in the target population.

Step V (Test of the pre-final version): The pre-final survey was tested among 20 participants (Beaton et al., 2000) selected from the target population, Iranian registered nurses. For this purpose, three open ended questions, which asked participants to point out any vague item, was added at the end of each three sections of the pre-final survey.

Step VI (Expert committee review): All the reports of the pre-final testing were reviewed again by the expert committee and the final version of the HL-KES was created.

Sample Size

In determining the association between many variables, the sample size should be five to 10 times the number of variables (Norman & Streiner, 1999). In this study the measurement instrument consists of 38 items (Health Literacy Knowledge: 29 items; Health Literacy Experience: nine items) and we considered five participants for each variable and estimated a sample size of 190 Iranian registered nurses.

Data Analysis

Data analysis was conducted using Statistical Package for the Social Sciences (SPSS) software. The data analysis process for each question is described below:

Descriptive statistics were used to describe the characteristics of the study participants. These characteristics include each participant's age (continuous variable), gender (male/female), level of nursing education (baccalaureate degree/master's degree), years of nursing experience (continuous variable), and area of practice (acute care/community health centre), prior work experience (other than nursing) in the healthcare system (yes/ no), and frequency of interaction with healthcare providers for personal needs. Based on the level of the variables, the central tendency was reported by a mean score and variability by a Standard Deviation for interval variables. Proportions were used to describe categorical variables.

Research Question 1 seeks to describe the Iranian registered nurses' knowledge of health literacy in five content areas measured by the first section of the HL-KES. The content areas are basic facts on health literacy, consequences associated with LHL, health literacy screening, guidelines for written health care materials, and evaluating the effectiveness of health care information. To answer Question 1, means, standard deviations, and the range of scores for each of the content areas and the whole section was reported. Additionally, proportions were calculated for correct answers to each item within each content area.

Research Question 2 intends to describe the Iranian registered nurses' experience of health literacy measured by the second section of the HL-KES. In analyzing the responses to the nine-item scale included in the second part of the HL-KES, proportions were calculated for each response within each question. Also using the score assigned for each response (1 = never, 2 = sometimes, 3 = frequently, and 4 =always) a mean score was reported.

Research Question 3 aims to determine whether there is a relationship between health literacy knowledge and the health literacy experiences of Iranian registered nurses. To answer

this question using the mean scores for the first and second sections of the HL-KES, a Pearson product-moment correlation coefficient was conducted.

Research Question 4 seeks to verify whether demographic variables can explain the variations in Iranian registered nurses' health literacy knowledge. Multiple linear regression analysis was conducted to determine whether the potential exploratory variables predicted the dependent variable of the Iranian registered nurses' knowledge of health literacy. These potential exploratory variables included the study participant's age, gender, level of nursing education, years of nursing experience, area of practice, prior work experience (other than nursing) in the healthcare system, and frequency of interaction with healthcare providers for personal needs. For all analyses, a ρ value of ≤ 0.05 considered statistically significant.

Ethical Considerations

Ethical approval was obtained from the University of Alberta Health Research Ethics Board and the Tehran University of Medical Sciences Research Ethics Committee. A participant information letter including a description of the study and information regarding the requirements, benefits, and risks for those who choose to participate was part of the survey package. Potential participants were reassured that their information in the study will be kept confidential. Written consent was not requested, as the participants were informed that the completed survey would be considered implied consent for participation in the study. Upon completion of data collection all completed surveys were coded with a numerical identifier. In order to maintain confidentiality and to secure the data, the unidentifiable data was uploaded to the Health Research Data Repository (HRDR) housed at the Faculty of Nursing, University of Alberta (U of A), and only the study investigator had access to the information linking the codes to the participants.

Within the Faculty of Nursing at the U of A, the HRDR is a secure and confidential virtual research environment (VRE) created to support both qualitative and quantitative research with the focus on health-related research topics. The HRDR's mandate is to support collaboration across research disciplines, to accommodate health research data and meta-data throughout their life-cycles, and to promote the secondary use and re-purposing of health research data. All research projects supported within the HRDR need to undergo a detailed assessment in order to identify support needs and to ensure that they are in accordance with all ethical and contractual obligations. The HRDR is a secure environment with no internet or

printing functions enabled; thus, projects supported within the HRDR are able to be securely and remotely accessed by researchers and their teams while ensuring that sensitive information remains secure. The HRDR additionally facilitates the secure transfer of data in order to support data collection and dissemination activities.

Dissemination of Study Findings

The Canadian Institute of Health Research (CIHR) (n.d.) describes the dissemination of knowledge as a process of recognizing appropriate groups of audiences and tailoring "the message and medium." In fact, the dissemination of knowledge involves the spreading of knowledge products directed to increase stakeholders' awareness (Graham et al., 2006). In this study I created a multilevel plan to disseminate the study findings taking into consideration several groups of stakeholders. I intend to share the study findings with the study target population (Iranian registered nurses) by publishing an article in the Iranian Nursing Organization magazine. This Persian language magazine is sent for free on a monthly basis to members of the Iranian Nursing Organization. I have presented the preliminary findings of this study at Margaret Scott Wright Research & Innovation Day, Edmonton, Alberta, Canada, November 2015. I am also very keen to present the study's final results in national and international conferences on patient education, health literacy or patient empowerment especially in Iran where the target population have the possibility of attending the conference. I will also publish the study findings in highly accessed, peer-reviewed scientific and health policy journals at national and international levels.

Summary

The purpose of this cross-sectional study is to examine Iranian registered nurses' knowledge of and experience with health literacy. Chapter 3 described the methods that was used in this study. Information was presented about the design of the study, study population and setting, data collection, instrument, data analysis, dissemination of study findings and ethical considerations. The study data was collected using the adapted form of the HL-KES for an Iranian context. The HL-KES was developed by Cormier (2006) to assess nursing students' knowledge of and experience with health literacy, and later was adapted by Knight (2011) to be used in a study on registered nurses for the same purpose. The instrument had been validated by the developer; however, to maintain the psychometric properties of the instrument in the context of Iran, it was adapted using the guideline published by Beaton et al. (2000) on cross-cultural

adaptation in medicine, sociology, and psychology. In the current study, Cronbach's alpha coefficient for the scale part of the HL-KES (section 3) was evaluated 0.85 which indicates a good internal consistency for the tool.

Chapter 4: Study Findings

Introduction

This chapter provides information on the findings of this cross-sectional study with the aim of examining Iranian registered nurses' knowledge of and experience with health literacy. The chapter includes the results of a pilot study which was part of the tool adaption for the main study, as well as the findings of the main study.

Pilot Study

This pilot study, required for the stage VI tool adaptation process (Sousa and Rojjanasrirat, 2011), aimed to pilot the pre final version of the HL-KES in an Iranian culture. A sample size of 20 participants was recommended by the guideline (Sousa & Rojjanasrirat, 2011) for this pilot study. Data collection took place in hospitals and community health centers affiliated with Tehran University of Medical Science, in August 2015.
The pre-final version of the HL-KES encompassed three sections. Section 1 HL-KES, demographics, consists of seven items, focusing on participants' characteristics such as age, sex(male & female), level of nursing education (undergrad degree and master's degree), years of nursing experience, area of practice (acute care and community health center), prior work experience (other than nursing) in the healthcare system, and frequency of interaction with healthcare providers for personal needs. In stage IV of the tool adaptation process, when an expert committee compared the back translation to the original HL-KES, two items in this section were excluded from the original HL-KES, one item asked about participants' ethnicity (White/ Africa American/ other) and the other their grade point average (GPA).

Section 2 HL-KES, health literacy knowledge, was used to assess the nurses' knowledge of health literacy (NK-HL) in five content areas: basic facts on health literacy; consequences associated with low health literacy; health literacy screening; guidelines for written healthcare materials; and evaluation of health literacy intervention. Through stage IV 0f tool adaptation, the decision was made to omit three questions (# 2, 19, and 21) out of 29 questions included in section 1. The removed items asked about: the magnitude of limited health literacy in different ethnic groups in the USA; recommended reading levels for written healthcare information in the USA; and application of Fry methods, they did not fit into the context of this study. Therefore, individuals who participated in the pilot study were asked to respond to 26 questions included in

the pre-final HL-KES. In addition to this elimination, two alternatives answers ("I cannot remember" and "I never heard about it") were added to the four options for each question. Also, one open ended question was added to the end of this section requesting that participants indicate the items that were unclear or vague.

Section 3 HL-KES, health literacy experience, contained a nine-item scale to measure nurses' experience with health literacy (NE-HL). Also, one open ended question was added to the end of this section asking the participants to indicate the items that were unclear or vague.

Section 1 HL-KES: Participants characteristics. The majority of study participants in the pilot study were female (18 [90%]), while 2 participants (10%) were male. The highest level of nursing education for all the participants (baccalaureate degree/ masters' degree) was a baccalaureate degree. None of the participants had prior work experience in healthcare areas other than nursing. The primary area of practice (acute care/ community health center) for all the study participants was acute care. In response to the question about whether they had had interaction with health care professionals for personal reasons within the last 5 year, the majority of the participants (14 [70%]) reported they 'usually' had this experiences (Table 1.1). The participants' age ranged from 25 to 44 years with a mean of 32.5 years (St deviation= 5.17). They reported having 1-20 years of nursing experience (mean=7.95± SD deviation=5.49) (Table1. 2).

Table 1.1: Demographic characteristics of the Iranian registered nurses working in hospital and community healthcare enters affiliated with Tehran University of Medical Science in August 2015.

	N	Frequency	Percentage
	20		
Gender			
Male		2	10
Female		18	90
Highest Nursing Degree			
Baccalaureate		20	100
Maters' Degree		0	0
Prior Experience in Healthcare Area			
No		20	20
Yes		0	0
Primary Area of Practice			
Acute Care		20	20
Community Health Centre		0	0
Interaction with healthcare professionals for personal reasons			
No		0	0
Yes		20	20
If " Yes", to the previous question, how often Frequency of the interaction			
Very often		4	20
Usually		14	70
Rarely		2	10

Table 1.2: Demographic characteristics (age and length of nursing experience) of the Iranian registered nurses working in hospital and community healthcare enters affiliated with Tehran University of Medical Science in August 2015.

Variables	N	Minimum	Maximum	Mean	St
Nursing experience(Year)	20	1	20	7.95	5.49
Age	20	25	44	32.5	5.17
Total	20				

Section 2 HL-KES: Health literacy knowledge. The decision to keep, revise, or remove the items included in section 2 HL-KES in the final version of the HL-KES was made based on responses to the open ended questions in the section and item analysis (Table 1.4). Also, proportions for all chosen alternative answers for each question were calculated and reported in Table 1.3.

None of the 20 participants mentioned that items in this section were unclear for them. For the item analysis, an Item Difficulty Index and Item Discrimination Index were computed for participants' responses to the 26 items included in this section. Results of the item analysis of the section 2 HL-KES revealed that the item difficulty index ranged from 0 to 1(lower score more difficult). Thirteen items out of 26 items incorporated in this section had an item difficulty index of less than 0.3 (hard questions), ten items were between 0.3 and 0.7 (medium questions), and three items rated greater than 0.7 (easy questions). In terms of the discrimination index, the items in section 2 HL- KES ranged between -0.2 and .60 (higher score better discrimination power). A negative discrimination index was calculated for only one item (item # 8). Among the other 25 items, twelve rated less than 0.1, reflecting a poor discrimination power; nine items were assessed of having a fair discrimination index, between 0.1 to 0.3; three items were reported to be greater than 0.3, showing a good discrimination index.

Reviewing the items with a poor discrimination index showed that, in terms of difficulty index, they were ranked either too easy (item # 5), or too difficult (items # 2, 9, 11, 12, 26). This provided a justification for the gap between the upper group and lower group in these items which was minimum or zero. Also, there were some items with poor or fair discrimination power

(items # 23, 25) which assessed "participants' ability to apply a principle" that was a different objective compared to most of the items included in section 2 HL-KES measuring "participants' knowledge of facts". This may be a reason for low the correlation between these items and the total test score in the discrimination index. In fact, discrimination index reflects internal consistency of items rather than the item quality and its validity (Western University of Washington, n.d.).

Caution must be taken in interpretation of the results of an item analysis and the figures must be considered in the context of the test, and individuals being tested (Western University of Washington, n.d.). In this pilot study, items with extremely low or high difficulty index or poor and fair discriminatory power were reviewed to identify the reasons; however, none of the items were removed from the pre final HL-KES. This was done because, the HL-KES is already a validated tool in North America and each of the aforementioned items covers one part of nurses' required knowledge of health literacy. Furthermore, the HL-KES was expected to be used in the main study as a needs assessment tool to provide information about the areas of health literacy knowledge specially to determine the areas that may require further improvement, therefore, eliminating an item based on a pilot study with 20 participants was not justified. Nevertheless, the wording of these outlier items and the alternative answers were closely reviewed and minor changes were inserted to increase clarity and increase understandability.

Table 1.3: Responses to the Section 2 of the HL-KES, by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science in August 2015.

	Health Literacy Knowledge Items	Na b%	A	B	C	D	E	F	NC d%	NE f%	NG h%
1	Low health literacy levels are most prevalent among	3		0	0	**11**	0	3	3	11	17
	which of the following groups? (BF)	15		0	0	55	0	15	15	55	85
2	The research on health literacy indicates that: (BF)	13		**0**	4	1	0	2	0	0	20
		65		0	20	5	0	10	0	0	100
3	What is the likelihood that a nurse working in a public health clinic	0		0	4	**15**	0	1	0	15	20
	primarily serving low-income minority patients, will encounter a	0		0	20	75	0	5	0	75	100
	patient with low health literacy skills? (BF)										
4	The best predictor of healthcare status is: (BF)	15		**4**	0	0	0	1	0	4	20
		75		20	0	0	0	5	0	20	100
5	Patients with low health literacy skills: (CQ)	0		0	0	20	0	0	0	20	20
		0		0	0	**100**	0	0	0	100	100
6	Health behaviors common among patients with low health literacy	**8**		2	2	7	0	1	0	8	20
	skills include: (CQ)	40		10	10	35	0	5	0	40	100
7	Patients cope with low health literacy by: (CQ)	12		2	3	**2**	0	1	0	2	20
		60		10	15	10	0	5	0	10	100
8	The nurse should keep in mind that individuals with low	1		5	0	**14**	0	0	0	14	20
	health literacy skills: (CQ)	5		25	0	70	0	0	0	70	100
9	The Rapid Estimate of Adult Literacy in Medicine is an instrument	0		0	1	**0**	1	18	0	0	20
	utilized to: (SC)	0		0	5	0	5	90	0	0	100
10	When working with individuals who have low health literacy	**11**		0	9	0	0	0	0	11	20
	skills the nurse should keep in mind that these individuals: (SC)	55		0	45	0	0	0	0	55	20

Health Literacy Knowledge Items	Na b%						NC d%	NE f%	NG h%
	A	B	C	D	E	F			
11 Which of the following questions should provide the nurse with	7	9	**0**	4	0	0	0	0	20
the best estimate of reading skills of the patient? (SC)	35	45	0	20	0	0	0	0	100
12 Which statement best describes the Test of Functional Health	**0**	0	0	2	2	16	0	0	20
Literacy? This instrument is: (SC)	0	0	0	10	10	80	0	0	100
14 Which of the following statements, made by the nurse, would be	6	0	**12**	0	0	2	0	12	20
the best approach to initiating a health literacy screening with a patient?	30	0	60	0	0	10	0	60	100
15 After providing written healthcare information to a patient he	0	6	6	**8**	0	0	0	8	20
states, "Let me take this information home to read." This may be a clue to the nurse that the patient: (EV)	0	30	30	40	0	0	0	40	100
16 An individual with functional health literacy will be able to: (BF)	0	0	12	**8**	0	0	0	8	20
	0	0	60	40	0	0	0	40	100
17 Which of the following is true with regards to written healthcare information? (GL)									
18 The first step in developing written healthcare	2	1	**10**	0	2	5	0	10	20
information is to: (GL)	10	5	50	0	10	25	0	50	100
19 Recommendations for developing written healthcare materials	1	**7**	6	2	0	4	0	7	20
include: (GL)	5	35	30	10	0	20	0	35	100
20 When listing side effects for a handout on chemotherapy	0	**2**	1	0	2	15	0	2	20
the oncology nurse should limit the list to: (GL)	0	10	5	0	10	75	0	10	100

Health Literacy Knowledge Items	Na b%						NC d%	NE f%	NG h%
	A	B	C	D	E	F			
21 Written healthcare information provided to a patient related to a specific disease should include: (GL)	**8**	5	0	0	1	6	0	8	20
	40	25	0	0	5	30	0	40	100
22 Which of the following would be the most effective wording for a heading in a brochure on hypertension? (GL)	**12**	4	4	0	0	0	0	12	20
	60	20	20	0	0	0	0	60	100
23 The best way to ensure that a breast cancer prevention brochure is culturally appropriate is to: (GL)	3	9	4	**4**	0	0	0	4	20
	15	45	20	20	0	0	0	20	100
24 Which of the following instruction on the management of diabetes would be least understood by an individual with low health literacy skills?(GL)	2	17	0	1	0	0	0	2	20
	10	95	0	5	0	0	0	10	100
25 Which of the following approaches to patient education provides minimal opportunity for the patient to actually engage in learning? (GL)	1	**3**	8	7	0	1	0	3	20
	5	15	40	35	0	5	0	15	100
26 The most effective way for a nurse to determine how well a patient with low health literacy understands healthcare information is to: (EV)	4	3	**0**	13	0	0	0	0	20
	20	15	0	65	0	0	0	0	100

Note: Bold faced numbers represent correct answers.

a Number of responses for each answer choice.

b Percentages of responses for each answer choice.

c Number of missing responses.

d Percentage of missing responses.

e Number of correct responses.

f Percentage of correct responses.

g Total number of responses.

h Percentage of total responses

Table 1.4: Item Difficulty Indices and Item Discrimination Indices for Responses to section 1 of the Pre final version of the HL-KES, by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science in August 2015.

	Health Literacy Knowledge Items[a]	Item Difficulty Index [b]	Item Discrimination Index [c]
1	Low health literacy levels are most prevalent among which of the following groups? (BF)	0.55	0.3
2	The research on health literacy indicates that: (BF)	0.0	0
3	What is the likelihood that a nurse working in a public health clinic primarily serving low-income minority patients, will encounter a patient with low health literacy skills? (BF)	0.75	0.3
4	The best predictor of healthcare status is: (BF)	0.2	0.0
5	Patients with low health literacy skills: (CQ)	1	0.0
6	Health behaviors common among patients with low health literacy skills include: (CQ)	0. 4	0.0
7	Patients cope with low health literacy by: (CQ)	0.1	0.2
8	The nurse should keep in mind that individuals with low health literacy skills: (CQ)	0.7	-0. 2
9	The Rapid Estimate of Adult Literacy in Medicine is an instrument utilized to: (SC)	0.0	0.0
10	When working with individuals who have low health literacy skills the nurse should keep in mind that these individuals: (SC)	0.55	0.5
11	Which of the following questions should provide the nurse with the best estimate of reading skills of the patient? (SC)	0.0	0.0
12	Which statement best describes the Test of Functional Health	0.0	0.0

Literacy? This instrument is: (SC) Health Literacy Knowledge Item	Item Difficulty Index	Item Discrimination Index
13 What is the strongest advantage of conducting health literacy screenings? Health literacy screenings: (SC)	0.55	0.5
14 Which of the following statements, made by the nurse, would be the best approach to initiating a health literacy screening with a patient? (SC)	0.6	0.0
15 After providing written healthcare information to a patient he states, "Let me take this information home to read." This may be a clue to the nurse that the patient: (EV)	0.4	0.0
16 An individual with functional health literacy will be able to: (BF)	0.4	0.0
17 Which of the following is true with regards to written healthcare information? (GL)	0.75	0.3
18 The first step in developing written healthcare information is to: (GL)	0.15	0.6
19 Recommendations for developing written healthcare materials include: (GL)	0.35	0.3
20 When listing side effects for a handout on chemotherapy the oncology nurse should limit the list to: (GL)	0.1	0.0
21 Written healthcare information provided to a patient related to a specific disease should include: (GL)	0.4	0. 2
22 Which of the following would be the most effective wording for a heading in a brochure on hypertension? (GL)	0.2	0.2
23 The best way to ensure that a breast cancer prevention brochure is culturally appropriate is to: (GL)	0.2	0.1

	Health Literacy Knowledge Item	Item Difficulty Index	Item Discrimination Index
24	Which of the following instruction on the management of diabetes would be least understood by an individual with low health literacy skills?(GL)	0.1	0.2
25	Which of the following approaches to patient education provides minimal opportunity for the patient to actually engage in learning? (GL)	0.15	0.1
26	The most effective way for a nurse to determine how well a patient with low health literacy understands healthcare information is to: (EV)	0	0.0

[a] Items listed in Section 1 of the pre final HL-KES (Appendix?)
[b] Item Difficulty = number of correct answers divided by the total number of respondents.
[c] Item Discrimination Index = Response frequency of the upper group minus the response frequency of the lower group divided by the total number of responses from the upper group.

Section 3 HL-KES: Health literacy experience. The decision to keep, revise, or remove the items included in section 3 HL-KES in the final version of the HL-KES was made based on responses to the open ended questions in the section and the proportions calculated for each response within each items (Table 1.4). None of the 20 participants mentioned that there was an item which was unclear for them. After reviewing the results of the analysis for this section, it was noticed that all the participants in the pilot study chose the option "Never" to answer to the litem in this section, which asked "how often did you use computer software to provide healthcare information to an individual or group?". Also, based on my own work experience of over 10 years in the study context (Iran), I recognize that there are no computer software programs available for nurses to provide healthcare information to their clients. Therefore, this item was omitted from the section 3 HL-KES.

Table 1.5: Frequencies and percentages of responses to the section 2 of the HL-KES, by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science in August 2015**.**

	Health Literacy Experience Items	N N (%)	F N (%)	S N (%)	O N (%)	N/a N (%)	TR N (%)
1	How frequently was health literacy emphasized in your nursing curriculum?	1(5)	9(45)	9(45)	1(45)	0(0)	20(100)
2	How often did you use a health literacy screening tool to assess the health literacy skill of an individual?	20(100)	0(0)	0(0)	0(0)	0(0)	20(100)
3	How often did you evaluate the reading level of written healthcare materials before using them for patient teaching?	3(15)	7(35)	5(25)	4(20)	1(5)	20(100)
4	How often did you evaluate the cultural appropriateness of healthcare materials, including written handouts, videos, audiotapes, before using them for patient teaching?	16(80)	0(0)	3(15)	1(5)	0(0)	20(100)
5	How often did you evaluate the use of illustration on written health care materials before using them for patient teaching?	17(85)	2(10)	1(5)	0(0)	0(0)	20(100)
6	How often did you use written materials to provide healthcare information to an individual or community group?	0(0)	3(15)	2(10)	15(75)	0(0)	20(100)
7	How often did you provide audiotapes to provide healthcare information to an individual or community group?	20(100)	0(0)	0(0)	0(0)	0(0)	20(100)
8	How often did you use videotapes to provide healthcare information to an individual or group?	19(95)	0(0)	1(5)	0(0)	0(0)	20(100)
9	How often did you use computer software to provide healthcare information to an individual or group?	18(90)	0(0)	0(0)	0(0)	0(0)	20(100)

Main Study

Data collection took place in hospitals and community health centers affiliated with the Tehran University of Medical Science between November 2015 and January 2016. During this time, 3413 nurses were working in 16 hospitals and three community health centers; a total 207 nurses participated in this study in two stages. During the first stage, an online version of the HL-KES was sent to a total of 300 nurses working in hospitals and community centers affiliated with the Tehran University of Medical Science. However, as the response rate was only 5% following two reminders in a one week interval, data collection was continued using a hard copy of the survey.

Data was collected using the HL-KES, which was adapted in this study for the Iranian context. The adapted version of HL-KES consisted of three sections: demographics (7 items); items related to nurses' health literacy knowledge (26 items); and items related to nurses' health literacy experiences (8 items).

Section 1 encompassed seven items focusing on participants' characteristics such as nurses' age (continuous variable), sex (male & female), level of nursing education (baccalaureate degree/ master's degree), years of nursing experience (continuous variable), area of practice (acute care/community health center), prior work experience (other than nursing) in the healthcare system (yes/ no), interaction with healthcare providers for personal needs (yes/ no), and frequency of the interaction with healthcare providers for personal needs (rarely/ usually/very often).

Section 2, health literacy knowledge, was designed to assess nurses' knowledge of health literacy. This section contained 26 multiple-choice questions to test the participant's knowledge in five content areas: basic facts on health literacy (five items: 1,2,3,4, and 16); consequences associated with low health literacy (four items: 5 6, 7, and 8), health literacy screening (six items: 9, 10, 11, 12, 13, and 14), guidelines for written health care materials (9 items: 17,18, 19, 20, 21, 22, 23, 24, and 25), and evaluating the effectiveness of healthcare information (two items: 15 and 26). The score for each content area was a sum of the correct answers within the area. Each correct answer was worth one point, therefore, a total score for this section was between 0 and 26.

Section 3, health literacy experience, participants were directed to rate the frequency of their participation in eight activities related to health literacy using the following scale: 1 =

never, 2 = *sometimes,* 3 = *frequently,* and 4 =*always.* Each item in this section focused on a unique experience related to health literacy which was categorized into two groups by Cormier (2006). The first six items measured "Core Health Literacy Experience" which included learning experience related to emphasis on health literacy in the nursing curriculum, use of health literacy screening tools, evaluating the reading level of written healthcare materials, and use of written materials to provide healthcare information. The remaining two items (item # 7 and 8) measured the "Technology Health Literacy Experience" including the use technology such as audio type and video type to provide healthcare.

The following research questions were addressed in this study:

1. What is the level of health literacy knowledge among Iranian registered nurses as measured by the Health Literacy Knowledge and Experience Survey?

2. What are the health literacy experiences of Iranian registered nurses as measured by the Health Literacy Knowledge and Experience Survey?

3. Does a relationship exist between the level of health literacy knowledge and the health literacy experiences of Iranian registered nurses?

4. Is there any variation in the health literacy knowledge level of Iranian registered nurses? If there is a variation, which of the following variables can explain that, Iranian registered nurses' age, gender, level of nursing education, years of nursing practice, areas of practice, prior work experience (other than nursing) in the healthcare system, and frequency of interaction with healthcare providers for personal needs.

Data Preparation

Data entry. Upon completion of data collection, data collected through the online version of the HL-KES (15 participants) was exported to a SPSS file by the researcher. The SPSS file accompanied by instructions for use and the HL- KES codebook (Appendix G) were sent to the two research assistants in Iran to be used for data entry. Data from hard copies of the HL-KES (192 participants) was entered into the SPSS file by the two research assistants independently. The two files were double checked by the researcher to identify any discrepancy between them. Since there were no discrepancies between them, one of the files was used for data analysis.

Data cleaning. To insure that the data was entered correctly, each variable within the SPSS file was examined considering its potential range of scores. Also for demographic

variables, violation in logic was used to examine whether within an individual survey a response given to one item was in conflict with other items (Bannon, 2013). Variables related to nurses' knowledge of health literacy (variables 10- 35) and their experience with health literacy (variable 36-43) were recoded into different variables based on pre-established scoring.

Checks of data integrity. To check the data integrity, missing data, reliability of the measurements, and parametric test assumptions were examined.

Missing data. The amount of missing data values per individual study participant as well as the proportion of study participants that had missing data values were calculated using descriptive statistics. Out of 207 individuals participating in this study, eight percent (15 hard copy surveys and 2 online surveys) that had more than 80% missing data in the two summary scores of the dependent variables (nurses' knowledge of health literacy and nurses' experience with health literacy) were excluded (Bannon, 2013).

In order to define missing data in the remaining 190 participants, the proportion of the missing data values for each variable was examined by calculating frequencies for individual variables. Missing values were detected in variable # 1, 2, 3, 4, 5, 18, 25, 26, 28, 29, 30, 31, 32, 33, 34, 37, 38, 39, 40, 41, 42, 43, and 44). Missing data was defined as the proportion of overall items without valid response within these variables. The proportion of missing data in the above mentioned variables was between 0.5 % (1) to 4.2% (8) which was lower than the level that required imputation (Bannon, 2013).

Tool reliability. Measurement of the tool reliability property is defined the extent to which an instrument yields the same results on repeated measures. In this study, Cronbach's alpha coefficient for the scale part of the HL-KES (section 3) was assessed at 0.85 which indicated a good internal consistency for the tool.

Univariate Analysis

*Sample characteristics***.** Data from a total sample of 190 Iranian registered nurses were included in the final analysis. The majority of study participants were female (160 [84%] vs 30[16%] male). The highest level of nursing education for 178(93.7%) participants was a baccalaureate degree, while 12 (6.3%) participants had master's degree. Only 25 (13.2 %) participants had prior work experience in healthcare areas other than nursing. The primary area

of practice (acute care/ community health center) for 186 (97.9%) of the study participants was acute care. In terms of frequency of interaction with healthcare professionals (rarely, usually, very often), the majority of the participants (73[38%])) reported they "usually" had interaction with health care professionals for personal reasons within the last 5 years (Table 2.1). The participants' age ranged from 21 to 52 years (Mean= 31.6, St deviation= 6.9) and reported having 1-26 years of nursing experience (Mean= 8.3, St deviation =6.5) (Table 2.2)

Table 2.1: Demographic characteristics of the Iranian registered nurses working in hospital and community healthcare enters affiliated with Tehran University of Medical Science in 2015

	N	Frequency	Percentage
Gender	190		
Female		158	83.2
Male		30	15.9
Highest Nursing Degree	190		
Baccalaureate		175	92
Maters' Degree		12	6.3
Prior Experience in Healthcare Area	183		
No		29	15.3
Yes		154	81.1
Primary Area of Practice	188		
Acute Care		186	97.9
Community Health Centre		2	1.1
Interaction with healthcare professionals for personal reasons	190		
No		44	23.2
Yes		146	76.8
If " Yes", to the previous question, how often Frequency of the interaction	188		
Very often		38	20
Usually		73	38.4
Rarely		29	15.3

Table 2.2: Demographic characteristics (age and length of nursing experience) of the Iranian registered nurses working in hospital and community healthcare enters affiliated with Tehran University of Medical Science in 2015

Variables	N	Minimum	Maximum	Mean	St
Nursing experience(Year)	187	1	26	8.28	6.55
Age	187	21	52	31.65	6.88
Total	190				

Research question 1. What is the level of health literacy knowledge among Iranian registered nurses as measured by the HL-KES? To determine registered nurses knowledge of health literacy, participants were asked to respond to 26 questions in section 2 of the HL-KES, where nine questions (34.6%) assessed participants" knowledge of guidelines for presenting written healthcare information; five questions (19.2%) examined participants" knowledge of basic health literacy facts; six questions (23%) assessed participants" knowledge of screening patients for health literacy skills; And four questions (15.4%) sought to understand participants" knowledge of the consequences associated with limited health literacy. Two additional questions (7.5%) investigated participants" knowledge in evaluating the effectiveness of healthcare information. For each question, in addition to the four alternative responses, there were two options of "I cannot remember" and "I never receive any information about it".

To answer the first research question, proportions for all the alternative answers to each question within each content area of section 2 are calculated and reported in Table 2.3. Responses to questions within section 2 of the HL-KES suggest that participants have some health literacy knowledge; but knowledge gaps do exist.

Basic facts on health literacy (Five items: 1,2,3,4 and 16). Although 74 (38%) of participants were aware that low health literacy levels are most prevalent among individuals 65 years of age and older, 8 participants (4.2%) expressed that they never heard of this relationship. When questioned about the result of health literacy research, 65 participants (34%) responded that the last obtained degree was the best predictor of people's ability to read. In fact, only 35 (18.4%) of participants chose the correct option that states people's ability to read is three to five years less than their last obtained degree. Although 73(38%) of respondents knew that the likelihood of encountering patients with limited health literacy skills is high when they work in public health clinics in low income areas, only 40 (21%) participants reported knowing the correct response when they were asked about the best indicator of health status. Regarding the definition of the functional health literacy definition, 74 (38.9%) respondents chose the correct response; however, 12 (6.3%) participants reported not having heard about this terminology.

Consequences associated with low health literacy (four items: 5, 6, 7 and 8). The majority (55%) of participants were aware that patients with low health literacy skills are often diagnosed late and have fewer treatment options than those with adequate health literacy skills.

However, only 64 (34.7%) participants were also knowledgeable regarding the lack of participation in preventative healthcare among patients with low health literacy skills. Another behaviour associated with low health literacy skills was inability of the individual to express their struggles with understanding written healthcare information, which is related to the stigma attached to their situation; only 24 (12.6%) participants had knowledge about this behavior. Although 94 (49.4%) participants were aware that patients with limited health literacy have difficulty in applying healthcare information, 32 (16.8%) responded that patients can understand healthcare information if they are able to read it.

Health literacy screening (six items: 9, 10, 11, 12, 13 and 14). Responses to the item on Rapid Estimate of Adult Literacy (REALM) and the Test of Functional Health Literacy (TOFHLA) suggested that participants have limited knowledge of these health literacy screening tools. Only 14 (7.4%) of participants knew that the REALM is used to assess the ability of an individual to read common medical terms; and 35 (17%) of respondents were aware that TOFHLA is utilized to assess both the reading and numerical skills of individuals. Although knowledge of health literacy screening tools was limited among participants, 74 (40%) recognized that health literacy screenings increased the effectiveness of healthcare teaching provided by the nurse. 56 (29.5%) of participants responded that asking a patient to read the label on a medication bottle would be the best estimate of a patient's reading ability; nevertheless, 41 (21.6%) respondents indicated that they would ask patients directly about their ability to read, and also another 51 (26.8%) associated the last grade completed in school with reading ability. In terms of participants' knowledge about functional health literacy, only 35(18.4%) of participants chose the correct answer and 57(35%) mentioned that they had never heard about functional health literacy.

Guidelines for written healthcare materials (9 items: 17, 18, 19, 20, 21, 22, 23, 24 and 25). While 67 (35.3%) of participants recognized that the very first step in developing written healthcare information is to know what your audience needs to know, 18 (9.5%) stated that they had never heard about how to develop written healthcare information. Regarding recommendations for appropriate word choices, 37 (19.5%) participants chose a heading for a brochure on hypertension that reflected the recommendation to use a question answer format with common terms. Similarly, only 46 (24.2%) of respondents were able to identify appropriate word choices and the use of an active voice in written healthcare materials for diabetes, and the

same number, 46 (24.2%) of respondents reported they would use pictures to increase patients' understanding of written healthcare materials. In terms of the guideline for preparing a culturally acceptable brochure for sensitive issues such as breast cancer, 46(24.2%) participants pointed out that it would be helpful to engage people from the specific culture in the process of creating the brochure. Surprisingly, while 53 (27.9%) participants pointed out the appropriate number of items that need to be included in a chemotherapy hand out, only 1 (0.5%) respondent gave the correct response to the question regarding the number of topics that should be incorporated in a brochure for a specific disease. When asking about suggestions for developing written healthcare information, 67(35.3%) participants chose the correct answer which is presenting information in the form of a conversation. Finally, 84(44.2%) of respondents demonstrated knowledge about the approaches that offer opportunities for patients to become actively involved in the learning process, but 14(7.4%) reported that they did not receive any information about the process.

Evaluating the effectiveness of healthcare information (two items: 15 and 26). With regard to evaluating health literacy interventions, 66 (34.7%) respondents chose the "teach back" method as the most effective way to evaluate a patient's understanding of healthcare information, while 7 (3.7%) participants expressed that they had never heard about the topic. Furthermore, 77 (40.5%) participants identified that when a patient states "let me take this information home to read" it may be because she/he is not able to read, but 15 (7.9%) responded that they had not heard about the phenomenon.

After reviewing the response to each of 26 items within section 2 HL-KES, the responses were then recoded into correct and incorrect; non responses, "I cannot remember", and " I never heard about it" were considered as incorrect (Table 2.4).

Table 2.3: Responses to the section 2 of the HL-KES, by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science in 2015.

	Health Literacy Knowledge Items	Na b%						NC d%	NE f%	NG h%
		A	B	C	D	E	F			
1	Low health literacy levels are most prevalent among which of the following groups? (BF)	19 10	14 7.4	13 6.8	44 23	**74** **38**	18 8	8 4.2	74 38	182 95.8
2	The research on health literacy indicates that: (BF)	66 34.7	**35** **18.4**	22 11.6	9 4.7	11 5.8	46 24.2	1 0.5	35 18	189 99.5
3	What is the likelihood that a nurse working in a public health clinic primarily serving low-income minority patients, will encounter a patient with low health literacy skills? (BF)	8 4.2	24 12.6	70 36.8	**73** **38.4**	6 3.2	9 4.7	0 0	73 38.4	190 100
4	The best predictor of healthcare status is: (BF)	80 42.1	**40** **21.1**	3 1.6	57 30	4 2.1	6 3.2	0 0	40 21.1	190 100
5	Patients with low health literacy skills: (CQ)	20 10.5	29 15.3	10 5.3	**105** **55.3**	11 5.8	15 7.9	0 0	105 55.3	190 100
6	Health behaviors common among patients with low health literacy skills include: (CQ)	**64** **33.7**	18 9.5	42 22.1	44 13.2	7 3.7	14 7.4	1 0.5	64 40	189 99.5
7	Patients cope with low health literacy by: (CQ)	107 56.3	25 13.2	15 7.9	**24** **12.6**	6 3.2	13 6.8	0 0	24 12.6	190 100
8	The nurse should keep in mind that individuals with low health literacy skills: (CQ)	32 16.8	31 16.3	12 6.3	**94** **49.4**	7 3.7	14 7.4	0 0	94 49	190 100
9	The Rapid Estimate of Adult Literacy in Medicine is an instrument utilized to: (SC)	28 14.7	19 10	53 27.9	**14** **7.4**	18 9.5	56 29	2 1.1	14 7.4	188 100
10	When working with individuals who have low health literacy	**50** **26.3**	16 8.4	79 41	28 14.7	4 2.1	13 6.8	0 0	50 26.3	190 20

Health Literacy Knowledge Item	Na b% A	B	C	D	E	F	NC d%	NE f%	NG h%
11 Which of the following questions should provide the nurse with the best estimate of reading skills of the patient? (SC)	41 **21.6**	51 26.8	**56** **29.5**	21 11.1	10 5.3	11 5.8	0 0	56 29.5	190 100
12 Which statement best describes the Test of Functional Health Literacy? This instrument is: (SC)	**35** **18.4**	15 7.9	25 13.2	38 20	20 10.5	57 30	0 0	35 18.4	190 100
13 What is the strongest advantage of conducting health literacy screenings? Health literacy screenings: (SC)	15 7.9	**77** **40.5**	44 23.2	22 11.6	7 3.7	25 13.2	0 0	77 40.5	190 100
14 Which of the following statements, made by the nurse, would be the best approach to initiating a health literacy screening with a patient? (SC)	40 21.1	27 14.2	**78** **41.1**	16 8.4	4 2.1	25 13.2	0 0	78 41.1	190 100
15 After providing written healthcare information to a patient he states, "Let me take this information home to read." This may be a clue to the nurse that the patient: (EV)	28 14.7	33 17.4	29 15.3	**77** **40.5**	8 4.2	15 7.9	0 0	77 40.5	190 100
16 An individual with functional health literacy will be able to: (BF)	18 9.5	28 14.7	49 25	**74** **38.9**	7 3.7	12 6.3	2 1.1	74 38.9	188 98.9
17 Which of the following is true with regards to written healthcare information? (GL)	36 18.9	**46** **24.2**	44 23.2	40 21.1	9 4.7	14 7.4	1 0.5		189 99.5
18 The first step in developing written healthcare information is to: (GL)	21 11.1	55 28.9	**67** **35.3**	18 9.5	11 5.8	18 9.5	0 0	67 35.3	190 100
19 Recommendations for developing written healthcare materials include: (GL)	22 11.2	**67** **35.3**	33 17.4	27 14.2	10 5.3	30 15.8	1 0.5	67 .35.3	189 0.5
20 When listing side effects for a handout on chemotherapy the oncology nurse should limit the list to: (GL)	31 16.3	**53** **27.9**	19 10	12 6.3	14 7.4	58 30.5	3 1.6	53 27.2	187 98.4

	Health Literacy Knowledge Item	Na b%						NC d%	NE f%	NG h%
		A	B	C	D	E	F			
21	Written healthcare information provided to a patient related to a specific disease should include: (GL)	**1** **0.5**	60 31.6	20 10.5	12 6.3	10 5.3	33 17.4	1 0.5	1 0.5	189 99.5
22	Which of the following would be the most effective wording for a heading in a brochure on hypertension? (GL)	1 0.5	75 39.5	**40** **21.1**	37 19.5	18 9.5	8 4.2	1 0.5	1 0.5	189 99.5
23	The best way to ensure that a breast cancer prevention brochure is culturally appropriate is to: (GL)	53 27.9	37 19.5	30 15.8	**46** **24.2**	10 5.3	13 6.8	1 0.5	46 24.2	189 99.5
24	Which of the following instruction on the management of diabetes would be least understood by an individual with low health literacy skills?(GL)	**34** **17.9**	84 44.2	16 8.4	33 17.4	8 4.2	12 6.3	2 1.1	34 17.9	188 98.9
25	Which of the following approaches to patient education provides minimal opportunity for the patient to actually engage in learning? (GL)	34 17.9	**39** **20.5**	65 34.2	32 16.8	5 2.6	14 7.4	1 0.5	34 17.9	188 98.9
26	The most effective way for a nurse to determine how well a patient with low health literacy understands healthcare Information is to: (EV)	32 16.8	28 14.7	**66** **34.7**	47 24.7	6 3.2	7 3.7	0 0	**66** **34.7**	190 100

Note: Bold faced numbers represent correct answers.

a Number of responses for each answer choice.

b Percentages of responses for each answer choice.

c Number of missing responses.

d Percentage of missing responses.

e Number of correct responses.

f Percentage of correct responses.

g Total number of responses.

h Percentage of total responses

Table 2.4: Frequencies and percentages of correct and incorrect responses to the section 2 of the HL-KES by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science in 2015

	Health Literacy Knowledge Items	Correct Response n (%)	Incorrect Response n (%)
	Basic facts on health literacy		
1	Low health literacy levels are most prevalent among which of the following groups? (BF)	74(38)	116(62)
2	The research on health literacy indicates that: (BF)	35(18.4)	155(81.6)
3	What is the likelihood that a nurse working in a public health clinic primarily serving low-income minority patients, will encounter a patient with low health literacy skills? (BF)	73(38.4)	177(61.6)
4	The best predictor of healthcare status is: (BF)	40(21)	150(79)
5	An individual with functional health literacy will be able to: (BF)	74(38)	116(62)
	Consequences associated with LHL		
1	Patients with low health literacy skills: (CQ)	105(55.3)	85(44.7)
2	Health behaviors common among patients with low health literacy skills include: (CQ)	64(33.7)	126(66.3)
3	Patients cope with low health literacy by: (CQ)	24(12.6)	166(87.4)
4	The nurse should keep in mind that individuals with low health literacy skills: (CQ)	94(49.4)	96(50.6)
	Evaluating the effectiveness of healthcare information		
1	After providing written healthcare information to a patient he states, "Let me take this information home to read." This may be a clue to the nurse that the patient: (EV)	77(40.5)	113(59.50
2	The most effective way for a nurse to determine how well a patient with low health literacy understands healthcare information is to: (EV)	66(34.7)	124(65.3)

Health Literacy Knowledge Items	Correct Response n (%)	Incorrect Response n (%)
Health literacy screening		
1 The Rapid Estimate of Adult Literacy in Medicine is an instrument utilized to: (SC)	14(7.4)	176(92.6)
2 When working with individuals who have low health literacy skills the nurse should keep in mind that these individuals: (SC)	79(41)	111(59)
3 Which of the following questions should provide the nurse with the best estimate of reading skills of the patient? (SC)	56(29.5)	134(70.5)
4 Which statement best describes the Test of Functional Health Literacy? This instrument is: (SC)	35(18.4)	155(81.6)
5 What is the strongest advantage of conducting health literacy screenings? Health literacy screenings: (SC)	77(40.5)	113(59.5)
6 Which of the following statements, made by the nurse, would be the best approach to initiating a health literacy screening with a patient? (SC)	78(41.1)	112(58.9)
Guidelines for written healthcare materials		
1 Which of the following is true with regards to written healthcare information? (GL)	46(24.2)	144(75.8)
2 The first step in developing written healthcare information is to: (GL)	67(35.3%)	123(64.7)
3 Recommendations for developing written healthcare materials include: (GL)	67(35.3%)	123(64.7)
4 When listing side effects for a handout on chemotherapy the oncology nurse should limit the list to: (GL)	53(27.9)	137(72.1)
5 Written healthcare information provided to a patient related to a specific disease should include: (GL)	1(0.5)	189(99.5)

Health Literacy Knowledge Items	Correct Response n (%)	Incorrect Response n (%)
Guidelines for written healthcare materials		
6 Which of the following would be the most effective wording for a heading in a brochure on hypertension? (GL)	37(19.5)	153(80.5)
7 The best way to ensure that a breast cancer prevention brochure is culturally appropriate is to: (GL)	46(24)	144(66)
8 Which of the following approaches to patient education provides minimal opportunity for the patient to actually engage in learning? (GL)	34(17.9)	156(82.1)
9 Which of the following instruction on the management of diabetes would be least understood by an individual with low health literacy skills? (GL)	34(17.9)	156(82.1)

Further analyses of the responses to section 1 HL-KES were conducted within the five content areas of basic facts on health literacy, consequences associated with low health literacy, health literacy screenings, guideline for written healthcare materials and evaluation of health literacy interventions. Each correct answer was given one point; thus, a total score for section 2 was between 0 and 26. The means, standard deviations, and range of scores for each content area and the total score for section 2 HL-KES is presented in Table 2.5.

Table 2.5: Mean and standard deviation for the scores for each content area within section 2 HL: KES obtained by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science in 2015

Knowledge of Health Literacy in Five content Areas	N	Minimum	Maximum	Mean	St
Basic Facts ((5 items, scores range from 0 to 5)	187	0	4	1.56	1.04
Consequences of limited Health Literacy (4 items, scores range from 0 to 4)	189	0	4	1.52	1.04
Guideline for Written Healthcare Information (9 items, scores range from 0 to 9)	183	0	7	2.35	1.5
Evaluation the effectiveness of Written Healthcare (2 items, scores range from 0 to 2)	186	0	2	0.76	0.7
Health Literacy Screening (6 items, scores range from 0 to 6)	188	0	4	1.63	10.9
Health Literacy Total Knowledge (26 items, scores range from 0 to 26)	174	1	17	7.83	3

Question 2. What are the health literacy experiences of Iranian registered nurses as measured by the HL- K ES? To determine Iranian registered nurses' experience with health literacy, in section 3 HL-KES, participants are directed to rate the frequency of their participation in eight activities related to health literacy using the following scale: 1 = never, 2 = sometimes, 3 = frequently, and 4 =always. Each item in this section focuses on a unique activity associated with health literacy.

To calculate response to study question 2, proportions were calculated for each response within each item (Table 2.6). Also, using the score assigned for each response (0 = never, 1 = sometimes, 2 = frequently, and 3 =always), the total score for this section and the scores for the two subsections of Core Health Literacy Experience and Technology Health Literacy Experience were calculated for individual participants (Table 2.7). Total scores for Iranian registered nurses' experience ranged from 0 to 24.

As reported in Table 2.6, responses to section 3 of the HL-KES revealed that between 3.3% and 8.4% of the participants, were working at positions where experiencing the activities related to health literacy was not applicable to them. A report on this table is provided in two subsections:

Core health literacy experiences. The largest proportion (approximately 30% to 36%) of the respondents described the frequency of their experience with health literacy activities as "sometimes". This included emphasis on health literacy content in the nursing curriculum (n = 69, 36.3%), use of health literacy screening tools (n = 58, 30.5%), evaluating reading level (n = 69, 36.3%), evaluating cultural appropriateness (n=59, 31%), and using written materials to provide healthcare information (n = 59, 31.1%). It is interesting to note that although about 86 (45.2%) of participants had 'never' or only 'sometime' evaluated the reading level of written healthcare materials, 109 (55.8%) of them used written healthcare materials "frequently" and "always" for healthcare teaching. Similarly, 111 (58%) of respondents expressed that they "never" or only "sometimes" evaluated cultural appropriateness of written healthcare materials.

Technology Health Literacy Experience. Two items explored the use of technology (such as audiotape and videotape) by participants when providing healthcare information for their clients. A large proportion of participants (n = 90, 47%) reported "never" using audiotapes to

provide healthcare teaching. Comparably, 90 (48%) of respondent stated they "never" used videotapes for patient education. Only 24 (12.6%) and 19 (10 %) of participants reported "frequently" or "always" using audiotape and videotape respectively in the patient teaching process.

Table 2.6: Frequencies and percentages of correct and incorrect responses to the section 2 of the HL-KES, by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science in 2015

Health Literacy Experience Items	N[a] N (%)	S[b] N (%)	F[c] N (%)	A[d] N (%)	N/a[e] N (%)	TR[h] N (%)
How frequently was health literacy emphasized in your nursing curriculum?	22(11.6 %)	69(36.3%)	48(25%)	42(21%)	9(4.7%)	190(100%)
How often did you use a health literacy screening tool to assess the health literacy skill of an individual?	62(32%)	58(30.5%)	41(21.6%)	15(7.9%)	13(6.8%)	189(99.5)
How often did you evaluate the reading level of written healthcare materials before using them for patient teaching?	17(8.9%)	69(36.3%)	41(21.6%)	43(22%)	16(8.4%)	186(97.9)
How often did you evaluate the cultural appropriateness of healthcare materials, including written handouts, videos, audiotapes, before using them for patient teaching?	52(27%)	59(31%)	40(21%)	28(14%)	10(5.3%)	189(99.5%)
How often did you use written materials to provide healthcare information to an individual or community group?	11(5.8%)	59(31.1%)	49(25.8%)	60(31%)	7(3.7%)	186(97.9%)
How often did you evaluate the written healthcare materials before using them for patient teaching?	52(27%)	59(31.1%)	40(21%)	28(14%)	10(5.3%)	189(99.5%)
How often did you provide audiotapes to provide healthcare information to an individual or community group?	90(47%)	60(31%)	9(4.7%)	15(7.9%)	15(7.9)	189(99.5)
How often did you use videotapes to provide healthcare information to an individual or group?	93(48%)	65(34%)	8(4.2%)	11(5.8%)	12(6.3%)	189(99.5%)

[a] Never
[b] Sometimes
[c] Frequently
[d] Always
[e] Not applicable
[h] Total response

Table 2.7: Mean and standard deviation and range of scores for each sub section within section 3 HL: KES obtained by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science in August 2015.

Variables	N	Minimum	Maximum	Mean	St
Core Health Literacy Experience (6 items, Scores range from 0 to 18)	183	0	18	8.12	3.84
Technology Health Literacy Experience (2 items, scores range from 0 to 6)	189	0	6	1.25	1.6
Total Score (8 items, scores range from 0 to 24)	183	0	24	9.35	4.79

Bivariate Analysis. In this section, bivariate analysis was used to determine how Iranian registered nurses' knowledge of health literacy related to their experience with health literacy in an attempt to answer study question number three. Moreover, an analysis was done to determine whether any of participants' demographic characteristics were associated with the two dependent variables of the Iranian registered nurses' knowledge of health literacy, and Iranian registered nurses' experience with health literacy. Among demographic variables, Iranian registered nurses' level of education (baccalaureate degree: 175 vs master's degree: 12) and areas of practice (acute care: 186 vs community health center: 2) were not entered in univariate analysis as they did not meet the criterion of having at least 15 participants in each category.

Test assumption (Test of normality). The normality of the scores for the dependent variables including Iranian registered nurses' knowledge of health literacy and Iranian registered nurses' experience with health literacy was examined using descriptive analysis in two stages.

First stage. Histograms were created for the above mentioned variables that demonstrated the values for both of the variables were not normally distributed and the associate curves were negatively skewed (Figures1. 1 and Figure 1.2).

Second stage. An analysis was performed to determine if the distribution for each variable was approximately normal using the ratio of skewness and kurtosis to the standard error of each of the variables (Table 2.8). For the Iranian registered nurses' knowledge of health literacy, the ratio of skewness to the standard error (.246/.184 < 2) and kurtosis to the error of kurtosis (.240/.366 < 2) were both less than 2 which indicated the distribution for this variable was approximately normal. In contrast, the values obtained for the ratio of skewness to the standard error (.644/.180 >2) and kurtosis to the error of kurtosis (.737/.358 > 2) for the Iranian registered nurses' experience with health literacy were greater than 2 meaning that the distribution of scores for this variable was not normal. Nevertheless, based on the central limit theorem states that in a sample size larger than 30, the distribution of the mean of any random variable will be normal or nearly normal. Therefore, the distribution of the mean of the total scores for the Iranian registered nurses' experience with health literacy in this study (with a sample size of 190) was treated as normal.

Table 2.8: Descriptive analysis of the total scores for section 1 and 2 HL-KES obtained by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science in 2015.

		Knowledge of Health Literacy	Experience with Health Literacy
N	Valid	174	182
	Missing	16	8
Mean		7.8276	9.9286
Std. Deviation		3.00945	5.22852
Skewness		0.246	0.644
Std. Error of Skewness		0.184	0.18
Kurtosis		-0.24	0.737
Std. Error of Kurtosis		0.366	0.358

Figure 2: Distribution of the total scores for section 1 HL-KES, knowledge of health literacy, obtained by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science in August 2015.
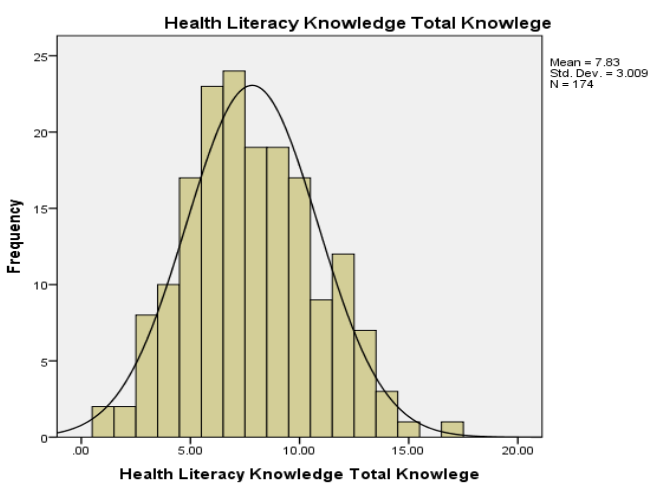
Figure 3: Distribution of the total scores for section 2 HL-KES, experience with health literacy, obtained by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science in 2015
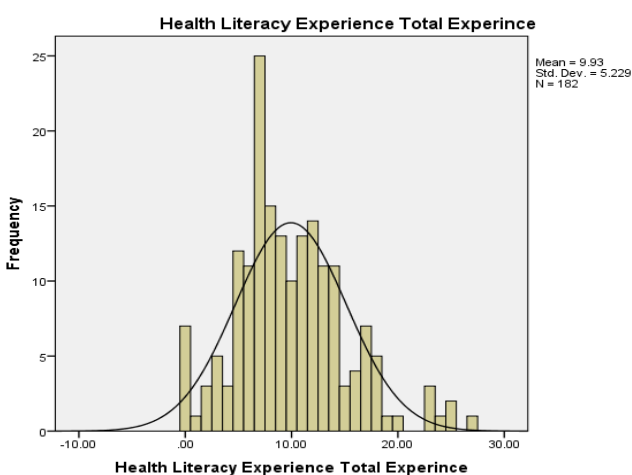
Question 3: Does a relationship exist between the level of health literacy knowledge and the health literacy experiences of Iranian registered nurses? To answer this question, the mean scores for section 2 and 3 of the HL-KES were used to assess the Iranian registered nurses' knowledge of and experience with health literacy respectively. A pearson product-moment correlation coefficient was used. The Pearson correlation coefficient indicated that participants'

knowledge of health literacy was correlated negatively with participants' experience with health literacy; however, this correlation is not statistically significant(r =-0.12, p =0.119) (Table 2.9).

*Association between knowledge of health literacy and demographic characteristics***.** To examine the correlation between the Iranian registered nurses' knowledge of health literacy and their demographic characteristics, bivariate tests were selected based on variables scale of measurement.

*Knowledge of health literacy vs age***.** Pearson's correlation demonstrated that there was a positive correlation between Iranian registered nurses' knowledge of health literacy and their age, nevertheless, the correlation was not statistically significant (r=0.44, p =0.564) (Table 2.10).

Knowledge of health literacy vs years of nursing experience. Pearson's correlation did not demonstrate a statistically significant association between Iranian registered nurses' years of nursing experience and their knowledge of health literacy (r=0.017, p =0.830) (Table 2.10).

*Knowledge of health literacy vs sex***.** An independent t test reflected that the mean score of knowledge of health literacy among the Iranian registered female nurses (Mean=7.79, SD=2.97) was not significantly different from the mean score for this variable among male nurses (Mean= 8.13, SD= 3.29, t (170) = 0. 567, p= 0. 213 (Table 2.11).

*Knowledge of health literacy vs having interaction with healthcare professional for personal reasons***.** An independent t test demonstrated that the mean score showing knowledge of health literacy for those Iranian registered nurses who had an interaction with healthcare professionals for personal reasons within the last 5 years (Mean=8.21, SD=3.08) was not significantly different from the mean score for this variable among nurses who did not have this interaction during the aforementioned period (Mean= 6.65, SD= 2.47), t (172) =-3.023, p= 0. 104. (Table 2.11).

Knowledge of health literacy vs frequency of interaction with healthcare professional for personal reasons. A one way ANOVA indicated a statistically significant difference between mean scores reflecting participants' knowledge of health literacy in relation to the frequency of interaction with healthcare professional for personal reasons, F(5, 166)=3.37, p<0.006. A Bonferroni post hoc test revealed the mean scores for the Iranian nurses' knowledge of health literacy differed where: 1) participants who had rarely interacted with healthcare professional for personal reasons obtained significantly lower scores, M= 6.86 (SD=3.75), than those who had usually or very often interacted with healthcare professional for the same reasons; 2) the scores

for those that had usually interacted with healthcare professionals for personal reasons, M= 8.57 (SD=2.90), was significantly lower than participants who had interacted with healthcare professionals for personal reasons very often; 3) the scores for those who had very often interacted with healthcare professionals for personal purposes, M=8.63 (SD= 2.58) was statistically significantly higher than for those who described interaction with usually and rarely (Table 2.11).

Association between experience with health Literacy and demographic characteristics. Bivariate tests were chosen to examine the correlation between the Iranian nurses' experience with health literacy and their demographic characteristics based on the variables scale of measurement.

Experience with health Literacy vs age. A Pearson correlation indicated that participants' age correlated negatively with participants' experience with health literacy at a statistically significant level (r= -0.189, p <0.01) (Table 2.10).

Experience with health literacy vs years of nursing experience. A Pearson correlation did not reveal a statistically significant association between Iranian registered nurses' years of nursing experience and their experience with health literacy (r=-0.140, p =0.062) (Table 2.10).

Experience with health literacy vs sex. Independent t test showed that the mean score reflecting Iranian registered nurses' experience with health literacy was not significantly different between female nurses (Mean=7.79, SD=2.97) and male nurses (Mean=8.13, SD=3.29), t (170) =0. 567, p=0. 213, indicating that participants' sex was not associated with the Iranian nurses' experience with health literacy study at a statistically significant level (Table 2.12).

Experience with health literacy vs having interaction with healthcare professional for personal reasons. The mean score reflecting the Iranian registered nurses' experience with health literacy was not significantly different from those who had had an interaction with healthcare professional for personal reasons within the past five years (Mean=9.90, SD=5.12) and those who did not (Mean=10.02, SD=5.64), t (180) =0. 133, p=0. 45 (Table 2.12).

Experience with health Literacy vs frequency of interaction with healthcare professional for personal reasons. A one way ANOVA demonstrated that the difference between mean scores reflecting the Iranian registered nurses' experience with health literacy in relation to frequency of their interaction with healthcare professional for personal reasons is not statistically significant, F(5, 174)=1.09, p=0.368 (Table 2.12).

Table 2.9: Pearson Product-Moment Correlations between Iranian registered nurses' knowledge of health literacy and their experience with health literacy

Variables	1	2	P value
Nurses' experience with health literacy		-0.12	0.119
Nurses' knowledge of health literacy			

Table 2.10: Pearson Product-Moment Correlations between Dependent variables of Iranian registered nurses' knowledge of and experience with health literacy and demographic variable

Variables	1	2	P value
Age		0.44	0.564
Nurses' knowledge of health literacy			
Age		-0.189	0.011
Nurses' experience with health literacy			
Years of nursing experience		0.017	0.83
Nurses' knowledge of health literacy			
Years of nursing experience		0.14	0.062
Nurses' experience with health literacy			

Table 2.11: Bivariate analysis between the Iranian nurses' knowledge of health literacy and demographic variables

Variables	M(SD)	t/F(df)	P value
Gender		.567 (170)	0.213
Male	8.13(3.29)		
Female	7.78(2.97)		
Having interaction with		3.023 (172)	0.104
healthcare professionals for personal reasons			
Yes	8.21(3.08)		
No	6.67(2.68)		
Frequency of interaction with		3.369(5)	0.006
healthcare professionals for personal reasons			
Rarely	6.86(3.75)		
Usually	8.57(2.90)		
Very often	8.63(2.58)		

Table 2.12: Bivariate analysis between the Iranian nurses' experience with health literacy and demographic variables

Variables	M(SD)	t/F(df)	P value
Gender		-0.19	0.441
Male	9.73(5.68)		
Female	9.93(5.18)		
Having interaction with		0.133	0.451
healthcare professionals for personal reasons			
Yes	9.90(5.64)		
No	10.02(5.64)		
Frequency of interaction with		1.09	0.368
healthcare professionals for personal reasons			
Rarely	10.74(6.85)		
Usually	9.04(4.45)		
Very often	11.19(4.62)		

Multivariate Analysis

Multivariate analysis was employed to identify which predictor variables were associated with the dependent variable Iranian nurses' knowledge of health literacy at a statistically significant level in order to answer study question four. However, in terms of the association between demographic variables and the other dependent variable in this study, Iranian nurses' experience with health literacy, decision was made not to include the multivariate analysis for this variable. The decision was based on the bivariate analysis which indicated that none of the demographics variables, except for the participants' age, correlated with the dependent variable Iranian nurses' experience with health literacy at a statistically significant level.

Test's assumptions. All the quantitative tests have specific assumptions that need to be reflected in the data before making a decision to apply a particular test (Bannon, 2013). The test assumptions for linear regression including normal distribution, homoscedasticity, multi-collinearity, and linearity were all met.

Normality. Using tests of normality in bivariate analysis, it was recognized that while the total scores for the Iranian registered nurses' knowledge of health literacy were normally distributed, the score for Iranian registered nurses' experience with health literacy were not normally distributed. However, as was mentioned, based on the central limit theorem, the total scores for Iranian registered nurses' experience with health literacy in this stud, with a sample size of 190, was treated as normally distributed.

Homoscedasticity. A boxplot graphic display of the regression standardized residual, which is the product of the linear regression function, was created to examine homoscedasticity and linearity. The plot is oval shaped indicating distribution of the residual scores above and below zero which suggests linear relationships between the independent and dependent variables. The plot also represents a full dispersion of values across all levels making a square shape meaning that distance between the dots and the center line remain almost stable which suggests that the assumption of homoscedasticity has been met (Bannon, 2013) (Figure 2.3).

Multi- collinearity. The independent variables included in the analysis were examined for the presence of multi-collinearity. The Variance Inflation Factor (VIF) of some variables including participants' sex, interaction with healthcare professionals for personal reasons, and frequency of the interaction with healthcare professionals for personal reasons ranged between

1.06 and 2.26. Also, the tolerance levels of these variables were from 0.447 to 0.937, suggesting that multi-collinearity was not present among them. Nevertheless, VIF for the two variables of participants' age and years of nursing experience is 0.152-0.153 and tolerance level ranged from 6.53 to 6.56 which suggest a significant multi-collinearity (Table 2.13). Therefore, participants' age was excluded from the final regression model.

Figure 4: Scatterplot for total scores of health literacy knowledge obtained by the Iranian registered nurses working in hospitals and community health centers affiliated with Tehran University of Medical Science 2015
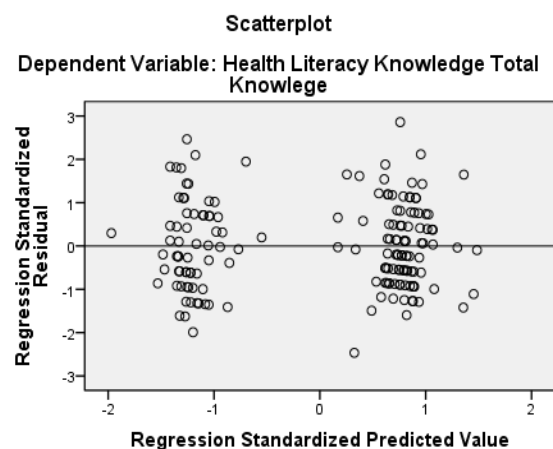
Table 2.13: Correlation coefficient for the Iranian registered nurses' demographics variables

	Collinearity Statistics	
	Tolerance[a]	VIF[b]
(Constant)		
Age	0.153	6.526
Gender	0.937	1.067
Years of nursing experience	0.152	6.558
In the past 5 years have you interacted with healthcare providers for your own personal health care needs or the healthcare needs of a significant other?	0.501	1.994
Interaction frequency is Usually	0.447	2.239
Interaction frequency is Very often	0.519	1.927

[a] Tolerance score above 0.20 suggest no significant collinearity

[b] VIF under 2.50 suggest no significant collinearity

Question 4. Is there any variation in the health literacy knowledge level of Iranian registered nurses? If there is a variation, which of the following variables may explain the variability, Iranian registered nurses' age, sex, level of nursing education, years of nursing practice , areas of practice, prior work experience (other than nursing) in the healthcare system, and frequency of interaction with healthcare providers for personal needs.

Multiple linear regression was chosen to analyse associations between the demographic variables and the Iranian registered nurses' knowledge of health literacy. Among demographic variables, nurses' level of education (baccalaureate degree: 175 vs master's degree: 12) and areas of practice (acute care: 186 vs community health center: 2) were not entered in the linear regression model as they did not meet the criterion of having at least 15 participants in each category. Furthermore, bivariate analysis revealed that the independent variables including participants' age, years of nursing experience, sex, and having interaction with healthcare professionals for personal reasons (yes/no) did not correlate with the dependent variable of Iranian registered nurses knowledge of health literacy. While statistically some did not meet inclusion criteria, all the aforementioned variables were included initially into the model to determine whether the presence of these variables increased the variation explaining the dependent variables.

A multiple linear regression was conducted to assess the relationship between Iranian registered nurses' knowledge of health literacy and the frequency of their interaction with healthcare professionals for personal reasons. The analysis was performed adjusting for participants' sex, years of experience, and having interaction with healthcare professional for personal reasons in the last five years (yes/ no).

Table 2.14 presents a multiple linear regression analysis examining scores reflecting the Iranian registered nurses' knowledge of health literacy. Data indicated that the overall model was statistically significant, $F_{(5,159)} = 3.293$, $p < 0.007$. Furthermore, the model explained 0.94% ($R = 0.306$, Adjusted $R = 0.094$) of the variance in the dependent variable Iranian registered nurses' knowledge of health literacy.

In terms of individual predictors, data indicated that having interaction with healthcare professionals for personal reasons was not associated with higher scores in knowledge of health literacy. However, the frequency of interactions with healthcare professionals for personal reasons remained independently predictive of the knowledge of health literacy. Participants who

reported "usually" interacting with healthcare professionals for personal reasons (P< 0.009) and "very often" interacting with healthcare professional for personal reasons (P< 0.01) obtained statistically significantly higher scores on health literacy knowledge compared to those who reported " rarely" interacting with healthcare professional for personal reasons.

Table 2.14: Result of Multiple Linear Regression examining the association between Iranian registered knowledge of health literacy and their demographic characteristics

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Gender	-0.312	0.426	-0.057	-0.731	0.466
(Constant)	7.69	0.973		7.901	0
Gender	-0.475	0.418	-0.087	-1.137	0.257
Years of nursing experience	0.002	0.035	0.004	0.046	0.963
In the past 5 years have you interacted with healthcare providers for your own personal health care needs or the healthcare needs of a significant other?	-0.064	0.751	-0.009	-0.085	0.933
Interaction frequency is Usually	1.859	0.699	0.3	2.658	0.009
Interaction frequency is Very often	1.981	0.765	0.271	2.588	0.011

Summary

Chapter four provides information on the findings of this cross-sectional study with the aim of examining Iranian registered nurses' knowledge of and experience with health literacy. The chapter includes the results of a pilot study which was part of the tool adaption for the main study, as well as the findings of the main study. The whole process of tool adaptation led to the elimination of five items of the original HL-KES (two items from section1, three items from section 2 and one item from section 3). Data for the main study was collected using the adapted version of the HL-KES. A total sample of 190 Iranian registered nurses was included in the final analysis. Subsequently analysis was completed using SPSS software through which univariate analysis showed that Iranian registered nurses have limited knowledge and experience with health literacy, and bivariate analysis identified that there is a weak negative association between participants' knowledge and experience with health literacy. To identify the factors which could predict Iranian registered nurses' knowledge of health literacy, multivariate analysis was operated. A multiple linear regression analysis indicated that 0.9% of variation in Iranian registered nurses' knowledge of health literacy was explained by the frequency of their interaction with healthcare professionals for personal reasons after adjusting for participants' sex, years of experience, and having interaction with healthcare professional for personal reasons in the last five years (yes/ no).

Chapter 5: Discussion

Introduction

This chapter presents a summary of the study findings, how these findings relate to Social Cognitive Theory (SCT), and recommendations for improving health literacy oriented practice. The recommendations encompass ideas for future research on health literacy, as well as suggestions for raising nurses' awareness of the issues related to health literacy and the development of new policies in this area.

Health literacy is a stronger indicator of an individual's health status than usual health predictors such as age, ethnicity, and socioeconomic status (Parker, Ratzen, & Lurie, 2003). Inadequate health literacy skills influence both an individual's health outcomes and the healthcare system by increasing hospitalization rates and healthcare costs. Also, inadequate health literacy can lead to health disparity if healthcare providers do not know how to manage communication with people with limited health literacy. An individual's health literacy skills are ultimately contingent upon their cognitive capacities, the complexity of the healthcare system and the quality of information received from healthcare providers (Baker, 2006; Paasche-Orlow & Wolf, 2007). Thus, improving health literacy is a shared responsibility of the individual, the healthcare system, and the educational system (IOM, 2004); the issue of limited health literacy will not be addressed unless actions are taken in these three areas. From the healthcare system side, it is imperative to increase healthcare professionals' awareness of the magnitude of the issue of limited health literacy; and it is also important to develop their competences to evaluate people's level of health literacy and utilize appropriate strategies to work with people with low health literacy. In Iran, almost 70% of adults over 18 years old have inadequate health literacy skills (Tehrani Banihashemi et al., 2007; Javadzade, et al., 2012), requiring immediate action from healthcare systems. The purpose of this cross-sectional study was to examine Iranian registered nurses' knowledge and experience of health literacy, applying quantitative measures.

Data was collected using the Health Literacy Knowledge Experience Survey (HL-KES), which was adapted in this study for the Iranian context. The adapted version of the HL-KES consisted of three sections: demographics (7 items); items related to nurses' health literacy knowledge (26 items); and items related to nurses' health literacy experiences (8 items). Cronbach's alpha coefficient for the scale part of the HL-KES (section 3), in the current study,

was evaluated at 0.85, which indicates a good internal consistency for the tool. Data collection took place in hospitals and community health centers affiliated with the Tehran University of Medical Science between November 2015 and January 2016. During this time, 3413 nurses were working in 16 hospitals and three community health centers; a total 207 nurses participated in this study. From 207 completed surveys 15 were excluded due to high percentage of missing data and 190 were included in the final data analysis. Social Cognitive Theory (SCT) formed the theoretical foundation for the study, therefore research findings were interpreted using SCT as the framework for discussion. SCT was utilized since it offers a comprehensive view of all the individual, organizational and political factors affecting human health activities which need to be respected to conduct multilevel interventions in health promotion.

The following research questions inspired the study.

1. What is the level of health literacy knowledge among Iranian registered nurses as measured by the Health Literacy Knowledge and Experience Survey?

2. What are the health literacy experiences of Iranian registered nurses as measured by the Health Literacy Knowledge and Experience Survey?

3. Does a relationship exist between the level of health literacy knowledge and the health literacy experiences of Iranian registered nurses?

4. Is there any variation in the health literacy knowledge level of Iranian registered nurses? If there is a variation, which of the following variables can explain that, Iranian registered   nurses' age, gender, level of nursing education, years of nursing practice, areas of   practice, prior work experience (other than nursing) in the in the healthcare system, and frequency of interaction with healthcare providers for personal needs.

Iranian registered nurses' knowledge of health literacy

Iranian registered nurses' knowledge of health literacy was assessed using section 2 of the adapted version of the HL-KES. This section encompasses 26 items which evaluates the participants' knowledge in five areas including: basic facts on health literacy; consequences associated with low health literacy; health literacy screening; guidelines for written healthcare materials; and evaluation of health literacy interventions. Iranian registered nurses presented limited knowledge in all the content areas, most noticeably in guidelines for written healthcare

information, screening tools for health literacy, and patients' coping behaviors to avoid the stigma attached to limited health.

In the area of basic facts on health literacy, the percentage of correct responses to the five questions included in this area, varied between 18.4 % and 40.20 % indicating that Iranian registered nurses have inadequate knowledge about the basic facts on health literacy. Although one third of the participants knew about the definition of functional health literacy and the fact that limited health literacy is most prevalent in the age group over 65 years, the majority did not have the knowledge that health literacy is the best indicator of health status compared to literacy level, educational level and gender. Also, when participants were asked whether the last grade completed by an individual reflects her/his reading skills, almost one quarter of respondents reported that they had never heard about the topics before.

In terms of the Iranian registered nurses' knowledge of consequences related to limited health literacy, the percentage of participants who chose the correct response varied (12.6% to 55.3 %) among the four questions; also, 6.8% to 7.9% of those who did not indicate the correct response, reported that they have never heard about the topics in the questions before. While the majority of the Iranian registered nurses knew about some of the ramifications of limited health literacy, such as delay in being diagnosed and having fewer treatment options, two thirds of them were unaware that people who are health illiterate might not be interested in taking part in preventative healthcare measures. Also, except for a few respondents (24 [12.6%]), the participants did not have knowledge about patients coping behaviors to reduce the stigma attached to the limited health literacy such as, pretending to read written healthcare materials in presence of their healthcare providers. Identifying these behaviours is important, since they can be misleading for the healthcare professionals who do not screen patients for health literacy skills in the first place. In general, it is imperative for nurses to have knowledge about the consequences of limited health literacy as it helps them to apply appropriate strategies to mitigate these detrimental outcomes. Regarding recognizing people with limited health literacy in practice, although most of the Iranian registered nurses answered affirmatively when asked whether health literacy screening would help improve patient teaching, the overwhelming majority of them did not respond correctly to questions related to specific screening tools. Despite very limited knowledge about screening tools in health literacy, the majority of Iranian registered nurses responded correctly on how to identify low health literacy using an alternative

strategy. Ultimately, knowing about how limited health literacy presented in patients' behaviors might be more useful in everyday practice than being aware of screening tools.

In respect to evaluating the effectiveness of health literacy interventions, a visible gap was noticed. A vast majority of the Iranian registered nurses responded incorrectly to the question on "teach back" as the most effective way of determining the patient understanding after education. Also, most of the participants were not aware of the reason for patients refusing to read the given written healthcare materials in the presence of the healthcare providers, which is related to patient limited health literacy skills.

Similar to other content areas of health literacy, Iranian registered nurses have inadequate knowledge about guidelines for developing written healthcare materials. The majority of participants did not choose the correct answer for questions on: steps need to be taken to provide a culturally acceptable pamphlet on a sensitive health issues, importance of using pictures to increase patients' understanding of written healthcare materials, number of the main points to be incorporated in pamphlets on a specific diseases, wording strategy in writing healthcare information, and creation of opportunities for patients to act as an active learner when preparing written healthcare information.

Further analysis of data collected from the Section 2HL-KES revealed that mean scores obtained by Iranian registered nurses from the Section 2HL-KES was less than the median for all the aforementioned content areas as well as the whole section.

Iranian registered nurses' experience with health literacy

Iranian registered nurses' experience with health literacy was assessed using section 3 of the adapted version of the HL-KES. This section encompasses eight items in two categories of Core Health Literacy Experience and Technology Health Literacy Experience, each focusing on a set of activities related to health literacy. The six items included in the Core Health Literacy Experience ask about participants' experience related to emphasis on health literacy in their nursing curriculum, use of health literacy screening tools, evaluating the reading level of written healthcare materials, and use of written materials to provide healthcare information; and evaluating cultural appropriateness of the written healthcare, evaluating the use of illustration on written healthcare materials. Health Literacy Experience included two items which ask participants whether they utilize technology such as audio tapes and video tapes to provide healthcare information.

Evidence from this study indicated that experience of the Iranian registered nurses with activities related to health literacy is limited; this was very noticeable when it came to applying health literacy screening tools and also, using technology such as audio and video tapes for delivering healthcare information (less than 8% of participants reported either frequently or always using these items). The most reported experience in health literacy among the Iranian registered nurses was using written healthcare materials in patient education; however, when participants were asked about evaluating cultural appropriateness of these materials, one third responded they never did that. It should be mentioned that a small percentage of the participants (from 3.7% to 8.4%) stated that regarding their position experiencing the given items was not applicable. Also, the limited experience of Iranian registered nurses in using technology in delivering healthcare information might be due to the unavailability of healthcare information in the form of audio and video tapes in Iran's healthcare settings.

Association between the Iranian registered nurses' knowledge and experience

The result of Pearson Product Coefficient demonstrated that Iranian registered nurses' knowledge of health literacy was correlated negatively with their experience with health literacy; however, this correlation is not statistically significant. This indicates that among the study population, Iranian registered nurses, revealing more knowledge about health literacy is related with having less experience with health literacy results. In addition, other bivariate analysis showed a positive correlation between Iranian registered nurses experience with health literacy and their age and the length of nursing experience, meaning that older nurses with more years' experience obtained higher scores for their experience with health literacy. Therefore, the negative correlation between the Iranian nurses' knowledge of health literacy and their experience with health literacy infers that younger nurses with more up to date knowledge of health literacy had less chance of exposure to health literacy activities.

Factors predicting the Iranian registered nurses' knowledge of health literacy

The results of multiple linear regressions demonstrated that 0.9% of variation in Iranian registered nurses' knowledge of health literacy was explained by the frequency of their interaction with healthcare professionals for personal reasons. Participants who reported "usually" interacting with healthcare professionals for personal reasons and "very often" interacting with healthcare professional for personal reasons obtained statistically significantly higher scores on health literacy knowledge compared to those who reported " rarely" interacting

with healthcare professional for personal reasons. Considering that less than 50% of the Iranian registered nurses reported that, either frequently or always, health literacy was emphasized in their education, it can be assumed that, even in the absence of formal education on health literacy, nurses who experienced interaction with healthcare in order to obtain necessary information to make healthcare decisions for themselves or their relatives acquired higher knowledge of health literacy. This might be partly because they have a better personal understanding of the importance of improving patients' health literacy in healthcare communications. This part of the results suggests that, in designing effective continuing education programs for nurses in the area of health literacy, more effort should be devoted to presenting the consequences associated with limited health literacy from patients' perspectives. For instance, portraying patients' frustration when they are not able to understand the given healthcare information using short videos and patients' anecdotes can inspire healthcare professionals to be more attentive and take an active role in learning. In respect to this, Kripalani and Weiss (2006) stated that a powerful means of describing the healthcare experiences of patients with limited health literacy would be inviting patient advocates or adult literacy students to explain their struggle in navigating the healthcare systems. Alternatively, an effective way to raise awareness about health literacy issues, would be displaying patient's testimonials from the Institute of Medicine's health literacy videos which feature patients stories revealing that limited health literacy can be present in any person. In addition, applying role playing as a teaching strategy in educating nurses about health literacy allows nurses to have a better understanding of the patients' experience in communicating with their healthcare providers.

Common trends in nurses' knowledge and experience of health literacy

The ultimate goal of this study is to define the gap between the current condition and ideal conditions in nurses' knowledge and experience with health literacy in Iran's healthcare system. The results will be used in planning some approaches to resolve health literacy knowledge and experience deficiency of the target population in the Iranian context. Therefore, comparing these results with findings of similar studies from other contexts does not seem plausible, as the environmental factors facilitating nurses' efforts to improve their knowledge and performance might be different across the countries.

However, it should be mentioned that some common trends were seen among nurses' deficits in health literacy knowledge and experience in Iran and other countries such as the USA,

where assessing nurses' knowledge of health literacy was inaugurated. For instance, practicing nurses' limited experience in using audio and video tapes to deliver healthcare information, applying health literacy screening tools, and evaluating reading levels of written materials are reported by Knight (2011) and Cafiero (2013) in the United States. Limited knowledge about the most frequently used health literacy screening tools, such as REALM and TOFHAL, were also declared by all the studies examining nursing students (Cormier, 2006; Torres & Nicholes, 2014) and practicing nurses' knowledge of health literacy (Knight ,2011; Cafiero , 2013). The reason for the similarity in findings about health literacy screening tools across different contexts may be related to the fact that although these screening tools are the most common used tools in research projects (Al Sayah, Williams & Johnson, 2012; Dickson-Swift, Kenny, Farmer, Gussy & Larkins, 2014), they are not necessarily the conventional tools in practice settings. In fact, the time required to complete these screening tools (3 minutes for REALM to 12 minutes for TOFHLA) limits their practicality (Mancuso, 2009) This questions the relevance of asking about REALM and TOFHLA to assess practicing nurses' knowledge of health literacy.

Implications

This study revealed that there is a gap in health literacy knowledge and experience of Iranian registered nurses working in hospitals affiliated with Tehran University of Medical Science. Considering that all the 184 nursing schools in Iran offer a consistent nursing program developed by the Iranian Ministry of Health and Medical Education (MOHME), it is implied that the Iranian registered nurses, regardless of their location, are not prepared to provide effective communication with 70% of the Iranian adult population who have limited health literacy. Furthermore, the very low response of the online survey might be an indication that Iranian registered nurses were reluctant to complete the survey because they are not confident about their health literacy knowledge. This suggests that those nurses who participated in this study have above the average knowledge of health literacy.

The implications of the results are further explained the appropriateness of Social Cognitive Theory (SCT) as the theoretical framework for this study. SCT provide a comprehensive understanding of the determinants of an individual's behaviors (Hatchinson & Estabrook, 2009). This theory offers a comprehensive view of forming human behaviors by addressing socio structural determinants as well as individual determinants. In the area of healthcare, SCT provides a basis for studies focusing on changing health-related behavior using

an inclusive approach which considers both individual characteristics and social systems' practices. The selection of SCT was based on the fact that this theory is unique in suggesting a bidirectional relationship between individuals' ultimate behaviors and their social environments. Moreover, although individuals' psychological factors, such as perceived self-efficacy and outcome expectations, have a pivotal regulatory power in the SCT's causal structure for changing a health behavior, these factors are in reciprocal relationship with social environmental factors as well.

An individuals' health literacy related behaviors such as navigating in healthcare systems, making informed decisions, and being an active agent to modify their health status are affected by environmental elements including the complexity of healthcare setting and quality of the healthcare communication. This is supported by the results of a recent systematic review that highlighted the importance of healthcare provider's effort in addressing limited health literacy as an approach that enable their clients to made lifestyle modification. Delivering high quality communication and facilitating shared decision making were the common factors in supporting clients to make successful lifestyle modifications (Dennis et al., 2012). While a person develops health literacy skills resulting in positive health literacy related behaviors, healthcare systems outcomes including healthcare costs will be affected. Furthermore, environmental factors which include the way healthcare professionals communicate healthcare information, can change individuals' health literacy related behaviors through modifying individuals' psychological factors, outcome expectations and perceived self-efficacy, by providing positive experiences for a person seeking healthcare information to change health behaviors.

This study indicated that Iranian registered nurses do not have adequate knowledge in almost all five areas of health literacy. Also, their experiences with health literacy activities aiming to provide people with healthcare information are limited. Accordingly, it is implied that communications between nurses and patients in the Iranian healthcare systems are less likely to be effective in conveying necessary healthcare information. This influences Iranian people's health literary behaviors in two ways: directly by increasing the perceived complexity of healthcare systems and indirectly by negatively affecting people' self-efficacy.

The ultimate outcomes of the Iranian registered nurses' inadequate knowledge of and experience with health literacy becomes even more crucial to understand given the fact that approximately 70% of the Iranian adult population presents limited health literacy skills.

Regarding the reality of the modern world, wherein healthcare systems are becoming more complex and more responsibility is being placed on the public to self-manage their illnesses, the demand on individuals to improve their abilities to gain access to, understand, and use healthcare information in ways that promote and maintain good health is overwhelmingly increasing. Therefore, it is important to take immediate action to change the modifiable environmental factors affecting an individual's health literacy skills which includes the quality of healthcare information offered by nurses.

Recommendations

According to SCT, the Iranian population's health literacy behaviors can be improved by manipulating the environmental determinants, such as the quality of healthcare information provided by the healthcare professionals. This modification will support even an individual with limited literacy to gain required basic knowledge which is fundamental to being an active agent in health care planning. Such actions are supported by a framework proposed by Edwards, Wood, and Edwards (2012). This framework delineates a process through which a client moves from functional health literacy toward critical health literacy where she/he has a greater share in making healthcare decisions. Our study indicated that the Iranian registered nurses are not prepared to offer such a support due to insufficiency in their knowledge of and experience with health literacy. Recommendations to improve the Iranian nurses' knowledge of and experience with health literacy are offered in three areas: research, practice and policy, including educational policy.

Research. Some suggestions are proposed for future studies which can provide more evidence for designing appropriate interventions to improve Iranian registered nurses' knowledge of health literacy and enrich their health literacy related activities and experiences.

This study provides information on the gap in health literacy knowledge and experience of Iranian registered nurses; however, it does not explain whether the insufficiency is due to inadequate nursing university education or lack of continuing education on the topic or other factors. A similar study with a target population of senior nursing students in the Iranian context can shed light on this area, which is necessary to time appropriate interventions. Moreover, designing larger scale and multisite studies, which provide the possibility of comparing health literacy knowledge and experience of nurses' working in different settings, would help to

determine environmental variables such as nurses' workload affecting their abilities. Also, it is necessary to conduct qualitative studies with the aim of exploring nurses' perceived barriers and facilitators in providing high quality healthcare information in their daily interactions. These qualitative investigations will provide complementary evidence required for conducting interventions to enrich nurse- patient communications, and in general the quality of provided healthcare information leading to improve patients' health literacy skills.

Practice. This study strongly recommends taking initiatives to increase registered nurses' motivation to actively seek events to improve their knowledge of health literacy. Disseminating findings of this study through the Iranian Nursing Organization magazine may be the initial step to raise Iranian registered nurses' awareness about the issues related to their knowledge and experience with health literacy.

In addition, the results of this study indicated that those nurses who had experiences of interaction with healthcare professionals for personal reasons obtained a higher score for their knowledge of health literacy. Accordingly, it is assumed that sharing patients and /or their relatives' positive and negative experience with healthcare professionals can motivate nurses to improve their knowledge of health literacy. One suggestion is to produce short videos which portray peoples' frustration when they do not have access to healthcare information or when they are not able to understand the given information to make decisions. Also, with the same aim, booklets presenting patients' anecdotes about their positive and negative experiences of interactions with healthcare professionals can be created. These products, which inform nurses of the consequence of ineffective communications with patients at a deeper level through a more powerful channel, can be incorporated in the materials of continuing education for nurses on health literacy.

Policy. Although patient education has been established as a formal part of nurses' responsibilities in the Iranian healthcare systems for more than a decade, the results of this study showed that health literacy concepts and health literacy oriented practice remain unfamiliar to most of the Iranian registered nurses. It is partly because, similar to other developing countries, health literacy is a new area in Iran, and there are not enough established policies to guide healthcare practice in terms of applying health literacy strategies. Therefore, more needs to be done at administrative levels to develop policies. In this section, the following recommendations

targeting health literacy related changes at administrative levels in the Iranian healthcare systems are offered: augmenting health literacy education for nurses at university level and practice level; defining a uniform strategy to evaluate patients' health literacy skills in practice; developing guidelines to evaluate written healthcare information before delivery; developing guidelines to apply health literacy universal percussions

Augmenting health literacy education for nurses. It is recommended to evaluate the content of the nursing undergrad program in respect to health literacy components and update them with new evidence in current literature. Correspondingly, and even of greater significance, is to take immediate action to enhance practicing nurses' knowledge of health literacy. Hence, it is suggested that up-to-date health literacy courses be designed by MOHME and incorporated into the continuing education for practicing nurses. However, unless special considerations are granted to the content and teaching strategies of the course, the objectives would not be achieved. Although there are not many available evaluative studies that examined the effectiveness of health literacy courses for practicing healthcare professionals, there is a notable trend in the existing literature toward using multiple modalities in teaching this course (Coleman, 2011).

Both deductive as well as experiential teaching techniques, such as group discussion, role play, and video review have been recommended to cover the course objectives. This allows learners to be engaged with the materials at a deeper level, debate and practice expected skills. Moreover, since learning objectives in improving nurses' knowledge of health literacy encompasses, the first three levels of the Bloom taxonomy (remembering, understanding, and applying), this must be reflected in the course content and teaching strategies. For instance, in addition to presenting basic information about health literacy strategies and measurement tools, small group discussions (Kripalani &Weiss, 2006) which can lead to better interpretation of patients' situations in terms of their health literacy needs must be included in teaching strategies for this course. Regarding improving application of the health literacy knowledge, role playing is advocated as an effective method (Rosenthal, Werner & Dubin , 2004). It confronts nurses with the complexity of real situations in which they are expected to utilise their knowledge of health literacy in helping patients to better understand healthcare information.

Defining a uniform strategy to evaluate patients' health literacy skills in practice. The results of this study demonstrated that the Iranian registered nurses noticeably lack adequate knowledge and experience related to health literacy screening tools. This indicated a deficiency in the Iran's healthcare systems rather than an individual nurses' weakness; therefore, it is crucial to determine a uniform evidence based strategy for nurses to evaluate people's health literacy skills in practice, and teach them to apply that appropriately. As the sixth vital sign, evaluating patients' health literacy skills must be approached using evidence based strategies and the same level of professionalism exhibited when assessing other health conditions. An example of health literacy screening tools that is practically manageable in the fast-paced Iranian healthcare settings, is the Single Item Literacy (SILs). The SILs comprises of Use of a Surrogated Reader, Confidence with Filling out Medical Forms, Self-Rated Reading Ability, and Difficulties Learning about Health in which a single question is asking from clients is described as valid and user- friendly strategies to determine reading skills of patients in practice (Morris, MacLean, Chew & Littenberg, 2006; Powers, Trinh & Bosworth, 2010,).

Developing technology supported healthcare communication. This investigation found a propensity in using written healthcare information; nevertheless, evaluating the materials regarding cultural appropriateness of the content and reading level is not performed. This can be explained, to some extent, by the availability of the printed healthcare information in Iran's healthcare settings, leading to the assumption that necessary considerations to accommodate the needs of people with limited health literacy are already taken into account. Nevertheless, nurses need to accept that patients are unique in terms of their health literacy skills. Thus, written materials must be reviewed, as some of them might need adjustments to ensure that they can be understood by all individuals. Consequently, guidelines need to be developed to delineate clearly a standard process to provide healthcare information to patients in any forms. Furthermore, since this study found that offering healthcare information in the form of video and audio tapes is not common, accessibility of these materials for patient education in Iran's healthcare systems needs to be investigated. It is evidenced that multimedia health education increased patients' motivation to learn as well as the effectiveness of the program regarding improving patients 'self-efficacy (Pugliese & Janowski, 2009). For this reason, using technology in offering healthcare information must be considered in the Iranian healthcare settings.

Developing guidelines to apply health literacy universal precautions. Finally, applying health literacy universal precautions is recommended to all healthcare providers to ensure that all clients, disregarding their literacy level, understand healthcare information. Although existing literature indicated that 70% of the adult Iranian population presented inadequate health literacy, limited medical vocabulary and unfamiliarity with health concepts are common to all people. Within the modern fast-changing healthcare systems, all clients disregarding their literacy and socioeconomic status can be health illiterate in some situations; however, the shame attached to that pushes some people to disguise their lack of understanding. Healthcare providers must assume that everyone may have difficulty comprehending or using healthcare information and, they must create an atmosphere wherein all people can thrive. Applying health literacy universal precautions can help healthcare providers to improve peoples' health literacy by reducing the complexity of healthcare systems. Adopting a universal precautions can also help healthcare providers to surmount the limitations of screening tools in estimating patients' health literacy skills. Thus, as all healthcare providers are expected to obey infection control universal precautions to avoid spreading germs, they are supposed to apply health literacy universal precautions to improve the outcomes of patients' interactions in healthcare environments (Brown, Ludwing, Buck, Durham, Shumard & Graham, 2004). Applying health literacy universal precautions is an inclusive and ethical approach for healthcare communication (Registered Nurses' Association of Ontario, 2012); using universal precautions regarding health literacy ensures that clear communication is the basis of every health information exchange (US Department of Health and Human Services, 2010). Best practices related to health literacy universal precautions are:

- create a shame free environment
- speak slowly
- limit concepts in each sentence
- use clear language and avoid medical jargons
- check for understanding using the teach back method
- develop healthcare written materials that are easy to read, understand and use.

 In this respect, the Agency for Healthcare Research and Quality (AHRQ) offers Toolkits, which provides concrete steps that must be taken by healthcare systems to promote better understanding of the healthcare systems by all patients. Implementing the Toolkit's steps has been recommended as a way to integrate health literacy quality improvement efforts into organizations' routine practice (Dewalt, et al., 2010). By implementing the Toolkits, we aim to create a health literate healthcare system. This is in line with the principles that were signed in Calgary Charter on Health Literacy in 2008. Participants from Canada, the United States, and the United Kingdom, in the Calgary Charter on Health Literacy, came to consensus that the health literacy of society is contingent on both individuals and the healthcare providers' health literacy skills. Individuals are health literate if they have enough skills to understand, evaluate and use healthcare information, while healthcare systems are health literate if they present healthcare information in a way that can promote patients understanding and application of the information (Coleman, Kurtz Rossi, McKinney, Pleasant, Runch, Rootman, Shohet, 2011). Although employing the Toolkits might be challenging due to the complex instructions, it has helped healthcare settings to map a direction for health literacy related quality improvement (Mabachi, et al., 2016).

Conclusion

From a health promotion perspective, health literacy is considered an individual asset that can be developed. However, this is definitely a shared responsibility of individuals and healthcare systems. From the healthcare system side, enhancing healthcare professionals' knowledge of health literacy leading to higher quality communications with their clients will eventually improve individuals' health literacy skills.

This study, utilizing a quantitative measure, assessed Iranian's registered nurses knowledge of and experience with health literacy as an environmental factor affecting Iranian people's level of health literacy according to SCT. The results revealed a gap in Iranian registered nurses' knowledge of health literacy most noticeably in knowing about guidelines to create written healthcare information and screening tools to measure health literacy. Iranian registered nurses also demonstrated limited experience with health literacy activities, specifically, in using health literacy screening tools, evaluating reading level of the written

healthcare materials, and employing new technologies in providing healthcare information for their clients.

Although the individual and environmental factors for this deficiency were not assessed in this study, according to SCT, Iranian registered nurses' limited knowledge and experience with health literacy should not be assigned as an individual weakness without considering Iran's healthcare systems capacities to support healthcare professionals with health literacy activities. Some recommendations, mostly at administrative levels, were proposed based on the existing information to close the gap; however, more investigations must be designed to shed light on barriers and facilitators for nurses to improve their knowledge and experience with health literacy.

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APPENDIX A: Invitation E-mail to Potential Participants

Dear……,

You are invited to participate in a study entitled Health Literacy: Knowledge and Experiences of Iranian Registered Nurses.

This study is being conducted by <u>Maryam Nesari</u>, a Ph.D. candidate at University of Alberta, in Canada, under the supervision of <u>Dr.</u> <u>Beverly Williams</u> and <u>Dr. Joanne Olson</u> in collaboration with <u>Dr. Alireza Nikbakht Nasrabadi,</u> Professor at Tehran University of Medical Science.

You were selected because you are working as a registered nurse in an acute care setting or a community health centre at Tehran University of Medical Science.

Health literacy is the ability to read and understand health information in order to make informed decisions about health care. A person's level of health literacy is one of the factors that might interfere with nurses' patient-education activities and might hamper the effectiveness of these efforts. Therefore, nurses need to be aware of how to determine a person's level of health literacy and how to deal with inadequate health literacy in patients.

The purpose of this study is to examine the health literacy knowledge and experience of registered nurses practicing in acute care and community health care centres at Tehran University of Medical Science.

Your participation in the survey will contribute to the body of knowledge on health literacy and provide valuable information to nursing faculty and health care administrators. Your responses will be kept anonymous and in no way affect your employment. I encourage you to participate in this research study; however, participation is optional. Informed consent is implied with completion of the survey. <u>Your total time commitment to fill out the study survey will be approximately 15-20 minutes.</u>

The information letter for the study and the survey are attached.

Thank you very much for your time.

Sincerely,

Maryam Nesari, RN, BScN, MN
PhD Candidate
University of Alberta
Edmonton, Alberta, Canada

APPENDIX B: Study Participants' Information Letter

You are invited to participate in a study entitled Health Literacy: Knowledge and Experiences of Iranian Registered Nurses.

Study Purpose: This study aims to determine the extent to which registered nurses practicing in acute care settings or community health centers affiliated with Tehran University of Medical Science have health literacy knowledge and experience. This study is being conducted by Maryam Nesari, a Ph.D. Candidate at the University of Alberta, in Canada, under the supervision of Dr. Beverly Williams and Dr. Joanne Olson, Professors at the University of Alberta, in collaboration with Dr. Alireza Nikbakht Nasrabadi, Professor at Tehran University of Medical Science.

What will be involved if you participate? If you decide to participate in this research study, you will be asked to complete the Health Literacy Knowledge and Experience Survey. Answer each question based on your current knowledge and experience. Please be honest with all responses. Your total time commitment will be approximately 15-20 minutes. If you complete a paper form of the survey, please return it to the survey administrator or send it to the Iranian Scientific Nursing Association using the enclosed, stamped, self-addressed envelope.

Potential risk or discomforts: There are no identifiable risks or discomforts associated with participating in this research study. All data collected will be anonymous. Your name will never appear on any document.

Potential benefits: If you participate in this study you will help educators and health care providers gain a better understanding of the health literacy knowledge and experience status of the nursing workforce at Tehran University of Medical Science. Participating in the survey may also benefit you by making you more aware of the various strategies available for improving communication between nurses and patients.

Remuneration for participating: There is no compensation for participating in this study. However, after completion of the study, research information will be made available to you upon request.

Voluntary participation: Your participation is completely voluntary. You can withdraw at any time during the study without any explanation. If you choose to withdraw, your data can be withdrawn as long as it is identifiable during data collection period. Your decision about whether or not to participate or stop participating will not jeopardize your employment in any way.

Anonymity: We will protect your privacy and the data you provide by excluding your identity and restricting access to only those individuals who are conducting this study. Information collected through your participation may be used to fulfill an educational requirement, be published in a professional journal, and/or presented at a professional meeting. By participating

in this study you are agreeing for your anonymized data to be used beyond the immediate project for future research purpose.

If you have questions about this study or your rights as a research participant, please contact Dr. Alireza Nikbakht Nasabadi, Professor at the Faculty of Nursing & Midwifery, Tehran University of Medical Science, 021-66921144, or email him at nikbakht@tums.ac.ir or email Maryam Nesari at nesari@ualberta.ca.

Having read this information, you must decide if you want to participate in this study. If you decide to participate, the data you provide will serve as your agreement to do so. This letter is yours to keep.

Thank you for your participation!

Maryam Nesari, RN, BScN, MN
PhD Candidate
University of Alberta
Edmonton, Alberta, Canada

APPENDIX C: Presentation for Potential Participants

You are invited to participate in a study entitled **Health Literacy: Knowledge and Experiences of Iranian Registered Nurses**

This study is being conducted by Maryam Nesari, a Ph.D. Candidate, at the University of Alberta, in Canada, under the supervision of Dr. Beverly Williams and Dr. Joanne Olson, Professors at the University of Alberta, in collaboration with Dr. Alireza Nikbakht Nasrabadi, Professor at Tehran University of Medical Science.

You were selected because you are working as a registered nurse in acute care settings or a community health centre affiliated with Tehran University of Medical Science.

Health literacy is the ability to read and understand health information in order to make informed decisions about healthcare. A person's level of health literacy is one of the factors that might interfere with nurses' patient-education activities and might hamper the effectiveness of these efforts. Nurses, as the largest health care professional group who spend the most time in direct contact with their patients, have the potential to improve health literacy levels and decrease the health impacts of limited health literacy. Thus, awareness of the magnitude of the limited health literacy and strategies to combat this issue needs to be part of the nursing curriculum and continuing education for nurses.

The purpose of this study is to examine the health literacy knowledge and experience of registered nurses practicing in acute care settings or community health care centres at Tehran University of Medical Science.

Your participation in this study will contribute to determining nurses' knowledge of and experiences with health literacy in the Iranian context. This information will be valuable for nursing administrators to revise nursing curricula at faculty of nursing and will be helpful for them to plan for continuing education for nurses. The findings of this study will also generate baseline information for future research that will contribute to mitigating the outcomes of limited health literacy in Iran.

Your responses will be kept anonymous and in no way affect your employment. I encourage you to participate in this research study; however, participation is optional. Informed consent is implied with completion of the survey.

Your total time commitment to fill out the study survey will be approximately 15-20 minutes. In case you are not able to fill out the survey at the presentation session, you can complete it later and send it to the Iranian Scientific Nursing Association using the enclosed, prepaid, self-addressed envelope. Please note that if you have already completed the online version of the Health Literacy Knowledge Experience Survey you are not supposed to participate again.

If you have questions about this study or your rights as a research participant, please contact Dr. Alireza Nikbakht Nasabadi, Professor at the Faculty of Nursing & Midwifery, Tehran University of Medical Science, 021-66921144, or email him at nikbakht@tums.ac.ir or email Maryam Nesari at nesari@ualberta.ca.

Thank you very much for attending this session!

APPENDIX D: Letter to the Study Instrument Developer

January 30, 2015
Catherine M. Cormier, PhD, RN
Assistant Professor
Southeastern Louisiana University, School of Nursing

Dear Dr. Cormier

This is Maryam Nesari, a PhD student at the Faculty of Nursing, University of Alberta in Edmonton, Alberta, Canada. I am conducting a study for my PhD entitled "Health Literacy: Iranian Registered Nurses' Knowledge and Experience of Health Literacy" under the joint supervision of Dr. Beverly Williams (Professor) and Dr. Joanne Olson (Professor) at the University of Alberta, School of Nursing.

This study aims to examine Iranian registered nurses' knowledge and experience of health literacy using a cross- sectional design. Data will be collected a convenience sample of the registered nurses currently practicing in acute care settings or community health centers affiliated with Tehran University of Medical Science, Tehran, Iran.

In searching for a valid instrument I found the Health Literacy Knowledge and Experience Survey (HL-KES) developed by you and would like to use that in my study. Your tool will be slightly adapted to assess Iranian registered nurses' knowledge and experience of health literacy using the guideline published by Sousa & Rojjanasrirat (2011) on cross-cultural adaptation in health research.

I am requesting permission to adapt and use the HL-KES. Your permission would be greatly appreciated. Thank you for considering this request. Should you have any further questions or require additional documentation please contact me at (780) 680-9286 or email me at nesari@ualberta.ca.

Looking forward to hearing from you,

Sincerely

Maryam Nesari

Maryam Nesari, RN, BScN, MN
PhD Student
University of Alberta
Edmonton, Alberta, Canada

APPENDIX E: Permission Letter from the Study Instrument Developer

UNIVERSITY OF ALBERTA

Requesting Permission to Adapt and Use the HL-KES

Catherine Cormier <ccormier@lsua.edu>   Mon, Mar 30, 2015 at 1:16 PM
To: Maryam Nesari <nesari@ualberta.ca>

Maryam

You have my permission to use the Health Literacy and Knowledge survey for your research. I have attached the survey instrument with answer key.

 Your study sounds very interesting. Would love to hear back with you regarding results and any information you may acquire regarding reliability and validity of the instrument.

Best wishes,

Cathy

APPENDIX F: Health Literacy Knowledge and Experience Survey

Part 1: Demographic Data
Directions: Questions 1-7 relate to demographic data. Choose the response that characterizes you best.

1. Age: ☐☐

2. Gender:
A. male (1)
B. female (2)

3. Years of nursing experience: ☐☐

4. Highest Level of nursing education completed:
A. undergraduate degree (1)
B. master's degree (2)

5. What is the primary area of your nursing practice?
A. Acute care (1)
B. Community health center (2)

Other (please Specify) _____

6. I worked in some area of healthcare (nursing assistant, radiology technician, emergency medical technician, licence practical nurse) prior to attending nursing school.
A. No (1)
B. Yes (2)

7. In the past 5 years have you interacted with healthcare providers for your own personal health care needs or the healthcare needs of a significant other?

A. No (1)
B. Yes (2)

If yes, how often were these interactions?
A. Very often (1)
B. Usually (2)
C. Rarely (3)

Part 2: Health Literacy Knowledge
Directions: Questions 1-29 are multiple-choice questions. Choose the best answer and record only one response for each question.
Not sure: I knew about the topic, but I have forgotten
Never heard about that: I do not have any previous knowledge about the topic

1. Low health literacy levels are the most prevalent among:
A. 16 to 24 years of age (1)
C. 25 to 44 years of age (2)
D. 45 to 54 years of age (3)
E. 65 years of age and older (4)
F. Not sure (5)
G. Never heard about that (6)

2. The research on the area of health literacy shows that:
A. The last grade completed precisely shows an individual's reading skills.(1)
B. Most individuals read three to five grade levels lower than the last school grade they have completed. (2)
C. If an individual has completed high school he/she will be functionally literate. (3)
D. If an individual has completed grammar school they will be functionally literate. (4)
E. Not sure (5)
F. Never heard about that (6)

3. What is the likelihood that a nurse working in a public health clinic, where she/he serves mostly low-income patients, will encounter a patient with low level health literacy skills?
A. Almost never (1)
B. Occasionally (2)
C. Often (3)
D. Very often (4)
E. Not sure (5)
F. Never heard about that (6)

4. The best predictor of health status is:
A. Socioeconomic status (1)
B. Literacy level(2)
C. Gender (3)
D. Educational level (4)
E. Not sure (5)
F. Never heard about that (6)

5. Patients with low level of health literacy skills:
A. Rate their health status higher than those with adequate literacy skills.(1)
B. Experience fewer hospitalizations than those with adequate literacy skills. (2)
C. Are often prescribed less complicated medication than those with adequate health literacy skills (3)

D. Are often diagnosed late and have fewer treatment options than those with adequate health literacy skills. (4)
E. Not sure (5)
F. Never heard about that (6)

6. Health behaviors common among patients with low health literacy skills include:
A. Lack of participation in preventative health measures.(1)
B. Disinterest in learning about healthcare problems. (2)
C. Disinterest in making necessary lifestyle changes to improve their health. (3)
D. Inability to learn how to correctly take prescribed medications.(4)
E. Not sure (5)
F. Never heard about that (6)

7. How would patients with low health literacy skills behave in health care situations?
A. Ask multiple questions about healthcare instructions that they cannot understand.(1)
B. Explore treatment options before signing surgical consent forms.(2)
C. Rely heavily on written healthcare instructions. (3)
D. Pretend to read information given to them by healthcare providers.(4)
E. Not sure (5)
F. Never heard about that (6)

8. The nurse should keep in mind that individuals with low health literacy levels:
A. Can understand written healthcare information if they are able to read it. (1)
B. Are not able to learn about their healthcare needs.(2)
C. Have lower intelligence scores than average readers. (3)
D. Have difficulty applying healthcare information to their health situation. (4)
E. Not sure (5)
F. Never heard about that (6)

9. The Rapid Estimate of Adult Literacy is an instrument which is used to:
A. Determine the reading level of written healthcare information. (1)
B. Assess the math skills of an individual required for medication administration. (2)
C. Evaluate the overall quality of written healthcare information. (3)
D. Assess the individual's ability to read common medical terms. (4)
E. Not sure (5)
F. Never heard about that (6)

10. When working with individuals who have low level of health literacy, the nurse should keep in mind that these people:
A. Might not express that they have difficulty in reading. (1)
B. Will express that they need assistance with written information. (2)
C. Will frequently ask questions about information they cannot understand. (3)
D. Should not be expected to manage their healthcare since they are not able to read. (4)
E. Not sure (5)
F. Never heard about that (6)

11. Which of the following questions would provide the nurse with the best estimate of reading skills of the patient?
A. "What is the last grade you completed in high school?" (1)
B. "Do you have difficulty in reading?" (2)
C. "Would you read the label on this medication bottle for me?" (3)
D. "Do you need eyeglasses to read?" (4)
E. Not sure (5)
F. Never heard about that (6)

12. Which statement best describes the test of Functional Health Literacy? This instrument is:
A. Used to assess the comprehension and numerical skills of an individual. (1)
B. Only available in English, therefore has limited use in non-English language countries. (2)
C. An effective tool for assessing the reading skills of individuals. (3)
D. Recommended for determining the reading level of written healthcare materials (4)
E. Not sure (5)
F. Never heard about that (6)

13. What is the strongest advantage of conducting health literacy screenings? Health Literacy screenings:
A. Provide nurses with a good estimate of the educational level of individuals. (1)
B. Will help nurses to be more effective when they are providing healthcare teaching. (2)
C. Can be used to diagnose learning difficulties considered as barriers to patient teaching. (3)
D. Assist healthcare agencies to comply with educational standards established by the Joint(4) Commission on Accreditation of Health organizations.
E. Not sure (5)
F. Never heard about that (6)

14. Which of the following statements is the best for a nurse to initiate health literacy screening with a patient?
A. "It is necessary for me to assess your reading skills; this will take a few minutes and it is very important." (1)
B. "I need to conduct a test to see if you are able to read. Please read these words for me." (2)
C. "I want to make sure that I explain things in a way that is understandable for you. Will you help me by reading some words for me?" (3)
D. "I need to administer a reading test to you. If you cooperate, it will not take long." (4)
E. Not sure (5)
F. Never heard about that (6)

15. After providing written healthcare information to a patient he states, "Let me take this information home to read."
This might indicate that the patient:
A. Is in a hurry and does not have time for instructions. (1)
B. Is not interested in learning the information. (2)
C. Is noncompliant with healthcare recommendations. (3)
D. Might not be able to read the written information. (4)

E. Not sure (5)
F. Never heard about that (6)

16. An individual with functional health literacy are able to:
A. Follow verbal instructions but not written healthcare instructions. (1)
B. Read healthcare information but have difficulties in managing basic healthcare needs. (2)
C. Read and comprehend healthcare information. (3)
D. Read, comprehend, and actively participate in making decisions about their healthcare situation. (4)
E. Not sure (5)
F. Never heard about that (6)

17. Which of the following is true with regards to written healthcare information?
A. Most of the written healthcare information is written at an appropriate reading level for patients. (1)
B. Illustrations can improve a patient's understanding of written healthcare information. (2)
C. Patients are usually provided with information that they think is important to know about their healthcare status. (3)
D. Generally, patients comprehend written information better than verbal instructions. (4)
E. Not sure (5)
F. Never heard about that (6)

18. The recommended literacy level for written healthcare information is:
A. 5th grade. (1)
B. 8th grade. (2)
C. 10th grade. (3)
D. 12th grade. (4)
E. Not sure (5)
F. Never heard about that (6)

19. The first step in developing written healthcare information is to:
A. Outline the content. (1)
B. List the learning objectives (2)
C. Finding out what the audience needs to know. (3)
D. Search about the content area. (4)
E. Not sure (5)
F. Never heard about that (6)

20. Recommendations for developing written healthcare materials include:
A. Using dark colored papers for printing. (1)
B. Presenting information in the form of conversation. (2)
C. Including abbreviations when possible to save space (3)
D. Printing words in fancy style. (4)
E. Not sure (5)
F. Never heard about that (6)

21. When listing side effects for a handout on chemotherapy, the oncology nurse should limit the list to:
A. 2-3 items. (1)
B. 5-6 items. (2)
C. 10-12 items. (3)
D. 15-20 items. (4)
E. Not sure (5)
F. Never heard about that (6)

22. Written healthcare information provided to a patient related to a specific disease should include:
A. Only three or four main ideas about the disease. (1)
B. All treatment options available to manage the disease. (2)
C. A detailed explanation of the pathophysiology of the disease. (3)
D. Statistics on the incidence of the disease. (4)
E. Not sure (5)
F. Never heard about that (6)

23. Which of the following would be the most effective wording for a heading in a brochure about hypertension?
A. Hypertension: The Silent Killer (1)
B. Symptoms of high blood pressure (2)
C. How do I know that I have high blood pressure? (3)
D. What are the contributing factors for hypertension? (4)
E. Not sure (5)
F. Never heard about that (6)

24. The best way to make sure that a brochure about breast cancer prevention is culturally appropriate is to:
A. Search about the community's culture. (1)
B. Obtain input from nurses who are working in the community. (2)
C. Explore the types of written information currently available. (3)
D. Ask for help from community members in the design of the brochure. (4)
E. Not sure (5)
F. Never heard about that (6)

25. Which of the following instructions on the management of diabetes would be least understood by an individual with low health literacy skills?
A. Check your blood sugar every morning. (1)
B. Insulin should be taken based on your prescription. (2)
C. Diabetes is a disorder in body metabolism. (3)
D. Complications of using insulin include hypoglycemic reaction (4)
E. Not sure (5)
F. Never heard about that (6)

26. Which of the following approaches in patient education provides minimal opportunity for patients to get actively involved in the learning process?
A. Incorporating short answer questions in written healthcare information and providing space for patients to write their answer. (1)
B. Suggesting patients to watch a video after providing them with written instructions. (2)
C. Planning a question/answer sessions in small groups after learning activities. (3)
D. Providing pictures for the patient as a choice in response to questions asked in a healthcare brochure. (4)
E. Not sure (5)
F. Never heard about that (6)

27. The most effective way for a nurse to determine how well a patient with low health literacy understands healthcare information is to:
A. Applying a pre-test before instruction and a post-test following instruction. (1)
B. Ask the question, "Do you understand the information I just gave you?" (2)
C. Ask the patient to teach back the information to the nurse. (3)
D. Verbally ask the patient a series of questions following instructions. (4)
E. Not sure (5)
F. Never heard about that (6)

Part 3: Health Literacy Experiences
Directions: Questions 27 – 36 ask you to describe how often you participated in activities related to health literacy.
Choose the response that best describes health literacy experiences while employed as a nurse:

Never (0) Sometimes (1) Frequently (2)   Always (3) Not applicable (4)

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30. How often was health literacy
emphasized in your nursing curriculum?

31. How often did you use a health literacy
screening tool to assess the health literacy of
your patients?

32. How often did you evaluate the reading level
of written healthcare materials before using them
for patient teaching?

33. How often did you evaluate the cultural
appropriateness of healthcare materials, including
written handout, videos, audiotapes, before using
them for patient teaching?

34. How often did you use written materials to provide
healthcare information to an individual and community
group?

35. How often did you evaluate the use of illustration
on written health care materials before using
them for patient teaching?

36. How often did you use audiotapes to
provide healthcare information to an individual
or community group?

37. How often did you use videotapes
to provide healthcare information to an individual
or community group?

38. How often did you did you use computer software to
provide healthcare information to an individual or
community group?

45. E-mail address
(optional):……………………………………………………………………………….

Thank you for completing this survey!

APPENDIX G: HL-KES Variable Codebook

Updated: July 20, 2014

VARIABLE NUMBER	COLUMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
Part 1: DEMOGRAPHIC FORM			
VAR001	1-2	F2.0	Age (in years) VAR001 99 Missing
VAR002	3	F1.0	Gender VAR002 1 Male 2 Female 9 Missing
VAR003	4-5	F2.0	Years of Nursing experience VAR003 99 Missing
VAR004	6	F1.0	Highest level of nursing education completed VAR004 1 undergraduate degree 2 master's degree 9 Missing

VARIABLE NUMBER	COL UMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR005	7	F1.0	What is the primary area of your nursing practice? VAR005 1 Acute Care 2 Community Health Centre 9 Missing
VAR006	8	F1.0	What is the primary area of your nursing practice?: Other, please specify VAR006 0 No text written 1 Text written
VAR007	9	F1.0	I worked in some area of healthcare (nursing assistant, radiology technician, emergency medical technician, licence practical nurse) prior to attending nursing school. VAR007 1 No 2 Yes 9 Missing
VAR008	10	F1.0	In the past 5 years have you interacted with healthcare providers for your own personal health care needs or the healthcare needs of a significant other? VAR008 1 No 2 Yes 9 Missing

VARIABLE NUMBER	COL UMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR009	11	F1.0	If yes to VAR008, how often were these interactions? VAR009 1 Very often 2 Usually 3 Rarely 8 Not applicable 9 Missing

VARIABLE NUMBER	COLUMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
Part 2: HEALTH LITERACY KNOWLEDG Note: Highlighted options are correct answers in this section		
VAR0010	12	F1.0	Low health literacy levels are the most prevalent among: VAR010 A. 16 to 24 years of age (1) B. 25 to 44 years of age (2) C. 45 to 54 years of age (3) D. 65 years of age and older (4) E. Not sure (5) F. Never heard about that (6)
VAR0011	13	F1.0	The research on the area of health literacy shows that: VAR011 A. The last grade completed precisely shows an individual's reading skills.(1) B. Most individuals read three to five grade levels lower than the last school grade they have completed. (2) C. If an individual has completed high school he/she will be functionally literate. (3) D. If an individual has completed grammar school they will be functionally literate. (4) E. Not sure (5) F. Never heard about that (6)
VAR0012	14	F1.0	What is the likelihood that a nurse working in a public health clinic, where she/he serves mostly low-income patients, will encounter a patient with low level health literacy skills? VAR012 A. Almost never (1) B. Occasionally (2) C. Often (3) D. Very often (4) E. Not sure (5) F. Never heard about that (6)
VAR0013	15	F1.0	The best predictor of health status is: VAR013 A. Socioeconomic status (1) B. Literacy level (2) C. Gender (3) D. Educational level (4) E. Not sure (5) F. Never heard about that (6)

VARIABLE NUMBER	COLUMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0014	16	F1.0	Patients with low level of health literacy skills: VAR014 A. Rate their health status higher than those with adequate literacy skills.(1) B. Experience fewer hospitalizations than those with adequate literacy skills. (2) C. Are often prescribed less complicated medication than those with adequate health literacy skills (3) D. Are often diagnosed late and have fewer treatment options than those with adequate health literacy skills. (4) E. Not sure (5) F. Never heard about that (6)
VAR0015	17	F1.0	Health behaviors common among patients with low health literacy skills include: VAR015 A. Lack of participation in preventative health measures.(1) B. Disinterest in learning about healthcare problems. (2) C. Disinterest in making necessary lifestyle changes to improve their health. (3) D. Inability to learn how to correctly take prescribed medications.(4) E. Not sure (5) F. Never heard about that (6)
VAR0016	18	F1.0	How would patients with low health literacy skills behave in health care situations? VAR016 A. Ask multiple questions about healthcare instructions that they cannot understand.(1) B. Explore treatment options before signing surgical consent forms.(2) C. Rely heavily on written healthcare instructions. (3) D. Pretend to read information given to them by healthcare providers.(4) E. Not sure (5) F. Never heard about that (6)
VAR0017	19	F1.0	The nurse should keep in mind that individuals with low health literacy levels: VAR017 A. Can understand written healthcare information if they are able to read it. (1) B. Are not able to learn about their healthcare needs.(2) C. Have lower intelligence scores than average readers. (3) D. Have difficulty applying healthcare information to their health situation. (4) E. Not sure (5) F. Never heard about that (6)

VARIABLE NUMBER	COL UMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0018	20	F1.0	The Rapid Estimate of Adult Literacy is an instrument which is used to: VAR018 A. Determine the reading level of written healthcare information. (1) B. Assess the math skills of an individual required for medication administration. (2) C. Evaluate the overall quality of written healthcare information. (3) D. Assess the individual's ability to read common medical terms. (4) E. Not sure (5) F. Never heard about that (6)
VAR0019	21	F1.0	When working with individuals who have low level of health literacy, the nurse should keep in mind that these people: VAR019 A. Might not express that they have difficulty in reading. (1) B. Will express that they need assistance with written information. (2) C. Will frequently ask questions about information they cannot understand. (3) D. Should not be expected to manage their healthcare since they are not able to read. (4) E. Not sure (5) F. Never heard about that (6)

VARIABLE NUMBER	COLUMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0020	22	F1.0	Which of the following questions would provide the nurse with the **best** estimate of reading skills of the patient? VAR020 A. "What is the last grade you completed in high school?" (1) B. "Do you have difficulty in reading?" (2) C. "Would you read the label on this medication bottle for me?" (3) D. "Do you need eyeglasses to read?" (4) E. Not sure (5) F. Never heard about that (6)
VAR0021	23	F1.0	Which statement best describes the test of Functional Health Literacy? This instrument is: VAR021 A. Used to assess the comprehension and numerical skills of an individual. (1) B. Only available in English, therefore has limited use in non-English language countries. (2) C. An effective tool for assessing the reading skills of individuals. (3) D. Recommended for determining the reading level of written healthcare materials (4) E. Not sure (5) F. Never heard about that (6)
VAR0022	24	F1.0	What is the strongest advantage of conducting health literacy screenings? Health Literacy screenings: VAR022 A. Provide nurses with a good estimate of the educational level of individuals. (1) B. Will help nurses to be more effective when they are providing healthcare teaching. (2) C. Can be used to diagnose learning difficulties considered as barriers to patient teaching. (3) D. Assist healthcare agencies to comply with educational standards established by the Joint(4) Commission on Accreditation of Health organizations. E. Not sure (5) F. Never heard about that (6)

VARIABLE NUMBER	COLUMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0023	25	F1.0	Which of the following statements is the best for a nurse to initiate health literacy screening with a patient? VAR023 A. "It is necessary for me to assess your reading skills; this will take a few minutes and it is very important." (1) B. "I need to conduct a test to see if you are able to read. Please read these words for me." (2) C. "I want to make sure that I explain things in a way that is understandable for you. Will you help me by reading some words for me?" (3) D. "I need to administer a reading test to you. If you cooperate, it will not take long." (4) E. Not sure (5) F. Never heard about that (6)
VAR0024	26	F1.0	After providing written healthcare information to a patient he states, "Let me take this information home to read." VAR024 This might indicate that the patient: A. Is in a hurry and does not have time for instructions. (1) B. Is not interested in learning the information. (2) C. Is noncompliant with healthcare recommendations. (3) D. Might not be able to read the written information. (4) E. Not sure (5) F. Never heard about that (6)
VAR0025	27	F1.0	An individual with functional health literacy are able to: VAR0025 A. Follow verbal instructions but not written healthcare instructions. (1) B. Read healthcare information but have difficulties in managing basic healthcare needs. (2) C. Read and comprehend healthcare information. (3) D. Read, comprehend, and actively participate in making decisions about their healthcare situation. (4) E. Not sure (5) F. Never heard about that (6)

VARIABLE NUMBER	COLUMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0026	28	F1.0	Which of the following is true with regards to written healthcare information? VAR026 A. Most of the written healthcare information is written at an appropriate reading level for patients. (1) B. Illustrations can improve a patient's understanding of written healthcare information. (2) C. Patients are usually provided with information that they think is important to know about their healthcare status. (3) D. Generally, patients comprehend written information better than verbal instructions. (4) E. Not sure (5) F. Never heard about that (6)
VAR0027	29	F1.0	The first step in developing written healthcare information is to: VAR0027 A. Outline the content. (1) B. List the learning objectives (2) C. Finding out what the audience needs to know. (3) D. Search about the content area. (4) E. Not sure (5) F. Never heard about that (6)
VAR0028	30	F1.0	Recommendations for developing written healthcare materials include: VAR028 A. Using dark colored papers for printing. (1) B. Presenting information in the form of conversation. (2) C. Including abbreviations when possible to save space (3) D. Printing words in fancy style. (4) E. Not sure (5) F. Never heard about that (6)
VAR0029	31	F1.0	When listing side effects for a handout on chemotherapy, the oncology nurse should limit the list to: VAR029 A. 2-3 items. (1) B. 5-6 items. (2) C. 10-12 items. (3) D. 15-20 items. (4) E. Not sure (5) F. Never heard about that (6)

VARIABLE NUMBER	COL UMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0030	32	F1.0	Written healthcare information provided to a patient related to a specific disease should include: VAR030 A. Only three or four main ideas about the disease. (1) B. All treatment options available to manage the disease. (2) C. A detailed explanation of the pathophysiology of the disease. (3) D. Statistics on the incidence of the disease. (4) E. Not sure (5) F. Never heard about that (6)
VAR0031	33	F1.0	Which of the following would be the most effective wording for a heading in a brochure about hypertension? VAR031 A. Hypertension: The Silent Killer (1) B. Symptoms of high blood pressure (2) C. How do I know that I have high blood pressure? (3) D. What are the contributing factors for hypertension? (4) E. Not sure (5) F. Never heard about that (6)
VAR0032	34	F1.0	The **best** way to make sure that a brochure about breast cancer prevention is culturally appropriate is to: VAR032 A. Search about the community's culture. (1) B. Obtain input from nurses who are working in the community. (2) C. Explore the types of written information currently available. (3) D. Ask for help from community members in the design of the brochure. (4) E. Not sure (5) F. Never heard about that (6)
VAR0033	35	F1.0	Which of the following instructions on the management of diabetes would be least understood by an individual with low health literacy skills? VAR033 A. Check your blood sugar every morning. (1) B. Insulin should be taken based on your prescription. (2) C. Diabetes is a disorder in body metabolism. (3) D. Complications of using insulin include hypoglycemic reaction (4) E. Not sure (5) F. Never heard about that (6)

VARIABLE NUMBER	COLUMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0034	36	F1.0	Which of the following approaches in patient education provides **minimal** opportunity for patients to get actively involved in the learning process? VAR034 A. Incorporating short answer questions in written healthcare information and providing space for patients to write their answer. (1) B. Suggesting patients to watch a video after providing them with written instructions. (2) C. Planning a question/answer sessions in small groups after learning activities. (3) D. Providing pictures for the patient as a choice in response to questions asked in a healthcare brochure. (4) E. Not sure (5) F. Never heard about that (6)

VARIABLE NUMBER	COLUMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0035	37	F1.0	The most effective way for a nurse to determine how well a patient with low health literacy understands healthcare information is to: VAR035 A. Applying a pre-test before instruction and a post-test following instruction. (1) B. Ask the question, "Do you understand the information I just gave you?" (2) C. Ask the patient to teach back the information to the nurse. (3) D. Verbally ask the patient a series of questions following instructions. (4) E. Not sure (5) F. Never heard about that (6)

VARIABLE NUMBER	COL UMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
Part 3: HEALTH LITERCAY EXPERINCE			
VAR0036	38	F1.0	How often was health literacy emphasized in your nursing curriculum? VAR036 Never (0) Sometimes (1) Frequently (2) Always (3) Not applicable (4)
VAR0037	39	F1.0	How often did you use a health literacy screening tool to assess the health literacy of your patients? VAR037 Never (0) Sometimes (1) Frequently(2) Always (3) Not applicable (4)

VARIABLE NUMBER	COL UMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0038	40	F1.0	How often did you evaluate the reading level of written healthcare materials before using them for patient teaching? VAR038 Never (0) Sometimes (1) Frequently(2) Always (3) Not applicable (4)
VAR0039	41	F1.0	How often did you evaluate the cultural appropriateness of healthcare materials, including written handout, videos, audiotapes, before using them for patient teaching? VAR039 Never (0) Sometimes (1) Frequently(2) Always (3) Not applicable (4)

VARIABLE NUMBER	COLUMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0040	42	F1.0	How often did you use written materials to provide healthcare information to an individual and community group? VAR040 Never (0) Sometimes (1) Frequently(2) Always (3) Not applicable (4)
VAR0041	43	F1.0	How often did you evaluate the use of illustration on written health care materials before using them for patient teaching? VAR041 Never (0) Sometimes (1) Frequently(2) Always (3) Not applicable (4)

VARIABLE NUMBER	COL UMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0042	44	F1.0	How often did you use audiotapes to provide healthcare information to an individual or community group? VAR042 Never (0) Sometimes (1) Frequently(2) Always (3) Not applicable (4)
VAR0043	45	F1.0	How often did you use videotapes to provide healthcare information to an individual or community group? VAR043 Never (0) Sometimes (1) Frequently(2) Always (3) Not applicable (4)

VARIABLE NUMBER	COL UMN	FORMAT	DESCRIPTION OF VARIABLE (HCA)
VAR0044	46	F1.0	How often did you did you use computer software to provide healthcare information to an individual or community group? VAR044 Never (0) Sometimes (1) Frequently(2) Always (3) Not applicable (4)
VAR0045	48	F1.0	E-mail address VAR045 No text 0 Written text:…..