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The Relationship between Health Literacy, Self-Efficacy, and Self-Care Behaviors in Diabetic Patients

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Abstract

Background: Neglecting self-care behaviors is considered an important factor contributing to mortality among diabetic patients. According to Bandura's Social-Cognitive Theory, there is a close relationship between individual performance and self-efficacy. Moreover, access to health-related information or health literacy can affect health status.

Aim: To investigate the relationship between health literacy, self-efficacy, and self-care behaviors in diabetic patients.

Method: This descriptive correlational study was conducted on 400 patients with diabetes referred to a diabetes clinic during 2015. The participants were selected through convenience sampling. The data collection tools included Short Test of Functional Health Literacy in Adults, Diabetes Management Self-Efficacy Scale, and the Summary of Diabetes Self-Care Activities. To analyze the data, Pearson's correlation coefficient, independent t-test, and one-way analysis of variance were run in SPSS, version 19.

Results: The mean age of the participants was 55.1±10.1 years and 74.75% of them were male. The mean scores of self-care behaviors, health literacy, and self-efficacy were 61.94±14.35, 63.6±20.7, and 146.3±22.9, respectively. Moreover, the results of Pearson's correlation coefficient showed a significant direct correlation between health literacy and self-efficacy (P=0.03, r=0.1), as well as health literacy and self-care behaviors (P=0.04, r=0.1). Furthermore, self-efficacy had a significant direct correlation with self-care behaviors (P<0.001, r=0.5).

Implications for Practice: Health literacy and self-efficacy can affect self-care behaviors in diabetic patients; thus, nurses are recommended to develop and implement simple educational interventions to enhance self-efficacy and health literacy, and in turn, promote self-care behaviors.

Keywords: Diabetic patients, Health literacy, Self-care behaviors, Self-efficacy

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Introduction

Diabetes is recognized as a chronic disease affecting nearly 285 million people worldwide (1). Over the past decade, the prevalence rate of this disease has increased by 50% (2). To control diabetes, self-care behaviors are essential to prevent long-term progression of the disease (3).

The most important factor affecting mortality among patients suffering from diabetes is lack of self-care behaviors, which is defined as decisions and actions adopted by an individual to cope with a health problem or to improve one's health status (4). Diabetes self-care behaviors include healthy diet, regular exercise, adherence to the medical treatment regimen, blood glucose control and monitoring, as well as application of skills to promote health (5).

Self-efficacy is also considered a significant factor influencing diabetes self-care behaviors (4). Self-efficacy is known as one of the strongest inner resources empowering individuals to perform their personal tasks. The concept of self-efficacy originated from Bandura's Social-Cognitive Theory (SCT). According to this theory, there is a close relationship between individual performance and self-efficacy. Moreover, self-efficacy is an intermediary between knowledge and practice. Thus, people's skills in acquiring and applying health-related knowledge can exert a significant effect on their well-being. It should be noted that such skills are currently known as health literacy. Access to health-related information and awareness of health issues and diseases can be also taken into account as important factors determining health status. Moreover, it is expected that individuals use such knowledge to achieve high levels of health. In other words, the active role of patients is required to have a high level of health literacy (6). Therefore, low levels of health literacy can lead to delayed disease diagnosis, low self-care skills, increased use of emergency services, high rates of hospitalization, augmented incidence of various diseases, and ultimately redoubled mortality rates (7).

In this regard, some studies examined self-efficacy, health literacy, and self-care behaviors in patients with diabetes (4, 8, 9). For example, in a cross-sectional study performed in the United States, Osborn et al. (2010) showed that health literacy was correlated with self-efficacy. They concluded that boosting self-efficacy was an important goal to improve diabetes management and promote health literacy (8). In Japan, Machico et al. (2013) came to the conclusion that communicative health literacy and critical health literacy were positively correlated with diabetes self-care and self-efficacy, respectively (9). In addition, the results of the investigation by Bohanny et al. (2013) revealed that the patients with higher levels of health literacy had received more education about diabetes and employed people compared to unemployed patients with lower health literacy and higher self-efficacy had benefited from less diabetes education. Moreover, health literacy, diabetes education, and employment status were considered as significant factors predicting self-efficacy among patients suffering from diabetes (4).

Some other studies investigated the relationship between health literacy, quality of life (2), and self-care behaviors (4, 10, 11) and reported discrepant results. Kooshyar et al. (2013) in their study in Mashhad, Iran, suggested that 70% of patients with diabetes had inadequate health literacy, and those with satisfactory levels of health literacy benefitted from higher quality of life. Furthermore, a significant relationship was observed between health literacy and physical and mental aspects of quality of life (2). In another descriptive analytical study, Reisi et al. (2014) concluded that self-care behaviors were significantly correlated with health literacy. Moreover, health literacy was correlated with self-care behaviors such as adhering to a diet, performing physical activities, monitoring blood glucose level, and foot care. Among the different dimensions of health literacy, communicative health literacy was recognized as a better predictor of practicing self-care behaviors in diabetic patients (10). Nevertheless, Seyedoshohadaee et al. (2015) found no significant correlation between health literacy and self-care behaviors (11). As of yet, it seems that previous studies have solely investigated one or two variables of the concepts of health literacy, self-efficacy, and self-care behaviors, which have yielded contradictory results. The only study investigating the above-mentioned concepts and their interrelationship in diabetic patients was the one conducted by Bohhany et al. (2013) in Taiwan (4).

It should be noted that culture and ethnicity could be among the factors influencing health status. In this respect, familial, social, and cultural influences can play a vital role in shaping attitudes and beliefs and may affect how people interact with health systems (12). Given that health literacy in some studies has been sometimes taken into account as an equivalent for individuals' knowledge of a

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particular topic or general literacy, and considering the significance of self-efficacy in disease self-management (nutrition, blood pressure measurement, sports, etc.) and adopting self-care behaviors to control the symptoms of diabetes, evaluation of such components is of utmost importance (13). Therefore, this study aimed at determining the relationship between health literacy, self-efficacy, and self-care behaviors in patients with diabetes.

Methods

In this descriptive correlational study, we explored the relationship between health literacy, self-efficacy, and self-care behaviors in diabetic patients during 2015. The study population included all the diabetic patients referred to the Diabetes Clinic of Kerman University of Medical Sciences, Kerman, Iran. The participants consisted of 400 patients with diabetes who were willing to participate in the study. The sample size was calculated at 265 based on the study by Bohanny et al. (2013) (4), considering the lowest correlation coefficient between self-efficacy and health literacy (2.0) of α=0.05 and β=0.1, and employing the sample size formula in correlational studies. In order to increase the statistical power of the study and considering the availability of samples, the sample size was increased to 400 people. The inclusion criteria were diabetes based on medical diagnosis, disease awareness, receiving at least one of the diabetes treatments, and ability to perform activities of daily living.

The data collection tools included a demographic information form, Short Test of Functional Health Literacy in Adults (STOFHLA), Diabetes Management Self-Efficacy Scale (DMSES), and Summary of Diabetes Self-Care Activities (SDSCA).

The demographic information form included items on age, gender, marital status, number of dependents, level of education, occupation, type of employment, and place of residence.

STOFHLA comprised of 24 items on reading, comprehension, and calculations. The total score of the questionnaire ranges from 0 to 100 with higher scores indicating greater health literacy. This questionnaire was also used by Javadzade et al. (2014) in Iran (7). To determine the content validity of this scale, they similarly investigated the criteria of relevance, clarity, and simplicity, and then accepted values higher than 0.79. The reliability of the given questionnaire was confirmed in the study of Javadzade et al. (2014) using Cronbach's alpha method (α=0.82) (7). In this study, the translated version of the questionnaire administered in the study by Javadzade et al. (2014) was employed. Reliability of the translated version of the questionnaire was established via internal consistency and Cronbach's alpha methods (α=0.79).

DMSES investigates patient's ability to monitor blood glucose, diet, and physical exercises. To this end, patients respond to 19 items using a Likert-type scale ranging from *I cannot do at all* (0) to *I certainly could do* (10). The total score ranges between 0 and 190 with higher scores reflecting better self-efficacy in the management of diabetes. Considering the English version, internal consistency and reliability coefficients were calculated at 0.91 and 0.76 using Cronbach's alpha method and test-retest method, respectively (4). This questionnaire was used in Iran by Hagahyegh et al. (2010) (13) and Behdani et al. (2012) (14) and its internal consistency using Cronbach's alpha method was established (α=0.83). In this study, the translated version of the questionnaire, which was employed by Behdani et al. (2012), was utilized. Reliability of the translated version was analyzed through internal consistency and its Cronbach's alpha was 0.86.

SDSCA questionnaire was developed by Toobert and Glasgow in 2000 (15). It consists of 12 items and 14 recommendations investigating commitment in five domains of diabetes self-care tasks including diet, exercise, blood glucose testing, foot care, and smoking. To this end, patients are asked to report the frequency of self-care activities during seven recent days. The mean score for each of the self-care behaviors other than smoking is calculated from 0 to 7. Patients are also questioned about smoking status as well as the number of cigarettes used in a day. In 2010, this questionnaire was employed by Haghayegh et al. (13) and Namdari et al. (16) and its internal reliability was calculated at 0.77. In this study, the translated version of the questionnaire by Namdari et al. (2010) was used, and its reliability was analyzed via internal consistency method and its Cronbach's alpha was equal to 0.86.

The study sample was selected through convenience sampling method, that is, the researchers presented to the Diabetes Clinic of Kerman University of Medical Sciences from May to July 2015 and selected the diabetic patients attending the clinic and meeting the inclusion criteria. If the

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patients were willing to participate in the study, they were asked to complete the questionnaires on health literacy, self-efficacy, and self-care behaviors. Given the large number of items, the patients were allowed to take rests after completing each questionnaire and then fill in the next ones. In those cases that did not have reading and writing literacy, the questionnaires were completed by interviews.

Furthermore, the ethical considerations included obtaining ethics code of IR.KMU.REC.1394.49, submitting a letter of introduction from the Vice-Chancellor's Office for Research at Kerman University of Medical Sciences to the officials of the clinic, describing the objectives of the study to the participants before completing the questionnaires, providing the required information about the completion of the questionnaires, and assuring the participants regarding confidentiality of the data.

To analyze the data, we used descriptive statistics (mean, variance, and standard deviation) and inferential statistics (Pearson's correlation coefficient, independent t-test, and analysis of variance [ANOVA]) in SPSS, version 19. The significance threshold was set at 0.05.

Results

The mean age of the participants was 55.1±10.1 years, and 299 individuals (74.4%) were male. The majority of the subjects (323; 80.7%) were married. Moreover, 281 individuals (72%) were literate (Table 1).

The mean scores of health literacy, self-efficacy, and self-care behaviors were 63.6±20.7 (score range: 17 and 100), 146.3±22.9 (range: 54 to 190), and 61.4±14.3 (range: 24 to 115), respectively (Table 2). The results of Pearson's correlation coefficient showed a significant positive correlation between health literacy and self-efficacy scores (P=0.03, r=0.1). In other words, increased health literacy in diabetic patients could promote their self-efficacy. There was also a significant direct correlation between health literacy and self-care behavior scores (P=0.04, r=0.1), that is, higher health literacy among patients with diabetes could promote their self-care behaviors. Moreover, there was a significant positive correlation between self-efficacy and self-care behavior scores (P=0.001, r=0.1), indicating that increased self-efficacy in diabetic patients could enhance their self-care behaviors

Table 1. Demographic characteristics of the participants

Variable	Mean±Standard deviation
Age	55.1±10.1
Gender	Frequency (percentage)
Male	299(74.7)
Female	92(23.0)
No response	9(2.2)
Marital status	Frequency (percentage)
Married	323(80.7)
Single	23(5.7)
Divorced	9(2.2)
Deceased spouse	35(8.7)
No response	10(2.5)
Level of education	Frequency (percentage)
Illiterate	112(28.0)
Primary school	103(25.2)
Middle and high school	57(14.2)
High school diploma	68(17.0)
Associate's degree	31(7.7)
Bachelor's degree and higher	24(5.5)
No response	7(1.7)
Occupation	Frequency (percentage)
Employee	28(7.0)
Worker	15(3.7)
Self-employed	243(60.7)
Housewife	80(20.0)
Unemployed	20(5.0)
No response	14(3.5)

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Table 2. Mean and standard deviation of health literacy, self-efficacy, and self-care behaviors among the participants

Variable	Minimum	Maximum	Mean±Standard deviation
Health literacy	17	100	63.3±20.7
Self-efficacy	54	190	146.3±22.9
Self-care behaviors	24	115	61.9±14.3

Table 3. Relationship between health literacy, self-efficacy, and self-care behaviors among the participants

Variables	r	P-value
Health literacy and self-efficacy	0.1	P=0.03
Health literacy and self-care behaviors	0.1	P=0.04
Self-efficacy and self-care behaviors	0.5	P<0.001

(Table 3).

The results of one-way ANOVA revealed a significant negative correlation between health literacy and age (P<0.001), while there was a significant positive correlation between health literacy and level of education (P<0.001). Moreover, the relationship between occupation and health literacy was statistically significant (P<0.001). In detail, health literacy among employees and individuals with "other jobs" was higher than that in other occupations mentioned. Besides, self-efficacy had a significant direct relationship with age (P<0.001), that is, advancing age was associated with higher self-efficacy scores. Moreover, there was a significant link between self-care scores and age in a way that self-care scores were higher in older participants (P<0.001).

Discussion

Our results showed a significant positive correlation between health literacy and self-efficacy, that is, increased health literacy in diabetic patients could enhance their self-efficacy. These findings were consistent with the results of the studies by Dennision et al. (2011) (17), Jones (2011) (18), Osborn et al. (2010) (8), and Rafiezadeh et al. (2014) (19). Bandura considered self-efficacy as one of the richest inner sources empowering individuals to perform their personal activities and a factor predicting changes in related behaviors (20, 21).

We found a significant positive correlation between health literacy and self-care behavior scores, suggesting that higher health literacy in patients with diabetes could enhance their self-care behaviors. In this respect, Reisi et al. (2014) (10) and Lai et al. (2013) also reported similar results. For instance, Lai et al. (2013) concluded that communicative health literacy and critical health literacy were correlated with the practice of self-care behaviors; however, no relationship was found between functional health literacy and self-care behaviors in diabetic patients. These researchers also suggested that the skills related to communicative and critical health literacy were among the necessary and vital factors affecting improved self-care behaviors in diabetic patients because these skills could boost self-confidence and help them establish effective relationships with healthcare providers. Such capabilities could ultimately enable patients receive their required information from different channels of communication and assess and practice them (22).

One of the other findings of this study was the significant positive correlation between self-efficacy and self-care behavior scores; in other words, increased self-efficacy in patients with diabetes could promote their self-care behaviors. According to the Theory of Self-Efficacy by Bandura, humans are endowed with a self-control system and self-regulatory power to manage their thoughts, emotions, and behaviors. The sense of self-efficacy enables individuals use their skills and do wonders in terms of tackling barriers. Thus, perceived self-efficacy is an important factor contributing to successful practice and use of necessary and rudimentary skills. Perceived self-efficacy can also have an impact on efforts made in tackling a task. Thus, individuals who believe in their own self-efficacy double their efforts to overcome their barriers and problems (20, 21). These findings were in line with those of Morowatisharifabad et al. (2009) (23), Shakibazade et al. (2009) (24), Rezasefat et al. (2014) (25), and Stellefson et al. (2012) (26).

Morovatisharifabad et al. (2009) also found a significant positive relationship between self-efficacy and self-care behaviors in diabetic patients. In addition, Stellefson et al. (2012) showed the significant effect of a self-care program on self-efficacy of patients. Further, Shakibazade et al. (2009)

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investigated the association between self-efficacy and perceived barriers and self-care performance in patients suffering from diabetes and concluded that self-efficacy was significantly and positively correlated with self-care behaviors (23, 24, 26). It was suggested that teaching self-care principles to individuals to cope with the disease, adhere to the prescribed treatments, and learn problem-solving skills could help in dealing with new conditions. Thus, lack of awareness regarding self-care behaviors was one of the reasons of re-hospitalization in individuals with chronic diseases. Accordingly, occupancy rate of hospital beds could be reduced and patients could be provided with relative recovery if a part of responsibility was assigned to patients and their families through patient education (27, 28).

Moreover, people with higher self-efficacy and health literacy have stronger motivation to incorporate self-care behaviors and deal with barriers. In addition, self-efficacy is a dynamic concept that can be promoted through behavioral interventions, and successful interventions to promote health literacy and self-efficacy in diabetic patients are accompanied with improved self-care behaviors (25). According to Bandura, perceived self-efficacy in an individual is a pivotal factor in their performance because it acts as an independent part of the basic skills of an individual. As stated by Bandura, self-efficacy determines feelings, thoughts, motivations, and behaviors (21). Thus, it is taken into account as one of the important and effective preconditions for successful incorporation of self-care behaviors. Contrary to the results of this study, Chlebowy et al. (2006) (29) and Gellibrand (2006) (30) did not observe any significant relationship between self-care behaviors and self-efficacy. This discrepancy could be due to the use of different measurement instruments and study populations.

Our results also demonstrated that advanced age could enhance self-care behaviors. Moreover, Vazini and Barati (2013) noted a significant difference in the mean scores of self-care behaviors based on the level of education. It was revealed that patients with higher levels of education had better power of judgment and decision-making to practice self-care behaviors. In other words, high education and awareness concerning diabetes complications and perception of the severity of the problem could bring about change in attitudes towards self-care behaviors, which can lead to adopting the given behaviors (31).

Our results reflected that patients living with other diabetic individuals showed higher self-care behaviors, which was in agreement with the findings of Shaw (2010). It was noted that the presence of a diabetic patient suffering from complications of the disease could increase the probability of other members' infliction with those same complications. Thus, this issue could lead to higher perception of threats as a predictor of self-care behaviors (32). Based on the given findings, advancing age was negatively linked with health literacy, and higher levels of education were positively associated with health literacy. Moreover, higher health literacy was observed among employees. Kooshyar et al. (2013) also found a relationship between health literacy and age, indicating that increased age could lead to a reduction in the level of health literacy. It should be noted that advanced age is associated with lower level of literacy as a result of reduced cognitive performance, long time elapsed from years of formal education, and reduced sensory abilities. Overall, health literacy such as other domains of literacy (e.g., writing, calculation, and problem-solving) increases from the age group of 15-19 years to the age group of 35-39 years, and it often decreases after 40 years of age (2).

Ghanbari et al. (2011) also showed that 25% of individuals holding university degrees and approximately 40% of those with diploma and pre-university degrees had inadequate and borderline levels of health literacy. They stated that the scores obtained in reading skills were often associated with lower grades of the final academic year; thus, academic years were not considered by themselves as totally valid indices for reading comprehension skills because they could only refer to efforts made to continue education but not to acquire such skills. In the study conducted by Ghanbari et al. (2011), no significant relationship was found between health literacy and occupation, which was not consistent with the findings of the present study. Limited number of employed people in this study could be among the reasons for the lack of significant relationship (33). Bohanny et al. (2013) stated that self-efficacy was higher in employed participants compared to unemployed ones. Furthermore, these authors ascribed that health-related activities, assistance, and screening programs for diabetes should be widely developed for unemployed individuals (4).

This study had some limitations restricting the generalizability of its findings. In this study, self-reports and questionnaires were used to collect the data, which could affect patients, expressing real

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opinions. Lack of cooperation of some patients in responding to the questionnaires due to shortage of time was one of the other limitations of this study; thus, some patients completed the questionnaires at other times as they wished.

Implications for Practice

The results of this study demonstrated that health literacy and self-efficacy could influence diabetes self-care behaviors. Accordingly, nurses are recommended to implement educational interventions to enhance self-efficacy, health literacy, and self-care behaviors in patients. The teaching methods used for such patients need to be simple, diverse, and specific to patients with regards to their age, gender, occupation, and education. Moreover, holding training sessions for family members and providing individual and family counseling services to promote health literacy and self-care strategies and establish a sense of self-efficacy seems to be of utmost importance. Interventions promoting self-efficacy and health literacy can prevent the short- and long-term complications of diabetes. Thus, it is recommended to investigate health literacy, self-efficacy, and self-care behaviors in patients with diabetes in future studies by instruments other than questionnaires, to deal with limitation of self-report method.

Acknowledgments

The present study was the result of a research project approved by the Ethics Committee of the Vice-Chancellor for Research and Technology at Kerman University of Medical Sciences registered with the ethics code number of IR.KMU.REC.1394.49. The researchers express their gratitude to the participants and the Vice-Chancellor for Research and Technology at Kerman University of Medical Sciences for their cooperation with this study.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

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