Original Article

The Effect of Illness Acceptance on Diabetes Self Care Activities in Diabetic Individuals

Sati Can, MSc, RN
Ministry of Health Bolu Abant Izzet Baysal University Izzet Baysal Education and Research Hospital, Diabetes Education Deparment, Bolu, Turkey

Saadet Can Cicek, PhD, RN
Assist. Prof. Bolu Abant Izzet Baysal University, Faculty of Health Sciences, Nursing Department, Internal Medicine Nursing, Bolu, Turkey

Handan Ankarali
Prof. Dr. Istanbul Medeniyet University, Basic Medical Sciences Department, Biostatistics and Medical Informatics, Istanbul, Turkey

Correspondence: Sati Can, MSc, RN, Ministry of Health Bolu Abant Izzet Baysal University Izzet Baysal Education and Research Hospital, Diabetes Education Deparment, Bolu/TURKEY E-mail: can_sati@hotmail.com

Abstract

Background: Diabetes necessitates lifelong behavior changes, and the patient must adapt to the disease and accept the large number of responsibilities which it brings with it. Illness acceptance is very important in the control of the disease and in the development of diabetes outcomes by providing diabetes self care activities.
Aim: The aim of this study was to determine the effect of diabetes self care activities on illness acceptance in diabetic individuals.
Method: This was a cross-section type study. Data collection was achieved by means of a structured questionnaire. The study was conducted with 133 participant.
Results: Acceptance score was found to be statistically significantly lower in females, those with additional chronic illness and in those with diabetic complications. Also, between the Acceptance of Illness Scale total score with the sub-dimensions score (diet, foot care, exercise) and The Summary of Diabetes Self Care Activities Questionnaire total score, a statistically significant positive correlation was determined.
Conclusion: Because diabetes is a lifelong illness which necessitates changes in behavior, the patient's compliance is a very important part of control of the disease. Acceptance is important for diabetes self care activities, and illness acceptance must be achieved with a multidisciplinary approach. Nurses, who play a key role in the health team on this topic, should help individuals in illness acceptance and participation in disease management, and they should support individuals with education programs.

Keywords: illness acceptance, diabetes, nurse, self care activities.

Introduction

With population growth, ageing, reduction in physical activity and urbanization, the prevalence of diabetes is increasing all over the World. Diabetes is a great load on society and on health care systems, affects many organs of the body, and has a high mortality and morbidity (International Diabetes Federation-IDF 9 th ed., 2019; World Health Organization-WHO, 2016). Unless urgent measures are taken, the number of diabetics in 2019, 463 million, is expected to reach 700 million by 2045 (age group 20-79 years) (IDF 9 th ed., 2019).

As a significant chronic illness, diabetes necessitates changes in lifestyle, and affects individuals not only physically but also psychosocially, potentially causing difficulties in adaptation. Diabetic individuals are obliged to adapt to their illness, to maintain planned care all their lives, and to adjust their daily lives to their illness. Acceptance is seen as an important factor in adaptation to diabetes. Illness acceptance can

be described as adapting to a chronic illness despite the negative effects of the illness, and as having a positive attitude and coping with the negative consequences of the condition on the aims of life (Casier et al., 2013). Studies have shown that individuals with a high level of acceptance have a higher capacity for coping, their metabolic and glycemic control is better (Richardson, Adner & Nordström, 2001; Schmitt et al., 2014) and their quality of life is improved. Furthermore it has been determined that the state of wellbeing is high in those whose acceptance is high, and therefore their conformity to treatment is high (Richardson, Adner & Nordström, 2001).

Diabetes, as a chronic illness, requires a greater degree of personal responsibility, and diabetes management has an important place in bringing the illness under control. The aim of diabetes management is basically to ensure a better quality of life, good metabolic control, and a reduction in the complications, mortality and economic cost of diabetes. To achieve these desired health outcomes, the health care team must strengthen the self care of diabetic individuals. Self care is the ability to perform the actions necessary to achieve optimal health and to maintain health. Self care is of critical importance in bringing a illness under control, and affects glycemic control, the development of clinical outcomes, state of health, quality of life, and costs (IDF 9 th ed., 2019; ADA, 2017). Self care activities consist of blood glucose monitoring, nutrition, foot care and exercise (Cosansu & Erdoğan, 2014; Toobert, Hampson & Glasgow, 2009).

Because diabetes is a illness which lasts throughout life and requires behavioral changes, the health care team must provide education and support in a way which will enable the individual to carry out self care. The International Diabetes Federation and World Health Organization aim to prevent diabetes related complications and to manage diabetes in an optimal way. Self care activities form the basis for diabetes management (IDF 9 th ed., 2019; WHO, 2016) and there is a positive correlation between the development and maintenance of self care activities and quality of life, use of resources, healthy coping methods, diabetes complications and care costs (Cosansu & Erdoğan, 2014). Illness acceptance has an important place in self care activities and diabetes management. Studies have shown a negative correlation between low diabetes acceptance and self care activities, and that when acceptance is low, self care activities are reduced (Ambrosio et al., 2015; Gregg et al., 2007; Lindholm-Olinder et al., 2015; Schmitt et al., 2014).

Aim of the study: The study was planned with the aim of determining the effect of illness acceptance on diabetes self care activities.

Methodology

Study design: This research was performed as a cross-sectional type study. It was conducted Bolu Abant Izzet Baysal University Hospital Internal Illness Department (Bolu, TURKEY).

Participants: The study population was diabetic indivuduals who attented internal illness departments between 1 March and 31 May 2017 as outpatients. The sample consisted of those aged 18 years or older, with a diagnosis of type 2 diabetes of at least one year, no problems with verbal communication, no hearing loss, and no diagnosis of psychiatric illness, and who agreed to take part in the study. The study was conducted with 133 individuals with type 2 diabetes. The correlation value in between illness acceptance and diabetes self care activities was calculated to be 0.32 in the study, a first type error probability of 5%, and a test power of 95% was seen with this sample size.

Data collection tools: A Question Form created in line with information from the literature, Acceptance of Illness Scale (AIS) and the The Summary of Diabetes Self Care Activities Questionnaire (SDSCA).

Acceptance of Illness Scale (AIS): The scale was developed in order to determine level of illness acceptance. Work on validity and reliability in Turkey was conducted in 2009 (Besen & Esen, 2011). AIS consists of eight items, each of which carries a score of five. The lowest score obtainable on the scale is 8, and the highest is 40. The scale is of five-point Likert type, and is scored according to agreement or disagreement. The lowest score, 1, indicates agreement, while the highest score, 5, indicates disagreement. One point scored by agreement with the statement on the scale means a lack of acceptance, and indicates poor adaptation to the illness. Five points scored by agreement with a statement shows illness acceptance and shows that there are no negative feelings towards the illness. The Cronbach alpha coefficient in the present study was found to be 0.68.

The Summary of Diabetes Self Care Activities Questionnaire (SDSCA): This scale is made up

of five headings (diet, exercise, blood glucose monitoring and foot care and smoking) and consists of 11 items. The diabetic individuals are asked how many days in the past seven they have engaged in these activities. The answers of the first ten items, on diet, exercise, blood glucose monitoring and foot care, are marked numerically from 0 to 7 days. Item 11, on smoking, is marked as 0-No, or 1-Yes. The score is expected to be high. A high score shows that individuals are performing health care activities more. Validity and reliability work for the scale in Turkey was conducted in 2009 (Cosansu & Erdoğan, 2014). This study, a cronbach alpha value of 0.69 was found for the total score, 0.51 for diet, 0.85 for exercise, 0.76 for blood glucose monitoring, and 0.67 for foot care.

Data Analysis: Descriptive values for data obtained are given as means dependent on the type of variable, standard deviation, numerical and percentage frequencies. Conformity to normal distribution of scores in the study was evaluated by skewness and kurtosis. In the evaluation of the statistics, the one-way ANOVA model was used in comparing groups and the Post-hoc Tukey test was used in determining groups which were different. Correlations between numerical variables was investigated by Pearson correlation analysis. The level of statistical significance was taken as $p < 0.05$, and the program SPSS version 18 was used in calculations.

Ethical Considerations: Written permission to conduct the research was obtained from the Clinical Research Ethics Committee of Abant Izzet Baysal University (no. 2005/173, 2015). Before beginning the study, the researchers explained its purpose to those who fitted the inclusion criteria, and informed voluntary consent was obtained in writing from those who consented to participate.

Results

Baseline Characteristics of the Participants: The mean age of the participants was 57.3±11.7 years (min-max:18-84). The sociodemographic data of the study participants are shown in Table 1. It was found that 72.2% of the participants had one or more chronic illness. Mean diabetes duration was found to be 11.1 ± 7.5 years, the mean number of diabetes-related complications was 1.3 ± 1.12, and 68.4% had one or more diabetes complications. The most frequently encountered complications were, in order, neuropathy, retinopathy, and nephropathy. The participants health status characterictics are shown in Table 1.

Comparison of AIS with Descriptive and Diabetes-Related Characteristics: Total scores on the AIS were found to be statistically significantly higher in males than in females, and significantly lower in those with income lower than expenditure than in others. The AIS scores of those with hypertension, asthma and heart failure were significantly low, and the scores of those with retinopathy, neuropathy and nephropathy and of those who had been hospitalized were statistically significantly lower (Table 2). The mean score on the AIS was found to be 30.14 ± 5.76. No significant correlation was found between the total score on the AIS and age but a significant negative correlation was found between time since diabetes diagnosis and the total score on the AIS. A medium level negative correlation was found between the total score on the AIS and the number of complications (Table 3).

Comparison of SDSCA with Descriptive and Diabetes-Related Characteristics: When SDSCA was compared with descriptive characteristics and characteristics relating to diabetes, a significant positive correlation was found between age and blood glucose scores. A significant negative correlation was determined between HbA1c and blood glucose monitoring scores (Table 4).

Comparison of SDSCA Scale Sub-Dimension Between Categoric Variebles: When categoric variables and SDSCA sub-dimensions were compared, it was found that the diet score was lower only in those whose educational level was low ($p < 0.05$), the exercise score was lower only in those who were married compared with those who were single ($p < 0.05$), and the foot care score of those living in urban areas was significantly higher than that of participants living in villages ($p < 0.05$). When categoric variables were compared with the SDSCA total score, it was seen that the score of those whose educational level was low was lower than that of participants whose educational level was high, and that as educational level rose, the score also rose significantly ($p < 0.05$).

Comparison of AIS with the SDSCA score Sub-Dimension and Total Scores: When comparing AIS with the sub-dimensions and total scores of the SDSCA, a statistically significant positive correlation was determined between the AIS total score and the diet score,

the foot care score, the exercise score, and the SDSCA (Table 5).

Table 1. Participant characteristics at baseline (n=133)

Characteristics	*n*	*%*
Gender		
Female	83	62.4
Male	50	37.6
Marital status		
Single	112	84.2
Married	21	15.8
Education level		
Illiterate	17	12.8
Literate	11	8.3
Primary school	75	56.4
Secondary school	10	7.5
High school	12	9.0
University	8	6.0
Economic status		
Income less than expenditure	50	37.6
Income and expenditure equal	76	57.1
Income more than expenditure	7	5.3
Chronic ilness		
Yes	39	72.2
No	67	27.8
Hypertension		59.4
Yes	79	40.6
No	54	
Coronary artery disease		
Yes	26	19.5
No	107	80.5
Chronic obstructive pulmonary disease		
Yes	1	0.8
No	132	99.2
Kidney failure		
Yes	4	3.0
No	129	97.0
Asthma		
Yes	2	1.5
No	131	98.5
Heart failure		
Yes	6	4.5
No	127	95.5
Total	133	100.0

SD, Standard deviation; $\bar{X}$, Mean.

Table 2. Comparison correlation of illness acceptance scores with descriptive and diabetes-related characteristics (n=133)

	Illness acceptance scale total score			
Diabetes-related characteristics	***n***	$\bar{x}$	***SD***	***p***
Gender				
Female	83	29.26	5.71	0.024*
Male	50	31.58	5.59	
Marital status				
Single	112	30.13	5.87	0.995
Married	21	30.14	5.211	
Education level				
Illiterate	17	27.41	6.21	
Literate	11	26.45	3.75	
Primary school	75	30.36	5.99	0.054
Secondary school	10	33.10	4.23	
High school	12	31.50	5.00	
University	8	33.12	2.99	
Economic status				
Income less than expenditure	50	28.0	5.73	0.003*
Income and expenditure equal	76	31.26	5.57	
Income more than expenditure	7	32.85	3.33	
Chronic illness				
Yes	37	31.35	5.40	0.131
No	96	29.67	5.85	
Chronic illness type				
Hypertension	79	29.22	5.98	0.025*
Coronary artery disease	26	29.46	5.75	0.508
Kidney failure	4	30.00	2.65	0.967
Asthma	2	21.00	1.41	0.023*
Heart failure	6	25.33	7.42	0.036*
Diabetes treatment				
Nutrition	1	30.0	-	
OAD	0	-	-	
Insulin	0	-	-	0.659
Nutrition +OAD	38	31.4	4.5	
Nutrition +Insulin	48	29.5	6.1	
Nutrition +OAD+Insulin	45	29.8	6.3	

Diabetes complication				
Retinopathy	48	28.65	5.90	0.024*
Neuropathy	68	28.62	5.87	0.002*
Nephropathy	43	27.95	6.20	0.002*
Hypertension	-	-	-	**
Cerebrovascular disease	3	26.67	9.07	0.293
Peripheric vascular disease	3	27.00	8.72	0.342
Ischemic heart disease	9	31.44	7.18	0.482
Diabetic foot	1	-	-	*

*p< 0.05; **, It is not compared because of lack of subject; OAD, Oral antidiabetic drug; SDSCA, The Summary of Diabetes Self Care Activities Questionnaire.

Table 3. Comparison correlation of illness acceptance scores with descriptive and diabetes-related characteristics (n=133)

Characteristics	***r***	***p***
Age	-0.023	0.796
Diabetes duration	-0.185	0.033*
HbA1c	-0.010	0.910
Complication number	-0.399	0.001**

*, $p < 0.05$; **$p < 0.001$.

Table 4. Comparison correlation of SDSCA with descriptive and diabetes-related characteristics (n=133)

Characteristics	**Diet total score**		**Foot care**		**Exercise**		**Blood glucose**		**Total score**	
	r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Age	0.006	0.943	-0.008	0.927	-0.056	0.525	0.187	0.031	0.032	0.717
Diabetes duration	-0.099	0.257	-0.023	0.793	-0.006	0.944	0.075	0.391	-0.023	0.794
HbA1c	-0.120	0.169	-0.047	0.587	-0.057	0.512	-0.198	0.022	-0.152	0.081
Complication number	-0.200	0.169	0.009	0.281	-0.078	0.374	-0.016	0.856	-0.032	0.713

Table 5. Comparison correlation of illness acceptance with the SDSCA score sub-dimension and total scores (n=133)

	Illness acceptance total scale score	
SDSCA scores	***r***	***p***
Diet score	0.290	0.001*
Foot care score	0.244	0.005**
Exercise score	0.199	0.022**
Blood glucose score	0.105	0.227
SDSCA total score	0.327	0.001*

* $p \leq 0.001$; ** $p \leq 0.05$.

Discussion

According to the findings of the study, while the mean AIS was found to be high (30.14 ± 5.76) and no significant difference was found between this score and education level and age, it was found to be statistically significantly higher in males than in females ($p = 0.02$). In a study by Richardson et al. (2001), no significant difference was found between gender, age, diagnosis duration with AIS, but AIS were found to be at a statistically significantly higher level in those with a high education level than in those whose education level was low ($p < 0.05$).

It was found in our study that the AIS in those whose income was less than their expenditure were significantly lower than those of participants in which it was higher ($p = 0.003$). In a study by Gimenes et al. (2009), it was found that conformity to treatment was five times lower in those whose income level was low than in those for whom it was high. It is thought that this may be caused by difficulties with access to resources because of the costs of such things as medicines and treatment, which may have affected illness acceptance and conformity to treatment. Income level is related to problem solving and coping with and illness acceptance, and at the same time is an indicator of the quality of life, metabolic control and coping with stress (Jaser et al., 2012).

According to the findings of the study, it was determined that as diagnosis duration lengthened, AIS score total scores fell, and a significant negative correlation was found between AIS total score and diagnosis duration ($p = 0.03$). This finding was similar to the literature, in that as diagnosis duration increased, quality of life fell significantly (Gimenes, Zanetti & Haas, 2009; Scollan- Koliopoulos et al., 2013). It is thought that as time since diagnosis increased, diabetes management was negatively affected by this because of the responsibilities and restrictions caused by the illness.

It was found that 68.4% of the diabetic individuals participating in the study had one or more complications of diabetes, the most frequently seen of which were, in order, neuropathy, retinopathy and nephropathy, and this is similar to the literature. The AIS of diabetic individuals with complications were seen to be statistically significantly low, and as the number of complications increased, AIS fell significantly ($p = 0.001$). In one study it was found that the AIS of those with two or more complications were significantly lower than the scores of those with no complications or with only one complication ($p < 0.05$) (Richardson et al., 2001). The presence of complications has a negative effect on the quality of life, problem solving skills and the ability to cope (Schmitt et al., 2017; Scollan- Koliopoulos et al., 2013).

Examining the correlation between SDSCA total score and categoric variables, it was seen that the diabetes self care activities total score was lower in those with a low level of education than in those whose education level was high, and that as education level rose, the score increased significantly ($p = 0.001$) (Al- Majed, 2014; Bohanny et al., 2013; Hwang et al., 2015; Lin et al., 2016). This finding is similar to the literature: educational level is an important factor in carrying out responsibilities brought by the illness such as conformity to treatment, regular monitoring, exercise, and taking medicines, and

in accessing health care. When the diet score and categoric characteristics were examined, it was seen that they were lower in those with a low level of education (p = 0.01). Low conformity to treatment in those with a low educational level has similarly been found in other studies (Gimenes, Zanetti & Haas, 2009; Visentin et al., 2016). A low educational level may be the reason for difficulties in achieving cognitive skills and in learning. It is for this reason that factors such as the educational level and cognitive functions of diabetic individuals must be taken into account in providing suitable care and treatment, and they must be monitored at more frequent intervals. SDSCA total scores and sub-scores between time since diagnosis and HbA1c no significant difference was found. However, a significant positive correlation was seen between age and the blood glucose monitoring score (p = 0.03). This finding is similar to the results of a study by Chourdakis et al. (2014). In a study by Lin et al. (2016), no significant difference was found between age and self care activities. In our study, a significant negative correlation was found between HbA1c and the blood glucose monitoring score (p = 0.02). As the HbA1c value rose, the blood glucose score fell significantly. It is thought that this may be caused by not only an increase in the HbA1c value, but also by the negative effects of an increase in complications, increased cost resulting from disruption of metabolic control, and psychosocial factors. Also, the costs of glucose monitoring strip and charges for medicines and treatment constitute a hindrance.

It was seen that there was a low positive correlation between the AIS and the total SDSCA score but that statistically this correlation was significant (p = 0.001). Examining the correlation between AIS and the sub-dimensions of SDSCA, positive correlations were found which were of low significance for the diet score (p = 0.01) and the foot care score (p = 0.01), and non-significant for the exercise score (p = 0.02). As the AIS increased, the foot care and exercise scores also increased. These findings are similar to the literature (Saleh et al., 2014; Smalls et al., 2014). In individuals who did non-accept diabetes, a significant strong correlation was found in some or all self care activities. In a study by Schmitt et al. (2014), a strong negative correlation was found between those who did non-accept diabetes and all self care activities and the sub-groups. Besides, a negative correlation was found between low acceptance and diabetic outcomes including a reduction in self care and poor glycemic control. High acceptance led to an increase in self care activities and better results for coping strategies (Lindholm- Olinder et al., 2015). When acceptance was low, it was determined that attachment to diabetes management was low and that there was a negative effect on glycemic control (Bussel et al., 2013).

A positive correlation was found between the maintenance of self care activities and quality of life, use of resources, care costs and diabetes complications (WHO, 2016; Shristava, Shristava & Ramasamy, 2013). It was determined that those who maintained self care activities had better problem solving skills and awareness of the management of changes in blood glucose. Self care management is affected by a patient's age, education level, time since diagnosis of diabetes and diabetes education (Bohanny et al., 2013; Shristava, Shristava & Ramasamy, 2013). As well, such individual characteristics as gender, health values, beliefs are also factors which affect self care activities. Also, self care activities may not be at the desired level in connection with hindrances such as poor socioeconomic condition, cultural characteristics, access to healthy food, and costs of such procedures as glucose monitoring (Ashur et al., 2016; Bohanny et al., 2013; Chourdakis et al., 2014; Hwang et al., 2015; Lin et al., 2016; Sadowski, Devlin, Hussain & 2012; Scollan-Koliopoulos et al., 2013; Smalls et al., 2014; Saleh et al., 2014).

Therefore, the health team must focus on coping strategies and education in the development of self care activities (Ashur et al., 2016; Kosti & Kanakari, 2012; Sadowski, Devlin, Hussain & 2012; Shristava, Shristava & Ramasamy, 2013). In one study, a significant positive correlation was found between diabetes education and self care (Bohanny et al., 2013). In another study a statistically significant correlation was found between self care education given by nurses and foot care behaviors (Neta, Silva, Neta, 2015). Similarly, it was determined in another study that self care activities in patients who had received foot care education from the health care team were three times more (Sadowski, Devlin, Hussain & 2012). Therefore, the continuity of education must be achieved by a multidisciplinary team, and conformity by diabetic individuals must be monitored. In the

development of self care activities, it was indicated that interventions to change behavior could be of benefit (Casier et al., 2013; Gregg et al., 2007; Manjula and Premkumar & 2016).

Conclusions: Illness acceptance has an important place in the accomplishment of self care activities in diabetic individuals. Nurses play a key role on this topic. Nurses must help individuals to accept their illness and to participate in illness management; they must recognize inadequate acceptance, and ensure regular monitoring and individual care according to acceptance levels. In ensuring glycemic control, they must help individuals to cope in order to improve the quality of life, prevent or reduce complications, and lower care costs, and they must assess the level of acceptance. It is recommended that effective self care activities be carried out, illness acceptance be ensured by a multidisciplinary approach, and that when necessary, individuals be supported with appropriate interventions to make behavioral changes.

Acknowledgements: We thank the diabetic individuals who agree to participate in this study.

References

Al-Majed TH. Ismael A. Al- Khatlan MH. & El-Shazly KM. (2014). Adherence of Type-2 Diabetic Patients to Treatment. Kuwait Medical Journal. 46(3): 225-232.

Ambrosio L. Garcıa JMS. Fernandez MR. Bravo SA. Ayesa DC. Sesma MEU. et al. (2015). Living with Chronic Illness in Adults: A Concept Analysis. Journal of Clinical Nursing. 24: 2357–2367.

American Diabetes Association. Standards of Medical Care in Diabetes – 2017. (2017). Diabetes Care. 40 (1): 1–142.

Ashur ST. Shah SA. Bosseri S. Fah TS. & Shamsuddin S. (2016). Glycaemic Control Status Among Type 2 Diabetic Patients and the Role of Their Diabetes Coping Behaviours: A Clinic-Based Study in Tripoli, Libya. Journal of Medicine. 1-9.

Besen DB. & Esen A. (2011). Hastalığı Kabul Ölçeğinin Türk Toplumundaki Diyabetik Bireylere Uyarlanması. TAF Preventive Medicine Bulletin. 10(2): 155-164.

Bohanny W. Wu VSH. Liu CY. Yeh HS. Tsay SL. & Wang JT. (2013). Health Literacy, Self Efficacy, and Self-Care Behaviors in Patients with Type 2 Diabetes Mellitus. Journal of the American Association of Nurse Practitioners. 25: 495–502.

Bussel A. Nieuwesteeg A. Janssen E. Bakel H. Bergh B. Schaaijk NM. et al. (2013). Goal Disturbance and Coping in Children with Type 1 Diabetes Mellitus: Relationships with Health-Related Quality of Life and A1C. Canadian Journal of Diabetes. 169-184.

Casier A. Goubert L. Gebhardtb WA. Baetsc FD. Akenc SV. Matthysc D. et al. (2013). Acceptance, Well-Being and Goals in Adolescents with Chronic Illness: A Daily Process Analysis. Psychology & Health. 28(11): 1337–1351.

Chourdakis M. Kontogiannis V. Malachas K. Pliakas T. & Kritis A. (2014). Self-Care Behaviors of Adults with Type 2 Diabetes Mellitus in Greece. J Community Health. 39: 972–979.

Cosansu G. & Erdoğan S. (2014). Influence of Phychosocial Factors on Self-care Behaviors and Glycemic Control in Turkish Patients Type 2 Diabetes Mellitus. Journal of Transculturel Nursing. 25(1): 51-59.

Gimenes HT. Zanetti ML. & Haas VJ. (2009). Factors Related to Patient Adherence to Antidiabetic Drug Therapy. Rev Latino-am Enfermagem Janeiro-Fevereiro. 17(1): 45-51.

Gregg JA. Callaghan GM. Hayes CS. & Glenn-Lawson JL. (2007). Improving Diabetes Self-Management Through Acceptance, Mindfulness, and Values: A Randomized Controlled Trial. Journal of Consulting and Clinical Psychology. 7(2): 336-343.

Hwang J. Rudnisky C. Sarah BS. & Johnson JA. (2015). Socioeconomic Factors Associated with Visual Impairment and Ophthalmic Care Utilization in Patients with Type II Diabetes. Can Jophthalmol. 50 (2): 119-126.

International Diabetes Federation Diabetes Atlas. 9 th ed. Brussels: IDF; 2019: 1-176.

Jaser SS. Faulkner MS. Whittemore R. Jeon S. Delamater A. & Grey M. (2012). Coping, Self-Management, and Adaptation in Adolescents with Type 1 Diabetes. The Society of Behavioral Medicine. 43: 311-319.

Kosti M. & Kanakari M. (2012). Education and Diabetes Mellitus. Health Science Journal. 6(4): 654-662.

Lin K. Yang X. Yin G. & Lin S. (2016). Diabetes Self-care Activities and Health-Related Quality-of-Life of Individuals with Type 1 Diabetes Mellitus in Shantou. China. Journal of International Medical Research. 44(1): 147–156.

Lindholm-Olinder A. Fischier J. Fries J. Alfonsson S. Elvingson V. Eriksson JW. et al. (2015). A Randomised Wait-List Controlled Clinical Trial of the Effects of Acceptance and Commitment Therapy in Patients with Type 1 Diabetes: A Study Protocol. BMC Nursing. 1-5.

Manjula BG. & Premkumar J. (2016). Effects of a Behavioral Intervention on Self-Efficacy, Self-Care Behavior and Hba1C Calues Among Patients with Type 2 Diabetes Mellitus. International Journal of Nursing Education. 8(3): 1-5.

Neta DSR. Silva ARV. & Silva GRF. (2015). Adherence to Foot Self-Care in Diabetes Mellitus Patients. Rev Bras Enferm. 68(1): 103-108.

Richardson A. Adner N. & Nordström G. (2001). Persons with Insülin-Dependent Diabetes Mellitus: Acceptance and Coping Ability. Journal of Advanced Nursing. 33(6): 758-763.

Sadowski D. Devlin M. & Hussain A. (2012). Diabetes Self-Management Activities for Latinos Living in Non-Metropolitan Rural Communities: A Snapshot of an Underserved Rural State. J Immigrant Minority Health. 991-998.

Saleh F. Mumu SJ. Ara F. Hafez A. & Ali L. (2014). Non-adherence to Self-Care Practices & Medication and Health Related Quality of Life Among Patients with Type 2 Diabetes: A Cross-Sectional Study. BMC Public Health. 39(5): 972-979.

Schmitt A. Reimer A. Kulzer B. Haak T. Gahr A. & Hermanns N. (2014). Short report: Educational and Psychological Issues Assessment of Diabetes Acceptance can Help Identify Patients with Ineffective Diabetes Self-Care and Poor Diabetes Control. Diabetic Medicine. 1446-1451.

Scollan-Koliopoulos M. Bleich D. Rapp K. Wong P. Hofmann CJ. Raghuwanshi M. et al. (2013). Health-related Quality of Life, Disease Severity, and Anticipated Trajectory of Diabetes. The Diabetes Educator. 39(1): 83-91.

Shrivastava SR. Shrivastava PS. & Ramasamy J. (2013). Role of Self-Care in Management of Diabetes Mellitus. Journal of Diabetes & Metabolic Disorders. 1-5.

Smalls BL. Gregory CM. Zoller JS. & Egede LE. (2014). Effect of Neighborhood Factors on Diabetes Self-Care Behaviors in Adults with Type 2 Diabetes. Diabetes Research and Clinical Practice. 106: 435 – 442.

Toobert DJ. Hampson SE. & Glasgow RE. (2000). The Summary of Diabetes Self-Care Activities: Measure Result From 7 Studies and Revised Scale. Diabetes Care. 23(7): 943-50.

Visentin A. Mantovani MFM. Caveiao C. Hey AP. Scheneider EP. & Paulino V. (2016). Self-Care of Users with Type 1 Diabetes in a Basic Health Unit. Journal of Nursing. 10(3): 991-998.

World Health Organization. Global Report on Diabetes. 2016: 1-88.