Assessment of knowledge on self-care practices by Diabetes Mellitus Type II attending Diabetes clinic at Kakamega County Referral Hospital

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ABSTRACT

Introduction: In 2012, more than 371 million people presented with Diabetes Mellitus Type II worldwide. Approximately 4.8 million people died in 2012 due to the complications of Diabetes Mellitus Type II (American Diabetes Association 2013). In 2012, in sub-Saharan Africa, Diabetes Mellitus Type II was estimated at 6 percent of total mortality, this reflects an increase from 2.5 percent in 2000. Rapid urbanization leading to sedentary lifestyle and diet changes is a big contributing factor to the rapid increase of Diabetes Mellitus Type II in Sub-Saharan Africa.Kenya presents with heavy disease burden with life expectancy averaging 56 years. Despite the commendable successes to curb CDs (Communicable Diseases), health problem status has stagnated as a result of increase in NCDs causing 28% of all patients deaths in 2010; Diabetes Mellitus Type II accounting for 2% of the total death.**Study area:** Kakamega County Referral Hospital is approximately 400 kilometers from Nairobi the capital city of Kenya. It is the main referral hospital in western Kenya and receives referrals from neighboring counties e.g. Vihiga County, Bungoma County and various hospitals within the County. **Target Population:** Diabetes Mellitus Type II patients attending Kakamega County Referral Hospital**Aim:** To assess adequate self-care practice by Diabetes Mellitus Type II patients attending the Diabetes clinic at Kakamega County Referral Hospital.**Methods and Materials:** This was a descriptive cross-sectional study. Researcher administered questionnaires based on W.H.O Diabetes Mellitus Type II self-care guidelines were used to collect data. Questionnaires that were filled were screened and carefully scrutinized for completeness, relevance and correctness before storage. Qualitative data was analyzed manually and Quantitative data was organized, coded, and standardized then descriptive statistics were used to analyze aided by statistical package for social scientists (SPSS) version 22. Descriptive analysis was carried out to provide simple summaries about the sample and the measures. Tables were used to present the data. Models of statistical analysis were done to validate the findings of the study.**Results:** The study found out that, only 22.02% of the participants gave correct signs and symptoms of high blood sugars. Only 13% of the participants demonstrated knowledge of signs and symptoms of low blood sugar. On low blood sugar management 84.52% gave correct responses. Frequency of feet checking was poor with only 16.67% of the participants giving correct responses. Majority (93.45%) of the participants were well versed with the complications of Diabetes Mellitus Type II. Frequency of eye examination had 90.48% of the participants giving the correct responses.**Conclusion:** The spoken knowledge in low literacy patient with Diabetes Mellitus Type II (SKILLD) scale was poorly scored with majority of the participants demonstrating low knowledge regarding common complications of Diabetes Mellitus Type II.
Keywords: Diabetes Mellitus Type II, Self-care and Patient.

Introduction

Orem (2001) defines self-care as an individual's initiative to take care and maintain his or her health and disease with an aim to prevent disease related complications. Diabetes Mellitus Type II is a disease that presents with resistance to insulin and deficiency of insulin relatively (Gatt*et al*. 2008). Either of which may be present at the time that Diabetes Mellitus Type II becomes clinically manifested and is characterized by high blood sugar levels (Gatt*et al*.2008). Majority of the patients present with Diabetes Mellitus Type II after the age of 40 years (Gatt*et al*.2008). However Diabetes Mellitus Type II can present earlier, especially in people with high prevalence of Diabetes Mellitus Type II (Gatt*et al*. 2008).

The population presenting with Diabetes Mellitus Type II is going up in every country (Christensen *et al*.2009). Diabetes Mellitus Type II makes up about 85 to 95% of all Diabetes in countries with high-income and may account for an even higher percentage in low- and middle-income countries (Christensen, *et al*. 2009). Diabetes Mellitus Type II presents as a common and serious global health problem that is associated with rapid population cultural and social changes, ageing, increasing rate of urbanization, changes in diet, less or no physical activity and other lifestyle and behavioral patterns that have been found to be unhealthy in many countries (Christensen *et al*. 2009).

Diabetes Mellitus Type II rates among the leading non-communicable diseases globally in patient's

mortality and morbidity (Whiting *et al*. 2011). The burden of Diabetes Mellitus Type II worldwide was approximated to be 366 million in 2011 (Whiting *et al*. 2011). The global prevalence is estimated to rise to 9.9 % with the total number of patients with Diabetes Mellitus Type II expected to rise to approximately 552 million by 2030 (Whiting *et al*. 2011). In Kenya, the prevalence amongst the adult population was estimated at 4.2% in 2009 with a range of between 3.5% and 7% showing urban-rural variation (Christensen *et al*. 2009).

Diabetes Mellitus Type II in Kenya has been associated with significant morbidity (Awari*et al*. 2007). The people affected mainly fall in the age group of 40 to 59 years and in most cases at the peak of their productive years (Awari*et al*. 2007). This population present with complications at an early stage of their diagnosis, as early as 2 years (Awari*et al*. 2007). The burden of cardiovascular risks as a result of Diabetes Mellitus Type II is increases in this population and Diabetic foot ulcers together with peripheral vascular disease contributing abundantly to amputation of lower limb (Awari*et al*. 2007).Diabetes Mellitus Type II is among the most challenging 21st century health problems (Christensen *et al*. 2009).

Management of patients with Diabetes Mellitus Type II has raised different debates especially among the nursing professionals with a section of nurses advocating for patient's management of disease themselves (Baumann*et al*. 2010). While others advocate for institutionalized care which they argue is the best form of management (Baumann*et al*. 2010).

Self-care management of Diabetes Mellitus Type II is accomplished through personal health management like continuing to maintain lifestyle activities that are healthy in areas of physical activities, diet and medication (Orem 2001). Orem described a self-care agency as the ability of oneself to perform an assessment, monitor and take decision on behalf of his own life situation to maintain health and promote wellness (Orem 2001).

Diabetes Mellitus Type II self-care is a patient's task and a result of personal decisions about good behavior to promote health (McEwen *et al*. 2010). The main agenda of self-care is to prevent additional illness, reduce complication arising from high blood sugar, re-establish health lifestyle and promote independence based on adherence rules and on factors presenting from individual perspective (McEwen *et al*. 2010).

Self-care management of Diabetes Mellitus Type II is argued to be an evolutionary process of knowledge development or creating awareness by adapting to survive with the disease complex nature in a social context and adhering to the set W.H.O self-care guideline (Ingram *et al*. 2007). Family members and workmates should be involved for successful performance of self-care activities by Diabetes Mellitus Type II patients (Jones *et al*. 2008).

Diabetes Mellitus Type II patients are encouraged to apply self-care activities that will help slow down development of morbidities associated with the disease and prolongs productive life (Christensen *et al*. 2009). This includes; diabetes education, impacting knowledge and skills to Diabetes Mellitus Type II population with an aim to empower them and ensure self-care in management of their condition and disorders associated with the disease (Christensen *et al*. 2009). Diet modification is among the cornerstones of Diabetes Mellitus Type II patient management, and is based on the principle of patients eating healthy in a social context, cultural and patient's psychological influence of food choices (Christensen *et al*. 2009).

Physical activity is essential in management of Diabetes Mellitus Type II (Heinrich *et al*. 2010). Regular patients physical activity leads to improved metabolic control, increases receptor sensitivity to insulin and helps patients loose and maintain weight as well as giving a sense of well-being (Heinrich *et al*. 2010). Regular examination of self-feet to detect signs of Diabetes Mellitus Type II ulcers and prevent development of the ulcers is key to promote comfort to Diabetes Mellitus Type II patients as nursing foot ulcers is a strenuous experience (Heinrich *et al*. 2010).

Daily medication, oral glucose lowering agents (OGLA) and insulin therapy are prescribed when individualized patient glucose control targets are not met by patients modification of lifestyle through diet adjustments and regular individualized exercise programme (Heinrich *et al*. 2010). Regular patient monitoring of glucose in urine and or blood glucose is important to determine whether patient's blood glucose control targets are within limits (Heinrich *et al*. 2010).

The ultimate self-care practiced by Diabetes Mellitus Type II patients demands high input from patients' social members as the patient lifestyle changes drastically (Jones *et al*. 2008). Thus self-care involves more than performing patients care activities but also taking in consideration interrelationships between patients and his or her social surrounding and implementing an appropriate change in the regular life cycle of the patient (Jones *et al*. 2008).

Methods and Materials

Study Design: A descriptive cross-sectional study design was used.

Study Area: Kakamega County Referral hospital is situated in Kakamega town in Western part of Kenya, within Kakamega County which is the second most populated County after Nairobi County (Census Report 2009). It is approximately 400 kilometers from Nairobi the capital city of Kenya (check appendix 5 for the map). It is the main referral hospital in western Kenya and receives referrals from neighboring counties e.g. Vihiga County,

Bungoma County and various hospitals within the County. The hospital has both inpatient services and outpatient services with a bed capacity of 448 beds and 80 cots (Kakamega County Hospital 2015).

Target Population: This study targeted Diabetes Mellitus Type II patients attending Kakamega County Referral Hospital.

Study Population: The study population was patients with Diabetes Mellitus Type II; aged 18 years and above attending outpatient Diabetes Mellitus Type II clinic at Kakamega County Referral Hospital.

Sample size: A sample of 168 Diabetes Mellitus Type II patients was used.

Data Collection: Kakamega County Referral Hospital was used as the setting for the study. Client who met the inclusion criteria were included in the study. The collection of data started after receiving the approval from Mount Kenya University ethical review committee, research permit from National Commission of Science, Technology and Innovation and the Ethical committee clearance at Kakamega County Referral Hospital. Three trained research assistants were involved in data collection that took place from 23rd November 2015 to 10th January 2016. Participants were selected using the systematic sampling where every 2nd Diabetes Mellitus Type II patients was selected, consent sort, assessed for inclusion criteria and given the questionnaires to fill. The research assistant guided the participants to fill the Diabetes Mellitus Type II self-care guideline questionnaire and clarified the questions to ensure clarity and validity. This was done repeatedly till the required sample size of 168 Diabetes Mellitus Type II was attained. The questionnaires were sorted checked for correctness labeled and data entered in tables on daily basis.

Data Management: Qualitative data was analyzed manually by first summarizing the information gathered, followed by categorization and coding into emerging themes and presenting in a narrative form. The results were presented in terms of percentages, frequencies and in figures and tables and a brief explanation of each given. Quantitative data was organized, coded, and standardized then descriptive statistics were used to analyze aided by statistical package for social scientists (SPSS) version 22. Descriptive analysis was carried out to provide simple summaries about the sample and the measures. Tables were used to present the data. The following models of statistical analysis were done to validate the findings of the study.

Ethical Consideration: The proposal for this study was submitted to Mount Kenya University Research ethics committee for approval, National Commission for Science Technology and Innovation, for research permit and Kakamega County Referral Hospital ethical committee for approval all based in Kenya.

Respondent's information was kept confidential and consent was sought before revealing any information. The researcher protected identity of individual subjects using pseudo names.

The researcher confirmed to the subjects of voluntary consent where participation was on willingness. The subjects were told the truth and were given all the facts about the research in order to make an informed decision about participation or not. The informed consent consisted of cover letter that explained the purpose of the study, the benefit and likely risk to the participant and where the participants provided their signature as a written acceptance of their voluntary participation.

The researcher intends to share the finding of the research so as to promote improved self-care management by patients with Diabetes Mellitus Type II at Kakamega County Referral Hospital.

Research findings: In this chapter a description of the participants sampled in this study is provided and an analysis of the result aimed at answering the research questions; what is the level of knowledge of Diabetes Mellitus Type II patients on Diabetes Mellitus Type II self-care practice at Kakamega County Referral Hospital. Majority, 46.4% (78) of the respondents were between the ages of 50-59. Gender was unevenly represented with the majority, 55.95% (94) of respondent's being females. Majority 58.3% (98) of the participants were married while 30% were widowed. Majority 61.9% (104) of the participants had primary education.

Majority, 71% (120) of the patients had stayed with the disease between 5-10 years. All the patients were on Diabetes medication with 98% (166) on insulin while only 2% being on oral hypoglycemic. Majority 99% (167) of the participants acknowledged having received Diabetes Mellitus Type II self-care education from a health professional. Majority 87% (146) of the participants reported history of smoking, only 7% (12) were current smokers.

Knowledge of the participants was assed using the spoken knowledge in low literacy patient with Diabetes Mellitus Type II (SKILLD) scale. Only 22.02% (37) of the participants gave correct signs and symptoms of high blood sugars with majority 77.98% (131) giving incorrect responses. Only 13% (23) of the participants demonstrated knowledge of signs and symptoms of low blood sugar with 86.3% (145) giving incorrect responses. On low blood sugar management 84.52% (142) gave correct responses while only 15.48% gave incorrect responses. Frequency of feet checking was poor with only 16.67% (28) of the participants giving correct responses while 83.33% (140) giving incorrect responses. Majority of the participants were well versed by complications of Diabetes Mellitus Type II with 93.45% (157) giving correct responses. Frequency of eye examination had 90.48% (152) of the participants giving the correct responses.

There was a strong positive relationship between Patient Demographic characteristics and knowledge on Diabetes Mellitus Type II self-care guidelines; r (0.568); p ≤ 0.50. The relationship between Adequate Diabetes

Mellitus Type II Self-care practice and knowledge on Diabetes Mellitus Type II self-care guidelines was equally positive; r (0.492); p ≤ 0.50, therefore significant.

Multiple regressions indicated an adjusted R squared of 0.834 implying that 82.4% of variation in Adequate Diabetes Mellitus Type II Self-care practice is attributable to Patient Demographic characteristics, Social support, Knowledge on Diabetes Mellitus Type II self-care guidelines and Attitude towards Diabetes Mellitus Type II self-care practice. 18.6% of variation in Adequate Diabetes Mellitus Type II Self-care practice is covered with other factors not considered in this study.

The variation between the groups sum of squares was 12.798; with degree of freedom df (4); F (5, 129) = 16.874; P<0.00 <0.05; therefore there is significant relationship between Adequate Diabetes Mellitus Type II Self-care practice and Patient Demographic characteristics, Social support, knowledge on Diabetes Mellitus Type II self-care guidelines and Attitude towards Diabetes Mellitus Type II self-care. Therefore the null hypothesis, There no relationship between Diabetes Mellitus Type II patient's attitude and self-care practice was rejected. There is no relationship between Diabetes Mellitus Type II patient's knowledge and self-care practice was rejected. There is no relationship between level of self-care practice by Diabetes Mellitus Type II patients and social support was rejected.

There was a regression coefficient ß (0.679); P<0.50, between Adequate Diabetes Mellitus Type II Self-care practice and Patients Demographic characteristics. The relationship between Adequate Diabetes Mellitus Type II Self-care practice and Social support had a regression coefficient ß (0. 342); P≤0.50, therefore significant. The relationship between Adequate Diabetes Mellitus Type II Self-care practice and adequate self-care practice had a regression coefficient ß (0.457); P≤0.50, therefore significant. The relationship between Adequate Diabetes Mellitus Type II Self-care and Knowledge on Diabetes Mellitus Type II self-care guidelines had regression coefficient ß (0. 279); P≥0.50, therefore the relationship was not significant. The relationship between Adequate Diabetes Mellitus Type II Self-care and Attitude towards Diabetes Mellitus Type II self-care had a regression coefficient ß (0. 216); P≤0.50, therefore significant.

Discussion

Majority71% of the participants reported to have been with the Diabetes Mellitus Type II for a period between 5-10 years. This according to Harris, (2008) has both positive and negative effects as the longer a person stays with the disease the more they may not have insulin sensitivity or depletion of secretion hence the more self-care activity needed at the same time the more experience they gain in self-care practice. In the same line of argument Odili*et al*. (2011), states that the longer one stays with Diabetes Mellitus Type II the more they get a good understanding of the disease and hence they are more likely to engage in the right self –care activity to stay free from complications.

Diabetes Mellitus Type II self-care education by health professionals was well covered 99% an indication that the clinic attendance and appointment adherence of the participants was excellent. According to Baumann *et al*. (2010) Diabetes self-management education (DSME) a critical element of care for all people with Diabetes and is necessary in order to improve patient's outcome.

Majority of the participants reported a negative history of smoking 87%, with 7% reporting a positive history of smoking; this was a good indicator towards control of Diabetes Mellitus Type II complications. In a study conducted by Nwasuruba et al.(2007) cigarette smoking was found to be a predisposing factor to Diabetes Mellitus Type II with smokers having a 30-40% risk of developing the disease than nonsmokers. It was also found that people with Diabetes Mellitus Type II who smoke are more likely than nonsmokers to have trouble with insulin dosing and with controlling the disease (American Diabetes Association, 2013)**.** Hence this group has higher risk of developing serious Diabetes Mellitus Type II related complication (American Diabetes Association, 2013).

Of the 168 participants only 22.02% were able to give at least two correct signs and symptoms of high blood sugar with the majority being unable 77.98%. Majority 86.3% of the participants were unable to identify at least two signs and symptoms of low blood sugar. This presents a significant challenge as about 98% of the patients were on insulin based treatment regimen which predisposes patients to hypoglycemia and death if not correctly identified and managed. A study by Christensen *et al*. (2009) indicated identification of signs and symptoms of hyperglycemia and hypoglycemia as a key factor in patient self-care management of Diabetes Mellitus Type II. In a similar study by Baumann*et al*. (2010) in Uganda 87% of the participants reported that they were unable to tell when their blood sugar is high and when it's low which complicated their management of Diabetes Mellitus Type II since they could not afford glucometres. Some of the reasons for this lack of distinction of these two acute complications of Diabetes Mellitus Type II is lack of emphasis on the symptomatology of hypoglycemia and hyperglycemia in Diabetes Mellitus Type II self-management education (Christensen *et al*. 2009).

Majority of the participants had the correct response on management of low blood sugar (84.52%) with 83.33% did not have knowledge on importance of frequency of checking their feet. Knowledge on risk reducing

behaviors like foot care is one of the strategies that have been used to reduce onset of Diabetic foot ulcers (Awari*et al*. 2007)**.**

There was no knowledge deficit concerning complications of Diabetes Mellitus Type II, majority of the participants 93.45% were able to give at least two complications. This reflected the quality of Diabetes Mellitus Type II self-care management education offered at Kakamega County Referral Hospital. These complications are associated with significant morbidity and mortality and are likely to be remembered by patients (Awari*et al*. 2007). Although majority of the participants mentioned foot amputation as a long term complication of Diabetes Mellitus Type II very few mentioned neuropathy. This underscores the importance of Diabetes Mellitus Type II education in not only imparting knowledge on self-care skills but also improving patients understanding of their illness, this assist in performance of self-care behavior (Awari*et al*. 2007).

This was in contrast with a study conducted by Odili*et al*. (2011) amongst patients with Diabetes Mellitus Type II using Brief Diabetes Knowledge Test in a tertiary care setting in Nigeria about related complication and found it to be quite low at 39.5%. In this study population only 56 % of patients had undergone formal Diabetes Mellitus Type II education unlike our study where 99% of the participants acknowledged having received Diabetes Mellitus Type II self-care education from a health professional.

About 75% of the participants did not know the range of normal fasting blood sugar, this could be partly due to the infrequent self-blood glucose monitoring among the participants. Majority 90.48% of the participants demonstrated knowledge on frequency of eye examination.

Although the study participants had substantial Diabetes Mellitus Type II self-care education from health professionals at 99% there were significant gaps in their self-care practices especially in areas where they had knowledge deficits. Based on the tool used a big percentage of participants,62.03% on average scored 0 days in performance of self-care activities over a period of fourteen days, with an average percentage of 21.42 % being able to perform the basic self-care activities over a period of 14 days. This may be due to the usual assumption by patients at the same time it may be due to the inability to afford the prescribed diet hence have to abide by the available family diet (Xu et al. 2008)..

Conclusion

Adequate self -care practice by Diabetes Mellitus Type II patients attending the Diabetes clinic at Kakamega County Referral Hospital, still remains a challenge. The patients demonstrated inadequate knowledge on Diabetes Mellitus Type II with majority giving incorrect responses in the spoken knowledge in low literacy patient with Diabetes Mellitus Type II (SKILLD) scale. This has resulted to suboptimal self-care practice by the Diabetes Mellitus Type II patients at Kakamega County Referral Hospital.

The level of practice of self-care by Diabetes Mellitus Type II patients at Kakamega County Referral Hospital was found to be suboptimal particularly in areas where knowledge deficits were present. Physical activity and self-monitoring of blood glucose were poorly practiced among the patients. Based on the tool used a big percentage of participants, were poor in performance of self-care activities over a period of fourteen days, with only few being able to perform the basic self-care activities over a period of 14 days.

The study found close relationship between adequate Diabetes Mellitus Type II self-care by patients with Diabetes Mellitus Type II at Kakamega County Referral Hospital with; social support. Knowledge of Diabetes Mellitus Type II self-care guidelines, which was poor in this study, was seen to be a key determinant of adequate Diabetes Mellitus Type II self-care practice. Demographic characteristics' was found to be a key determinant of self-care practice in this study with majority reporting problems associated with Diabetes Mellitus Type II, high blood sugar dominated.

Further exploration of the relationship between Diabetes Mellitus Type II knowledge and self-care behaviors is needed to strongly validate the cognitive aspect of holistic self-care model in the disease management. On the broader scale, intervention using holistic self-care approach in the management of Diabetes Mellitus Type II may be beneficial for more controlled and complication prevented Diabetes Mellitus Type II. This will help promote more quality life, benefitting the individual with Diabetes Mellitus Type II, the family, the government in terms of health care cost, nongovernmental organization involved in Diabetes Mellitus Type II support and the society.

Recommendations

The importance of knowledge of Diabetes Mellitus Type II self-care guidelines, Social support and Attitude towards Diabetes Mellitus Type II was recognized. There was poor scores in the social support scale, spoken knowledge in low literacy patients with Diabetes Mellitus Type II (SKILLD) scale,4 Point Morisky Adherence Scale and The Summary of Diabetes Self- Care Activities (SDSCA) hence an indication of inadequate Self-care practice.

- ➤ There is a need to revisit the Diabetes Mellitus Type II Self-care Management Education program in order to make it less didactic and more applicable by patients; especially in aspects of identification and

management of acute complications of Diabetes Mellitus Type II.

➢ The importance of self-monitoring of blood glucose and physical activity need emphasis in Diabetes Mellitus Type II patients education.

➢ There is also a need to develop policies that encourage health promotion from a public health aspect especially in providing an enabling environment for physical activity within rural areas and also public awareness of the risks of sedentary lifestyle.

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CERTIFICATE OF ETHICAL CLEARANCE

This is to certify that the proposal titled **"ASSESSMENT OF ADEQUATE SELF-CARE PRACTICE BY DIABETES MELLITUS TYPE II PATIENTS ATTENDING THE DIABETES CLINIC AT KAKAMEGA COUNTY REFERRAL HOSPITAL,"**, whose Principal Investigator is Mr. Wilson Lugaya Akhonya (MSCN/2014/59802) has been reviewed by Mount Kenya University Ethics Review Committee (ERC), and found to adequately address all ethical concerns.

Prof. Mbaruk Suleiman
Chairman, Mount Kenya University ERC

Sign: _____   Date: _2·11·2015_

Dr. Francis W. Muregi
Secretary, Mount Kenya University ERC

Sign: _____   Date: _02·11·2015_

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Table 1 Participants Length of time diagnosed with Diabetes Mellitus Type II

	Frequency	PERCENTAGES
Less than 5 years	40	24
5-10 years	120	71
11-16 years	2	1
17 years and above	6	4
	168	100

Figure 1: **the spoken knowledge in low literacy patient with Diabetes Mellitus Type II (SKILLD) scale**
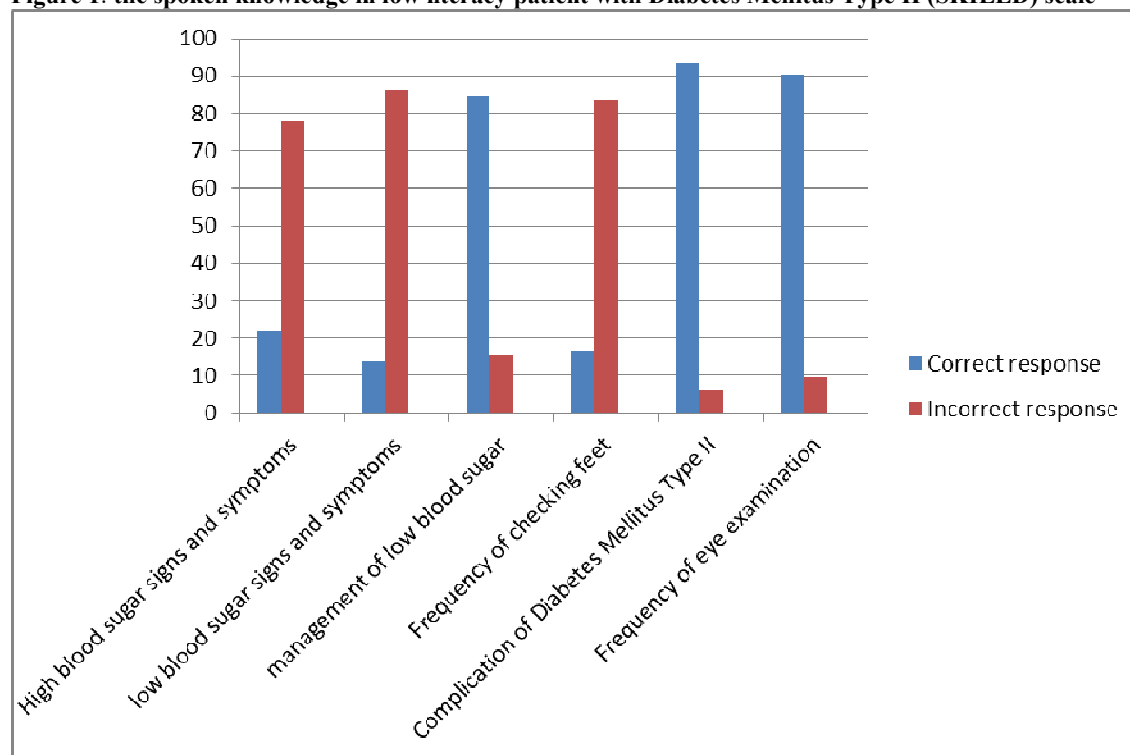

Table 2 Regression Coefficients of variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.700	3.272		-.399	.000
Demographic characteristics	.967	.338	.679	3.571	.017
Social support	.053	.228	.342	-.358	.000
adequate self-care practice	.769	.389	.457	1.652	.026
Knowledge on Diabetes Mellitus Type II self-care guidelines	.159	.121	.279	-1.791	.071
Attitude towards Diabetes Mellitus Type II self-care	.313	.227	.216	1.603	.000