

Knowledge About Diabetes and Its Effect on Quality of Life among Diabetic Patients in KAU, Jeddah

Abstract:

Background

Quality of life (QOL) is an essential part in Diabetic patients since low QOL can decrease self-care which can lead to increased mortality and complications. The purpose of this study is to determine the effects of diabetes on QOL in Saudi Arabia, and to assess the knowledge about diabetes among these patients in order to know if there is a relation between diabetes knowledge and patient's QOL.

Method

Cross sectional study done in king Abdul-Aziz university hospital in Jeddah. The sample was on type 2 Diabetic patients (N=300), they were recruited from hospital wards and outpatient clinics during 2016. The questionnaire consisted of 3 sections: demographic and medical characteristic, knowledge of diabetes and QOL by 4 dimensions.

Result

The mean age of the study population was 55.6 ± 10.1 years and 189 (63%) were female. The median duration of having diabetes was 10 years. The mean score of diabetes knowledge was 8.57 ± 1.8 out of 12 indicating good level of knowledge. The worst score was for alcohol's effect on blood glucose, only 21.7% answered correctly. The mean score QOL was 34.1 ± 7.7 out of 50 which indicates average level of lifestyle. Rereading effect of the knowledge on QOL, there was positive correlation with no significant association, expect for environment P-Value is 0.02.

26 **Conclusion**

27 Diabetes impairs QOL of patients, and the knowledge about diabetes affects QOL. We
28 recommend the engagement of health professionals in educational settings in order to
29 enhance health-related knowledge. Seminars, counseling sessions and workshop should be
30 arranged periodically for diabetic patients to increase their awareness.

31 **Key words:**

32 Knowledge, Quality of Life, Diabetic Patients.

33 **1.Introduction**

34 Diabetes is a common chronic illness that have been increasing throughout the years, million
35 people have diabetes in the world and more than 35.4 million people in the MENA Region
36 (middle east, north African region), by 2040 this will rise to 72.1 million. There were 3.4
37 million cases of diabetes in Saudi Arabia in 2015(1).

38 Diabetic patients are usually older, overweight, less likely to exercise, and more likely to have
39 comorbidities and complications. The increasing number of diabetes has harmful effects on quality of
40 life outcomes. Quality-of-life issues are of absolute importance, because they may strongly predict an
41 individual's capability to manage his disease and maintain long-term health and well-being (2).

42 Diabetes mellitus imposes a heavy burden on individuals and health care systems (3). Quality of life is
43 an essential part in Diabetic patients since low quality of life can decrease self-care which can prompt
44 to increase mortality and complications (e.g. chronic renal failure, blindness, and lower limb
45 amputations) which influence wellbeing and productivity (4). Evidence shows that people affected
46 by diabetes often have inadequate knowledge about the nature of the disease, its risk factors
47 and the associated complications (5). Poor motivation from the patient's side to maintain
48 optimum glyceemic control, their negligent attitude toward infection, injury, and other
49 symptoms related to the feet leads to a delay in timely consultation to their physician (6).

50 Knowledge about diabetes is fundamental for the management, since it requires day-to-day
51 knowledge about nutrition, exercise, monitoring, and medications (7).

52 The purpose of this study is to assessing the knowledge about diabetes among diabetic
53 patients in order to know if there is a relation between diabetes knowledge and patient's
54 quality of life. Education about diabetes is important to change the behavior of the patients
55 and encouraging the patients in active management of their condition.

56 We chose patients in King Abdul-Aziz University Hospital; assessing knowledge about DM
57 and measuring different dimensions of quality of life, including (general health, physical
58 health, psychological health, social relationships, environment).

59 A lot of other studies came to the importance of health education because it is the theoretical
60 and methodological basis for health promotion actions, as it can support both diseases
61 prevention and rehabilitation and promote citizenship, personal and social responsibility
62 related to health and contribute in the training of multipliers and caregivers (8).

63 **2.Methods**

64 This is cross sectional, interview- based study design conducted at King Abdul-Aziz
65 University Hospital in Jeddah, the target population was diabetic patients who were attending
66 the diabetes outpatient clinic. The data was collected from April 2016 to May 2016. Sample
67 size was calculated using Raosoft site, it was 300 Physicians. By adding 10% The total number
68 of patients that participated in the study was 300. (based on total DM patients number per
69 month 1200 patients, an error of 5%, the confidence interval of 95% and a prevalence of
70 50%). Patients were chosen randomly, and they were included in the study if they had
71 diagnosis of type 2 DM either inpatients (ward) or outpatients (OPD, clinic), were at
72 between 18-70 years old, Saudi or non-Saudi lived more than 3 years in Saudi Arabia, and
73 excluded if they were currently pregnant and were non- Saudi living less than 3 years in

74 Saudi Arabia_ face to face structured interview questionnaire, was pre-tested on 10 diabetic
75 patients a likely similar population to the study participants. The questionnaire was based on
76 three major dimension: demographic data (consisting of 18 items), knowledge (general
77 knowledge consists of 2 items, monitoring blood glucose consist of 2 items, factors affecting
78 on blood glucose level consist of 2 items, complication of DM consist of 3 items) and QOL
79 (physical health consist of 4 items, psychological health consist of 3 items, social relationship
80 consist of 2 items, environment consist of 1 item). The questionnaire was based on thorough
81 search of relevant literature and discussion with experienced Faculty members. The

82 **Scoring of Participants' Responses**

83 Regarding knowledge questions (12), a score of (1) was given to the right answer.
84 Summation of scores computed and the total score was 12, and the range was (0 -12). Then
85 the score was transformed to a percentage. Which was categorized into high, who will get
86 >80, the moderate, who will get between 50 to 80, and poor, who will get <50. (100)

87 **Data Entry and Statistical Analysis**

88 All collected data were coded and entered into a personal computer. Data entry and statistical
89 analysis performed by using the Statistical Product and Service Solutions (SPSS, version
90 22.0) and appropriate statistical tests were applied.

91 Descriptive statistics (i.e., frequency, percentage, mean and standard deviation) calculated.
92 Chi-square test, One way ANOVA, and independent t test were applied to compare
93 participants' knowledge grades knowledge dimension & total score of lifestyle dimension
94 and different demographic variables. Pearson test was used for the correlation between
95 knowledge dimension & total score of lifestyle dimension P-value of <0.05 was considered as
96 statistically significant.

97 **Ethical Considerations**

98 The protocol for the study was approved by the Ethics committee for Health at King Abdul-
99 Aziz University Hospital

100 Moreover, before the interview, the researchers used to explain the purpose of the study to all
101 participants briefly and deal with collected data confidentially and used only for the purpose
102 of research. Participants were informed that their participation in the study was completely
103 optional and they had the full right to refuse to participate. Their consent to participate in the
104 interview was then obtained verbally and the ethical consideration was observed through all
105 research steps.

106 **Pilot Study:**

107 Face to face structured interview questionnaire, was pre-tested on 10 diabetic patients a likely
108 similar population to the study participants.

109 **Validity**

110 The questionnaire developed by the researchers after reviewing the relevant literature to
111 collect the necessary data which has been revised and validated by three expert consultants
112 from medicine department.

113 **Reliability**

114 The researchers evaluated the reliability of variables included in the study questionnaire. It
115 was assessed using the Cronbach's alpha coefficient. The questionnaire proved an acceptable
116 reliability which was equal 0.719.

117 **3.Results**

118 Three hundred diabetes patients who attend outpatient clinics in KAUH were involved in this
119 study, of which 189 (63%) were female & 111 (37%) were male, with mean age score
120 55.6 ± 10.1 , 144 (48%) were Saudi, and the majority (250-83.3%) were married. Only 56

121 (18.6%) had university degree & more than half (180- 60%) reported no job. three quarter

122 (265- 89%) reported no smoking. (Table 1)

123 **Table (1) Demographic data:**

Variables	N (300)	%
Gender		
Female	189	63.0
Male	111	37.0
Nationality		
Saudi	144	48.0
Non-Saudi	156	52.0
Marital status		
Single	16	5.3
Married	250	83.3
Divorced	11	3.7
Widow	23	7.7
Employee		
Employed	68	22.7
Not employed	180	60.0
Retired	52	17.3
Education		
University and above	56	18.6
High school	60	20.0
Intermediate school	41	13.8
elementary school	58	19.3
Illiterate	85	28.3
Smoking		
No	265	89.0
Yes	35	11.0
Smoking type		
Cigarettes	21	60%
Shisha	14	40%
Variables		
Age	Mean± SD	Rang (min-max)
	55.6±10.1	(27-70)

124 Table 2 showed the medical characteristic of the participants, the median score of duration of

125 being diabetes patients was 10 years, 255 (85%) reported taking medication on regular base ,

126 122 (40%) stated checking blood sugar 1-2 times per day ,the majority (249-83%) reported

127 hyperglycemia experience , where two third (200- 66.7% reported hypoglycemia experience

128 with main symptoms sweating (34.3%) followed by shacking (33.7%) then (32.7%)

129 confusion. More than half (177-59%) stated seeing dietitian. The main source of knowledge
 130 was doctors (64.7%). (Table 2 & Figures 1&2)

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132 **Table (2) Medical characteristic:**

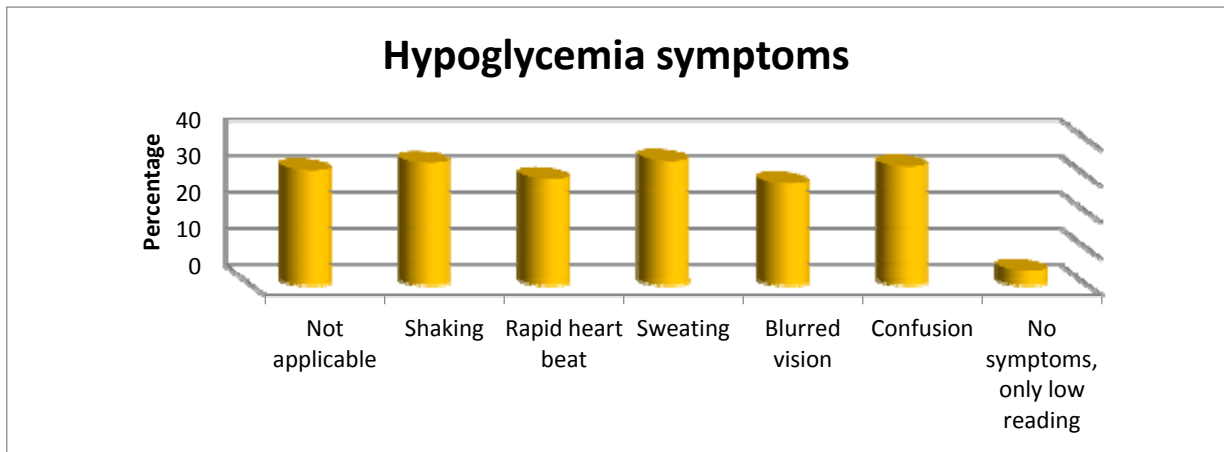
Variables	N (300)	%
Medications regularly		
Yes	255	85.0
No	45	15.0
Checking blood sugar		
Never	76	26.0
1-2 times per day	122	40.0
3-5 times per day	30	10.0
3 times or less per week	72	24.0
Experienced hypoglycemia		
Yes	200	66.7
No	100	33.3
If yes, list symptoms (Multiple symptoms)		
Not applicable	95	31.7
Shaking	101	33.7
Rapid heart beat	88	29.3
Sweating	103	34.3
Blurred vision	84	28.0
Confusion	98	32.7
No symptoms, only low reading	12	4.0
Experienced hyperglycemia		
Yes	249	83.0
No	51	17.0
Complain of other illness		
Yes	208	69.4
No	92	30.6
Saw dietitian		
Yes	177	59.0
No	123	41.0
Source of knowledge (Multiple sources)		
Doctors	194	64.7
Social media	62	20.7
Friends	30	10.0
Other	31	10.3
Nothing	34	11.3
Variables		
Duration of diabetes by years	Median 10	Quartile (25-75) (5-15)

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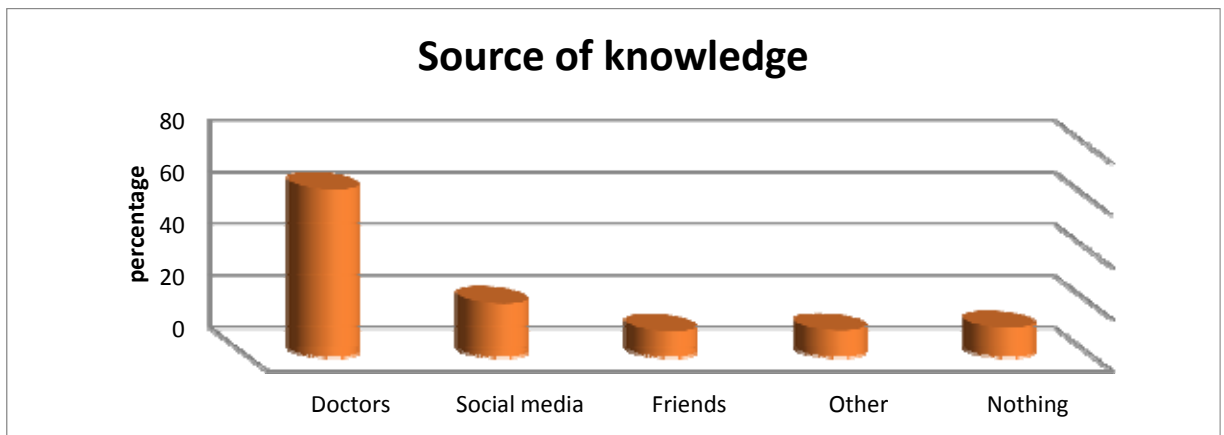
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142 **Figure (1) Hypoglycemia symptoms (Multiple symptoms):**



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144 **Figure (2) Source of knowledge (Multiple symptoms):**



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146

147 Table 3 showed the rate of choosing right information about DM, the higher rate was for
148 (Exercise: Decrease DM) 92%, followed by (Carbohydrates & stress : Increase DM) 91.3%
149 equally , (Home Monitoring: Blood testing) 89.3%, then (Hypoglycemia Correction: Drink
150 juice) 87.3% , then (Complication of diabetes: Eye diseases) 79.3% , (Diet: low fat, high

151 fiber, and low added sugar diet) 70.3% , (Infection : increase DM) 66.7% , then (Controlling
 152 DM: Glycosylated HB (HbA1c) & Diabetic foot: Check the feet and wash) 58.3%,
 153 followed by (Hyperglycemia signs: Numbness) 53.3%, and lastly (Alcohol: Increase DM)
 154 | 21.7%. (Table 3)
 155

156 **Table (3) Participants' knowledge of DM:**

Variables	N (300)	%
Exercise: Decrease blood sugar	276	92.0
Carbohydrates: Increase blood sugar	274	91.3
Stress: Increase blood sugar	274	91.3
Home Monitoring of Blood Sugar: Blood testing	268	89.3
Hypoglycemia Correction: Drink juice	262	87.3
Complication of Diabetes: Eye diseases	238	79.3
Healthy Diabetic Diet: low fat, high fiber, and low added sugar diet	211	70.3
Infection: Increase blood sugar	200	66.7
Assessing Control of Diabetes: Glycosylated HB (HbA1c)	175	58.3
Diabetic Foot Care: Check the feet and wash	175	58.3
Hyperglycemia signs: Numbness	160	53.3
Alcohol: Increase blood sugar	65	21.7

157

158 Regarding participants' knowledge & relation with gender, martial statue & educational
 159 level , there was significant association between gender & stress increasing DM item (94.2%
 160 female vs 86.5%male, p=0.01),there was significant association between martial statue &
 161 Controlling DM: Glycosylated HB (HbA1c) item (p=0.03) , also there was significant
 162 association between educational level and two items (Hypoglycemia Correction: Drink juice)
 163 (p=0.03) & (Alcohol: Increase DM) (p=0.004), while all other items showed no significant
 164 difference.

165 Table 4 showed the mean scores of individual domains for knowledge dimension & lifestyle
 166 dimension and also the total score for each dimension, the mean score of total knowledge
 167 dimension was 8.57 ± 1.8 which indicate good level of knowledge. While the mean score of
 168 total lifestyle dimension was 34.1 ± 7.7 which indicate average level of lifestyle. (Table 4)
 169

170 **Table (4) Participants' knowledge of DM and life style scores:**

Variables	Mean \pm SD	RANG (Min-Max)
General knowledge	1.56\pm0.6	(0-2)
Monitoring Blood glucose	1.47\pm0.6	(0-2)
Factors affecting on blood glucose level	3.64\pm0.9	(0-5)
Complication of DM	1.91\pm0.9	(0-3)
Total score 1 (knowledge of DM)	8.57\pm1.8	(0-12)
Physical health	12.8\pm3.9	(4-20)
Psychological health	10.7\pm3.1	(3-15)
Social relationship	8.02\pm1.7	(2-10)
Environment	3.8 \pm1.1	(1-5)
Total score 2 (quality of life)	34.1\pm7.7	(10-50)

171
 172 Regarding Knowledge & lifestyle dimensions & relation with gender, **marital** status &
 173 educational level , there was significant association between gender & physical activity
 174 domain where male are more interesting in physical activity than female (12.33 ± 3.69 for
 175 female vs 13.57 ± 4.14 for male , $p=0.008$) , also there was significant association between
 176 educational level & two domains Environment domain ($p=0.001$) & Monitoring Blood
 177 glucose domain ($p=0.002$) & significant association between educational level & total mean
 178 scores for Knowledge dimension was found ($p=0.008$) in all the domain there is increasing in
 179 lifestyle domains with high level of education, while all other domains showed no significant
 180 difference . (Tables 5,6 & 7)

181 **Table (5) Comparing participants' life style & knowledge scores regarding gender:**

variables		Mean	\pm	SD	P value
Physical health	Female	12.33	\pm	3.69	0.008*

	Male	13.57	±	4.14	
Psychological health	Female	10.49	±	2.98	0.09
	Male	11.12	±	3.37	
Social relationship	Female	8.10	±	1.68	0.29
	Male	7.88	±	1.85	
Environment	Female	2.53	±	1.28	0.31
	Male	2.70	±	1.44	
General knowledge	Female	1.51	±	0.59	0.05
	Male	1.64	±	0.55	
Monitoring Blood glucose	Female	1.41	±	0.62	0.07
	Male	1.54	±	0.58	
Factors affecting on blood glucose level	Female	3.67	±	0.85	0.31
	Male	3.56	±	0.95	
Complication of DM	Female	1.85	±	0.90	0.17
	Male	2.00	±	0.89	
Total 1(Knowledge dimension)	Female	8.45	±	1.81	0.17
	Male	8.75	±	1.92	
Total 2 (Lifestyle dimension)	Female	33.47	±	7.05	0.05
	Male	35.29	±	8.21	

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183 **Table (6) Comparing participants' life style & knowledge scores regarding marital**
184 **status:**

variables		Mean	±	SD	P value
Physical health	Single	13.87	±	3.42	0.14
	Married	12.89	±	3.89	
	Divorced	10.72	±	5.64	
	Widow	12.00	±	3.06	
Psychological health	Single	12.25	±	2.62	0.15
	Married	10.56	±	3.15	
	Divorced	11.18	±	3.45	
	Widow	11.26	±	3.07	
Social relationship	Single	7.62	±	1.85	0.52
	Married	8.04	±	1.73	
	Divorced	7.54	±	1.86	
	Widow	8.30	±	1.76	

Environment	Single	2.62	±	1.36	0.23
	Married	2.66	±	1.36	
	Divorced	2.09	±	1.30	
	Widow	2.17	±	1.11	
General knowledge	Single	1.50	±	0.63	0.92
	Married	1.56	±	0.58	
	Divorced	1.63	±	0.50	
	Widow	1.52	±	0.59	
Monitoring Blood glucose	Single	1.68	±	0.47	0.09
	Married	1.48	±	0.60	
	Divorced	1.36	±	0.92	
	Widow	1.21	±	0.59	
Factors affecting on blood glucose level	Single	3.37	±	1.08	0.64
	Married	3.64	±	0.89	
	Divorced	3.63	±	0.67	
	Widow	3.73	±	0.86	
Complication of DM	Single	1.75	±	0.93	0.55
	Married	1.89	±	0.90	
	Divorced	2.18	±	0.98	
	Widow	2.04	±	0.87	
Total 1(Knowledge dimension)	Single	8.31	±	2.12	0.92
	Married	8.57	±	1.84	
	Divorced	8.81	±	2.08	
	Widow	8.52	±	1.87	
Total 2 (Lifestyle dimension)	Single	36.38	±	6.28	0.45
	Married	34.15	±	7.76	
	Divorced	31.55	±	10.41	
	Widow	33.74	±	6.65	

185

186 **Table (7) Comparing participants' life style & knowledge scores regarding educational**
187 **level:**

Variables		Mean	±	SD	P value
Physical health	University and above	13.69	±	4.12	0.16
	High school	13.33	±	3.74	
	Intermediate school	13.00	±	3.76	
	Elementary school	12.28	±	3.91	
	Illiterate	12.09	±	3.87	
Psychological health	University and above	11.07	±	3.34	0.26
	High school	10.20	±	2.93	
	Intermediate school	11.63	±	2.90	
	Elementary school	10.36	±	3.23	
	Illiterate	10.68	±	3.16	
Social relationship	University and above	7.92	±	1.69	0.89
	High school	7.95	±	1.74	
	Intermediate school	8.26	±	1.44	
	Elementary school	8.10	±	1.88	

	Illiterate	7.95	±	1.84	
Environment	University and above	2.94	±	1.41	0.001*
	High school	2.98	±	1.30	
	Intermediate school	2.34	±	1.01	
	Elementary school	2.62	±	1.37	
	Illiterate	2.18	±	1.32	
General knowledge	University and above	1.67	±	0.54	0.13
	High school	1.65	±	0.51	
	Intermediate school	1.48	±	0.59	
	Elementary school	1.60	±	0.59	
	Illiterate	1.44	±	0.62	
Monitoring Blood glucose	University and above	1.63	±	0.58	0.002*
	High school	1.60	±	0.58	
	Intermediate school	1.53	±	0.55	
	elementary school	1.41	±	0.59	
	Illiterate	1.25	±	0.63	
Factors affecting on blood glucose level	University and above	3.87	±	0.81	0.06
	High school	3.68	±	0.79	
	Intermediate school	3.78	±	0.82	
	Elementary school	3.58	±	0.91	
	Illiterate	3.41	±	0.99	
Complication of DM	University and above	1.92	±	0.878	0.68
	High school	2.03	±	0.82	
	Intermediate school	1.78	±	1.01	
	Elementary school	1.91	±	0.90	
	Illiterate	1.87	±	0.92	
Total 1(Knowledge dimension)	University and above	9.09	±	1.61	0.008*
	High school	8.96	±	1.47	
	Intermediate school	8.53	±	1.93	
	Elementary school	8.52	±	1.93	
	Illiterate	7.98	±	2.03	
Total 2 (Lifestyle dimension)	University and above	35.64	±	8.6	0.32
	High school	34.47	±	7.5	
	Intermediate school	35.24	±	7.2	
	Elementary school	33.35	±	7.5	
	Illiterate	32.92	±	7.5	

188

189 Regarding the domain of quality of life. The mean scores of individual items are shown in
190 Table (8). One item (10.0%) (Item 4) its mean scores was (2.6) indicating poor quality of life,
191 scores on 3 out of 10 (30.0%) (Items 1,2 & 5) were between (3.0-3.5), and 5 items(50.0%)
192 (Items 3,6,7,9 &10) were between (3.6-4.0) which indicate average satisfaction, one item
193 (10.0%) (Item 8) was (4.2) indicating good quality of life with positive trend. On the other

194 each item of the domains was divided to three categories (poor, moderate and good) and
 195 percentage was calculate for each category, half of the participants reported poor level of
 196 practicing exercises, more than third reported moderate impact on their sleep, emotions and
 197 moderate level of physical pains, more than half stated moderate level of family supports and
 198 safety environments, more than half reported that diabetes condition didn't affect their social
 199 life , daily activities, working performance and that they don't have any worries about their
 200 blood sugar changes. Regarding the association between level of knowledge and of quality of
 201 life, the results showed significant association between good level of knowledge and all items
 202 of good physical health, physiological conditions, social relationship, and environment.

203 (Table 8)

204 **Table (8) Dimensions of Quality of life:**

Variables	Poor	Moderate	Good	P value	Mean± SD	Range
Physical Health						
1-Physical pain	98 (32.6%)	126 (42.1%)	76 (25.3%)	0.002*	3.3±1.2	(1-5)
2-Sleep	100 (33.3%)	101 (33.6%)	99 (33.0%)	0.0001**	3.3±1.5	(1-5)
3-Performance at work	80 (26.6%)	92 (30.7%)	128 (42.7%)	0.0001**	3.6±1.4	(1-5)
4-Exercise	150 (50.0%)	112 (37.3%)	38 (12.7%)	0.0001**	2.6±1.3	(1-5)
Psychological						
5-Emotions	101 (33.7%)	130 (43.3%)	69 (23.0%)	0.0001**	3.2±1.3	(1-5)
6-Diabetes affect daily activities	74 (24.6%)	105 (35.1%)	121 (40.3%)	0.0001**	3.7±1.3	(1-5)
7-Blood sugar changes worries	65 (21.6%)	89 (29.6%)	146 (48.8%)	0.0001**	3.8±1.4	(1-5)
Social relationships						
8-Diabetes affect social life	35 (11.7%)	64 (21.3%)	201 (67.0%)	0.0001**	4.2±1.2	(1-5)
9-Family support	50 (16.7%)	163 (54.3%)	87 (29.0%)	0.0001**	3.7±1.2	(1-5)
Environment						
10-Home safety environment	32 (10.6%)	184 (61.4%)	84 (28.0%)	0.0001**	3.8±1.1	(1-5)

205 **Chi square test was used to detect the association**

206 Regarding the relation between level of knowledge and of quality of life, the results showed
 207 significant association between good level of knowledge and safety environment (p=0.02) ,

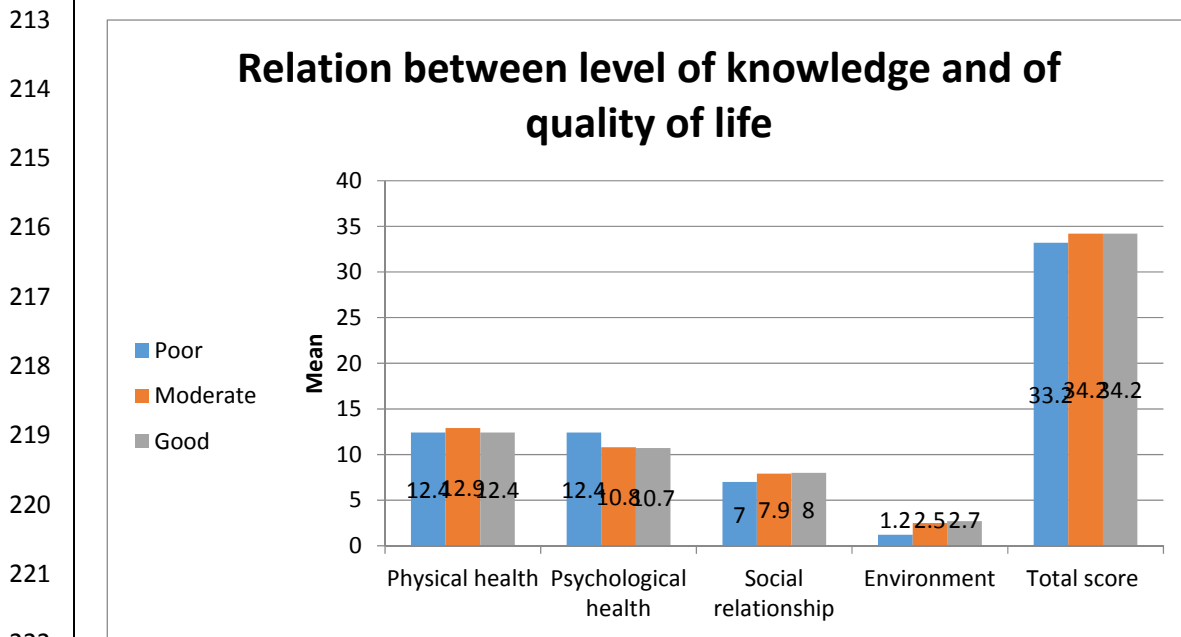
208 while in all other quality of life domains no significant difference was found. (Table 9 &
 209 figure 3)

210 **Table (9) Relation between level of knowledge and of quality of life:**

Variables	Level of knowledge			P value
	Poor N=5 (1.6%)	Moderate N=143 (47.7%)	Good N= 152 (50.7%)	
Physical health	12.4±3.6	12.9±3.8	12.4±4.0	0.9
Psychological health	12.4±3.4	10.8±2.9	10.7±3.3	0.4
Social relationship	7.0± 2.5	7.9±1.7	8.0±1.7	0.4
Environment	1.2±0.4	2.5±1.4	2.7±1.3	0.02*
Total score	33.2±6.1	34.2±7.1	34.2±8.3	0.9

211 One way ANOVA test was used to detect the association

212 **Figure (3) Relation between level of knowledge and of quality of life:**



223 Concerning the correlation between total score of knowledge dimension & total score of
 224 lifestyle dimension there was a positive correlation but with no significant difference (r=
 225 0.014, p=0.82), while the correlation between total score of lifestyle dimension and age and

226 duration of diabetes were negative correlation without significant difference ($r = -0.103$,
227 $p = 0.07$) and ($r = -0.063$, $p = 0.28$) respectively.

228 **4. Discussion**

229 The current study shows prevalence of T2DM in female (63%) is significantly higher than
230 men (37%). similar result found in studies made in Brazil and Saudi Arabia (8,11). On the
231 contrary, studies show the opposite result with minimal differences (9,10,12). It is maybe due
232 to larger number of females involve in the study compared to men.

233 Our result show significant increases of DM in married people compare to other patient with
234 different marital status and maybe due to higher number of married patient (N= 250- 83.3%)
235 compare to single patients (N=16 -5.3%), divorced (N=11- 3.7%), and widow (N=23 -7.7%).

236 Studies from Brazil and Poland show the same result. (8,14)

237 Also, the study found increase prevalence of DM2 in not employed patients (60%). The same
238 result in study made in Saudi Arabia (11).

239 The current study found illiterate diabetic patient have higher prevalence of diabetes than
240 educated patients with minimal differences (28.3 %) This result agrees with other studies from
241 Saudi Arabia (11) and Canada (13).

242 Study also show increase prevalence of DM 2 in non-smoker patients (89%). It may be due to
243 a higher number of females compared to men in the study and smoking is less common in
244 female in Saudi culture. The same result from study from Canada (13).

245 **Medical characteristic:**

246 Although the most of diabetic patients are taking their medication regularly (85%) and more
247 than the half had saw dietitian (59%), it shows increase prevalence of experienced
248 hypoglycemia (66.7%) and (83%) experienced hypoglycemia. May be due to poor sources of
249 knowledge about this chronic disease as current study shows most of them have information
250 from their doctors (64.7%), followed by Social media (20.7%), then (11.3%) had No source

251 of knowledge (18) .As study from USA(15) and Thailand (16) found strong opposite
252 relationship between patient education and glycemic control .The other reason that may
253 contribute to having poor glycemic control is having other illness as the current study show
254 highly prevalence (69.4%) of diabetic patient with other diseases .

255 The results of the current study found (40%) of DM2 patient are checking blood sugar at
256 home and (26%) are never which may increase risk of diabetes complication (17).

257 **Knowledge of DM:**

258 The mean score of total knowledge dimension was 8.57 ± 1.8 which indicate good level of
259 knowledge, similar to other researches done in Saudi Arabia Riyadh in 2016 (22). Unlike 2
260 studies done in Vietnam with different regions (23,24) show insufficient knowledge of T2D
261 in different geographical regions indicate the importance of education especially in rural
262 areas.

263 Our study shows No differences in knowledge were observed between men and women, and
264 between different martial statues (single, married, divorced and widow). The same result
265 regarding relation between sex and knowledge found in study conducted in Greece (19).

266 Patients with higher education demonstrated greater diabetes knowledge comparing to
267 Illiterate people as better education attainment is indicative of better understanding of the
268 disease. The same result in studies conducted in Greece (19) and Ohio (20), and Pakistan
269 (21).

270 The knowledge percentage of questions about treat hypoglycemia by different (drink juice)
271 was 87.3% which is a good percentage comparing to incorrect answering in the studies
272 (22,26,27).

273 Knowledge scores were high regarding questions about factors affecting the glucose level in
274 blood which are (Exercise: Decrease DM), as study done at 2016(22) and (Carbohydrates:
275 Increase DM). This finding disagrees with those of other studies (25,26,27.). Also, high

276 scores in answering the question (Home Monitoring: Blood testing) 89.3% with relatively
277 same result in study done in Emirate (28).

278 Patients' awareness about complications was relatively average; 79.3% with same finding in
279 a study (22). Other study shows satisfaction result (28).

280 Knowledge scores were low regarding the both questions (Controlling DM: by (HbA1c) and
281 diabetic foot: check the feet and wash) 58.3% as in the in Riyadh (25) show poor knowledge
282 about Hba1c test but good knowledge about foot caring.

283 lastly, knowledge about (Alcohol: Increase DM) was significant low 21.7% maybe as
284 Alcohol drinking is not allowed in Islam and is not socially accepted.

285 **Quality of Life:**

286 Diabetes affects negatively all quality dimensions, the quality of life score 34.1 ± 7.7 out of 50.
287 Many studies found similar results (4,29). In Saudi Arabia, the quality of life of diabetic
288 patients was studied by multiple researchers using deferent questioners such as SF36 and
289 EQ5d, they also reached the same result (11,22).

290 The main age of the sample was 55 years and most of the sample had diabetes for 10 years.
291 The effect of age on quality of life showed negative correlation without significant difference
292 ($r = -0.103$, $p = 0.07$), while the correlation between duration of diabetes and quality of life also
293 showed negative correlation without significant difference ($r = -0.063$, $p = 0.28$). These results
294 were similar a research done in Portuguese (12).

295

296 Women had worse quality of life than men regarding physical health dimension only and
297 similar results as men in other dimensions. The physical health score for female 12.33 ± 3.69
298 out of 20, and as for male 13.57 ± 4.14 and the P-Value is 0.008. This is similar to a research
299 done India and Saudi Arabia in 2014 (4,11) This might be due to higher HbA1c and anxiety
300 level and increased cardiovascular risk in female (12).

301 The safety of home and neighborhood conditions such as availability of stairs at home and
302 places for exercise affects quality of life, the score for environment is 3.8 ± 1.1 out of 5. In
303 Saudi Arabia, a research was done to assess environment effect in lifestyle of diabetic
304 patients and it shows a close relation between the environment setting, life style and health
305 statutes (30).

306 The association between quality of life and level of knowledge about diabetes was studied.
307 There was significant association between good level of knowledge about diabetes and a safe
308 environment, P-Value is 0.02. Regarding effect of the knowledge on other dimensions of
309 quality of life, there was positive correlation with no significant association. In contrast to a
310 pilot study done in Saudi by Hana R. Al-Ban nay, et al (31), which showed education
311 program has increased all dimension of the quality of life not only environment dimension,
312 this result is similar to another research done in Thai (16).

313 **5.Conclusion**

314 Diabetes impairs QOL of patients, and the knowledge about diabetes affects QOL. We
315 recommend the engagement of health professionals in educational settings in order to
316 enhance health-related knowledge. Seminars, counseling sessions and workshop should be
317 arranged periodically for diabetic patients to increase their awareness.

318 **6.Limitation of the study**

319 The research consisted of two parts, knowledge about diabetes and quality of life, which
320 compromised the number of questions that can be asked to patients. In kingdom of Saudi
321 Arabia, the assessment of quality of life was done by different methods which made the
322 comparison of the results between researches not accurate.

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