Assessing the Effect of Various Risk Factors of Type 2 Diabetes Mellitus on the Quality of Life of the Patients Using RV DQOL Questionnaire: A Cross Sectional Study

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Abstract

Diabetes mellitus is a complex, progressive, non-communicable disease that has reached widespread proportions worldwide. India ranks second highest in number of people with diabetes mellitus which was roughly 69 million as of 2015 and this estimate is anticipated to rise to 123.5 million by 2040. Proper awareness about diabetes mellitus amongst people attributes to effective control of the disease. To evaluate the quality of life of diabetic patients by assessing three domains namely satisfaction, impact and worry, a hospital based Cross-Sectional study, conducted between October 2018 and January 2019 among 245 patients suffering from diabetes mellitus. Patients with Diabetes mellitus attending General Medicine OPD in SRM Hospital and Research Centre were included in the study. The results are statistically calculated using Unpaired T-test. Effect of known family history of the illness on quality of life is statistically significant whereas other risk factors such as Smoking and Alcohol consumption showed lesser statistical difference.
For the study's targeted population, known family history of diabetes mellitus is significantly associated with poor quality of life of the patients.

Keywords: worry, impact, satisfaction, RV DQOL questionnaire, quality of life, diabetes

1. Introduction

Diabetes mellitus is a complex, progressive, non-communicable disease that has reached widespread proportions worldwide. According to International Diabetes Federation one in 11 people are affected due to diabetes mellitus out of which 90% of patients have type 2 diabetes mellitus. The population of diabetic patients have quadrupled in the past three decades with China and India emerging as the top two global epicenters of type 2 diabetes mellitus. India ranks second highest in number of people with diabetes mellitus which was roughly 69 million as of 2015 and this estimate is anticipated to rise to 123.5 million by 2040. [1, 2]

According to the largest nationally representative study of diabetes in India (ICMR-INDIAB), the total prevalence of diabetes in 15 states was calculated and it was found to be 7.3% as obtained from a population representing 363.7 million people. The prevalence of diabetes and prediabetes was higher in the mainland region compared to the north east, with overall prevalence in urban regions being twice than that of rural regions. The variance in the prevalence of diabetes amongst states were attributed to various factors such as differences in socio-economic status, physical activity, dietary patterns, prevalence of obesity and probable genetic variation. [3]

Socio-demographic and clinical characteristics are the vital factors that have a high impact on health- related quality of life in patients with type 2 diabetes mellitus undergoing treatment in a primary care setting. Health-related quality of life is adversely related to symptomatic complications of diabetes mellitus. [4]

Health related factors such as uncontrolled diabetes, higher risk of complications, high mortality rate, increased healthcare expenses are known to cause negative consequences which has the tendency to make the patients prone to depression. [5]

Proper awareness about diabetes mellitus amongst people attributes to effective control of the disease. An interventional study conducted in Iran proposed that incorporation of interactive education by health care professionals improves the knowledge, health beliefs, behavior HbA1c and quality of life of patients.

Furthermore, the study also expressed that ongoing education of diabetes mellitus with patient centered approach is necessary. It is absolutely essential to evaluate the extent to which diabetes affects the quality of life in order to provide proper diabetes care. [6,7] Therefore, the main objective of the current study is to assess the knowledge, satisfaction, worries and impact of the disease on the patient’s life.

Materials and Methods

Study design:

This study was conducted amongst South Indian population, consisting of diabetic patients attending 360- bedded hospital which is located in the sub-urban part of South India. This is a hospital based cross- sectional study, conducted from October 2018 to April 2019 on 245 randomly selected patients suffering from diabetes mellitus. Patients with Diabetes mellitus attending General Medicine OPD were included in the study.

Patients with diabetes mellitus who gave consent to participate in the study were taken as inclusion criteria. Patients with gestational diabetes mellitus, patients with known psychiatric disorder and patients who were not willing to give consent were taken as exclusion criteria.

Patients attending the general medicine OPD during the study period were included in the study after obtaining their written informed consent. Patient's demographic data like name, age, sex, duration of diabetes, complications, BMI etc were collected. The Validated Revised Version of DQOL was distributed to patients after obtaining written informed consent. The RV DQOL consists of three domains namely Satisfaction, Impact and Worry with five, four and three items in each domain respectively. Each item was scored on a scale of one to five and the sum and percentage of each domain was calculated indicating that patients with higher score had poorer quality of life. [8]

Statistical analysis:

The demographic data of the patients were collected and their mean and standard deviation values were calculated for age, duration of diabetes, age of onset and BMI. The statistical analysis was done using SPSS Version 19 statistical software. Unpaired T test was used to compare the mean values between the parameters. One-way ANOVA was used to derive statistical results of BMI.

Ethical clearance:

Ethical clearance for this study was obtained from the Institutional Ethics Committee of SRM Medical College and Research Centre and written informed consent was obtained from all the study participants.

Results

Demographics of the participants:

Mean age of the targeted population was 51 (S.D. = 12) for Males and 52.5 (S.D. = 9.51) for Females with the majority of the respondents being male (53.12%). (Table 1)

The comparison of mean score values for the domains of RV DQOL between groups were statistically calculated using Unpaired T test and ANOVA. 245 patients with diabetes mellitus were enrolled in the study and their demographics were collected. Unpaired T test was used to statistically calculate the difference between the groups of various factors such

as age, gender, complications, social history and family history (Figure 1). ANOVA was used to derive the statistical inference of BMI. (Table 2)

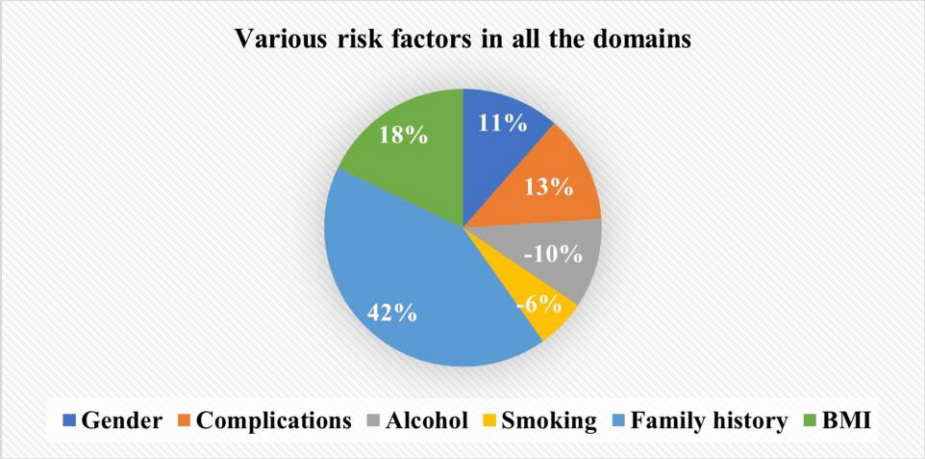

Figure 1: Pie chart representing the total score of various risk factors in all the domains

Table 1: Demographics and Clinical Data

VARIABLES	**FREQUENCY (%)**
GENDER	
Male	53.12
Female	46.875
AGE	
18-40	17.1875
41-60	62.5
61 and above	20.3125
OCCUPATION	
Working	53.125
Retired	13.67
Housewife	33.203
DURATION OF DIABETES	
<5 years	16.79
6-10 years	41.40

>10 years	40.62
BMI	
< 25	34.76
> 25	65.23

Table 2: The comparison of mean score values for the domains of RV DQOL between groups

GENDER						
	Male		**Female**		**T test**	**P value**
	Mean	**SD**	**Mean**	**SD**		
Satisfaction	17.82	0.42	17.40	0.52	0.622	0.534
Impact	13.06	0.30	12.04	0.37	2.159	0.032
Worry	9.34	0.23	9.04	0.28	0.832	0.406
Total	40.21	0.87	38.49	1.07	1.264	0.208
COMPLICATIONS						
	Present		**Absent**		**T test**	**P value**
	Mean	**SD**	**Mean**	**SD**		
Satisfaction	17.98	0.46	17.11	0.47	1.297	0.196
Impact	12.86	0.33	12.19	0.33	1.379	0.169
Worry	9.36	0.23	8.97	0.27	1.073	0.285
Total	40.19	0.94	38.27	0.95	1.387	0.167
SOCIAL HISTORY (ALCOHOL)						
	Present		**Absent**		**T test**	**P value**
	Mean	**SD**	**Mean**	**SD**		
Satisfaction	16.00	1.06	17.81	0.35	-1.653	0.100
Impact	12.62	0.60	12.58	0.26	0.42	0.967
Worry	8.46	0.56	9.28	0.19	-1.412	0.159
Total	37.08	2.01	39.67	0.72	-1.152	0.250
SOCIAL HISTORY (SMOKING)						
	Present		**Absent**		**T test**	**P value**
	Mean	**SD**	**Mean**	**SD**		
Satisfaction	16.67	1.32	17.68	0.34	-0.720	0.472
Impact	12.40	0.86	12.60	0.25	-0.196	0.845
Worry	8.60	0.70	9.24	0.18	-0.849	0.397
Total	37.67	2.59	39.52	0.71	-0.638	0.524
FAMILY HISTORY						
	Present		**Absent**		**T test**	**P value**

	Mean	SD	Mean	SD		
Satisfaction	19.67	0.42	16.83	0.42	3.961	0.0001
Impact	14.24	0.28	11.94	0.30	4.529	0.0001
Worry	10.36	0.22	8.74	0.22	4.268	0.0001
Total	44.26	0.82	37.51	0.85	4.631	0.0001

BMI

	Underweight	Normal	Overweight	Obese	ANOVA	P value
Satisfaction	17.00	18.01 ± 0.49	16.95 ± 0.52	18.37 ± 0.78	1.140	0.334
Impact	12.00	12.90 ± 0.33	11.91 ± 0.40	13.44 ± 0.50	2.388	0.069
Worry	10.00	9.62 ± 0.23	8.70 ± 0.30	9.51 ± 0.39	2.084	0.103
Total	39.00	40.53 ± 0.95	37.56 ± 1.13	41.32 ± 1.52	1.976	0.118

Discussion

The purpose of the current study is to test the hypothesis that the presence of diabetes mellitus in patients is linked to poorer quality of life, suggesting that various factors associated to diabetes have a significant effect on the satisfaction, impact and worry domains. The results of this study suggest that, in our targeted population, family history significantly affects the total score of quality of life of the patients (P = 0.0001, T test = 4.631) and this outcome is consistent with that of John et al., suggesting that patients with positive family history produced higher mean scores than those without family history. [9] This is followed by the overall score of BMI (P = 0.118, ANOVA = 1.976), Complications (T test = 1.387, P = 0.167) and gender of the patient (T test = 1.264, P = 0.208) respectively. In contrast, Social history such as Alcohol consumption (T test= -1.152, P= 0.250) and Smoking (T test= -0.638, P= 0.524) are negatively associated with the overall score of RV DQOL.

The satisfaction domain consists of six questions to evaluate the contentment of the patients in terms of management of the disease, the knowledge of their condition, treatment and life in general. In the satisfaction domain, patients with known family history of diabetes showed the highest score (T test= 3.961, P= 0.0001), indicating that those with known family history are less satisfied with their management of diabetes compared to those without family history. Other factors such as BMI (ANOVA= 1.140, P= 0.334), complications (T test= 1.297, P= 0.196) and gender (T test= 0.622, P= 0.534) also showed a positive correlation with poor satisfaction. Social history like Alcohol consumption (T test= -1.653, P= 0.100) and smoking (T test= -0.720, P= 0.472) showed negative correlation with satisfaction domain.

The impact domain consists of four items with a range of score from one to five, high score indicating poor quality of life. This domain evaluates the impact of the disease on patient's relationships and associated pains. In this domain, patients with known family history of diabetes mellitus produced the highest score (T test= 4.529, P= 0.0001). This score is

followed by that of BMI (ANOVA= 2.388, P= 0.069), Sex (T test= 2.159, P= 0.032) and complications (T test= 1.379, P= 0.169). A study conducted among Dutch population by Rekedop WK, et al. concluded that obesity and complications are important factors that determine poor quality of life irrespective of age and gender. The difference in gender plays a significant role in all the four items of impact domain. [10] This is comparable with the result of the study published by Ana Spasc, et al. where it was acknowledged that men experienced statistically lesser impact in terms of vitality and pain compared to women. [11]

The worry domain consists of three items with a range of score from one to five, higher the score, poorer the quality of life. In this domain, patients with known family history produced the highest score (T test= 4.268, P= 0.0001), depicting that people with known family history tend to feel more stressed than those without family history. This interpretation is reliable with the cross-sectional study conducted by Thapa, et al. among Rural Nepal population which concluded that family history of Diabetes mellitus distresses the mental status of the patient. [12]

Differences in other factors namely BMI (ANOVA= 2.084, P= 0.103), Complications (T test= 1.073, P= 0.285) and gender (T test= 0.832, P= 0.406) were also associated with higher scores of worry domain whereas social history showed negative correlation with the worry domain (Alcohol: T test= -1.412, P= 0.159; Smoking: T test= -0.849, P= 0.397)

Conclusions

The current study is the first to be conducted using the Revised Validated Version of Diabetes Quality of Life Questionnaire in our country. For the study's targeted population, known family history of diabetes mellitus is significantly associated with poor quality of life of the patients. Furthermore, this study showed statistically significant differences in all the domains in terms of gender, complications, and BMI. The effect of social history namely alcohol consumption and smoking were found to be statistically insignificant in the satisfaction and worry domain whereas the impact domain showed a statistically significant difference.

Appendix

RV DQOL Questionnaire [8]:

The Revised Version of DQoL (RV-DQOL13)

Please read every statement carefully and circle the number that best describe your feeling or situation.

Satisfaction Domain					
	Very satisfied	**Moderately satisfied**	**Neither satisfied nor dissatisfied**	**Moderately dissatisfied**	**Very dissatisfied**
1 How satisfied are you with the amount of time it takes to manage your diabetes?	1	2	3	4	5
2 How satisfied are you with the amount of time you spend getting checkups?	1	2	3	4	5
3 How satisfied are you with the time it takes to determine your sugar level?	1	2	3	4	5
4 How satisfied are you with your current treatment	1	2	3	4	5
5 How satisfied are you with your knowledge about your diabetes?	1	2	3	4	5
6 How satisfied are you with life in general?	1	2	3	4	5
Impact Domain					
	Never	**Sometimes**	**Often**	**Frequently**	**Always**
1 How often do you feel pain associated with the treatment for your diabetes?	1	2	3	4	5
2 How often do you feel physically ill?	1	2	3	4	5
3 How often does your diabetes interfere with your family life?	1	2	3	4	5
4 How often do you find your diabetes limiting your social relationships and friendships?	1	2	3	4	5
Worry Domain					
	Never	**Sometimes**	**Often**	**Frequently**	**Always**
1 How often do you worry about whether you will pass out?	1	2	3	4	5
2 How often do you worry that your body looks different because you have diabetes?	1	2	3	4	5

3 How often do your worry that you will get complications from your diabetes?	1	2	3	4	5

Table 1: The proposed scoring of each domain and total score for a revised DQoL

Domains	**No. of items**		**Range of score for each item**	**Range of score**	**Converted to percentage**	
Satisfaction (S)	6		1 to 5	6 – 30	(S) / 30 x 100	
Impact (I)	4			4 – 20	(I) / 20 x 100	
Worry (W)	3			3 – 15	(W) / 15 x 100	
Total	13			13 – 65	Total / 65 x 100	

Higher score indicates poorer quality of life.

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