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CORRELATION OF PATIENTS' KNOWLEDGE REGARDING DIABETES WITH THEIR GLYCAEMIC CONTROL: A CROSS-SECTIONAL STUDY FROM AN URBAN AREA

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ABSTRACT

Introduction: Diabetes is a chronic condition requiring lifelong management, associated with increased mortality and morbidity. It is important for diabetic patients to have knowledge regarding the disease and self-care. The objective of current study was studying correlation of patients' knowledge regarding diabetes with their glycaemic control.

Methods: It is a cross-sectional study conducted among the patients attending a diabetic clinic in a tertiary care hospital, from Sangli City (Maharashtra). The study tool was pretested and self- administered questionnaire. Analysis was done using Microsoft Excel and SPSS- 22.

Results: Of the 573 study participants, only 114 (19.9%) had fasting plasma glucose level ≤ 130 mg/dl. Considering the knowledge regarding diabetes; 46.4% participants had scored less than 50%, while only 12.9% participants had scored >75%. The participants with fasting plasma glucose level at ≤130 mg/dl had highest mean knowledge score. On examining with Pearson correlation; the knowledge regarding diabetes had a positive correlation with the period of diabetes morbidity and a negative correlation with fasting plasma glucose.

Conclusion: The knowledge regarding diabetes was helpful in achieving better glycaemic control. Hence efforts should be made to increase the diabetes related literacy among the patients.

Keywords: Diabetes Mellitus; Self care; Knowledge; Blood Glucose.

INTRODUCTION

Diabetes Mellitus is a group of common metabolic disorders results in hyperglycaemia. It is chronic condition warranting lifelong management. The loss of metabolic regulation in a diabetic patient leads to pathophysiological changes in many organs, thus resulting in many health problems. Many complications are associated with diabetes mellitus; acute like diabetic ketoacidosis, hyperglycaemic hyperosmolar state and chronic like retinopathy, cerebro-vascular disease, coronary heart disease, infections etc.[1]

Last century has witnessed the transition of non-communicable diseases from secondary to most important contributors to human mortality and morbidity.[2] The diabetes mellitus is one of the torch bearers for non-communicable diseases.[3] The global

prevalence of diabetes was estimated to be 9% in 2014 while it was directly responsible for 1.5 million deaths in 2012 and 89 million DALYs.[4] International diabetes federation estimated that 66.847 million adults (20-79 yrs) from India are suffering with diabetes mellitus.[5] Various studies have estimated high prevalence of diabetes related complications in India. The Chennai Urban Population Study (CUPS) and The Chennai Urban Rural Epidemiology Study (CURES) estimated the prevalence of coronary artery disease in 21.4%, peripheral vascular disease (PVD) in 6.3% diabetic retinopathy in 17.6%, overt nephropathy in 2.2% and microalbuminuria in 26.9% diabetic subjects.[6,7,8,9]

The sheer number of patients, the chronic nature as well as range of complications; make it important for the patients of diabetes to have knowledge regarding the diseases as well as self care.[10] Sorganvi observed that majority of diabetic patients from Bijapur, (Karnataka) India had poor knowledge regarding the diabetes.[11] While in the study conducted by Indian Council of Medical Research, the investigators concluded that knowledge and awareness about diabetes in India, particularly in rural areas, is poor.[12] However most of such studies are based in hospitals with general OPD, while very few are conducted in specialized diabetic clinics like the study in Ludhiana by Gulabani et. al.[13] The studies based in the non-metropolitan area are even more rare.

This study was conducted with the objective of observing knowledge regarding diabetes among the patients attending diabetic clinic in a tertiary care hospital and to assess the factors on which the knowledge was dependent. As well as to study, whether glycaemic control of the patients was correlated with the knowledge regarding diabetes.

METHODS

This was a cross-sectional study conducted in a diabetic clinic from a tertiary care hospital, from an urban area of Sangli (Maharashtra), India. Institutional ethical committee approval, permissions from the respective authorities and consents from participants or guardians in case of minors were acquired. The study population was diabetic patients who were on medication for atleast one year; attending diabetic clinic from the selected tertiary care hospital on out-patient basis. Those not willing to participate and requiring indoor management at the time of study were excluded. Sampling technique was convenience sampling and the study period was January-May 2015.

Study instrument was pretested, prevalidated, self-administered questionnaire. It consists of initial section with general information of patient like age, gender etc. The second section consisted of questions regarding knowledge of patients about diabetes, its complications and self care. This section was developed with the help of subject experts, published literature.[14] A pilot study was carried out and questionnaire was finalized after the study. The final questionnaire to assess the knowledge can be scored maximum 44 marks out of which 22 were based on self care knowledge. On considering the view of experts regarding the minimum desirable knowledge in the diabetic patients it was decided as participants scoring ≤ 50%, 51-75% & >75% marks to be considered as having poor, moderate and good knowledge respectively.

All the follow up adult type 2 diabetes mellitus patients from the selected diabetic clinic were the study population. Diabetic patients are routinely examined for fasting plasma sugar level before counselling. Hence after acquiring the laboratory reports, the every patient informed about their current fasting plasma sugar level status. The American diabetic association has set a target for fasting plasma glucose level at 90 -130 mg/dl. This range was used assess the glycaemic control of the participants.[15] Then patients were informed about the study with assurance of anonymity. Only willing patients were included in the study, while those unwilling were guided to further counselling and management. The informed consent with permission to use the total data for research purpose was collected from all willing participants. Then they were seated in an area earmarked for the data collection inside the diabetic clinic. They were given privacy and comfort for filling up of questionnaire, with the investigators waiting outside for help if required. All the questionnaires were collected in dropbox to maintain complete anonymity. After the procedure the participants were guided to further counseling and management.

Ethical approval: All procedures performed in this were in accordance with the ethical standards of the institutional ethical committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from all the participants in the study.

Analysis was done using SPSS-22 and Microsoft Excel 2003. Percentage, mean, annova and correlation were used in the analysis. Data from the pilot were not included in the final analysis.

RESULTS

Out of the 631 study participants, 573 had completed the questionnaire correctly and hence used in the final analysis. In the study, male participants were 379 (66.1%) and female participants were 194

(33.9%). The youngest participants in the study were of age 38 years and most elderly were 80 years of age; the mean age was 60.3 years (standard deviation 8.6 years). The number of participants belonged the age groups i.e. ≤50, 51 – 60, 61 – 70 and > 70 years were 86 (15%), 223 (38.9%), 171 (29.8%) and 93 (16.2%) respectively. The participants were on diagnosed for diabetes for minimum 1 year to 30 years, with mean 8.5 years (standard deviation 6.6 years). Two hundred thirty five (41%) participants were school educated i.e. upto or below 10th grade, while 338 (59%) were college educated.

The maximum fasting plasma glucose level recorded was 397 mg/dl, with the mean of 184 mg/dl (standard deviation 58.6 mg/dl). On considering the cut-off of for the glycaemic control at 130 mg/dl; 114 (19.9%) participants had fasting plasma glucose level ≤ 130 mg/dl. While 459 (80.1%) had fasting plasma glucose level above 130 mg/dl.

The maximum possible score for the questionnaire of knowledge regarding diabetes mellitus was 44. The observed range of the score by the study participants was from 9 to 40, with mean of 23.4 (standard deviation 8). While 266 (46.4%) participants had scored ≤50% i.e had poor knowledge, 233 (40.7%) had scored 51-75% i.e had moderate knowledge and only 74 (12.9%) scored above 75% i.e. had good knowledge.

While considering various individual factors from the knowledge regarding diabetes mellitus questionnaire, majority (> 75%) of risk factors of diabetes and the complications of diabetes were identified by 140 (24.4%) and 269 (46.9%) respectively. One hundred and thirty two (23%) participants thought that diabetes cannot be prevented. All the patients knew about fasting plasma glucose level as it was informed to every patients during every visit however, 117 (20.4%) participants could not identify any other essential investigation that has to be routinely undertaken by a diabetic patient; all the investigations were correctly identified by only 61 (10.6%) participants. Self-reported good adherence to management was reported by 220 (38.4%) participants. The mean score by study participants for this part of the total knowledge questionnaire was 11.6 (standard deviation 5.9).

The mean age of female participants was significantly higher than male participants. However mean period since diagnosis of diabetes i.e period of diabetes morbidity was lower in females; the difference was statistically significant. The mean current fasting plasma glucose level was lower and the mean score of knowledge regarding diabetes was higher, in females as compared to males. However these differences were not statistically significant. **(Table 1)**

On comparing mean knowledge regarding diabetes in each age group, the difference was statistically significant with highest mean knowledge belonging to age group of 61 – 70 years. Similarly there was statistically significant difference in mean knowledge regarding diabetes to period since detection of diabetes i.e. period of diabetes morbidity. The mean knowledge increased with increase in years of morbidity. The participants who had college education had higher mean knowledge; however the difference was not statistically significant.

Table 1: Anova for comparing various variables for gender

Variables	Mean (± SD)		P value
	Male (n=379)	Female (n=194)	
Age (years)	59.3 (±8.1)	62.2 (±9.3)	0.00
Period of diabetes morbidity (years)	8.9 (±6.9)	7.7 (±6)	0.04
Current fasting plasma glucose level (mg/dl)	187.3 (±60.7)	177.6 (±53.9)	0.06
Score knowledge of diabetes	23 (±8)	24.3 (±8.1)	0.07

SD = Std. Deviation

Table 2: Anova of various variables to the knowledge regarding diabetes (n=573)

Variables	Mean ± SD	P value
Age Group (years)		
<50 (n=86)	23.2 (±7.5)	0.01
51-60 (n=223)	22.7 (±8.6)	
61-70 (n=171)	25.2 (±7)	
>70 (n=93)	22.2 (±8.7)	
Period of diabetes morbidity (years)		
≤ 2 (n=130)	20.1 (±6.4)	0.00
3 – 5 (n=130)	21.1 (±7.9)	
5 – 10 (n=134)	25.1 (±8.7)	
>10 (n=179)	26.2 (±7.4)	
Education		
School (n=235)	23.1 (±8.5)	0.45
College (n=338)	23.6 (±7.7)	
Current fasting plasma glucose level (mg/dl)		
≤130 (n=114)	31.4 (±6.3)	0.00
131-180 (n=211)	25.2 (±6.8)	
> 180 (n=248)	18.2 (±5.7)	

SD = Std. Deviation

Table 3: Correlations of age, period of diabetes morbidity and fasting plasma glucose level with knowledge regarding diabetes

Variables	Knowledge of diabetes	
	Pearson Correlation	Significance (2-tailed)
Age	0.075	0.074
Period of diabetes morbidity	0.319**	0
Fasting plasma glucose	-0.574**	0

**. Correlation is significant at the 0.01 level (2-tailed)

The participants with fasting plasma glucose level at ≤130 mg/dl had highest mean knowledge score, followed by those with fasting plasma glucose level at 130 to 180 mg/dl. This difference was statistically significant. **(Table 2)**

On examining with Pearson correlation; a high degree of positive correlation was observed between period of diabetes morbidity with knowledge regarding diabetes. On the other hand, a higher degree negative correlation was observed between fasting plasma glucose and knowledge regarding diabetes. **(Table 3)**

DISCUSSION

In the current study, patients suffering with diabetes for longer period had better knowledge regarding it. Glycaemic control was better in patients with higher knowledge.

Gulabani et. al. (2005), conducted a study on diabetics in an integrated diabetes clinic from a tertiary care hospital in Ludhiana, India. They observed that 46.5% patients thought that diabetes could be prevented. 71.3% patients did not knew the risk factors involved in the development of diabetes and over 94% patients did not knew all the investigations regarding diabetes. Similarly, they found that duration of disease was associated with higher knowledge score. [13] A similar study was conducted by Sorganvi et. al.(2009), in Bijapur (Karnataka) India; they observed that 32% participants didn't knew the risk factors and 81% were unaware that diabetes could be prevented. Similarly they also found that duration of diabetes was associated with the knowledge of the disease. [11]

Malathy et. al. (2011) studied the effect of a diabetes counseling programme on knowledge, attitude and practice among diabetic patients in Erode district of Tamil Nadu, India. They observed that in pre-program phase the knowledge of diabetics was unsatisfactory. The major causes and complications of diabetes were identified by nearly 50% participants of study group.

In our study, we observed that 23% participants thought that diabetes cannot be prevented. Only 24.4% participant could identify majority of the risk factors and 89.4% participants could not identify all the essential routine investigations required to be taken by a diabetic patient. Similarly the duration of diabetic morbidity was observed to be associated with higher knowledge. Hence our observations were in the similar lines to above mentioned studies.

Berikai et. al. (2007), had studied the relationship of gain in knowledge after self care training and its effect on glycaemic control in diabetics attending a hospital from Chicago, Illinois, They concluded that with higher knowledge level there is significant betterment of glycaemic control.[17] Ozcelik et. al. (2008), conducted a study among the type 2 diabetic patients from Istanbul, Turkey and concluded that, better knowledge in patients resulted in better glycemic control.[18] Bains et. al. (2008), observed that diabetes knowledge was one of the most important factor associated with glycemic control in the type 2 diabetes mellitus patients attending tertiary care centre in Charleston, United States of America.[19]

Our findings are similar to the findings of the above mentioned studies.

In a study conducted by Chavan et.al.; 9.4%, 71.3% and 19.2% study participants had good, moderate and poor knowledge respectively. The percentage of participants with good and poor knowledge is lower as compared to the current study. The observed difference in the result may be attributed to difference in questionnaires, study setting and difference in demographic profile of the study subjects. Similarly the patient load in the rural area may be lower than the urban tertiary center from the current study hence the quality of counseling may be better; resulting in lower percentage of subjects with poor knowledge in rural area. However in depth comparative study is required before the confirmation.

CONCLUSION

Knowledge regarding the diabetes is associated with the glycemic control. However, many of the patients have poor knowledge regarding the disease. Knowledge regarding the diabetes is also associated with period of diabetes morbidity; the patients suffering with diabetes for longer duration have better knowledge. Hence specialized training programs, mass media campaign, seminars, counselling sessions and workshop should be arranged periodically for diabetic patients to achieve better knowledge and thus better glycaemic control.

LIMITATIONS

The results are based on patients attending single diabetic clinic, hence the results cannot be generalized to the community. Similarly as this is a tertiary referral center the patients may not be confined to the surrounding urban area, hence these results do not necessarily reflect the trend from urban population. Glycosylated Haemoglobin and post prandial plasma glucose level of the participants was not considered in the current study due to feasibility constraints. Self administered questionnaire was used hence reporting bias cannot be negated. The effect of mass media or any recent health event

which may result in increased knowledge is not enquired in the questionnaire. This study does not compare the knowledge of patients attending specialized diabetic clinic with those attending general medicine outpatient department.

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