Knowledge about diabetes and relationship between compliance to the management among the diabetic patients from Rural Area of Sangli District, Maharashtra, India

Girish M. Chavan[1], Vivek B. Waghachavare[1], Alka D. Gore[1], Vishwajeet M. Chavan[1], Randhir V. Dhobale[1], Girish B. Dhumale[1]

[1]Department of Community Medicine, Bharati Vidyapeeth Deemed University Medical College and Hospital, Sangli, Maharashtra, India

ABSTRACT

Introduction: Diabetes is an important public health problem of India. Studies have shown that increase in patients' knowledge regarding the disease results in better compliance to treatment and decrease in complications. This study was planned to assess the knowledge about diabetes and its correlation with pharmacological and non-pharmacological compliance, among the diabetic patients attending rural health center from Sangli District, Maharashtra (India). **Materials and Methods:** The study was conducted during September to November 2014. The study subjects were all willing adult patients with type II diabetes mellitus attending a selected rural hospital. The study tool was pretested and self-administered questionnaire. Analysis was done using Microsoft Excel and SPSS-22. **Results:** Total study participants were 307 in number, with the mean age of 55.6 years. The mean morbidity with diabetes was 10.7 years. Only 23.8% had good knowledge regarding diabetes, while 19.2% participants had poor knowledge. Knowledge was significantly associated with the compliance to the pharmacological and non-pharmacological management. **Conclusion:** Although most of the patients were suffering with diabetes for many years there is lack of knowledge regarding the disease and self care. The compliance to the management of diabetes was better in patients with good knowledge. Seminars, counseling sessions and workshop should be arranged periodically for diabetic patients to increase their awareness.

Keywords: Awareness, diabetes mellitus, India, medication compliance, patients

Introduction

International diabetic federation estimated that in India there are 66.8 million patients in 2013, with nearly 50% undiagnosed. Diabetes was related to one million deaths and mortality was higher under age of 60 years.[1] By 2030 there will more than 79 million diabetics, making it one of the major public health challenge to the country.[2,3] There is high burden of diabetes-related complications in Indian patients. Agrawal *et al.* observed retinopathy in 28.9%, nephropathy in 32.5%, neuropathy in 30.1%, cardio-atherosclerotic diseases in 19.2%

and peripheral vascular diseases in 18.1% diabetic patients.[4] The investigators of A_1cheive study observed high prevalence of macrovascular and microvascular complications among the Indian diabetic patients.[5]

Different studies conducted in countries like United States have observed the positive association of patient's knowledge regarding the disease and self care to the treatment compliance.[6,7] However, such studies in Indian scenario are few and concentrated around large cities. Hence, this study was planned to assess knowledge about diabetes and its correlation with pharmacological and non-pharmacological compliance, among the diabetics attending a rural health center from Sangli District, Maharashtra (India).

Address for correspondence: Dr. Waghachavare Vivek Baliram, Department of Community Medicine, Bharati Vidyapeeth Deemed University Medical College and Hospital, Sangli - 416 414, Maharashtra, India. E-mail: vivek416416@gmail.com

Material and Methods

This was a cross-sectional study conducted in a rural health center attached to a medical college from Sangli district of Maharashtra, India. It was undertaken after Institutional ethical committee approval and permissions from the respective authorities. Written informed consent from each participant was acquired. The study population was adult type-2 diabetes patients on oral hypoglycemic drugs for at least 6 months attending the rural health centre. The patients attending for routine check up or drug re-prescription and consenting to participate were included in the study. Minors, patients on insulin, hospitalized patients, patients who had undertook any sensitization program other than routine counseling by physician and those who cannot read in the local language were excluded from the study. Prevalence of knowledge regarding diabetes in the pilot study was 52.71%; considering level of significance as 5% and error 15%; the sample size derived was 265. Sampling technique was a convenience sampling and study duration was September to December 2014.

Study instrument was a pretested, prevalidated, self-administered questionnaire with good test-retest reliability (Spearman correlation coefficient, $r = 0.81$) and internal consistency (Cronbach's α, $r = 0.78$). It was developed in Marathi language with the help of subject experts and published literature[8-11] and finalized after the pilot study. It consists of initial section with general information of patient like age, gender etc., The occupations reported by patients were classified as sedentary work, moderate work and heavy work.[8] The second section consisted of questions regarding knowledge of patients about diabetes and its complications and the answers were scored. The maximum possible knowledge score was 24. Those scoring under 50%, 50–75% and more than 75% were considered to be having poor, moderate and good knowledge, respectively. Final section had self-reported pharmacological compliance and non-pharmacological compliance. Pharmacological compliance was self-reported, with participants reporting to have missed more than two doses in last 15 days were considered as non-compliant.[12] Non-pharmacological compliance means adherence to the measures like diet modification and exercises. Due to lack of exact definition of compliance to the non-pharmacological management, a scale was developed with equal importance to diet modifications and physical exercises. The maximum possible score was 12 and the participants scoring above 9 (75%) were considered as compliant to non-pharmacological management.

Analysis was done using SPSS-22 and Microsoft Excel 2007. Mean, standard deviation, percentage, Chi-square and binary logistic regression were applied. Data from the pilot study and incomplete questionnaires were not included in the final analysis.

Results

Out of 329 questionnaires collected, 307 were complete and hence used in the final analysis. Two hundred twenty-three (72.6%) participants were male while 84 (27.4%) were female [Table 1]. The mean age of study participants was 55.6 years (range 35–85 years and standard deviation ± 12.22 years). Two hundred ninety-two (95.1%) participants were married. While considering the educational status, 106 (34.5%) had studied up to secondary school and 201 (65.5%) had attended college. Among the participants: 208 (67.8%), 56 (18.2%) and 43 (14%) were sedentary, moderate and heavy workers, respectively. The mean morbidity with diabetes was 10.7 years (range: 1 to 44 years and; standard deviation: 10.02 years).

The pharmacological compliance was reported by 234 (76.2%) participants. The mean score for the non-pharmacological compliance was 8.35 (standard deviation: 2.8). Based on preset criteria of score, 156 (50.8%) participants were considered to compliant to the non-pharmacological management.

The mean score for knowledge regarding diabetes was 14.82 (standard deviation: 3.5). Only 29 (9.4%) participants had good knowledge, whereas 219 (71.3%) had moderate and 59 (19.2%) participants had poor knowledge. Age was not associated with the knowledge (Chi-square 5.47, $P = 0.49$), however, higher percentage of older age group (≥75 yrs) participants had poor knowledge. Gender was associated with knowledge (Chi-square 10.78, $P = 0.005$); higher percentage of male participants (81.6%) had moderate to good knowledge as compared to females (78.6%). Marital status and occupation were not associated with knowledge. Education was not associated with the knowledge (Chi-square 2.23, $P = 0.33$), however higher percentage of participants who had attended college had moderate to good knowledge.

Pharmacological compliance was associated with knowledge. Among the participants with good compliance, 88.5% had moderate to good knowledge as compared to only 56.2% participants with poor compliance. Compliance to the non-pharmacological management was associated with the knowledge. The moderate to good knowledge was present in 87.8% participants with good compliance as compared to only 73.5% with poor compliance [Table 2].

Table 1: Age group and gender distribution of the participants		
Age group	**Gender**	**Total**
	Male	**Female**	
≤50 years	72	48	120
	60%	40%	100%
51-60 years	39	18	57
	68.4%	31.6%	100%
61-75 years	96	18	114
	84.2%	15.8%	100%
≥75 years	16	0	16
	100%	0%	100%
Total	223	84	307
	72.6%	27.4%	100%

Binary logistic regression was applied with knowledge regarding diabetes as dependent variable, while age, gender, education, occupation, pharmacological compliance and non-pharmacological management compliance as independent variables. Enter method was used to identify most significant predictors of knowledge. The chance accuracy rate for the model is 83.6%, which was greater than calculated chance accuracy rate (67.3%). Pharmacological and non-pharmacological management compliance were the highly significant predictors, while education and age were also significant predictors for knowledge regarding diabetes [Table 3].

Discussion

In the current study, we observed that the patients compliant with pharmacological and non-pharmacological management had good knowledge regarding diabetes.

Al-Qazaz HKh *et al*., (2010), observed significant correlations between the knowledge about diabetes and adherence to the treatment in subjects from Penang.[13] Sweileh *et al*., when carried out a study at Al-Makhfia governmental diabetes primary healthcare clinic in Nablus, Palestine in 2012, observed that diabetic patients with high knowledge were less likely to be non-adherent.[14] These observations are similar to the results obtained in the current study. This reflects the importance of knowledge regarding diabetes among the patients for better compliance.

Chaudhary *et al*., from Multan (Pakistan) in 2010, observed that male gender, higher education and older age (>40 years) were associated with the knowledge regarding diabetes mellitus. The observations from the current study are similar.[15] However, age groups used by them were only two: <40 years and >40 years, while in the current study four age groups were considered with lowest being 35–50 years. Abdella and Mohammad studied awareness of diabetic patients about their illness and associated complications in Ethiopia (2012); majority of patients (67%) had good knowledge on actions to be taken on the occurrence of acute complications and reasons for developing acute complications.[16] While we observed that less than 10% participants had good knowledge. However, there is difference in the questionnaire used in both the studies and most of the participants from Abdella study had undergone sensitization unlike the current study subjects. This could be the reason behind the difference in the observations.

Mumu *et al*., at Daka (Bangladesh) 2013, observed that 19% respondents had poor knowledge, while 68% had average and 13% had good knowledge. They also deduced that male gender and higher educated people are likely to have better knowledge regarding Diabetes.[17] Muninarayana *et al*. conducted a study on adults in Tamaka village, Kolar (India) in 2009. They observed 74.2% of diabetics were aware of the complications. This study also revealed that knowledge regarding diabetes was very poor in rural areas.[18] Rujul *et al*. observed that male gender, higher education and younger age of respondents was significantly associated with level of knowledge, while type of occupation is not associated with it.[19] These studies have similar results as our observations.

Bansal *et al*. observed compliance to medication in 82.5% patients from rural area of Ludhiana district, India.[20] Rao *et al*. observed that 83.6% patients from Southern Karnataka were on regular medication.[21] Santhanakrishnan *et al*. observed compliance to oral hypoglycemic agents in 76% subjects, dietary modifications in 81.4% and physical activity in 37% subjects from Puducherry, India.[12] While in the current study, pharmacological compliance was reported by 76.2% participants and compliance to the

Table 2: Association between knowledge regarding diabetes with pharmacological compliance and non-pharmacological management compliance

Compliance to the type of management	Knowledge regarding diabetes			Total	Chi-square test
	Poor	Moderate	Good		
Pharmacological					
Poor	32	38	3	73	38.1
	43.8%	52.1%	4.1%	100%	*P*=0.000
Good	27	181	26	234	
	11.5%	77.4%	11.1%	100%	
Non-pharmacological					
Poor	40	105	6	151	17.7
	26.5%	69.5%	4%	100%	*P*=0.000
Good	19	114	23	156	
	12.2%	73.1%	14.7%	100%	
Total	59	219	29	307	
	19.2%	71.3%	9.4%	100%	

Table 3: Binary logistic regression model-association of age, gender, education occupation, pharmacological compliance and non-pharmacological management compliance with knowledge regarding to diabetes

Variable	B	S.E.	Wald	*P*	OR (95% CI for OR)
Age	−0.387	0.194	3.970	0.046	0.679 (0.464, 0.994)
Gender	−0.097	0.491	0.039	0.843	0.907 (0.346, 2.377)
Education	1.485	0.642	5.344	0.021	4.414 (1.253, 15.541)
Occupation	0.739	0.377	3.849	0.050	2.094 (1.001, 4.382)
Pharmacological compliance	1.980	0.362	29.881	0.000	7.242 (3.561, 14.728)
Non-pharmacological management compliance	1.155	0.398	8.417	0.004	3.174 (1.455, 6.927)
Constant	−2.590	1.919	1.821	0.177	0.075

B: Regression coefficient, SE: Standard error, OR: Odds ratio, CI: Confidence interval

non-pharmacological management was reported by 50.8% participants. The results observed by us were similar to the above-mentioned findings.

Being a self-administered questionnaire reporting bias cannot be totally eliminated; there may be over-estimation of compliance. Confounders like economical state, availability of medications, counseling by health professionals, exposure to information through media, additional use of ayurvedic/homeopathic/other indigenous systems of medicines etc., may be present and are not considered in the current study. Only self-reported compliance was considered without confirming.

Conclusion

Compliance to the management of diabetes depends on knowledge regarding it. However, many of the patients have poor knowledge regarding the disease, the situation is worse among the females. Lower level of literacy and old age hinder the presence of knowledge regarding the diabetes. Seminars, counseling sessions and workshop should be arranged periodically for diabetic patients to increase their awareness regarding diabetes disease in total per say.

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