Research Article

A community-based study on knowledge of diabetes mellitus among adults in a rural population of Kerala

Mariya Amin Qurieshi[1], Rajini Ganesh[2], Kamalamma Leelamoni[2], Beteena Kurian[2]

[1]Department of Community Medicine, Government Medical College, Srinagar, Jammu and Kashmir, India.
[2]Department of Community Medicine, Amrita Institute of Medical Sciences, Kochi, Kerala, India.
Correspondence to: Mariya Amin Qurieshi, E-mail: maryaamin123@gmail.com

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Abstract

Background: Worldwide India leads in diabetes mellitus and within India, Kerala tops the list. Keeping in view increasing burden of diabetes mellitus in Kerala, it is highly important to know about the awareness of the disease among general population to chalk out culturally appropriate and need-oriented educational strategies.

Objective: To assess the knowledge of diabetes mellitus in a rural population of Kerala.

Materials and Methods: A descriptive cross-sectional study was undertaken in a rural panchayat of District Ernakulam of Kerala wherein 343 adults were randomly interviewed from six randomly selected wards. The interview schedule had 23 items on knowledge, which were assessed in four domains including general awareness of diabetes mellitus, its risk factors, complications, and lifestyle modifications. Each item was given a score. Maximum possible score was 23. Knowledge score of less than 9 was considered as poor, 9-17 as average, and above 17 was taken as good. Data were analyzed using SPSS version 11. Descriptive analysis was done for sociodemographic variables, and *t*-test and analysis of variance were used to ascertain the level of significance of predictors in awareness.

Result: Mean age of the participants was 47.7 ± 15.74 years with more than half (55.7%) having completed their high school education. Mean knowledge score was 15.6. Being diabetic, having completed high school education, and with a family history of diabetes had significantly better knowledge score ($p < 0.05$).

Conclusion: Educating community on risk factors is the key strategy for the prevention of diabetes and delaying the onset of disease among high-risk individuals.

KEY WORDS: Diabetes mellitus, knowledge, Kerala

Introduction

India leads the world in the alarming epidemic of diabetes mellitus with the highest number of 50.8 million of people with diabetes followed by China and United States.[1] Rapid epidemiological transition in India with increased urbanization and westernization has contributed to a substantial rise in diabetes.[2] Prevalence estimates of diabetes in India ranges from 5.6% to 12.4% in urban areas and 2.4% to 2.7% in rural areas.[3] This difference not only exists across rural urban divide but also across the Indian states because different states in India are at diverse stages of demographic transition.[4] A community-based cross-sectional survey in urban Kerala recorded highest prevalence of 19.5% in India.[5] As Kerala has the highest proportion of ageing population in India, the prevalence of diabetes mellitus is highest in Kerala.[4] In addition, drastic change in the living standard of people in Kerala over the last two decades has also significantly contributed to it.[6]

It is now being considerably agreed that knowledge of diabetes mellitus and its risk factors and preventive lifestyle among population will likely have a substantial benefit in the prevention of disease.[7] Unfortunately, there is an inadequate awareness about the real dimension of the problem among the general public. There is also lack of awareness about the existing intervention for the prevention of disease.[8] Keeping

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in view the increasing burden of diabetes mellitus in Kerala, it is very important to know about the awareness of the disease among the general population to chalk out culturally appropriate and need-oriented educational strategies. Even though ample literature on the prevalence of diabetes mellitus is available from Kerala, but to our knowledge no comprehensive study on the knowledge about diabetes mellitus has been undertaken so far. With this perspective, a community-based study was undertaken with the objective of assessing the awareness of diabetes mellitus, its risk factors, treatment, complications, and role of lifestyle modifications in controlling diabetes in a rural population in Kerala.

Materials and Methods

A community-based cross-sectional study was conducted in Cheranalloor Panchayat (self-administration unit) of Ernakulum District, Kerala, India. Six wards were randomly chosen from the 16 wards of the panchayat. From the selected wards, 190 houses were randomly visited. Adults aged 20 years and above, who were willing and available at the time of visit were interviewed. A total of 343 individuals were interviewed. For any house with more than one eligible person, interview was carried out separately to avoid any family influence. In addition to baseline data on sociodemographic characteristics and family history of diabetes mellitus, the questionnaire covered different aspects of diabetes mellitus. Besides, enquiry about diabetes status (self-reported) was made. Socioeconomic status was assessed by Prasad's Social Scale.[9] There were a total of 23 questions, four on the general awareness of diabetes mellitus, six on the risk factors, six on the treatment and complications, and five on the lifestyle modifications. All 23 questions were scored. The possible response for closed question was "yes" or "no" and "don't know." Score one (1) was awarded to response "yes," and zero (0) for "no" and "don't know." For open-ended questions, scores were graded. Maximum possible score was 23. Knowledge score of less than 9 was considered as poor, 9–17 as average, and above 17 was taken as good. Data were analyzed using SPSS version 11. Descriptive analysis was done for sociodemographic variables, and *t*-test and analysis of variance were used to ascertain the level of significance of predictors in awareness.

Result

Sociodemographic Profile

A total of 343 individuals were interviewed. Mean age of the respondents was 47.74 ± 15.74 (standard deviation). Respondents were predominantly women, 242 (74.6%). Over half of the respondents 191 (55.7%) had high school and higher secondary education. A total of 136 (38.5%) were below poverty line. Among 343 respondents, 79 (23%) reported (self) to have diabetes and 146 (42.6%) had family history of diabetes mellitus. Sociodemographic details are given in Table 1.

General Awareness on Diabetes Mellitus

Awareness on different aspects of diabetes mellitus is shown in Table 2. It is interesting to note that even though 333 (97.1%) of the respondents had heard of the condition diabetes, only 297 (89.2%) could define it correctly. Out of the 79 people with diabetes, only 58 (73.4%) could specify it correctly. On the age group affected in diabetes, only 117 (34.1%) said that all ages could be affected, and among the people with diabetes, 39.2% could answer it correctly.

Awareness on Risk Factors, Symptoms, and Complications

The most common risk factor identified by respondents was diet (197 [57.4%]), followed by heredity (59 [17.2%]), stress (27 [7.8%]), physical inactivity (17 [4.9%]), alcohol intake (16 [4.6%]), and obesity (12 [3.5%]). Among the population with diabetes, 20 (25.3%) were unaware of the risk factors.

The most common symptom identified was fatigue (173 [50.4%]), followed by polydipsia (94 [27.4%]), polyphagia (58 [16.9%]), polyuria (42 [12.2%]), and loss of weight (9 [2.6%]). Among the self-reported respondents with diabetes, 9 (11.4%) were either unaware of the symptoms or the responses were incorrect.

Regarding complications, 277 (80.8%) respondents were aware that diabetes can lead to complications or can affect various organs in the body. However on further enquiry, 150 (43.7%) of them could not specify any complication or the responses were incorrect. Among the complications, kidney was cited by 105 (30.6 %), eyes by 82 (23.9%), and heart by 61(23.1%), only a few (22 [6.4%]) were aware of the neurological complications. Surprisingly among the respondents with diabetes, 27 (34.1%) were unaware of any of the complications.

Awareness on Prevention and Treatment

Regarding prevention, 248 (72.3%) knew that diabetes can be prevented; however, among the subjects with diabetes only 53 (67.1%) were aware about the preventive aspects. When asked about treatment, 307 (89.1%) said that treatment is available for diabetes but lifelong and regular intake of medicine was known to 140 (40.8%) only. Even among the respondents with diabetes, 35 (44.3%) were unaware of the fact that treatment for diabetes is lifelong and regular.

Awareness on Lifestyle Modifications among Study Subjects

Different dietary modifications listed by respondents included reduced intake of sugar and sweets by 169 (64%), decreased intake of starchy food such as potato, beetroot by 34 (12.8%), and increased intake of vegetable and fruits by 124 (42.8%).

About three-fourths of the respondents felt that intake of alcohol 263 (76.7%) and smoking 262 (76.4 %) should be avoided by patients with diabetes mellitus. Among the subjects with diabetes, 16 (20.2%) of them were not aware of it. Importance of exercise and foot care was known to 302 (88%) and 283 (82.5%), respectively.

Table 1: Sociodemographic Characteristics of study population (n=343)

Variable	No.	%
Age (years)	52	15.16
<30	129	37.61
30-50	123	35.86
50-70	39	11.37
> 70		
Sex		
Male	101	29.4
Female	242	70.6
Education		
Primary & below	31	9.03
Middle	43	12.54
HS &secondary	191	55.69
Graduation & above	78	22.74
Religion		
Christian	245	71.4
Hindu	98	28.6
Per capita monthly income (In Rupees)		
>10000	01	0.29
5000-9999	24	07.0
3000-4999	56	16.3
1500-2999	78	22.7
500-1499	52	15.2
<500	132	38.5
Occupation		
Professional/ skilled	94	27.4
Unskilled	10	2.9
Home makers/Students	214	62.4
Retired/unemployed	25	7.3
Type of family		
Nuclear	219	63.8
Joint	124	36.2
Self reported diabetes		
Yes	79	23.0
No	264	77.0
Family history of diabetes		
Yes	146	42.6
No	197	57.4

Table 2: Awareness on Diabetes Mellitus

Variable	Yes	No	Don't know
Heard of diabetes	333 (97.1%)	10 (2.9)	
Risk of getting diabetes (if parents are diabetic)	270 (78.7%)	25 (7.3%)	48 (14%)
Person to personTransmission	27 (7.9%)	275 (80.1 %)	41 (12%)
Preventable	248 (72.3%)	55 (16%)	40 (11.7%)
Complications	277 (80.8%)	9 (2.6%)	57 (16.6%)
Diet modification	319 (93%)	4 (1.2%)	20 (5.8%)
Abstinence from smoking	263 (76.7%)	36 (10.5%)	44 (12.8%)
Abstinence from Alcohol	262 (76.4%)	37 (10.8%)	44 (12.8%)
Need for exercise	302 (88%)	11 (3.3%)	30 (8.7%)
Need for foot care	283 (82.5%)	11 (3.2%)	49 (14.3%)

Table 3: Predictors of Knowledge on Diabetes Mellitus among study population

Age groups (years)	Frequency	Mean knowledge score	S.D	*P* Value
20-39	52	15.50	2.961	
40-59	129	16.05	3.273	
60-79	123	14.95	4.368	.000
> 80	39	11.54	6.090	
Sex				
Male	101	15.17	4.100	
Female	242	15.02	4.319	NS*
Education				.000
Primary & below	31	9.69	6.339	
Middle	43	11.79	4.894	
High school & Higher secondary	191	16.08	3.062	
Graduation & above	78	16.50	2.466	
Religion				
Christian	245	15.48	3.818	
Hindu	98	14.02	5.050	.011
Socio economic status				
I	01	17.50	-	
II	24	13.88	5.239	
III	56	14.94	4.154	
IV	78	15.33	4.040	NS
V	52	15.86	3.563	
VI	132	14.84	4.462	
Occupation				
Professional/ skilled	94	15.56	4.10	NS
Homemakers/ students	214	14.94	4.23	
Unskilled	10	13.25	5.12	
Retired /unemployed	25	14.94	4.55	
Diabetic Status				
Diabetic	79	15.77	3.252	.046
Non diabetic	264	14.85	4.490	
Family history of Diabetes				
yes	146	16.08	3.22	.000
No	197	14.31	4.74	

* NS = Not significant

Knowledge Score

The mean knowledge score of the respondents was 15.06 (maximum possible score: 23). Overall, significant difference in knowledge was seen among the respondents with diabetes and those without diabetes, and also in case of respondents with and without family history of diabetes ($p < 0.05$).

Influence of certain sociodemographic variables was also assessed. Significant difference in awareness was seen across different age groups ($p < 0.05$). Awareness also increased with education ($p < 0.05$). However, no significant difference in knowledge was observed when comparison was made for gender, occupation, and socioeconomic status ($p > 0.05$). Results are shown in Table 3.

Discussion

Knowledge is a logical prerequisite for the intentional performance of health-related behavior. As knowledge accumulates, changes in attitudes are initiated and over a period, it results in behavior change.[10] Knowledge of diabetes is of paramount importance in determining intended behavior such as lifestyle modifications and adherence to treatment. This study was undertaken to assess knowledge about various domains of diabetes in a rural population of Kerala. Overall awareness was average (15.06 mean knowledge score with 23 maximum possible score); however, certain deficit areas in knowledge were identified, which needs to be addressed through an organized

community-based awareness program focusing on behavior change. It is well established in medical literature that prevention of diabetes cannot be obtained unless a general population including high-risk groups know how to protect themselves.[11–13] Even though 97% of the respondents had heard of diabetes only 46.9% were able to give a reasonably correct definition. Disappointingly, more than one-fourth (26.6%) of the people with diabetes could not define it. However, our findings are encouraging as compared with a population-based study conducted in Chennai (Chennai Urban Rural Epidemiology Study), which is considered one of the best cities in India in terms of diabetes educational activities. Chennai Urban Rural Epidemiology Study reported that about one-third of the Chennai population was unaware of diabetes.[14]

It is well understood that risk factor knowledge is a prerequisite for the prevention of disease and the inability to recognize risk factors impedes preventive efforts such as adoption of healthy lifestyle.[15] As diabetes prevention is primarily dependent on altering lifestyle and increasing levels of physical activity, improving knowledge about the risk factors of diabetes must receive urgent attention.[14] Awareness about risk factors was abysmally poor in the study population, as more than one-fourth of the study population (27.1%) could not identify any of the risk factors for diabetes. Except for diet, which was stated by over half of the respondents (57.1%), other important risk factors such as physical inactivity, obesity, smoking, and alcohol was cited by less than 5% of the respondents. Only 17.2% of the respondents mentioned hereditary as a risk factor for diabetes. The awareness on risk factors was even very less as compared with other population-based studies such as Chennai Urban Rural Epidemiology Study conducted among the Chennai residents, which also demonstrated that less than 12% were aware that obesity and physical inactivity could lead to diabetes.[14] Similar observations were reported from Singapore study and a population-based study done in Oman.[16]

It is noteworthy that 24.5% of the respondents were either unaware or gave incorrect responses on being asked about the symptoms of diabetes. Our results are in accordance with the observations made from a population-based study in Oman.[16] It is obvious that inability to recognize symptoms in early stages can adversely affect the outcome of the disease.

Awareness of diabetes-related complications is central in empowering individuals to prevent and manage diabetes.[17] In this study, awareness on complications of diabetes was poor as nearly half (43.7%) of the respondents could not cite any of the complications. It was surprising to see that even among the people with diabetes, one-third (34.1%) were unaware of the complications. The results are consistent with the findings of studies done elsewhere.[11,14,18] It partly reflects that patients are not sensitized about the complications of diabetes, which can have dreadful consequences in terms of mortality and morbidity. Several reasons have been cited for this including lack of time, inappropriate way of providing information, lack of trained support staff such as diabetic educators.[14,19]

Nearly two-third of the subjects knew that diabetes could be prevented. These findings are comparable with the evidences from other studies.[14,18] Recently conducted large studies have documented the role of preventive measures in the control of diabetes;[20,21] hence, it is the need of the hour to disseminate this message targeting both general as well as high-risk population.

Knowledge on treatment is a primary determinant of adherence to therapy for chronic diseases such as diabetes. Disturbingly nearly half of the respondents with diabetes (44.3%) were unaware that they have to take medication lifelong and regularly. Similar observation was made by Gulabani et al.[18] among the patients with diabetes attending a tertiary care setting. This reflects the inadequate role played by health care professionals in imparting diabetes education to their patients. It is an established fact that lack of knowledge on treatment can adversely affect the quality of life of the patients as it can lead to early complications and subsequent disability,[22] which in turn will increase the burden of disease and imbalance the economy, creating a troublesome situation for countries such as India that is already leading the world in terms of diabetic figures.[1]

The study showed that respondents were better aware of lifestyle modifications that are needed in diabetes. More than two-third of the respondents with diabetes were aware that they should modify their diet, exercise regularly, stop smoking, and abstain from alcohol. However, it needs to be explored whether this knowledge translates in their attitude and practice. A comparative study conducted in south India showed that there exists a large gap between knowledge and action among the patients with diabetes in terms of drug therapy and lifestyle modifications.[23]

Being diabetic and having a family member with diabetes mellitus made them more likely to be aware than their counterparts ($p < 0.05$). Higher education also had a similar influence on knowledge ($p < 0.05$). A large cross-sectional study conducted among African–American adults suggested that family history of diabetes is associated with better awareness of diabetes.[24] The reason for this difference can be attributed to perceived susceptibility to illness such as having family history of diabetes, which stimulates individual to seek more information about the disease.[10]

The health machinery of our country is facing immense challenges as a result of diabetes. Different approaches are envisaged, which include low cost primary diabetes screening targeting high-risk population.[25] Pharmacists are now increasingly considered as an important workforce to deliver patient-oriented activity. They can easily deliver education to the patients with diabetes, which will reduce the workload of treating physicians.[26] Other option is to have diabetic educators who have evolved as a special workforce in developed countries to deal with alarming rise in diabetes. Such a cadre of diabetic educators can go a long way in supporting health care system in delivering effective care to the patients.[27]

Conclusion

As India is fighting against triple burden of diseases, Kerala has taken a leap ahead and is at par with most developed nations of the world in terms of health and socioeconomic development, which is mainly attributed to its high literacy rate, especially female literacy. However, knowledge about diabetes mellitus in the study population reflects the fact that being literate does not necessarily imply that they are equally health conscious. The study indicated that awareness regarding diabetes mellitus was average but in-depth knowledge was lacking. Thrust has to be given for educating community on the risk factors as this can prevent occurrence of diabetes and delay the onset among high-risk individuals Moreover, knowledge about complications and treatment was less among respondents with diabetes. Hence, for achieving successful outcome, it is essential to educate patients on the importance of treatment adherence and simultaneously recognize diabetes-related complications once the disease is diagnosed. Positively, awareness on lifestyle modifications needed in case of diabetes was superior; nonetheless, it needs to be explored whether this is translated into actual practice.

Recommendations

Public awareness and patient empowerment can play a leading role in curbing diabetes and its sequelae, which should be given priority. This can be achieved by utilizing existing human resources such as health workers, physician assistants, and social workers. They can be trained to identify high-risk groups in the community and also to impart diabetes education using culturally appropriate behavior change in communication strategies. It should not undermine the major role to be played by the doctors, who can easily inspire their patients, as motivation is a prerequisite for behavior change. Thus, everyone in the health team can play a crucial role. These measures will definitely pave way to reduce health care expenditure and indirect costs because of lost productivity.

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