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Original Research Article

Risk assessment of type 2 diabetes mellitus among fisherman community in Beypore area of Kozhikode

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ABSTRACT

Background: In the past decade it has become obvious that the prevalence of type 2 diabetes is increasing very rapidly. Unless necessary and appropriate action is taken, it is predicted that there will be at least 350 million people in the world with type 2 diabetes by the year 2030. The aim of the study was to assess the risk for type 2 diabetes mellitus (T2DM) among fisherman community in Beypore area of Kozhikode. The objectives of the study were to identify the total number of participants with abnormal random blood sugar among Beypore fisherman community of Calicut; to identify risk factors associated with type 2 diabetes mellitus patients among Beypore fisherman community of Calicut.
Methods: A cross sectional study was conducted among fisherman colony of Beypore area, Calicut. All the eligible participants according to inclusion and exclusion criteria were included in the study. An pretested and piloted Finnish Diabetes questionnaire modified according to local settings was used to map the screened participants. As the first step, history and basic anthropometry measurements was taken. Then each participant underwent physical examination. Further random blood glucose was calculated using strip glucometric method. Once confirmed, the treatment for type 2 diabetes was started.
Results: Overall prevalence was found to be 29.23%. Prevalence of T2DM was significantly associated with age i.e. as age increases there is the risk of developing T2DM and p value was found to be significant.
Conclusions: Age, educational status, central obesity and addiction are major risk factors for type 2 diabetes mellitus.

Keywords: Type 2 diabetes mellitus, Hypertension, Fisherman

INTRODUCTION

In the past decade it has become obvious that the prevalence of type 2 diabetes is increasing very rapidly. Unless necessary and appropriate action is taken, it is predicted that there will be at least 350 million people in the world with type 2 diabetes by the year 2030.[1] This is double the current number. Also equally alarming and less well known fact is that, of these people, only around one half are known or diagnosed to have type 2 diabetes. This has been repeatedly shown in various descriptive epidemiological studies and surveys. Also the added concern is that half of those who do present with type 2 diabetes clinically already have signs of the complications of the disorder.

Diabetes and its consequences

Diabetes mellitus is a metabolic disorder characterised by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both.2The

current diagnostic criteria are shown in Table 1 In summary, diabetes is diagnosed if the (venous) fasting plasma glucose (FPG) value is ≥7.0 mmol/l (126 mg/dl), or if the casual plasma glucose value is ≥ 11.1 mmol/l (200 mg/dl), or if the plasma glucose value 2 hours after a 75 g oral load of glucose ≥11.1 mmol/l (200 mg/dl). In asymptomatic subjects, performing the test on one occasion is not enough to establish the diagnosis (i.e. basis to treat diabetes). This must be confirmed by carrying out at least one further test on a subsequent day.

T2DM is a diverse group of diseases developing insidiously and portrayed by chronic hyperglycaemia, resulting from a assortment of environmental and genetic risk factors.[3] Other correlates are population explosion, increasing geriatric population, cost of industrial growth, urban trend, liking of high fat containing junk foods, inactive living, and obesity.[4] The diabetes epidemic is accelerating in the developing world, with an increasing proportion of affected people in younger age groups. Recent reports describe type 2 diabetes being diagnosed in children and adolescents.[5-7] This is likely to increase further the burden of chronic diabetic complications worldwide. Consequences of diabetes result from its macrovascular and microvascular complications. (Some describe a third category – 'neuropathic', whereas others classify the diabetic neuropathies as microvascular complications.) The age-adjusted mortality, mostly due to coronary heart disease (CHD) in many but not all populations, is 2-4 times higher than in the non-diabetic population and people with diabetes have a 2-fold increased risk of stroke.[8,9]

Diabetes is the leading cause of end stage renal failure in many populations in both developed and developing countries.[10] Lower extremity amputations are at least 10 times more common in people with diabetes than in non-diabetic individuals in developed countries, and more than half of all non- traumatic lower limb amputations are due to diabetes.[11-13] In developed countries, diabetes is one of the leading causes of visual impairment and blindness People diagnosed with diabetes mellitus require at least 2-3 times the health care resources of people as compared to those who do not have diabetes and thus diabetes care itself accounts for up to 15% of national healthcare budgets.[14,15]

For intervention of this colossal public health and economic burden created by the pandemic of T2DM, earliest clinical concern in the prediabetes phase to prevent complications seems to be the most rational step. Sensible lifestyle changes have been shown to notably trim down the risk of progression in individuals with impaired fasting glucose (IFG). Impaired glucose tolerance (IGT) results in continued preventive benefit even after stoppage of structured counselling. The age adjusted death rates in T2DM are 1.5%-2.5% times higher than general population.[16] Recent European study noted that population groups with more deprived socioeconomic position (SEP) have increased incidence, prevalence and mortality due to T2DM. Recent systematic review and meta-analysis showed that augmented risk of T2DM was linked with lower educational level, occupation and income even in people with low SEP in high, middle, and low- income countries.[17,18]

Why screening of type 2 diabetes mellitus

A. That there is a long, latent, asymptomatic period in which the condition can be detected.
B. A substantial proportion of people with type 2 diabetes are undiagnosed.
C. A substantial proportion of newly referred cases of type 2 diabetes already have evidence of the micro-vascular complications of diabetes.[18]
D. The rising prevalence of type 2 diabetes in Kerala.[19]
E. The seriousness of the immediate effects and long-term complications of type 2 diabetes.
F. Evidence supporting the efficacy of intensive blood glucose control blood pressure control and blood lipid control in type 2 diabetes.[20-24]
G. Accumulating evidence that treatment of hypertension, dyslipidaemia (for example lowering LDL cholesterol can prevent cardiovascular disease in people with type 2 diabetes.[23,24]
H. A positive effect on individuals, health system and societies.

The various communities cross the world exhibit different variations of risk factors with respect to development of type 2 diabetes. Fisherman community is particularly at high risk due to poor health outcomes when compared to general population. Fisherman display high risk taking behaviour, with higher rates of smoking, poorer diets and poorer health knowledge In addition, poor socio economic status with low literacy rates with ignorance towards health among the same community increases the burden of the disease. The current study is one of its kinds as in is being done for first time among fisherman colony of Beypore area of Calicut. The study attempts to identify the prevalence of type 2 Diabetes Mellitus and the various risk factors among the fisherman community.

Aims and Objectives

To assess the risk for type 2 diabetes mellitus among fisherman community in Beypore area of Kozhikode. The objectives are to identify the total number of participants with abnormal random blood sugar among Beypore fisherman community of Calicut and to identify risk factors associated with type 2 diabetes mellitus patients among Beypore fisherman community of Calicut.

METHODS

Design and settings

A cross sectional study design and fisherman colony of Beypore area, Calicut.

Study place and period

Beypore area, Calicut and January 2016 to May 2016

Participants and sampling:

All people staying Beypore area belonging to fisherman community aged 28 yrs and above.

Inclusion criteria

Inclusion criteria were all the persons with primary occupation as fisherman presently or in past living in Beypore area of Calicut; age more than 28 yrs.

Exclusion criteria

Exclusion criteria was all previously diagnosed type 2 diabetes mellitus patients on or without treatment.

Measures and measurements

All the eligible participants according to inclusion and exclusion criteria were included in the study. An pretested and piloted finnish diabetes questionnaire modified according to local settings was used to map the screened participants. As the first step, history and basic anthropometry measurements were taken. Then each participant underwent physical examination. Further random blood glucose was calculated using strip glucometric method. The screened positive participants for type 2 Diabetes was further referred for fasting and post prandial blood sugar levels at Urban Health Training Centre, Department of Community Medicine, KMCT Medical College at Calicut for confirmation. Once confirmed, the treatment for type 2 diabetes was started. All the laboratory investigations and treatment charges was provided free of cost. The previously diagnosed patients were separately assessed for treatment and complications. Data analysis included proportions, and Chi-square test were applied appropriately to determine statistical significance

RESULTS

The below Table 1 describes the socio demographic profile of the study participants. A total of 236 people participated in the study. According to the age, 57.62% of the study participants were belonging to age group between 28 to 49 years and 42.38% were 50 years and above. 55.08% were males and 44.92% were females. With respect to type of family 38.98% were had joint families and 61.02 had nuclear family. Nearly 89% were literates and 11% were illiterates. 52.11% of study participants were sedentary and 47.89% were non sedentary. 92% of the participants were non vegetarians and 8% were vegetarians. 28% of study participants were addicted to alcohol and 35% were addicted to tobacco. There was family history of diabetes among 41.11%. General obesity was present among 24.58% of the participants and 59% had abdominal obesity. Hypertension was present among 33.06% of participants.

Table 1 : Socio demographic profile of study participants during screening for type 2 diabetes mellitus.

S. no	Variables	Number N (%)	Total (%)
1	Age distribution		
	28-49	136 (57.62)	236
	50 and above	100 (42.38)	
2	Sex distribution		
	Male	130 (55.08)	236
	Female	106 (44.92)	
3	Type of family		
	Joint	92 (38.98)	236
	Nuclear	144 (61.02)	
4	Educational status		
	Literate	211 (89.40)	236
	Illiterate	26 (10.60)	
5	Nature of occupation		
	Sedentary	123 (52.11)	236
	Non Sedentary	113 (47.89)	
6	Dietary habits		
	Vegetarain	19 (8.05)	236
	Non Vegetarian	107 (91.95)	
7	Addiction to alcohol		
	Absent	169 (71.61)	236
	Present	37 (28.39)	
8	Addiction to tobacco		
	Absent	153 (64.83)	236
	Present	83 (35.17)	
9	Family history of Diabetes Mellitus		236
	Absent	139 (58.89)	
	Present	97 (41.11)	
10	General obesity		
	Absent (BMI < 30)	178 (75.42)	236
	Present (BMI > 30)	58 (24.58)	
11	Abdominal obesity (Waist Hip Ratio)	97 (41.10)	236
	Absent		
	Present	139 (58.9)	
12	Hypertension		
	Absent	158 (66.94)	236
	Present	78(33.06)	

In Table 2, overall prevalence was found to be 29.23%. Prevalence of T2DM was significantly associated with age i.e. as age increases there is the risk of developing T2DM and p value is found to be significant. Type of family i.e. either joint or nuclear was not found to be significantly associated with T2DM. Educational status, nature of occupation, dietary habits, addiction to alcohol and tobacco, family history of T2DM were found to be significantly associated with T2DM while general obesity

was not found to be significantly associated with T2DM. Waist hip ratio and hypertension were also found be significantly associated with T2DM with p value less than 0.05.

Table 2: Prevalence of T2DM and association between T2DM and each risk factor (OR and 95% confidence intervals) among study participants during screening of type 2 diabetes mellitus.

S. no	Variables	Type 2 DM N=69 (100%)	OR (95% CI)	P value
1	**Age distribution (in years)**			
	28-49	18 (26.08)	0.2397 (0.1513- 0.3798)	<0.0001
	50 and above	51 (73.92)		
2	**Type of family**			
	Nuclear	41 (59.42)	0.6054 (0.4993- 1.198)	>0.05
	Joint	28 (40.58)	1	
3	**Educational status**			
	Literate	58 (84.05)	1	<0.05
	Illiterate	11 (15.95)	2.660 (1.28- 5.04)	
4	**Nature of occupation**			
	Sedentary	43 (62.31)	2.227 (1.223- 4.357)	<0.05
	Non sedentary	26 (37.69)	1	
5	**Dietary habits**			
	Vegetarain	4 (5.79)	1	<0.05
	Non vegetarian	65 (94.21)	2.147 (1.191- 3.992)	
6	**Addiction to alcohol**			
	Absent	49 (71.01)	1	<0.05
	Present	20 (28.99)	2.541 (1.371- 3.511)	
7	**Addiction to tobacco**			
	Absent	42 (60.86)	1	<0.05
	Present	27 (39.14)	2.191 (1.113 - 3.592)	
8	**Family history of diabetes mellitus**			
	Absent	43 (62.31)	1	<0.05
	Present	26 (37.69)	2.2214 (1.521- 3.752)	
9	**General obesity**			
	Absent (BMI<30)	47 (68.11)	1	>0.05
	Present (BMI>30)	22 (31.89)	5.68 (1.71 - 39.37)	
10	**Abdominal obesity (waist hip ratio)**			
	Absent	18 (26.09)	1	
	Present	51 (73.91)	2.381 (1.631- 3.519)	>0.05
11	**Hypertension**			
	Absent	39 (56.52)	1	<0.05
	Present	30 (43.48)	2.916 (1.681- 3.171)	

DISCUSSION

The current study shows the correlates of diabetes mellitus in 236 adult above 28 years of age belonging to fisherman colony of Beypore area, Calicut during 2016.The proportion of diabetes mellitus was found to be higher (73.92%) among study participants aged ≥50 years than in between 28 and 49 years. This difference was found statistically significant. Diabetes mellitus was seen to be more prevalent among those from nuclear families (59.42%), illiterate (15.95%), having sedentary occupation (62.31%), were non-vegetarian (94.21%), alcoholic (29%), and smokers (39.14%), having family history of diabetes mellitus (37.69%), obesity (31.89%), with higher waist–hip ratio (73.91%).

Age was found to be an important factor associated with Diabetes Mellitus. The prevalence of type 2 DM was significantly associated with age i.e. with increase in age there is the higher risk of developing Type 2 DM. The p value is found to be significant. The type of family of study participants i.e. either joint or nuclear was not found to be significantly associated with T2DM. Occupation, Educational status, dietary habits, addiction to alcohol and tobacco, family history of T2DM were found to be significantly associated with T2DM while general obesity was not found to be significantly associated with T2DM. Waist hip ratio and Hypertension were also found be significantly associated with T2DM with p value less than 0.05. Totally 69 (29.23%) study subjects had abnormal venous blood glucose level ≥126

mg/dl. Similar comparable data were seen in in studies done at Madurai and Lucknow i.e. 1.4% and 9.1% respectively and in the population above 30 years of age. The current study shows diabetes mellitus rate increases as age increases. Similar trend reported by Ramaiya et al and Ramachandran et al.[25,26] Sedentary lifestyle had positive association in our study. This was in conjunction with studies done by Ramaiya et al in Mauritius and Swai et al among Indian Muslim of Tanzania which reported a positive association.[25,26]

Non-vegetarian diet showed positive association in this study while many studies reported positive association among vegetarians. The participants in our study showed strong association between T2DM with education, addiction to tobacco and alcohol and abdominal obesity (waist–hip ratio). But no association was seen in generalised obesity. In an study done by Bjorntorp et al found association of T2DM with intra-abdominal fat.[27] A Polish study was done to evaluated prevalence of diabetes, obesity and lipid disorders urban population aged 35 and over.[28] The prevalence was 15.7 percent. Over weight was noted in 39.9 percent and 31.0 percent were diagnosed with obesity.

A study in China reported prevalence of T2DM and IFG of 5.5% and 3.3%, respectively and 42.3 percent were newly diagnosed.[29] The prevalence of T2DM and impaired fasting glucose increased with age, a positive family history, and associated with obesity, hypertension, and hyperlipidaemia.

CONCLUSION

To conclude age, educational status, central obesity and addiction are major risk factors for type 2 diabetes mellitus.

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