A Study on Risk Factors of Diabetes Mellitus among Workers of a Medical College of Kolkata, India

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Abstract
Background: Diabetes mellitus is a chronic non communicable disease with considerable mortality. Persons exposed to different risk factors for years together ultimately develop the disease. By modification of these risk factors diabetes can be prevented or controlled. Methods: This descriptive cross sectional study was carried out in 2018 among the non physician workers of a medical college of Kolkata. Known Diabetic persons were excluded from the study. A predesigned pre tested proforma was used for data collection. After getting the consent the data were collected by interviewing the person. Blood pressure and different anthropometric measurements were done following the standard procedure. Results: Different diabetic risk factors were noted in high percentage of study subjects. Among study subjects 45.1% were overweight or obese. High waist circumference and high waist hip ratio was noted among 66.5% and 84.5% study participants. One third (34.8%) had family history of Diabetes and14.2 % were hypertensive. Majority (67.9%) had sedentary life style and 11.6% were using alcohol and 24.5% were smokers. Conclusion: Frequency of different risk factors of diabetes mellitus among hospital care workers was very high.
Key Words: Diabetes Mellitus, risk factors, obesity, diet, hospital worker
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I. Introduction

Diabetes is a chronic non communicable disease due to absolute or relative deficiency of Insulin. It is an ice berg disease. Large number of person are not aware of their disease condition.[1]Diabetes over time lead to damage of many organ of the body. Globally the number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014.[2] The global prevalence of diabetes among adults over 18 years of age has risen from 4.7% in 1980 to 8.5% in 2014.[3] Diabetes prevalence has been rising more rapidly in middle- and low-income countries. Diabetes is a major cause of blindness, kidney failure, heart attacks, stroke and lower limb amputation.[2] WHO estimates that diabetes was the seventh leading cause of death in 2016.In India, an estimated 7.8% of the population above 18 years of age has raised blood glucose level or is on treatment for diabetes.[4]

A recently reported Indian Council of Medical Research - INdia DIABetes (ICMR-INDIAB) study conducted in four different zones of rural and urban India showed that the prevalence of diabetes and prediabetes are higher compared to previous studies. The inter-state variations in prevalence, ranging from 4.3% in Bihar, 10.4% in Tamil Nadu and 13.6% in Chandigarh.[5] In 2012, the survey carried out by the National Nutrition Monitoring Bureau among the rural population showed 8.2% and 6.8% among adult men and women were positive for diabetes, respectively. The prevalence was reported to be high in the states of Kerala, Tamil Nadu and Gujarat (8.2 – 16.4%) among both genders. Analysis of secular trends revealed an increase in diabetes prevalence in the rural population at a rate of 2.02 per 1000 population per year.[6]

Probability of development of diabetes is more in person who are exposed to some modifiable and non modifiable risk factors. Important modifiable risk factors are unhealthy diet, obesity, smoking, sedentary lifestyle. Non modifiable risk factors are age and family history. If persons are aware about the different risk factors of diabetes they can modify it and reduce the probability of development of the disease.

Healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use are ways to prevent or delay the onset of type 2 diabetes. The cause of type 1 diabetes is not known and it is not preventable with current knowledge.[2]

With this background the present study was conducted to ascertain the prevalence of different diabetic risk factors among workers in a medical college in Kolkata, India.

II.   Materials And Methods

This descriptive cross sectional study was carried out in 2018 among the non physician workers of a medical college of Kolkata. Known Diabetic persons were excluded from the study. Total 155 workers participate in this study.A predesigned pre tested proforma was used for data collection. The selected study subjects was explained the purpose of the study and consent was sought. After getting the consent the data were collected by interviewing the person. Different anthropometric measurements were done following the standard procedure.

Anthropometry: Digital weighing scale was used to measure weight. The weighing scale was adjusted to 0.0 and the study subject was asked to remove his/her footwear and stand in the middle of the scale with feet slightly apart, hands at sides, and head looking straight. Participants were weighed with minimal clothing and weight was noted down. Standing height was measured using a stadiometer with a fixed vertical backboard and an adjustable head piece. The study subject was told to stand up straight with the body weight evenly distributed and both feet flat on the platform and look straight. The height was recorded. The weight and height were then used to calculate body mass index (BMI). Waist circumference (WC) was measured at the approximate midpoint between the lower margin of the last palpable rib and the top of the iliac crest, using a flexible plastic tape. Hip circumference measurement was taken around the widest portion of the buttocks. WC values > 90 and >80cm for men and women considered high. Waist hip ratio 0.90 and 0.85 were considered high for male and female.

 Vigorous intensity activities were defined as activities that cause large amount of effort, rapid breathing and a substantial increase in heart rate for at least 10 min continuously. Moderate intensity activities were defined as activities that required moderate amount of effort and noticeably accelerated heart rate for at least 10 min continuously. Blood pressure (BP) was taken in a sitting position from the right arm using a digital sphygmomanometer. Two readings were taken 5 minutes apart, and the mean was considered as the final BP result.

The data were entered in MS excel spreadsheet and it was analysed with the help of SPSS17. Frequency and percentages were calculated.

III. Results

Total 155 non physician workers were included in the study. Four fifth (79.3%) of the study participants were male and rest female. Among the study participant 30.3% were less than 35 years of age, 41.9% were between 35- 50years and rest 27.8% were 50 years or more. Overwhelming Majority (97.42%) were Hindus. More than one tenth (13.5%) were unmarried and rest were married. Fifty eight percent were graduate or more in educational status. Among the staff, 43.8% were group D staff and rest were nurses, clerk or other office staff. More than half (56.8%) had educational level were graduate and above. About one third (30.3%) had monthly income more than INR 50000.

Table1.Soco demographic characteristic of the study subjects (n=155)

Variable	Number	Percentage
Sex		
Male	123	79.3
Female	32	20.7
Age group (yrs)		
<35	47	30.3
35-50	65	41.9
≥50	43	27.8
Education		
Primary	19	12.3
Secondary	48	30.9
Graduate and above	88	56.8
Marital status		
Married	134	86.5
Unmarried	21	13.5
Monthly income(INR)		
<10000	18	11.6
10000-30000	72	46.5
30001-50000	18	11.6
>50000	47	30.3

Risk factors of type 2 diabetes mellitus can be divided into two groups. Some risk factors like age, family history of diabetes are non modifiable. Other risk factors can be modified by individual and community effort.

Obesity is an important modifiable risk factor. Obesity was assessed by Body mass index, waist circumference and waist hip ratio. According to BMI, more than half (51.6%) had normal BMI. It is interesting to note that only 3.2% are low BMI, but31.6% was overweight and 13.5% were obese. Other measure like waist circumference and waist hip ratio had different cut off for male and female. One third (33.5%) had normal waist circumference and two third (66.5%) had high value. Among the study subjects 86.18% of male had high (>0.90) waist hip ratio and 78.12% female had high waist hip ratio (>0.85).Overall 84.5% participants had high waist hip ratio.

Table 2.Distribution of risk factors in the study subjects (n=155)

Variable	Number	Percentages
Body mass index		
Underweight (< 18.5 kg/m2)	5	3.2
Normal (18.5–24.9 kg/m2)	80	51.6
Overweight (25–29.9 kg/m2)	49	31.6
Obese (≥30 kg/m2)	21	13.5
Waist circumference		
Normal	52	33.5
High	103	66.5
Waist hip ratio		
Normal	24	15.5
High	131	84.5
Hypertension		
Normal	52	33.5
Prehypertensive	81	52.3
Hypertensive	22	14.2
Family History of Diabetes Mellitus		
Yes	54	34.8
No	101	65.2
Physical Activity		
Sedentary	104	67.9
Moderate	50	32.3
vigorous	1	0.6
Alcohol consumption		
Yes	18	11.6
No	137	88.4
Smoking Habit		
Yes	38	24.5
No	117	75.5

Diet: Only few were vegetarian, 96.78% were non vegetarian. Silver line in their dietary habit is that 39.4 % were not used to fast food. But, 14.6% took it frequently and 49.0% took it occasionally. Fresh fruits and vegetable were regularly consumed by 69% of the respondents.

Addiction: Among the study subjects 24.5% used tobacco, 11.6% used alcohol, 7.7% have other type of addiction. About three fourth (61.3%) were not addicted to any substances.

One third (33.5%) study subjects had normal blood pressure, 52.3% were pre hypertensive and 14.2% were hypertensive (9.7% stage1and 4.5% stage 2). Among the study subjects 17(10.97%) had history of high blood cholesterol.

More than one third (34.8%) study subjects had history of diabetes. In 32.3% participants had history of diabetes in either parent and in 2.5% diabetes was present in both the parents. But, 65.2% of the study subjects did not have history of diabetes in their parent. Among the study subjects 10.9% had history of high blood cholesterol.

IV. Discussion

Incidence and prevalence of diabetes mellitus is increasing throughout the globe. This increase is attributable to increase in life expectancy and change in life style. Type 2 diabetes mellitus have some modifiable and non modifiable risk factors. If the population of the country can be made aware about the different modifiable risk factors, then incidence of diabetes can be reduced. Present study has studied the different risk factors of diabetes among health care workers in medical college of Kolkata.

Family history of diabetes is important risk factors of diabetes. In the present study 34.8% study subjects have family history of diabetes. A study conducted among young medical student in North India only 18% had family history of diabetes.[7]Another study conducted in rural area of Khammam, Telengana 10.8% of diabetic person have family history of diabetes and corresponding figure for non diabetic person is only 4%.[8] Another community based study conducted in Punjab also reported that 11.9%had history of diabetes.[9] Another study from outside India, in Ethiopia among persons aged more than 15 years and above reported history of

diabetes only in 5% of persons.[10] The higher level of diabetes history among the present study subject might be due to higher age group of the study participants**.**

Age is another non modifiable factor and we have nothing to do with that. As age increases incidence of diabetes also increases like other chronic non communicable diseases. So, with increase of age regular screening for diabetes should be initiated for early diagnosis and management of the condition.

Diet and obesity:

In the present study 31.6% were overweight and 13.6% were obese. In regard to waist hip ratio 86.18% of male and 78.12% female had high waist hip ratio. These rates were higher than other study. According to NFHS 4, women who are overweight or obese (BMI ≥ 25.0 kg/m2) in urban area was 30.6% and corresponding figure for male was 20.6%.[11]In a study in Bengaluru among urban poor, 36.5% of them were obese, 23.0% of them were overweight, 33.0% of them had normal weight, and 7.5% of them were underweight.[12] In one study in rural area of Nigeria proportion of overweight among diabetic was 59.5% but, corresponding figure for non diabetic was 26.1%[13]. Sanjeevaiah et al also reported 24.4% overweight and obesity in their study in South India.[14]

Smoking and alcohol has many health hazards, but they are not found to be associated with diabetes in large study in Punjab.[9] But, a study in rural Telengana smoking and alcohol-both was statistically associated with Diabetes.[8] In the present study 11.6 % used alcohol and 24.5% were smoker. In another study in South India by Sanjeevaiah et al also smoking was found associated with diabetes.[14]

Regular physical activity is an important way to prevent or delay type 2 diabetes mellitus. In the present study majority (67.9%) were sedentary and 32.3% were involved in moderate activity and very few are involved in vigorous activity. Throughout the globe this life style change is evident. In a community based study in Nigeria physical activity is less in diabetic than non diabetic. [13]. In a rural area of Telengana also more than half were not involved in physical activity.[8] In a review article from Saudi Arabia also reported decrease in the physical activities and adoption of unhealthy dietary patterns. [15]In a study among medical students also only 55 % were involved in moderate or vigorous physical activity**.[7]**

In a large population based study in Punjab hypertension was found to be risk factors for diabetes.[9]In the present study 14.2% were hypertensive. But, 52.3% were pre hypertensive and they were unaware of it. So, there is need for regular monitoring of blood pressure so that it can be kept under control with proper management.

V. Conclusion
Among the workers of the medical college there was high frequency of the different modifiable risk factors of diabetes. They did not know their diabetes status. Uncontrolled blood glucose can damage different organ and can cause early death. So, there is need for periodic screening for diabetes among adult and early management, if found positive**.**

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