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Cross sectional study of Casual Blood Glucose in apparently healthy people at tertiary care hospital

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ABSTRACT

Background: Burden of type 2 diabetes is increasing day by day . It remains asymptomatic in most of the cases and patients. Most of the time in advanced disease it shows symptoms. Various studies have shown that early identification of diabetes and lowering of blood glucose delayed the onset and progression of diabetes complications. The present study was conducted with the objectives to screen healthy persons for diabetes, to assess the various risk factors for diabetes and to study perception of healthy individuals about diabetes. **Methodology:** It is a cross sectional observational study conducted at outpatient Department (OPD) of Government Medical College and Hospital, Akola. Healthy relatives of patients were screened. Patients' relatives history, blood collection and Casual Blood glucose measurement was done. **Results:** Out of 266 participants, 25.9% (69) participants were having RBS above 140mg/dl and 13.2% (35) participants were having RBS level >200mg/dl. 31% (83) of participants gave history of DM in family. 12.8% (34) of have addiction of smoking, about 10.2% were addicted to alcohol. Only 43% participants were having some information about diabetes. 82% were aware about hereditary inheritance of DM, 45% about frequent urination, 75% study subjects were agreed on dietary modification needed. 51% participants were having perception that exercise is beneficial. **Conclusion:** Study reveals high proportions of diabetics in study populations (>30 years) and Perceptions about symptoms, risk factors, screening test, diagnosis and complications were poor among study population.

Key words: Random Blood Sugar (RBS), Diabetes Mellitus Screening, Casual blood glucose (CBG)

Introduction

Type 2 diabetes is the most prevalent form of the disease, and because it is often asymptomatic in its early stages, it frequently goes undiagnosed for many years. Hyperglycemia develops gradually, and a degree of hyperglycemia sufficient to cause pathological and functional changes in various target tissues, which may not be severe enough for the patient to notice any of the classic symptoms of diabetes. [1] Type 2 diabetes is usually only recognized 5–12 years after hyperglycemia develops. [2] Many of these asymptomatic patients will have or will be at risk for preventable diabetes complications. [3]

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Epidemiological evidence shows that retinopathy begins to develop at least 7 years before the clinical diagnosis of type 2 diabetes.[4] Individuals with type 2 diabetes are at a significantly higher risk for coronary heart disease, stroke, and peripheral vascular disease than nondiabetic individuals.[5] They also have a greater likelihood of having dyslipidemia, hypertension, and obesity.[6] Tests for hyperglycemia can identify these asymptomatic patients.[7] Studies have clearly demonstrated that lowering blood glucose delayed the onset and slowed the progression of micro vascular complications in patients with diabetes.[8,9] These complications can be prevented with earlier diagnosis and more aggressive treatment of hyperglycemia.[7] The present study was conducted to screen healthy persons for diabetes, to assess the various risk factors for diabetes and to study perception of healthy individuals about diabetes. According to ADA casual (random) blood glucose

level can be a criterion for diabetes screening however Casual Blood sugar is not gold standard for the screening of diabetes, but it can be used where resources are limited.

Methodology

The Present cross sectional observational study was conducted at outpatient Department (OPD) of Government Medical College and Hospital, Akola, Maharashtra under the aegis of Department of Community Medicine, Government Medical College, and Akola. For study purpose apparently healthy relatives of patients were chosen. For data collection of patients' relatives health history, blood collection and Casual Blood glucose measurement, a unit consisting of one Doctor, 4 Interns, 2 lab technicians and 1 assistant staff were established. Data was collected during health camp conducted on World health day 7th April 2016. Collection of sample and history taking was started from 8:00 am to 3:00 pm. Inclusion criteria was study subjects having age more than >30 years were considered for screening. Patients those were the known case of diabetes were excluded from study. Total 273 participants were enrolled for study. Out of them 7 subjects left the interview in between, so finally **266** study subjects were screened. Detail history of diabetes and related factors, with knowledge of diabetes was asked. For history and data collection pretested, semi-structured paper based questionnaire was used. Capillary blood samples were used to measure RBS and an ISI marked standard glucometer and glucose strips were used. Patients were classified according criteria given by **American Diabetes association [10]** for Casual Blood Sugar.

Result	Casual blood Sugar
Normal	less than 140 mg/dl
Prediabetes	140 mg/dl to 199 mg/dl
Diabetes	200 mg/dl or higher (with symptoms)

After screening of CBS, study subjects having CBS >140 gm/dl were referred to Medicine OPD for further management and guidance. Study protocol was reviewed by ethical committee and granted permission for the study. Data was entered in duplicate into an Epidata Software Package (Epidata entry Version 3.1; Epidata Association, Ondense, Denmark. http://www.epidata.dk), the database were compared and discrepancies resolved by checking the original data. Data was analysed using SPSS 20.0 for windows (SPSS inc., Chicago, IL, USA).

Results

Table 1: Socio demograhic profile of Study Subjects

	Gender		
Age (in yrs)	Male (%) n=170	Female (%) n=96	Total (%) n=266
30 - 39	48 (28.2)	24 (25)	72 (27.1)
40- 49	34 (20)	24 (25)	58 (21.8)
50 - 59	44 (25.8)	32 (33.3)	76 (28.6)
60- 69	36 (21.2)	12 (12.5)	48 (18)
≥70	08 (4.8)	04 (4.2)	12 (4.5)
	Mean ± SD= 49 ± 12.3	Mean ± SD =47.8 ± 10.9	Mean± SD =48.56± 11.8
	Area of residence		
Rural	034 (20)	14 (14.6)	048 (18)
Urban	136 (80)	82 (85.4)	218 (82)
	Occupation		
Professional	16 (9.4)	12 (12.5)	28 (10.6)
Semi professional	10 (5.9)	10 (10.4)	20 (7.5)
Clerical/shop owner/farmer	62 (36.4)	08 (8.3)	70 (26.3)
Skilled	12 (7.1)	02 (2.1)	14 (5.2)
Semi skilled	24 (14.1)	10 (10.4)	34 (12.8)
Unskilled	30 (17.7)	08 (8.3)	38 (14.3)
Unemployed	16 (9.4)	46 (47.9)	62 (23.3)

Above table shows that out of 266 participants, most common age group was 50 – 59 i.e. 29% followed by 30-39 (27%). Mean ± SD of age for male & female population was 49 ± 12.3 & 47.8 ± 10.9 respectively. Almost two third (63.9%) of participants were male. Out of 266, 82% (218) participants were from urban area. Occupation of maximum number of participants 26.13% (70) were clerks, shop/owner/farmer. Of the total study subjects illiterate were about 67%.

Table 2: Distribution of risk factors [11] of Non communicable diseases according to Gender

H/O DM in Family	Male (%)	Female (%)	Total (%)
Present	057 (33.5)	26 (27.1)	083 (31.2)
Absent	113 (66.5)	70 (72.9)	183 (68.8)
	χ^2 = 1.188 df.=1 p value =0.2770 , p< not significant		
H/O of Smoking			
Present	028 (16.50)	06 (6.25)	034 (12.8)
Absent	142 (83.50)	90 (93.75)	232 (87.2)
	170 (100)	96 (100)	266 (100)
	χ^2 = 5.749 d.f.=1 p value =0.01650, p<0.05 so significant		
H/o of Alcoholism			
Present	022 (12.9)	05 (5.2)	27 (10.2)
Absent	148 (87.1)	91 (94.8)	239 (89.8)
	χ^2 =4.023 d.f.=1 p value =0.04489, p<0.05 so significant		
H/o of junk food consumption			
Present	14 (8.2)	06 (6.3)	20 (7.5)
Absent	156 (91.8)	90 (93.7)	246 (92.5)
	χ^2 = 0.3478 d.f.=1 p value =0.5554, p>0.05 not significant		
Type of diet			
Vegetarian	59 (34.7)	34 (35.4)	093 (35)
Mixed(vegetarian+non vegetarian)	111 (65.3)	62 (64.6)	173 (65)
	χ^2 =0.01363 d.f.=1 p value =0.9071, p>0.05 not significant		
H/o Physical activity			
Minimal	14 (08.20)	05 (05.20)	19 (7.14)
Routine	123 (72.30)	79 (82.20)	202 (75.9)
Routine + Exercise	34 (20)	12 (12.50)	46 (17.3)
	χ^2 = 3.584 d.f.=2 p value = 0.1666, p>0.05 not significant		
	170	96	266

Table 2 shows that 31% (83) of participants gave history of DM in family. 12.8% (34) of have addiction of smoking, about 10.2% were addicted to alcohol., 7.5% participants gave history of regular junk food consumption and only 35% of participants were vegetarians. Among history of Diabetes in family, smoking, alcoholism, junk food consumption and type of diet only H/o Smoking and H/o Alcoholism only these two factors were having statistical difference according to gender.

Table 3: Distribution of participants according to level of RBS

Level of RBS (mg/dl)	Frequency
≥140	162 (60.9)
140- 200	69(25.9)
>200	35 (13.2)
Total	**266 (100)**
Mean	163 mg/dl
Median	138 mg/dl
Range	079 - 458 mg/dl

Table 3 shows that 60.9% (162) participants were having RBS <140mg/dl, 25.9% (69) participants were having RBS above 140mg/dl and 13.2% (35) participants were having RBS level >200mg/dl. As per criteria of **American Diabetic Association** if blood glucose level is above 140 mg/dl, screening test should be considered as positive and they should consult physician and if blood glucose level is above 200mg/dl then that patient should be labeled diabetic, so there were total 39.1% of participants whose casual blood glucose level was above 140mg/dl.

Table 4: Perception of participants about DM

Various perception about diabetes	Correct perception (%)
Few knowledge about diabetes	43
Causes of diabetes	13
Is Diabetes curable?	25
Symptoms of Diabetes	
Few can asymptomatic	02
Increase thirst	34
Frequent urination	45
Weight loss	03
Weight gain	23
Increase appetite	21
Repeated infection	09
Non-healing ulcers (Diabetic foot)	15
Diabetes can transmitted hereditary	82
diabetes is caused by infection	03
Loss of vision/eye problems	39
Kidney problems	08
Life style modification in diabetes	Percentage
Benefits of exercises	51
Dietary modifications needed	75
Exercises should be done by only obese person?	46
Benefits of Yoga	37

Percentage* rounding off to nearest integer value

This table depicts that perception about diabetes is on lower side. Only 43% participants were having some information about diabetes and only 13% were having some idea about insulin deprivation/abnormality. Out of 266 participants, 82% were aware about hereditary inheritance of DM, 45% about frequent urination, 34% about increase thirst, and 21% about increase appetite. 75% study subjects were agreed on dietary modification needed. 51% participants were having perception that exercise is beneficial in Diabetes. Yoga and Meditation should be done to control DM was mentioned by 37% participants.

Table 5: Pearson correlation coefficient of Random Blood sugar with Age of participant

	Age	RBS
Mean±SD	48.56± 11.8	153.5±65
Pearson correlation (R)	0.028	
P value	0.648, Not significant	

In our study we found that Correlation between of RBS & age of participants is non significant as p value is 0.648, which is greater than 0.05. It means, change in age has no effect on RBS.

Discussion

In the present study total 273 study subjects were participated. Out of them 7 provided incomplete data, they quit interview in between. Others were examined for CBS and their perceptions about Diabetes were asked. it was observed that mean ± SD of Age was 48.56± 11.8year and most common age group was 50-59years age group. Similar results were obtained by **Gautam A. et.al. (2015)[**12**]** conducted an institutional based cross sectional study & found that the mean age was 54.64 years and most common age group was 40 to 60years. we have found that history of smoking and history of alcoholism is statistically significant with gender. But history of DM in family is found to be non-significant in study subjects. This difference is probably due to Alcohol consumption and habit of smoking far more common in males than females. Similar results were found in study conducted by **Gautam A. et al (2015). [**12**]**In present study we have also estimated some risk factors of Non-communicable diseases. we observed that total 12.8% were smokers and 10.2% were alcoholic. In a STEP wise approach to surveillance (STEPS) **World Health Organization-ICMR [**13**]** report says that 26.5% were smokers. about 33% of urban men, 49.3% of peri-urban/slum men and 40.5% of rural men were found to be current users of alcohol. In our study we found that 7.14 % were doing minimal physical activity, 75.9 % were doing routine work and 17.3 %.were doing exercise in addition to routine work. In **WHO-ICMR [**13**]** study they observed that more than 50% of the urban residents, 41.4% of peri-urban/slum residents and 35% of rural residents had a sedentary lifestyle while 25.4% of rural residents, 14.2% of peri-urban/slum residents and 7.4% of urban residents were involved in vigorous physical activity. In **WHO-ICMR [**13**]** study, self reported diabetes was observed in 3.1% rural followed by peri-urban/slum (3.2%) and the highest in urban areas (7.3%). Present study shows that perception about diabetes is on lower side. Only 43% participants were having some information of DM. only 13% were having some idea about cause of diabetes. In a study conducted by **C Munninarayana et al. (2010) [14]** observed that cause of Diabetes was hormonal (12.9%) and hereditary (12.90%). In present study Out of 266 participants, 82% were aware about hereditary inheritance of DM, 45% about frequent urination, 34% about increase thirst, and 21% about increase appetite. 75% study subjects were agreed on dietary modification needed **Mukhopadhyay P. et al (2010)[15]** conducted a study and found that, perception about symptoms of DM like Frequent urination, frequent hunger and frequent thirst was 42.2%, 35.9 % and 6.3% respectively. In the same study 81% were aware about DM drugs and insulin. A study conducted by **C Munninarayana et al. (2010) [14]** stated that 11.90% participants said eyes can be affected in diabetes, 12.90% participants were aware about diabetic foot. 10% of participants were aware about kidney complications. One limitation of the study is that it is conducted in relatives accompanying patients in outpatient departments so it is not possible to generalize the results of study to general population. But it gives a approximate estimate about various perception about factors related to diabetes in population attending tertiary health care centers.

Conclusion

In this study various aspects related to NCDs with emphasis on diabetes were studied. We have studied risk factors, perceptions about DM and Screening of DM was done by estimating casual blood glucose level. According to WHO estimations we will be the capital of diabetes in next decade. Our study showed that risk factors for DM are prevalent in higher proportions. Thus we are progressing towards being capital of diabetes. Perceptions about symptoms, risk factors, screening test, diagnosis and complications were poor among study population. Instead of implementation of National program for prevention of cardiovascular diseases, cancer, stroke and diabetes (NPCDCS) by Govt of India. It can be recommended that policy makers has to emphasize more on IEC activities amongst general population and motivate people to adopt healthy life styles more concretely. Behavior of individuals towards non communicable diseases is found to be risky as they know symptoms, complications of DM but still they are reluctant to practice regular exercise, diet modification, regular screening and treatment. In present study we used criteria given by ADA to screen diabetes. We found very large population i.e, 13% were diabetics (> 200 mg/dl) and 26% were prediabetic (>140mg/dl). Though this method is not a gold standard to diagnose diabetes still we can use it in situations where resources are scarce. This study reveals high proportions of diabetics in study populations (>30 years). This shows we are in need of implementations of national program (NPCDCS) effectively and extensively to limit damage caused by NCDs. epidemic

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