Original Article

Targeted Screening for Diabetes among Women of Reproductive Age group in Kolkata: A Community Based Study

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Abstract:

Background: Diabetes is increasing in alarming scale in India. Diabetic among women in reproductive age has not been explored much in community level. The present study was conducted with objective to screen for diabetic among women between 18 and 44 years. **Materials & Methods**: A descriptive observational community based study was conducted with health camp approach. At first step, women between age 18 and 44 years were screened for three risk factors: age ≥40 years, BMI≥25 and family history of diabetes. Those who have positive history were tested for random blood sugar. **Result**: Out of 17157 women, 6386 women were tested for random sugar. 16.21% were pre-diabetic and 19.21 % were diabetic. Prevalence of diabetic was found to increase with increase in age, BMI, and positive family history and more among Muslim women. **Conclusion:** This type of screening will enhance Yield & help in early diagnosis and prompt treatment minimising gestational problems.

Key Words: Diabetes, Gestational diabetes, Screening

Introduction:

Prevalence of diabetes is estimated to be 366 million globally in 2030 with maximum increase in India. In 2000, India topped the world countries with highest number of diabetic patients as estimated to be 31.7 million.[1,2] The International Diabetes Federation (IDF) estimated, early in the 21st Century, the total number of diabetic subjects to be around 40.9 million in India and predicted that this was going to rise to 69.9 million by the year 2025.[3] The earliest national study reported an overall prevalence of 2.1 % in urban areas and 1.5% in rural areas.[4] The ICMR-INDIAAB study, a nationally representative study conducted in recent years in 15 states in India estimated overall of diabetes and pre-diabetes in India to be 7.3% and 10.3% respectively. Urban people having more prevalence than rural one (11.2% vs 5.2%)[5] Environmental and lifestyle changes including unhealthy eating habits, addiction and physical inactivity as a consequence of industrialization and migration to urban area from rural settings may be responsible to a greater extent, for this epidemic of Type 2 diabetes in India.[4] Along with the increase in diabetes prevalence as a whole, the prevalence of gestational DM (GDM) was found to be increasing over the time. The prevalence of gestational diabetes has been reported to range from 3.8% in Kashmir[6] to 41% from Lucknow[7]. It is estimated that about 4 million women are affected by GDM in India, at any given time point.[8] GDM has immediate effect on maternal outcome (preeclampsia, stillbirths, macrosomia) and neonatal outcomes (hypoglycemia, respiratory distress). It increases the possibility of future Type 2 diabetes in mother and the baby as well[9]. Community based data on diabetic prevalence among women in reproductive group is grossly lacking. In this connection, the study was undertaken to assess the prevalence of diabetes among women between 18 to 44 years with a screening test.

Materials and Methods:

A descriptive observational study with cross-sectional design was undertaken in Borough 7 area of Kolkata Corporation among women between 18 to 44 years. Seriously ill persons and pregnant women were excluded from the study.

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(Gestational diabetes was addressed separately, here, analysis done with non-pregnant women as a part of the total project).

A targeted screening[10] was performed in a sub-group of subjects who were at relatively high risk for diabetes. One hundred and fifty six (156) health camps were arranged with the help of local clubs scattered throughout Borough 7 of Kolkata Corporation during a period of one years starting from February 2016 to 31st January 2017. Community living around the clubs were sensitised about the camp beforehand and eligible members of the family i.e women between age group 18 to 44 years were asked to attend the camp for health check up. In the Camp trained workers of Grecaltes screened the women with any or more of the following criteria

a. Women having family history of diabetes
b. Women with BMI >=25, and
c. Women of age 40-44 years

Total 17157 women were examined initially during the study period; those who fulfilled any one or more of above criteria were counselled for blood testing. Verbal consent was taken after briefing up the project. Capillary blood was drawn from willing candidates through finger prick and tested for random sugar with the help of a Gluco-meter. Those who were having sugar level 200 mg/dl or more was taken as positive and sent to diabetes clinic of Government Hospital for further evaluation and management

Table 1: Demographic characteristics of study subjects (n=17157)

Demographic Characteristics	Frequency	Percentage (%)
Age (yrs)		
18-19	971	5.66
20-24	2626	15.31
25-29	3518	20.50
30-34	3886	22.65
35-39	3269	19.05
40-44	2887	16.83
Religion		
Christian	3	0.02
Hindu	10916	63.62
Muslim	6238	36.36
Occupation		
Housemaid	2157	12.57
Housewife	13563	79.05
Other	340	1.98
Service	87	0.51
Student	1010	5.89
Family history		
Blood related	277	1.61
Both	155	0.90
Father	754	4.39
Mother	687	4.00
None	15284	89.08
BMI		
Underweight	1356	7.90
Normal Weight	10421	60.74
Overweight	3965	23.11
Obese	1414	8.24

Result:

Total 17157 women between 18 to 44 years were initially screened. About 43% belonged to age group 25 to 34 years, 63.62% were Hindu, and most of them were housewives. About 10% participants had family history of diabetes. Twenty-three percent was overweight and 8% were obese (Table-1).

Out of 17157 women, 6386 fulfilled the criteria prefixed for blood test for random sugar. Eight percent women was from 40 to 44 years of age, 10.3% had family history of diabetes mellitus and 29.54 % had BMI ≥25 (Table 2).

Blood for random sugar was tested on the spot with the help of a standard Glucometer. From initial screening, More than 60% (64.58%) had normal sugar, 16.21% were pre-diabetic (Blood sugar between 140 & 199 mg/dl) and 19.21% were diabetic (Blood sugar ≥ 200 mg/dl). Prevalence of diabetic were found to increase with increase in age, lowest was found in 18-19 years (4.58%) and highest among 40-44 years (30.89%)(p=0.0000). Muslim women have more prevalence than their Hindu counterpart (20.50% versus 17.92%). Prevalence of diabetes among students (10%) was less than other occupational groups; higher prevalence was found among in-service women (21.05%) & others groups (23.10%). Relation between BMI & Diabetics prevalence was found to be directly proportional, lowest prevalence was found among under-weights (9.30%) and highest among obese group (30.31%) (P=0.0000). About 35% of 153 study subjects from diabetic parents (both), showed high blood sugar. Food habit and physical exercise showed no relation with the prevalence of diabetes in the present study (Table 3).

Table 2 Study subjects fulfilling criteria for sugar testing (N=17157)

Criteria	No	%
Age 40 years & above	1376	8.02
Family history of diabetes	1768	10.30
BMI =25	5068	29.54
Total*	6386	37.22

*Criteria were not mutually exclusive

Discussion:

From 17157 women attending 156 health camps organised between 1st February 2016 and 31st January 2017, 6386 women were screened out based on three pre-fixed criteria, age 40-44 years, and or, BMI ≥ 25, and or family history of diabetes. This was done to get better yield so that chance of case detection will be more with the screening test.

Table3:Prevalence of Diabetes with respect to different pertinent variables (n=6386)

Age Group	Normal No (%)	Pre-diabetic No (%)	Diabetic No (%)	TOTAL No (%)	X^2 p
<20	107 (81.68)	18 (13.74)	6(4.58)	**131 (100.00)**	**286.89 0.0000**
20-29	1300 (74.28)	307 (17.54)	143 (8.17)	**1750 (100.00)**	
30-39	1687 (62.69)	437 (16.67)	567 (21.63)	**2691 (100.00)**	
>=40	757 (55.01)	194 (14.10)	425 (30.89)	**1376 (100.00)**	
Total	**3851**	**956**	**1141**	**5948**	
Religion					
Christian*	0 (0.00)	1 (100.00)	0 (0.00)	**1 (100.00)**	**14.94 0.00057**
Hindu	2696 (66.19)	647 (15.89)	730 (17.92)	**4073 (100.00)**	
Muslim	1428 (61.76)	387 (16.74)	497 (20.50)	**2312 (100.00)**	
Total	**4124 (64.58)**	**1035 (16.21)**	**1227 (19.21**	**6386 (100.00)**	
Occupation					
Housemaid	455 (70.87)	76 (11.84)	111 (17.29)	**642 (100.00)**	**63.4995 0.0001**
Housewife	3414 (63.74)	886 (16.54)	1056 (19.72)	**5356 (100.00)**	
Other	73 (56.15)	27 (20.77)	30 (23.10)	**130 (100.00)**	
Service	21(55.26)	9 (23.68)	8 (21.05)	**38 (100.00)**	
Student	161(73.18)	37 (16.82)	22 (10.00)	**220 (100.00)**	
Total	**4124**	**1035**	**1227**	**6386**	
BMI					
Underweight	70 (81.40)	8 (9.30)	8 (9.30)	**86 (100.00)**	**308.9636 0.0000**
Normal Weight	966 (78.47)	120 (9.75)	145 (11.78)	**1231 (100.00)**	
Overweight	2444 (66.07)	596 (16.11)	659 (17.82)	**3699 (100.00)**	
Obese	643 (46.97)	311(22.72)	415 (30.31)	**1369 (100.00)**	
Total	**4123**	**1035**	**1227**	**6385**	
Family history					
Blood related	165 (62.98)	34 (12.98)	63 (24.05)	**262 (100.00)**	**63.4995 0.0000**
Both	63 (41.18)	37 (24.18)	53 (34.64)	**153 (100.00)**	
Father	509 (72.51)	92 (13.11)	101 (14.39)	**702 (100.00)**	
Mother	427 (65.59)	102 (15.67)	122 (18.74)	**651 (100.00)**	
None	2960 (64.10)	770 (16.67)	888 (19.23)	**4618 (100.00)**	
Total	**4124**	**1035**	**1227**	**6386**	
Food habit					
Both	343 (60.39)	98 (17.25)	127 (22.36)	**568 (100.00)**	5.941 0.2036
Homemade food	3748 (64.95)	931 (16.13)	1092 (18.92)	**5771 (100.00)**	
Junk food	33 (70.21)	6 (12.77)	8 (17.02)	**47 (100.00)**	

*not included in test of significance

Overall prevalence of pre-diabetic and diabetic were 16.21% and 19.21% respectively. Similar finding (20% prevalence) was noted in another study among urban adults. Overall prevalence of pre-diabetes and diabetes in a recent study done in 15 states was 10.3% and 7.3% respectively, whereas diabetes in urban area was found higher (11.2%)[8]. In South-East Asia region adult diabetes was estimated to be 8.6%[11] The difference in the findings was probably due to different population groups, different geographic location and Targeted screening. Diabetes as revealed from this screening

test in the Present study showed that with advancement of age, prevalence of diabetics was increasing. The ICMR-INDAB study showed same trend. They showed take off of diabetics in the group of 25-34 years. Present study was corroborating the findings of studies done elsewhere reflecting that BMI was strongly and independently associated with the risk of being diagnosed with diabetes.[12,13] Women with positive family history, particularly when both parents are diabetics, are more prone to developing diabetes. Similar findings were also shown in different study done elsewhere in India & abroad[14]

Conclusion:

Age, positive family history, over-weight and obesity were found to be associated with diabetes in women in reproductive age. Targeted screening among women could enhance yield and would help in early detection and management of diabetes to avert future complication.

Limitation:

Prevalence of diabetes was calculated on screening data based on testing with Glucometer at field condition. Random sugar might be influenced on time of food intake, type of food, physical exercise, and illness and so on. As it was targeted screening, prevalence appeared to be high.

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