

Original Research Article

How good are we in detecting and screening for diabetes? Results from community-based survey in rural Puducherry, South India

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ABSTRACT

Background: Early diagnosis is the mainstay for reducing complications associated with diabetes. Though blood sugar testing was made freely available, there is gap in utilization of the same. Hence, the current study was conducted to assess the detection gap in diabetes compared to regional estimates. Also, to assess the extent of screening and factors associated with not getting screened.

Methods: A community based cross-sectional analytical study was conducted in the selected rural areas of Puducherry. House to house enumeration survey was conducted in the purposively selected rural areas during September-2016 to February-2017. Information on diabetes status, status of screening in last one year was collected from individuals aged more than eighteen years. Data was entered in Epidata 3.1 and analyzed using Stata 12 software. Percentages with 95% CI were used to estimate the detection gap in diabetes on comparing with regional estimates given by IDF (8.6%). Generalized Linear Models were used to assess the individual level characteristics associated with not screening for diabetes.

Results: Of the total 1844 enumerated individuals, 1423 (78.6%) were above 18 years of age. The detection gap for diabetes based on IDF was 39% and based on DLHS-4 was 69.8%. Of the eligible individuals for screening 81.9% (95% CI: 79.7%-83.9%) were not screened for diabetes in last one year.

Conclusions: With high detection gap and low utilization of screening, there is need for developing innovative strategies like task shifting, ICT utilization for screening and targeted screening.

Keywords: Coverage, Screening, Detection gap, Diabetes, South India

INTRODUCTION

According to World Health Organization, by 2020, Non Communicable diseases (NCDs) are expected to contribute 60% of the global disease burden and 73% of the total mortality.¹ Of NCDs, Diabetes is one such common chronic morbidity which can lead to life-threatening complications.² This could be prevented by

early detection and also by elimination of risk factors. Early diagnosis and adherence to standard management is a simple key to avert life threatening complications.³ With increasing burden, Ministry of Health and Family Welfare has launched a national program – NPCDCS in the year 2010, under which NCD clinics are functioning in PHCs, where simple, cost-effective tests like glucose testing by glucometer are made accessible free of cost.⁴

Though such facilities are provided in PHCs, there is lower utilization of these screening procedures and there is a high level of detection gap which are evident from the previous studies.⁵ In this context, screening will eventually help in developing specific interventions to overcome these lacunae. Hence the current study aims, to estimate the detection gap in diabetes compared to regional estimates, to determine the proportion not been screened for diabetes in past one year and to assess the socio-demographic factors associated with not being screened for diabetes, among the adults (>18 years) in the selected rural areas of Puducherry district.

METHODS

The study was a cross-sectional analytical study conducted among the adult population in rural Puducherry from September-2016 to February-2017. Four villages (Bahour, Kuruvinatham, Pillaiyarkuppam and Irulansandai) located closer to the institute were selected conveniently, all the houses in selected villages were enumerated and all the individuals of more than age eighteen years were included. Locked houses even after the visit for more than 2 attempts & people not willing to give interview were excluded. The sample size was calculated using n-master software 2.0 version as 1028 assuming 70% not screened, 5% relative precision, 95% CI and design effect of 1.5. A semi-structured interview using EpiCollect5 mobile based application and variables such as socio-demographic factors (age, gender, education, occupation, socio-economic status, marital status, caste), presence of diabetes and screened for diabetes in the last one year were captured.

Procedure

Each house in the selected village were enumerated and Interviews were conducted by trained MBBS students under the supervision of faculties and post graduates,

among those individuals who are available and information of those are not available was extracted from the available individuals. If the house is locked during the first visit one more attempt was made to cover the whole population.

Data entry and analysis

Data was entered using EpiData v3.0 and was analyzed using STATA 12 software. Percentage was used to summarize the categorical variables. Detection gap was calculated using the following formula,

$$\text{Detection gap} = \frac{(\text{Expected} - \text{self reported}) \times 100}{\text{Expected}}$$

95% confidence interval was calculated for all outcomes of interest and generalized linear models adjusting for clustering at village was used to assess the independent association. Prevalence Ratio (PR) with 95% confidence interval was used to express the association in both bivariate and multivariate model.

Ethical approval

The study was approved by the Institutional Human Ethics Committee, Mahatma Gandhi Medical College and Research Institute, Puducherry.

RESULTS

In a total of 1423 individuals were included majority were belonged to age group of 30-44 years. Females were in higher proportion compared to males. Almost 402 (28.3%) had no formal education. Majority were married 1093 (76.8%). Around 749 (52.7%) were not involved in income generation activities and 831 (73.8%) belonged to Scheduled caste. In these villages surveyed, prevalence of diabetes was found to be 5.7% (Table 1).

Table 1: Socio-demographic characteristics of adults in the selected villages of rural Puducherry (n=1423).

Socio-demographic characteristics	Frequency (%)
Age (in years)	
18-29	399 (28.0)
30-44	437 (30.7)
45-59	343 (24.1)
60 and above	244 (17.2)
Gender	
Male	658 (46.2)
Female	765 (53.8)
Education	
No formal education	402 (28.3)
Primary	190 (13.4)
Secondary	302 (21.0)
Higher secondary	157 (11.1)
Intermediate/diploma	114 (8.0)
Graduate and above	258 (18.2)

Continued.

Socio-demographic characteristics	Frequency (%)
Occupation	
Unemployed/housewife	749 (52.7)
Unskilled	279 (19.6)
Semiskilled	138 (9.7)
Skilled	130 (9.1)
Semi-professional and professional	127 (8.9)
Marital status	
Never married	267 (18.8)
Married	1093 (76.8)
Widow/separated	63 (4.4)
Socio-economic status (Modified B G Prasad's Classification)*	
Upper	147 (12.6)
Upper middle	178 (15.3)
Middle	315 (27.0)
Lower middle	325 (27.9)
Lower	200 (17.2)
Caste*	
Forward caste	3 (0.3)
Backward caste	196 (16.8)
Most backward caste	107 (9.2)
Scheduled caste	861 (73.8)
Village	
Pillayarkuppam	397 (27.9)
Bahourpet	517 (36.3)
Kuruvinatham	299 (18.0)
Irulansandhai	253 (17.8)

* Data was available only for 1167 individuals.

Table 2: Socio-demographic factors associated with not getting screened for diabetes among adults in rural areas of Puducherry (n=1423).

Characteristic	Total	Not screened, N (%)	Unadjusted PR (95% CI)	Adjusted PR (95% CI)
Overall	1342	1089 (81.2, 95%CI:79.0 -83.2)		
Age (in years)				
18-29	397	360 (90.7)	1.20 (1.11-1.31)	1.18 (1.10-1.26)
30-44	425	338 (79.5)	1.06 (0.97-1.16)	1.06 (1.01-1.11)
45-59	302	227 (75.2)	1.00 (0.90-1.10)	0.99 (0.91-1.08)
≥60	218	164 (75.2)	1	1
Gender				
Male	613	498 (81.2)	1	
Female	729	591 (81.1)	0.99 (0.95-1.05)	
Marital Status				
Never Married	265	244 (92.1)	1.46 (1.19-1.78)	1.46 (0.86-2.46)
Married	1020	809 (79.3)	1.25 (1.03-1.53)	1.36 (0.82-2.24)
Widow	57	36 (63.2)	1	1
Education				
NFE	385	317 (82.3)	1.11 (1.01-1.23)	1.09 (0.89-1.33)
Primary	165	112 (73.9)	1	1
Secondary	278	220 (79.1)	1.07 (0.96-1.19)	0.98 (0.89-1.07)
Higher Secondary	149	121 (81.2)	1.10 (0.97-1.23)	0.95 (0.80-1.13)
Intermediate	112	90 (80.4)	1.08 (0.95-1.23)	0.93 (0.75-1.15)
>Graduate	253	219 (86.6)	1.17 (1.05-1.29)	0.92 (0.79-1.08)

Continued.

Characteristic	Total	Not screened, N (%)	Unadjusted PR (95% CI)	Adjusted PR (95% CI)
Occupation				
Unemployed	711	585 (82.3)	1.08 (1.01-1.17)	1.04 (1.01-1.08)
Unskilled	266	201 (75.6)	1	1
Semiskilled	125	102 (81.6)	1.08 (0.96-1.20)	1.02 (0.95-1.09)
Skilled	121	97 (80.2)	1.06 (0.95-1.18)	1.05 (0.95-1.16)
Semi-professional	119	104 (87.4)	1.15 (1.05-1.27)	1.11 (1.05-1.18)
SES				
Upper	138	122 (88.4)	1.04 (0.96-1.14)	
Upper middle	173	149 (86.1)	1.02 (0.93-1.11)	
Middle	296	238 (80.4)	0.95 (0.87-1.03)	
Lower middle	307	256 (83.4)	0.98 (0.91-1.06)	
Lower	183	155 (84.7)	1	
Caste				
FC and BC	188	149 (79.3)	1.13 (0.98-1.31)	1.13 (1.02-1.25)
MBC	103	72 (69.9)	1	1
Scheduled caste	808	701 (86.8)	1.24 (1.09-1.41)	1.21 (0.89-1.64)

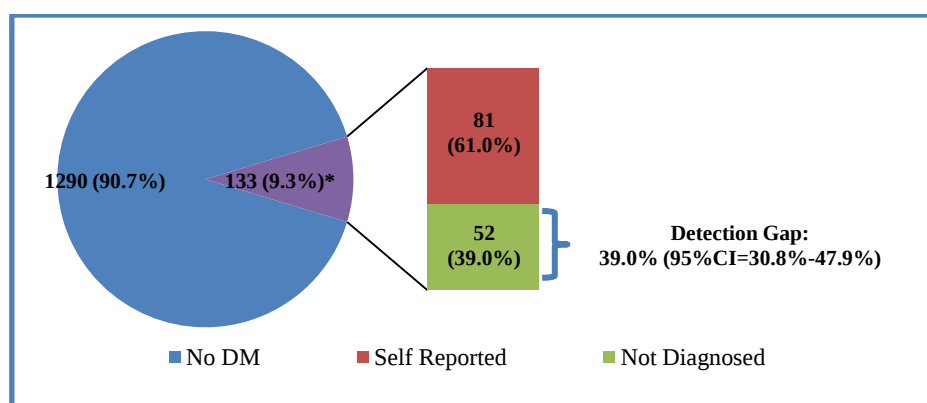


Figure 1: Detection gap in diabetes (based on IDF estimates) among adults of selected rural areas of Puducherry (n=1423).

Source: *International Diabetes Federation (IDF). IDF Diabetes Atlas. 7th ed. 2015. Available from: <http://www.idf.org/iddiabetesatlas-seventh-edition>.

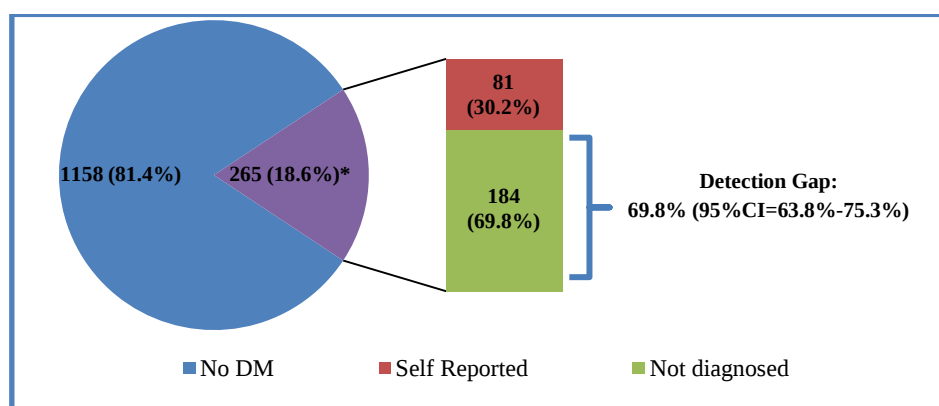


Figure 2: Detection gap in Diabetes (based on DLHS-4 estimates) among adults of selected rural areas of Puducherry (n=1423).⁶

A multivariate analysis was done to find the association between the socio-demographic factors and not getting screened for diabetes. It was found that Age had significant association. However on adjusting, Age

groups of 18-29 years (PR-1.18, 95% CI-1.10-1.26) and 30-44 years (PR-1.06, 95% CI-1.01-1.11), unemployed (PR-1.04, 95% CI-1.01-1.08), semi-professional (PR-1.11, 95% CI-1.05-1.18), forward class (PR-1.13, 95%

CI-1.02-1.25) were independently associated with not getting screened for diabetes (Table 2).

Figure 1 and 2 depicts the detection gap in diabetes. Since there were no regional estimates for diabetes, estimate from International Diabetes Federation (IDF) was used. Based on 9.3% estimate from IDF, when compared with the current study results, around 61% had diagnosed for diabetes and 39% had not been diagnosed (Figure 1). Another estimate from DLHS-4 was used. Comparing with DLHS-4 estimate of 18.6%, around 30% had been diagnosed for diabetes. There was a detection gap of 69% (Figure 2).

DISCUSSION

The prevalence of diabetes was 5.7% in our population which is similar to the survey done by Akhtar et al from 2012 to 2013. The study also found a higher prevalence of diabetes in the urban area (9.8%) and the overall prevalence was 7% for the country with higher proportion of males being diabetics than females.⁶

One of our findings in the study was the significant low level of screening rates among the people of age group 18-25. This shows that there is a low level of awareness among the youth population regarding the diabetes screening. There is also lower level of screening among the unemployed and semi-professionals which shows screening level is low in both the end of the occupation spectrum. On comparing this with National Health and Nutrition Survey (NHANES) conducted among the US population by the National Center for health statistics an agency of the Centre for Disease Control and Prevention (CDC) in which Age, Ethnicity, high school education and Income played a significant role in the screening status of their Population such as among Adults of age less than 45 are more likely not to be screened for diabetes and people whose education is lower than high school and who are in poverty level are also less likely to be screened for diabetes.⁷

The detection gap for diabetics based on IDF was 39% and based on DLHS-4 was 69.8% in our study this can be compared with the household survey by MAMTA Health Institute for Mother and Child in partnership with Medtronic foundation among 7181 individuals across urban and rural areas. In which they have identified coverage gap of 41% for diabetes and they have further explored qualitatively and have found that most of the people waited until they were symptomatic to seek treatment.⁸ Similar explanation can be applied to the present study also as the reason for high detection gap.

CONCLUSION

India with nearly 50.9 million diabetic population is racing towards the 'Diabetes Capital of the World' by 2025 with a burden of 80 million diabetics. Thus, India

being in this constant threat it is important to focus more on the prevention and screening area. With high detection gap and low utilization of screening, there is need for developing innovative strategies like task shifting, ICT utilization for screening and targeted screening.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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