

Prevalence of Self-Reported Diabetes in a Rural Area of Mysore, India: Need for Community Based Screening Action

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Abstract

Background: Diabetes epidemiological prevalence study is a preliminary step for planning community based intervention on diabetes care and prevention. Sporadic epidemiological studies on diabetes in India have been conducted but Community-based prevalence (self reported) estimates are unavailable for rural Mysore.

Aims: Aim of this study was to estimate the prevalence of self-reported diabetes mellitus in rural Mysore.

Setting and Design: This study was conducted in the field practice area of two Rural Health Centres (PHCs), JSS Medical College, Mysore with retrospective data from Comprehensive Data base of the family records.

Methods: An individual should have been diagnosed to be a diabetic by a medical doctor and who was on anti diabetes treatment for at least the past six months.

Results: We found 423 persons to be diagnosed with diabetes. Prevalence of known diabetes in the general population was 1.8% (423/23,281). Prevalence of known diabetes among persons aged above 35 years was 4.3%. Sex-specific prevalence of diabetes in rural Mysore was 2.1% (248/11,984) and 1.5% (175/11299) for men and women respectively.

Conclusions: Community-based health surveillance data comprise a useful tool to measure the prevalence of diagnosed cases of diabetes mellitus within the Indian context. Low prevalence of known diabetics reflects ice berg phenomena in the burden of diabetes. High proportions of undiagnosed diabetic cases in the population are to be detected through screening programs.

Key words: Community-based study; Diabetes prevalence; Self-reported-diabetes; Rural; Mysore.

Introduction

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(Received on 30.04.2013, Accepted on 22.05.2013)

The health care needs of the Indian population are undergoing dramatic changes due to ongoing demographic transition. Non communicable diseases like Cardio-Vascular Diseases, Cancer, Diabetes and Hypertension are rapidly replacing infectious diseases and are

becoming the leading causes of morbidity, mortality and disability.[1]

Disease and risk factor surveillance involves a systematic analysis and interpretation of data; changes in population, health behaviour are also to be monitored. Such data are useful to inform public and decision makers for planning and evaluating prevention and control programs and designing health policy and legislation.[2]

Over the past three decades, diabetes has become a major cause for morbidity and mortality. The largest increase of the diabetic population occurs in the most economically productive age group.[3]

Population-based studies showing the prevalence of type 2 diabetes in different parts of India have recently been reviewed[4,5] and shows that the prevalence has risen five-fold from 2.1 percent in 1975 to 12.1 percent in 2000.[6-13] and there exists higher prevalence in urban area than rural areas. However, there have been no community-based prevalence rates for diabetes available from rural Mysore in the recent past except for Suttur survey[14] that indicated that there is an increasing problem of diabetes in the region.

Region-specific prevalence data of diabetes are needed, so that appropriate public health measures can be initiated by public policymakers and supported by all those concerned. Very few data are available for rural area where more than 70 percent of the population lives and in the absence of surveillance system for Non communicable diseases.

Thus, in estimating the prevalence of diabetes in a defined geographical area, the logical first step would be to know the number of diagnosed diabetes patients and then apply, cost-effective screening methods among the high-risk group to identify the undiagnosed diabetes patients.

As an initial step towards diabetic care in our service area, we undertook this study with the following objectives

- i) to estimate the prevalence of known diabetes in the service area of the Rural

Health Centre (PHC's), JSS Medical College, and

- ii) then use this data to study associated factors with diabetes in the rural area of Mysore district.

Subjects and Methods

This is a community based cross-sectional (descriptive) study carried out in the service area of the rural primary health centre (PHC Suttur and PHC Hadinaru of Nanjangud taluk, Mysore district) of Department of Community Medicine, JSS Medical College. The two PHC's are around 20 kilometres away from Mysore city. The two PHC's cover a population of 14,000 and 24,000 respectively. Source of data for the study was obtained from the comprehensive data base. Comprehensive data base was prepared by conducting a cross-sectional study in the field Practice area of JSS Medical College.

The study protocol was approved by the JSS Medical College Institutional Ethics Committee. Informed consent was obtained from the individuals before data collection. They were encouraged to continue regular treatment and follow-up for their illness.

Data collection was carried out from January 2008 to December 2008. The field investigators were interns posted to department of Community Medicine. The interns were trained to collect information from each household and they obtained the information on a pretested proforma.

Part I of the proforma obtained household information. Part II was prepared to obtain the socio-demographic information of the individuals like age, gender, education, marital status, type of family, occupation, the type of house and the land holding was used to assess the socio-economic status of the individual, their dietary pattern, and also the tobacco and alcohol consumption was noted and the third part of the proforma obtained information regarding the chronic morbidities like diabetes, hypertension and asthma they were treated for.

Table 1: Prevalence rate (in %) of known diabetics according to age

Age (yrs)	No. of subjects	No. of diabetics	%
0-14	5106	0	0.0
15-34	8988	20	0.2
35-54	6208	181	2.9
55 & Above*	3029	222	7.3
Total	23,281	423	1.8

*p value < .05

In the present study a known diabetic was defined as an individual who was diagnosed to have diabetes by a health professional and was on anti diabetic treatment for the past six months and this was cross checked with medical records.

Statistical Analysis

Excel spreadsheets was used for data entry and cleaning. Epi-info software version 3.5.3

was used for analysis. Overall prevalence rate of self reported diabetes was calculated. Prevalence of self reported diabetes was calculated for the individual factors. Chi-square test was performed to test the association between the prevalence of diabetes and various factors. Multi-variate logistic regression analysis was carried out to identify the independent factors that were associated with diabetes.

Results

Table 1 shows the age-specific prevalence of self reported diabetes in the area. There were a total of 423 individuals with diabetes in the population of 23,281, the prevalence was found to be 1.8% in the general population. In the age group of e" 35 years, the prevalence was 4.3 percent whereas the age-specific prevalence was above 7.3 percent after the age of 55 years.

Table 2: Prevalence Rate (in %) of Known diabetes according to demographic and clinical characteristics

Factor	Categories	No. of study subjects	No. of diabetics	Prevalence rate (in %)	P-value
Gender	Men	9361	248	2.6	> 0.05
	Women	8815	175	2.0	
Education	Illiterate	8966	306	3.4	< 0.05
	Literate	613	17	2.8	
	Primary	1285	21	1.6	
	Middle	3486	47	1.3	
	High school	2390	17	0.7	
	Puc & above	1435	15	1.4	
Occupation	Farmer	3529	116	3.3	< 0.05
	Laborer	4519	54	1.2	
	Office job	738	9	1.2	
	Shop keeper	241	5	2.1	
	Businessmen driver,	719	34	4.7	
	Housewife	5958	137	2.3	
	Retired	663	65	9.8	
	Unemployed	144	3	2.1	
Diet	Vegetarian	3716	140	3.8	< 0.05
	Non-vegetarian	14459	283	2.0	
Current Tobacco Use	Yes	2098	104	5.0	< 0.05
	No	16078	319	2.0	
Current Alcohol use	Yes	895	50	5.6	< 0.05
	No	17281	373	2.2	
History of Hypertension	Yes	696	185	26.6	< 0.05
	No	17480	238	1.4	
History of COPD/Asthma	Yes	268	21	7.8	< 0.05
	No	17907	402	2.2	

Table 3: Multiple Logistic Regression Analysis for Association of Various Risk Factors with Prevalence of Diabetes

Variable	Categories	Odds Ratio	95% CI (lower limit-upper limit)	P-value
Age in years	15-34	1		
	35-54	9.218	5.617-14.833	<0.01
	>55	15.425	9.374-25.383	<0.01
Sex	Male	1		
	Female	0.732	0.361-1.184	>0.05
Education	Illiterate	1		
	< 10 years of schooling	0.822	0.626-1.081	>0.05
	>10 years of schooling	0.699	0.458-1.068	>0.05
Type of occupation	Farmer/labourer	1		
	Professional/Businessmen	1.638	1.133-2.368	<0.01
	Housewives	1.903	1.334-2.714	<0.01
	Retired /unemployed	2.375	1.574-3.505	<0.01
Tobacco consumption	No	1		
	Yes	1.125	0.832-1.521	>0.05
Alcohol consumption	No	1		
	Yes	1.467	1.605-2.140	<0.01
Hypertension	No history	1		
	Positive History	11.399	9.082-14.30	<0.01
COPD /Asthma	No history	1		
	Positive History	1.125	0.676-1.87	>0.05

Table 2 shows the prevalence of self-reported diabetes in the area according to various demographic and clinical characteristics. There were 248 males and 175 females with known diabetes. The prevalence rates were 2.6% among males and 2.0% among females; the difference was not statistically significant ($P > 0.05$).

It was observed that the Vegetarians had higher prevalence of diabetes than non-vegetarians (3.8% vs. 2.0%). The prevalence of diabetes was observed to be high among the tobacco users than the non users (5% vs 2%). Similarly the prevalence of diabetes was high among alcohol users than the non users. Prevalence of diabetes was very high among persons who gave a history of hypertension than those persons who did not give a history of hypertension (26.6% vs 1.2%). It was observed that the prevalence of diabetes was higher among the persons who gave history of

Asthma/COPD than the persons who did not give the history of Asthma/COPD (7.8% vs 2.2%).

Table 3 shows the results of multiple logistic regression analysis which was performed to remove the effect of the confounding variables and identify the independent factor associated with diabetes. Persons aged above 35 years, professional workers, tobacco and alcohol consumers, hypertensive and asthmatics are high risk group for diabetes

Discussion

Diabetes burden in India has been increasing exponentially year after year in urban as well as rural areas.[3] In order to develop a comprehensive diabetes care, understanding the burden of the disease is of prime

importance. In the past 20 years, there has been an increase in diabetes related prevalence studies in India. In the present study the overall prevalence of diabetes in the general population was 1.8 percent and among persons aged above 35 years was 4.3 percent. The prevalence of diabetes mellitus in rural India is within a broad range of 0.8 percent to 9.3 percent.[9-18] A high prevalence of 14.6 percent was estimated in study carried out in rural central Kerala.[20]

Previous diabetes prevalence studies have clearly depicted the ratio of Known:Unknown diabetic was ranging from 1:1 to 1:3 in rural areas[15,17,22] and 1:3.3 in urban areas.[21] Estimated prevalence in the present study represents a tip of the ice-berg and a large portion of the diabetes patients still remain undiagnosed in the community. Poor socio-economic circumstances, lack of awareness regarding the disease and the absence of a well equipped health delivery system, absence of routine screening program for diabetes, the disease may not have been diagnosed. The prevalence in rural India may be much higher than previously realized. Hence, community based health awareness and screening programs for diabetes are the need of the hour.

As observed in the study, a high prevalence of diabetes is associated with alcohol and tobacco consumption. High prevalence has also been observed among individuals with other co-morbidities like hypertension and COPD. Diabetes related complications is observed to be high and would occur at a faster rate among patients who have co-existent morbidities. Diabetic complications would worsen the quality of life and increase the cost of diabetic care.

An increased odds of association of diabetes was observed among persons aged above 35 years, among professional workers, housewives, retired persons, tobacco and alcohol consumers, hypertensive and asthmatics. These groups of people are at high risk of having diabetes.

Conclusion

We conclude that persons aged above 35 years, tobacco users, alcohol consumers, hypertensive and asthmatics should be screened for diabetes in rural areas of Mysore.

References

1. Shah B, Mathur P. Surveillance of Cardiovascular disease risk factors in India: the need & scope. *Indian J Med Res.* 2010; 132: 634-42.
2. Deepa M, Pradeepa R, Anjana RM, Mohan V. Non communicable Diseases Risk Factor Surveillance: Experience and Challenge from India. *Indian J Community Med.* 2011; 36(1): 50-6.
3. Sicree R, Shaw J, Zimmet P. Diabetes and impaired glucose tolerance. In: Gan D, editor. *Diabetes Atlas.* International Diabetes Federation. 3rd ed. Belgium: International Diabetes Federation; 2006, 15-103.
4. Mohan V, Sandeep S, Deepa R, Shah B, Varghese C. Epidemiology of type 2 diabetes: Indian scenario. *Indian J Med Res.* 2007; 125: 217-30.
5. Mohan V, Madan Z, Jha R, Deepa R, Pradeepa R. Diabetes—social and economic perspectives in the new Millenium. *Int J Diabetes Dev Countries.* 2004; 2: 29-35.
6. Ahuja MM. Epidemiological studies on diabetes mellitus in India. In: Ahuja MM, editor. *Epidemiology of diabetes in developing countries.* New Delhi: Interprint; 1979, 29-38.
7. Ramachandran A, Jali MV, Mohan V, Snehalatha C, Viswanathan M. High prevalence of diabetes in an urban population in south India. *BMJ.* 1988; 297: 587-90.
8. Sridhar GR, Rao PV, Ahuja MM. Epidemiology of diabetes and its complications. In: RSSDI textbook of diabetes mellitus. Hyderabad: Research Society for the Study of Diabetes in India; 2002, 95-112.
9. Rao PV, Ushabala P, Seshaiyah V, Ahuja MM, Mather HM. The Eluru survey: Prevalence of

- known diabetes in a rural Indian population. *Diabetes Res Clin Pract.* 1989; 7: 29-31.
10. Ramachandran A, Snehalatha C, Dharmaraj D, Viswanathan M. Prevalence of glucose intolerance in Asian Indians: Urban-rural difference and significance of upper body adiposity. *Diabetes Care.* 1992; 15: 1348-55.
 11. Ramachandran A, Snehalatha C, Latha E, Vijay V, Viswanathan M. Rising prevalence of NIDDM in an urban population in India. *Diabetologia.* 1997; 40: 232-7.
 12. Menon VU, Kumar KV, Gilchrist A, Sugathan TN, Sundaram KR, Nair V, *et al* . Prevalence of known and undetected diabetes and associated risk factors in central Kerala -ADEPS. *Diabetes Res Clin Pract.* 2006; 74: 289-94.
 13. Raman Kutty V, Joseph A, Soman CR. High prevalence of type 2 diabetes in an urban settlement in Kerala, India. *Ethn Health.* 1999; 4: 231-9.
 14. Basavangowdappa H, Prabhakar AK, Prasannaraj P, Gurudev KC, Virupaksha, Suma. Study of prevalence of Diabetes Mellitus and Impaired fasting glucose in a rural population. *Int J Diab Dev Countries.* 2005; 25: 98-102.
 15. Clara K Chow, Krishna Raju P, Rama Raju, Reddy KS, Mangolia Cardona, David S Celermajir, Bruce C Neal. The Prevalence and Management of Diabetes in Rural India. *Diabetes care.* 2006; 29: 1717-1718.
 16. Kokiwar PR, Gupta S, Durge PM. Prevalence of diabetes in a rural area of central India. *Int J Diab Dev Ctries.* 2007; 27: 8-10.
 17. Gupta SK, Singh Z, Purty AJ, Kar M, Vedapriya DR, Mahajan P, Cherian J. Diabetes prevalence and its risk factors in a rural area of Tamil Nadu. *Indian J community Med.* 2010; 35: 396-9.
 18. Patadin S, Bots ML, Abel R, Valkenburg HA. Impaired glucose tolerance and diabetes mellitus in a rural population in South India. *Diabetes Res Clin Pract.* 1994; 24: 47-53.
 19. Zargar AH, Khan AK, Soodi SR, Laway BA, Wani AI, Bashir MI, *et al*. Prevalence of type 2 diabetes mellitus and impaired glucose tolerance in Kashmir valley of Indian subcontinent. *Diabetes Res Clin Pract.* 2000; 47: 135-46.
 20. Vijayakumar G, Arun R, Kutty VR. High Prevalence of type 2 diabetes mellitus and other metabolic disorders in rural central Kerala. *Journal of Associations of Physicians of India.* 2009; 57(8): 563-567.
 21. Sadikot SM *et al*. The Indian task force on diabetes care in India. Available from <http://www.diabetesindia.com/diabetes/itfdci.htm>. Accessed on 14.8.2010.
 22. Majgi SM, Soudarssanane BM, Roy G, Das AK. Risk Factors of Diabetes Mellitus in Rural Puducherry. *Online J Health Allied Scs.* 2012; 11(1):4. Available from: <http://www.ojhas.org/issue41/2012-1-4.html>.