

How Prevalent Is Diabetes among Rural Women: A Cross Sectional Study among Rural Women of West-Bengal

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Abstract: Many studies have shown that the prevalence of diabetes is increasing rapidly in urban as well as in rural India. But there is scarcity of significant data on prevalence of diabetes in the rural population especially among women. **Objective:** 1.To find out the prevalence of diabetes among adult rural women. 2. To determine the risk factors of diabetes among the study population. **Methods:**It was a cross-sectional, community based study conducted on 183 adult rural women of 20 years and more of Dearah village of West Bengal. The study was conducted for a period of 3 months. A predesigned, pre tested, semi-structured schedule was used for data collection. Diabetes was assessed by measuring fasting blood sugar with diagnostic kits. **Statistical Analysis:** Data were analysed by using SPSS version 20.A multivariate analysis was done to ascertain the relationship of diabetes and its risk factors. **Results:**Prevalence of diabetes among rural adult women was 13.12%. Analysis with univariate and multivariate Logistic Regression showed that diabetes was more among the females with increasing age (AOR = 4.451, CI = 1.794-7.881), non-vegetarian diet (AOR = 4.073, CI = 1.236-8.767), No physical activity (AOR = 4.746, CI = 2.343-9.161), Family history of diabetes (AOR = 3.013, CI = 1.629-9.231) and Obesity (AOR = 5.710, CI = 1.759-11.536). **Conclusion:** This study shows that high prevalence of diabetes and its risk factors among rural adult woman making it an important public health priority requiring urgent preventive actions.

Key-words: Diabetes, Rural women, BMI

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I. Introduction

The Prevalence of Diabetes is rapidly increasing all over the world¹. It is now estimated that there are at least 150 million people living with diabetes world wide of which 75% are in developing countries. This number is projected to rise above 354 million by 2030² and the greatest relative rise will be seen in the developing countries of the Middle Eastern Crescent, Sub-Saharan Africa and the Indian subcontinent. India has now more people with diabetes than any other nation and is being called the diabetic capital of the world with over 50 million diabetic individuals. The prevalence is expected to increase to 79.4 million in 2030.^{2,3}

In last 30 years, diabetes has become a major cause of morbidity and mortality affecting youth and middle aged. Although the prevalence of type I diabetes is also increasing, more than 90% of all the diabetes cases account for type II diabetes.

There has been a marked increase in the prevalence of diabetes in the last two decades among both urban as well as the rural Indians. Although in rural India the prevalence of diabetes is much lower than in the urban population, even here the prevalence of diabetes is rapidly rising. The increase in diabetes is mostly due to increased consumption of high calorie containing foods and increased sedentary behaviour associated with urbanization and underpinned by parallel increases in obesity. Obesity and weight gain significantly increase the risk of diabetes, and physical inactivity further elevates the risk, independently of obesity.^{4,5} Several lifestyle factors also affect the incidence of type II diabetes.

It has been noted that the studies which have shown an increase in prevalence of diabetes have also reported a very high prevalence of undiagnosed diabetes in the community. Moreover there have been no community based prevalence rates for diabetes for rural West Bengal in the recent past except for a hospital based study and a few lay reports that indicated that there is an increasing problem of diabetes in the region.⁶

In rural India most of the women are home maker and their activities are mostly confined within their house. Men become the wage earners and all other outdoor activities are their main responsibilities. Most of the women become dependent on men both physically & financially & their problems, whether it is health and nutrition or any other field, remain un-noticed and unattended. So they are the worst sufferers. This may be one

of the reasons why we have only a very little information about prevalence of diabetes in adult rural female population.

In this context it is important to ascertain the prevalence and life style risk factors of diabetes of adult rural female population so that appropriate public health measures can be initiated by public policymakers to mitigate the suffering of the rural women.

II. Objective

1. To find out the prevalence of diabetes among adult rural women.
2. To determine the risk factors of the diabetes among the study population.

III. Materials And Methods

- **Type of Study:** A community based cross-sectional study.
- **Study Period:** 3 months (April to June, 2018)
- **Study Design:** A cross-sectional study was conducted using a Pre designed, pre-tested semi structured schedule in a rural population served by a Union Health Centre (UHC) in Hooghly District of West-Bengal. This health centre is under the purview of All India Institute of Hygiene and Public Health. An approval by Institutional Ethics Committee (IEC) was granted for this study. Based on technical feasibility Dearah village in the UHC area was selected randomly. Prevalence of Diabetes in rural India is 13.2%.⁷ Hence, assuming a prevalence of 13.2%, the sample size was worked out to be 183, taking the allowable error as 5%. The participant's informed consent was obtained. There were 945 women in the age group 20 years and above based on the register of UHC, Dearah. Using this as the sampling frame, 183 women were selected by simple random sampling method.

Study Technique: Interviews and measurements were performed at residence of participants. Details such as age, level of education, marital status, type of family, per capita income, diet, physical activity, symptom of diabetes like polyuria, polydipsia, family history of diabetes etc. were recorded. Body weight (kg) and height (cm) were recorded for all adult subjects.

Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m^2). The body mass index was used as an index of obesity. Women were considered obese if their BMI was ≥ 30 .⁸

Fasting blood sugar was estimated in each subject. Blood was obtained by a finger prick and measurement was done by rapid diagnostic kit. Subjects who had a blood glucose of ≥ 126 were considered diabetic as per American Diabetes Association recommendations.⁹

Blood pressure was measured on the right arm, with the subject in a sitting position and after a minimum of 5 minutes rest, using a properly calibrated and validated standard mercury sphygmomanometer. Two consecutive measures of systolic and diastolic blood pressure were recorded and mean value of the two readings was taken into account. As per JNC7, subjects with Systolic B.P ≥ 140 and/or Diastolic B.P ≥ 90 were considered Hypertensive.¹⁰

Participants were weighed using a scale with an accuracy of ± 100 g. Height was measured using a non-stretchable measuring tape, specifically designed to provide accurate measurements (to the nearest 0.1 cm) in a developing-country field situation. The weight and height data were used to calculate BMI.

“Physical activity” referred to any type of vigorous or moderate activity for at least 30 minutes a day for most of the days in a week other than routine daily activities.¹¹ Socio economic status was assessed by modified Prasad scale (2018). All women who were previously diagnosed as Diabetic and currently on medication, irrespective of their present sugar status, were included in the study.

- Inclusion Criteria:**
1. Women of 20 years and above
 2. Permanent resident of the village.
 3. Previously diagnosed Diabetic women and currently on medication.

- Exclusion Criteria:**
1. Women who were pregnant at the time of the study or women who had given birth during the two months preceding the study
 2. Women suffering from any serious illness.

Data Entry and Analysis:

Data entry and analysis were done using the SPSS version 20. The descriptive data were analysed for frequency and percentages. Univariate & multivariate analysis were done for statistical significance, OR and AOR with 95% CI were calculated for the association between hypertension and some contextual independent variables.

IV. Result

Prevalence of diabetes among rural adult women was 13.12%. Among diabetic 29.17% women were in the age group 41 to 60 years and 62.5% in the age group of 61 to 80 years. 50% diabetic women were from upper middle social class and 25% were from upper high social class. Illiterate diabetic women were 37.5%, 27% were educated up to primary level & 35.5% were above primary level. 95.83% of diabetic women were house wives. Obesity among diabetic women was 70.83% i.e. 9.29% of sample size. No physical activity was seen in 75% of diabetic women.

Analysis with univariate and multivariate Logistic Regression showed that diabetes was more among the females with increasing age (AOR = 4.451, CI = 1.794-7.881), non-vegetarian diet (AOR = 4.073, CI = 1.236-8.767), With no physical activity (AOR = 4.746, CI = 2.343-9.161), family history of diabetes (AOR = 3.013, CI = 1.629-9.231) and obesity (AOR = 5.710, CI = 1.759-11.536). Proportion of diabetes was more among currently married (OR = 4.918, CI=1.625-8.396), in joint family (OR = 2.385, CI=1.028-5.537) and women suffering from hypertension (OR = 3.638, CI=1.254-7.937), but those variables lost their significance when adjusted with other variables on multivariate analysis (as shown in table 1).

Table 1: Association of Diabetes with Socio-demographic, and other relevant variables (Physical activity, History of Diabetes, Obesity and Hypertension) Univariate and Multivariate Logistic Regression (n=183)

Sl no	Variable		Diabetes Present (13.12%)		OR (CI)	AOR (CI)
			n	%		
1.	Age in years (Mean age 60 years)	20 – 60	09	37.5	1	4.451 (1.794-7.881)
		>60	15	62.5	2.327 (1.662 – 4.760)	
2.	Education	Literate	15	62.5	1	-
		Illiterate	09	37.5	0.428 (0.587 – 4.485)	
3.	Marital Status	Currently Married	18	62.5	1	7.112 (0.136 – 10.792)
		Unmarried, Widow and other	06	25	4.918 (1.625 – 8.396)	
4.	Type of Family	Joint	20	83.33	1	4.269 (0.521- 8.114)
		Nuclear	04	16.67	2.385 (1.028 – 5.537)	
5.	PCI (Mean PCI 2000)	>=2000	16	66.67	1	-
		<2000	8	33.33	1.348 (0.668 – 2.720)	
6.	Diet	Vegetarian	07	29.17	1	4.073 (1.236 – 8.767)
		Non Vegetarian	17	70.83	3.810 (1.740 – 8.884)	
7.	Physical Activity	Yes	6	25	1	4.746 (2.343 -9.161)
		No	18	75	2.810 (1.840 – 7.884)	
8.	Family History of Diabetes	No	8	33.33	1	3.013 (1.629-9.231)
		Yes	16	66.67	2.429 (1.153 – 5.117)	
9.	Obesity	No	07	29.17	1	5.710 (1.759 – 11.536)
		Yes	17	70.83	3.676 (1.872 – 7.726)	
10.	Hypertension	No	10	41.67	1	4.018 (0.787 – 10.183)
		Yes	14	58.33	3.638 (1.254 – 7.937)	

V. Discussion

In the present study it was observed that 13.12% rural women suffered from diabetes which is quite similar to the study conducted in rural Andhra Pradesh by Clara K. Chow et al⁷ where it was found to be 13.2%. Another study conducted in Malwan area of rural Maharashtra by Sudha S. Deo et al¹² where it was found to be 9.9%, which is similar to the present study. However the prevalence of diabetes was found to be 1.5% in a study of Agrawal et al¹³ based on NFHS 3 data and 2.3% in a study of Chhetri MK et al¹⁴ conducted in West Bengal. This difference in prevalence may be due to the fact that diabetes was measured in different scale and because of different sample size.

This study showed significant relationship between increasing age and prevalence of diabetes (AOR = 4.451, CI = 1.794-7.881) like Agrawal S et al,¹³ Zargar AH et al¹⁵, Hassan H et al.¹⁶ and Sayeed MA et al¹⁷

No significant association was found between education and diabetes similar in the study by Agrawal S et al.¹³ Recently studies had shown that with affluence, the prevalence of diabetes and related disorders tend to increase. This was not seen in developed countries, where an inverse relationship between diabetes and per capita income was noted and the prevalence of diabetes was higher in the lower per capita income. A population based study in south India called CUPS involving two residential areas, representing lower and middle income groups, showed that the prevalence of diabetes was significantly higher among middle income group (12.4%) compared to lower income group (6.5%). Similar finding was also seen in a study of rural Saudi Arabia.¹⁶ However in the present study, per capita income (OR=1.348, CI=0.668-2.720), did not show any significant association with diabetes.

In this study, non-vegetarian diet was found to be significantly associated with diabetes (AOR=4.073, CI=1.236-8.767). Same finding was also found in the study of Agrawal S et al¹³ where high consumption of eggs, chicken or meat and fish has been associated with an increased risk of diabetes whereas a low-fibre diet with high intake of vegetables and fruits and legumes is associated with a decrease in diabetes risk.

The present study highlighted the significant association between no physical activity and with the occurrence of diabetes mellitus (AOR=4.746, CI=2.343-9.161) like other studies^{13,17}. Lack of exercise, which change the interaction between insulin and its receptors, may be a cause behind the development of diabetes mellitus. In most of the studies, dietary and physical activities have been considered individually, although behavioural factors are typically correlated with one another.

Obesity has long been accepted as a risk factor of diabetes and the risk was related to both the duration and degree of obesity. Association of obesity with diabetes was found in this study (AOR=5.710, CI=1.759-11.536). Similar findings were observed by Agrawal S et al¹³ and Hassan H et al.¹⁶ The cut off values for ideal body weight applicable to western population might not hold well in the generally lean Indians. Moreover, insulin resistance which was found to be a characteristic feature of Asian Indian, despite their lean body mass, could be adversely affected by even small increase in the body mass.¹⁷

Unlike other studies,¹⁷ hypertension did not show any association with diabetes (OR=3.638, CI=1.254-7.937).

VI. Conclusion

The prevalence of diabetes in rural women is quite alarming. In our country a major part of the women population are residing in rural area with very little knowledge of diabetes. With the rising prevalence of diabetes, the mortality and morbidity from the disease will also increase. Therefore, the need of the hour is to take urgent primary preventive measures like lifestyle modifications, balance diet, , increasing physical activity and reduction of body weight etc. in order to arrest the emergence of a major health care challenge of our country.

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