

Correlation between body mass index and blood glucose levels in a selected diabetic weaving population in Tamil Nadu

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Abstract

Background: The majority of Indians live in rural areas. Weaving, which is a leading occupation among the rural South Indian families involves a predominantly sedentary nature of work. There is a dearth of studies on diabetes mellitus among weavers in the rural areas of South India. **Aim:** The aim of this study was to determine the correlation between body mass index (BMI) and blood glucose levels of a selected diabetic weaving population in Tamil Nadu, South India. **Materials and Methods:** Sixty type 2 diabetes mellitus patients, both males and females, in the age group of 30 to 50 years were randomly selected from a weaving sector, in a rural area of Tamil Nadu, South India. Anthropometric measurements were done, and fasting and postprandial blood glucose levels were obtained. Pearson product-moment correlation coefficient was determined to find the relationship between body mass index and blood glucose levels. **Results:** We found a very weak negative correlation between body mass index (BMI) and fasting blood glucose levels ($r = -0.13$, $p = 0.35$, $n = 60$) and between BMI and postprandial blood glucose levels ($r = -0.10$, $p = 0.48$, $n = 60$) which was not statistically significant. **Conclusion:** This study done to determine the correlation between body mass index and blood glucose levels in a diabetic weaving population revealed a very weak negative correlation which was statistically not significant. There was an increase in blood glucose levels in people with normal BMI also, emphasizing the need for regular health checkups in rural weaving sectors.

Keywords: body mass index, blood glucose, diabetes mellitus, weavers.

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Introduction

The majority of Indians (72.2%), live in villages in rural areas and only 27.8% live in towns and urban areas.¹ Among the industries in India, the textile industry contributes 14% of the industrial output, 27% of India's economy and provides 21% of total employment in India.² The structure of the textile industry is complex, with modern sophisticated mills and hand spinning

and hand weaving sectors and small scale power loom sectors with more than 20 million workers in the handloom industry.² In Tamil Nadu, there are approximately 4.8 million diabetics, the combination of genetic susceptibility plus adoption of a high calorie, sedentary lifestyle and a higher waist circumference all contributing to the high number of diabetics in India.³ Seventy percent of the world's diabetics are in the low income

group or in middle income countries.⁴ In India, although earlier the prevalence of diabetes in urban areas was higher than in rural areas, the prevalence of diabetes in rural population too is now being found to be high.⁵

Weaving, a leading occupation among rural people is followed in families of South India, and such weavers follow a predominantly sedentary lifestyle. There is a dearth of studies on diabetes mellitus among the weaving population in rural areas. So we were interested in studying the body mass index (BMI) and blood glucose levels of a selected diabetic weaving population of a rural area in Tamil Nadu, South India with the intention of determining if there was a correlation between BMI and blood glucose levels.

Materials and Methods

This cross sectional study involved 60 previously diagnosed diabetics, of both genders, in the age group of 30 to 50 years who were randomly chosen from a selected weaving industry in a rural area of Tamil Nadu, South India. Institutional ethical committee approval was obtained. Informed consent was obtained from the participants. Volunteers with cardiovascular problems were excluded from the study.

Anthropometric measurements including height, weight and BMI were obtained from the weavers using standard protocol.⁶ A questionnaire was distributed and details including duration of diabetes, drug history, and duration of working in the industry, nutrition pattern and personal habits were elicited. Blood samples were collected under aseptic precautions and fasting and postprandial blood glucose levels were obtained using glucose oxidase-peroxidase (GOD-POD) method, in an automatic analyzer.

The results obtained were statistically analyzed using standard statistical methods (Pearson correlation).

Results

The mean blood glucose level of the study group of diabetic weavers was found to be high (FBS = 178.22 ± 11.25 mg/dl, PPBS = 269.18 ± 13.52 mg/dl) and the BMI was (24.41 ± 2.68 kg/m²). Table 1 shows the anthropometric characteristics with the blood sugar levels.

Table 1: Anthropometric and biochemical parameters of the study group of diabetic weavers

Parameter	Mean ± SD
Age (years)	45.46 ± 6.23
BMI (kg/m ²)	24.41 ± 2.68
FBS (mg/dl)	178.22 ± 11.25
PPBS (mg/dl)	269.18 ± 13.52

BMI = body mass index, FBS = fasting blood glucose, PPBS = postprandial blood glucose

As shown in Table 2, there was a very weak negative correlation between body mass index (BMI) and fasting blood glucose levels (r = -0.13, p = 0.35, n = 60) and between BMI and postprandial blood glucose levels (r = -0.10, p = 0.48, n = 60) which was not statistically significant.

Table 2: Correlation between body mass index and fasting and postprandial blood sugar levels in the study group of diabetic weavers

Parameter	r value	p value
FBS	-0.13	0.35
PPBS	-0.10	0.48

FBS = fasting blood glucose, PPBS = postprandial blood glucose; r value = Pearson product-moment correlation coefficient; p value of <0.05 being considered as significant.

Discussion

We conducted this study to determine the correlation between body mass index (BMI) and blood glucose levels of a selected diabetic weaving population in a rural area of Tamil

Nadu, South India. Akther *et al.*, in a population based cross-sectional study, found that an average of 7.2% of a rural population in Bangladesh, were affected by diabetes and that the risk of diabetes was increased mainly due to central obesity.⁶ In a study by Yerpude *et al.*, conducted in Guntur, which is a heavily industrialized city in Andhra Pradesh in South India, with textile factories, engineering firms, etc., it was found that 25.6% of the industrial workers were affected by diabetes.⁷ Another study found that the prevalence of type 2 diabetes mellitus was 2.1% while the prevalence of impaired glucose tolerance (IGT) was higher, at 13.3%, in a rural community in Bangladesh.⁸ They also found that the association between increased BMI and diabetes or IGT was inconsistent.⁸

From our study, it was found that there was a very weak negative correlation between the BMI and blood glucose levels which was statistically not significant. This finding can be compared to the findings of Syed *et al.*, who found an inconsistent correlation between BMI and diabetes.⁸ Thus, in our study group of diabetic weavers, diabetes was present in patients with normal BMI in contrast to the commonly held belief of patients that diabetes occurs with a high BMI only, which emphasizes the need for regular checkup and investigation.

The limitations of the study include the sampling - findings may not be representative of all diabetic weavers in general. Comparison of the correlation between BMI and blood sugar levels of diabetics and non-diabetes could have been done. The effect of factors like gender, duration of disease and treatment could also have been considered, which will be carried out in our future study.

Conclusion

This study done to determine the correlation between body mass index and blood glucose levels in a selected diabetic weaving population

in a rural area of Tamil Nadu, South India revealed a very weak negative correlation which was statistically not significant. Blood glucose levels were increased in weavers with normal BMI also, emphasizing the need for regular health checkups.

Acknowledgment: Nil

Conflicts of interest: Nil

References

1. Indiaonlinepages.com.[Internet]. Population of India 2016. [Updated: 2016 June 13; Cited 2016 June 13]. Available from: www.indiaonlinepages.com/population/india-current-population.html
2. Saroj SC. Textile industry of India. [Internet] [Updated: 2013 Aug 2; Cited 2016 June 13]. Available from: <http://www.slideshare.net/Dharmikpatel7992/textile-industry-of-india-case-analysis-of-siyaram-silk-mill-ltd-24870822>
3. Mohan V, Sandeep S, Deepa R, Shah B, Varghese C. Epidemiology of type 2 diabetes: Indian scenario. *Indian J Med Res.* 2007;125(3):217-30.
4. Kaveeshwar SA, Cornwall J. The current state of diabetes mellitus in India. *Australas Med J.* 2014;7(1):45-48.
5. Chow CK, Raju PK, Raju R, et al. The prevalence and management of diabetes in rural India. *Diabetes Care.* 2006;29(7):1717 - 1718.
6. Akhter A. Diabetes Mellitus and Retinopathy in Rural Bangladesh: A Population Based Study. [M.Phil dissertation] University of Oslo; 2009. Retrieved from: <https://www.duo.uio.no/bitstream/handle/10852/30180/AfrozaxAkhter.pdf?sequence=1>
7. Yerpude PN, Jogdand KS. A study on risk factor profile of hypertension and diabetes among industrial workers of south India. *Innovative Journal of Medical and Health Science* 2015;5(2): 31-33.
8. Sayeed MA, Banu A, Khan AR, Hussain MZ. Prevalence of Diabetes and Hypertension in a Rural Population of Bangladesh. *Diabetes Care* 1995;18(4): 555-558