

Original Research Article

Assessment of risk of diabetes and knowledge regarding prevention of diabetes among office workers in Shillong, Meghalaya

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ABSTRACT

Background: Sedentary lifestyle of the office workers can be a crucial risk factor for developing diabetes. An early detection of risk for diabetes can be beneficial for participants to prevent occurring of diabetes and its serious complications. Therefore, this study assessed the risk of developing diabetes among office workers and their knowledge regarding prevention of diabetes.

Methods: A cross-sectional study was conducted among 110 non-diabetic office workers in Shillong, Meghalaya, India, using purposive sampling, from 15 January to 10 February 2024. The risk for developing diabetes was assessed by the Indian diabetes risk score. Self-administered knowledge questionnaire was utilized to assess knowledge about diabetes prevention.

Results: Majority of the participants (50.9%) were in the age group of 50 years and above, were female (51.8%), were graduates (60%), were residing in urban areas (63.6%), had a monthly income between Rs 73,054 to Rs 1,09,579 (44.5%) and were married (78.2%). A mean risk score of 53.27 ± 19.49 indicated that the majority of office workers (52.7%) had a high risk for developing Diabetes. Most participants had average knowledge (47.3%) with a mean score of 7.92 ± 2.54 . A weak positive correlation was found between diabetes risk and knowledge, the association was not statistically significant ($p=0.882$), while knowledge of prevention was significantly associated with educational status ($p \leq 0.05$).

Conclusions: The study emphasizes office workers' knowledge on diabetes must be enhanced in order to prevent diabetes. Early diagnosis of the disease may prevent progression of disease and its complications.

Keywords: Diabetes, Knowledge, Office workers, Risk

INTRODUCTION

Diabetes is a chronic illness that develops when the body is unable to use insulin efficiently or when the pancreas is unable to produce insulin at all.¹ 10.5% of adult people worldwide, according to the International Diabetes Federation, currently have diabetes. An estimated 90 million people live with diabetes in south-east Asia. Removing the mortality risks associated with the COVID-19 pandemic, the estimated number of adult fatalities from diabetes or its sequelae in 2021 was 6.7 million. The south-east Asia region accounts for 11% of all diabetes-

related deaths.¹ Globally, diabetes is expected to affect 643 million people by 2030 and 783 million by 2045. The number of individuals (20-79 years old) in India who have diabetes is currently 74 million; by 2030, it is predicted to rise to 93 million and by 2045, it is expected to reach 125 million.¹ More than half (53.1%) of diabetics in India do not receive a diagnosis. If undetected or inadequately managed, the condition can lead to serious, potentially deadly complications such as strokes, heart attacks, kidney failure, blindness, and amputation of lower limbs. These occurrences decrease life quality, raise healthcare expenses, and intensify the need for care

access.¹ Diabetes affects 422 million people worldwide, the bulk of whom live in low- and middle-income countries. Every year, the illness is directly to blame for 1.5 million deaths. Both the incidence and the number of cases of diabetes have steadily increased during the previous few decades.² Poor quality of life, costs, and mortality are significantly impacted by acute complications, which occur when diabetes is not adequately managed. These issues might potentially endanger an individual's life. In particular, for those who are at risk, routine exams and screenings can detect diabetes early on and delay or stop its onset.³

In the course of their Chennai urban rural epidemiology study (CURES) in 2005, Mohan et al at the Madras Diabetes Research Foundation developed the Indian diabetes risk score (IDRS).⁴ With a sensitivity of 92.3% and specificity of 82.6%, it is a validated instrument designed to identify those who are most vulnerable individuals for developing type 2 diabetes mellitus based on four variables: age, physical activity, abdominal obesity, and family history of diabetes.⁵

The prevalence of type 2 diabetes is rising worldwide, particularly in low- and middle-income countries. High medical costs, high rates of morbidity and mortality, and early death are associated with the disease, which is mostly brought on by epidemiological factors such sedentary lifestyles, urbanization, and dietary changes. Meghalaya has a high or very high blood sugar rate (>140 mg/dl) in 9.5% of women and 13.9% of men, according to NFHS-5, indicating the severity of diabetes in the state. To develop effective health education programs, office workers' knowledge of diabetes prevention must be assessed. Knowing the early warning signs of diabetes, making dietary adjustments, and changing their lifestyles can help people prevent and manage disease. The process of identifying gaps in knowledge also makes it easier to create tailored educational materials and activities that aim to raise diabetes literacy and promote workplace behavior adjustment. For the purpose of preventing diseases like diabetes, it is crucial to understand risk factors. Diabetes has a substantial negative influence on healthcare, has financial repercussions, and is especially detrimental for developing countries like India; hence addressing its prevention is essential.^{4,6,7}

Office workers make up a sizable section of the workforce in contemporary nations, and they are more likely to develop diabetes due to their sedentary lifestyles, high stress levels, and unhealthy diets.⁸⁻¹⁰ Sedentary work, shift work or insufficient rest periods between shifts, work schedules that restrict physical activity, challenges taking medication or eating regularly, and access to nutritious food options are all occupational factors linked to the development of diabetes.¹¹ In spite of this increased susceptibility, there is still a significant information gap about the particular risk factors that are common in this group as well as preventive strategies. Healthcare providers and policymakers can design

focused interventions and workplace wellness initiatives to reduce the risk of diabetes and encourage healthier lifestyles among office workers by determining the risk of the disease.

The study's findings will add to the body of information about diabetes prevention and help develop evidence-based tactics to lessen the disease's impact on office workers. Organizations can cultivate a culture of wellbeing, longevity, and productivity among their workforce by placing a high priority on employee health and well-being. This, in turn, can promote social resilience and general health. Sedentary lifestyle of the office workers can be a crucial risk factor for developing diabetes. An early detection of risk for diabetes can be beneficial for participants to prevent occurring of diabetes and its serious complications.

METHODS

Study design and setting

A cross-sectional study was conducted from 15 January 2024 to 10 February 2024 among non-diabetic office workers in selected offices in Shillong, Meghalaya, India. In the present study two offices were selected, Office of Principal Accountant General (A and E), Shillong, Meghalaya and Office of Principal Accountant General (Audit), Shillong, Meghalaya, India.

Instrument

The tool for this study consisted of three sections:

Section-A

Section-A consisted of the demographic data of participants, like age (in years), gender, educational status, area of residence, total family income per month and marital status. This section consists of 6 questions.

Section-B

Section-B was adapted from the Indian diabetes risk score (IDRS) which was developed by Mohan et al.⁵ Based on four straightforward factors- age, abdominal obesity, a family history of diabetes, and physical activity- the Indian diabetes risk score estimates the likelihood of developing diabetes. The cumulative score for these categories is limited to 100. The participants' mid-abdominal circumference was measured by the researcher in this section (interpretation: if the IDRS score was ≥ 60 , then high risk of having diabetes; if the score was 30 to 50, then moderate risk of having diabetes; if the score was < 30 , then low risk of having diabetes.)

Section-C

Section-C consisted of a self-administered knowledge questionnaire on prevention of diabetes. It consists of 12

multiple choice questions, each correct answer carrying 1 mark. There was no negative marking. Unattended questions or wrong answers carry 0 marks.

Sample and data collection procedure

Purposive sampling technique was utilized and 110 non-diabetic office workers were selected. The sample size was calculated using the population proportion formula, with a Z-value of 1.96, 95% confidence, and a 7% margin of error. The proportion (p) used for estimating the sample size was set at 13.9%, (*p is taken from National Family Health Survey (NFHS-5) 2019-21 report where the prevalence of high blood sugar level (>140 mg/dl) among men (age group 15 and above) in Meghalaya is 13.9%). Considering 10% attrition rate sample size was 104.¹⁰

Inclusion criteria

Office workers who were available at the time of data collection were included.

Exclusion criteria

Office workers who were previously diagnosed with diabetes, antenatal mothers and participants who were not willing to participate in the study.

Independent and outcome variables

Independent variables included demographic variables (age, gender, educational status, monthly income, marital status) of the office workers.

Outcome variables included risk of diabetes and knowledge regarding prevention of diabetes of the office workers.

Ethics statement

The research topic was approved by the research committee, College of Nursing, NEIGRIHMS. The topic was approved by the board of review and monitoring committee, NEIGRIHMS and the institution ethics committee (IEC) NEIGRIHMS under the thesis number T98/2023/98 (NEIGR/IEC/M12/N12/2023). Formal approval was obtained from concerned authority of Office of Principal Accountant General (A and E), Shillong, Meghalaya and Office of Principal Accountant General (audit), Shillong, Meghalaya. In accordance with ethical standards, written informed consent was obtained from all participants prior to data collection and a participant information sheet was provided to them which contained detailed information of the study and study procedure. Participants were given the opportunity to address any

queries they had before providing their consent. Once fully informed, participants signed the informed consent forms. They were assured the freedom to decline participation or withdraw from the study at any point. To safeguard confidentiality, participants were assigned code numbers in place of their names, ensuring anonymity for both their identities and responses.

Statistical analysis

Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to present the demographic characteristics such as age, gender, educational status, area of residence, total family income per month, and marital status.

Descriptive statistics were used to measure the risk of diabetes and the level of knowledge for diabetes prevention (frequency, percentage, mean, and standard deviation)

The Pearson's correlation coefficient was used to determine the relationship between diabetes risk and knowledge of prevention, and Fisher's exact test was performed to determine the relationship between diabetes prevention knowledge and the chosen demographic variables. A p value <0.05 was considered significant.

All the statistical analysis was conducted utilizing Statistical Package for Social Sciences (SPSS) version 25.

RESULTS

Socio-demographic characteristics

Out of the 110 participants, 50.9% were in the age group of 50 years and above. Majority of the participants (51.8%) were female. Distribution of participants according to the educational status (adapted from the modified Kuppaswamy scale 2023) showed that, majority of the office workers (60%) were graduates and were residing in urban areas (63.6%).⁹ Distribution according to monthly income (adapted from the modified Kuppaswamy scale 2023) revealed that majority of the participants (44.5%) had a monthly income between Rs 73,054 to Rs 1,09,579. 78.2% of the office workers were married (Table 1).⁹

Risk of developing diabetes

Majority of the office workers 58 (52.7%) had a high risk of getting diabetes, 42 (38.2%) participants had moderate risk of developing Diabetes and only 10 (9.1%) participants had a low risk of getting diabetes. The mean risk score is 53.27 ± 19.49 , which indicates that the data is normally distributed (Table 2).

Table 1: Socio-demographic data of the office workers (n=110).

Demographic variables		N (%)
Age in years	34 and below	23 (20.9)
	35-49	31 (28.2)
	50 and above	56 (50.9)
Gender	Male	53 (48.2)
	Female	57 (51.8)
Educational status	High school	09 (8.2)
	Intermediate/diploma	23 (20.9)
	Graduate	66 (60)
	Professional degree	12 (10.9)
Area of residence	Rural	40 (36.4)
	Urban	70 (63.6)
Monthly income	Rs 21,914-Rs 36,526	05 (4.5)
	Rs 36,527-Rs 45,588	01 (0.9)
	Rs 45,589-Rs 54,650	08 (7.3)
	Rs 59,252-Rs 63,853	12 (10.9)
	Rs 63,854-Rs 68,454	02 (1.8)
	Rs 68,455-Rs 73,053	10 (9.1)
	Rs 73,054-Rs 1,09,579	49 (44.5)
	Rs1,09,580-Rs1,46,103	07 (6.4)
	More than Rs 1,46,103	16 (14.5)
Marital status	Unmarried	24 (21.8)
	Married	86 (78.2)

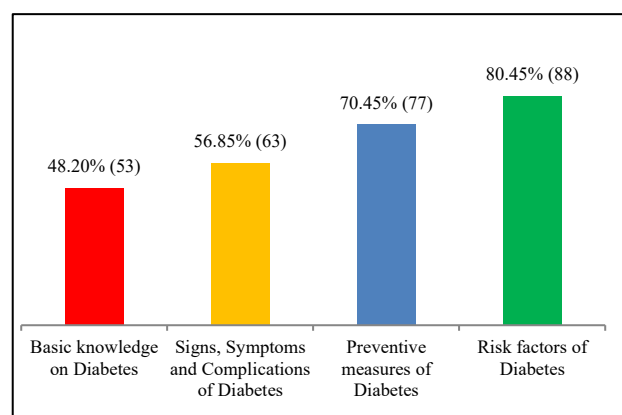
Table 2: Risk of diabetes among office workers.

Risk of diabetes	N (%)	Mean risk score	SD
High (≥ 60)	58 (52.7)	53.27	19.49
Moderate (30-50)	42 (38.2)		
Low (< 30)	10 (9.1)		

Knowledge regarding prevention of diabetes

The knowledge score obtained by the participants out of maximum possible score of 12. The Table 3 depicts that majority of the office workers 52 (47.3%) had average knowledge regarding prevention of diabetes, 27 (24.5%) had poor knowledge and only 31 (28.2%) of them had good knowledge regarding prevention of diabetes. The mean knowledge score of the office workers regarding prevention of diabetes was 7.92 ± 2.54 , which indicates that data was normally distributed. This also reveals that majority of the participants in the selected offices had average knowledge regarding prevention of diabetes. Out of 110 participants, 48.20% responded correctly on

questions related to basic knowledge on diabetes, 56.85% were able to respond correctly on signs, symptoms and complications of diabetes, 70.45% responded correctly on preventive measures of diabetes and 80.45% responded correctly on risk factors of diabetes (Figure 1).

**Figure 1: Percentage distribution of knowledge score on prevention of Diabetes on different domains among the office workers (n=110).****Table 3: Knowledge regarding prevention of diabetes among office workers.**

Knowledge	Range of score	N (%)	Mean knowledge score	Standard deviation
Good	10-12 ($\geq 76\%$)	31 (28.2)	7.92	2.54
Average	7-9 ($> 51-75\%$)	52 (47.3)		
Poor	0-6 ($\leq 50\%$)	27 (24.5)		

Table 4: Association between knowledge regarding prevention of diabetes and selected demographic variables.

Demographic variables		Level of knowledge			P value
		Good	Average	Poor	
Age in years	34 and below	7	12	4	0.893
	35-49	9	13	9	
	50 and above	15	27	14	
Gender	Male	18	22	13	0.377
	Female	13	30	14	
Educational status	High school	0	3	6	0.000*
	Intermediate/diploma	1	16	6	
	Graduate	23	29	14	
	Professional degree	7	4	1	
Area of residence	Rural	11	16	13	0.326
	Urban	20	36	14	
Monthly income	Rs 21,914-Rs36,526	0	3	2	0.105
	Rs 36,527-Rs 45,588	0	0	1	
	Rs 45,589-Rs 54,650	0	4	4	
	Rs 59,252-Rs 63,853	1	6	5	
	Rs 63,854-Rs 68,454	0	2	0	
	Rs 68,455-Rs 73,053	3	6	1	
	Rs73,054-Rs1,09,579	16	23	10	
	Rs1,09,580-Rs1,46,103	2	3	2	
	More than Rs 1,46,103	9	5	2	
Marital status	Unmarried	8	9	7	0.553
	Married	23	43	20	

*p value ≤ 0.05 = significant

Correlation between risk of diabetes and knowledge regarding prevention of diabetes

The correlation between risk of diabetes and knowledge regarding prevention of diabetes among office workers was computed with the help of SPSS version 25 using Pearson's correlation coefficient. There is a weak positive correlation between risk of diabetes and knowledge regarding prevention of diabetes among office workers. Since the Pearson correlation coefficient (r) was 0.014, it reveals that with an increase in risk of diabetes there is an increase in knowledge regarding prevention of Diabetes among office workers. However, the p value was 0.882, therefore it was not statistically significant.

Association between knowledge with the selected demographic variables

Table 4 depicts the association between knowledge with the selected demographic variables. The data were computed with the help of SPSS version 25 using Fisher's exact test. The data reveals that there was no significant association between knowledge regarding prevention of diabetes with age, gender, area of residence, monthly income and marital status. However, there was a significant association between knowledge regarding prevention of diabetes and educational status at p value ≤ 0.05 level of significance.

DISCUSSION

The present study focused on the non-diabetic office workers to assess their risk of developing diabetes in future and their knowledge regarding diabetes prevention. The majority of study participants in this study (50.9%) are 50 years of age and above, which is consistent with a community-based study on diabetes risk assessment in Hyderabad done by Prasad et al, where 53.5% of participants were over 45.¹⁰ In contrast, the majority of participants (52.8%) in the study by Dika et al on the assessment of diabetes awareness among Tanzanian office workers were in the 18-32 age range.¹²⁻¹⁵

The majority of research participants (52.7%) have a high risk of getting diabetes in the present study. The majority of participants (59.3%) in the study on the assessment of diabetes risk in Hyderabad by Prasad et al were at a moderate risk of getting diabetes. Whereas, only 35% of study participants had a high risk of getting diabetes, according to a study by Holla et al on risk assessment among office workers in the offices of healthcare institutions in coastal south India.^{13,15}

In this study only 28.2% study participants have a good knowledge on prevention on diabetes. This is consistent with the study conducted by Konduru et al on assessment of diabetes related knowledge, attitude and practice in Andhra Pradesh where only 2% of study participants had

good knowledge on diabetes. The study conducted by Dika et al, on assessment of knowledge on diabetes among office workers in Tanzania found only 27.8% had good knowledge regarding risk factors for diabetes.^{12,14}

In the present study there is a significant association between knowledge regarding prevention of diabetes and educational status at p value ≤ 0.05 level of significance. A study published by Sharma et al on status of diabetes control and knowledge of diabetes, in Lucknow, found that among educated graduates in majority of participants (62.5%) had good level of knowledge about diabetes which was statistically significant.¹⁵

There are some limitations of the study. The study was limited only to the office workers. Due to time constraints, only two offices were selected. Longitudinal studies can be conducted to evaluate the long-term efficacy of lifestyle modification programs and educational interventions in lowering the risk of diabetes among office workers. Targeted education initiatives from occupational health care providers or the employers are necessary, to increase the office workers' understanding on diabetes prevention. It would be prudent to adopt focused interventions for instance, regular health exams, individualized counselling sessions with medical professionals, and lifestyle change plans catered to individual's risk profiles. Employers can make a significant contribution to the prevention of diabetes by integrating campaigns for education and awareness into workplace regulations. Encouraging regular exercise, stocking workplace cafeterias with nutritious food options, and planning wellness events all within the confines of the office are some of the examples.

The results of this study can be used as a basis for future investigations into diabetes risk and its prevention in other geographic regions and occupational categories. Furthermore, the current study emphasizes the necessity of developing and executing focused health promotion programs for office workers that emphasize dietary adjustments, physical activity, and lifestyle modifications to lower the risk of diabetes. The study emphasizes the importance of enhancing the knowledge of office workers regarding prevention of diabetes in order to prevent its onset.

CONCLUSION

The study highlights the need for office workers' knowledge on diabetes to be improved in order to prevent diabetes and establish greater control over risk factors, complications, and management. Therefore, early diagnosis of the disease may prevent progression of the disease and its complications.

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