Prevalence of Diabetes Mellitus and Awareness of Its Management among Tailors in Urban India

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DOI: 10.24252/al-sihah.v16i2.51734
Received: 9 October 2024 / In Reviewed: 19 December 2024 / Accepted: 29 December 2024 / Available online: 31 December 2024

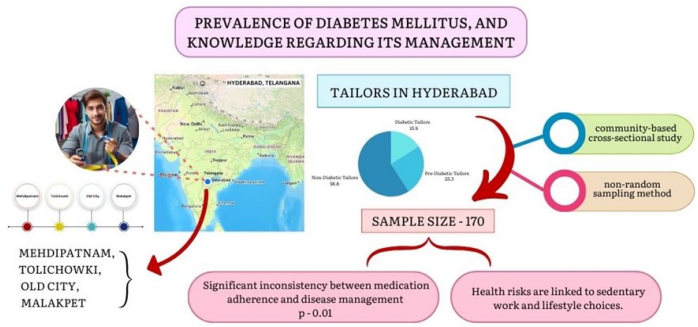
ABSTRACT

The rising diabetes prevalence in developing countries highlights a critical public health challenge linked to lifestyle changes and limited awareness of disease management. This study addresses the gap in understanding diabetes prevalence and management knowledge among sedentary occupational groups, such as tailors. This study aims to assess the prevalence of Diabetes Mellitus (DM) and evaluate knowledge regarding its management among tailors in Hyderabad. This community-based cross-sectional study assessed the prevalence of DM and evaluated knowledge about its management among tailors in Hyderabad, a group particularly at risk due to their sedentary work environments and limited awareness of diabetes management. Data were collected from 170 tailors aged 30–60 years across four localities in Hyderabad using a structured questionnaire and random blood glucose level checks. Results indicated that 58.8% of participants had normal glucose levels, 25.3% were pre-diabetic, and 15.9% were diabetic. Diabetes (19.4%) and hypertension (22.9%) were common, though only 37.1% adhered to regular medication. Irregular dietary habits were noted, with 61.8% skipping meals occasionally and 45% consuming outside food monthly. The mean blood glucose level was 146.85 mg/dL (SE: 3.92 mg/dL), with 97.1% consuming tea or coffee daily and 48.2% eating street food monthly. This study highlighted that Tailors, who tend to have sedentary work environments, are at particular risk due to a lack of awareness about diabetes, its management, proper nutrition normal Blood glucose, values and complications of DM.

ABSTRAK

Peningkatan prevalensi diabetes di negara-negara berkembang menyoroti tantangan kesehatan masyarakat yang serius yang terkait dengan perubahan gaya hidup dan kurangnya kesadaran akan pengelolaan penyakit ini. Penelitian ini berupaya mengisi kesenjangan pemahaman mengenai prevalensi diabetes dan pengetahuan pengelolaannya di antara kelompok pekerjaan dengan lingkungan kerja sedentari, seperti penjahit. Penelitian ini bertujuan untuk menilai prevalensi Diabetes Mellitus (DM) dan mengevaluasi pengetahuan tentang pengelolaannya di kalangan penjahit di Hyderabad. Penelitian berbasis komunitas dengan desain cross-sectional ini menilai prevalensi DM dan mengevaluasi pengetahuan tentang pengelolaannya di kalangan penjahit di Hyderabad, kelompok yang berisiko tinggi karena lingkungan kerja sedentari dan kurangnya kesadaran akan pengelolaan diabetes. Data dikumpulkan dari 170 penjahit berusia 30–60 tahun di empat wilayah di Hyderabad menggunakan kuesioner terstruktur dan pemeriksaan kadar glukosa darah acak. Hasil menunjukkan bahwa 58,8% peserta memiliki kadar glukosa normal, 25,3% pradiabetes, dan 15,9% diabetes. Diabetes (19,4%) dan hipertensi (22,9%) ditemukan umum, meskipun hanya 37,1% yang rutin minum obat. Kebiasaan makan yang tidak teratur juga terdeteksi, dengan 61,8% sesekali melewatkan makan dan 45% mengonsumsi makanan luar rumah setiap bulan. Rata-rata kadar glukosa darah adalah 146,85 mg/dL (SE: 3,92 mg/dL), dengan 97,1% mengonsumsi teh atau kopi setiap hari dan 48,2% makan makanan kaki lima setiap bulan. Penelitian ini menyoroti bahwa penjahit, yang cenderung memiliki lingkungan kerja sedentari, berada pada risiko khusus akibat kurangnya kesadaran akan diabetes, pengelolaannya, nutrisi yang baik, kadar glukosa darah normal, dan komplikasi DM

GRAPHICAL ABSTRACT



Keyword
blood glucose
diabetes mellitus
occupational health
prevalence
tailor

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ISSN-P : 2086-2040
ISSN-E : 2548-5334

INTRODUCTION

Tailors represent a particularly vulnerable group in such populations due to their sedentary occupation, which increases their risk of developing diabetes (Park et al., 2020; Yong et al., 2020). Despite the well-established risk factors for diabetes, empirical research focusing on specific occupational groups, such as tailors, is limited. Obesity, a key factor in diabetes mellitus (DM), significantly contributes to the rising prevalence of diabetes. According to International Diabetes Federation (2019), the number of diabetics in India was 77 million in 2019 and is projected to exceed 100 million by 2030. The Indian Council of Medical Research corroborates this, noting an increase in diabetes prevalence across different geographical areas in India, particularly in urbanized regions such as Hyderabad, where unhealthy eating habits and insufficient physical activity are prevalent (Ramachandran et al., 2018).

Sedentary work has been increasingly recognized as a significant contributor to the rising prevalence of type 2 diabetes mellitus (T2DM). The relationship between sedentary behavior and diabetes is multifaceted, involving metabolic, physiological, and lifestyle factors. Sedentary behavior, defined as any waking activity characterized by an energy expenditure of 1.5 metabolic equivalents (METs) or less, has been linked to various adverse health outcomes, including obesity, cardiovascular diseases, and diabetes (Park et al., 2020; Tjahjono & Arthamin, 2024; Vinothkumar et al., 2021). The global trend towards more sedentary occupations, particularly in office environments, exacerbates these risks, as prolonged sitting is associated with reduced physical activity levels and increased caloric intake, leading to weight gain and insulin resistance (Park et al., 2020; Nousias et al., 2019). Research indicates that sedentary lifestyles are strong predictors of obesity and metabolic disorders, including diabetes. For instance, sedentary behaviors significantly reduce lipoprotein lipase activity, impairing lipid metabolism and diminishing carbohydrate metabolism, which are critical processes in maintaining glucose homeostasis (Park et al., 2020). Furthermore, sedentary behavior has been shown to activate the sympathetic nervous system, decrease insulin sensitivity, and alter hormonal levels, all of which contribute to the development of T2DM (Park et al., 2020; Diolindo et al., 2023). The cumulative effect of these physiological changes underscores the importance of addressing sedentary behavior as a modifiable risk factor for diabetes.

Globally, the number of people with diabetes has increased dramatically, from 108 million in 1980 to 433 million in 2019. Developing countries are experiencing a rapid rise in diabetes prevalence, with 79% of adults with diabetes living in middle- and low-income countries. The projects of International Diabetes Federation (2019) that the global prevalence of diabetes will increase by 25% in 2030 and by 51% in 2045 if prevention methods and treatment programs remain unchanged. This trend is particularly pronounced in urban areas of developing countries, where lifestyle changes and increased consumption of processed foods contribute to the rise in diabetes cases.

India is facing a significant diabetes epidemic, with approximately 77 million individuals currently diagnosed with diabetes and projections indicating that this number could rise to over 134 million by 2045 (Lagad, 2023; Mohanty, 2024). The prevalence of diabetes in India is estimated to be around 9% of the adult population, with type 2 diabetes accounting for the vast majority of cases (Sindhuja, 2024). The American Diabetes Association predicts that diabetes cases in India will continue to rise, emphasizing the urgent need to engage specific high-risk groups. The country is often referred to as the "diabetes capital" of the world due to its high rates of the disease, which are exacerbated by rapid urbanization, dietary changes, and sedentary lifestyles (Mathur et al., 2022; Sarkar et al., 2020). The complications associated with diabetes in India tend to manifest earlier compared to Western populations, with individ-

uals often diagnosed at a later stage of the disease (Das et al., 2019; Pradeepa & Mohan, 2021). This late diagnosis contributes to a higher incidence of complications, including cardiovascular diseases and microvascular issues, which significantly impact morbidity and mortality rates among the diabetic population (Shekhar et al., 2023; Pradeepa & Mohan, 2021). Furthermore, the burden of diabetes is unevenly distributed, with urban areas experiencing higher prevalence rates compared to rural regions (Chandrupatla et al., 2020; Unnikrishnan et al., 2022). Addressing this public health crisis requires comprehensive strategies focused on prevention, early detection, and effective management of diabetes across diverse populations in India.

Safieddine et al. (2024) analyzed the prevalence of type 2 diabetes among different occupational sectors in Germany using health insurance claims data. The findings revealed significant differences in diabetes prevalence among various occupational groups, with higher rates observed in sectors such as transport, logistics, and security. The study highlighted the need for targeted prevention interventions for specific occupational groups. Carlsson et al. (2020), in a nationwide study in Sweden, examined the incidence and prevalence of type 2 diabetes across various occupational groups. The results showed that professional drivers, manufacturing workers, and cleaners had a higher risk of developing diabetes compared to university teachers and physiotherapists. Grimani et al. (2023) emphasized the importance of workplace interventions to reduce weight and increase physical activity among employees in high-risk occupations.

While previous research has explored diabetes prevalence among various socioeconomic groups and occupational sectors (Carlsson et al., 2020; Kuruvilla et al., 2023; Li & Nowrouzi-Kia, 2017; Nakazawa et al., 2022), there is a lack of studies specifically focusing on tailors. Additionally, there is limited research on the relationship between occupation-induced lifestyle habits and diabetes management, particularly concerning diet and nutrition. This study aims to fill these gaps by examining diabetes prevalence among tailors in Hyderabad and exploring the role of diet and lifestyle modifications in managing the disease. This study hypothesizes that the prevalence of diabetes among tailors in Hyderabad is higher than in the general population due to their sedentary occupation and limited awareness of diabetes management strategies. The objectives are to assess diabetes prevalence among tailors using random blood glucose levels, evaluate their knowledge regarding diabetes management through diet and lifestyle modifications, and identify associations between blood glucose levels, dietary patterns, and physical activity. By focusing on this occupation-specific group, the research aims to enhance the understanding of diabetes in Hyderabad and provide insights for public health interventions to reduce diabetes prevalence in sedentary workforces.

METHODS

The present research is a community-based cross-sectional study targeting tailors working in textile shops or boutiques in Hyderabad. A quantitative approach was employed to measure the prevalence of diabetes and assess the level of knowledge regarding diet and lifestyle management within the target population. The study utilized both descriptive and inferential statistical techniques to analyze data collected through questionnaires and random blood glucose level measurements.

The research was conducted across various localities in Hyderabad, Telangana, including Mehdipatnam, Tolichowki, Old City, and Malakpet. Data collection spanned a two-month period following approval from the institutional ethics committee. The geographical diversity of the selected areas ensured broad representation of tailors.

The study population included all tailors working in textile shops and boutiques in

Table 1
Existing medical conditions

Medical condition	Frequency	Percentage
Diabetes	33	19.4
Hypertension	39	22.9
Obesity	0	0
Asthma	1	0.6
Thyroid	6	3.5
None	91	53.5

Hyderabad who met the inclusion criteria. The sample size was calculated at 170 participants, based on the average incidence of diabetes among tailors. A non-random sampling method was used to recruit participants who met the inclusion criteria: individuals aged 30–60, both diabetic and non-diabetic, and capable of providing informed consent. Pregnant and lactating women, as well as individuals under the age of 30, were excluded from the study.

The research objectives were explained to participants, and written informed consent was obtained before data collection began. Ethical approval for the study was secured from the institution's ethics board. A detailed questionnaire was designed to capture participants' demographic profiles, medical history, eating habits, and diabetes-related knowledge. The questionnaire included five sections addressing personal details, eating patterns, diabetes awareness, and food frequency evaluation.

Random blood glucose levels were measured using a glucometer, and participants were classified as normal, borderline, or diabetic based on their glucose readings: normal (≤140 mg/dL), borderline (140–199 mg/dL), and diabetic (≥200 mg/dL). After assessment, dietary advice was provided, focusing on regular meals, monitoring sugar levels, and attending health clinics periodically.

Collected data were entered and processed using SPSS software. Descriptive statistics summarized demographic characteristics, while chi-square tests analyzed associations between diabetes status and variables such as dietary habits and weight changes. Results were presented in tables and graphs, highlighting the prevalence of diabetes and its correlations with lifestyle factors among participants. Confidentiality and anonymity of participants were maintained throughout the research process, ensuring adherence to ethical standards.

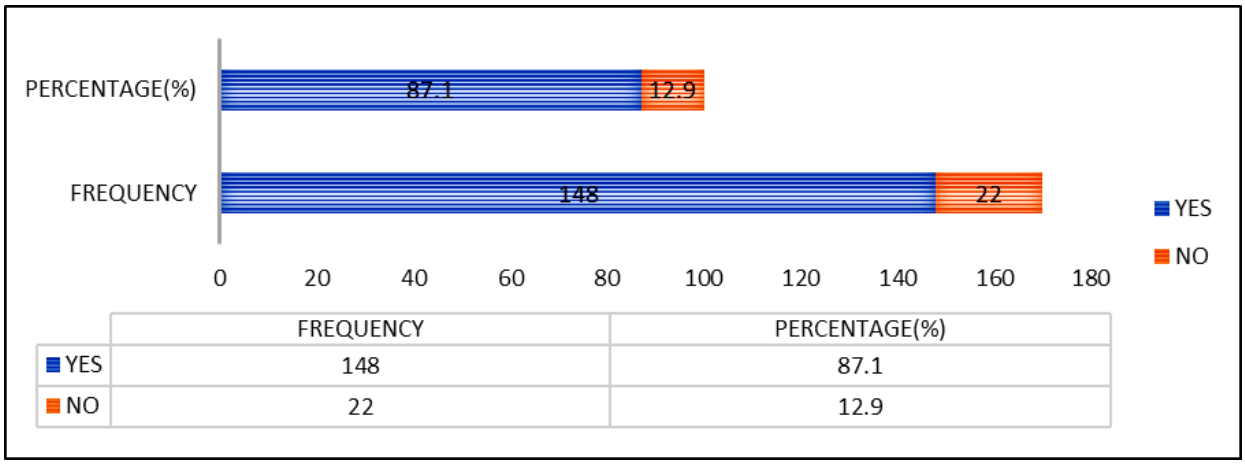
RESULTS

This study provides a comprehensive demographic and medical profile of tailors in a specific region. The research aimed to investigate age, gender, education, income levels, lifestyle diseases, medication usage, and dietary habits among tailors. Data were collected from 170 tailors using a structured questionnaire, and the study was conducted between July 2023 and September 2023. The majority of the tailors (50.6%) were aged between 40–50 years, with an equal gender distribution (50.6% males and 49.4% females). Most participants (41.8%) had an intermediate-level education, and 73.5% belonged to the middle-income category.

Table 1 indicates that a significant proportion (44.1%) of the tailors had lifestyle diseases, primarily diabetes (19.4%) and hypertension (22.9%). However, only 37.1% took regular medication, and 10.2% consumed nutritional supplements. Figure 1 presents data on the participants' knowledge of diabetes, the majority of participants (87.1%, n=148) reported having knowledge of diabetes, while 12.9% (n=22) indicated a lack of awareness. This highlights a relatively high level of awareness about diabetes among the study population, though a small proportion still remains uninformed, underscoring the need for targeted educational interventions for this group.

Figure 2 shows that 45.3% of the tailors had three meals per day, but 61.8% sometimes skipped meals. Around 45% consumed outside

Figure 1
Knowledge of diabetes



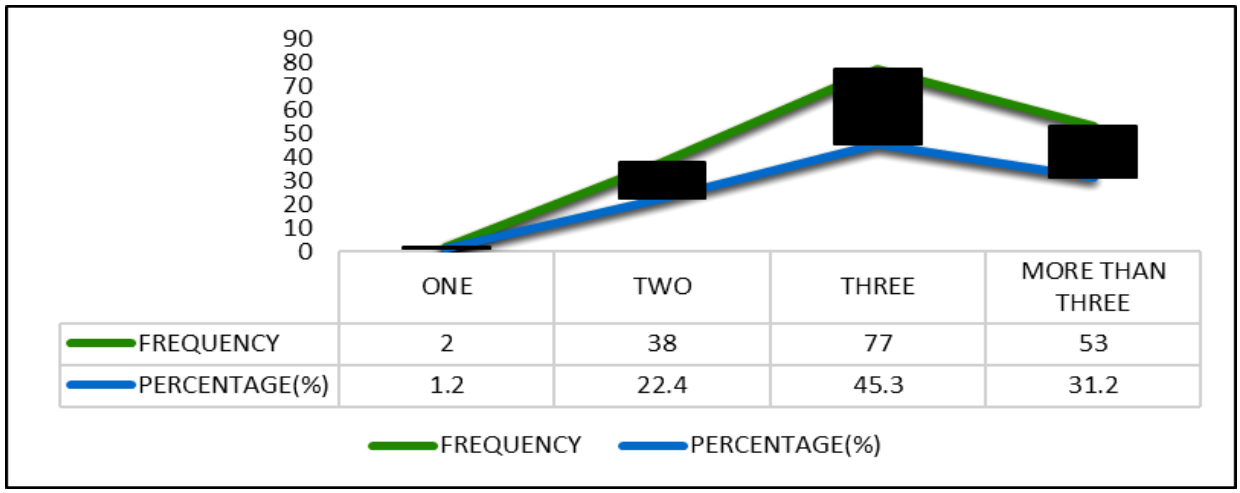
	FREQUENCY	PERCENTAGE(%)
YES	148	87.1
NO	22	12.9

food once a month, while 12.4% never ate outside food. Figure 3 reveals that 47.6% of the tailors had a good appetite, 34.1% had a fair appetite, and 18.2% had a poor appetite. Figure 4 shows the majority of study participants (62.9%) did not engage in regular exercise, while only a small proportion (37.1%) reported engaging in physical activity. This finding suggests that physical activity habits among the studied tailors are low, which could pose an additional risk for a sedentary lifestyle and potential health complications, such as diabetes or other chronic diseases.

Table 2 indicates that most tailors (48.8%) had their meals prepared by their spouse, while 49.4% prepared their meals themselves. Regarding diabetes control, 58.8% of the tailors had normal blood glucose levels, 25.3% were pre-diabetic, and 15.9% were diabetic. The mean random blood glucose level among the participants was 146.85 mg/dl with a standard error of 3.92 mg/dl. In terms of consuming food prepared outside the home, 48.2% of the tailors ate street food once a month, 27.1% consumed it once a week, and 1.8% consumed it twice a week. The majority (97.1%) of the participants reported consuming tea and coffee daily, while 51.8% consumed carbonated drinks once a month, and 54.7% consumed desserts and bakery products at the same frequency.

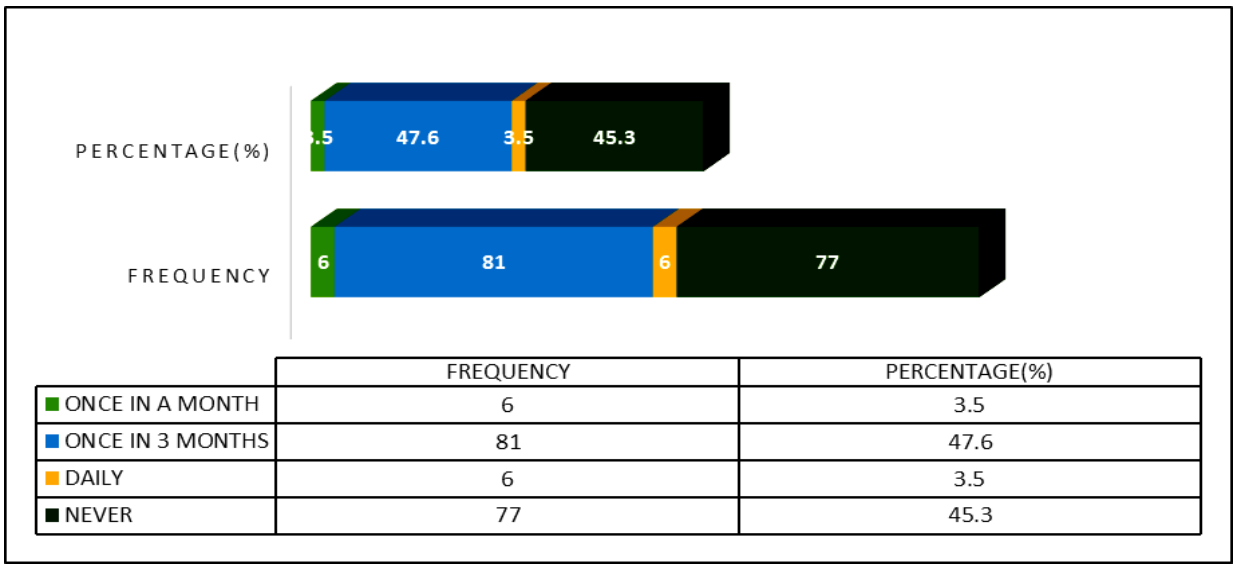
The study provides valuable insights into the demographic and medical profiles of tailors, highlighting the prevalence of lifestyle-

Figure 2
Number of meals consumed daily



	ONE	TWO	THREE	MORE THAN THREE
FREQUENCY	2	38	77	53
PERCENTAGE(%)	1.2	22.4	45.3	31.2

Figure 3
Frequency of blood glucose monitoring



	FREQUENCY	PERCENTAGE(%)
ONCE IN A MONTH	6	3.5
ONCE IN 3 MONTHS	81	47.6
DAILY	6	3.5
NEVER	77	45.3

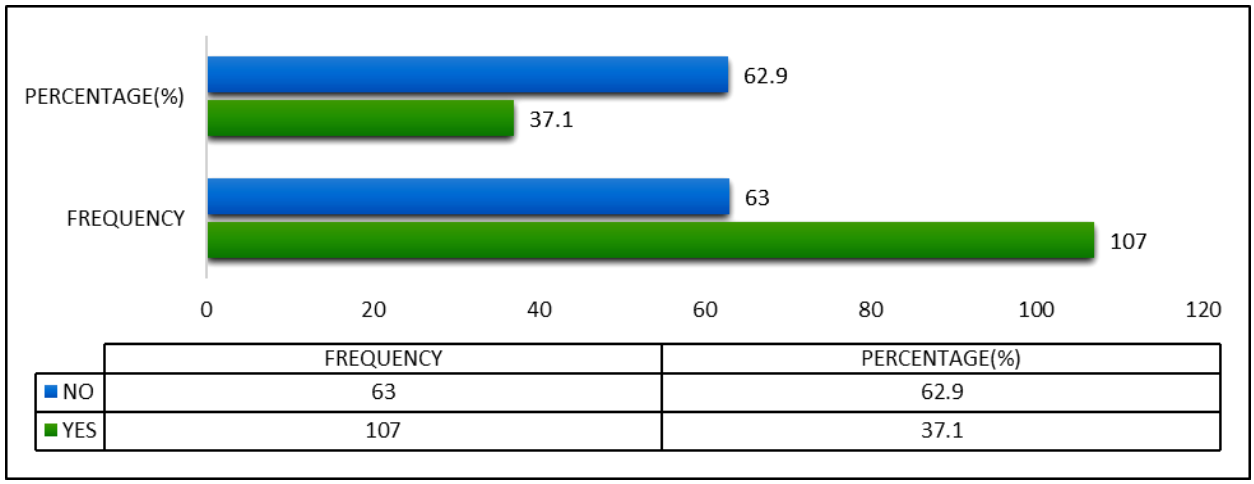
related diseases, dietary habits, and other health factors. These findings underscore the need for targeted interventions and health promotion strategies tailored to this occupational group.

DISCUSSION

The present study provides critical insights into the demographic and medical profile of tailors, a significant yet under-researched occupational group. These findings enhance our understanding of the health status and lifestyle habits of tailors, serving as a foundation for the development of targeted health interventions and promotion strategies (Tamiya et al., 2023).

A notable finding is the high prevalence of lifestyle diseases, particularly diabetes and hypertension, among tailors. The study revealed that 44.1% of the participants had lifestyle diseases, with 19.4% diagnosed with diabetes and 22.9% with hypertension. This aligns with previous research demonstrating an elevated risk of chronic diseases among individuals in sedentary occupations, such as tailoring, due to prolonged sitting, inadequate physical activity, and unhealthy dietary habits (Carlsson et al., 2020). These findings highlight the importance of regular health screenings and workplace-based health promotion programs tailored to the needs of this occupational group (International Diabetes Federation, 2019).

Figure 4
Frequency of exercise



	FREQUENCY	PERCENTAGE(%)
NO	63	62.9
YES	107	37.1

Table 2
Eating habits, diabetes control, and food and beverage consumption patterns of study participants

Category	Percentage (%)	Notes
Food Preparation		
Prepared by spouse	48.8	Majority rely on their spouse for cooking.
Prepared by self	49.4	Almost half prepare their own food.
Diabetes Control		
Normal glucose levels	58.8	Glucose ≤140 mg/dL.
Pre-diabetic	25.3	Glucose 140–199 mg/dL.
Diabetic	15.9	Glucose ≥200 mg/dL.
Consumption of Outside Food		
Street food (once a month)	48.2	Majority consume street food occasionally.
Street food (once a week)	27.1	
Street food (twice a week)	1.8	
Beverages		
Tea or coffee (daily)	97.1	High consumption among participants.
Carbonated drinks (once a month)	51.8	Moderate frequency of carbonated drinks.
Desserts/bakery (once a month)	54.7	Moderate frequency of sweets consumption.

Another significant finding is that only 37.1% of the tailors took regular medication despite the high prevalence of lifestyle diseases. This points to a potential gap in awareness and management of these conditions. Understanding barriers to medication adherence and disease management is critical, as poor control can lead to complications and further health deterioration (Dagogo-Jack, 2017). Targeted educational interventions and improved access to healthcare services may address these issues and enhance health outcomes for tailors (Sun et al., 2017).

The study also sheds light on dietary habits, revealing that 61.8% of the tailors sometimes skipped meals and 45.3% consumed outside food once a month. Irregular meal patterns and frequent consumption of outside food, often high in calories, fat, and sodium, are concerning due to their contribution to chronic disease development (Hu et al., 2018; Ramachandran et al., 2018). Additionally, 97.1% of the tailors consumed tea and coffee daily, 51.8% consumed carbonated drinks monthly, and 54.7% consumed desserts or bakery products once a month. High consumption of caffeinated beverages, sugary drinks, and processed foods increases the risk of obesity, diabetes, and cardiovascular diseases (Malik & Hu, 2022; Reyes & Cornelis, 2018). These findings underscore the need for targeted nutritional education and the promotion of healthier dietary practices among tailors (Safieddine et al., 2024).

Furthermore, the study examined self-care practices, focusing on foot care and the use of appropriate footwear. Alarmingly, 66.5% of the tailors never examined their feet, and only 0.6% wore orthopedic footwear. This is particularly concerning for individuals with diabetes, as inadequate foot care and inappropriate footwear can lead to diabetic foot complications, a major cause of lower-limb amputations (Dewi & Hinchliffe, 2020). Promoting regular foot examinations, proper foot care, and the use of appropriate footwear can help prevent such complications and enhance quality of life (Assah & Mbanya 2017).

This study highlights the high prevalence of lifestyle diseases, suboptimal dietary habits, and inadequate self-care practices among tailors. These findings emphasize the need for tailored interventions and health promotion strategies addressing the specific needs of this group. By tackling these health concerns, the study contributes to the broader public health agenda, promoting improved well-being and productivity among the workforce (World Health Organization, 2024).

The strengths of this study include its

comprehensive assessment of the demographic, medical, and lifestyle characteristics of tailors, providing a holistic understanding of their health status. The use of a structured questionnaire and objective measures, such as random blood glucose levels, enhances the reliability and validity of the findings. Additionally, the focus on an understudied occupational group contributes valuable insights to the broader literature on workforce health. However, the study has limitations. The cross-sectional design restricts the ability to establish causal relationships between variables. Additionally, its focus on a specific geographical region may limit the generalizability of the findings to other populations of tailors. Future research could investigate longitudinal trends in the health and lifestyle habits of tailors and expand the geographical scope to provide a more comprehensive understanding of this occupational group.

CONCLUSIONS

The findings of this study provide valuable insights into the health status and lifestyle habits of tailors, an occupational group that has received limited prior research attention. The study highlights a significant prevalence of lifestyle diseases, including diabetes and hypertension, along with a notable gap in medication adherence and disease management. Additionally, the study identifies concerning dietary habits and inadequate self-care practices, particularly regarding foot care among diabetic tailors. These results underscore the specific health risks faced by this population, largely influenced by their sedentary work environment and lifestyle choices. This research directly addresses the need to better understand the health challenges faced by tailors, highlighting areas for targeted interventions.

The contribution of these findings to public health is substantial, as they reveal the need for occupational health interventions tailored to sedentary workers, such as tailors. By addressing chronic disease management, improving access to healthcare, and promoting healthier lifestyle choices, the study's results can inform public health strategies aimed at reducing the burden of lifestyle diseases in similar occupational groups. Recommendations for regional and central governments include the development of workplace health promotion programs, regular health screenings, and public health campaigns that emphasize medication adherence, proper nutrition, and self-care practices. Institutions employing tailors should also consider offering health education sessions and facilitating access to medical resources. Future research could expand on these findings by exploring longitudinal trends and evaluating the effectiveness of tailored health interventions across different geographic regions. Addressing these areas would enhance public health efforts to improve the well-being and productivity of tailors and similar workforce populations.

ACKNOWLEDGEMENT

We would like to extend our heartfelt gratitude to all those who have contributed to this study. Especially to tailors of Hyderabad and secundrabad regions for their enthusiastic participation and valuable inputs for this study. Their cooperation and willingness to take part in this study were crucial to its success.

FUNDING

No funding was provided for carrying out this project.

AUTHORS' CONTRIBUTIONS

Nasreen Begum designed the study,wrote and revised the manuscript, and approved the final manuscript. Saadia Fatima enrolled participants, collected and acquired the data and performed the field work. All authors formulated the concept and analyzed the data

AUTHORS' INFORMATION

Nasreen Begum is an assistant professor and head of the Nutrition Department at St Ann's College for Women. She has 11 years of teaching and research Experience. She guides and mentors Undergraduates and Post graduate students for carrying out Dissertation thesis projects. Her interest areas of research include Nutrition science, food science, Public health, Community Nutrition and Health. Saadia Fatima is a researcher and Postgraduate Nutrition Student pursuing Masters in Clinical Nutrition and Public Health. This Project was part of her Dissertation Thesis. She is currently working as a Counsellor with a Nutrition Clinic.

COMPETING INTERESTS

The authors confirm that all of the text, figures, and tables in the submitted manuscript work are original work created by the authors and that there are no competing professional, financial, or personal interests from other parties.

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