

GENDER DIFFERENCES IN DIETARY ADHERENCE AMONG INDIVIDUALS WITH DIABETES: A COMMUNITY-BASED CROSS-SECTIONAL STUDY FROM VARANASI

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ABSTRACT

Diabetes management requires continuous lifestyle modifications, particularly adherence to a healthy diet. However, dietary practices are often influenced by the resources individuals have access to and the social expectations associated with gender. Previous studies have shown that gender-related responsibilities may influence dietary practices, with women often prioritizing caregiving responsibilities over their own health needs, while men may experience different challenges in managing diabetes. This study aimed to describe dietary adherence among individuals with diabetes and compare dietary adherence between male and female participants while examining the distribution of selected sociodemographic characteristics. A community-based cross-sectional study was conducted in the Arajilne block of Varanasi district. Data were collected using a semi-structured schedule that included socio-demographic characteristics, dietary practices, and diabetes-related information. The findings of this study may help inform public health interventions aimed at improving dietary adherence by considering gender differences and relevant sociodemographic characteristics among individuals with diabetes.

KEYWORDS: Dietary adherence, gender roles, diabetes management, lifestyle choices

INTRODUCTION

Diabetes mellitus has emerged as a major global public health challenge, affecting more than 537 million adults worldwide in 2021, with the number expected to increase substantially in the coming decades.^[1] India is one of the countries most severely affected by the diabetes epidemic and accounts for the highest number of diabetes-related deaths globally, with an estimated 331,308 deaths reported in 2021.^[2,3] According to the World Health Organization (WHO), diabetes is a chronic metabolic disorder characterized by elevated blood glucose levels resulting from defects in insulin secretion, insulin action, or both. If left inadequately managed, diabetes can lead to serious complications affecting the cardiovascular system, kidneys, eyes, nerves, and other organs.^[4]

Effective diabetes management relies heavily on long-term adherence to healthy lifestyle practices, particularly dietary modifications. Appropriate dietary adherence plays a crucial role in achieving optimal glycaemic control, delaying disease progression, and preventing diabetes-related complications. However, maintaining recommended dietary practices remains challenging for many individuals because dietary behaviour is influenced not only by personal motivation but also by social, cultural, and demographic factors.

Previous studies have shown that social determinants of health, including education, neighbourhood environment, and access to healthcare, influence diabetes management and self-care behaviours.^[5,6] These factors affect individuals' ability to obtain health information, adopt healthier lifestyles, and follow dietary recommendations. In addition to these determinants, gender-related differences may also influence diabetes management. Women, particularly in patriarchal societies such as India, often prioritise household responsibilities and family needs over their own health, which may limit their ability to adhere to recommended dietary practices. Conversely, men may encounter different challenges, including occupational demands, irregular meal schedules, and delayed healthcare-seeking behaviour, which can also influence diabetes self-management.^[6,7]

Although previous research has explored the influence of social determinants and gender on diabetes outcomes, limited community-based evidence is available regarding dietary adherence among individuals with diabetes in the Indian context, particularly with respect to gender differences. Understanding the distribution of dietary adherence across different population groups and comparing dietary adherence between male and female individuals can provide valuable evidence for designing targeted public health interventions.

Therefore, the present community-based cross-sectional study was undertaken in the Arajiline block of Varanasi district to describe dietary adherence among individuals with diabetes, examine its distribution according to selected sociodemographic characteristics, and compare dietary adherence between male and female participants.

REVIEW OF LITERATURE

Sociodemographic Factors and Dietary Adherence

Previous studies have demonstrated that dietary adherence varies across different population groups. Sociodemographic characteristics such as educational attainment, family support, place of residence, and access to healthcare resources can influence an individual's ability to follow recommended dietary practices. Hill-Briggs et al. (2021) highlighted that social determinants of health, including education, neighbourhood environment, and healthcare accessibility, significantly affect diabetes self-management behaviours.^[6]

Jeyalakshmi et al. (2024) reported that education and social support were important determinants of dietary compliance among elderly individuals with chronic diseases, including type 2 diabetes, in rural Karnataka. Their findings suggest that individuals with better educational backgrounds and stronger family support are more likely to adhere to recommended dietary practices.^[13]

Although socioeconomic disadvantage has been associated with poorer diabetes outcomes in several studies, including those conducted by Suwannaphant et al. (2017), Houle et al. (2016), and Tol et al. (2013), these studies primarily focused on socioeconomic inequalities rather than dietary adherence across different demographic groups.^[8,10,11]

Dietary Adherence in Diabetes Management

Dietary adherence is a cornerstone of effective diabetes management and plays an important role in achieving optimal glycaemic control and reducing the risk of diabetes-related complications. Along with medication and physical activity, adherence to dietary recommendations contributes substantially to improved health outcomes among individuals with diabetes. Walker et al. (2010) emphasized that maintaining a healthy diet and regular physical activity are essential components in the prevention and management of diabetes. However, adherence to these lifestyle recommendations is often influenced by multiple personal, social, and environmental factors.^[12]

Gender Differences in Diabetes Management

Gender-related differences represent another important aspect of diabetes self-management. Previous studies suggest that men and women may experience different challenges in maintaining healthy dietary practices. In many cultures, particularly in India, women often prioritize household responsibilities and caregiving roles over their own health needs, making adherence to dietary recommendations more challenging. Conversely, men may experience barriers related to occupational responsibilities, irregular meal timings, and delayed healthcare-seeking behaviour.^[7]

These gender-related differences may influence dietary practices and self-management behaviours, highlighting the importance of examining dietary adherence separately among male and female individuals.

Research Gap and Rationale

Although numerous studies have investigated the influence of socioeconomic conditions and social determinants on diabetes outcomes, relatively few community-based studies in India have specifically examined dietary adherence while simultaneously describing its distribution across sociodemographic characteristics and comparing dietary adherence between male and female individuals. Understanding these differences is important for designing culturally appropriate and gender-sensitive interventions that improve dietary adherence and diabetes management.

Therefore, the present study was undertaken to describe dietary adherence according to selected sociodemographic characteristics and to compare dietary adherence between male and female individuals with diabetes residing in the Arajiline block of Varanasi district.

Aim:

To describe dietary adherence among individuals with diabetes and compare dietary adherence between male and female participants.

Research Questions:

1. How is dietary adherence distributed across selected sociodemographic characteristics among individuals with diabetes?
2. Are there gender differences in dietary adherence among individuals with diabetes?

Objectives:

1. To describe dietary adherence according to selected sociodemographic characteristics.
2. To compare dietary adherence scores between male and female participants.

METHODOLOGY

Study Design

A community-based cross-sectional study was conducted in the Arajiline block of Varanasi district, Uttar Pradesh, India. The study area comprises a mixture of rural and semi-urban populations, providing an appropriate setting for describing dietary adherence among individuals with diabetes and comparing dietary adherence between male and female participants.

Study Participants and Sampling

Participants were selected using a purposive sampling technique. Individuals aged 18 years or older who had been previously diagnosed with diabetes for at least six months were eligible for inclusion in the study. Individuals with co-morbid conditions, such as chronic kidney disease, that could substantially influence dietary patterns were excluded.

Sample Size Calculation

The sample size was calculated using the formula for estimating a single proportion in a cross-sectional study:

$$n = \frac{Z^2 \times p \times q}{d^2}$$

where n is the required sample size, Z is the standard normal deviate at 95% confidence level (1.96), p is the estimated prevalence of diabetes, $q = 1 - p$, and d is the absolute precision.

Based on evidence from the Indian Council of Medical Research–India Diabetes (ICMR–INDIAB) national study, which reported an overall diabetes prevalence of approximately 11.4% among Indian adults, the prevalence was rounded to **12%** for sample size estimation. Assuming $p = 0.12$, $q = 0.88$, and an absolute precision of 5% ($d = 0.05$), the minimum sample size was calculated as:

$$n = \frac{(1.96)^2 \times 0.12 \times 0.88}{(0.05)^2} = 162.2$$

Thus, the minimum required sample size was **163 participants**. After accounting for a potential non-response rate of 10%, the final sample size was estimated to be approximately **181 participants**. Therefore, a total of 181 diabetic patients were approached, with 172 participants meeting the eligibility criteria.

Written informed consent was obtained from all participants prior to data collection. Confidentiality and anonymity of the respondents were maintained throughout the study.

Data Collection

Data were collected through house-to-house visits using a pretested semi-structured interview schedule. Information was obtained regarding participants' sociodemographic characteristics, lifestyle practices, dietary habits, and diabetes-related information.

Dietary adherence was assessed based on participants' self-reported consumption of recommended food items, including whole grains, fresh vegetables, fruits, and lean protein sources, as well as their avoidance of foods high in sugar and saturated fat. Based on the predefined scoring criteria, participants were categorized as having either **low dietary adherence** or **high dietary adherence**.

Statistical Analysis

Data were entered and analysed using IBM SPSS Statistics version 26. Descriptive statistics were used to summarize the characteristics of the study participants. Categorical variables were presented as frequencies and percentages, whereas continuous variables were summarized using means and standard deviations.

The distribution of participants with low and high dietary adherence was described according to selected sociodemographic characteristics, including gender, age group, educational attainment, family type, family size, marital status, religion, community, and food habits.

To compare dietary adherence between male and female participants, an independent samples t -test was performed using the mean dietary adherence score. Prior to conducting the t -test, the assumptions of normality and homogeneity of variances were assessed using appropriate graphical methods and Levene's test, respectively. Since the assumption of equal variances was satisfied, the standard independent samples t -test was applied. All statistical tests were two-tailed, and a p -value of less than 0.05 was considered statistically significant.

RESULTS

Table 1 describes the socio-demographic characteristics of participants according to diet adherence status. Participants with low diet adherence were predominantly female (53.0%), belonged mainly to the Hindu religion (94.0%), and were largely from the general community (77.8%). Most of them lived in nuclear families (65.0%) and had a family size greater than five members (54.7%). The majority were older adults (47.9%) and married (83.8%). With respect to food habits, 53.8% were vegetarians and 46.2% were non-vegetarians. In terms of education, a higher proportion had higher education (56.4%), followed by secondary (23.9%) and basic education (19.7%).

In contrast, participants with high diet adherence were mainly male (65.4%), predominantly Hindu (94.2%), and largely belonged to the general community (78.8%). A greater proportion resided in joint families (44.2%) and had a family size of more than five members (61.5%). Most were older adults (44.2%) and married (88.5%). The distribution of food habits was similar to the low adherence group, with 53.8% vegetarians and 46.2% non-vegetarians. Regarding educational status, the majority of participants with high adherence had higher education (75.0%), while smaller proportions had secondary (13.5%) and basic education (11.5%).

Overall, low diet adherence was more common among females, individuals from nuclear families, and those with lower educational attainment, whereas high diet adherence was more frequently observed among males, individuals from joint families, and those with higher educational attainment.

Table 1: Socio-demographic characteristics of participants according to diet adherence status.

Characteristics		Diet Adherence		Total
		Low adherence	High adherence	
Sex	Female	53.00%	34.60%	47.30%
	Male	47.00%	65.40%	52.70%
Religion	Hindu	94.00%	94.20%	94.10%
	Muslim	6.00%	5.80%	5.90%
Community	Gen	77.80%	78.80%	78.10%
	OBC	16.20%	11.50%	14.80%
	SC	6.00%	9.60%	7.10%
Type of family	Joint	35.00%	44.20%	37.90%
	Nuclear	65.00%	55.80%	62.10%
Family size	2	3.40%	0.00%	2.40%
	3	4.30%	7.70%	5.30%
	4	18.80%	11.50%	16.60%
	5	18.80%	19.20%	18.90%
	More than 5	54.70%	61.50%	56.80%
Age-group	Young Adults	2.60%	3.80%	3.00%
	Middle-Aged Adults	40.20%	40.40%	40.20%
	Older Adults	47.90%	44.20%	46.70%
	Elderly Adults	9.40%	11.50%	10.10%
Marital Status	Married	83.80%	88.50%	85.20%
	Separated	1.70%	0.00%	1.20%
	Unmarried	1.70%	1.90%	1.80%
	Widow	10.30%	9.60%	10.10%
	Widower	2.60%		1.80%
Food habit	Non-Vegetarian	46.20%	46.20%	46.20%
	Vegetarian	53.80%	53.80%	53.80%
Educational Qualification	Higher education	56.4%	75.0%	62.1%
	Basic education	19.7%	11.5%	17.2%
	Secondary education	23.9%	13.5%	20.7%
	Total	100.00%	100.00%	100.00%

As presented in Table 2, a large proportion of the study participants demonstrated **low diet adherence**, accounting for 118 individuals (69.4%). In contrast, **high diet adherence** was observed in only 52 participants (30.6%). These results indicate that fewer than one-third of the respondents adhered adequately to the recommended dietary practices, suggesting a high prevalence of poor dietary compliance in the study population.

Table 2: Status of Diet Adherence among individual with diabetes.

Diet adherence	Frequency	Percent
Low diet adherence	118	69.4
High diet adherence	52	30.6
Total	170	100

Table 3 presents the gender-wise distribution of diet adherence among the study participants. Among those with **low diet adherence**, females constituted 52.5% of the group, while males accounted for 46.6%. In contrast, among participants with **high diet adherence**, a higher proportion were males (65.4%) compared to females (34.6%). Overall, males represented 52.4% of the total study population, whereas females comprised 47.1%. These findings suggest that high diet adherence was more prevalent among males than females in the study sample.

Table 3: Gender-wise distribution of Diet adherence among individual with diabetes

Sex	Diet Adherence		Total
	Low diet adherence	High diet adherence	
Female	52.50%	34.60%	47.10%
Male	46.60%	65.40%	52.40%
Total	100.00%	100.00%	100.00%

Levene's Test for Homogeneity of Variances was performed prior to the t-test to ensure that the assumption of equal variances was satisfied. The result ($F = 3.220$, $p = 0.075$) indicated no significant variance differences between males and females, allowing for the application of a standard t-test.

Table 4: Levene's test for homogeneity of variances

Variable	F	sig.(p-value)	Equality of Variances
Average dietary adherence score	3.22	0.075	Equal

Table 5 presents the results of the independent samples t-test comparing mean dietary adherence scores between male and female participants. Males ($n = 89$) had a higher mean dietary adherence score (Mean = 4.88, SD = 0.98) than females ($n = 80$; Mean = 4.53, SD = 0.71). The difference in mean scores was statistically significant ($t = 2.59$, $p = 0.01$). The 95% confidence interval for the mean difference did not include zero, indicating a true difference between the groups. These findings suggest that dietary adherence was significantly higher among males compared to females in the study population.

Table 5: Independent Samples t-test for diet adherence among male and female

Variable	Group	N	Mean	Std. Deviation	t statistic	Sig. (2-tailed)	95% Confidence Interval of the Difference	
							Lower	Upper
Average dietary adherence score	Male	89	4.88	0.9817	2.59	0.01	0.083	0.609
	Female	80	4.534	0.7148			0.087	0.605

DISCUSSION

The present study described dietary adherence among individuals with diabetes and examined its distribution across selected sociodemographic characteristics, while comparing dietary adherence between male and female participants. Overall, the findings indicate that low dietary adherence was common among the study participants, with less than one-third demonstrating high dietary adherence. These findings highlight the continuing challenges faced by individuals with diabetes in adhering to recommended dietary practices and emphasize the need for interventions that address both individual and contextual factors influencing dietary behaviour.

One of the key observations of the present study was the variation in dietary adherence across selected sociodemographic characteristics. Participants with higher educational attainment showed a greater proportion of high dietary adherence than those with lower educational levels. Education plays an important role in improving health literacy, enabling individuals

to better understand dietary recommendations, recognize the importance of glycaemic control, and make informed food choices. Similar findings have been reported by Jeyalakshmi et al., who observed that education and social support were important determinants of dietary compliance among individuals with chronic diseases, including diabetes.^[13] Individuals with higher educational attainment may also be more likely to access health information and adhere to lifestyle recommendations provided by healthcare professionals.

The present study also observed differences in dietary adherence according to family characteristics. Participants living in joint families demonstrated relatively better dietary adherence than those residing in nuclear families. Family support may facilitate diabetes self-management by encouraging healthy eating behaviours, assisting with meal preparation, and reinforcing adherence to dietary recommendations. Conversely, individuals living in nuclear families may receive comparatively less support in maintaining recommended dietary practices. Similar observations have been reported by Tol et al., who highlighted the importance of social and contextual factors in influencing diabetes management outcomes.^[11] These findings suggest that family involvement should be considered while planning diabetes education and counselling programmes.

Gender differences constituted an important finding of the present study. Male participants demonstrated significantly higher mean dietary adherence scores than female participants, and the independent samples *t*-test confirmed that this difference was statistically significant. This finding is consistent with previous literature indicating that gender-related differences may influence diabetes self-management behaviours.^[6] In the Indian sociocultural context, women often assume primary responsibility for household activities and meal preparation, frequently prioritising the nutritional preferences of other family members over their own dietary requirements. These responsibilities may make it more challenging for women to consistently follow recommended dietary practices. At the same time, men may have greater autonomy in making food-related decisions, which could contribute to the higher dietary adherence observed in the present study. Although gender roles were not directly measured in this study, the observed differences may reflect the influence of prevailing social and cultural expectations regarding health and caregiving.^[6,7]

The overall prevalence of low dietary adherence observed in the present study is a matter of concern, as inadequate adherence to dietary recommendations may compromise glycaemic control and increase the risk of long-term diabetes-related complications. Since dietary management remains one of the fundamental components of diabetes care, improving adherence should be an important priority for healthcare providers and public health programmes. Community-based nutrition education, regular dietary counselling, and family-centred interventions may help improve adherence among individuals living with diabetes.

The prevalence of low dietary adherence observed in the present study is a matter of concern, as inadequate adherence to dietary recommendations may compromise glycaemic control and increase the risk of long-term diabetes-related complications. Since dietary management remains one of the fundamental components of diabetes care, improving adherence should be an important priority for healthcare providers and public health programmes. Community-based nutrition education, regular dietary counselling, and family-centred interventions may help improve adherence among individuals living with diabetes.

The findings of this study should be interpreted in light of its design. The descriptive analysis provides useful information regarding the distribution of dietary adherence across selected sociodemographic characteristics, while the comparison between male and female participants demonstrates significant gender differences in dietary adherence. However, because of the cross-sectional nature of the study, causal relationships cannot be established. Future longitudinal and qualitative studies are needed to better understand the underlying behavioural, cultural, and social factors contributing to gender differences in dietary adherence among individuals with diabetes.

CONCLUSION

The present study highlights that dietary adherence among individuals with diabetes remains suboptimal, with notable differences observed across selected sociodemographic characteristics. Female participants demonstrated significantly lower dietary adherence than male participants, indicating the importance of considering gender-related challenges in diabetes self-management. These findings underscore the need for community-based, gender-sensitive nutritional education and family-centred interventions to promote healthy dietary practices among individuals with diabetes. Future studies employing longitudinal and qualitative designs are warranted to further explore the social and behavioural factors underlying dietary adherence and to develop effective strategies for improving diabetes self-management.

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