

Original Research Article

Knowledge, attitude and practice regarding diabetes mellitus and hypertension among non-teaching staff of a tertiary care hospital in Tamil Nadu: a cross-sectional study

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ABSTRACT

Background: Diabetes mellitus and hypertension are major non-communicable diseases. Adequate knowledge, positive attitudes, and healthy practices are important for their prevention and control. This study assessed knowledge, attitude, and practice (KAP) regarding diabetes mellitus and hypertension among non-teaching staff and their association with selected sociodemographic characteristics and risk factors.

Methods: An institution-based cross-sectional study was conducted among 110 non-teaching staff at Government Medical College and Hospital, Cuddalore, Tamil Nadu, during May–June 2024. Participants were selected by simple random sampling. Data were collected using a validated structured questionnaire, and anthropometric measurements were recorded. Data were analysed using SPSS version 26. Differences in continuous KAP scores across groups were assessed using independent samples Student's t-test and one-way ANOVA, while categorical associations were evaluated using the Chi-square test ($p < 0.05$ considered significant).

Results: Among 110 participants, 88 (80.0%) had good knowledge, 103 (93.6%) had a positive attitude, and 29 (26.4%) had good practices. Most participants were male (80.0%), and 53 (48.2%) were aged 41–50 years. Educational status was significantly associated with knowledge ($p = 0.007$) and practice ($p = 0.009$). Diabetes mellitus was present in 41 (37.2%) and hypertension in 53 (48.2%) participants. Participants with ≥ 3 risk factors had a significantly higher proportion of diabetes mellitus (47.5% vs. 24.5%; $\chi^2 = 6.18$, $p = 0.013$) and hypertension (60.7% vs. 32.7%; $\chi^2 = 8.53$, $p = 0.003$) compared with those with < 3 risk factors.

Conclusion: Despite good knowledge and positive attitudes, preventive practices were suboptimal. Workplace-based health education, regular screening, lifestyle counselling, and risk-factor reduction strategies may improve NCD prevention among non-teaching staff.

Keywords: Diabetes mellitus, Hypertension, Knowledge, Attitude, Practice, Non-teaching staff, Non-communicable diseases

INTRODUCTION

Non-communicable diseases (NCDs) are the leading cause of morbidity and mortality worldwide and account for a substantial proportion of the global disease burden. Cardiovascular diseases, diabetes mellitus, chronic respiratory diseases, and cancers collectively contribute to

millions of deaths annually, particularly in low- and middle-income countries. Diabetes mellitus and hypertension are among the most common NCDs and are major contributors to cardiovascular morbidity, renal disease, stroke, disability, and premature mortality. Their increasing prevalence poses a significant challenge to healthcare systems globally.¹⁻⁴

According to the World Health Organization (WHO), approximately 422 million people worldwide are living with diabetes mellitus, while more than 1.28 billion adults aged 30–79 years have hypertension. The burden of both conditions is increasing rapidly, especially in developing countries, due to urbanization, population ageing, unhealthy dietary habits, physical inactivity, obesity, tobacco use, and harmful alcohol consumption. Diabetes mellitus and hypertension are often asymptomatic during the early stages and may remain undiagnosed for prolonged periods, resulting in preventable complications and increased healthcare expenditure.^{5,6}

KAP studies are valuable tools for assessing awareness, perceptions, and health-related behaviours within a population. Adequate knowledge regarding risk factors, symptoms, complications, and preventive measures can facilitate early diagnosis and effective disease management. Similarly, positive attitudes toward lifestyle modification and preventive healthcare are essential for translating awareness into healthy practices. However, several studies have demonstrated a gap between knowledge and actual health-related behaviours, particularly in the prevention and control of chronic diseases.⁷⁻¹⁰

Non-teaching staff working in healthcare institutions represent a unique occupational group comprising administrative personnel, clerical staff, maintenance workers, attendants, security personnel, and other support staff. Although they work within healthcare environments, they may not receive the same level of health education and awareness as healthcare professionals. Occupational stress, sedentary work patterns, irregular dietary habits, and limited access to structured health promotion programmes may increase their vulnerability to diabetes mellitus and hypertension. Furthermore, evidence regarding KAP related to these conditions among non-teaching staff remains limited.

Assessing the knowledge, attitude, and practice regarding diabetes mellitus and hypertension among non-teaching staff is essential for identifying gaps in awareness and preventive behaviours. Understanding these factors can help design targeted workplace-based health education programmes and lifestyle interventions aimed at reducing the burden of non-communicable diseases. Therefore, the present study was undertaken to assess the knowledge, attitude, and practice regarding diabetes mellitus and hypertension among non-teaching staff in a tertiary care teaching hospital and to examine their association with selected sociodemographic characteristics.

Primary objective

To assess the knowledge, attitude, and practice regarding diabetes mellitus and hypertension among non-teaching staff working in Government Medical College and Hospital, Cuddalore.

Secondary objectives

To determine the association of knowledge and practice scores with selected sociodemographic characteristics. To assess the association between the presence of selected risk factors and diabetes mellitus and hypertension among the study participants.

METHODS

Study design and setting

An institution-based cross-sectional study was conducted among non-teaching staff members of Government Medical College and Hospital, Cuddalore.

Study duration

The study was carried out over a period of two months from May 2024 to June 2024.

Study population

The study population comprised all non-teaching staff working in Government Medical College and Hospital, Cuddalore during the study period.

Inclusion criteria

Non-teaching staff employed at Government Medical College and Hospital, Cuddalore during the study period.

Individuals willing to participate and provide informed consent.

Exclusion criteria

Staff members who were absent during the data collection period.

Sample size

The sample size was calculated based on the findings of Manjrekar et al in which the proportions of good knowledge, attitude, and practice regarding hypertension were reported as 80%, 57%, and 30%, respectively, while the corresponding proportions for diabetes mellitus were 60.2%, 76%, and 30%.¹¹ Using these proportions, the sample size was estimated using the formula: $n = Z^2 pq / L^2$, where $Z = 1.96$ at 95% confidence level, $p = \text{expected proportion}$, $q = 1 - p$, and $L = \text{absolute precision of } 10\%$.

The calculated sample sizes for the various KAP components ranged from 62 to 95. The highest calculated sample size ($n = 95$) was considered for the study. After adding 10% to account for possible non-response, the required sample size was 105. The final sample size was rounded off to 110 participants.

Sampling technique

A sampling frame consisting of all eligible non-teaching staff members was prepared. Participants were selected using a simple random sampling technique to ensure equal probability of selection and minimize selection bias.

Study tool

Data were collected through face-to-face interviews using a pre-tested, structured questionnaire available in both English and Tamil. Content validity was evaluated by community medicine and general medicine faculty. The questionnaire demonstrated acceptable internal consistency reliability (overall Cronbach's $\alpha=0.78$). The questionnaire consisted of four sections.

Section I: sociodemographic characteristics

Information regarding age, gender, educational status, occupation, smoking status, alcohol consumption, dietary pattern, family history of diabetes mellitus and hypertension, and other relevant characteristics was collected.

Section II: knowledge assessment

Knowledge regarding diabetes mellitus and hypertension was assessed using 11 questions, including questions related to risk factors, symptoms, complications, prevention, and control measures.

Section III: attitude assessment

Attitude towards diabetes mellitus and hypertension was assessed using six statements evaluating participants' perceptions regarding prevention, treatment, and lifestyle modification.

Section IV: practice assessment

Practice was assessed using 5 questions, including questions related to lifestyle behaviours, preventive measures, health-seeking behaviour, and disease control practices.

Anthropometric assessment

Anthropometric measurements were obtained using standard procedures.

Body mass index

BMI was calculated as: $BMI = \text{Weight (kg)} / \text{Height (m)}^2$. Participants were classified according to BMI as normal (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²), and obese (≥ 30.0 kg/m²).

Waist–hip ratio

Waist–hip ratio was calculated by dividing waist circumference by hip circumference. Central obesity was defined using the sex-specific cut-off values adopted for the study. Normal values "WHR" ≤ 0.90 for men and ≤ 0.85 for women.

Diabetes and hypertension

Diabetes mellitus was defined as previous physician diagnosis, current use of antidiabetic therapy, or random capillary blood glucose ≥ 200 mg/dl referred for confirmatory laboratory testing. Hypertension was defined as self-reported prior physician diagnosis, current antihypertensive medication, or systolic blood pressure ≥ 140 mmHg / diastolic ≥ 90 mmHg on two readings

Risk-factor scoring

Eight cardiometabolic risk factors were evaluated, each assigned a binary score (1 if present, 0 if absent) age ≥ 45 years, Current cigarette/beedi smoking, Current alcohol consumption, non-vegetarian dietary pattern, Overweight or obesity (" $BMI \geq 25.0$ (kg/m²)"), Elevated waist–hip ratio (> 0.90 men, > 0.85 women), Family history of diabetes mellitus, Family history of hypertension. Cumulative risk scores were summed (range: 0–8) and categorized into < 3 risk factors vs ≥ 3 risk factors.

Operational definitions

Good knowledge

Participants who correctly answered more than six knowledge-related questions were categorized as having good knowledge.

Poor knowledge

Participants who correctly answered six or fewer knowledge-related questions were categorized as having poor knowledge.

Positive attitude

Participants who demonstrated positive responses to more than three attitude-related questions were considered to have a positive attitude.

Negative attitude

Participants who demonstrated positive responses to three or fewer attitude-related questions were considered to have a negative attitude.

Good practice

Participants who reported appropriate practices in more than two practice-related questions were categorized as having good practice.

Poor practice

Participants who reported appropriate practices in two or fewer practice-related questions were categorized as having poor practice.

Data collection procedure

After obtaining institutional permission and ethical clearance, eligible participants were approached individually. The objectives of the study were explained, and written informed consent was obtained. The questionnaire was administered in a confidential setting, and anthropometric measurements were recorded using standard techniques.

Statistical analysis

Data were processed using IBM SPSS Statistics version 26.0. Categorical variables are reported as frequencies and percentages. Continuous KAP scores are expressed as mean±standard deviation (SD). Between-group comparisons of mean scores were executed using the independent samples t-test (for 2 groups) or one-way ANOVA (for ≥3 groups). Associations between risk score categories and clinical conditions were examined using the Pearson Chi-square test. A p value <0.05 was considered statistically significant.

Ethical considerations

Ethical approval was obtained from the Institutional Ethics Committee of Government Medical College and Hospital, Cuddalore, prior to commencement of the study. Written informed consent was obtained from all participants. Confidentiality, anonymity, and privacy of the study participants were maintained throughout the study. Participation was voluntary, and participants were free to withdraw from the study at any stage without any consequences.

RESULTS

A total of 110 non-teaching staff participated in the study. The majority were males (88, 80.0%), while females

constituted 22 (20.0%). The largest proportion of participants belonged to the 41–50 years age group (53, 48.2%), followed by 51–60 years (40, 36.4%) and 30–40 years (17, 15.5%). Regarding educational status, 66 (60.0%) were diploma/graduate/postgraduate educated, while 37 (33.6%) had middle or high school education and 7 (6.4%) had primary education. Skilled workers constituted the largest occupational group (41, 37.3%). Regarding lifestyle characteristics, 34 (30.9%) participants reported alcohol consumption and 28 (25.4%) were smokers. The majority were non-vegetarians (96, 87.3%). A family history of diabetes mellitus was reported by 26 (23.6%) participants, while 23 (20.9%) reported a family history of hypertension. Diabetes mellitus was present in 41 (37.2%) participants and hypertension in 53 (48.2%). On anthropometric assessment, 58 (52.7%) participants had normal BMI, 38 (34.5%) were overweight, and 14 (12.7%) were obese. A high waist–hip ratio was observed in 53 (48.2%) participants, while 57 (51.8%) had a normal waist–hip ratio.

Regarding KAP, 88 (80.0%) participants had good knowledge and 22 (20.0%) had poor knowledge. A positive attitude was observed among 103 (93.6%) participants, while 7 (6.4%) had a negative attitude. Only 29 (26.4%) participants demonstrated good practices, whereas 81 (73.6%) had poor practices. Educational status was significantly associated with knowledge scores ($p=0.007$) and practice scores ($p=0.009$). No statistically significant association was observed between knowledge scores and age, gender, occupation, alcohol consumption, smoking, dietary pattern, or family history of diabetes mellitus or hypertension.

Similarly, practice scores were not significantly associated with age, gender, occupation, alcohol consumption, smoking, dietary pattern, or family history of diabetes mellitus or hypertension. Regarding cumulative risk factors, 61 (55.5%) participants had three or more risk factors, while 49 (44.5%) had fewer than three risk factors. Among those with three or more risk factors, 29 (47.5%) had diabetes mellitus compared with 12 (24.5%) among those with fewer than three risk factors. This association was statistically significant ($\chi^2=6.18$, $p=0.013$). Hypertension was present in 37 (60.7%) participants with three or more risk factors compared with 16 (32.7%) among those with fewer than three risk factors. This association was also statistically significant ($\chi^2=8.53$, $p=0.003$).

Table 1: Socio-demographic characteristics of the study participants.

Variables	Frequency	%
Age (in years)	30–40	17
	41–50	53
	51–60	40
Gender	Male	88
	Female	22

Continued.

Variables		Frequency	%
Education	Primary	7	6.4
	Middle & high school	37	33.6
	Diploma/graduate/postgraduate	66	60.0
Occupation	Unskilled	18	16.4
	Semiskilled	26	23.6
	Clerical	25	22.7
	Skilled	41	37.3
Alcohol consumption	Consume	34	30.9
	Not consume	76	69.1
Smoking habits	Smoker	28	25.4
	Not smoker	82	74.5
Dietary pattern	Vegetarian	14	12.7
	Non vegetarian	96	87.3
Family history of diabetes mellitus	Yes	26	23.6
	No	84	76.4
Family history of hypertension	Yes	23	20.9
	No	87	79.1
Diabetes mellitus	Present	41	37.2
	Absent	69	62.8
Hypertension	Present	53	48.2
	Absent	57	51.8

Table 2: Distribution of study participants according to anthropometry measurements.

Anthropometry examinations		Frequency	%
BMI	Normal	58	52.7
	Overweight	38	34.5
	Obese	14	12.7
Waist-hip ratio	Normal	57	51.8
	High	53	48.2

Table 3: Distribution of study participants according to knowledge, attitude and practice categories.

Outcomes	Knowledge Frequency (%)	Attitude Frequency (%)	Practice Frequency (%)
Good	88 (80)	103 (93.6)	29 (26.4)
Poor	22 (20)	7 (6.4)	81 (73.6)

Table 4: Association between selected sociodemographic characteristics and knowledge score.

Variables	Category	N	Mean±SD	Test statistics	P value
Age (in years)	30–40	17	7.53±1.94	F=0.62	0.54
	41–50	53	7.87±1.79		
	51–60	40	7.95±1.83		
Gender	Male	88	7.89±1.80	t=0.49	0.625
	Female	22	7.68±1.91		
Education	Primary	7	5.57±1.51	F=5.21	0.007*
	Middle & High school	37	7.62±1.77		
	Diploma/Graduate/Postgraduate	66	8.21±1.74		
Occupation	Unskilled	18	7.33±1.91	F=1.09	0.357
	Semiskilled	26	7.73±1.85		
	Clerical	25	8.04±1.74		
	Skilled	41	8.02±1.77		
Alcohol	Yes	34	7.71±1.87	t=-0.52	0.604
	No	76	7.91±1.81		

Continued.

Variables	Category	N	Mean±SD	Test statistics	P value
Smoking	Yes	28	7.64±1.93	t=-0.71	0.479
	No	82	7.92±1.79		
Diet	Vegetarian	14	8.07±1.77	t=0.49	0.625
	Non-vegetarian	96	7.81±1.84		
Family history of diabetes	Yes	26	8.08±1.74	t=0.75	0.455
	No	84	7.77±1.85		
Family history of hypertension	Yes	23	8.00±1.76	t=0.46	0.646
	No	87	7.80±1.84		

*Statistically significant

Table 5: Association between selected sociodemographic characteristics and practice score.

Variables	Category	N	Mean±SD	Test statistics	P value
Age in years	30–40	17	1.82±0.95	F=0.51	0.602
	41–50	53	1.91±0.93		
	51–60	40	2.00±0.96		
Gender	Male	88	1.94±0.93	t=0.50	0.618
	Female	22	1.83±0.98		
Education	Primary	7	1.14±0.69	F=4.88	0.009*
	Middle & High school	37	1.76±0.93		
	Diploma/Graduate/Postgraduate	66	2.09±0.91		
Occupation	Unskilled	18	1.72±0.96	F=0.92	0.434
	Semiskilled	26	1.85±0.92		
	Clerical	25	1.96±0.93		
	Skilled	41	2.05±0.95		
Alcohol	Yes	34	1.82±0.97	t=-0.69	0.492
	No	76	1.96±0.93		
Smoking	Yes	28	1.79±0.96	t=-0.86	0.392
	No	82	1.96±0.93		
Diet	Vegetarian	14	2.00±0.96	t=0.35	0.727
	Non-vegetarian	96	1.91±0.94		
Family history of diabetes	Yes	26	2.04±0.92	t = 0.76	0.449
	No	84	1.88±0.95		
Family history of hypertension	Yes	23	2.00±0.95	t = 0.48	0.632
	No	87	1.90±0.94		

*Statistically significant

Table 6: Association between risk factors and diabetes mellitus.

Risk factor	Diabetes Mellitus			χ^2	P value
	Yes	No	Total		
≥3	29	32	61	6.18	0.013*.
< 3	12	37	49		
Total	41	69	110		

*Statistically significant

Table 7: Association between risk factors and hypertension.

Risk factor	Hypertension			χ^2	P value
	Yes	No	Total		
≥3	37	24	61	8.53	0.003*
<3	16	33	49		
Total	53	57	110		

*Statistically significant

DISCUSSION

The present study assessed the KAP regarding diabetes mellitus and hypertension among non-teaching staff of a tertiary care teaching hospital. Among the 110 participants, 88 (80.0%) had good knowledge, 103 (93.6%) had a positive attitude, whereas only 29 (26.4%) demonstrated good preventive practices. These findings indicate a clear gap between knowledge and attitude on the one hand and the adoption of healthy preventive practices on the other. Similar gaps between awareness and actual health-related practices have been reported in previous studies among individuals and community populations.^{11,12} In the present study, 80.0% of participants demonstrated good knowledge regarding diabetes mellitus and hypertension. This finding is comparable with the observations of Manjrekar et al and Yadav et al who reported adequate knowledge regarding the causes and risk factors of diabetes mellitus and hypertension among their study participants. Chakraverty et al also reported satisfactory awareness regarding diabetes mellitus among community participants in India.^{7,11,13-16} The relatively good level of knowledge observed in the present study may be related to the participants' working environment within a healthcare institution, where they may have greater exposure to health-related information. However, knowledge alone may not be sufficient to result in sustained preventive behaviour.

A positive attitude was observed among 103 (93.6%) participants. Similar favourable attitudes towards prevention and control of diabetes mellitus and hypertension have been reported by Asante et al and Rajalakshmi et al.^{10,17} A positive attitude may indicate recognition of the importance of healthy lifestyles, disease prevention, treatment adherence, and regular health monitoring. However, the high proportion of participants with a positive attitude did not correspond to a similarly high proportion reporting good practices.

Only 29 (26.4%) participants demonstrated good preventive practices, while 81 (73.6%) had poor practices. Similar findings have been reported by Neupane et al, Ralapanawa et al and Das et al who identified gaps between knowledge and the implementation of recommended preventive and disease-control measures.^{9,12,14} This difference between knowledge, attitude, and practice suggests that awareness and favourable perceptions may not automatically result in behavioural change.

Several factors may contribute to inadequate preventive practices. Occupational responsibilities, irregular work schedules, limited time for physical activity, dietary habits, and sedentary behaviour may make it difficult for employees to consistently follow healthy lifestyle recommendations. In addition, behavioural change requires continued motivation and a supportive environment. Therefore, health education programmes

should not focus only on increasing knowledge but should also include practical strategies that facilitate sustained lifestyle modification.

Educational status was significantly associated with both knowledge and practice scores. Participants with higher educational attainment had higher mean knowledge and practice scores. The association was statistically significant for knowledge ($p=0.007$) and practice ($p=0.009$). Similar associations between educational status and health-related knowledge, attitudes, and practices have been reported by Baety et al, Rahayu et al and Rajalakshmi et al.^{16,17} Higher educational attainment may facilitate access to health information and improve the ability to understand, interpret, and implement health recommendations. These findings highlight the importance of tailoring health education according to the educational needs of different categories of non-teaching staff.^{18,19}

No statistically significant associations were observed between knowledge or practice scores and age, gender, occupation, alcohol consumption, smoking, dietary pattern, or family history of diabetes mellitus or hypertension. Although some differences in mean scores were observed across these groups, the differences did not reach statistical significance. In this study, educational status was the only sociodemographic characteristic significantly associated with knowledge and practice scores. However, because of the relatively small sample size, smaller differences between subgroups may not have been detected.

The study also demonstrated a significant association between the cumulative number of risk factors and the occurrence of diabetes mellitus and hypertension. Among participants with three or more risk factors, 29 (47.5%) had diabetes mellitus compared with 12 (24.5%) among those with fewer than three risk factors ($\chi^2=6.18$, $p=0.013$). Similarly, hypertension was present in 37 (60.7%) participants with three or more risk factors compared with 16 (32.7%) among those with fewer than three risk factors ($\chi^2=8.53$, $p=0.003$). These findings are consistent with evidence that diabetes mellitus and hypertension are influenced by multiple interacting behavioural and metabolic risk factors.²⁰⁻²² The findings also support the importance of assessing the overall risk-factor profile rather than considering individual risk factors in isolation.

Anthropometric findings further indicate the presence of cardiometabolic risk among the participants. In the present study, 38 (34.5%) participants were overweight and 14 (12.7%) were obese, while 53 (48.2%) had a high waist-hip ratio. Thus, nearly half of the participants had evidence of increased central adiposity. Excess body weight and central obesity are recognized risk factors for diabetes mellitus and hypertension and may contribute to the occurrence of these conditions.^{3,4,20} The presence of these risk factors among hospital employees highlights

the importance of incorporating weight management and physical activity promotion into workplace health programmes.

Non-teaching staff represent an important workforce within healthcare institutions but may receive less structured health education than healthcare professionals. Their work may involve prolonged sitting, shift-related duties, irregular meal timings, occupational stress, and limited opportunities for physical activity.^{21,22} These factors may create barriers to adopting healthy behaviours even when awareness regarding NCD prevention is adequate. Workplace-based interventions may therefore provide an appropriate opportunity to address these barriers.

The findings have important implications for workplace health promotion. Periodic screening for diabetes mellitus and hypertension, lifestyle counselling, promotion of physical activity, healthy dietary practices, weight management, and behaviour-change communication could be incorporated into employee health programmes. Such interventions should particularly emphasize the translation of knowledge and positive attitudes into sustainable preventive practices. Regular follow-up may also help identify employees with multiple risk factors and facilitate early intervention.

Overall, the findings demonstrate that although most participants had good knowledge and positive attitudes towards diabetes mellitus and hypertension, preventive practices remained inadequate. Educational status was significantly associated with knowledge and practice, while the presence of three or more risk factors was significantly associated with the occurrence of both diabetes mellitus and hypertension. These findings support the need for workplace-based interventions that move beyond information provision and focus on practical, sustained behavioural change among non-teaching staff.

Strengths

The study employed a validated structured questionnaire and simple random sampling technique, thereby minimizing selection bias. Simultaneous assessment of knowledge, attitude, and practice regarding both diabetes mellitus and hypertension provided a comprehensive understanding of awareness and preventive behaviours among non-teaching staff in a tertiary care teaching hospital.

Limitations

The study was conducted in a single tertiary care institution, limiting the generalizability of findings. The cross-sectional design precludes causal inference. In addition, self-reported responses may be subject to recall bias and social desirability bias.

CONCLUSION

The present study demonstrated that non-teaching staff possessed adequate knowledge and favourable attitudes regarding diabetes mellitus and hypertension. However, healthy practices remained inadequate among the majority of participants. Educational status was significantly associated with knowledge and practice scores, indicating that educational differences may be relevant when designing workplace health-education interventions. In addition, the presence of multiple risk factors was significantly associated with diabetes mellitus and hypertension. These findings underscore the need for workplace-based health education programmes, regular screening, and lifestyle modification interventions to improve preventive practices and strengthen the prevention and control of non-communicable diseases among non-teaching staff.

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