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Knowledge, attitude and practice towards diabetes among healthcare patient in tertiary care hospital

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Abstract
Introduction: Non-communicable diseases like diabetes mellitus (DM) pose a major global health threat, with DM being the fourth leading cause of death. Despite advancements in diagnosis and management, a gap remains between ideal treatment goals and outcomes. Raising awareness and understanding Knowledge, Attitudes, and Practices (KAP) among diabetics is crucial for effective diabetes control and reducing healthcare costs.
Aims and objectives: To assess the level of knowledge, attitude and practice [KAP] towards diabetes among health care patients.
Methodology: The study included 289 subjects meeting the inclusion criteria of adults with type 2 diabetes, while excluding those under 18, with type 1 or gestational diabetes, or unwilling to consent. Data was collected using a structured questionnaire after obtaining written informed consent.
Results: This study of 289 participants found that 52% were female and 47% male. Most were aged 51-70 years, with 30.1% having higher secondary education a majority (86.5%) belonged to the middle class, and most had diabetes for 1-10 years. The study found that KAP scores were significantly associated with education level, occupation, duration of diabetes, and socio-economic status.
Conclusion: This study identified significant gaps in diabetes-related knowledge, attitudes, and practices, including awareness of medication side effects, foot care, and regular eye check-ups. Attitudinal barriers to routine blood glucose monitoring were also observed. KAP scores were significantly associated with demographic factors such as education, occupation, diabetes duration, and socioeconomic status. Tailored patient counseling was essential to address these gaps and improve diabetes management.

Keywords: Knowledge Attitude and Practices (KAP), diabetes mellitus and patient education

Introduction
Non-transmissible diseases such as heart disease, stroke, cancer, chronic respiratory diseases, and diabetes mellitus lead to worldwide mortality. Diabetes mellitus (DM) is a significant threat to the health of the world. Additionally, diabetes and pre-diabetes global prevalence are increasing rapidly [1]. The fourth leading cause of death (one and a half million deaths) is diabetes mellitus [2, 3], which is a rapidly increasing non-communicable disease (NCD) that has endangered global health [3]. Diabetes mellitus is a common metabolic condition resulting in hyperglycemia and hyperglycemia related chronic complications [4]. Due to changes in lifestyle and diet, diabetes has a relatively high prevalence worldwide. According to the World Health Organization, 170 million people with diabetes lived in 2000, which is estimated to be doubled by 2030 [5]. Despite considerable advances in diagnosis and management of diabetes, there is a large gap between ideal treatment goals and actual outcomes. Lack of up-to date knowledge, wrong attitudes and malpractice among healthcare workers regarding diabetes control may play an important role in failure to achieve therapeutic goals. Patients are at least once educated at the first year of their initial diagnosis of diabetes [6]. Being a developing nation, India has a huge economic burden to overcome to control the morbidity and mortality associated with diabetes. In 2010, it was reported that only 19% of the Indian population was covered by state and central government sponsored health insurance policies, which indicates that the burden of health care costs directly falls upon patients and their families [7]. Since a majority of the diabetics fall within 45-64 years age group, it can threaten the earning abilities and financial productivity of the country [8].

Awareness of and a right approach to diabetes can significantly reduce the morbidity and mortality, and can cut down the burden of health care costs among diabetics. The acquisition of information about the Knowledge, Attitudes, and Practices (KAP) of diabetic population is therefore important for developing efficient health education and diabetes control awareness programs [9].

Materials and Methods

This was a Hospital-based cross sectional study done in a tertiary care center in Chennai. Adult subjects aged 18 years and above, of both genders, diagnosed with type 2 diabetes mellitus, with or without co-morbidities, who were willing to provide voluntary written informed consent and had educational qualifications ranging from primary education, secondary education, graduate, postgraduate, or others, were included in the study. On the other hand, subjects aged below 18 years, those diagnosed with type 1 diabetes mellitus or gestational diabetes, and those unwilling to provide voluntary written informed consent were excluded from the study. Following the approval of institutional ethics committee (Ref No: MC/KOL/IEC/ NON-SPON/797/09/20, dated September 04, 2020), the study was conducted. Its duration was 6 months from May to November 2024.

The study subjects was recruited only after the consultation of the subjects with the endocrinologist. The study was explained to the patient in detail in the language understood by them. After receiving their verbal consent to participate, the voluntary written informed consent written in a language the study participants could best understand was taken before their enrolment.

The subjects were interviewed by the investigator using a questionnaire that was pre-designed and validated. The questionnaire consisted of 24 questions to assess knowledge (total question=11), attitude (total question=5) and practice (total question=7) regarding DM. Socio-demographic data such as age, sex, occupation, duration of diabetes, economic status and education were collected through the questionnaire. KAP scores were determined based on the responses of the participants to a structured questionnaire consisting of knowledge, attitude, and practice domains. Each question had two possible responses: Yes or No. Each correct response was scored as 1, and each incorrect response was scored as 0. The combined Knowledge, Attitude, and Practice (KAP) questionnaire had a maximum attainable score of 23 and a minimum score of 0. Based on the total scores achieved by the subjects, their KAP levels were classified into three categories: Poor (0-8), Average (9-17), and Good [18-23].

Statistical analysis

For data analysis, SAS Studio was utilized. Qualitative data were presented as frequency and percentage, and quantitative data were expressed as mean ± standard deviation (SD). Chi-square test was performed to analyze associations between categorical variables. Analysis of Variance (ANOVA) was used to compare Knowledge, Attitude and Practice (KAP) levels across different demographic characteristics.

Results

A total of 289 diabetic patients participated in the study. The mean age of the participants was 59.87 years. The majority of participants (39.7%) were between 51-60 years of age, followed by 31-40 years (19.3%), and 41-50 years (18.6%). Only 0.3% of participants were in the 81-90 years age group. Female participants made up 52% of the study population, while males accounted for 47%.

In terms of education, the highest proportion (30.1%) of the participants had completed higher secondary education, followed by undergraduate (21.8%) and secondary education (17.9%). A small proportion (3.4%) had completed postgraduate studies. Most participants (86.5%) belonged to the middle socio-economic class. Regarding the duration of diabetes, 68.7% of the participants had diabetes for 1-10 years, 18.34% for 11-20 years, and 12.8% for more than 21 years.

Occupational analysis revealed that 48.79% were unemployed. Among the employed, the most common were blue-collar (15.2%) and white-collar (13.4%) workers, followed by pink-collar (11.4%), grey-collar (6.6%), and yellow-collar (4.8%) categories. Table 1 provides the characteristics of study subjects.

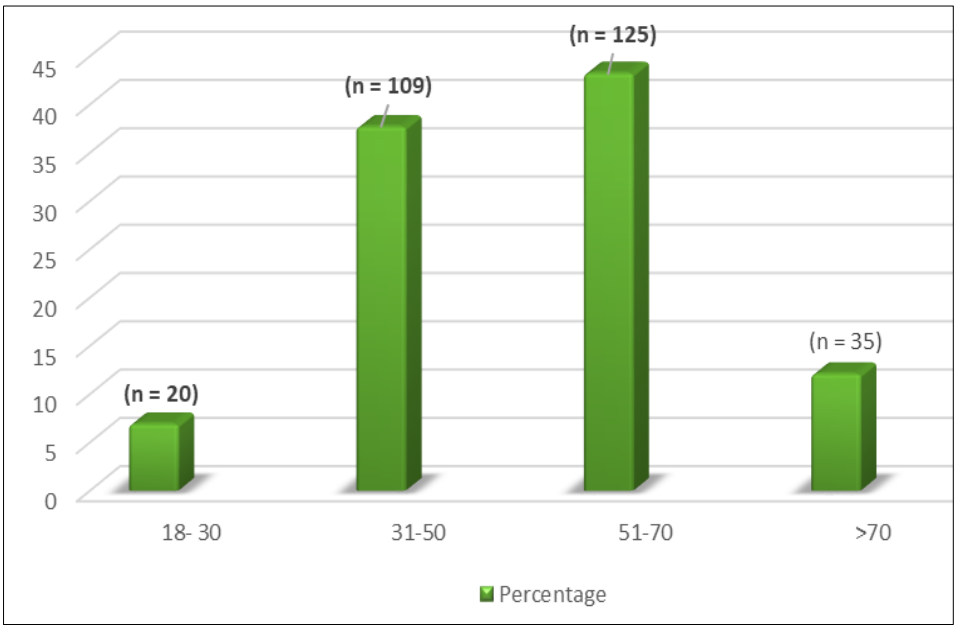

Fig 1: Age-wise distribution of the study participants

Table 1: Characteristics of study subjects (N=289)

Parameters	N (%)
Age, Years	59.87
Gender	
Male	137 (47)
Female	152 (52)
Age Group	
18-30	20 (6.92)
31-50	109 (37.72)
51-70	125 (43.25)
>70	35 (12.11)
Education	
Secondary	66 (22.8)
Higher secondary	87 (30.1)
Under-graduate	75 (26.0)
Post-graduate	61 (21.1)
Economic Status	
Low socio-economic class	11 (3.8)
Middle-class	250 (86.5)
Upper-class	28 (9.7)
Duration of Diabetes	
1-10 Years	199 (68.86)
11-20 Years	53 (18.34)
>21 Years	37 (12.80)
Occupation	
Gray (IT, technicians)	28 (9.69)
Pink (nurse, teachers)	19 (6.57)
Unemployed	141 (48.79)
Blue (laborers)	49 (16.95)
White (accountants, managers)	49 (16.96)
Yellow (artists, designers)	3 (1.04)

Knowledge regarding diabetes mellitus

Participants demonstrated a relatively good knowledge of diabetes. All participants (100%) were aware that they had diabetes and 80.97% correctly identified the normal blood glucose range. Awareness of complications was varied. While 82.01% knew that diabetes could affect their eyes, only 68.51% were aware of its impact on kidney function. Awareness was notably lower regarding diabetic foot complications, with only 44.98% recognizing this risk. In terms of risk factors, only 52.25% identified obesity as a contributing factor to diabetes. Additionally, 85.12% were aware of low blood sugar (hypoglycemia) and its associated symptoms. Participants showed a fairly good understanding of diabetes transmission with 91% acknowledging that diabetes is not a contagious disease. Furthermore, 77.85% recognized that exercise and physical activity could influence blood glucose levels. However, several gaps in knowledge were observed. Only 45.67% of participants understood that diabetes medication should not be discontinued even if blood glucose levels return to normal. Moreover, just 33.56% were aware of the common side effects associated with the medications they were taking for diabetes. Responses to assess knowledge regarding DM are presented in Table 2.

Table 2: Response of the subjects towards knowledge regarding DM (N=289)

Knowledge questions	Percentage of appropriate answers (%)
Do you know you are suffering from diabetes?	100
Do you know the normal range of blood glucose level?	80.97
Is obesity a risk factor for the development of diabetes?	52.25
Are you aware of Low blood sugar and its symptoms?	85.12
Do you know that diabetes can affect your eyes?	82.01
Do you know that diabetes can affect your kidneys?	68.51
Do you know that diabetes can affect your foot?	44.98
Is diabetes a contagious disease?	91
Does exercise and physical activity affect blood sugar levels?	77.85
Should you stop taking medication if your blood glucose level comes to normal?	45.67
Are you aware of the common side effects of the medicines you are taking for diabetes?	33.56

Attitude regarding diabetes mellitus

Regarding participants' attitudes, a large majority (92.73%) believed it was necessary to monitor blood sugar levels regularly, and 71.28% supported the importance of following a controlled diet. Daily physical activity was reported by 80.62% of participants, indicating a positive attitude toward incorporating exercise into diabetes management. Additionally, 82.35% reported taking their medications regularly, reflecting a responsible attitude toward treatment adherence. However, only 59.86% expressed comfort with regularly monitoring their blood glucose levels as part of their routine, suggesting that while participants acknowledged its importance, consistent implementation remained a challenge for some. Responses to assess attitudes regarding DM are presented in Table 3.

Table 3: Response of the subjects towards attitude regarding DM (N=289)

Attitude Questions	Percentage of appropriate answers (%)
Do you think it is necessary to monitor blood sugar levels regularly?	92.73
Do you believe in following a controlled diet?	71.28
Are you doing exercise daily?	80.62
Are you taking your medicines regularly?	82.35
Are you comfortable with the idea of regularly monitoring your blood glucose levels as part of your routine?	59.86

4. Practice Regarding Diabetes Mellitus

Approximately 78.55% of the subjects reported consuming fruits daily. A majority 60.21% included green leafy vegetables and salads in their meals. About 76.12% of the participants owned a glucometer, and 67.82% checked their blood sugar levels at least once a month. Regular doctor visits were reported by 82.70% of the subjects. Additionally, 69.55% adhered to their prescribed medication regimen. Notably, only 22.15% of the participants underwent eye check-ups at least once every six months.

Table 4: Response of the subjects towards practice regarding DM (N=289)

Practice questions	Percentage of appropriate answers (%)
Do you visit the doctor for regular check-ups?	82.70
Do you have a glucometer?	76.12
Do you check your blood sugar at least once a month?	67.82
Do you include fruits in your diet every day?	78.55
Does your meal include green leafy vegetables and salad?	60.21
Do you take your medicines as told by your doctor?	69.55
Do you go for eye check-ups at least every six months?	22.15

5. Factors associated with KAP scores

The overall distribution of KAP scores revealed that 50.17% of participants fell into the "average" category, 44.64% in the "good" category, and 5.16% in the "poor" category. Mean scores for knowledge, attitude, and practice were 8.0, 3.56 and 5.04 respectively. KAP scores did not differ significantly between male and female participants (P=0.954), and no notable differences were observed across various age groups (P=0.893). However, education level had a significant impact on KAP scores (P=0.000), with individuals holding higher educational qualifications showing better knowledge, attitudes, and practices related to diabetes. The duration of diabetes also showed a significant association with KAP scores (P=0.018) participants with a longer history of diabetes tended to have higher scores. Occupation was another factor significantly linked to KAP scores (P=0.012), indicating that one's type of work may influence their understanding and management of diabetes. Furthermore, socioeconomic status was strongly associated with KAP scores (P=0.000), with participants from higher socioeconomic groups displaying better overall knowledge, attitudes, and practices.

Table 5: Association between different factors with KAP score (N=289)

Variables	Overall KAP Grades	Total	Chi-square values	P-Value
Age				
18-30	0 (Poor), 10 (Average), 20 (Good)	35	5.746, DF=6	0.893
31-50	5 (Poor), 59 (Average), 109 (Good)	173		
51-70	9 (Poor), 55 (Average), 125 (Good)	189		
>70	1 (Poor), 21 (Average), 35 (Good)	57		
Gender				
Male	6 (Poor), 71 (Average), 60 (Good)	137	0.512, DF=2	0.954
Female	9 (Poor), 74 (Average), 69 (Good)	152		
Education				
Secondary	9 (Poor), 36 (Average), 21 (Good)	66	46.476, DF=6	0.000*
Higher Secondary	6 (Poor), 54 (Average), 27 (Good)	87		
Under-graduate	0 (Poor), 40 (Average), 35 (Good)	75		
Post-graduate	0 (Poor), 15 (Average), 46 (Good)	61		
Duration of Diabetes				
1-10 Years	13 (Poor), 101 (Average), 85 (Good)	199	5.834, DF=4	0.018*
11-20 Years	2 (Poor), 29 (Average), 22 (Good)	53		
>21 Years	0 (Poor), 15 (Average), 37 (Good)	52		
Occupation				
Blue	2 (Poor), 32 (Average), 15 (Good)	49	19.440, DF=10	0.012*
Gray	0 (Poor), 14 (Average), 14 (Good)	28		
Pink	1 (Poor), 4 (Average), 14 (Good)	19		
Unemployed	12 (Poor), 68 (Average), 61 (Good)	141		
White	0 (Poor), 26 (Average), 23 (Good)	49		
Yellow	0 (Poor), 1 (Average), 2 (Good)	3		
Status				
Low-Class	1 (Poor), 9 (Average), 11 (Good)	21	19.446, DF=4	0.000*
Middle-Class	14 (Poor), 130 (Average), 250 (Good)	394		
Upper-Class	0 (Poor), 6 (Average), 28 (Good)	34		

Discussion

Most epidemiological studies on diabetes in India have been conducted in the southern region, with limited data available from North India [10-13]. Notably, no previous KAP studies have been reported specifically from the Chennai region, which this study aims to address. The classification of patients by occupation ranging from blue-collar (manual labor) to white- and yellow-collar (professional and creative roles) was used to explore how employment type may influence diabetes-related knowledge and behavior [14].This survey assessed diabetes-related knowledge, attitudes, and practices (KAP) among diabetic patients. Findings revealed that while a majority (51%) had good overall knowledge, many lacked information about specific aspects of diabetes management. For instance, only 81% were aware of normal blood glucose values. In comparison, a study by Rathod *et al*. Gujarat reported significantly higher awareness (82.45%) [15]. Positively, all participants (100%) were aware of their diabetic status, and 85% recognized symptoms of hypoglycemia. While 78% believed in the benefits of exercise, this was lower than the 92.8% reported by Rathod *et al*. [15]. Only 52% of patients identified obesity as a risk factor, which was lower compared to findings by Tejaswi P *et al*. [9]. In terms of attitudes, 57% of patients had a positive outlook toward diabetes management. Most 71% believed in maintaining a controlled diet, and 92% considered regular glucose monitoring important. However, only 60% were comfortable incorporating regular monitoring into their routine. Encouragingly, over 80% supported regular exercise, and just 18% were hesitant about taking medications regularly.When compared with studies by Tejaswi P *et al*. [9], Bollu *et al*. [16] and Rathod *et al*. [15], similar trends were observed regarding diet control and glucose monitoring. However, discrepancies existed in attitudes toward exercise and medication adherence. For example, Bollu *et al*. reported that only 36% of patients had a positive attitude toward exercise and just 24% followed a controlled diet [16]. In contrast, Rathod *et al*. found that 73.68% had favorable views on exercise, but only 35% followed a planned diet [15]. These findings highlight the need for more targeted diabetes education, particularly focusing on specific risk factors and lifestyle practices, to bridge knowledge gaps and encourage healthier behaviors.

Conclusion

KAP (Knowledge, attitudes and practices) studies have been instrumental in shaping effective awareness and disease control strategies for chronic conditions like diabetes. This study highlighted several important gaps in diabetes-related knowledge, attitudes, and practices among patients. A significant number of participants lacked awareness about common side effects of diabetes medications and the impact of diabetes on foot health. Attitudinal gaps were also evident, particularly regarding discomfort or reluctance in routinely monitoring blood glucose levels. In terms of practice, a considerable portion of participants were unaware of the importance of undergoing eye check-ups. These gaps can be addressed with more tailored patient counseling, which can improve overall diabetes management. The study also found significant associations between KAP scores and demographic factors such as education, occupation, duration of diabetes, and socioeconomic status.

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Authors' Contributions

Preparation of the protocol was done by Selvadidtose Selvaraj. Collection of data was done by Selvadidtose Selvaraj, Jawahar R and Akwin Donel D Statistical analysis was done by Akwin Donel D Preparation of the manuscript was done by Akwin Donel D and Selvadidtose Selvaraj.

Conflict of Interest

There is no conflict of interest

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