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Unveiling Diabetes Literacy: An Insight into Awareness of Diabetes Mellitus among Nursing Undergraduates

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Abstract: *Introduction: Elevated blood glucose levels are a hallmark of diabetes mellitus, a chronic metabolic disease caused by abnormalities in insulin secretion or activity. If not properly handled, it is linked to major difficulties. Adequate information is crucial since nursing students, as future healthcare providers, play a crucial role in diabetes prevention, management, and patient education.*
Aim: The purpose of this study was to evaluate undergraduate nursing students' knowledge of diabetes mellitus and ascertain its correlation with particular demographic factors.
Methods: A quantitative descriptive cross-sectional research design was used for the investigation. 150 nursing students enrolled in DGNM, B.Sc. Nursing, and P.B.B.Sc. Nursing programs made up the sample. A non-probability convenience sampling method was used to choose participants, and informed consent was acquired. A systematic, validated self-administered questionnaire comprising demographic information and a 20-item multiple-choice knowledge test on diabetes mellitus was used to gather data.
Results: The results showed that the students' mean knowledge score was 11.55±3.17, which indicates a reasonable level of knowledge. Knowledge level and degree of study were shown to be significantly correlated ($p<0.05$), with B.Sc. and P.B.B.Sc. students showing greater knowledge than DGNM students. However, there was no discernible correlation found between knowledge level and factors such geography and past diabetes mellitus knowledge.
Conclusion: Overall, the study's findings show that undergraduate nursing students have a moderate understanding of diabetes mellitus, with some groups showing clear gaps. To increase knowledge and get students ready for efficient diabetes treatment and patient education, curriculum content must be improved and focused educational interventions must be put in place.

Keywords: Diabetes mellitus, Knowledge, Nursing students, Awareness, Cross-sectional study, Education, Risk factors.

I. INTRODUCTION

Diabetes mellitus is a long-term metabolic disease marked by elevated blood sugar levels brought on by either inadequate insulin utilization or insufficient insulin synthesis. Diet, exercise, medication, and routine blood sugar testing are all part of its therapy because diabetes can cause major consequences.[1] The three main forms of diabetes mellitus are gestational diabetes, which develops during pregnancy, Type 2, which is defined by insulin resistance, and Type 1, which is characterized by insulin deficit and necessitates insulin therapy. Different causes and management strategies apply to each kind.[2]

The etiopathogenesis of diabetes mellitus includes insulin resistance and impaired secretion in type 2 diabetes, which is influenced by hereditary and environmental variables such as obesity and inactivity, and insulin insufficiency in type 1

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diabetes, which is caused by autoimmune destruction of beta cells.[3] Early diagnosis, dietary changes, and exercise are the cornerstones of managing diabetic mellitus (DM). There are several kinds of anti-hyperglycemic medications that can be used alone or in combination. New approaches include gene therapy, stem cell treatments, and nanotechnology for insulin administration and glucose monitoring. Alpha-glucosidase inhibitors, thiazolidinediones, and non-sulfonylurea secretagogues are examples of effective drugs. Improving patient-centered treatment and successfully managing diabetes depend on achieving optimal metabolic control and supporting public health initiatives.[4]

Diabetes mellitus (DM) can be prevented by educating the public about the condition, its complications, and how to control it through regular blood sugar checks, physical activity promotion, and education. Effective preventative initiatives require focused health education and community screening.[5]Undergraduate (UG) students' knowledge of diabetes mellitus (DM) varies greatly by location and demographic. Research shows that although some students have a rudimentary understanding of diabetes symptoms and risk factors, there are still gaps in their knowledge of management and treatment. Based on recent study findings, this overview will examine UG students' awareness, knowledge, and attitudes toward diabetes.

Methods

Study Design and Setting

To determine nursing students' knowledge of diabetes mellitus at a particular nursing school, a quantitative, descriptive cross-sectional study was carried out. After receiving institutional approval, the study was conducted for a predetermined amount of time.

Participants and Sample Size

Nursing students enrolled in the Diploma in General Nursing and Midwifery (DGNM), Bachelor of Science in Nursing (B.Sc. Nursing), and Post Basic Bachelor of Science in Nursing (P.B.B.Sc. Nursing) programs comprised the study population. The study comprised 150 individuals in total.

A non-probability convenience sampling method was used to choose the participants. Students who fit the eligibility requirements and were available during the data collecting period were invited to take part.

Eligibility Criteria

Inclusion criteria:

(i) DGNM, B.Sc Nursing, and P.B.B.Sc Nursing programs
(ii) Students present at the time of data collection
(iii) Students who provided informed consent

Exclusion criteria:

(i) Students absent during data collection
(ii) Students unwilling to participate

Data Collection Instrument

A systematic, self-administered questionnaire that was created after a thorough literature review was used to gather data.

There were two parts to the instrument:

Section A: Background variable proforma

Age, course of education, religion, place of residence (rural or urban), and past awareness of diabetes mellitus were among the demographic factors considered in this section.

Section B: Knowledge Questionnaire

A 20-item multiple-choice questionnaire (MCQ) was used to gauge awareness about diabetes mellitus. There were four possible answers to each question, and only one was right.

Every right answer received a score of 1, while every wrong answer received a score of 0. Greater awareness was indicated by higher ratings, which ranged from 0 to 20.

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Scoring and Categorization

Knowledge scores were categorized as follows:

Poor knowledge: 0–7

Moderate knowledge: 8–14

Good knowledge: 15–20

Validity and Reliability

Expert examination by nursing and medical science specialists established the instrument's content validity. Based on their comments, changes were made. Internal consistency metrics like Cronbach's alpha can be used to evaluate the tool's reliability.

Data Collection Procedure

Prior to data collection, formal authorization was acquired from the institutional authorities. Written informed consent was acquired when participants were made aware of the study's objectives. Students who qualified were given the questionnaire, which they had to do in the allocated time. Anonymity and confidentiality were guaranteed.

Ethical Considerations

The Institutional Ethics Committee examined and approved the study protocol. Participants were guaranteed secrecy and the freedom to leave the study at any time without facing any repercussions. Participation was entirely voluntary.

Statistical Analysis

Inferential statistics, like the chi-square test, were used to ascertain the relationship between specific demographic variables and awareness levels regarding Diabetes Mellitus; a p-value of less than 0.05 was deemed statistically significant. Descriptive statistics, such as frequency, percentage, mean, and standard deviation, were used to summarize demographic variables and knowledge scores.

RESULTS

Out of the 160 questionnaires distributed, 155 (97%) were returned. Five questionnaires were excluded due to incomplete data. A total of 150, 49 DGNM (33%), 93 BSc (62%) and 8 PBBSc (5%) responded.

Table 1. Frequency and Percentage Distribution of Demographic Variables of undergraduate nursing students *N=150*

Demographic variables	f	%
Age		
Age in years		
<20	94	63
>_20	56	37
Course of study		
DGNM	49	33
BSc	93	62
PBBSc	8	5
Relegion		
Christian	75	50
Hindu	67	45
Muslim	8	5
Residence		
Kerala	70	47
Tamil nadu	63	42
Other states	17	11
Previous knowledge about DM		

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Yes	Yes	Yes
No	No	No

Based on to the demographic distribution of 150 undergraduate students, 37% are under 20 and 63% are over 20. A majority of participants (62%) are from the BSc program, followed by DGNM students (33%) and PBBSc students (5%). In terms of religion, 50% of the students surveyed identify as Christians, 45% as Hindus, and 5% as Muslims. About prior exposure, 41% of students claimed having some prior knowledge of diabetes mellitus, while 59% reported having none at all. Kerala accounts for 47% of the student body, followed by Tamil Nadu (42%) and other states (11%).

Table 2. Mean and Standard Deviation of knowledge score on DM among undergraduate students

Demographic variables	f	%
Age		
Age in years		
<20	94	63
>_20	56	37
Course of study		
DGNM	49	33
BSc	93	62
PBBSc	8	5
Relegion		
Christian	75	50
Hindu	67	45
Muslim	8	5
Residence		
Kerala	70	47
Tamil nadu	63	42
Other states	17	11
Previous knowledge about DM		
Yes	Yes	Yes
No	No	No

Variables	Mean	SD
Knowledge score	11.54667	3.167763

Undergraduate students' average knowledge score about diabetes mellitus is 11.55, with a standard deviation of 3.17. This suggests that students' knowledge of diabetes mellitus is generally moderate. The majority of students' knowledge levels are rather near to the mean, but there is still significant variation among individuals, as indicated by the standard deviation of 3.17, which indicates a moderate variety in results.

Table 3. Association Between Selected Demographic Variables and Level of Knowledge on DM

Background variables	Level of knowledge		χ^2 (df)	P value
	Upto mean	Above mean		
Course of study			**25.393** (df=1)	**0.00**
DGNM	43	6		
BSc & PBBSc	45	56		
Region			0.4129 (df=1)	0.52051
Kerala	43	27		
Tamil Nadu &	45	35		

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Other				
Previous Knowledge			2.427 (df=1)	0.11926
Yes	41	21		
No	47	41		

The knowledge score and course of study are significantly correlated ($\chi^2 = 25.393$, $p = 0.00$). Compared to DGNM students, a greater percentage of BSc and PBBSc students scored higher than the mean. This suggests that advanced nursing program students are more knowledgeable about diabetes mellitus. The region and knowledge score do not significantly correlate ($\chi^2 = 0.4129$, $p = 0.52051$). The knowledge levels of students from Kerala, Tamil Nadu, and other states are comparable, indicating that domicile does not affect DM knowledge.
The knowledge score and prior knowledge do not statistically significantly correlate ($\chi^2 = 2.427$, $p = 0.11926$). Students with past knowledge score marginally higher, but this difference is not statistically significant, suggesting that prior exposure has little bearing on present knowledge levels.

II. DISCUSSION

The current study evaluated 150 undergraduate nursing students' knowledge of diabetes mellitus and evaluated at the way it related to certain background variables.

Similar to the study by Yd S and N D (2018), where participants were between the ages of 16 and 20 (mean 17.71±0.77), the majority of participants (63%) in the current study were under 20. While general nursing students without course classification were included in the comparison study, the bulk of participants in the current study (62%) were BSc Nursing students. The fact that 59% of students had no prior knowledge of diabetes mellitus, indicating low baseline awareness, was a notable finding in the current study. This is in line with a related study that also highlighted the need to increase nursing students' understanding of diabetes[6].

A moderate degree of knowledge (11.55 ± 3.17) with variation across students was found in the current study. This is in line with the results of Uğur Yılmaz (2024), who also found that nursing students had moderate knowledge levels. Knowledge and degree of study were shown to be significantly correlated, with BSc and PBBSc students scoring higher than DGNM students, suggesting that more education enhances comprehension of diabetes mellitus[7].

Geographical background and prior exposure may not have a substantial impact on current understanding of diabetes mellitus, as the current study demonstrated no statistically significant correlation between knowledge levels with residence area or prior knowledge. The study by Abdulrahman Alsolais et al. (2022), which found that academic and educational characteristics have a greater influence on nursing students' knowledge levels than demographic variables, supports this conclusion[8].

Additionally, even though the pupils in this survey showed a moderate level of understanding, a sizable percentage still lacked awareness. In a similar vein, Alsolais et al. highlighted the necessity for systematic educational interventions by emphasizing disparities between perceived and real knowledge. Therefore, both studies emphasize how crucial it is to improve formal education and training programs in order to increase nursing students' understanding of diabetes mellitus[8].

III. CONCLUSION

The current study finds that undergraduate nursing students have a modest understanding of diabetes mellitus (mean = 11.55 ± 3.17), with significant individual variance. Even while there is a decent degree of comprehension, a sizable percentage of pupils still exhibit insufficient knowledge, showing learning gaps.

Knowledge level and course of study were shown to be significantly correlated, with BSc and PBBSc students demonstrating greater knowledge than DGNM students. This demonstrates how exposure to advanced curricula and higher education improves students' comprehension of diabetes mellitus. However, there was no discernible correlation found between knowledge level and either prior knowledge or place of residence, indicating that students' present knowledge is not significantly influenced by demographic characteristics alone.

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Overall, the results highlight the necessity of curriculum enhancement, planned educational interventions, and ongoing training programs to improve nursing students' understanding of diabetes, especially at the diploma level, in order to better prepare them for clinical practice.

ETHICAL CONSIDERATION

Consent was obtained by all participants in this study.

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