Vol. 4 No. 3 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

A STUDY TO EVALUATE KNOWLEDGE ON DIABETES AND ITS RELATED FACTORS AMONG UNDERGRADUATE NURSING STUDENTS

Ms. Sajna Kumari Malhi (Corresponding Author)
MSN Scholar & Nursing Instructor College of Nursing Mirpurkhas, Sindh
Email: skmalhi577@gmail.com
Mr. Muhammad Rahimoon
Principal, Al-Biruni Institute of Medical and Health Sciences, Hyderabad.
Dr. Husan Bano Channar
Assistant professor, People's Nursing School, Liaquat University of Medical and Health Sciences, Jamshoro.
Ms. Farzana Muhammad Juman
Msn scholar, Liaquat University of medical and health sciences, jamshoro.
Mr. Jairam Dalpat
MSN scholar, Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan
Ms. Farzana Soomro
Assistant professor, BBS-ION PUMHS Nawabshah
Ms. Shafqat sikander Ali
MSN scholar, Liaquat University of Medical and Health Sciences, Jamshoro, Pakistan.

Author Details

Keywords: Diabetes Mellitus, Knowledge, Risk factors, Nursing students

Received on 15 July 2025
Accepted on 11 Aug 2025
Published on 20 Aug 2025

Corresponding E-mail & Author*:
Ms.Sajna Kumari Malhi
MSN Scholar & Nursing Instructor College of Nursing Mirpurkhas, Sindh
Email: skmalhi577@gmail.com

Abstract

Background: Diabetes mellitus is a major public health concern worldwide, requiring adequate knowledge among healthcare professionals for effective management and patient education. Nursing students, as future frontline caregivers, must possess sound knowledge of diabetes and its related factors.

Aim of study: To evaluate the knowledge regarding diabetes and its related factors among undergraduate nursing students.

Material and methods: A Quasi experimental study was conducted among undergraduate nursing students of Al-Biruni College of Nursing Hyderabad. A total of 63 students were selected of 1st year, 1st semester using Convenient, non -randomized sampling. Data were collected by using a structured, validated diabetic knowledge test (DKT2) assessing knowledge on diabetes definition, causes, risk factors, symptoms, complication, and management. The study was conducted in the month of May 2025.

Results: The study included a total of 63 participants, the majority were males, with the mean age of 20.48 years. The pre-test results

Vol. 4 No. 3 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

revealed consistently low levels of understanding, with correct response rates ranging from 12.69% to 65.07% across the 20 questions. Following the educational intervention, post-test scores showed a notable improvement, with the most correct responses ranging between 76% and 95%. This reflects a substantial gain in knowledge, especially in key areas like insulin administration, glucose monitoring, dietary management, identifying complications, and appropriate treatment of hypoglycemia, and the p-value of ≤ .001 indicates that this improvement is statistically significant.

Conclusion: Overall positive response was not found in pretest, after educational session it improved significantly among respondents, which was recorded in posttest.

INTRODUCTION

Diabetes is a serious, long-term condition with a major impact on the lives and well-being of individuals, families, and societies worldwide. It is among the top 10 causes of death in adults and was estimated to have caused four million deaths globally in 2017. In 2017, global health expenditure on diabetes was estimated to be USD 727 billion. The three main types of diabetes are type 1 diabetes (T1D), type 2 diabetes mellitus (T2DM), and gestational diabetes mellitus GDM(1).

Approximately 463 million adults worldwide have diabetes, and 90% of these people suffer from type 2 diabetes mellitus. According to an article by "The News", Pakistan ranks 3rd in the world in diabetes prevalence after China and India[(2).] The prevalence of diabetes in Pakistan in 2016, 2018, and 2019 was 11.77%, 16.98%, and 17.1%. According to the International Diabetes Federation (IDF), in 2022, 26.7% of adults in Pakistan are affected by diabetes making the total number of cases approximately 33,000,000. This number is alarmingly high and is also increasing with each passing year[(3).]

Asia, particularly South-East Asia, shows a consistently high prevalence of diabetes. The region is experiencing rapid urbanization, dietary shifts, and a rise in sedentary behavior, all of which contribute to increasing diabetes rates. The burden is particularly heavy in low- and middle- income countries, where over three in four adults with diabetes reside. The IDF highlights that diabetes in Asia is a growing concern requiring urgent public health attention[(4).]

Pakistan presents one of the most alarming diabetes trends globally. According to the IDF Diabetes Atlas 2021, the adult prevalence of diabetes in Pakistan (ages 20–79) was estimated at **30.8%**, the highest in the world. This means approximately **33 million adults** in Pakistan are living with diabetes [(5).]

T2DM is the most prevalent form of diabetes, accounting for nearly 90% of all cases, T1DM is comparatively rare [(6).] Individuals with DM experience a significantly higher mortality rate, largely attributable to long-term complications associated with the disease. In our population, those with T2DM had a significantly higher mortality rate, results that are not supported by larger scale studies[(7).]

In this regard, the role of genetics in DM prevalence in South Asians is noteworthy found that South Asians are three times more susceptible to developing type 2 DM as compared to Europeans [(8).]

Vol. 4 No. 3 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

A key element in improving diabetes care is patient education, providing clear information about the disease, its management, potential complications, and the importance of self-care [9]. However, evidence suggests that patients often receive limited education and guidance, which hampers their ability to manage the condition effectively[9]. Contributing to this problem are healthcare provider-related barriers, such as a lack of preparation, insufficient training in diabetes education, low prioritization of patient instruction, and time constraints[10].Previous research has underscored the importance of education and training in enhancing nurses' knowledge of diabetes and its management [11]. This foundational knowledge should begin during undergraduate nursing education, as nursing students represent the future of the profession. Nursing programs play a crucial role in preparing students to be competent in delivering effective diabetes care. During clinical placements, student nurses are often directly involved in caring for patients with diabetes, making it essential that they possess sufficient understanding of
the condition. The current study aims to explore the predictors of both self-perceived and actual knowledge of diabetes among undergraduate nursing students.

RESEARCH PROBLEM STATEMENT

Diabetes mellitus is a rapidly growing global health concern, contributing significantly to morbidity, mortality, and healthcare costs. As future frontline healthcare providers, nursing students play a vital role in the prevention, management, and education of diabetic patients. However, studies suggest that gaps in knowledge and awareness about diabetes and its associated risk factors persist even among healthcare students. Inadequate knowledge can hinder effective patient education, early detection, and management strategies, ultimately affecting patient outcomes. Therefore, there is a critical need to assess the current level of knowledge on diabetes and its related factors among undergraduate nursing students to identify educational needs and improve curriculum effectiveness.

AIM OF STUDY

The aim of this study was to explore how much undergraduate nursing students at Al-Beruni College of Nursing know about diabetes mellitus and then educate them to enhance their competency related to Diabetes mellitus.

OBJECTIVES

To evaluate the level of knowledge about Diabetes Mellitus among undergraduate nursing students.
To promote evidence-based practices in the prevention and management of diabetes through targeted student education.

RESEARCH HYPOTHESIS:

Null Hypothesis (Ho):
There is no significant difference in the knowledge on diabetes and its related factors among undergraduate nursing students before and after intervention.
Alternative Hypothesis (H1):
There is a significant difference in the knowledge on diabetes and its related factors among undergraduate nursing students before and after intervention.

Vol. 4 No. 3 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

SIGNIFICANCE OF STUDY

Diabetes Mellitus is one of the most widespread and serious health challenges faced globally and especially in countries like Pakistan, where the number of people living with diabetes is alarmingly high. Nurses play a vital role in helping patients manage this condition through education, early recognition of symptoms, and appropriate care. This makes it essential for nursing students to have a strong understanding of diabetes before they enter clinical practice.

LITERATURE REVIEW

Diabetes Mellitus (DM) is a chronic endocrine disorder characterized by Hyperglycemia. Diagnosed by fasting blood sugar level more than 126mg /dl or glycated hemoglobin (HbA1c)Levels of > 6.5% [(12).] Type 1 Diabetes mellitus involves a lack of insulin secretion, while type 2 DM results from insulin resistance combined with imbalanced or impaired beta cells function (11) Type 1 Diabetes Mellitus (T1DM) An autoimmune condition where the immune system destroys pancreatic β-cells, leading to absolute insulin deficiency. It usually presents in children and adolescents [(13).] Type 2 Diabetes Mellitus(T2DM) Characterized by insulin resistance and relative insulin deficiency. It is commonly associated with obesity, sedentary lifestyle, and aging [(14).]

Type 1 Diabetes causes: Genetic predisposition (e.g., HLA-DR3 and DR4), autoimmune destruction, viral infections[(15).]

Type 2 Diabetes: Obesity, physical inactivity, poor dietary habits, family history, age >45, ethnicity (e.g., African-American, Hispanic), hypertension, and dyslipidemia [(12).]

Gestational Diabetes: Hormonal changes in pregnancy, obesity, history of GDM, advanced maternal age [(16,17).] Pathophysiology of Diabetes Mellitus: In **T1DM**, autoimmune destruction of pancreatic β-cells leads to an absolute deficiency of insulin, resulting in unchecked gluconeogenesis and ketogenesis, causing hyperglycemia and ketoacidosis [(18).] In **T2DM**, insulin resistance in peripheral tissues combined with β-cell dysfunction leads to relative insulin deficiency. Hyperglycemia results from increased hepatic glucose production, impaired insulin signaling, and decreased glucose uptake by muscles [(19).]

Diabetes leads to both acute and chronic complications: **Acute**: Diabetic ketoacidosis (DKA), hyperosmolar hyperglycemic state (HHS), hypoglycemia and Chronic which leads to *Micro vascular*: Retinopathy, nephropathy, neuropathy. *Macro vascular*: Coronary artery disease, cerebrovascular disease, peripheral artery disease. Others : Diabetic foot ulcers, infections, depression [(20).]

Diet and Insulin Therapy:

Medical Nutrition Therapy (MNT): Individualized diet plans that consider carbohydrate counting, glycemic index/load, calorie intake, and balanced macronutrients help manage glucose levels[(20).]

Insulin Therapy:

Essential in T1DM and sometimes in T2DM.

Regimens include basal-bolus, premixed insulin, or insulin pumps.

Vol. 4 No. 3 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

Close monitoring is necessary to avoid hypoglycemia [21].

Nursing plays a crucial role in holistic diabetes care, including: Assessment, Education, Medication Management, Psychosocial Support, Monitoring and Coordination [22]. Globally the number of adults has reached 536.6 million. South-East Asia consistently shows a high prevalence of DM. Pakistan is particularly alarming in this context, with the International Diabetes Federation (IDF) Diabetes Atlas 2021 estimating its comparative prevalence rate of adults about 30.8% the highest in the world[23] [24]. Several issues and challenges related to the delivery of quality care for diabetes patients have been identified in the literature. For example, a study conducted in Ethiopia reported poor glycemic control and poor blood glucose testing practices[25]. Other issues identified were poor adherence to medication, diet and lifestyle modifications[26]. Educating patients about diabetes-related information, including its pathology, management, complications and patient self-care, is a critical aspect in improving the quality of diabetes care. However, the literature indicates that patients receive inadequate instructions and training regarding diabetes- related information, which are essential in enhancing knowledge, modifying behavior, increasing compliance to a treatment regimen and self-care and increasing quality of life. Provider-related factors such as being unprepared to provide diabetes education to patients, inadequate training or education related to diabetes, low priority given to patient teaching and lack of time to conduct patient teaching were identified as barriers in providing quality diabetes education to patients[27]. Nurses acknowledge that ignorance, the large number of patients in their care and self-doubt are some of the causes for this deficiency. Several research investigations have been undertaken to test the knowledge of nurses in various areas related to diabetes and nursing care for patients with diabetes. A study from the Republic of Rwanda reported a low knowledge level among nurses in terms of diabetes education, specifically on diet, complications, insulin use and impact of stress[28]. There is a results show gaps in the students' self-reported and actual knowledge. For example, the students perceived that their knowledge in identifying the long-term complications of diabetes was excellent, but their actual knowledge of the complications of diabetes was very poor [29]. Another example was in relation to blood glucose monitoring, where approximately 87.9% of the students agreed that they were comfortable in instructing patients about glucose monitoring, but their actual knowledge score in this area was very poor. The good level of perceived knowledge among the students was related to being enrolled in University B. This finding is also true with actual knowledge, where students from University B scored higher than those from the other university. The differences in self-reported and actual diabetes knowledge between the students from the two universities maybe related to several factors such as curricular content, teaching methodologies and strategies and the expertise of faculty members [30]. University settings present a unique environment where individuals may experience significant lifestyle changes and face various health-related challenges. Factors such as academic stress, irregular schedules, sedentary behavior, and unhealthy dietary habits can contribute to the development of risk factors associated with diabetes, such as obesity, physical inactivity, and poor dietary choices [31]. Despite the increasing prevalence of diabetes among young adults, there is a paucity of research focusing specifically on diabetes awareness, risk factors, and health behaviors among university students and staff. Existing studies often overlook the interplay between awareness, risk factors, and health behaviors concerning diabetes within the university context [32]. Nurses' knowledge, attitudes, and practices about diabetes nutrition management are essential to improve the quality of patient care[33]. In

Vol. 4 No. 3 (2025)
Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Online ISSN 3007-2387
Print ISSN 3007-2379

treating and managing Diabetes, nurses are crucial front-line healthcare professionals[34]. Nurses are frequently involved in patient education, medication delivery, monitoring, and supporting patients and their families[35]. Multiple aspects are involved in managing Diabetes, including education, lifestyle changes, medication intervention, and regular blood glucose monitoring[36]. Among these interventions, dietary management is essential for reaching and maintaining adequate glycemic control and preventing complications[37]. Another critical factor influencing diabetes development is genetic predisposition. Numerous studies confirm that students with a family history of diabetes, particularly those with diabetic parents or grandparents, are at a significantly higher risk. However, perception studies show a paradox: while family history is a known risk factor, students with such a history often consider themselves at *lower* risk, possibly due to denial or lack of symptoms. This gap between actual and perceived risk is a consistent finding across different cultural contexts[38]. Emerging evidence also points to the impact of micronutrient deficiencies—commonly referred to as "hidden hunger"—on metabolic health. Deficiencies in essential nutrients such as vitamin D, magnesium, and iron have been linked to poor glucose regulation and insulin resistance. Although specific research on undergraduate populations is limited in this area, the findings underline the potential role of micronutrients in diabetes prevention and management[39]. Genetic factors, particularly family history, also play a significant role in diabetes risk. Research indicates that students with diabetic parents or grandparents are at considerably higher risk. Nonetheless, some studies have reported a contradictory trend, where individuals with a family history of diabetes perceive themselves to be at lower risk, possibly due to lack of awareness or denial. This disconnect between actual and perceived risk is consistent across various populations and is an important area for further investigation[40].

MATERIAL AND METHODS

Research design: Quasi experimental study design was used to evaluate knowledge and related risk factors on diabetes mellitus among undergraduate nursing students.
Setting: The study was conducted in Al-Beruni college of nursing Hyderabad.
Sample: Sample size 63 nursing students (Whole class of First year).
Sampling technique: A convenient non-probability sampling technique is used.

Inclusive criteria:
Student nurses of 1st year.
Student nurses willing to participate.
Student nurses are available or present at the time of the study.

Exclusion criteria:
Student nurses are not willing to participate.
Nursing students who were on leave.

Data Collection Tools: A structured questionnaire was used to collect data for the study which consists of:

Socio-demographic Data Sheet: Which includes data about the general characteristics of the study sample such as age, gender, year of education, etc.
A structured Diabetes Knowledge Test (DKT2) was used for the data collection in the study(41).

Vol. 4 No. 3 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

Student Assessment Knowledge sheet: Consist of 20 knowledge items.
The structured questionnaire corresponds to the first 13 questions related to disease and 07 items related to insulin therapy and diabetes diet.

DIABETES KNOWLEDGE TEST (DKT2) Validity and Reliability:
Diabetes knowledge test 2 Revised by the Michigan Diabetes Research Education Center, this test consists of 20 questions that measure diabetes knowledge. The test includes the following topics: the first 13 questions are about diet, metabolic tests, complications of diabetes, and exercise. The seven questions are about insulin and insulin administration. Each question has only one correct answer. The scale score can be obtained by calculating the percentage of correct answers given to the sub-dimensions and the total scale or by summing the scores assigned to each correct response. The alpha reliability co-efficient was 0.77 for the general knowledge test and 0.84 for the insulin use sub-dimension [41].

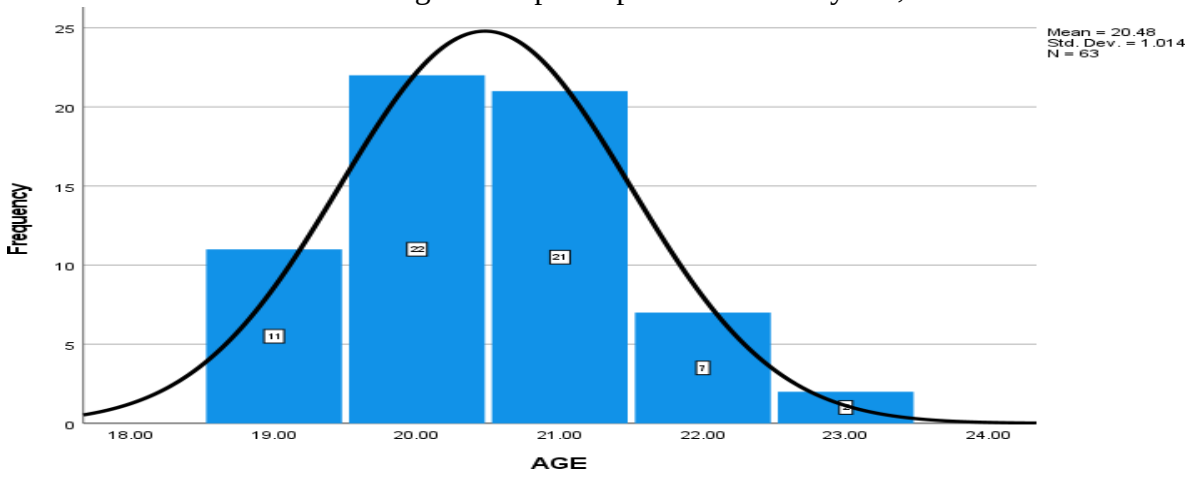
Procedure for data collection
Data was collected after obtaining formal permission from the Principal of AL-BERUNI COLLEGE OF NURSING to conduct a study. Once the official permission was granted, I took a pretest from the students and then I delivered a 45-minutes power point presentation on the Topic diabetes, types, treatment and management. Then post session data was collected.

Data Analysis
The data were analyzed on SPSS version 27.0 by using descriptive statistics and provided in the form of a figures, tables, and percentages.

RESULTS

DEMOGRAPHIC CHARACTERISTICS

GRAPH NO. 01: AGE DISTRIBUTION
Graph No.01 showed that The mean age of the participants was 20.48 years, with a standard



Vol. 4 No. 3 (2025)

Pakistan Journal of Medical & Cardiological Review

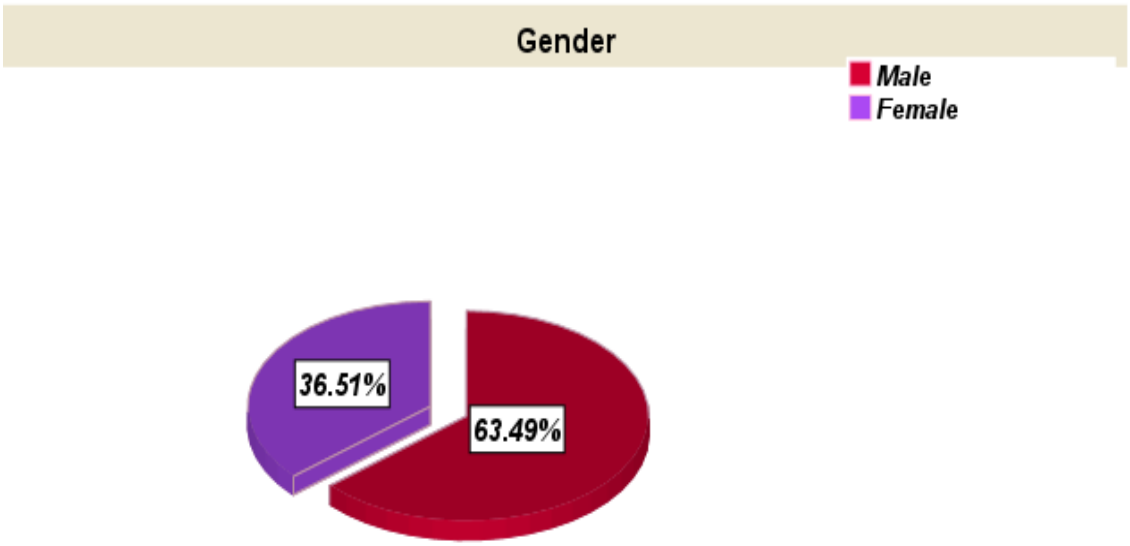
https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

deviation of 1.01, indicating that most participants were close to the mean age. The majority of respondents were between 20 and 21 years old, with 22 participants aged 20 years and 21 participants aged 21 years. Additionally, 11 participants were 19 years old, 7 were 22 years old, and only 2 participants were 23 years old.

GRAPH NO.02: GENDER DISTRIBUTION



The study comprised a total of 63 participants, as illustrated in the gender distribution graph. A significant majority of the participants were male, accounting for 63.49% (n=40) of the sample, while females represented 36.51% (n=23). This distribution highlights a notable gender imbalance among the study population, which may be considered when interpreting the results and generalizing findings.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Online ISSN 3007-2387
Print ISSN 3007-2379

TABLE NO. 01; PRETEST AND POST TEST SCORE IN PERCENTAGE OF ITEM

QUESTIONS	PRE TEST CORRECT SCORE	POST TEST CORRECT SCORE
Q1: The diabetes diet is:	28(44.4%)	55(87.30%)
Q2: Which of the following is highest in carbohydrate?	41(65.07%)	60(95.23%)
Q3: Which of the following is highest in fat?	22(34.92%)	49(77.7%)
Q4: Which of the following is a "free food"?	18(28.57%)	49(77.7%)
Q5: A1C is a measure of your average blood glucose level for the past:	19(30.1%)	60(95.23%)
Q6: Which is the best method for home glucose testing?	26(41.26%)	54(85.71%)
Q7 What effect does unsweetened fruit juice have on blood glucose?	09(14.28%)	48(76.19%)
Q8: Which should not be used to treat a low blood glucose?	24(38.09%)	53(84.12%)
Q9: For a person in good control, what effect does exercise have on blood glucose?	22(34.92%)	50(79.36%)
Q10: The best way to take care of your feet is to:	28(44.44%)	53(84.12%)
Q11: Type 2 diabetes is mostly linked to:	26(41.26%)	58(92.06%)
Q12: Numbness and tingling may be symptoms of?	13(20%)	51(80.95%)
Q13: Which of the following is usually not associated with diabetes:	11(17.46%)	59(93.65%)
Q14. Signs of ketoacidosis (DKA) include:	09(14.28%)	55(87.30%)
Q15. If you are sick with the flu, you should:	08(12.69%)	52(82.53%)
Q16. If you have taken rapid-acting insulin, you are most likely to have a low blood glucose reaction in:	24(38.09%)	56(88.8%)
Q17. You realize just before lunch that you forgot to take your insulin at breakfast. What should you do now?	20(31.7%)	53(84.12%)
Q18. What is diabetes mellitus?	33(52.38%)	55(87.30%)
Q19. Type 1 diabetes mostly linked to:	28(44.44%)	54(85.71%)
Q20. If you take your morning insulin but skip breakfast, your blood glucose level will usually:	22(34.92%)	57(90.47%)

The results of the pre-test and post-test scores show a significant improvement in students' knowledge regarding diabetes management after the educational intervention. In the pre-test, correct responses for most questions ranged between approximately 12% to 65%, indicating limited baseline knowledge. However, after the intervention, post-test scores increased substantially for all questions,

Vol. 4 No. 3 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

with many exceeding 80% to 90% correct responses. This demonstrates that the educational session was effective in enhancing students' understanding of diabetes diet, complications, insulin administration, glucose monitoring, and general disease knowledge. Overall, the data highlights the positive impact of structured teaching on improving awareness and knowledge related to diabetes care among participants as shown in table No.01.

Table No. 02: Paired Samples t-Test Results for Pre-Test and Post-Test Scores

Group Statistics			
Test	**N**	**Mean Score**	P – Value
Pre Test	63	6.8254	<.001
Post Test		**17.1429**	

The system for analysis and synthesis of the evidence was to score the (DKT 2) tool questions and correct responses for the pre-tests and post-tests scores among the 63 participants showed a significant improvement after the intervention. The mean of pre-test score was "6.82 with SD =2.667", while the mean post test score increased to "17.1429 with SD= 2.26373". The difference in scores was statically significant with a "P-value of <.001", indicating that the intervention was highly effective in enhancing the knowledge participants

DISCUSSION

This study analyzed the evaluate the knowledge on Diabetes and its related factors among undergraduate nursing students at Al-biruni College of Nursing Hyderabad Sindh Pakistan. 63 students are selected for non-randomized sampling technique all the students participated in pre-test and posttest. None of the participants answered all the questions correctly. The study shows that among participants were a slightly majority of Males 63.46% (n=40) compared to female 36.51 % (n=23)(see Graph1), as a study conducted in the study was conducted in Riyadh, Saudi Arabia, and was first published on July 16, 2022 [(42).] Age distribution of study participants Males and females with ages ranging from 18 to 23 years. The mean age of the participants was 20.48 years, with a standard deviation of 1.01, indicating that most participants were close to the mean age. The majority of respondents were between 20 and 21 years old, with 22 participants aged 20 years and 21 participants aged 21 years. Additionally, 11 participants were 19 years old, 7 were 22 years old, and only 2 participants were 23 years old.(see Graph2)[(43).] Five areas were assessed related to Diabetes Mellitus, Definition, pathophysiology, sign and symptoms, diet and nursing and medical management. Majority of students did not got good scores in pre-test but post-test score was good after conduct of session In our study, the results are consistent with the previous literature; we noticed a decrease [(44).] According to this study attitude were assessed of nursing students regarding diabetes mellitus, before delivering of teaching session student's attitude score were low, after teaching session posttest

Vol. 4 No. 3 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

shows positive attitude of students toward Diabetes Mellitus. The findings mirrored a study done in (Moran, V.2021). Which state that trained students had a more positive attitude than untrained students and there were significant differences between trained and untrained students regarding Diabetes Mellitus [(45)]Unfortunately, lack of proper knowledge on Diabetes Mellitus is very evident among nursing students. It is believed that Knowledge on Diabetes Mellitus is a necessity. According to the findings of this study, nursing students' knowledge of Diabetes Mellitus was evaluated both before and after an educational session. The pre-test results revealed consistently low levels of understanding, with correct response rates ranging from 12.69% to 65.07% across the 20 questions. This highlights significant gaps in baseline knowledge, particularly in areas such as recognizing symptoms of ketoacidosis, managing diabetes during illness, and understanding how unsweetened fruit juice affects blood glucose levels. Following the educational intervention, post-test scores showed a notable improvement, with most correct responses ranging between 76% and 95%. This reflects a substantial gain in knowledge, especially in key areas like insulin administration, glucose monitoring, dietary management, identifying complications, and appropriate treatment of hypoglycemia. The mean score increased from 6.83 to 17.14 out of 20 after the session, and the p-value of $\leq$ 0.001 indicates that this improvement is statistically significant. These results confirm that the session had a meaningful impact on enhancing students' understanding of diabetes.

CONCLUSION

This study assessed the effectiveness of a structured educational intervention in improving nursing students' knowledge of Diabetes Mellitus. The findings revealed a significant deficiency in baseline knowledge, particularly in critical areas such as dietary management, insulin use, symptom recognition, and self-care. However, the implementation of a targeted teaching program led to a marked improvement in post-test scores, with most participants achieving over 80% accuracy. The Diabetes Knowledge Test (DKT2) served as a reliable tool for evaluating knowledge gain. These results underscore the critical role of structured diabetes education within undergraduate nursing curricula. By equipping students with essential knowledge early in their training, such interventions can contribute to better patient care, improved disease prevention, and more effective management of diabetes in clinical settings. Future research should explore long-term retention of knowledge and the impact of repeated or
Advanced educational sessions on clinical performance.

LIMITATIONS

The convenience nonrandomized sampling was done.
As such, the sample analysis may not be truly representative of the general population; therefore, it may not be generalizable to the target population of all BS nursing students.
The timeline for the practicum project was limited.

RECOMMENDATION

Further studies can be conducted on a large scale to provide a better picture of

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Online ISSN 3007-2387
Print ISSN 3007-2379

knowledge regarding Diabetes Mellitus and its related factors.
Introduce effective learning platforms, seminars, and simulation tools to make diabetes education more interactive, accessible, and effective.
There should be in-service workshops and seminar to enhance the student nurses' knowledge on Diabetes and its related factors among undergraduate nursing students.
A comparative study should be conducted on subjects from different nursing institutes.

REFRENCES:

Shahid MB, Saeed M, Naeem H, Kumari U. Diabetes mellitus: Is Pakistan the epicenter of the next pandemic? Chronic Diseases and Translational Medicine. 2024;10(01):75-7.

Younas F, Mariyam A, Qayyum S. Perceived Stress, Coping Strategies and Life Satisfaction in Patients with Type-II Diabetes. Pakistan Journal of Social Sciences (PJSS). 2024;44(2).

Azeem S, Khan U, Liaquat A. The increasing rate of diabetes in Pakistan: A silent killer. Annals of medicine and surgery (2012). 2022;79:103901.

Nugrahani ASD, Muharram FR, Novida H, Swannjo JB, Wibisono S, Wungu CDK. Trends and disability-attributable risk factors of type 2 diabetes mellitus in Southeast Asia (1990–2019): An in-depth 30-year analysis from the Global Burden of Disease study. Nutrition, Metabolism and Cardiovascular Diseases. 2025;35(1):103750.

Cardella A. HEALTH CONSEQUENCES OF URBANIZATION: EFFECTS OF AIR AND ELECTROMAGNETIC POLLUTION ON THE PREVALENCE OF OBESITY, DIABETIC COMPLICATIONS AND OLFACTORY DYSFUCTION IN DIABETIC PATIENTS. 2025.

Ahmad E, Lim S, Lamptey R, Webb DR, Davies MJ. Type 2 diabetes. The Lancet. 2022;400(10365):1803-20.

Carstensen B, Rønn PF, Jørgensen ME. Prevalence, incidence and mortality of type 1 and type 2 diabetes in Denmark 1996–2016. BMJ Open Diabetes Research and Care. 2020;8(1):e001071.

Mohan V. Lessons learned from epidemiology of type 2 diabetes in South Asians: Kelly West award lecture 2024. Diabetes care. 2025;48(2):153-63.

Educators AAoD. An effective model of diabetes care and education: revising the AADE7 Self-Care Behaviors®. The Diabetes Educator. 2020;46(2):139-60.

Yimer YS, Ahmed AA, Addissie A, Kidane EG, Reja A, Abdela AA. Patients and healthcare providers needs and challenges in diabetes self-management and support in Ethiopian primary healthcare context. BMC Health Services Research. 2025;25(1):774.

Uğur E, Demir H, Akbal E. Postgraduate education needs of Nurses' who are caregivers for patients with diabetes. Pakistan journal of medical sciences. 2015;31(3):637-42.

Kunyiha N, Adan R, Ngugi R, Odhiambo J, Sokwalla SM. The unique ethnicity-specific aspects of burden, pathogenesis and management of prediabetes: Insights from Africa. Current Diabetes Reports. 2025;25(1):25.

Holt RIG, DeVries JH. The Management of Type 1 Diabetes in Adults. A Consensus Report by the American Diabetes Association (ADA) and the

Vol. 4 No. 3 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

European Association for the Study of Diabetes (EASD). 2021;44(11):2589-625.

Młynarska E, Czarnik W, Dzieża N, Jędraszak W, Majchrowicz G, Prusinowski F, et al. Type 2 diabetes mellitus: new pathogenetic mechanisms, treatment and the most important complications. International journal of molecular sciences. 2025;26(3):1094.

Jönsson J, Lernmark Å. Type 1 Diabetes. 2025.

Bapayeva G, Terzic S, Dotlic J, Togyzbayeva K, Bugibaeva U, Mustafinova M, et al. The influence of advanced age and obesity on pregnancy course and outcome in patients with diabetes mellitus. Menopause Review/Przegląd Menopauzalny. 2022;21(3):170-9.

Prideaux L, Sandeman M, Stratton H, Kelleher AD, Smith S, Hanson J. Melioidosis in people living with diabetes; clinical presentation, clinical course and implications for patient management. Acta Tropica. 2025;263:107559.

Scarr D. The Effects of Sodium-Glucose Co-transporter 2 Inhibition on Plasma and Urine Ketones in Type 1 Diabetes: University of Toronto (Canada); 2022.

Accili D, Deng Z, Liu Q. Insulin resistance in type 2 diabetes mellitus. Nature Reviews Endocrinology. 2025:1-14.

El-Naas A, Hamad O, Nair S, Alfakhri B, Mahmoud S, Haji A, et al. New onset of type 1 and type 2 diabetes post-COVID-19 infection: a systematic review. Emerging Microbes & Infections. 2025(just-accepted):2492211.

16. Diabetes care in the hospital: standards of care in diabetes—2024. Diabetes Care. 2024;47(Supplement_1):S295-S306.

Neto NCD, de Paula Bortolan G, Furtado DRL, de Gouveia DM, de Vasconcelos Mourão MH, Rodrigues EM, et al. Adherence to diabetes mellitus treatment: nursing care strategies. Observatório de la Economía Latinoamericana. 2025;23(1):182.

Sun H, Saeedi P, Karuranga S, Pinkepank M, Ogurtsova K, Duncan BB, et al. IDF Diabetes Atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. Diabetes research and clinical practice. 2022;183:109119.

Genitsaridi I, Salpea P, Salim A, Sajjadi SF, Tomic D, James S, et al. Idf Diabetes Atlas: Global, Regional and National Diabetes Prevalence Estimates for 2024 and Projections for 2050.

Rayani AM. Use of Mobile Technology: Effects on Diabetic Health Outcomes and Health Care Costs in the Kingdom of Saudi Arabia. 2022.

Basheikh MA, Balubaid H, Mohammed B, Hashim B. Kingdom of Saudi Arabia. Int J Ageing Dev Ctries. 2021;6:141-54.

Aladhab RA, Alabbood MH. Adherence of patients with diabetes to a lifestyle advice and management plan in Basra, Southern Iraq. International Journal of Diabetes and Metabolism. 2019;25(3-4):100-5.

Świątoniowska N, Sarzyńska K, Szymańska-Chabowska A, Jankowska-Polańska B. The role of education in type 2 diabetes treatment. Diabetes Research and Clinical Practice. 2019;151:237-46.

Falce RE. Knowledge, Perception, and Risk-Related Behaviors Among College Students With and Without Family History of Diabetes: Kent State University; 2022.

Vol. 4 No. 3 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

Bagweneza V, Musabirema P, Mwiseneza MJ, Collins A, Bhengu BR. Diabetes health education: nurses' knowledge of essential components at a Rwandan hospital. Rwanda Journal of Medicine and Health Sciences. 2019;2(2):172-7.

Goyal D, Malhan S, Kumar M, Tyagi A, Bhatnagar A, Pal S, et al. Diabetes Awareness and Health Behaviours Among University Students and Staff. African Journal of Biomedical Research. 2025;28(1):80-6.

Gazzaz ZJ. Knowledge, attitudes, and practices regarding diabetes mellitus among university students in Jeddah, Saudi Arabia. Diabetes, Metabolic Syndrome and Obesity. 2020:5071-8.

Farzaei M, Shahbazi S, Gilani N, Ostadrahimi A, Gholizadeh L. Nurses' knowledge, attitudes, and practice with regards to nutritional management of diabetes mellitus. BMC medical education. 2023; 23(1):192.

Sharkey F, Coates V, editors. Investigating the co-management of diabetes and dementia: a challenging duo. RCN International Nursing Research Conference 2024; 2024.

Alshammari MFF, Alshammari NBA, Aldhafeeri HH, Alanazi MSH, Alhazmi NH, Alhazmi MM, et al. The Role of Nursing in Enhancing Patient Experience in Critical Care Units. Journal of International Crisis and Risk Communication Research. 2024;7(S6):18.

Ernawati U, Wihastuti TA, Utami YW. Effectiveness of diabetes self-management education (DSME) in type 2 diabetes mellitus (T2DM) patients: Systematic literature review. Journal of public health research. 2021;10(2).

Reynolds A, Mitri J. Dietary advice for individuals with diabetes. Endotext [Internet]. 2024.

Aasbjerg K, Nørgaard CH, Vestergaard N, Søgaard P, Køber L, Weeke P, et al. Risk of diabetes among related and unrelated family members. Diabetes Research and Clinical Practice. 2020;160:107997.

Cart C. The Hidden Hunger: Micronutrient Deficiencies.

Kim J, Choi S, Kim CJ, Oh Y, Shinn SH. Perception of risk of developing diabetes in offspring of type 2 diabetic patients. The Korean journal of internal medicine. 2002;17(1):14-8.

Uzeli ÜŞ, Yapar D, Aydemir N, Küçükler FK. Validity and Reliability Study of the Turkish Version of the Michigan Revised Diabetes Knowledge Test and Its Relationship with the Turkish Health Literacy Scale-32 Scores. 2023.

Syed W, Alharbi MK, Samarkandi OA, Alsadoun A, Al-Rawi MBA, Iqbal A, et al. Evaluation of Knowledge, Awareness, and Factors Associated with Diabetes: A Cross-Sectional Community-Based Study. International Journal of Endocrinology. 2022;2022(1):1921010.

Zemba D, Sagna Y, Traore S, Zoungrana L, Somé DP, Kissou SA, et al. Diabetes knowledge and associated factors in adolescents and young adults with type 1 diabetes in Ouagadougou (Burkina Faso). BMC Endocrine Disorders. 2023;23(1):210.

Mehta P, Kiruthika S, Laksham KB. Effectiveness of health education on insulin injection technique in patients with type 2 diabetes mellitus: A quasi-experimental Pre-test post- test research. Journal of Family Medicine and Primary Care. 2024;13(11):5101-7.

Moran V, Blanchette J. Changes in attitudes toward diabetes in nursing students at diabetes camp. 2021;38(4):579-87.