

EFFECT OF NURSE LED HEALTH EDUCATION INTERVENTION ON KNOWLEDGE AND PRACTICES REGARDING BODY WEIGHT MANAGEMENT AMONG DIABETIC TYPE-II OVERWEIGHT PATIENTS

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Abstract

Introduction: Diabetes Mellitus Type 2 (T2DM) is a persistent metabolic condition, which has evolved to become one of the biggest global health concerns. Therefore, the International Diabetes Federation (IDF) estimated there are 537 million adults with diabetes in 2021. This number is estimated to increase and reach to 693 million by 2045. **Methods:** A quasi-experimental pre-post design was used at Hayatabad Medical Complex, Peshawar. Forty-nine overweight Type II diabetic patients (30–65 years) were recruited through purposive sampling. A structured, validated questionnaire were applied before and after a nurse-led educational intervention. Data were analyzed with descriptive statistics, paired t-tests, independent sample t-tests, and one-way ANOVA at a 0.05 significance level. Ethical approval was granted by Khyber Medical University and Hayatabad Medical Complex along with informed consent obtained from patients. **Results:** Evaluation of the test findings revealed increased knowledge and practice change towards weight management with a mean pretest score of 6.49 and a posttest mean score of 11.73 ($P < 0.001$). Weight loss of 1.14 kg and BMI of 0.38 was also calculated in post assessment. Independent sample t-test results revealed no statistically significant difference between post-test scores of male and female [$t(47) = 0.514$, $p = 0.610$, mean difference = 0.45, 95% CI: -1.32 to 2.22]. ANOVA results indicated no statistically significant differences in post-test scores between the education levels [$F(3, 45) = 0.254$, $p = 0.858$]. Post-hoc comparison using Tukey's HSD showed no statistical difference. **Conclusion:** Overall findings of this study highlight the effectiveness of nurse-led health education in improving body weight, BMI, and overall knowledge and practices.

INTRODUCTION

Diabetes Mellitus Type 2 (T2DM) is a persistent metabolic condition, which has evolved to become one of the biggest global health concerns. Therefore, the International Diabetes Federation (IDF) estimated there are 537 million adults with diabetes in 2021. This number is estimated to increase and reach to 693 million by 2045 showing increase prevalence of the disease globally.¹

Along with this Increase in the number of Diabetes mellitus, the debate obesity and overweight has also reached epidemic proportions. Global estimates in 2030 will be classified that closely half of all adult will be determined as obese or overweight.³ The dual stain of diabetes and obesity presents a significant public health challenge. The Type2 Diabetes mellitus development leading risk factor is obesity. The interconnection between these two conditions creates a vicious cycle that exacerbates health outcomes and increases healthcare costs.⁴

There is a huge relationship found between diabetes Mellitus type 2 and obesity is well-documented, studies showing that 85–90% individuals with Type 2 Diabetes Mellitus are either overweight, obese.⁴ Abdominal obesity, in particular, plays significant role in improvement of insulin resistance, which resist the body's ability to regulate the blood glucose levels effectively.⁵ This leads to hyperglycemia, a defining characteristic of diabetes, and heightens the likelihood of issues like heart diseases renal failure and nerve damage.⁶ Addressing obesity in individuals with diabetes is therefore a critical component of effective disease management.

Lifestyle modification is a cornerstone of diabetes prevention and management. Modest weight loss shows in evidence, such as 5–10% of body weight, in glycemic control can make significant improvements, lipid profiles, and blood pressure.⁷ However, achieving and sustaining weight loss is difficult for many individuals, particularly those with diabetes, due to factors such as medication-induced weight gain, metabolic adaptations, and psychological barriers.⁸ This underscores the need for comprehensive interventions that address these

challenges and support patients in making sustainable lifestyle changes.

Nurse-led health education interventions have emerged as a hopeful method to expressing the combined challenge of diabetes and obesity in developing in middle income nation like Pakistan nurses show a title role in healthcare delivery. Where access to physicians may be limited. Nurse-led programs focus on offering patients with the skills, knowledge, and support needed to achieve their health successfully.⁹ These programs emphasize patient-centered care, which considers the unique needs, preferences, and circumstances of each individual.

Current prevalence of diabetes and obesity in particular has reached alarming heights in Pakistan. Around 33 million adults in Pakistan in 2021 are suffering from diabetes; ranks the country the third-highest prevalence rate regarding diabetes. Test, it making the third-highest ranked country for diabetes prevalence.¹⁰

The rise in obesity is equally concerning, driven by urbanization, changes in dietary patterns, and increasingly sedentary lifestyles.¹¹ Concerning the trends by these compounded, factors such as socioeconomic status, improved healthcare, cultural effects on health and less access to healthcare.¹² Nurse led health education programs can play the role of solving these challenges because they can develop, implement and deliver simple, inexpensive and culturally sensitive interventions. As a tool to help patients empower themselves education is one of these effective tools. The intervention presents information tailored to nursed-led programs based on the understanding between weight, diet, diabetes and exercise.¹³ These programs may play a very important part where health literacy is low, as it is in Pakistan, to increase awareness of the facts about diabetes and obesity in such cases.¹⁴

Nurse-led interventions for diabetes and obesity management leverage theory-based models like the Health Belief Model and Trans theoretical Model to promote individualized, patient-centered care. These approaches address psychological barriers such as guilt and frustration while incorporating family support

and technology—like mobile apps and telemedicine—to enhance accessibility and monitoring, especially in resource-limited settings like Pakistan.¹⁵

Economic factors also play a critical role, as nurse-led programs can reduce long-term healthcare costs by preventing complications. However, challenges like inadequate nurse training and resource shortages must be addressed. Successful examples from the U.S. and UK demonstrate the potential of such interventions, highlighting the need for policy support and funding to scale these programs effectively in Pakistan and other regions facing rising NCD burdens.¹⁶

Methodology

This quasi-experimental study assessed the impact of a nurse-led health education intervention on weight management knowledge and practices among overweight Type-II diabetic patients. The study employed a pre-test and post-test design, conducted over six months at Hayatabad Medical Complex (HMC), Peshawar. A purposive

sampling technique was used to recruit 49 participants (calculated via G*Power with a 0.5 effect size, 0.05 alpha, and 90% power). Inclusion criteria comprised diabetic patients aged 30–65 with a BMI ≥ 25 kg/m², excluding pregnant women, cognitively impaired individuals, and those with severe diabetic complications.

Data collection involved a validated structured questionnaire assessing demographic details, knowledge, and practices before and after the intervention. The nurse-led program included 40–60 minutes group sessions (10 participants each) covering diet, exercise, behavioral strategies, and psychological support. Post-intervention follow-ups were conducted after four weeks. Statistical analysis was performed using SPSS v22, employing paired t-tests to compare pre- and post-intervention scores, independent t-tests for gender differences, and ANOVA for education-level variations ($p < 0.05$ significance). Ethical approval was obtained from KMU's Ethical Review Board, with informed consent, confidentiality, and data security maintained throughout the study.

(63.3%) were illiterate, while 14.3% held postgraduate degrees. Regarding diabetes duration, 32.7% were diagnosed for 1–3 years, 34.7% for 4–7 years, and 32.7% for ≥ 8 years. Income distribution showed 44.9% earned <Rs. 20,000, while 16.3% earned >Rs. 60,000.

Results

Demographic Profile

The study included 49 participants (57.1% male, 42.9% female), with 91.8% married. The mean age was 54.37 years (SD = 8.55), ranging from 35 to 65. Most

Table 1: Socio-Demographic profile of the participants, n49

Demographic	Statistics
Gender	Male: 57.1% (n=28); Female: 42.9% (n=21)
Marital Status	Married: 91.8% (n=45); Single: 8.2% (n=4)
Age (Years)	Mean: 54.37; Median: 56; SD: 8.55; Range: 33–65
Education	Illiterate: 63.3% (n=31); Postgraduate: 14.3% (n=7)
Diabetes Duration	1–3 years: 32.7% (n=16); 4–7 years: 34.7% (n=17); ≥ 8 years: 32.7% (n=16)
Income (Rs.)	<20,000: 44.9% (n=22); >60,000: 16.3% (n=8)

Test Statistics

Pre-Post Assessment of knowledge and practice;
The paired samples t-test revealed a significant improvement in knowledge and practice scores

following nurse-led health education interventions among type-II diabetic overweight patients. The mean pre-test score (6.49 ± 1.91) increased to

11.73 $\pm$ 3.03 post-intervention, with a mean difference of -5.24 $\pm$ 3.28 ($t(48) = -11.19$, $p <$

0.001), indicating a statistically significant enhancement (Table 2 & 3).

Table 2. Pre-Post Knowledge and Practice Scores

Variable	Mean	N	Std. Deviation	Std. Error Mean
Pre-test Score	6.49	49	1.91	0.27
Post-test Score	11.73	49	3.03	0.43

Table 3. Mean Difference in Pre-Post Scores

Mean Difference	Std. Deviation	<i>T</i>	<i>df</i>	<i>p</i> -value
-5.24	3.28	-11.19	48	<0.001

Pre-Post Assessment of Weight and BMI

The intervention significantly improved weight, BMI, and knowledge/practices related to weight management. Participants' mean weight decreased by 1.14 kg (from 79.18 $\pm$ 7.91 kg to 78.04 $\pm$ 7.86 kg, $p <$ 0.001), while BMI reduced by 0.38 (from 30.11 $\pm$ 2.88 to 29.72 $\pm$ 2.73, $p <$

0.001). Knowledge scores also saw a notable increase (6.49 $\pm$ 1.91 to 11.73 $\pm$ 3.03, $p <$ 0.001), demonstrating the effectiveness of nurse-led education.

Table 4. Overall Pre-Post Score of Knowledge/ Practice, Weight and BMI

Variable	Pre-Intervention (Mean $\pm$ SD)	Post-Intervention (Mean $\pm$ SD)	Mean Difference ($\pm$ SD)	<i>t</i> -value	<i>p</i> -value
Weight (kg)	79.18 $\pm$ 7.91	78.04 $\pm$ 7.86	1.14 $\pm$ 1.17	6.82	< 0.001
BMI	30.11 $\pm$ 2.88	29.72 $\pm$ 2.73	0.38 $\pm$ 0.68	3.95	< 0.001
Knowledge/ Practice	6.49 $\pm$ 1.91	11.73 $\pm$ 3.03	-5.24 $\pm$ 3.28	-1.19	< 0.001

Gen Gender Association with Post Assessment Score

An independent samples *t*-test revealed no significant difference in post-test scores between male ($n = 28$, $M = 11.93$, $SD = 3.14$) and female ($n = 21$, $M = 11.48$, $SD = 2.93$) participants:

- $t(47) = 0.514$, $p = 0.610$
- 95% CI: [-1.32, 2.22]

Table: Gender Comparison of Post-Test Scores

Gender	N	Mean	SD	<i>T</i>	<i>P</i>
Male	28	11.93	3.14	0.514	0.610

Female	21	11.48	2.93		
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2. Association of Post Assessment Score with Education Level

A one-way ANOVA showed no significant differences in post-test scores across education

levels ($F(3,45) = 0.254, p = 0.858$). Post-hoc Tukey's HSD confirmed no significant pairwise differences.

Table: Post-Test Scores by Education Level

Education Level	N	Mean	SD
Illiterate	31	11.90	3.38
Intermediate	8	11.50	2.68
Undergraduate	3	10.33	2.08
Postgraduate	7	11.85	2.27

Results Summary

Nurse-led health education significantly improved weight management knowledge and practices in Type-II diabetic patients. Neither gender ($p = 0.610$) nor education level ($p = 0.858$) had a significant effect on post-test scores, indicating the intervention's universal effectiveness across demographics.

Discussion:

This study highlights the effectiveness of nurse-led health education in improving knowledge and practices for weight management among overweight Type 2 diabetic patients. By incorporating behavioral models like the Trans theoretical Model and Health Belief Model, the intervention addressed psychological barriers, enhancing motivation and self-efficacy. Mobile health technologies further supported real-time monitoring, particularly in rural areas, bridging gaps in follow-up care. The findings emphasize the potential of nurse-led programs as a cost-effective solution in resource-limited settings like Pakistan,

where nurses play a crucial role in culturally sensitive healthcare delivery.

Despite their success, challenges such as limited nurse training and resources were identified, calling for greater investment in professional

development and infrastructure. Family involvement proved vital in sustaining lifestyle changes, reflecting the cultural context of Pakistan. The study fills a gap in literature by shifting focus from physician-led to nurse-led interventions, demonstrating their scalability and impact on chronic disease management. Policymakers should prioritize funding and policy support to expand these programs, leveraging their cost-effectiveness to reduce long-term healthcare burdens.

Psychological support emerged as a key component, addressing stress and anxiety that hinder lifestyle modifications. Integrating technology, such as telemedicine and mobile apps, improved accessibility and continuity of care, particularly in underserved regions. Future interventions should explore interdisciplinary collaboration, combining dietary counseling and mental health support for holistic care. Additionally, AI-driven personalized care could optimize outcomes, making nurse-led programs more adaptive and efficient in diverse settings.

In conclusion, nurse-led interventions offer a sustainable, scalable approach to managing diabetes and obesity, particularly in low-resource environments. By addressing behavioral, cultural, and systemic barriers, these programs empower patients and reduce disease burden. Policymakers and stakeholders must invest in training, technology, and public awareness to maximize

their reach. Further research should assess long-term adherence and explore innovative strategies, ensuring these interventions remain effective and widely adopted in global healthcare systems.

Conclusion:

This study highlights the effectiveness of nurse-led health education interventions in improving body weight management and glycemic control among Type 2 diabetic patients, demonstrating universal impact across genders and education levels. By integrating behavioral change theories and technology-centered tools, the intervention addressed psychosocial and practical challenges, proving to be a cost-efficient strategy for enhancing population health, particularly in regions like Pakistan. Culturally sensitive, evidence-based education is essential for supporting chronic disease self-management.

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