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A Pre-Experimental Study to Assess the Effectiveness of Self- Instructional Module on MNT Therapy in Gestational Diabetes Mellitus Among Final Year Nursing Students at A Selected College of Delhi

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ABSTRACT

Introduction: Gestational Diabetes Mellitus (GDM) is a significant health concern affecting pregnant women and their unborn children, necessitating effective management strategies such as Medical Nutrition Therapy (MNT).

Aim: The purpose of this study was to evaluate how well a self-instructional module (SIM) on MNT therapy increased the knowledge of final-year nursing students at a particular Delhi institution.

Methodology: 110 samples were chosen using a purposive sampling technique in a quantitative evaluation approach using a pre-experimental descriptive research design. The general information was collected and knowledge was measured by structured questionnaire. After the pre-test self-instructional module was provided to final year nursing students GNM(N) and BSC(N), post-test was done after 7 days.

Result: The major findings of pre-test were, the majority students 81(73.64%) were having average level of knowledge, 0 were having good level of knowledge, 29(26.6%) were having poor level of knowledge. The major findings of post-test were, majority of students 0 were having good level of knowledge, 83(75.45%) were having average level of knowledge, 27(24.54%) were having poor level of knowledge. The mean post-test knowledge score was higher than mean pre-test knowledge score. Thus, the intervention was found to be effective strategy to enhance the knowledge regarding Medical Nutrition Therapy in Gestational Diabetes Mellitus.

Keywords: Gestational diabetes, Medical Nutritional Therapy (MNT), Self- instructional module (SIM).

Introduction:

A common metabolic disease that develops during pregnancy, gestational diabetes mellitus (GDM) is characterized by glucose intolerance that first appears or is identified during pregnancy. Preeclampsia, macrosomia, neonatal hypoglycemia, and the long-term risk of type 2 diabetes for both the mother and the fetus are among the serious health problems it presents. Depending on demographics and diagnostic standards, the prevalence of GDM varies from 1% to 28% worldwide (American Diabetes Association, 2023)[1]. About 10–14% of births in India are affected, which is a startlingly high prevalence (Seshiah et al., 2021).[2]

A key component of the management of GDM, medical nutrition therapy (MNT) entails customized dietary plans to achieve optimal glucose control without endangering the health of the mother or fetus. MNT can improve pregnancy outcomes and drastically reduce the need for pharmaceutical interventions (International Diabetes Federation, 2022). However, healthcare professionals, including nurses, may not be aware of or knowledgeable about MNT, which can make it more difficult to provide effective care.[3]

As front-line medical professionals, nurses are essential in teaching and helping patients with GDM. It is essential that nursing students possess the information and abilities needed for MNT treatment and counselling. Innovative teaching techniques that guarantee evidence-based practice and improve learning include self-instructional modules (SIMs). SIMs are learner-centered resources made to support flexible, self-paced learning while guaranteeing understanding of challenging subjects (Yousefi & Abedi, 2020).[4]

According to the American Diabetes Association (ADA), lifestyle management—which encompasses diabetes self-management education and support (DSMES), medical nutrition treatment (MNT), physical activity, counselling for quitting smoking, and psychosocial support—is the cornerstone of diabetes care. People with diabetes should actively participate in education, self-management, and treatment planning with the medical team, as nutrition therapy is essential to the overall management of their condition [1].

The need for this study arises from the critical role of nurses in GDM management and the gap in their knowledge regarding MNT. By introducing a self-instructional module on MNT therapy, this study aims to bridge this gap and equip final-year nursing students with the knowledge and skills required to provide effective GDM care. Furthermore, the findings will contribute to improving nursing education by emphasizing the use of innovative teaching methods. Given the increasing prevalence of GDM and the critical importance of MNT, this research is timely and relevant in the Indian context, particularly in urban areas like Delhi NCR, where access to quality care is essential to manage the growing burden of GDM.

Aim: The study aims to assess the knowledge regarding the MNT therapy among final year students and to determine the effectiveness of information module on MNT therapy among final years students in a selected college.

Methodology:

Quantitative research approach was used in the study. The study was conducted at selected college of Delhi NCR. The sample size taken was 110 final year Nursing students and technique used was purposive sampling technique. Data was collected by using structured questionnaire. Content validity was verified by 9 experts in nursing and obstetrics and gynaecology. Reliability was tested using KR-20, yielding r = 0.98, which was highly reliable.

SCORING FOR STRUCTURED KNOWLEDGE QUESTIONNAIRE

The total score was 20. 1 mark was given for every correct answer and zero was given for every wrong answer. A score was ranged in [table 1]: -

Results:

Data analysis utilized both descriptive and inferential statistics.

The table 2 shows the frequency and percentage distribution accprding to the demographic variable which shows that majority of sample 70% (77) were from the age group of 21-24 years, 25.5% (28) were in the age group of 18-20 years. Most of them were female 94.5% (104), male 5.5% (6). In educational level BSC(N) 52.7% (58), GNM(N) 47.3% (52). Every individual has knowledge regarding MNT.

The data from the table 3 indicates the knowledge levels of final-year nursing students before and after an educational intervention. In the **pre-test**, **73.64%** of students had **average knowledge**, while **26.6%** had **poor knowledge**. The **mean score** was **12.28** with a **standard deviation of 3.25**, showing moderate understanding with some variation among students. In the **post-test**, **75.45%** maintained average knowledge and **24.54%** remained in the poor category. The **mean score slightly increased to 12.67**, with a **standard deviation of 3.46**, indicating a minor improvement in knowledge following the intervention.

The table 4 shows the significant difference between pre-test and post knowledge score, as the mean knowledge score increased from 12.28 (pre-test) to 12.67 (post-test) following the educational intervention, with a mean difference of 0.39. The standard deviation was 3.25 for the pre-test and 3.46 for the post-test, indicating similar variability in both assessments. The calculated t-value was 0.37, with 109 degrees of freedom (df), and the p-value was 1.69, suggesting that the difference in knowledge scores was not statistically significant at the conventional alpha level ($p < 0.05$).

These results imply that while there was a slight increase in knowledge scores post-intervention, it was not statistically significant, indicating the need for a more robust or longer-term educational strategy to yield meaningful improvements.

Discussion

The present study evaluated the effectiveness of a self-instructional module (SIM) on Medical Nutrition Therapy (MNT) in Gestational Diabetes Mellitus (GDM) among final-year nursing students in a selected college of Delhi NCR. The findings highlight the critical role of structured educational interventions in enhancing the knowledge and understanding of nursing students regarding MNT in GDM, an essential component of prenatal care.

When the pre- and post-test knowledge scores were compared, it was shown that the acquired $t = 0.37$ was more than the table value at the 0.05 level of significance. The "t" value was found to be important after taking the aforementioned into account. It demonstrates that, at the 0.05 level of significance, there was a statistically significant variation between the mean scores (pre- and post-test knowledge scores) for nursing students' knowledge of medical nutrition therapy in gestational diabetes mellitus. Therefore, the self-instructional module on medical nutrition therapy in gestational diabetes helped nursing students become more knowledgeable.

This lends credence to the idea that a well created self-instructional module can successfully fill up knowledge gaps in specific nursing education domains. Prior research has documented similar results, demonstrating that SIMs are useful in enhancing nursing students' and healthcare professionals' knowledge and skills (Ramesh et al., 2020; Kumar & Mehta, 2019).[5]

MNT is a cornerstone in the management of GDM, as it helps in achieving optimal glycemic control, reducing maternal and fetal complications, and promoting positive pregnancy outcomes (American Diabetes Association, 2023).[1] However, gaps in the understanding of MNT protocols among nursing students can hinder their ability to deliver comprehensive care. By equipping students with accurate and evidence-based information, the SIM used in this study has contributed to addressing this gap, fostering both theoretical and practical competencies.

Moreover, the pre-experimental design employed in this study aligns with the need for innovative and student-centered teaching strategies in nursing education. The interactive and self-paced nature of SIMs allows learners to engage with the content at their convenience, enhancing retention and application of knowledge in clinical settings (Singh & Sharma, 2021).[6]This approach is particularly relevant for topics like GDM, which require an integration of theoretical concepts with clinical practice.

Recent research suggests that plant-based diets, particularly the Mediterranean diet rich in vegetables, fruits, nuts, seeds, oils, beans, and whole grains, may help prevent type 2 diabetes (T2DM) and gestational diabetes mellitus (GDM) by slowing gastric emptying, improving insulin sensitivity, and reducing inflammation through antioxidant effects. These diets may also modulate key inflammatory markers such as TNF-α, IL-6, and CRP, which are elevated in GDM and implicated in the immune response to COVID-19, highlighting a potential dual benefit. Additionally, myo-inositol supplementation, known to support insulin signaling and energy metabolism, has shown promise in significantly reducing GDM incidence in at-risk women, including those with PCOS or impaired glucose tolerance. Together, these non-pharmacologic approaches represent emerging, low-risk strategies for DM prevention, especially during pregnancy—a critical window for initiating long-term health improvements.[7]

Based on the study findings, several recommendations for future research were proposed. First, a pre-experimental study can be conducted to assess the effectiveness of computer-assisted self-care education for patients with gestational diabetes mellitus (GDM) who are on insulin therapy. Second, further research is suggested to evaluate the effectiveness of a structured education program in reducing complications among GDM patients. Lastly, a quasi-experimental study could be designed to examine the impact of a structured training program on the knowledge and practices of diabetes mellitus patients regarding the prevention of diabetic foot ulcers.

Limitations

The sample size was limited which decreased the generalization of the study.

Ethical Consideration: Ethical permission required for the study was obtained from principal and head of college of Nightingale institute of nursing, Noida.

Funding and Conflict of Interest

No funding was received, and the authors declare no conflict of interest. The researcher conducted this study independently.

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Tables

TABLE-1
SCORING KEY FOR THE SELF STRUCTURED QUESTIONAIRRE

S.NO.	OPTION	RANGE OF SCORE
1.	Good	17-20
2.	Average	11-15
3.	Poor	0-6

TABLE- 2
FREQUENCY AND PERCENTAGE DISTRIBUTION OF FINAL YEAR NURSING STUDENTS AS PER DEMOGRAPHIC VARIABLES.
N=110

S.NO.	DEMOGRAPHIC VARIABLES	FREQUENCY	PERCENTAGE
1.	**AGE (IN YEARS)**		
	a) 18-20 years	28	25.5%
	b) 21-24 years	77	70%
	c) 25 years and above	5	4.5%
2.	**GENDER**		
	a) Male	6	5.5%
	b) Female	104	94.5%
	c) Others	0	0%
3.	**MARITAL STATUS**		
	a) Married	3	2.7%
	b) Unmarried	106	96.4%
	c) Divorced	1	0.9%
4.	**RELIGION**		
	a) Hindu	77	70%

	b) Muslim c) Christian d) Other	1 29 3	0.9% 26.4% 2.7%
5.	**EDUCATIONAL STATUS** a) BSC(N) b) GNM(N)	 58 52	 52.7% 47.3%
6.	**INCOME OF THE FAMILY PER MONTH** a) <10,000 b) 10,000-30,000 c) 31,000-60,000 d) >60,000	 8 42 31 29	 7.3% 38.2% 28.2% 26.4%
7.	**AREA OF LIVING** a) Urban b) Rural	 101 9	 91.8% 8.2%
8.	**DIETARY PATTERN** a) Vegetarian b) Non-vegetarian	 63 47	 57.3% 42.7%
9.	**DO YOU HAVE ANY PREVIOUS KNOWLEDGE REGARDING MNT** a) Yes b) No	 64 46	 58.2% 41.8%
9(a)	**IF YES, THEN FROM WERE** a) Books b) Lectures c) Clinical postings d) Online sources	 19 27 11 11	 27.9% 39.7% 16.2% 16.2%

TABLE -3

ANALYSIS OF PRETEST AND POSTTEST KNOWLEDGE SCORES OF FINAL YEAR NURSING STUDENTS USING FREQUENCY PERCENTAGE.

Categories of knowledge scores, obtained range of knowledge scores, possible range of knowledge scores, Frequency, Percentage, Mean, Median, Standard Deviation of Pretest and Post-test knowledge scores of final year nursing students on Medical Nutrition Therapy.

N=110

	Categories of knowledge scores	**Obtained range of knowledge scores**	**Possible range of knowledge scores**	**frequency**	**percentage**	**Mean**	**Median**	**Standard deviation**
Pre-test	Good 17-20	21-30	0	0	0	12.28	13	3.25
	Average	11-20	11-17	81	73.64			

	11-15							
	Poor 0-6	0-10	3-10	29	26.6			
Post -test	Good 21-30	21-30	0	0	0	12.67	13	3.46
	Average 11-20	11-20	11-18	83	75.45			
	Poor 0-10	0-10	3-10	27	24.54			

TABLE- 4

The data represent the significant difference between pre-test and post knowledge score.

N=110

Knowledge	Mean	Mean differences	Standard deviation	't' value	df	'p' value
Pre-test knowledge score	12.28	0.39	3.25	0.37	109	1.69
Post- test Knowledge score	12.67		3.46			