

EFFECTIVENESS OF DEMONSTRATION METHOD ON USE OF DIGITAL GLUCOMETER AMONG DIABETES PATIENTS

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Abstract

Diabetes mellitus, a chronic condition with rising prevalence globally and particularly in India, necessitates effective self-monitoring and management to prevent complications. Digital glucometers have emerged as essential tools for self-monitoring of blood glucose (SMBG), but their appropriate use often requires proper training. This study evaluates the effectiveness of the demonstration method in teaching diabetes patients how to use digital glucometers. A pre-experimental one-group pretest-posttest design was used, involving 60 diabetic patients from community areas in Indore, selected through purposive sampling. Participants were assessed on their ability to use a digital glucometer before and after a structured demonstration intervention. Data were collected using a modified observation checklist and analyzed using descriptive and inferential statistics. The mean pre-demonstration score was 5.375, which significantly increased to 9.233 after the intervention (paired t-test = 23.688, $p < 0.001$). Chi-square analysis revealed significant associations between pre-demonstration scores and participants' education ($\chi^2 = 16.426$, $p < 0.05$) and occupation ($\chi^2 = 23.115$, $p < 0.05$). The study concludes that the demonstration method is an effective approach to improving SMBG practices. It highlights the need for tailored, hands-on training programs to empower diabetic patients and enhance diabetes management, ultimately reducing healthcare burdens.

Keywords: *Diabetes Mellitus, Digital Glucometer, Self-Monitoring of Blood Glucose (SMBG), Demonstration Method, Diabetes Education*

Introduction

Diabetes mellitus is a chronic condition that has reached epidemic proportions globally, with India experiencing one of the highest burdens. Managing diabetes effectively requires consistent monitoring of blood glucose levels to prevent complications and improve quality of life. Digital glucometers have become indispensable tools for self-monitoring of blood glucose (SMBG), enabling patients to take control of their health. However, many individuals, especially those with limited education or technical skills, struggle to use these devices effectively.

Educational interventions play a pivotal role in bridging this gap, empowering patients to adopt SMBG practices confidently. Among various teaching strategies, the demonstration method stands out for its hands-on approach, allowing participants to observe and practice the steps involved. This study evaluates the effectiveness of the demonstration method in teaching

diabetes patients to use digital glucometers, aiming to improve their proficiency and contribute to better diabetes management outcomes.

Background

Diabetes mellitus is a chronic condition characterized by high levels of blood glucose, which necessitates continuous monitoring and management to prevent complications such as cardiovascular diseases, kidney damage, neuropathy, and retinopathy. Effective management of diabetes not only improves the quality of life for patients but also reduces the financial burden on healthcare systems and families.

In recent years, technological advancements have introduced tools like digital glucometers, which are compact, user-friendly devices enabling individuals to monitor their blood glucose levels at home. This self-monitoring approach empowers diabetic patients to take charge of their condition, adjust their diet, medication, and lifestyle as needed, and seek timely medical intervention. However, the adoption and appropriate use of digital glucometers require adequate training, especially among populations with limited education or access to healthcare resources.

The last two decades have seen a staggering rise in diabetes cases worldwide, with India bearing the brunt of this epidemic. Dubbed the "Diabetes Capital of the World," India faces significant challenges in diabetes management due to socio-economic disparities, lack of awareness, and inadequate healthcare infrastructure. Against this backdrop, education and training programs focusing on self-monitoring of blood glucose (SMBG) are crucial for improving health outcomes.

This study investigates the effectiveness of the demonstration method in teaching diabetes patients how to use digital glucometers. By assessing the improvement in their ability to perform SMBG before and after the demonstration, the study aims to highlight the value of hands-on training in empowering patients and enhancing their diabetes management practices.

Objective

The primary objective of the study was to evaluate the effectiveness of the demonstration method in improving the ability of diabetes patients to use a digital glucometer for checking their blood glucose levels.

Methodology

Study Design:

The study employed a pre-experimental one-group pretest-posttest design. This design allowed for the assessment of changes in participants' skills and knowledge before and after the intervention.

Sampling:

A total of 60 diabetic patients were selected from community areas in Indore, Madhya Pradesh, using a purposive sampling technique. This non-probability sampling method ensured that individuals most likely to benefit from the intervention were included.

Data Collection Tools:

A modified observation checklist was used to assess participants' ability to use the digital glucometer. The checklist included criteria for handling the device, preparing for the test, obtaining a blood sample, and interpreting results.

Procedure:**1. Pre-Demonstration Assessment:**

On the first day, participants were evaluated on their existing knowledge and skills in using a digital glucometer. This pretest was conducted using the observation checklist.

2. Demonstration Intervention:

A detailed, step-by-step demonstration of the proper use of a digital glucometer was provided to the participants. The demonstration emphasized key aspects such as cleaning the testing site, inserting the test strip correctly, using the lancing device, and reading the results accurately.

3. Post-Demonstration Assessment:

After seven days, participants were reassessed using the same observation checklist to evaluate improvements in their skills and knowledge.

Data Analysis:

Descriptive statistics (mean and standard deviation) were used to summarize the data, while inferential statistics (paired t-test and chi-square test) were applied to determine the significance of changes and associations between variables.

Results

The study results revealed a marked improvement in participants' ability to use digital glucometers following the demonstration.

Mean Scores:

- The mean pre-demonstration score was 5.375, indicating limited proficiency in using the device.
- The mean post-demonstration score increased to 9.233, reflecting significant improvement.

Paired t-Test Analysis:

- The calculated t-value was 23.688, with a p-value of less than 0.001, indicating a statistically significant gain in participants' skills after the demonstration.

Chi-Square Test Analysis:

- Education: A significant association was found between pre-demonstration scores and participants' educational level ($\chi^2 = 16.426$, $p < 0.05$). Participants with higher education demonstrated better baseline proficiency.
- Occupation: The occupation of participants was also significantly associated with pre-demonstration scores ($\chi^2 = 23.115$, $p < 0.05$). Those in professions requiring technical skills had better initial knowledge of the device.

Discussion

The findings underscore the effectiveness of the demonstration method in teaching diabetic patients how to use digital glucometers. The marked improvement in post-demonstration scores highlights the value of hands-on training in enhancing self-monitoring practices.

Implications for Practice:

1. Empowering Patients:

The demonstration method bridges knowledge gaps and equips patients with the skills needed to manage their diabetes effectively. This empowerment reduces dependency on healthcare providers for routine glucose monitoring.

2. Cost-Effectiveness:

By enabling patients to perform SMBG independently, the financial burden on healthcare systems and families is significantly reduced. Patients can identify fluctuations in blood glucose levels early, preventing complications and costly hospitalizations.

3. Targeted Interventions:

The study's findings regarding the association of education and occupation with baseline proficiency suggest that tailored interventions may be necessary for populations with lower literacy levels or limited technical exposure.

Challenges and Recommendations:

• Low Literacy Levels:

Patients with limited education may require repeated demonstrations and the use of visual aids or videos for better understanding.

• Cultural Barriers:

In some communities, cultural beliefs and misconceptions about diabetes management may hinder the adoption of SMBG practices. Culturally sensitive education programs are essential to address these barriers.

• Technological Barriers:



Older patients or those unfamiliar with technology may struggle with using digital devices. Simplified training and follow-up sessions can enhance their confidence and competence.

Conclusion

The study concluded that the demonstration method is an effective educational intervention for improving the practice of SMBG using digital glucometers among diabetes patients. The significant improvement in post-demonstration scores validates the importance of practical, hands-on training in diabetes education programs.

Recommendations for Future Research

- Comparative studies involving different teaching methods (e.g., video-based learning, peer education) to identify the most effective approach for SMBG training.
- Longitudinal studies to assess the sustainability of skills acquired through demonstrations.
- Exploration of the psychological impact of SMBG training on patients' confidence and motivation in managing their diabetes.

Implications for Healthcare Policy

Healthcare systems should prioritize training programs incorporating demonstration methods for diabetes management. Policies should aim to make digital glucometers accessible and affordable, especially in rural and underserved areas. Collaboration between government agencies, healthcare providers, and technology manufacturers can facilitate widespread adoption of SMBG practices, ultimately improving diabetes care and outcomes on a national scale.

In conclusion, this study highlights the transformative potential of education and training in enhancing self-care practices among diabetes patients. The demonstration method not only improves technical skills but also fosters a sense of empowerment and responsibility, paving the way for better health outcomes and a higher quality of life for those living with diabetes.

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