Enhancing Nurses' Knowledge in Stroke Care: Effectiveness of an Educational Intervention Program

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Abstract

Stroke remains a leading cause of death and long-term disability worldwide, with significant implications for healthcare systems, families, and communities. Nurses play a pivotal role in all stages of stroke care; however, gaps in knowledge and a lack of specialized training often hinder optimal patient outcomes. This study aimed to assess the baseline knowledge of staff nurses regarding stroke care, evaluate the effectiveness of an educational intervention program, and compare pre- and post-test knowledge scores to determine its impact. A quantitative, quasi-experimental one-group pretest–posttest design was conducted among 40 staff nurses at selected hospital, Kollam, Kerala. Participants were selected through purposive sampling. Data were collected using a validated structured questionnaire comprising 30 multiple-choice questions on stroke care. Following the pretest, an interactive educational program was delivered through lectures, powerpoint presentations, video demonstrations, and case discussions. A posttest was administered 7 days later. Data were analyzed using paired *t*-test and chi-square test. The mean pretest knowledge score was 14.60 (SD = 5.95), which significantly increased to 19.65 (SD = 3.98) in the posttest ($t = 13.39$, $p < 0.001$). Knowledge levels shifted markedly, with a reduction in poor knowledge (37.5% to 2.5%) and an increase in good knowledge (15% to 42.5%). No significant associations were found between knowledge scores and demographic variables such as age, education, years of experience, workplace, or prior stroke care exposure ($p > 0.05$). The educational intervention program effectively enhanced nurses' knowledge regarding stroke care, irrespective of demographic characteristics. These findings underscore the importance of structured, ongoing, and stroke-specific educational programs in improving nurses' competencies and ensuring evidence-based, high-quality care for stroke patients.

Keywords: Stroke care, Nurses' knowledge, Educational intervention, Quasi-experimental study, Stroke rehabilitation, Nursing education

Introduction

Stroke is a leading cause of morbidity and long-term disability worldwide. According to WHO, each year, 15 million individuals worldwide suffer from a stroke. Of them, 5 million die, and another 5 million are permanently disabled placing a burden on families and communities[1]. Using the most recent Global Burden of Disease (GBD) 2021 statistics, this study analyses stroke incidence, mortality, and disability-adjusted life years (DALYs) throughout India from 1990 to 2021. The study suggests that geographical differences in stroke rates, with greater rates found in cities and in states like Kerala and Goa[2]. To reduce mortality and improve patient outcomes by enhancing access to optimum treatment, there is a growing need to enhance the accuracy of stroke detection and classification systems in prehospital settings and emergency rooms[3].

Care in stroke units is highly recognised for improving stroke patients' prognoses. Patients treated at stroke centres had better outcomes than those treated in other hospitals. This can be attributed to the presence of multidisciplinary teams with substantial knowledge, skills, and experience in stroke care. According to the Guidelines for Stroke Management, healthcare personnel participating in stroke care must have a strong sense of service, knowledge, and excellent communication skills. Additionally, professional education and training should be provided to those who lack the requisite knowledge or competencies

Nurses play a crucial role as stakeholders and team members in the entire stroke care system, influencing all aspects of care, including initial evaluations and symptom detection, treatment, rehabilitation exercises, early warning monitoring, psychological support, and end-of-life care. As a result, stroke nursing professionals require extensive training and education to ensure their ability to provide high-quality care to stroke patients. Developing and implementing stroke education and training programs for nurses is crucial to achieving high-quality stroke treatment and improving patient outcomes[4].

Krüger et al. (2024) conducted a scoping review of existing educational and training programs for nurses caring for stroke patients, with an emphasis on content, delivery, and effect. Seventeen studies were examined, and the findings showed that such programs improved patient outcomes by boosting self-care abilities, contentment, and overall health, while nurses reported higher knowledge, clinical skills, and practice standards. Barriers, such as practicality and cost-effectiveness, were highlighted, whereas facilitators included strong managerial support, professional participation, and organised learning settings. The evaluation emphasises the need for focused and well-supported educational initiatives in stroke treatment, as well as the necessity for standardised and widely accessible nurse training programs[5].

To effectively manage stroke patients, nurses must possess specialised knowledge and skills due to the increasing prevalence of stroke and its complex care requirements. However, the lack of specialised stroke units in many multispecialty hospitals means that general nursing staff who might not have received specialised training in this area are responsible for providing stroke care. Thus, it becomes essential to provide organised educational and training programs to improve their proficiency and self-assurance in providing high-quality care. This study aims to assess how a customised intervention program can enhance nurses' understanding and close the knowledge gap in stroke care, ultimately leading to better patient outcomes.

The objectives of this study are to assess the baseline knowledge of staff nurses regarding the care of stroke patients, to evaluate the effectiveness of an educational intervention program in enhancing their knowledge on acute stroke care and rehabilitation, and to compare the pre-test and post-test knowledge scores to determine the impact of the intervention. Additionally, the study aims to create awareness and improve the confidence of nurses in delivering evidence-based and comprehensive care for stroke patients, thereby contributing to better patient outcomes.

Methodology

A quantitative, quasi-experimental one-group pretest-posttest design was adopted for this study to evaluate the effectiveness of the educational intervention program. The study was conducted among 40 staff nurses working in various departments of Bishop Benziger Hospital, Kollam.

Sampling and Participants:

The inclusion criteria comprised staff nurses with at least six months of clinical experience who were directly or indirectly involved in patient care and willing to participate, while nurses on leave, with prior specialized training in stroke care, or unwilling to participate were excluded. A purposive sample technique was used in this study.

Tool for Data Collection:

The data were collected using a structured questionnaire and a demographic data form, which required approximately 20 to 30 minutes to complete. The questionnaire comprised 30 multiple-choice questions. Each correct response was awarded 1 mark, while incorrect responses received 0 marks, with a maximum possible score of 30. Based on the total number of correct answers, the level of nurses' knowledge was categorized as follows:

- 0–10 = Poor knowledge
- 11–20 = Average knowledge
- 21–30 = Good knowledge

Validity and Reliability of the Tool:

The validity and reliability of the tool were ensured through expert review and pilot testing. Content validity was established by a panel of experts in neurology, nursing education, and clinical practice, who evaluated the questionnaire for relevance, clarity, and appropriateness. Reliability was assessed through a pilot test conducted with 10 nurses (excluded from the main study), and the internal consistency measured using Cronbach's alpha yielded a coefficient of 0.82, indicating good reliability of the tool.

Data Collection Procedure

Prior to the intervention, a pretest was administered using the structured questionnaire to assess the baseline knowledge of nurses regarding stroke care, including aspects of acute management, rehabilitation, risk factor control, and caregiver education. Following this, an interactive educational session was conducted, which included a comprehensive lecture, PowerPoint presentations, video demonstrations, and case-based discussions. The class focused on essential topics such as the early recognition of stroke symptoms, emergency management, multidisciplinary approaches to rehabilitation, prevention of complications, and the nurse's role in patient and caregiver education. To evaluate the retention and improvement of knowledge, a post test was administered 7 days after the intervention using the same questionnaire. The difference between pretest and post test scores was analyzed to determine the effectiveness of the educational intervention.

Results

Table 1 shows frequency and percentage of nurses (N=40)

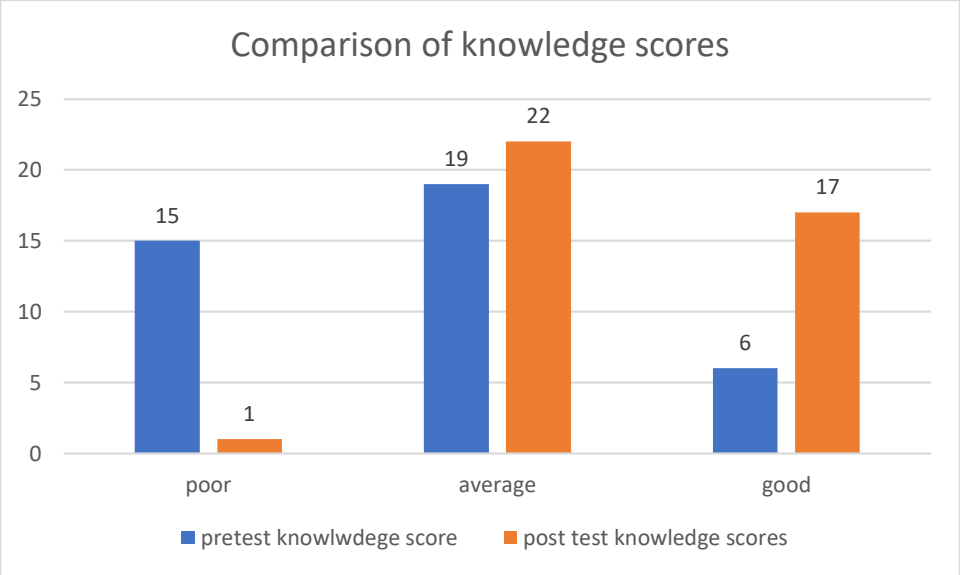
Variable	Category	Frequency (n)	Percentage (%)
Age in years	21–30 years	18	45%
	31–40 years	19	47.5%
	41–50 years	3	7.5%
Level of Education	GNM	26	65%
	B.Sc. Nursing	12	30%
	M.Sc. Nursing	2	5%
Years of Nursing Experience	0–1 year	9	22.5%
	2–5 years	14	35%
	>5 years	17	42.5%
Work Place	Wards	25	62.5%
	Emergency	5	12.5%
	Critical Care	10	25%
Previous Exposure in Managing Stroke Patients	Yes	22	55%
	No	18	45%

The majority of the nurses were between 31–40 years of age (47.5%), followed by 21–30 years (45%), while only 7.5% were in the 41–50 age group, indicating that most participants were in the early to mid-career stage. In terms of educational qualification, a significant proportion were GNM diploma holders (65%), while 30% had a B.Sc. Nursing degree, and only 5% had completed M.Sc. Nursing, showing that the majority had basic nursing education. Regarding nursing experience, 42.5% of participants had more than 5 years of experience, 35% had 2–5 years, and 22.5% had less than 1 year, reflecting a mix of both experienced and less-experienced nurses. Most participants worked in the wards (62.5%), followed by critical care units (25%) and emergency departments (12.5%), indicating that a majority were involved in routine ward care. Additionally, 55% of the nurses reported having previous exposure to managing stroke patients, while 45% had no prior experience, suggesting the need for targeted educational programs to strengthen knowledge among all nurses, particularly those with limited exposure to stroke care.

Table 2: Comparison of Pre- and Post-Test Knowledge Scores of nurses

Knowledge score	Mean	SD	t-value	df	p-value
Pre-test	14.60	5.95	13.3898		
Post-test	19.65	3.98		39	<0.001

The data presented in this table indicate the results of the paired t-test, which shows a significant improvement in nurses' knowledge scores after the educational intervention. The mean pre-test score was 14.60 (SD = 5.95), which increased to 19.65 (SD = 3.98) in the post-test. The calculated t-value (t = 13.39, df = 39) and the two-tailed p-value (< 0.0001) indicate that this difference is extremely statistically significant. These findings demonstrate that the educational intervention program had a positive and statistically significant effect on improving the nurses' knowledge regarding stroke care.



The graph shows a clear increase in nurses' knowledge following the educational intervention. In the pre-test, the majority of nurses had poor (15) or average (19) knowledge, with only 6 having good knowledge. Post-test results show a significant decrease in poor knowledge (1) and an increase in average (22) and good knowledge (17) levels. This indicates that the education intervention was effective.

TABLE -3: Association between nurses knowledge regarding the care of stroke patients with selected demographic variables.

SI No.	Variables	Level of knowledge			Chi-square value	Table value	df	Level of Significance
		Good	Average	Poor				
1.	**Age (in years)** 21-30 31-40 41-50	 9 5 1	 7 10 2	 2 4 0	3.1115	9.488	4	NS
2.	**Level of Education** GNM Bsc Nursing Msc Nursing	11 3 1	11 7 1	3 2 1	2.1277	9.488	4	NS
3.	**Years of Nursing Experience** 0-1 year 2-5 years	 4 7	 4 6	 1 1	3.2624	9.488	4	NS

	>5 year	4	9	4				
4.	**Work place** Wards Critical care units Casualty	 4 2 9	 12 3 4	 3 0 3	6.6373	9.488	4	 NS
5.	**Previous Exposure in Managing Stroke Patients** Yes No	 2 2	 12 61	 3 20	0.2552	 5.9 91	2	 NS

Table 3 presents the association between nurses' knowledge regarding the care of stroke patients and selected demographic variables using the Chi-square test. The results indicate that none of the demographic variables show a statistically significant association with knowledge levels. Specifically, age ($\chi^2 = 3.1115$, df = 4, $p > 0.05$), level of education ($\chi^2 = 2.1277$, df = 4, $p > 0.05$), years of nursing experience ($\chi^2 = 3.2624$, df = 4, $p > 0.05$), and workplace setting ($\chi^2 = 6.0373$, df = 4, $p > 0.05$) did not significantly influence the knowledge scores of nurses. Additionally, previous experience in managing stroke patients also showed no significant association with knowledge ($\chi^2 = 0.2552$, df = 2, $p > 0.05$). In all cases, the calculated Chi-square values were less than the corresponding table (critical) values at a 0.05 level of significance. These findings suggest that nurses' knowledge regarding stroke care is not significantly affected by their age, education level, years of experience, workplace, or prior experience in managing stroke patients.

Discussion

The present study was conducted to evaluate the effectiveness of the educational intervention program on knowledge regarding the care of stroke patients among staff nurses working in various departments of Bishop Benziger Hospital, Kollam. In order to achieve the objectives of the study, quasi experimental, pretest posttest control group research design was adopted. The respondents were selected by non-probability purposive sampling technique. It comprised of 40 staff nurses. The findings of the study are discussed in reference to the objectives stated.

To assess the baseline knowledge of staff nurses regarding the care of stroke patients

The majority of the participants (47.5%) were in the 31–40 years age group, followed closely by those aged 21–30 years (45%), indicating that most nurses were in their early to mid-career stages. Only a small proportion (7.5%) belonged to the older age group (41–50 years), which reflects a relatively young nursing workforce.

With regard to educational qualifications, a significant proportion of participants (65%) held a General Nursing and Midwifery (GNM) diploma, 30% had completed B.Sc. Nursing, and only 5% had an M.Sc. in Nursing. This reflects the predominance of diploma-trained nurses in the workforce.

In terms of professional experience, 42.5% had more than five years of experience, while 35% had 2–5 years and 22.5% had less than one year. This distribution suggests a mix of both experienced and relatively new nurses in clinical practice. The majority of nurses were working in general wards (62.5%), with fewer in critical care (25%) and emergency settings (12.5%).

More than half of the participants (55%) reported prior experience managing stroke patients. However, 45% lacked this exposure.

In a descriptive cross-sectional study results supported this as intensive care unit and emergency department nurses had the highest level of stroke knowledge. Nurses reporting three or more post-licensure education modalities had higher stroke knowledge scores than those reporting two or less. Practice setting, self-perception of stroke knowledge, self-identified knowledge of acute stroke management and three items related to code stroke were significantly correlated with stroke knowledge[6].

To evaluate the effectiveness of an educational intervention program in enhancing their knowledge on acute stroke care and rehabilitation

The study findings showed a statistically significant improvement in nurses' knowledge following the educational intervention. The mean knowledge score increased from 14.60 in the pre-test to 19.65 in the post-test.

Additionally, a noticeable shift was observed in the distribution of knowledge levels. Pre-intervention, the majority of nurses had poor (n = 15) or average (n = 19) knowledge, with only 6 demonstrating good knowledge. Post-intervention, only 1 nurse remained in the poor category, 22 had average knowledge, and 17 nurses demonstrated good knowledge. This demonstrates the effectiveness of the educational program in enhancing knowledge across all baseline levels.

A quasi–experimental study was conducted to find out the effectiveness of an interventional program on nurses knowledge concerning nursing management for patients with stroke study supported this as knowledge regarding management of patients with stroke at the Pre-test was moderate with (0.52) mean of score and Post-test was good with (0.92) mean of score[7].

To compare the pre-test and post-test knowledge scores to determine the impact of the intervention

Despite the improvement in knowledge scores, no statistically significant association was found between post-test knowledge levels and any of the selected demographic variables. This includes age, educational qualification, years of experience, workplace setting, and previous exposure to stroke care, as all Chi-square values were below the critical values at a 0.05 significance level.

A quasi–experimental study was conducted to find out the effectiveness of planned teaching programme on knowledge regarding brain stroke with code FAST among nursing officers. This study result supported as there was no significant association of knowledge with selected demographic variables such as Age in years, religion, education and health care facility. Chi square was computed there is significant association between post- test level of knowledge with demographic variable such as educational qualification (14.24), exposure to workshop or continuous nursing programme (10.17) at $p>0.05$ level of significant[8].

Ethical Considerations

Approval was obtained from the Institutional Ethical Review Board. Informed written consent was taken from all participants. Participants were informed about the purpose, procedures, risks, and benefits of the study. Participation was voluntary, and withdrawal was allowed at any time without consequences.

Limitations

- Small sample size limits generalizability.
- Short duration may not assess long-term knowledge retention.
- Self-reported knowledge may not fully reflect practical skills.

Implications of the Study

Nursing Practice:

The study highlights the need for continuous and structured educational programs to enhance nurses' knowledge of stroke care. Regardless of demographic factors, nurses benefited significantly from the intervention, emphasizing that regular updates and training in stroke management protocols are essential to improve clinical outcomes.

Nursing Education

The findings support the integration of stroke-specific modules in undergraduate and in-service nursing education curricula. Educators can use the study outcomes to design competency-based teaching strategies that address current gaps in knowledge and promote evidence-based stroke care practices among nursing students and professionals.

Nursing Administration

Nursing administrators and hospital policymakers can use this evidence to implement mandatory continuing education programs, especially in settings that deal with high volumes of stroke patients. Allocation of resources toward stroke care training may enhance the quality of care and promote better patient outcomes.

Conclusion

The study is designed to assess the impact of a structured intervention program on nurses' knowledge regarding stroke care. The findings revealed that although the educational intervention program led to a significant improvement in knowledge scores, there was **no statistically significant association** between nurses' knowledge levels and demographic factors such as age, level of education, years of nursing experience, workplace, or previous exposure to managing stroke patients. This indicates that knowledge improvement is likely influenced more by structured training and educational interventions rather than inherent demographic characteristics. The study highlights the importance of targeted stroke-specific education programs in enhancing nurses' clinical knowledge and competencies, irrespective of their background variables. Regular in-service education and skill-based training sessions are recommended to ensure consistent and evidence-based stroke care delivery by nursing professionals.

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