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Effectiveness of self-instructional module on knowledge regarding self-care of plaster of paris among patient with fracture

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Abstract

Introduction: Fractures are common musculoskeletal injuries requiring immobilization, with Plaster of Paris (POP) casts being a widely used treatment modality. Proper self-care of POP casts is essential to prevent complications such as infections, pressure sores, and improper healing. However, studies indicate that many patients lack adequate knowledge about POP care. Educational interventions, such as self-instructional modules (SIMs), can play a crucial role in improving patient awareness and adherence to self-care guidelines.

Aim of the study: The study aims to evaluate the effectiveness of a self-instructional module in improving knowledge of Plaster of Paris self-care among patients with fractures. It focuses on enhancing self-care practices, reducing complications, and supporting recovery.

Methodology: The study used a quasi-experimental pre-test and post-test design with 60 patients having Plaster of Paris casts, selected through purposive sampling. A structured knowledge questionnaire assessed baseline knowledge, followed by a self-instructional module on POP self-care. After seven days, a post-test measured knowledge improvement, analyzed using descriptive and inferential statistics. The results confirmed the module's effectiveness in enhancing patients' knowledge.

Result: The study found that 53.33% of participants had poor knowledge and 46.67% had average knowledge about POP self-care before the intervention. Post-intervention, all participants (100%) demonstrated good knowledge, showing a significant improvement (paired t-test, $t=43.27$, $p<0.001$). A chi-square test revealed a significant association between pre-test knowledge and education level, highlighting the need for tailored educational strategies.

Conclusion: The study demonstrates that self-instructional modules effectively enhance patients' knowledge of Plaster of Paris self-care. These structured, self-paced materials improve adherence to care guidelines, reduce complications, and support better recovery. Integrating such tools into routine patient education programs is recommended for optimal fracture management.

Keywords: Plaster of paris, fracture management, self-instructional module, patient education, knowledge enhancement, orthopaedic care

Introduction

The skeletal system is collectively the largest organ system in the body, providing structural support and protection for the soft tissues that make up the rest of the body. The human skeleton plays a critical role in mobility, posture, and overall health. However, injuries such as accidents, falls, and physical trauma can significantly impact the functionality of the skeletal system, leading to various musculoskeletal conditions, including fractures, sprains, strains, and dislocations. Among these, fractures are one of the most common injuries encountered in medical practice, affecting individuals of all ages and backgrounds ^[1].

Fractures can be classified into different types based on their severity, location, and mechanism of injury. Common types include closed fractures (where the bone breaks but does not penetrate the skin), open fractures (where the bone pierces through the skin), comminuted fractures (where the bone shatters into multiple fragments), and stress fractures (small cracks in the bone caused by repetitive stress). Lower limb fractures account for approximately one-third of all fractures, often occurring in isolation or in combination with other severe injuries, such as cranial, spinal, and upper body trauma ^[2].

Global Burden of Musculoskeletal Conditions

The Global Burden of Disease (GBD) study (2016) reported that musculoskeletal conditions were the second-highest contributor to global disability. The prevalence of musculoskeletal conditions varies based on factors such as age, lifestyle, and occupation, but it is estimated that between 20%-33% of people worldwide live with a painful musculoskeletal condition. Among these, fractures represent a significant burden, leading to prolonged hospital stays, loss of productivity, and increased healthcare costs [3].

Need of the study

Fractures, particularly lower limb fractures, represent a major public health concern in India and worldwide. With the increasing incidence of road traffic accidents, osteoporosis-related fractures, and occupational injuries, there is an urgent need for effective patient education programs to improve self-care practices and reduce complications [4].

Despite medical advancements, many patients remain unaware of the essential steps required for proper fracture care. Lack of knowledge regarding limb elevation, skin integrity maintenance, pain management, and the signs of complications can lead to delayed recovery, infections, and long-term disability.

Role of Nurses in Patient Education

Nurses serve as the backbone of patient education and rehabilitation by empowering individuals with the knowledge and skills necessary to manage their own health. Through education on proper cast care, such as cleaning and maintaining the cast, avoiding moisture, and recognizing warning signs of complications, nurses ensure patients are well-prepared for recovery. Teaching symptom monitoring—like identifying swelling, pain, or changes in skin color—enables patients to promptly seek medical attention when needed. By integrating preventive measures, nurses help reduce the risk of infection, pressure sores, and other complications, creating a more seamless healing process. This proactive guidance not only aids in physical recovery but also alleviates anxiety, boosting patients' confidence and independence during their rehabilitation journey [5].

Structured teaching programs designed by nurses have proven instrumental in fostering better self-care practices. By using tailored, evidence-based education strategies, these programs ensure patients understand and adhere to care instructions, leading to reduced rates of complications and hospital readmissions. Moreover, the personalized approach of these interventions often improves the overall quality of life for patients, as they feel more supported and equipped to manage their health. Nurses' role in delivering such programs highlights their critical influence in bridging the gap between medical care and patient-centered outcomes, reinforcing the importance of comprehensive and compassionate education in healthcare [6].

Aim of the study

The aim of the study is to evaluate the effectiveness of a self-instructional module in improving patients' knowledge regarding self-care of Plaster of Paris (POP) casts. This includes assessing baseline knowledge, identifying gaps, and determining the extent of knowledge enhancement post-intervention. The study seeks to highlight the role of

structured educational tools in promoting better self-care practices, reducing complications, and supporting overall recovery in patients with fractures.

Methodology

The study employed a quasi-experimental pre-test and post-test design. A total of 60 patients with fractures requiring Plaster of Paris (POP) casts were selected using a non-probability purposive sampling technique from specific hospitals in the city. A structured knowledge questionnaire consisting of 20 multiple-choice questions was used to assess the participants' baseline knowledge.

Following the pre-test, participants were provided with a self-instructional module that covered essential aspects of POP self-care, including cast maintenance, hygiene, recognition of complication signs, and mobility precautions. After seven days, a post-test was conducted to evaluate the improvement in knowledge. The data were analyzed using descriptive statistics (mean, standard deviation, frequency, and percentage) and inferential statistics (paired t-test and chi-square test).

Results

Section I: Findings related to distribution of socio-demographic variables of subjects.

The frequency and percentage distribution of participants (N=60) across various sociodemographic and clinical variables revealed that the majority (43.33%) were aged between 18-30 years, followed by 36.67% in the 40-50 age group. Males constituted 75% of the sample, while females represented 25%. Most participants were married (50.00%), with 41.67% being single.

In terms of educational background, 38.33% of participants had a college or postgraduate degree, whereas 20.00% were illiterate. Regarding income, 40.00% of participants earned either up to ₹10,000 or between ₹10,000-15,000 per month. Among personal habits, 10% used both alcohol and tobacco, while 25% consumed alcohol exclusively. In the category of chronic diseases, hypertension was the most common (58.33%), followed by diabetes mellitus (20.00%), ischemic heart disease (11.67%), and peripheral vascular disease (10.00%).

Section II Assessment of the baseline knowledge levels regarding self-care of plaster of paris among patients with fracture

Table 1: The distribution of respondents based on their pre-test knowledge levels reveals that the majority (53.33%) had poor knowledge (below 6)

S. N	Level of knowledge	Pre-test	
		F	%
1	Poor knowledge (Below 6)	32	53.33
2	Average knowledge (07-13)	28	46.67
3	Good knowledge (14-20)	00	00

Table 1: The distribution of respondents based on their pre-test knowledge levels reveals that the majority (53.33%) had poor knowledge (below 6). A smaller proportion (46.67%) demonstrated average knowledge (7-13). None of the respondents (0.00%) displayed good knowledge (14-20). This indicates a significant gap in knowledge regarding self-care of plaster of Paris among patients with fractures prior to the intervention.

Section III: Effectiveness of a self-instructional module on knowledge regarding self-care of plaster of paris among patients with fracture n=60

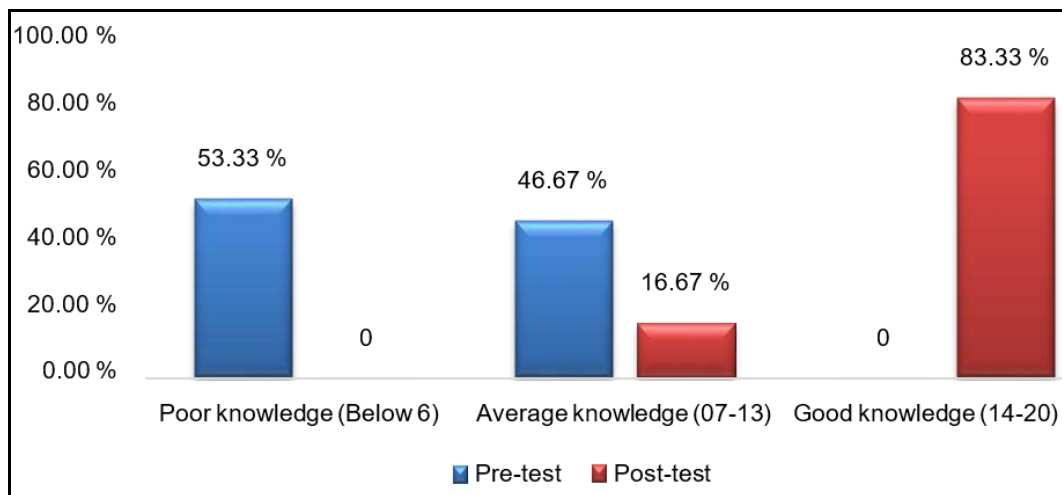


Fig 1: Percentage wise distribution of respondents according to Pre-test and Post-test knowledge levels regarding self-care of plaster of paris among patients with fracture

Figure 1: illustrates the respondents' knowledge levels before and after the intervention on self-care of plaster of Paris. During the pre-test, a majority of participants (53.33%) had poor knowledge, and 46.67% had average knowledge. Notably, none had good knowledge at baseline. However, in the post-test, there was a significant

improvement—83.33% of respondents achieved good knowledge, while poor knowledge dropped to 0%. Only 16.67% remained in the average category. This indicates a marked improvement in knowledge following the intervention.

Table 2: Paired 't' value of pre and post-test level of knowledge levels regarding self-care of plaster of Paris among patients with fractures. (N=60)

S. N	Group	Mean	SD	't' value	P Value	Level of significance
1	Pre-test	6.22	1.61	43.27	0.001	Significant
2	Post-test	16.83	1.01			

Table 2: The paired t-test analysis revealed a significant improvement in knowledge regarding Plaster of Paris self-care among patients with fractures (N=60). The mean score increased from 6.22 (SD = 1.61) in the pre-test to 16.83 (SD

= 1.01) in the post-test. The calculated t-value of 43.27 exceeded the critical value of 2.000, with a highly significant p-value of <0.001, confirming the effectiveness of the intervention.

Table 3: Item-wise Analysis of Pre-Test and Post-Test Knowledge Scores on regarding self-care of plaster of Paris among patients with fractures.

Item No.	Question	Post-Test (%)	Pre-Test (%)	Difference (%)
1	Why is it important to keep a POP cast dry?	100	50	50
2	What should you use to cover your cast while bathing?	96	40	56
3	What can you do to relieve itching under the cast?	90	30	60
4	Why should you elevate your limb after the cast is applied?	92	34	58
5	What is a warning sign that circulation under the cast might be poor?	98	44	54
6	How should you protect your cast from damage?	94	36	58
7	When should you contact your healthcare provider about your cast?	100	38	62
8	How should you care for your skin around the cast?	96	32	64
9	What should you do if the cast becomes wet?	90	30	60
10	What should you do to prevent stiffness in joints not covered by the cast?	88	28	60
11	What is a common sign of an infection under the cast?	92	34	58
12	What type of movement is recommended while wearing a leg cast?	98	36	62
13	What is the purpose of follow-up appointments after getting a cast?	100	38	62

- The largest improvement was observed in "How should you care for your skin around the cast?" (Item 8) with a 64% increase in correct responses from pre-test to post-test.
- Several items demonstrated a consistent 62% improvement, particularly those focusing on identifying complications (e.g., Items 7, 12, 13, and 14).

- Items related to avoiding stiffness in joints (Item 10) and what to do if the cast becomes wet (Item 9) showed significant knowledge gains of 60%.
- The smallest improvement, though still notable, was observed in "Why is it important to keep a POP cast dry?" (Item 1) with a 50% increase.

Section IV: To find the association between pre-test study findings with selected demographic variables

The chi-square test results indicate that educational level has a statistically significant association with the knowledge level regarding self-care of plaster of Paris among patients with fractures. ($p=0.00$). Other demographic variables do not show a significant association ($p>0.05$).

Discussion

The findings of this study align with Prakash *et al.* (2020), who also observed significant improvements in mean knowledge scores regarding cast care, rising from 6.5 ± 1.8 to 16.7 ± 1.4 post-intervention ($p<0.001$), emphasizing gains in areas like complication prevention and joint mobility maintenance. Similarly, Patel *et al.* (2019) identified education as a key factor influencing baseline knowledge, with higher scores among participants with high school or college education ($p<0.01$). In contrast, Rani *et al.* (2021) found no significant link between knowledge and gender, consistent with the present study's results. Collectively, these comparisons underscore the pivotal role of education in shaping healthcare-related knowledge, while suggesting that other demographic factors, such as gender, have limited influence. In the study by Sharma *et al.* (2017), participants' knowledge about managing wet casts increased from 18% pre-test to 87% post-test after an educational session, mirroring the present study's findings of a similar increase (22% to 90%).

Kumar *et al.* (2020) noted that caregiver awareness about skin care around casts improved from 23% to 82% following an intervention, demonstrating that specific guidance on hygiene and early complication signs can significantly boost understanding.

Conclusion

The study findings suggest that a self-instructional module is an effective tool for enhancing patients' knowledge regarding self-care of Plaster of Paris. Educating patients using structured, self-paced materials can help improve adherence to care guidelines, reduce complications, and promote better recovery outcomes. Healthcare professionals should integrate such educational interventions into routine patient education programs to ensure optimal fracture management.

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