

DEVELOPMENT OF STANDARD OPERATING PROCEDURES FOR SPANNING PATIENTS WITH FRACTURES IN THE EMERGENCY ED OF BALIMED HOSPITAL, DENPASAR

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ABSTRACT

Background: Emergency services provided to fracture patients include splinting, which is a nursing action to relax or rest (immobilize) the injured body part using a splint with the aim of reducing pain and preventing excessive bone displacement. Splinting is a technique used to immobilize or stabilize a broken limb. Immobilization can reduce pain, swelling, muscle spasms, epistaxis, and the risk of fat embolism

Purpose: The aim of this study is to analyze the development of standard operating procedures for splinting in patients with fractures in the emergency room of Balimed Hospital, Denpasar.

Methods: The method used was a case report with the ADDIE approach, which is an abbreviation of the stages, namely Analysis, Design, Development, Implementation, and Evaluation. Its use is for various forms of product development such as models, strategies, methods, or media.

Results: The same thing as HIPPII, (2019) which informs that the steps and principles of writing an SOP are by implementing a policy review that underlies a procedure or work process, considering the procedure, when the SOP was created, searching for literature and other related information that supports the procedure, seeking input from staff and officers, writing down the equipment or facilities needed, determining who is authorized to carry out the procedure, writing down indications or contraindications and underlining risks, warnings, and other things that are needed.

Conclusion: The effectiveness of the SOP that has been developed on patients and evaluating patient comfort and controlling pain due to fractures experienced.

Keywords: Fractures, Optimizing The Preparation Of Splinting Sops, Splinting

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BACKGROUND

The human body is composed of several bones. The thigh bone, or femur, is the largest and strongest bone in the human body. It connects the hip and knee. Several causes can lead to bone abnormalities that then interfere with the effective function of the femur. Among the causes of femur fractures are accidents, where a fracture is a break in the integrity of the bone, resulting in calcification/brittleness of the bone (Fransiska et al., 2024) .

Fractures are a common consequence of trauma caused by traffic accidents. The global incidence of femoral fractures is estimated at one to two point nine million per year, with 91% of these occurring in developing countries, with an average incidence of 15.7 to 45.4 per 100,000 (Rachman et al., 2023) .

According to data from the Basic Health Research (Riskesdas), approximately 67.9% of all fractures in Indonesia are lower extremity fractures caused by accidents. Of the 92,976 people who experienced lower extremity fractures due to accidents, 19,754 people experienced femoral fractures, 14,027 people experienced crural fractures, 3,775 people experienced tibial fractures, 970 people experienced minor leg fractures, and 337 people experienced fibular fractures (Zefrianto, 2024) .

Clinical manifestations of fractures include pain, shortening of the bone or limb, changes in bone shape, and possible loss of bone function. Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage (Muzaki, 2023) .

One rescue technique that can be used to save a fracture victim is splinting. Splinting is a rescue procedure for victims of physical injury or trauma. It is used to rest or immobilize a body part using a device (a board covered with gauze). Splinting aims to reduce pain so the victim does not feel pain and can prevent bone movement that could cause damage to the surrounding soft tissue (Pobi, 2024) .

Emergency services provided to fracture patients include splinting, which is a nursing action to relax or rest (immobilize) the injured body part using a splint with the aim of reducing pain and preventing excessive bone displacement (Sumpono, 2025) .

Splinting is a technique used to immobilize or stabilize a broken limb. Immobilization can reduce pain, swelling, muscle spasms , epistaxis, and the risk of fat embolism. There are various types of splints, namely soft splints , hard splints, air or vacuum splints, traction splints, and anatomical splints. The principle of splinting is to maintain the anatomical position of the bone structure, namely the splint covers 2 joints in the injured area, provides soft padding on the splint, ties the splint on the top or bottom of the fracture area, and uses 3 splint blades on the lower extremities to reduce the risk of rotation in the extremities (Rafiqi, 2025) .

OBJECTIVE

The aim of this study is to analyze the development of standard operating procedures for splinting in patients with fractures in the emergency room of Balimed Hospital, Denpasar.

METHODS

This study was conducted from October 15, 2025, to December 25, 2025. The method used was a case report with the ADDIE approach, which is an abbreviation of the stages, namely Analysis, Design, Development, Implementation, and Evaluation. Its use is for various forms of product development such as models, strategies, methods, or media. The ADDIE process requires several tests by a team of experts, individual research subjects, on a limited scale or a large scale (field), and there are revisions to improve the final product so that although the development procedure is shortened, it already includes the testing and revision process.

The first stage was problem analysis, involving data collection through interviews, observations, and field surveys. Interviews were conducted with the ward heads and clinical instructors at Balimed Hospital's Emergency Department. Observations were conducted in the Balimed Hospital Denpasar Emergency Department due to the lack of standard operating procedures (SOPs) for splinting in that area. Nurses performed splinting using only the principle of binding between two joints and ensuring proper fixation.

The second stage is design. The author brainstormed and drafted a plan of action with all nursing leaders regarding the initial treatment of fracture patients. Risk management can be chosen from one of the methods: avoiding the risk, reducing the possibility of risk or the impact of damage caused by a risk (mitigation), sharing the risk, accepting the risk, or exploiting the risk. The involvement of the nursing team in problem solving is intended to achieve mutual agreement from planning to evaluation. The action plan is made according to POSAC (Planning, Organizing, Staffing, Actuating, and Controlling).

The third stage is development. This included the creation of a prototype patient repositioning aid, along with Standard Operating Procedures (SOPs), and work instructions (IK). The fourth stage, implementation, involved a random sampling trial of the patient repositioning aid and IK on 12 fracture patients by 15 nurses over three days in the emergency room at Balimed Hospital, Denpasar.

After completing the trial, which is the fifth stage, nurses conducted a usability evaluation using g-forms. The evaluation results were communicated via a message intended to facilitate collaborative follow-up on the implementation.

RESULTS

The results of this study will discuss the implementation of standard operating procedures for splinting for fracture patients in the Emergency Room of Balimed Hospital, Denpasar. The purpose of this SOP is to prevent complications resulting from fractures experienced by patients. First aid that must be given to fractures is to try to prevent the broken bones from shifting (immobilization), if the bones shift, further damage will occur. One way that can be done is by applying a splint that is attached through two joints. Splinting is a method of first aid for injuries/trauma to the musculoskeletal system that is useful for resting (immobilizing) the injured part of our body by using a tool to apply the splint (Riamah, 2024).

Proper treatment is necessary to prevent more serious injuries to the musculoskeletal system. Emergency care for fractures involves splinting, a nursing procedure that immobilizes

the fractured body part using a device to reduce and eliminate pain and prevent movement of the fractured bone, which can damage the surrounding soft tissue (Ritonga, 2023) .

Table 1. Development of SOP for Aid in Fracture Patients

Understanding	A tool for immobilization (maintaining the position of bones), to reduce movement of injured limbs.
Objective	As material reference medical team in use tool in ambulance
Procedure	Tool preparation : - Mitella (triangular cloth) - Elastic bandage - Rolled gauze - Soft band - Splints of various sizes - Pin Patient : - is given about the actions to be taken. - The patient's position is adjusted according to needs. Fracture Humerus (broken bone arm on) - the lower arm on the chest with the palm of the hand facing to in - Install splint from elbow until to on shoulder - Tie on area on And under bone Which broken - Arm lower carried - If elbow Also broken And hand not can folded, install spalk to - Arm lower and let it be depends No no need carried Clavicle fracture (broken collarbone) Signs broken bone collarbone: - Victim No can lift hand until to the top shoulder, painful press area broken. - Installed backpack - Bandage installed from shoulders left crossed through the back to the armpit victim - From the right armpit to the front and top of the right shoulder, from the shoulder right crossed to the left armpit, then to the right shoulder, finally given safety pin/tied Fracture cruris (broken bone legs lower) - Install 2 blinds next to inside/below foot and next to outside stem foot the broken one - Among blinds and leg given cloth as coating - Splint installed between eye foot until a number of cm on knee

4. B ring victim to House Sick

Based on table 1 above, it shows that the design of the splinting SOP that has been developed is by carrying out validation with the aim that the SOP for the splinting technique that has been developed is in accordance with existing theories and in accordance with the nature of the implementation procedure and can be used as a guide for implementing activities that are controlled, clear, concise, systematic, use everyday language, are easy to understand, have no double meaning, and have a sequence and technique that is logical in process and produces benefits and quality that are in accordance with the goal, namely reducing blood sugar levels.

Table 2. Expert Validation Results

Expert	Aspect	Presentation (%)	Information
NS. GA Santi Lisiana Dewi, S.kep	Contents	100	Very Worthy
	Appearance	100	Very Worthy
Ms. Dedi Nurdiansyah, S.Kep	Contents	100	Very Worthy
	Appearance	100	Very Worthy
Amount		100	

Based on table 2 above, it is informed that the expert validation results are very appropriate without any improvements because they are in accordance with the existing theory using language that is easy to understand and systematic, starting from the training carried out on the extremity area and on the upper body area.

Table 3. Respondent Characteristics Results

Category	N	Mean±SD	Min	Max	Frequency	Percentage
Age	31	34.9 ±8.06	23	54		
Gender						
- Woman					11	35.5%
- Man					20	64.5%
Length of working						
- < 5 years					13	41.9%
- > 5 years					18	58.1%

Based on the results of table 3, the average age of respondents was 35 years. Based on gender, the majority of patients were female, 20 (64.5%). Based on length of service, the majority of respondents had worked for more than 5 years, 18 (58.1%).

Table 4. SOP Feasibility Questionnaire

No	Statement	Percentage of Answers				
		STS	TS	N	S	SS
A	Usability					
	This SOP is easy to use even the first time you try it.	1 (3.2%)	0(0%)	0(0%)	9 (29%)	21 (67.7%)
	This SOP guide is clear and easy to understand.	1 (3.2%)	0(0%)	0(0%)	17 (54.8%)	13 (41.9%)
	The information attached to this SOP is easy to understand.	1 (3.2%)	0(0%)	0(0%)	15 (48.4%)	15 (48.4%)
	I did not experience any confusion while using this SOP.	1 (3.2%)	1 (3.2%)	0(0%)	11 (35.5%)	18 (58.1%)
	This SOP is consistent in appearance and function in each section.	1 (3.2%)	1 (3.2%)	2 (6.5%)	14 (45.2%)	13 (41.9%)
B	Functionality (Application Functionality)					
	this SOP are in accordance with the expected objectives.	1 (3.2%)	0(0%)	0(0%)	13 (41.9%)	17 (54.8%)
	There is no problem when I use this SOP.	1 (3.2%)	0(0%)	1 (3.2%)	18 (58.1%)	11 (35.5%)
	When implemented, this SOP is easy to use.	1 (3.2%)	0(0%)	0(0%)	16 (51.5%)	14 (45.2%)
	I feel that the steps in this SOP suit my needs as a nurse.	0(0%)	0(0%)	1 (3.2%)	16 (51.6%)	14 (45.2%)
	I feel safe and comfortable when using this SOP	1 (3.2%)	0(0%)	0(0%)	14 (45.2%)	16 (51.6%)
C	Transportability (Portability)					
	This SOP can be used in various conditions in the ER	1 (3.2%)	0(0%)	2 (6.5%)	17 (54.8%)	11 (35.5%)
	SOP can function well in its application to patients	0(0%)	0(0%)	0(0%)	17 (54.8%)	14 (45.2%)
	The socialization and implementation of this SOP went smoothly.	1 (3.2%)	0(0%)	1 (3.2%)	12 (38.7%)	17 (54.8%)
D	Validity					
	The information in this application is accurate and reliable.	0(0%)	0(0%)	2 (6.5%)	15 (48.4%)	14 (45.2%)
	The contents of the SOP provided are relevant to the maintenance needs.	0(0%)	0(0%)	0(0%)	14 (45.2%)	17 (54.8%)

No	Statement	Percentage of Answers				
		STS	TS	N	S	SS
	The language and terms in the SOP are easy to understand.	0(0%)	0(0%)	2 (6.5%)	15 (48.4%)	14 (45.2%)
E	Reliability					
	This SOP rarely experiences errors when applied.	0(0%)	0(0%)	1 (3.2%)	15 (48.4%)	15 (48.4%)
	SOP is easy and does not cause confusion	0(0%)	0(0%)	4 (12.9%)	16 (51.6%)	11 (35.5%)
	The implementation of this SOP is in accordance with the needs	0(0%)	0(0%)	0(0%)	19 (61.3%)	12 (38.7%)
F	User					
	I am satisfied with the experience of using this SOP.	0(0%)	0(0%)	0(0%)	16 (51.6%)	15 (48.4%)
	The implementation that has been done helps me to complete tasks or needs more efficiently.	0(0%)	0(0%)	1 (3.2%)	16 (51.6%)	14 (45.2%)
	I am willing to use this SOP again in the future.	0(0%)	0(0%)	0(0%)	17 (54.8%)	14 (45.2%)
	I would recommend this SOP to other units.	0(0%)	0(0%)	2 (6.5%)	17 (54.8%)	12 (38.7%)
	I will use this SOP for the case of splinting in fracture patients.	0(0%)	0(0%)	1 (3.2%)	18 (58.1%)	12 (38.7%)

Based on the results of table 4, the results obtained show that most respondents chose to strongly agree with question number 4 with the question " I did not experience confusion when using this SOP" with a percentage of 18 (51.8%).

DISCUSSION

Development of SOP for Splinting

The results of the development of the SOP for progressive muscle relaxation techniques resulted in an SOP development design, including the definition, objectives, tools, environment, patients, implementation, and evaluation. The same thing as HIPPII, (2019) which informs that the steps and principles of writing an SOP are by implementing a policy review that underlies a procedure or work process, considering the procedure, when the SOP was created, searching for literature and other related information that supports the procedure, seeking input from staff and officers, writing down the equipment or facilities needed,

determining who is authorized to carry out the procedure, writing down indications or contraindications and underlining risks, warnings, and other things that are needed.

Splinting is a first aid method for musculoskeletal system injuries/traumas that is useful for resting (immobilizing) the injured part of our body by using a tool to perform splinting (Riamah, 2024) . Good handling is needed to prevent more serious injuries to the musculoskeletal system. Emergency services carried out in cases of fractures are splinting which is a nursing action to rest (immobilize) the body part that has a fracture using a tool that aims to reduce and eliminate pain, prevent movement of the fracture that can cause damage to the surrounding soft tissue .

SOP Eligibility

The feasibility of the SOP was assessed by the first material expert validator and the second expert. The validation was very feasible without any improvements from the two experts. This was because the SOP was in accordance with the theory, using easy-to-understand language, and was systematic, starting from the handling of fractures in the extremities. The implementation of the SOP must meet the following principles: consistency, commitment, continuous improvement, and binding all elements that have important roles and well-documented. The expert validity test was conducted in the hope of knowing the level of feasibility of a product developed through instrument experts and content experts. Where, the validation results obtained were assessments, comments, and suggestions. Then, they were used as improvement materials. The result was that both the instrument and the content would be feasible for testing. Based on the results of the expert assessment, the results of the standard operating procedure were declared very feasible for application. Based on the results of the feasibility questionnaire, the results showed that the majority of respondents chose to strongly agree with question number 4 with the question " I do not experience confusion when using this SOP" with a percentage of 18 (51.8%).

Effectiveness of Implementing the SOP for Splinting at Balimed Hospital Denpasar

Emergency services carried out in cases of fractures include splinting, which is a nursing action to rest (immobilize) the body part that has experienced a fracture using a device that aims to reduce and eliminate pain, prevent movement of the fracture which can result in damage to the surrounding soft tissue (Nurnaningsih et al., 2021) .

When a fracture occurs, the affected parts become immobilized and tend to move unnaturally (extraordinary movements) instead of being rigid as normal. Muscles will naturally respond by contracting, the purpose of which is to bandage and protect the injured area. Continuous contraction will cause pain. The muscle spasms that accompany fractures are also a form of natural splinting designed to minimize movement between bone fragments. Splints can support or hold body parts from shifting or changing their desired position, thereby preventing them from shifting and reducing/eliminating pain. Correct and proper splinting can significantly reduce bleeding by reducing movement and increasing the effect of muscle tamponade around the fracture (Faidah, 2022) . Fractures that are not properly treated can cause various complications, including arterial damage, compartment syndrome, fat embolism

syndrome, wound infection, avascular necrosis, and even hemorrhagic shock and severe pain. To maintain proper position and alignment, early immobilization can be performed using internal and external fixation methods. External fixation methods include bandaging, plaster casts, traction, and splinting.

CONCLUSION

The development of SOP for splinting in the Emergency Room of Balimed Hospital, Denpasar, uses the ADDIE development model, including the analysis stage: collecting information that can be used as material for developing SOP for splinting in fracture patients using the literature review method, design: designing the developed SOP for splinting, development: feasibility testing through a series of processes, namely: expert testing, implementation: SOP trial on fracture patients before and after implementation, evaluation: identifying the effectiveness of the SOP that has been developed on patients and evaluating patient comfort and controlling pain due to fractures experienced.

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CONFLICTS OF INTEREST

There is no conflict in this study

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