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Effectiveness of Mobilization Mat on Decubitus Incidents in Patient on Bed Rest Due to Stroke at West Java Regional Hospital

Anah Sasmita[1], Sugiyanto Sugiyanto[2], Peni Cahyati[3], Metilda Metilda[4]
[1]Bandung Health Polytechnic, Bandung, Indonesia, anah.sasmita@gmail.com
[2]Tasikmalaya Health Polytechnic, Tasikmalaya, Indonesia, sugiyanto_poltekkestsm@yahoo.com
[3]Tasikmalaya Health Polytechnic, Tasikmalaya, Indonesia, peni_poltekestsm@yahoo.com
[4]Rajawali Health Institute, Bandung, Indonesia, metildaikes@gmail.com

Corresponding Author: peni_poltekestsm@yahoo.com[3]

Abstract: Pressure ulcers are a common complication among bedridden stroke patients, leading to pain, infection, prolonged hospitalization, and reduced quality of care. These injuries result from sustained pressure that impairs blood circulation and causes tissue damage. Major risk factors include immobility, prolonged pressure, skin moisture, malnutrition, and the inability to change body position independently. This study aimed to analyze the effectiveness of the Pastibar patient mobilization mat (Alasmob Pastibar) in preventing pressure ulcers among bedridden stroke patients at the West Java Regional General Hospital. A quasi-experimental pretest–posttest design with a control group was employed. The sample consisted of 80 respondents selected through purposive sampling and divided equally into intervention and control groups. Data were collected through direct observation and questionnaires assessing patients' skin conditions before and after seven days of treatment. Statistical analyses were conducted using the Wilcoxon and McNemar tests. The findings demonstrated that Alasmob Pastibar significantly enhanced patient mobilization and reduced the incidence of pressure ulcers compared to conventional care ($p < 0.05$). In the intervention group, 88% of patients did not develop pressure ulcers, whereas 75% of patients in the control group experienced pressure ulcers. Additionally, patients using Alasmob Pastibar reported lower pain complaints, and nursing staff required less time to reposition patients. These results indicate that Alasmob Pastibar is an effective tool for preventing pressure ulcers in bedridden stroke patients by improving comfort, reducing injury risk, and facilitating patient mobilization. Therefore, its implementation in nursing practice is recommended to enhance the quality of care for bedridden patients. Further studies involving larger populations and longer observation periods are recommended to validate and strengthen these findings.

Keywords: Decubitus, Mobilization Mat, Bed Rest Patients, Stroke.

INTRODUCTION

Stroke is a clinical syndrome with sudden onset and rapid progression, causing focal or global neurological deficits lasting ≥ 24 hours or death, due to non-traumatic cerebral circulatory disorders (Brunner & Suddarth, 2015). Stroke is a life-threatening disease that

causes the loss of 1.9 million brain cells per minute during an attack. It is the second leading cause of disability and death worldwide. In Indonesia, stroke accounts for 11.2% of total disability and 18.5% of total deaths. Based on the 2023 Indonesian Health Survey (SKI), the prevalence of stroke in Indonesia reached 8.3 per 100,000 people. 1,000 people. This data shows that approximately 8 out of every 1,000 people in Indonesia suffer from a stroke. Furthermore, stroke is one of the most costly catastrophic diseases, third only to heart disease and cancer, with costs reaching IDR 5.2 trillion in 2023 (Kemkes.go.id, 2024).

Patients experiencing health problems such as stroke often require bed rest, either for a short or long period. Bed rest or immobilization is a condition in which the patient cannot move actively or freely continuously for 5 days or more due to physiological changes for therapeutic purposes (Negari et al., 2022; Garrison, 2004; Bimoariotejo, 2009). Bed rest is caused by the patient's inability to carry out activities or intolerance to activities, or both. Patients experiencing health problems often require bed rest, either for a short or long period. Bed rest as a nursing action can provide many benefits for the patient's health recovery, but if it is done too long it can cause complications, one of which is the occurrence of pressure ulcers, which most often occur on the seventh day of bed rest (Levita M., 2015; Asmadi, 2008).

Pressure ulcers are damage to the structure and function of the skin caused by prolonged and continuous pressure, typically on areas associated with bony prominences. Continuous pressure disrupts the circulation of oxygen and nutrients to the skin and surrounding tissue, leading to tissue death (Suriadi, 2003; Potter and Perry, 2012). Other risk factors that can increase the potential for pressure ulcers or pressure ulcers in patients, in addition to immobility, include friction from bed rest, excessive sweating, wound drainage, and urinary or fecal incontinence (Agustina et al., 2023). Pressure ulcers not only affect the patient's condition but also increase the length of hospital stay. Patients with these ulcers require longer intensive care, increasing medical costs due to closer monitoring, the use of specialized materials, and the involvement of more healthcare professionals. Therefore, preventing pressure ulcers is crucial to reducing the burden of healthcare costs (Oktatiranti et al., 2013).

Based on previous research in several hospitals in Indonesia, the incidence of pressure ulcers in government hospitals in Indonesia ranges from 15.8% to 38.18%, especially in patients with high dependency or total care (Oktatiranti et al., 2013). In addition, factors that contribute to the occurrence of pressure ulcers include patient mobility and activity, decreased sensory perception, skin moisture due to urinary and fecal incontinence, shearing force, friction, nutrition, age, low arteriolar pressure, emotional stress, smoking, and skin temperature. One action that can be taken to treat and prevent pressure ulcers from worsening is by changing positions or mobilization (Badrujamaludin et al., 2022). Research by Yahya & Husein (2024) and Suriadi (2003) shows that mobility is a significant factor in the development of pressure ulcers. Implementing mobilization every 2 hours can reduce the risk of pressure ulcers. Research by Huda (2012) found that patients undergoing treatment with less effective mobilization

have a higher tendency to experience pressure ulcers compared to patients who receive more attention in changing body positions.

Conventional mobilization methods often face various obstacles, particularly related to time efficiency and comfort for both patients and nurses. Nurses play a crucial role in preventing pressure ulcers by performing position changes every 2–3 hours. However, in inpatient settings, mobilization often lasts for more than 4 hours, increasing the risk of pressure ulcers (Morisson, 2013). Manually repositioning patients requires significant effort and can increase the risk of injury for nurses, while for patients, improper handling can cause discomfort or even additional injury. Furthermore, limited human resources and time often hinder the optimal implementation of routine mobilization. To address this, this study developed a device called the patient bed rest mobilization mat (alasmob pastibar) as an innovative solution that facilitates the mobilization of bed rest patients. This device allows for more efficient patient repositioning, reduces the workload of nurses, and lowers the risk of pressure ulcers. The Alasmob Pastibar is designed to support more effective and efficient mobilization to reduce pressure on areas of the body susceptible to pressure ulcers. One action that can be taken to treat and prevent pressure ulcers from worsening is repositioning or mobilization (Badrujamaludin et al., 2022). Positioning is a key aspect of pressure ulcer prevention, aiming to reduce pressure and prevent direct skin contact that can cause pressure ulcers (Sugiarto & Al Jihad, 2022).

Based on the above background, the author is interested in developing the Alasmob Pastibar, which can help reduce pressure on the skin and surrounding tissues, thus preventing or reducing the incidence of pressure ulcers. After the device is developed and consulted with experts, limited testing will be conducted in the nursing laboratory and the device's effectiveness will be tested on patients experiencing prolonged bed rest. This study aims to assess the effectiveness of the mobilization mat in preventing pressure ulcers in patients on bed rest due to stroke at the West Java Regional General Hospital. Specifically, this study identifies the incidence of pressure ulcers before and after the use of the mobilization mat and analyzes its effect on patients on bed rest due to stroke.

METHOD

This study used a Quasi-Experimental design with a pre-post test with control design. This method aims to observe the symptoms that arise due to a particular treatment by comparing the pre-test and post-test results in the control and intervention groups. This approach is used to analyze cause-and-effect relationships in research by involving a control group as a comparison (Nursalam, 2013). This study was conducted at the West Java Regional General Hospital (RSUD). This hospital has adequate stroke patient care and medical rehabilitation facilities to support this research. This location was selected based on the high incidence of pressure ulcers in bedridden patients and the availability of facilities and competent medical personnel to treat patients with this condition. Before the study was conducted at the hospital, a quality test of the mobilization mat was first conducted in the nursing laboratory. The stages carried out included design, production, testing, improvement, and final production of the mobilization mat for bedridden patients due to stroke.

The sample in this study consisted of 80 respondents who were divided into two groups, namely the intervention group and the control group. Each group consisted of A purposive sampling method was used to select 40 respondents based on predetermined inclusion and exclusion criteria. The intervention group received Alasmob Pastibar treatment, while the control group received conventional mobilization methods. Inclusion criteria included patients diagnosed with stroke who had been bedridden for more than 48 hours and had family consent to participate. Exclusion criteria included patients with unstable hemodynamics and other medical conditions that could affect the study results.

Data were collected through questionnaires and observation sheets after informed

consent. The questionnaire assessed the use of Alasmob Pastibar, while observations recorded patients' skin conditions related to pressure ulcers. Data analysis was performed using the Wilcoxon and McNemar tests to determine significant differences between patient conditions before and after the intervention in both groups. Data analysis was performed using the SPSS program to ensure the accuracy of the results. This study has two main types of variables: the independent variable, namely the use of Alasmob Pastibar, and the dependent variable, namely the incidence of pressure ulcers. The research hypothesis consists of the null hypothesis (H_0), which states that there is no significant difference between the use of Alasmob Pastibar and conventional mobilization methods in preventing pressure ulcers, and the alternative hypothesis (H_1), which states that there is a significant difference between the two methods. Interpretation of the p value (<0.05) as an indicator of whether or not the difference between groups is significant.

RESULTS AND DISCUSSION

Manufacturing and Testing of Bed Rest Patient Mobilization Mats (Pastibar Mobilization Mats) Prior to the hospital research, a quality test of the mobilization mat was conducted in the nursing laboratory through the following activities:

Designing a bed rest patient mobilization mat (Alasmob pastibar)

The Alasmob Pastibar is designed to help mobilize bedridden patients by changing positions every two hours to prevent pressure ulcers and pneumonia. Made of white linen, the Alasmob Pastibar measures 95 cm long and 2–3 meters wide. It consists of three parts: right and left straps, and a body section. Each strap is 50 cm long, while the body section is 100 cm long, according to the width of the patient's bed.

Figure 1. Bed Rest Patient Mobilization Mat (Pastibar Mobilization Mat)

Production of bed rest patient mobilization mats

The Alasmob Pastibar is produced in two versions: a single-layer fabric for non-obese patients and a double-layer fabric for obese patients for safety. Twenty units have been produced for testing: 15 for non-obese patients and five for obese patients.

Figure 2. Alasmob Pastibar for Trial in Nursing Laboratory

Alasmob Pastibar trial in the nursing laboratory

A trial in the nursing laboratory was conducted prior to hospital use to evaluate the advantages and disadvantages of the Pastibar Alasmob. These activities included: 1) Developing standard operating procedures (SOPs) for conventional mobilization and mobilization with the Pastibar Alasmob. 2) Preparing tools, materials, and beds with safety barriers (bad signs). 3) Preparing 20 students who had studied stroke nursing care to conduct the trial. 4) Developing a measuring tool for the Pastibar Alasmob trial through observation, questionnaires, and interviews to assess ease of use and obtain suggestions for improvement.

Table 1. Frequency Distribution of Ease of Use of Tools in Patient Position Changing Activities

Category	Conventional (n=40)	Alasmob Pastibar (n=40)
Very difficult	14 (35%)	0 (0%)
Difficult	26 (65%)	4 (10%)
Easy	0 (0%)	16 (40%)
Very easy	0 (0%)	20 (50%)
Total	**40 (100%)**	**40 (100%)**

Based on Table 1, it can be seen that the majority of respondents using the conventional method experienced difficulty in changing the patient's position, with 35% stating it was very difficult and 65% stating it was difficult. In contrast, in the group using the Alasmob Pastibar, 50% stated it was very easy, 40% stated it was easy, and only 10% found changing the patient's position difficult. No respondents stated. The Alasmob Pastibar was very difficult to use. These results indicate that this device offers greater convenience than conventional methods, thereby improving the efficiency of healthcare workers and enhancing patient comfort during mobilization.

Table 2. Results of Analysis of Differences between Conventional and Alasmob Methods

Variables	N	Mean Rank	Wilcoxon	p-value
Ease of use of the tool	40	10.50	-4,018	< 0.05
Ease of maintaining position	40	10.50	-4,089	< 0.05
Nurse comfort during position changes	40	10.50	-3,904	< 0.05
Patient comfort while maintaining position	40	10.50	-4,030	< 0.05
Speed of changing patient position	40	10.50	-3,981	< 0.05

Based on Table 2, the results of the Wilcoxon test show that all variables have a p

value. <0.05, which indicates a significant difference between the conventional method and the use of Alasmob Pastibar in ease of use of the device, maintaining position, nurse comfort, patient comfort, and speed of changing patient positions. The uniform Mean Rank in all variables (10.50) indicates consistency in increasing comfort and efficiency of using this device compared to the conventional method. These results further strengthen the evidence that Alasmob Pastibar is more effective in supporting the mobilization of bedridden patients. The results of this study indicate that Alasmob Pastibar provides significant benefits in preventing pressure ulcers by increasing patient mobilization. Patients who received intervention with Alasmob Pastibar experienced fewer complaints of pain, and the nurse's care time in changing patient positions was shorter. Therefore, the implementation of this device is recommended in nursing practice to improve the quality of care for bedridden patients and Alasmob Pastibar is suitable for use as a tool to assist the mobilization of bedridden patients in accordance with the specified standard operating procedures.

Alasmob Pastibar Improvements after Trial

Based on interviews with healthcare workers and evaluations during the trial, several aspects of the Alasmob Pastibar need improvement to optimize patient mobility. One key improvement is the length of the left and right sides of the base, which has been increased from 50 cm to 75 cm. This additional length aims to provide better support in maintaining patient position, thereby reducing the risk of unstable shifts. Furthermore, this change also helps improve patient comfort during mobilization, reduces excessive pressure on areas of the body prone to pressure sores, and makes it easier for healthcare workers to transfer patients.

Production of Alasmob Pastibar for Use in Hospitals

Following improvements, the Alasmob Pastibar will be produced in larger quantities to support wider implementation in hospital settings. A total of 200 units of the Alasmob Pastibar are planned for production and distribution to various care units. This production aims to ensure that both the intervention and control groups can use this device as part of standard procedures in pressure sore prevention. With wider distribution, the use of the Alasmob Pastibar is expected to improve the work efficiency of medical personnel, speed up patient care times, and significantly reduce the incidence of pressure sores in hospitals.

Statistical Analysis Results

Table 3. Respondent Characteristics

Variables	Category	Intervention (N=40)	Control (N=40)
Age (years)	Average	59	56
	Age	22 - 85	27 - 80
Gender	Man	22 (55%)	18 (45%)
	Woman	18 (45%)	22 (55%)
Medical Diagnosis	Stroke (total)	33 (83%)	36 (90%)
	Other	7 (17%)	4 (10%)
Decubitus Ulcer Risk	Mild - Moderate	14 (35%)	13 (32%)
	Tall	16 (40%)	23 (58%)
	Very high	10 (25%)	4 (10%)
Mobilization Frequency	Rarely - Sometimes	11 (28%)	24 (60%)
	Often	17 (42%)	10 (25%)
	Always	12 (30%)	6 (15%)

Based on Table 3, the average age of respondents in the intervention group was 59 years, while in the control group it was 56 years. The primary medical diagnosis of the

majority of respondents was stroke and was more common in the control group (90% vs. 83%). High-risk pressure ulcers were more common in the control group (58% vs. 16%), while very high-risk pressure ulcers were more common in the intervention group (25% vs. 10%). The frequency of mobilization was more frequent in the intervention group (42% vs. 25%), and continuous mobilization was also more common in the intervention group (30% vs. 15%).

Table 4. Pre-Test and Post-Test Results

Evaluation	Category	Intervention Group (N=40)	Control Group (N=40)
		Amount (%)	Amount (%)
Pre-test	No Decubitus Ulcers	24 (60%)	32 (80%)
	Decubitus	16 (40%)	8 (20%)
Post-test	No Decubitus Ulcers	35 (88%)	10 (25%)
	Decubitus	5 (12%)	30 (75%)

Table 4 shows the distribution of pressure ulcer status data in the intervention and control groups before and after the intervention. Before the intervention (pre-test), 60% of patients in the intervention group did not experience pressure ulcers, while in the control group, this figure was higher, at 80%. Conversely, patients who experienced pressure ulcers before the intervention were 40% in the intervention group and 20% in the control group. After the intervention (post-test), the condition of patients in the intervention group improved significantly, with 88% of patients not experiencing pressure ulcers, indicating the effectiveness of the intervention. Meanwhile, the condition of patients in the control group actually worsened, with 75% experiencing pressure ulcers. These results indicate that the use of Alasmob Pastibar is effective in preventing and reducing the incidence of pressure ulcers, whereas without intervention, the risk of pressure ulcers increases. This suggests that Alasmob Pastibar increases the frequency of mobilization, and that regular mobilization plays an important role in reducing the risk of pressure ulcers in bedridden patients.

Table 5. Analysis of Differences in Decubitus Status Pre-Test and Post-Test

Group	PreTest (Before Intervention)	Post-Test (After Intervention)	Total (N)	McNemar test (p-value)
Intervention			**40**	**0.001**
- No Decubitus	24	24 (still not decubitus)		
- Decubitus	16	11 improved, 5 remained decubitus		
Control			**40**	**0.002**
- No Decubitus	32	10 remained, 22 became decubitus		
- Decubitus	8	8 fixed decubitus		

Based on Table 5, the results show that the use of Alasmob Pastibar is effective in preventing and reducing the incidence of pressure ulcers in bedridden patients. In the intervention group, before use of the device, there were 24 patients who did not experience pressure ulcers and 16 patients with pressure ulcers. After the intervention, all 24 patients remained free of pressure ulcers, while of the 16 patients who initially had pressure ulcers, 11 improved and only 5 continued to have pressure ulcers. This result is supported by the McNemar test value of $p = 0.001$ ($p < 0.05$), which indicates a significant difference before and after use of the device. In contrast, in the control group that did not use Alasmob Pastibar, the patient's condition actually worsened. Before the study, there were 32 patients

who did not have pressure ulcers and 8 patients who did. The results after the study, there were 10 respondents who did not experience changes in the pretest and posttest, but there were 22 people who experienced negative changes, namely no pressure ulcers in the pretest but became pressure ulcers in the posttest, while 8 patients continued to have pressure ulcers, with the McNemar test value of $p = 0.002$ ($p < 0.05$) indicating a significant difference without using the device.

Hypothesis Test Results

Based on the results of the hypothesis test conducted using the McNemar test in Table 4, the results showed that the use of Alasmob Pastibar in the intervention group and the control group showed a probability value (p-value) smaller than alpha 0.05 (p-value <0.05) in both groups. This indicates that the null hypothesis (H_0), which states there is no significant difference in pressure ulcer prevention between the conventional method and Alasmob Pastibar, is rejected. Conversely, the alternative hypothesis (H_1), which states that there is a significant difference between the two methods in preventing pressure ulcers, is accepted. This means that there is a change in pressure ulcer status before and after mobilization using Alasmob Pastibar. From these results, it can be concluded that the use of Alasmob Pastibar helps keep patients free of pressure ulcers and improves the condition of patients who already have pressure ulcers, while patients without intervention tend to experience an increased risk of pressure ulcers.

DISCUSSION

Interpretation of Research Results

The results of this study indicate that the use of Alasmob Pastibar significantly reduced the incidence of pressure ulcers in bedridden patients due to stroke. In the intervention group, most patients did not develop pressure ulcers after using this device, while in the control group, the majority of patients did. This difference indicates that the use of a mobilization aid contributes significantly to preventing excessive pressure on body areas susceptible to pressure ulcers. This suggests that the use of a mobilization aid can increase the effectiveness of this study. pressure ulcer prevention compared to conventional methods. Regular mobilization plays a role in maintaining blood circulation and reducing prolonged pressure on pressure ulcer-prone areas, as explained by Guenter (2000) that effective mobilization can increase blood flow to the compressed tissue, thereby preventing ischemia, which is the main cause of pressure ulcers.

Comparison with Previous Studies

This research aligns with Levita's (2015) study, which demonstrated that mobilization aids can significantly reduce the risk of pressure ulcers. Ningsih (2016) also demonstrated that mobilization is effective in preventing pressure ulcers in bedridden stroke patients. Research by Sholihah et al. (2021); Yahya & Husein (2024); and Suriadi (2003) demonstrated that mobilization methods can reduce the risk of pressure ulcers in bedridden patients. Huda (2012) found that higher mobilization frequency can help maintain optimal blood circulation in tissues vulnerable to prolonged pressure. This study also aligns with Black et al. (2015), who found that proper patient mobilization and the use of preventive aids can significantly reduce the risk of pressure ulcers. Regular position changes, more even pressure distribution, and aid-based interventions such as mobilization mats can prevent tissue injury from prolonged pressure. Bergstrom et al. (2013) also stated that patients mobilized with specialized tools had a lower incidence of pressure ulcers than patients who only used manual methods. This suggests that tool-based interventions not only make it easier for healthcare workers but are also more effective in distributing pressure on the patient's body to prevent bedsores. These findings reinforce the recommendation that the use of specialized mobilization tools can be an effective solution in improving the quality of care for

bedridden patients and optimizing the work efficiency of medical personnel in hospitals. Patients who were mobilized more frequently using the Alasmob Pastibar were less likely to develop pressure ulcers compared to patients who were only mobilized using conventional methods.

Advantages and Benefits of Alasmob Pastibar

The use of the Alasmob Pastibar offers advantages over conventional methods, with the ability to increase patient mobilization, reduce pressure on areas prone to pressure sores, and improve patient comfort and nurse work efficiency. Ergonomically designed, this device reduces excessive pressure on the patient's body and provides better comfort (Potter & Perry, 2012). In addition to benefiting patients, the Alasmob Pastibar also reduces the risk of injury to nurses due to repetitive movements during conventional mobilization. The results showed that 50% of respondents stated that the Alasmob Pastibar was very easy to use, while no respondents stated that the conventional method was easy. This factor is important in nursing practice, because facilitating mobilization can increase the frequency of patient position changes, a key step in preventing pressure sores, as well as increasing time efficiency and reducing nurse workload.

The results of this study also showed that patients in the intervention group experienced an increase in subjective comfort compared to the control group. Some patients reported feeling more comfortable after using the Alasmob Pastibar, which supports that this device not only has physical benefits but also psychological benefits.

It also offers psychological benefits for patients undergoing long-term care. Overall, the findings of this study support the Alasmob Pastibar as a beneficial innovation in preventing pressure ulcers. Implementing this device in hospitals can help improve the quality of care for bedridden patients and reduce the incidence of pressure ulcers, a major problem in the long-term care of stroke patients and other patients with mobility limitations.

Clinical Implications

The results of this study have significant clinical implications for preventing pressure ulcers in bedridden patients due to stroke. The Alasmob Pastibar can be integrated into standard operating procedures in hospitals to improve the effectiveness of patient mobilization and reduce the incidence of pressure ulcers. In nursing practice, this device provides a more ergonomic solution for healthcare workers, thereby reducing physical fatigue and the risk of injury for nurses when mobilizing patients. Furthermore, by reducing mobilization time, healthcare workers can more optimally treat more patients while maintaining the quality of care.

Another implication is improved patient comfort, as the use of these devices can help reduce prolonged pressure on areas of the body susceptible to pressure sores. This aligns with recommendations from Black et al. (2015), who stated that more effective and routine mobilization can reduce the risk of excessive pressure causing tissue damage. Furthermore, with easier-to-use devices, nurses can not only improve compliance with standard pressure sore prevention measures but also reduce the incidence of side effects such as pain or skin irritation due to unstable positions.

From a hospital policy perspective, the results of this study indicate the need for the procurement and distribution of mobility aids as part of pressure ulcer prevention programs. Hospitals and healthcare facilities may consider investing in these devices to reduce the cost of care for pressure ulcer complications, which often require further medical interventions, such as the use of specialized wound dressings or additional therapies, which increase the cost burden for both hospitals and patients.

CONCLUSION

Conclusion

The study results showed that the use of Alasmob Pastibar was proven to be more

effective in preventing pressure ulcers in bedridden patients due to stroke compared to conventional mobilization methods. The use of this device not only improves patient comfort but also reduces the risk of injury and speeds up mobilization time. Furthermore, healthcare workers also benefit from reduced workload due to easier and more efficient mobilization procedures. The results of the statistical analysis showed a significant difference between the intervention and control groups, confirming that the intervention using Alasmob Pastibar can be a solution in preventing pressure ulcers in bedridden patients.

Suggestion

It is recommended that hospitals and healthcare facilities adopt the Pastibar mattress as a mobility aid for bedridden patients to prevent pressure ulcers. Furthermore, nurses and medical personnel need special training to ensure more effective and efficient use of the Pastibar mattress. Further research is also recommended to refine the design and functionality of this device, ensuring it can be more optimally used to assist in the mobility of patients with various health conditions.

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