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The Design Body Support Pillow Prevent and Reduce Pressure Ulcers

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ABSTRACT

Patients with a long duration of bed rest have a potential risk of impaired skin integrity due to prolonged pressure that can lead to the appearance of decubitus. One alternative to prevent decubitus is by giving mobilization over the bed that is tilted right and left every 2 hours with an angle of 30° with a foam pillow as a buffer in bed. This study aims to design a right and left-tilt body support pillow to prevent and reduce the risk of decubitus ulcers in bed rest patients. The method used in this study is Research and Development (R&D) with ADDIE method which consists of five stages: analysis, design, development, implementation, and evaluation. This study was conducted at Mitra Medika Clinic in Blitar Regency with 6 participants and 3 media experts. Results of this study showed that the value of product feasibility from expert validators is 98% and from participants is 99%. The results showed the product has met the criteria of very feasible based on the assessment of the participants. It is expected that this product can help nurses maintain the right and left tilt position to prevent and reduce the risk of decubitus ulcers in bed rest patients.

Keywords: Pressure Ulcer, Body Support Pillow, Design

Background

Decubitus ulcers are wounds of the skin and soft tissues that result from constant or prolonged pressure on certain areas of the skin, especially on bony areas of the body such as the ischium, greater trochanter, sacrum, heel, and lateral malleolus. These wounds often occur in individuals with decreased mobility, who have difficulty in changing body position (1). Potter & Perry (2012) and Asmadi (2008) state that patients with a long duration of bed rest have a high risk of skin integrity disorders due to prolonged pressure, skin irritation, or limited movement, which can lead to the appearance of decubitus ulcers (2). Suheri (2009) stated that decubitus ulcers can appear around the fifth day after immobilization, although the level of risk is highly dependent on the precautions taken (3). Compared to other ASEAN countries, the incidence of decubitus ulcers in Indonesia reaches 33.3%, which is still very high, according to Riskesdes data (2018), which shows that the number of decubitus cases in East Java reached 55.3% (4). Assessment of the quality of hospital services is also related to the high incidence of decubitus ulcers. Maryam (2005) reported that the prevalence of decubitus ulcers varies, with 5- 11% occurring in acute care settings, 15-25% in long-term care settings, and 7-12% in home care settings (5).

One alternative in patient management to prevent decubitus ulcers is to perform regular changes in sleeping position, such as shifting the patient's body to the right and left sides (6). The use of skin oils and additional medical devices such as back pillows can also support this effort (Potter & Perry, 2006). Herly et al. (2021) recommend changing position every 2 hours by maintaining an angle of about 30 degrees at the head of the bed and supporting it using foam pillows (7). The mobilization position involves three different positions, namely, tilting to the right for 2 hours, lying on the back for 2 hours, and tilting to the left for 2 hours (3). In some cases of decubitus ulcers in hospitals to prevent and reduce the risk of decubitus ulcers by using ordinary pillows, the use of ordinary pillows as body support often causes discomfort for patients. This is due to uneven pressure, pillows that are easy to shift, not sturdy and often the accumulation of pillows behind the patient's body because they require more than two pillows.

The mika miki body support pillow is a media in the form of a modified pillow for bed rest patients. This body support pillow aims to prevent and reduce the risk of decubitus ulcers in bed rest patients. This body support

pillow can also be used as a medium of care for patients at home with impaired mobilization and can also be used in nursing homes for the elderly with impaired mobilization. This body support pillow is expected to be a cheap, easy, and comfortable body support pillow product, so that it can facilitate and assist nurses in carrying out care actions on patients.

Methods

The method used in this research is Research and Development or research and development. This research procedure uses the ADDIE development model which consists of five stages, namely analysis, design, development, implementation, and evaluation (8). Data analysis was carried out to determine the feasibility and validation of experts (3 people consisting of lecturers, doctors, and nurses) and user responses (6 Mitra Medika Clinic patients) to the design of body support pillows. The data were analyzed descriptively, and the level of feasibility was obtained by comparing the number of respondents' scores with the total score. Feasibility standards are classified into very feasible (81% - 100%), feasible (61% - 80%), quite feasible (41% - 60%), less feasible (21% - 40%), and not feasible (<20%) (8). Data were obtained at the Mitra Medika Clinic located in Jeblog Village, Talun District, Blitar Regency in January-March 2024.

Results

Based on the research and design carried out, the following results were obtained:

Analysis Stage

a) Based on interviews from sources, information is obtained: Product planning analysis results The results of interviews with doctors and nurses of the Mitra Medika Clinic can be obtained information that bed rest patients will be carried out right and left tilts using ordinary pillows but the use of ordinary pillows is less effective for maintaining the patient's tilted position because it is easy to shift, easily flattened, difficult to clean, requires more than 2 pillows.
b) Product needs analysis results

The expectations of doctors and nurses for further product innovation are to create a body support pillow that is comfortable, practical, effective and not easy to shift.

Design

Product design results include:

a) Specifications of the designed product

The product designed is a right and left angled body support pillow in an effort to prevent and reduce the risk of decubitus ulcers. This pillow is designed with a special model that ensures stability and does not shift easily, thanks to the wood with a hinge inside that forms the letter “L” to adjust the angle of the pillow. The pillow frame can be folded into a rectangular shape and is equipped with a poke lock clasp to prevent it from slipping off, making it easy to carry around. The wavy design of the pillow is designed to improve blood circulation and reduce pressure on skin areas prone to pressure sores. In addition, the wavy structure also contributes to improved air circulation during sleep, allowing for better airflow around the pillow. This helps prevent heat build-up, keeps the body temperature cool, reduces moisture, and avoids feeling sultry, thus providing a more comfortable sleeping experience.

b) Materials used

This pillow has a light and strong wooden frame, and is filled with anti-allergic white dacron that is soft and does not flatten easily. The wooden frame is equipped with hinges to adjust the tilt angle and hooks to support the pillow. In addition, there is a poke lock to ensure the pillow stays locked when folded, making it easy to carry around. This design ensures the cushion remains stable and does not shift easily, providing optimal support and comfort for the user.

c) Product design

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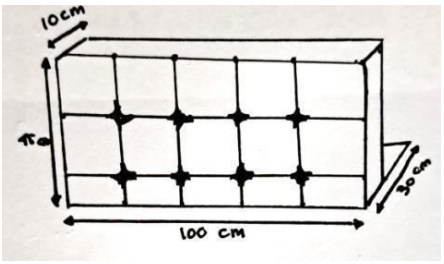

Figure 1. Desain pertama

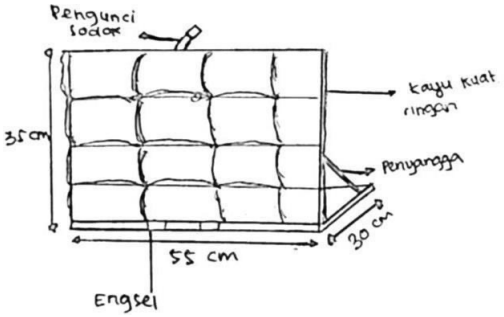

Figure 2. Revised design of right and left tilt body support pillow

The previous product design used the first design, but after revisions by expert validators, researchers made a new product design. The picture description is as follows, the frame is made of light and strong wood, so it is not easy to shift or flatten. The pillow support allows adjusting the tilt angle according to user needs using hinges and hooks. In addition, this pillow is equipped with a poke lock that functions to lock the pillow and as a rope, so that the pillow is easy to carry everywhere.

Development Stage

This stage aims to develop products that have been designed.

a) Making initial products

Researchers made initial products from the results of analysis and design. The first product is made according to the design that has been designed and uses the first designPenilaian oleh validator ahli

Table 1 Results of expert validator assessment

No	Aspects to be assessed	Skore
1	Design elements	26
2	Design principle	25
	Total	51

Based on the data from the table the total score is 51, to determine the quality and feasibility level of the product the criteria are obtained by comparing the number of respondents' scores (51) with the maximum number of scores (85).

$$P = \frac{51}{85} \text{ x } 100\% = 60\ \%$$

According to Oktavia et al., (2020) Oktavia et al., (2020) if the analysis results obtain the standard (41%-60%), then the product is classified as quite feasible. At this stage, suggestions and responses from expert validators are still accepted by researchers as evaluation material.

b) The results of stage 1 product revision

Table 2 hasil revisi produk

Response	Before revision	After revision
Tool size is too big		
Pillow is too heavy and not easy to move		
The slope of the pillow cannot be changed		

c) Assessment by expert validator 2

Table 3 results of expert validator 2 assessment

No	Aspects to be assessed	Skore
1	Design elements	42
2	Design principle	40
	Total	82

Based on the data from the table the total score is 82, to determine the quality and feasibility level of the product the criteria are obtained by comparing the number of respondents' scores (82) with the maximum number of scores (85).

$$P = \frac{82}{85} \text{ x } 100\% = 96\%$$

According to Oktavia et al., (2020) if the analysis results obtain the standard (82%- 100%), then the product is classified as very feasible.

Health Gate
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Implementation Stage

a) Expert validator test results

Table 4 results of expert validator test assessment

Participants (P)	Score	Eligibility Standard Criteria	Description
Description	82	$P = \frac{82}{85} \times 100\% = 96\ \%$	Very Feasible
Nurse	85	$P = \frac{85}{85} \times 100\% = 100\ \%$	Very Feasible
Total	167	$P = \frac{167}{170} \times 100\% = 98\%$	Very Feasible

According to Oktavia et al., (2020) if the analysis results obtain the standard (82%- 100%), then the product is classified as very feasible.

b) Field trial results

Table 5 field trial results

Participants (P)	Score	Eligibility Standard Criteria	Description
P1	82	$P = \frac{82}{85} \times 100\% = 96\%$	Very Feasible
P2	83	$P = \frac{83}{85} \times 100\% = 98\%$	Very Feasible
P3	83	$P = \frac{8}{8} \times 100\% = 98\%$	Very Feasible
P4	85	$P = \frac{85}{85} \times 100\% = 100\ \%$	Very Feasible
P5	85	$P = \frac{85}{85} \times 100\% = 100\ \%$	Very Feasible
P6	85	$P = \frac{85}{85} \times 100\% = 100\ \%$	Very Feasible
Total	503	$P = \frac{503}{510} \times 100\% = 99\ \%$	Very Feasible

According to Oktavia et al., (2020) if the analysis results obtain the standard (82%- 100%), then the product is classified as very feasible.

c) Stage 2 product revision

Table 6 results of stage 2 product revision

Response	Before revision	After revision

Health Gate
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The tool is added with a cloth like a pillowcase so that it can be removed and easily cleaned.	 No pillowcase	 There is a pillowcase with a water-repellent parachute fabric inside.

Discussion

Analysis of Right and Left Tilt Body Support Pillow

1. Product planning analysis

   According to the data obtained based on interviews with doctors and nurses, information is obtained that one of the actions to prevent and reduce the risk of decubitus ulcers is to position the right and left side of the patient, the action is in accordance with the statement of Ariyani & Nurlaily (2023) where the purpose of giving an inclined position is to maintain body balance or body balance, which reduces problems caused by immobilization and increases comfort. The results of interviews with nurses and doctors said that the use of ordinary pillows and bolsters as a support for the patient's body is less effective because it requires more than 2 pillows, pillows are easy to shift, pillows are easily flattened, easily dirty and difficult to clean.

2. Product needs analysis

   In accordance with the data obtained based on interviews with nurses and doctors at Mitra Medika Clinic, information was obtained that at the clinic and at home using ordinary pillows in the right and left oblique positions. The disadvantages of these ordinary pillows are that they are easy to shift, require more than 2 pillows, pillows are easily flattened and pillows are difficult to clean, especially kapok filled pillows. The hope of the mika miki body support pillow tool is that the pillow is not easy to shift and practical. The advantages of this mika miki body support pillow are that it is effective in preventing decubitus, soft, not easy to shift, can be adjusted in tilt angle and can be used as bed rest patient care at home. This is in line as according to Parwata & Suharto (2022) tilting patients 30 degrees regularly and supporting them with pillows can prevent decubitus.

Design of Right and Left Tilt Body Support Pillow

This research produces products in the form of right and left tilt body support pillows. This research design uses the research and development (R&D) method. According to Sugiono (2018) the research and development (R&D) method is a research approach that is applied to create specific products and evaluate the extent to which these products are effective (9).According to the researcher, these results are in line with the Researc and Development method according to Sugiono (2018), because the result of this product is a right and left tilted body support pillow as an effort to prevent and reduce the risk of dkubitus ulcers.

According to Sugiono (2013), the research method used follows the ADDIE development model, which consists of five stages, namely analysis, design, development, implementation and evaluation. According to researchers, the results of product research developed with the ADDIE model have been achieved with good assessment results, but it has not been carried out at the evaluation stage because this product is still not in production in factories in large quantities.

At the implementation stage of product feasibility, a field trial was conducted on participants at the Mitra Medika Clinic. Product assessment was carried out using an evaluation sheet provided by the researcher. After that, the product was revised based on criticism and suggestions from field trial participants. The results of this study are in line with the theory expressed by Ayu et al. (2018), where at this stage validation was carried out by expert validators and field trials by six participants who were treated at Mitra Medika Clinic and home care. The assessment results show that the product is very feasible to use.

Based on the results of the questionnaire calculation, 2 expert validators obtained a score (167) with a maximum score (170) so that the calculation received a value (98%). According to Oktavia et al., (2020) if the analysis results get the standard (81%-100%), then the product is included in the classification very feasible to use, it can be concluded that the right and left tilt body support pillow product is included in the classification very feasible so that it can be used for the next stage trial.

In the field trial, the product was assessed by 6 participants, namely Mitra Medika Clinic patients. Based on the results of the assessment of the right and left tilt body support pillow products in the field trial, the product received a total score (503) from the maximum score (510). So that in the calculation of the standard criteria for product feasibility, it gets a value (99%) according to Oktavia et al., (2020) if the analysis results obtain the standard (81%-100%), then the product is included in the classification very feasible to use. According to the researcher, the results of this field trial assessment show that the product can be developed better. As for some additional suggestions from respondents in the field trial, researchers can accept them as evaluation material to further develop the products that have been made.

Conclusions and Recommendations

The product development of the right and left tilt body support pillow was developed using the ADDIE model. The ADDIE method has been achieved with good assessment results, but it has not been carried out at the evaluation stage because this product is still not in production in the factory in large quantities. However, the results of the feasibility test by expert validators and 6 participants obtained results, namely the assessment of 2 expert validators obtained a value of (98%) the level of validation of the product is very feasible to use, at the field trial stage conducted on 6 participants obtained results (99%) into the product level is very feasible to use.

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