Jurnal Kesehatan
Vol. 15, No. 1, April 2024
ISSN 2086-7751 (*Print*), ISSN 2548-5695 (*Online*)
http://ejurnal.poltekkes-tjk.ac.id/index.php/JK

Development of a Decubitus Risk Assessment Instrument using Website Media on The Incidence of Decubitus

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ARTICLE INFO

Article history

Received date
25 Jan 2024

Revised date
21 Feb 2024

Accepted date
20 Mar 2024

Keywords:

Braden;
ICU;
Virginia Henderson.

ABSTRACT

Decreased quality of service in the ICU occurs due to decubitus conditions, namely localized tissue damage due to pressure on soft tissue over bony prominence and pressure from outside for an extended period, so the importance of instruments with the Braden scale is used as an effort to prevent decubitus. This study aims to develop a decubitus risk assessment instrument based on Virginia Henderson's theory on a website that can be applied in the ICU to prevent decubitus. This research is descriptive research using the Delphi approach method, which consists of two stages: a literature study, FGD, expert consultation, content validity tests, readability tests, and website-based applications. In the second stage, researchers will conduct instrument experiments on ICU nurses at RSI Sultan Agung Semarang, with a sample of 50 ICU nurses. The results showed that the instrument has strong validity, so the manufacture of instruments can continue at the stage of making website applications. The results of the validity and reliability test of the instrument obtained 11 instruments that were declared feasible to use with valid and reliable values of 0.714>0.70. ICU nurses can use the Virginia Henderson theory-based decubitus instrument with a website to prevent decubitus.

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INTRODUCTION

Intensive Care Unit (ICU) is an independent hospital section, equipped with specialized staff and facilities for observation, care, and therapy (Labeau et al., 2021). Patients in the intensive care unit suffer from severe illnesses, critical conditions, injuries, or life-threatening complications (Rahmawati, 2022). Patients in critical care vary from those without any assistive devices to those requiring total care (Labeau et al., 2021).

Patients in the ICU are considered to be at the highest risk of developing decubitus ulcers due to limited physical activities and mobility, resulting in a decreased ability to actively change positions and experiencing prolonged pressure (Khojastehfar et al., 2020). Decubitus is localized tissue damage caused by soft tissue compression over prominent bones (bony prominence) and external pressure over an extended period (Lin et al., 2022). The incidence of decubitus ulcers in Indonesia is also a matter of concern (Labeau et al., 2021).

From this chronology, several consequences arise from decubitus ulcers. One factor leading to decubitus ulcers is the lack of standardized decubitus assessment instruments, resulting in persistent decubitus ulcers. The measurement instruments for decubitus assessment require accuracy for complex ICU patients, covering basic human needs according to the concept of human needs. Nursing experts mention various components of basic human needs, one of which is Virginia Henderson's Nursing Theory (Khojastehfar et al., 2020).

Virginia Henderson's theory includes components that need to be included in the decubitus assessment instrument for ICU patients as they influence the occurrence of decubitus, including general condition, respiratory aid usage, temperature, elimination, skin condition, hygiene, and fluids. Therefore, as the closest individuals caring for decubitus patients, nurses must know everything about decubitus risk to prevent its occurrence. Decubitus management focuses on

nursing care, from assessment, diagnosis, intervention, implementation, and proper evaluation to maintaining skin integrity. Planned and consistent skin care interventions ensure high-quality care (Saleh & Ibrahim, 2023).

Based on the preliminary study at Sultan Agung Islamic Hospital, there is currently no assessment tool for early detection and continuous monitoring, resulting in sudden decubitus incidents reported to the hospital's quality improvement team. The decubitus is also included in the Hospital Patient Safety Reporting and Learning System (SP2KP) guidelines in the Director General of RSISA Regulation number 3134/PER/RSI-SA/VI/2022, stating that decubitus is considered an incident that must be reported, namely an Unexpected Event (KTD) or an adverse event—an unexpected event resulting in patient injury due to performing an action or not making a decision that should have been made, and not due to the underlying disease or patient condition.

In this context, nurses must continuously monitor and document preventive aspects of decubitus for patients. The research problem is the effectiveness of the decubitus risk assessment instrument based on Virginia Henderson's nursing theory with a website medium in preventing decubitus incidents in ICU patients at RSI Sultan Agung Semarang. This research's novelty is introducing a decubitus risk assessment instrument based on Virginia Henderson's Nursing theory through the media.

This study aimed to develop a decubitus risk assessment instrument based on Virginia Henderson's nursing theory that is valid and reliable in preventing decubitus events in patients in the ICU RSISA.

METHOD

Phase I of the research is a descriptive study using the Delphi method approach related to using expert opinions to obtain agreement with experts with high-reliability values on mastering the instrument using a questionnaire accompanied by feedback on the agreement (Nursalam et al., 2020). The first phase aims to develop a web-based decubitus screening instrument to explore and investigate the prevention of decubitus incidents in the ICU of RSI Sultan Agung Semarang.

Literature Review: The first step in instrument development is screening the instruments used to detect decubitus through literature review. Researchers identify problems related to the research topic.

Focus Group Discussion (FGD): FGD activities are used to involve a group process in understanding a problem related to the incidence of pressure ulcers in the ICU at RSI Sultan Agung Semarang through FGD.

Expert Consultation: Expert consultation is conducted with individuals considered experts in the relevant field. A multidisciplinary team conducts expert consultation to evaluate components in the instrument, with 5 participants, including nurses, doctors, and IT team members. Validity and reliability testing of the feasibility of the decubitus risk instrument based on Virginia Handerson's nursing theory with a website medium is performed. Validity testing uses the content validity ratio (CVR) and content validity index (CVI). Readability testing involves ICU nurses from other hospitals. Each respondent in the readability test is asked to fill out a prepared questionnaire. Respondents are asked to report if some words or sentences are difficult to understand. Additionally, respondents can provide suggestions, comments, and questions about items that need to be understood.

The website is developed in consultation with the IT team of RSI Sultan Agung Semarang to make it accessible to all nurses. The decubitus detection and assessment website is expected to help nurses prevent decubitus in ICU patients admitted to RSI Sultan Agung Semarang.

Phase 2 of this research aims to pilot-test the web-based instrument by conducting validity and reliability testing by ICU nurses at RSI Sultan Agung Semarang and recommending the hospital use the decubitus instrument with Brenden scale measurements and Virginia Henderson's nursing theory with a website medium.

The population is the generalization area consisting of objects/subjects with specific quantities and characteristics set by the researcher for the study and subsequent conclusions (Sudana, 2015). The population in this study is all ICU nurses from January to April 2023, totaling 50 ICU nurses.

The inclusion criteria for this study are:

1. All educational levels (Diploma to Bachelor in Nursing).
2. Willing to participate in the study.
3. Length of work/experience in ICU for a minimum of 2 years.

The exclusion criteria are as follows:

1. Nurses are currently undergoing an ICU internship program.
2. Nurses are undergoing a mutation.

Literature studies were conducted by collecting data from several journals related to the assessment of decubitus prevention. The literature study was based on searching for articles obtained from several databases such as Scopus, ScienceDirect, and PubMed in the last five years relevant to the indicator, which is the use of decubitus prevention instruments. The keywords used in the search engine are ICU, Decubitus, Braden, Virginia Henderson, and website. As a result, six studies were obtained and used as references in developing an early detection decubitus instrument based on the Branden instrument and Virginia Henderson's nursing theory with a Web-based approach.

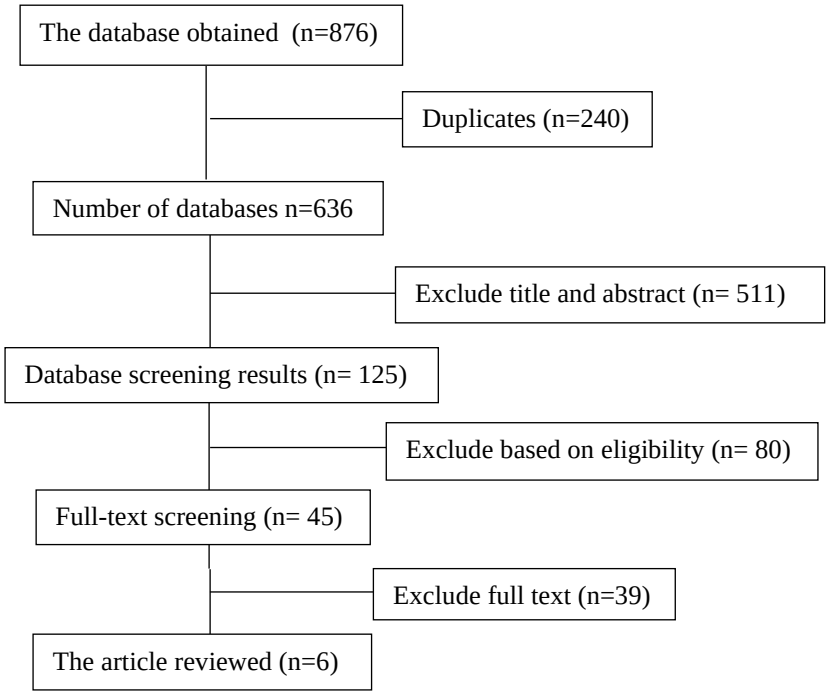

Figure 1. Flow Chart

RESULTS

Results and FGD Analysis

Table 1. FGD results analysis

Indicator	Issue	FGD Results	Standard	Development Solutions
Identify decubitus patients	Pressure ulcers are still detected in the ICU	Pressure ulcers still occur in the ICU	The incidence of decubitus in the ICU is 0%	Optimization of decubitus prevention screening
Identify decubitus early detection instruments that have been used	Decubitus screening using instruments applied in the ICU is considered less objective and accurate in assessing the incidence of decubitus	The decubitus screening that is applied is considered to be less effective in preventing decubitus	The incidence of decubitus in the ICU is 0%	We are developing a decubitus instrument using the Branden instrument and Virginia Henderson's web-based nursing theory.
Identification of decubitus instruments using the Branden instrument and Virginia Henderson's web-based nursing theory	Compile and identify the contents of the instrument	There are still points that are missing and need to be added to the instrument	The instrument is expected to be able to assess decubitus effectively	Evaluating the decubitus instrument using the Branden instrument and Virginia Henderson's web-based nursing theory

The FGD activity was conducted on July 15, 2023, at 09:30 AM in the Training Room Class 2 of RSISA, attended by 1 IPCN, 1 PPI, 1 IT, 1 RSISA Training, and 7 ICU nurses. This FGD activity was conducted to evaluate the decubitus instrument used in the ICU of RSI Sultan Agung Semarang, assess the challenges faced, and present a plan for the development of an early detection decubitus instrument combining the Branden instrument and Virginia Henderson's nursing theory. The results of the FGD provided solutions to improve decubitus screening, such as the initial assessment of patients to minimize the incidence of decubitus in ICU patients.

Expert consultation

Expert consultation was conducted on July 28-29 and August 1, 2023, after the FGD implementation. Expert consultation will be carried out after the FGD and formulation of the decubitus screening instrument. Expert consultation is conducted to obtain input from the results of literature studies and FGDs conducted and implemented in developing the decubitus screening instrument. The expert consultation activity involved five experts, including four people who are expert nurses as consultation experts are explained in the following table.

Table 2. Expert consultation results

Instrument	Standard	Input
Word writing	Writing according to standards	Adjusted to instrument assessment standards
Questions/instrument contents	The questions/instrument content is easy to understand and corresponds to accurate decubitus screening.	The questions should be easy for all users and accurate for decubitus assessment.
Flow of questions	The flow of questions is adjusted based on the most common questions to specific questions on decubitus detection.	The order of questions is adjusted based on specific questions for early detection of decubitus.
Initial screening assessment	Assessment is adjusted to assessment standards	Added decubitus screening score assessment

Results and content validity analysis

Testing the development of the decubitus screening instrument based on the assessment sheet filled out by four experts. The results of the validity of the instrument development in stage 1 are shown in the table below:

Table 3. Content validity results

Content	Validity test results				
	Expert	CVR	Results CVR	CVI	Results CVI
Item 1	4	1.000	Valid	1.000	Very High
Item 2	4	0.830	Valid	0.830	Very High
Item 3	4	0.830	Valid	0.830	Very High
Item 4	4	0,660	Valid	0,660	Very High
Item 5	4	0.580	Valid	0.580	Very High
Item 6	4	0.580	Valid	0.580	Very High
Item 7	4	0.830	Valid	0.830	Very High
Item 8	4	0.830	Valid	0.830	Very High
Item 9	4	0.910	Valid	0.910	Very High
Item 10	4	1.000	Valid	1.000	Very High
Item 11	4	0.830	Valid	0.830	Very High

Content validity checks the compatibility between test items created with indicators, material, or learning objectives that have been determined (Sugiyono, 2010). Based on the table above, the V value for item one is obtained from V=12/(4 (4-1))=1 and other items with the same calculation. The Aiken's V coefficient value is 0-1. Based on the table of V values, it can be concluded that the decubitus prevention instrument has content validity with a very high validity category for eight items, including items 1, item 2, item 3, item 7, item 8, item 9, item 10, and item 11. There is one high content validity on item 4, and two content variables have sufficient values on item 5 and item 6.

Results of instrument readability testing

This readability test involved 5 ICU nurses from other hospitals with characteristics similar to those at the research hospital. The results of this readability test stated that for each instrument item, readability was understandable, language was easy to understand, no confusing sentences, and no revisions from before, according to all five respondents.

Website creation

The website was created by consulting an Information Technology (IT) expert with programming expertise at RSISA. The stages of website creation include sketching the layout, designing the database, coding the layout into a program/application, and setting testing. The instrument in the form of this website aims to facilitate the work of nurses quickly and accurately. It can be used online on a computer/smartphone.

Results of stage 2 analysis

Results of the validity test of the website-based decubitus instrument

The results of the validity test of the website-based decubitus instrument can be explained with three types of data processing as follows.

Table 4. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.632
Bartlett's Test of Sphericity	Approx. Chi-Square	139.034
	df	55
	Sig.	.000

From these results, it can be explained that KMO has a result of 0.632, which means that factor analysis can be performed because it has a value>0.05.

Table 5. Anti-image matrices

		item1	item2	item3	item4	item5	item6	item7	item8	item9	item10	item11
Anti-image Correlation	item1	.595[a]	-.167	-.167	-.178	.090	-.058	-.271	-.168	-.388	-.241	.111
	item2	-.167	.640[a]	.021	-.121	-.359	-.402	.294	.054	.273	.227	.223
	item3	-.167	.021	.487[a]	-.116	.110	.122	.222	.395	.072	.122	.092
	item4	-.178	-.121	-.116	.665[a]	.137	.037	.240	-.112	.133	-.200	.421
	item5	.090	-.359	.110	.137	.512[a]	.219	.013	-.079	-.031	-.092	.041
	item6	-.058	-.402	.122	.037	.219	.496[a]	-.124	.256	.131	.029	-.167
	item7	-.271	.294	.222	.240	.013	-.124	.707[a]	.297	-.179	.009	.068
	item8	-.168	.054	.395	-.112	-.079	.256	.297	.474[a]	.034	.087	.000
	item9	-.388	.273	.072	.133	-.031	.131	-.179	.034	.756[a]	-.082	.118
	item10	-.241	.227	.122	-.200	-.092	.029	.009	.087	-.082	.709[a]	-.038
	item11	.111	.223	.092	.421	.041	-.167	.068	.000	.118	-.038	.661[a]

Note: a. Measures of Sampling Adequacy (MSA)

Furthermore, the anti-image matrix results in the validity test have a standard value >0.050, indicating that the sample meets or shows MSA. From the results of the anti-image matrix data processing that has been done, it can be explained that items 3, 6, and 8 do not meet the standard value because the data processing results show values <0.050. Meanwhile, other items have values >0.050, indicating that they have shown MSA. The KMO result shows a negative sign (-), meaning that the sufficiency of the sample measurement has not met the requirements.

The last validity test is the rotated component matrix, which has the following data processing results.

Table 6. Rotated Component Matrix

	Component			
	1	2	3	4
item1	.760			
item2		.824		
item3			-.690	
item4		.843		
item5			.779	
item6				.876
item7	.775			
item8			.583	
item9	.789			
item10	.840			
item11		-.786		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Note: a. Rotation converged in 6 iterations.

From the data processing results, the factor loading can be considered valid if it has a value

>0.75 with a sample of 50. Items declared invalid with a value <0.75 are items 3 and 8. These items are grouped into four components: item 1, item 7, item 9, and item 10 belong to component 1. Those that belong to component 2 are item 2, item 4, and item 11, while item 5 belongs to component 3 and item 6 belongs to component 4.

Results of the reliability test of the website-based decubitus instrument

Table 7. Reliability statistics

Cronbach's Alpha	N of Items
.714	11

An instrument is considered reliable if it has a value >0.70, so the data processing results in this instrument can be considered reliable because it has a value of 0.714>0.70.

DISCUSSION

Based on the instrument validity and reliability test results, 11 instruments were declared feasible with valid and reliable values of 0.714>0.70. ICU nurses can use Virginia Henderson's theory-based decubitus instrument with a website to prevent decubitus. Ramadhan et al. (2022) stated that the Virginia Henderson Theory could be used in patient nursing care, especially in exploring health service needs so that patients can improve patient self-management compliance in preventing the occurrence of a disease repeatedly.

A decubitus ulcer, also known as a pressure ulcer, is the damage/death of the skin and underlying tissue due to constant pressure on an area, resulting in impaired circulation to the area. Ulcers can also occur when a person stays in one position for a long time, such as lying in bed, and the area becomes ischemic due to continuous and constant pressure (Trizolla et al., 2020). The elderly have a high potential for decubitus due to age-related skin changes, including reduced subcutaneous fat tissue, reduced collagen tissue and elasticity, decreased capillary collateral efficiency in the skin so that the skin becomes thinner and brittle, decreased skin moisture, decreased skin sensation (Mamoto & Gessal, 2018).

Decubitus wounds are an endemic problem for the patient population who are admitted to home or other care homes. These patients risk developing decubitus wounds during treatment (Erika et al., 2021). The length of treatment days and disease conditions will threaten the occurrence of decubitus (Jona et al., 2022). The presence of decubitus wounds that are not adequately treated can result in a long patient care period and an increase in hospital costs, thus burdening the economy of patients, institutions, and society in general, especially patients who are treated in intensive rooms that require enormous costs (Angriani et al., 2020). The healing process of decubitus wounds takes a long time and is also a serious problem because it can affect the patient's quality of life (Alimansur & Santoso, 2019).

Decubitus ulcers that are left too long will cause the wound to deepen and can cause infection. This will affect therapeutic management (Bhoki et al., 2014). According to Suriadi in Mahmuda (2019), a high risk of decubitus ulcers is found in the following:

a. People who cannot move (e.g., paralyzed, very weak, shackled).
b. People who cannot feel pain because pain is a sign that generally encourages a person to move. Nerve damage (e.g., from injury, stroke, diabetes) and coma can lead to a reduced ability to feel pain.
c. People who are malnourished do not have a protective layer of fat, and their skin does not fully recover from the lack of essential nutrients.

Prevention is an essential factor in the immobilized elderly to avoid the risk of decubitus. The most significant risk of decubitus occurs due to pressure on protruding skin over a long period (Sulidah & Susilowati, 2017).

Thus, the Virginia Henderson theory-based decubitus risk assessment instrument presented through website media is a reliable and helpful tool for nurses in the intensive care unit to prevent decubitus events in patients.

CONCLUSION

The research resulted in developing a decubitus risk assessment instrument based on the Virginia Henderson theory on a website that can be applied in the ICU to prevent decubitus. The development of a draft instrument for assessing decubitus risk based on the Virginia Henderson nursing theory in ICU patients has been arranged. The number of items used is 11, with Items 3 and 8 in the early detection instrument related to temperature and mobilization that can be used in the early detection screening instrument for decubitus (Bhoki et al., 2014).

The validity test of the website-based decubitus instrument can be explained by KMO having a result of 0.747, which means that factor analysis can be performed because it has a value

>0.05. An instrument is considered reliable if it has a value <0.70, so the data processing results in this instrument can be considered reliable because it has a value of 0.832>0.70. Items 3 (temperature) and 8 (mobility) in the early detection instrument for decubitus still need to be validated for use. However, based on expert guidance, they can still be used with instrument modifications due to the influence and supporting articles.

CREDIT AUTHOR STATEMENT

DS: Checking original draft, visualization, obtaining funding, conceptualization; **JH:** writing, obtaining funds, help revise writing; **DRS**: supervision (lead), validation (equal), visualization (equal), obtaining funding (equal), review and editing; **HP**: tasked with completing the original draft, formal analysis, conceptualization.

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