Quality Improvement Paper

Noelle Fallon

Dr. Susan L. Davis, RN & Richard J. Henley College of Nursing, Sacred Heart University

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Introduction

A pressure ulcer, or pressure injury is defined as localized damage to the skin and underlying soft tissue. Pressure ulcers usually occur over a bony prominence from prolonged pressure, or from the placement of a medical device (Fu et al., 2023). Pressure ulcers are a hospital complication occurring in patients worldwide. Globally, the incidence rate of pressure injuries was 5.4/10,000 patients per day and the prevalence was 12.8% in hospitalized adults. The rate of hospital-acquired pressure injuries worldwide was 8.5% (Fu et al., 2023). The occurrence of a pressure ulcer can increase the length of hospital stay, contribute to higher medical expenses, increase susceptibility to infection, and decrease patient quality of life (Huang et al., 2021). Although pressure ulcers are one of the most commonly occurring adverse events in hospitalized patients, they can be prevented with proper interventions put in place. For example, the Braden Scale used to identify patient risk for pressure injury. To identify this risk, the Braden Scale assesses six factors: sensory function, moisture, activity, mobility, nutrition, shearing force, and friction (Huang et al., 2021). As a part of my learning and research, I appraised two articles, one systematic review and one single quantative study, to determine the Braden Scale's efficacy in preventing pressure ulcers.

Databases and Key Terms

During my research process, I used the Cumulative Index of Nursing and Allied Health (CINAHL) and MEDLINE databases to find the best current evidence related to the Braden Scale's efficacy as an intervention to prevent pressure injuries. Some key terms I used to specify my search results were "Braden Scale", "pressure injury or pressure ulcer", "prevention" and "adult".

Development of PICO Question

To begin the process of formulating my PICO question, I thought about what interventions already exist to prevent the occurrence of pressure ulcers and how effective these interventions are. I also thought about what factors contribute to the development of pressure ulcers. Questions like these facilitated my search for interventions geared towards the decreased incidence of pressure ulcers, and ultimately, lead me to select the Braden Scale as my intervention. Once I found my intervention, I began to identify all the PICO elements as related to my intervention. I identified my population as the adult hospitalized population, my intervention as a skin assessment using Braden Scale, my comparison as a skin assessment without the Braden Scale, and my outcome as the decreased incidence of pressure ulcers. This ultimately led me to develop the PICO question, "In the general adult hospitalized population, how does a skin assessment using the Braden Scale compared with a skin assessment without the Braden Scale affect the decreased incidence of pressure ulcers?"

Appraisal of Systematic Review

The systematic review that I chose to appraise is titled "Predictive validity of the Braden scale for pressure injury risk assessment in adults: A systematic review and meta-analysis". This systematic review was published in 2021. The purpose of this study is to evaluate the accuracy of the Braden Scale in assessing risk for pressure injury (Huang et al., 2021).

Variables

In this article, I identified an independent and a dependent variable being assessed. The independent variable is the intervention being used and the dependent variable is the outcome that is measured. For this systematic review, the independent variable is the Braden Scale, and the dependent variable reviewed is the decreased rate of pressure ulcers (Huang et al., 2021).

Key Search Terms and Databases Identified

The key search terms that were used to search for the initial studies were “pressure ulcer”, “risk assessment”, “sensitivity and specificity” and “systematic review”. The digital databases that were searched for evidence include PubMed, EMBASE, Web of Science, the Cochrane Library, and the Cumulative Index of Nursing and Allied Health (CINAHL) (Huang et al., 2021).

Inclusion and Exclusion Criteria

In order to be an included in the review, inclusion criteria for the study consisted of the following: patients 18 years or older with no pressure injuries at the time of admission, Braden Scale use to assess and identify pressure injury risk, directly provided true positive, false positive, false negative, and true negative for predicting pressure injury risk or directly provided data available regarding these statistics, inclusion of definition and classification of pressure injury produced by one of the accepted standards (i.e. National Pressure Ulcer Advisory Panel), and the inclusion of the cross sectional and the cohort study (Huang et al., 2021). Exclusion criteria were the following: studies failed to obtain complete data, letter, comment, and meeting abstract, and duplicate publications (Huang et al., 2021).

Description of Flow Diagram, Number of Initial Studies, and Number of Final Studies

Figure 1 of this article includes a flow diagram outlining the process of selecting the final studies from the beginning of the selection process. According to this diagram, there were 6,441 studies identified in the initial search. After removing duplications, 4,215 studies remained. From that point, 4,143 studies were excluded via their title and abstract, and 71 studies remained for further investigation. After reviewing the full text for the 71 remaining articles, 11 were excluded due to insufficient data, unrelated data, or letter abstract. This left a final total of 60 studies to be included in this systematic review (Huang et al., 2021).

Study Designs and Level of Evidence

A systematic review with meta-analysis was conducted of the 60 final selected studies. The final selected studies included a total of 49,326 patients with ranging on average from 31-84 years. 47 studies were prospective studies and 13 were retrospective studies. 45 studies were conducted in hospitals and 15 were conducted in long term care facilities. All studies were published between 1987-2019 (Huang et al., 2021). This study was performed in accordance with the guidelines put forth by the Cochrane Handbook for Systematic Reviews of Diagnostic Test Accuracy from the Cochrane Collaboration and Preferred Reporting Items for Systematic Review and Meta-analysis. The protocol of the study was also registered with the International Prospective Register of Systematic Reviews (Huang et al., 2021). This study included a comprehensive search strategy and appraisal method, the use of only research evidence, and the inclusion of nonexperimental research, making its Level of Evidence a III (Dang et al., 2021).

Results

To determine the efficacy of the Braden Scale at assessing risk for pressure injury, the area under a Receiver Operating Characteristic Curve (AUC) was measured. Area values can range from 0-1, and the closer to 1 the AUC value is, the higher the accuracy level in distinguishing a positive vs. a negative result. Analysis indicated that the AUC value was higher for prospective studies (0.84), mean age of less than 60 (0.87), in hospital studies (0.82), and in the Caucasian population (0.86). Specific to this study, this means that the Braden Scale was over 80% accurate in determining at risk patients who were included in prospective studies, younger than 60, involved in hospital studies, and in the Caucasian population.

Conclusion

To conclude, the Braden Scale has a moderate predictive ability in predicting incidence of pressure ulcers. This tool is most suitable for hospitalized adults of a mean age under 60 and of the Caucasian population. Finally, a cut-off value of 18 is the most suitable Braden Score Value for identifying patients at risk vs. not at risk (Huang et al., 2021).

Limitations

One limitation of this study is that all of the included studies were limited to English and Chinese. This may result in publication bias. Another limitation of this article is that the comprised parameters in the systematic review had limited opportunity for interpretation. This is because the Braden Score cut-off value of 16 was only found in 4 studies out of 60. One way the article suggested to address this issue is to do more research going forward on cut off values between 16-18 (Huang et al., 2021).

Appraisal of Single Quantitative Article

The single quantitative article I chose to appraise is titled “Epidemiological characteristics of pressure injury and the predictive validity of Braden scale among the older hospitalized patients: A cross-sectional study”. This article was published in 2023 (Fu et al., 2023).

Purpose of Study

The purpose of this study is to investigate the incidence of pressure injuries in older adults, and to investigate the validity of the Braden Scale in predicting these pressure injuries (Fu et al., 2023).

Sample Size and Population

This study included a sample size of 13,064 patients. The population of this study included patients 60 years and older admitted to admitted to general medical surgical floors (Fu et al., 2023).

Setting

This study took place at a 2600-bed tertiary hospital located in Northwestern China. Data was gathered on patients for this study in between the months of January-June of 2022 (Fu et al., 2023).

Study Design and Level of Evidence

This study is a cross sectional study, which is a type of quantitative study that collects and observes data at a specified point in time. This study contained an independent variable (The Braden Scale) that was used and manipulated but did not contain a control group (Fu et al., 2023). According to Appendix E, this makes the study a Level II Evidence study (Dang et al., 2021).

Results

The study identified that pressure injuries are more likely to occur in patients with older age, longer hospital stays, lower BMIs, and lower Braden Scores (Fu et al., 2023). Data revealed that the incidence of pressure injuries was highest in the age group of 80 years or older (0.95%), and incidence decreased as age decreased. Older inpatients with a BMI of less than 18.5kg/m^2 had the highest incidence of pressure injuries (0.60%), and incidence decreased as BMI increased. Occurrence of pressure injuries was 0.37% in older patients with hospital stays greater than 7 days, which is significantly higher than patients whose hospital stays were less than 7 days (0.02%). The most common pressure injury stage in older adults was stage 2 (71.00%). Patients with Braden Scores 14 or lower were at highest risk for pressure injury. Finally, this study revealed that the most common site for a pressure injury in older adults was the sacrococcygeal area (42.00%), followed by the hip (32.30%), and heels (12.90%) (Fu et al., 2023). Furthermore, to determine the accuracy of the Braden Scale at assessing risk for pressure injury, the area under

a Receiver Operating Characteristic Curve (AUC) was measured. Area values can range from 0-1, and the closer to 1 the AUC value is, the higher the accuracy level in distinguishing a positive vs. a negative result. Data indicated that the Braden Scale can accurately identify more than 80% of patients at risk for pressure injury within this sample size (the area under the ROC curve was greater than 0.80), making it an appropriate and useful assessment tool (Fu et al., 2023).

Strengths and Limitations

One strength of this study was that it used the information platform "Long Hu Hui", which offers a foundation for the use of AI predictive technology along with the Braden Scale to predict risk for pressure injuries. There is data to suggest that using AI technology along with the Braden Scale can help health systems to identify a larger percentage of pressure injury risk. In addition, all the data filed by nurses during this trial were subject to quality control and audit by their care department, ensuring that the data is fully accurate (Fu et al., 2023). One limitation to this study is the study only included patients at one hospital in one geographical region of China. The data may, as a result, be biased to that patient population. Another limitation to this study is that it cannot determine cause and effect relationships. For example, this study showed that there is a relationship between age and incidence of pressure injuries. While this information is useful to healthcare professionals in preventing pressure injuries, a cross-sectional study cannot clearly determine that age is the cause of the pressure injury (Fu et al., 2023).

Conclusion

To conclude, patients older than 80, patients with a BMI<18.5, patients hospitalized longer than 7 days, and patients with Braden Scores less than or equal to 14 are at highest risk for pressure injuries. The Braden Scale is appropriate and applicable tool to predict pressure injury risk in the

adult hospitalized population (Fu et al., 2023). By identifying those at risk for pressure injuries, we can intervene appropriately to prevent their occurrence.

Recommendations for Patient Care and Implications for Future Research

One suggestion the article made for future research is to conduct multicenter studies to explore the occurrence of pressure injuries in adult hospitalized patients in other geographical areas of China (Fu et al., 2023). It may also be helpful to conduct a similar study in various areas of the United States to evaluate the predictive validity of the Braden Scale across various populations. Based on the results of the study, it should be recommended that the Braden Scale assessment tool be incorporated regularly into patient care, as it helps to prevent the occurrence of pressure injuries in those the scale identifies as at risk (Fu et al., 2023).

Explanation of Evidence as Related to the Nurses Role

Given that nurses are responsible for routine skin assessments, and more specifically Braden Scale Assessments, this evidence is clinically significant to everyday nursing practice. Nurses would benefit from additional education sessions specific to the Braden Scale's use in predicting and preventing pressure ulcers, and evidence from the articles I have appraised highlight teaching points that nurses may benefit from hearing. For example, the systematic review concluded that Braden Scale was over 80% accurate in determining at risk patients who were younger than 60, involved in hospital studies, and in the Caucasian population (Huang et al., 2021). For nurses that care for the adult hospitalized population, this is an important education point to include in teaching about the Braden Scale. This conclusion point highlights the fact that while the Braden Scale is a useful tool in determining pressure injury risk, additional assessment may be needed, especially for patients older than 60 or not of a Caucasian population, to accurately determine pressure ulcer risk. A thorough assessment is the best way for a nurse to

assess pressure ulcer risk and prevent its incidence, and the Braden Scale is an excellent assessment tool for this process. Another important education point that nurses may benefit from hearing is that the most common site for a pressure injury in older adults was the sacrococcygeal area, followed by the hip, and heels (Fu et al., 2023). Education in this area allows for nurses to prioritize these areas of the body in their assessment, which can further prevent the occurrence of pressure ulcers. To conclude, the appraisal of my two articles reveals that the Braden Scale is an accurate and helpful pressure ulcer assessment tool for nurses. Use of the Braden Scale identifies patients at risk for pressure injuries, allowing for prompt intervention to prevent their occurrence. With the use of this tool, adult patients will be safer and healthier in the hospital setting.

References

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