CONTENT VALIDATION OF PRESSURE INJURY PREVENTION ALGORITHM: TURKEY CASE

BASINÇ YARASI ÖNLEME ALGORİTMASININ KAPSAM GEÇERLİLİĞİ: TÜRKİYE ÖRNEĞİ

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Öz

Amaç: Basınç yarası önleme algoritması basınç yarası riskinin değerlendirilmesini, derinin değerlendirilmesini ve bakımının yapılmasını, aktivite, beslenme, ıslaklık/inkontinans, destek yüzey yönetiminin sağlanmasını, eğitim verilmesini ve kayıt tutulmasını kapsamalıdır. Bu uygulamaların hepsinin bir arada olduğu basınç yarası algoritmalarının geliştirilmesiyle bakım kalitesinin artacağı belirtilmektedir. Bu prospektif, tanımlayıcı çalışmanın amacı, geliştirilen basınç yarası önleme algoritmasının kapsam geçerliliğini incelemektir. Gereç ve Yöntem: Yıldırım Beyazıt Üniversitesi Ankara Atatürk Eğitim ve Araştırma Hastanesi'nde çalışan yoğun bakım hemşirelerinin tümü araştırmaya davet edilmiştir. Katılımcılardan yazılı izin alındıktan sonra, demografik veriler ve basınç yarası önleme algoritması hakkındaki görüşlerle ilgili veriler toplanmıştır. Katılımcılardan standart kapsam geçerlilik çalışma prosedürleri kullanılarak 101 algoritma karar adımlarının her birinin uygunluğunun değerlendirilmesi istenmiştir. Bulgular: Demografik veri istatistikleri, ortalama uygunluk skorları ve kapsam geçerlik indeksi (CVI) hesaplanmıştır. Davet edilen 96 yoğun bakım hemşiresinden 81'i araştırmaya katılmayı kabul ederek çalışmayı tamamlamıştır (% 84'lük bir yanıt oranı). Katılımcıların yaş ortalaması 28.35 (SS 4.55; aralık 22-41), çoğu katılımcı kadın (% 85.2) ve % 38.3'ü 5 yıldan fazla yoğun bakım deneyimi yaşamıştır. Algoritmanın genel ortalama puanı 3.02 (SS:0.02); kapsam geçerlilik indeksi 0,90 (1.0'dan) puan olarak belirlenmiştir. Tartışma: Basınç yarası önleme algoritması birkaç küçük değişiklikle geçerli ve uygundur. Kapsam geçerliliği yapılan basınç yarası önleme algoritması yoğun bakım hastaları için basınç yarası ve risklerini tanılama ve uygun hemşirelik girişimlerini yapmada hemşirelere yardımcı olabilir. Basınç yarası önleme algoritmasının daha büyük gruplarda uygulanması ve değerlendirilmesi önerilmektedir.

Anahtar Kelimeler

Basınç Yarası; Önleme; Algoritma; Kapsam Geçerlilik Çalışması

Abstract

Aim: Algorithms for preventing pressure injury should include skin care, activity management, nutrition management, moisture/incontinence management, support surface management, registration, and training. Increased quality of care can be observed through algorithms created through a combination of preventive care phases. Material and Method: The purpose of this prospective, descriptive study was to examine the content validity of the pressure injury prevention algorithm incorporating a combination of the preventive care stages and using a larger sample size of intensive care nurses. Material and Method: All of the intensive care nurses working in Yıldırım Beyazıt University Ankara Ataturk Training and Research Hospital were invited to participate in the study. After participants provided written informed consent, demographic variables and opinions on the pressure injury prevention algorithm were collected and participants were asked to comment on and rate the relevance and appropriateness of each of the 101 algorithm decision steps using standard content validation study procedures. Results: Descriptive summary statistics, mean appropriateness scores, and the content validity index (CVI) were calculated. Of the 96 intensive care nurses invited, 81 consented to participate and completed the study (a response rate of 84%). The mean age was 28.35 years (SD 4.55; range 22–41), most participants were female (85.2%), and (38.3%) had >5 years of intensive care experience. The algorithm's overall mean score was 3.02 (SD: 0.02); all except 1 of the 101 steps had a high CVI of 0.90 (out of 1.0). Several minor algorithm modifications were made. Discussion: The pressure injury prevention algorithm is valid and appropriate with the addition of the minor modifications. A construct validated pressure injury prevention algorithm may help nurses identify pressure injury and risks and also help them develop appropriate nursing interventions for intensive care patients. It is recommended that large group studies involving the application and evaluation of the pressure injury prevention algorithm be conducted.

Keywords

Pressure Injury; Prevention; Algorithm; Validation Study

DOI: 10.4328/JCAM.5018 Received: 07.04.2017 Accepted: 23.04.2017 Printed: 01.04.2017 J Clin Anal Med 2017;8(suppl 2): 175-81
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Introduction

A pressure injury is localized injury to the skin and/or underlying tissue, usually over a bony prominence, as a result of pressure, or pressure in combination with shear [1]. Pressure injury causes physical and psychological trauma by prolonging the healing process, delaying the responsibility of the individual, and increasing the effect of care. At the same time, unnecessary occupation of the hospital bed and increased workload brings additional financial burden to the institution [2,3].

Although pressure injury is an unwanted, preventable condition, it continues to be a worldwide problem despite highly trained staff and advances in medical technology and healthcare [4]. The extent of the problem can be seen by examining the literature. Incidents of pressure injury vary from 4.3% to 30.8% in international studies [5-10]. A multicenter study in Belgium, Italy, Portugal, United Kingdom, and Sweden, approved by the EPUAP (European Pressure Ulcer Advisory Panel) conducted national studies on pressure injury all over the world; 5947 patients were evaluated in 25 hospitals, and the average prevalence of pressure injury was determined to be 18.1%. Italy had the lowest rate at 8.3%, whereas Sweden had the highest at 23% [11]. In Turkey, studies in two different university hospitals found rates of 10,4% and 5,9%, respectively [8,9].

In health services, data on the incidence and prevalence of pressure injury can be used as an indicator for assessing the quality of care provided. Prevention and treatment require an interdisciplinary team with a holistic care approach [12-16]. The nurse's primary role as a member of this team is taking precautions to remove causative factors by evaluating the individuals at risk and factors that may prevent wound healing. Processes that should be followed to prevent the development of pressure injury include the evaluation of risk by skin assessment and preventive skin care like activity management, nutrition management, moisture/incontinence management, support surface management, training and registration with a holistic approach [1,12-19]. Among these methods, providing nursing care is most effective.

Nurses, who play a key role in preventing pressure injury, make numerous daily decisions in clinical practice that directly affect the outcomes of care. They make these decisions with the help of clinical instruments such as algorithms. Algorithms for preventing pressure injury should include skin care, activity management, nutrition management, moisture/incontinence management, support surface management, registration, and training. Increased quality of care can be observed by the use of algorithms, created through a combination of preventive care phases [1,20].

The purpose of this prospective, descriptive study was to examine the content validity of the pressure injury prevention algorithm generated by the combination of the preventive care stages, using a larger sample size of intensive care nurses.

Material and Method

Design. This prospective, descriptive study was constructed to obtain content validation data for the prevention injury prevention algorithm generated by the combination of the preventive care stages.

Sample and setting. All of the intensive care nurses working in Yıldırım Beyazıt University Ankara Ataturk Training and Research Hospital were invited to participate in the study. Sample inclusion criteria were relatively broad to encourage participation by a wide range of providers. Criteria included: licensed nursing, substantive (>1 years) intensive care experience, and/or wound care education. Participants did not receive financial compensation.

A total of 96 intensive care nurses were invited to participate through face-to-face interaction.. If they agreed to participate, they were given a confirmation form, an algorithm, and a study instrument. Volunteers were asked to complete the documents within one week.

Ethical considerations. Institutional permission was obtained from Yıldırım Beyazıt University Ankara Ataturk Training and Research Hospital. Study volunteers were asked to read a consent form and to provide written informed consent. Signed consent forms were collected and the algorithm surveys were distributed. Participants were asked to return consent forms within one week.

Instrumentation. The data collection survey comprised an instrument consisting of a 10-item demographic data form, a 6-item evaluation form for the pressure injury prevention algorithm, and the content validation questionnaire containing 101 statements matched to each of the 101 decision steps of the pressure injury prevention algorithm. The content validation survey asked participants to review the entire algorithm and to then read the statements related to each of the decision steps and rate their level of agreement with the relevance (appropriateness) of the item. A 4-point rating scale was used as per Lynn [21] and Waltz, Bausell (22): 4 = very relevant and appropriate; 3 = relevant but needs minor alteration; 2 = unable to assess relevance without revision; 1 = not relevant/appropriate. For each statement, participants were asked to add written comments for the changes they proposed.

Data collection procedures. Following an overview of the ethical considerations and a brief oral introduction about the history of the algorithm development and purpose of the study, participants signed and returned the consent forms. Each participant received the algorithm and the questionnaire. Participants reviewed the algorithm and then provided validation ratings and narrative comments. All participants completed and returned the survey within one week.

Data analysis. The questionnaire data were coded and entered into SPSS® Version 21.0 for analysis. Descriptive summary statistics were calculated for all demographic variables and the evaluation form for the pressure injury prevention algorithm. The Content Validity Index (CVI) and mean scores were calculated for each of the 101 individual algorithm components. CVI was calculated by grouping very relevant/relevant (ratings 3 and 4) and not relevant/unable to assess relevance (ratings 1 and 2). The proportion of items rated 3 and 4 was used to calculate the CVI; validity was indicated by a score of >0.70 (scale 0 to 1.0) [23,24].

Results

Participant characteristics. Of the 96 providers invited, 81 consented to participate and completed the study (a response rate of 84%). The majority (85.2%) of participants were female and

their mean age was 28.35 years (SD 4.55; range 22–41). Of the participants, 59.3% had a baccalaureate degree and 3.7% a masters degree. Thirty-one (38.3%) had 5 or more years of intensive care experience. Twenty-two (27.2%) encountered more than 5 patients weekly who had or were at risk for pressure injury.

Quantitative analysis. The calculated average item appropriateness score for the entire algorithm's decision points was 3.02, with an overall CVI of 0.90 (out of 1.0). Suggestions were made for five decision points/steps. Four participants suggested that the use of support surfaces should be explained. Two participants suggested that priority should be given to enteral feeding. Four participants suggested that the severity of the edema and the gode drop status should be added. Four participants suggested that the phrase "follow the age of 65 and above" should be added in front of "especially". Two participants suggested that the value of prealbumin should be added. Otherwise, quantitative data analysis found that the algorithm components and inherent decision processes are appropriate.

All participants gave written answers about the evaluation of the pressure injury prevention algorithm. Analysis of general answers produced themes such as comprehensive, feasible, necessary, and helpful in making clinical decisions about the strengths of the algorithm. Negative themes included complexity and taking a long time in practice.

Table 1. Study participant data (N = 81)

Nurses' Characteristics	N	%
Gender		
Male	12	14.8
Female	69	85.2
Age (in years)		
20-30	57	70.4
31-40	23	28.4
41-50	1	1.2
Professional degree		
Masters	3	3.7
Bachelor	48	59.3
Years of intensive care experience		
10–14	2	2.5
5–9	29	35.8
1-4	50	61.7
Average number of weekly patients treated who are at risk for or who have pressure injury		
≥5	22	27.2
3-4	16	19.8
1–2	43	53.1
Source of pressure injury education		
Wound care nurse	4	9.5
Conference	3	7.1
Journal	7	16.7
In-service training	28	66.7

Discussion

The best evidence-based practices for preventing pressure injury are approved by the European Pressure Ulcer Advisory Panel (EPUAP) and the National Pressure Ulcer Advisory Panel (NPUAP) under skin care, activity management, nutrition management, moisture/incontinence management, support surface management, training, and registration. Pressure injury prevention algorithms should include these approaches [1]. In this study, the content validation of the algorithm created by the combination of preventive care stages was done. To the author's knowledge, this is the first study in Turkey to examine the content validity of the Pressure Injury Algorithm generated by the combination of the preventive care stages.

Table 2. Content validation results: individual item score averages and content validity index (CVI)a

Item #/Decision statement/step	N	Average	SD	CVI
1. Assess the skin.				
(Within the first 8 hours after being admitted to the clinic)	81	4	0.00	1
1.a Color (Normal, Pale, Cyanotic, Jaundice, Redness)	81	4	0.00	1
1.b Moisture (Normal, Dry, Wet)	81	4	0.00	1
1.c Heat (Normal, Cold, Hot)	81	4	0.00	1
1.d Structure (Smooth, Rough, Thin, Thick, Flexible, Nervous, Sensitive, Susceptible to scratches)	81	4	0.00	1
1.e Edema (Yes,No)	81	3.62	0.58	0.95
1.f Turgor (Normal, Abnormal)	81	4	0.00	1
1.g Localized pain (Yes, No)	81	3.89	0.32	1
1. h Lesion (Yes, No)	81	4	0.00	1
2. Non-intact skin	81	4	0.00	1
2.a Follow the inflammation.	81	4	0.00	1
2.b Follow skin damage related to moisture.	81	4	0.00	1
2.c Follow the induration.	81	4	0.00	1
2.d Follow the partial and full-thickness skin loss.	81	4	0.00	1
3. Intact skin	81	4	0.00	1
4. Evaluate daily risk with holistic factors.	81	4	0.00	1
4.a Follow the Weight/BMI.	81	4	0.00	1
4.b Follow the fever.	81	4	0.00	1
4.c Follow age 65 and above.	81	3.37	0.58	0.95
4.d Follow the edema.	81	4	0.00	1
4.e Follow the Diastolic pressure <60mmHg.	81	4	0.00	1
4.f Follow the protein level.	81	4	0.00	1
4.g Follow the albumin level.	81	3.75	0.49	0.98
4.h Follow the hemodynamic instability.	81	4	0.00	1
4.i Follow the reduced activity level.	81	4	0.00	1
4. j Follow the comorbities.	81	4	0.00	1
5. Evaluate pressure-injury risk with a valid assessment (Braden, Norton vs.).	81	4	0.00	1
6. Evaluate change in each situation and daily risk with risk assessment tool.	81	4	0.00	1
7. Not at risk+Braden >18	81	4	0.00	1
7.a Daily; Continue skin assessment.	81	4	0.00	1
7.b Daily; Continue to use the Braden scale.	81	4	0.00	1
8. Yes, at risk + Braden≤18	81	4	0.00	1
9. Pressure injury	81	4	0.00	1
9.a Yes	81	4	0.00	1
9.b No	81	4	0.00	1
10. * Set the stage. *Use the template behind the algorithm to determine the stage.	81	4	0.00	1
10.a Stage II Pressure Injury	81	4	0.00	1

10.b Stage III Pressure Injury	81	4	0.00	1
10.c Stage IV Pressure Injury	81	4	0.00	1
10.d Unstageable Pressure Injury	81	4	0.00	1
10.e Deep Tissue Pressure Injury	81	4	0.00	1
10.f Mucosal Membrane Pressure Injury	81	4	0.00	1
11. Tell stoma and wound care nurse.	81	4	0.00	1
12. Stage I Pressure Injury	81	4	0.00	1
13. Perform preventive care.	81	4	0.00	1
14. Skin Care	81	4	0.00	1
14.a Keep the skin clean and at normal moisture.	81	4	0.00	1
14.b Clean the skin with a Ph stabilizing product.	81	4	0.00	1
14.c Protect skin with barrier product.	81	4	0.00	1
14.d Do not rub skin strongly, do not massage.	81	3.86	0.34	1
14.e Evaluate the pressure regions in contact with the medical device at least twice a day.	81	4	0.00	1
14.f Ensure that the sheets are kept clean, stretched, and dry.	81	4	0.00	1
15. Activity Management	81	4	0.00	1
15.a Change position at least every 2 hours.	81	4	0.00	1
15.b Give 30° right side, back side, 30° left side respectively.	81	4	0.00	1
15.c If there is no objection, give a supine position.	81	4	0.00	1
15.d Do not rotate to the area of redness.	81	3.93	0.24	1
15.e Prevent the individual from rubbing the skin while positioning.	81	4	0.00	1
15.f Do not position medical devices so they will cause pressure.	81	4	0.00	1
15.g Support the body region where medical devices are located.	81	4	0.00	1
15.h Do not give 90° side position - semi-seated position.	81	4	0.00	1
15. i Support the extremities.	81	4	0.00	1
16. Nutrition Management	81	4	0.00	1
16.a Provide the diary / nutrition nurse to organize the daily diet together.	81	4	0.00	1
16.b Provide individual nutrition (enteral/parenteral).	81	3.64	0.53	0.98
16.c Evaluate the daily nutritional status.	81	4	0.00	1
16.d Follow the weekly albumin / CRP values.	81	4	0.00	1
16.e Evaluate the state of dehydration.	81	4	0.00	1
17. Moisture/Incontinence Management	81	4	0.00	1
17.a Minimize skin contact with urine / feces.	81	4	0.00	1
17.b Avoid excessive skin moisture.	81	4	0.00	1
17.c Use barrier products.	81	4	0.00	1
18. Support Surface Management	81	4	0.00	1
18.a Use a support surface for individuals in need.	81	3.56	0.50	1
18.b Use a support surface that matches the characteristics and risk factors of the individual.	81	3.40	0.59	0.95
19. PRESSURE INJURY STAGING	81	4	0.00	1
20. Stage 1 Pressure Injury				
Non-blanchable erythema of intact skin	81	4	0.00	1
20.a Intact skin with non-blanchable redness of a localized area usually over a bony prominence.	81	4	0.00	1
20.b The area may be painful, firm, soft, warmer, or cooler as compared to adjacent tissue.	81	4	0.00	1
20.c Darkly pigmented skin may not have visible blanching.	81	4	0.00	1
21. Stage 2 Pressure Injury				
Partial-thickness skin loss with exposed dermis.	81	4	0.00	1
21.a Partial-thickness loss of skin with exposed dermis.	81	4	0.00	1
21.b The wound is superficial.	81	4	0.00	1
21.c The wound bed is red-pink in color and has no yellow, brown necrotic tissue.	81	4	0.00	1
21.d It can also be seen as bulbs filled with solid or explosive liquid.	81	4	0.00	1
22. Stage 3 Pressure Injury				
Full-thickness skin loss	81	4	0.00	1
22.a Full-thickness loss of skin.	81	4	0.00	1
22.b Subcutaneous tissue can be seen in the wound bed, but bones, tendons, and muscles are not affected.	81	4	0.00	1
22.c Slough and/or eschar may be visible.	81	4	0.00	1
22.d Undermining and tunneling may occur.	81	4	0.00	1
23. Stage 4 Pressure Injury				
Full-thickness skin and tissue loss	81	4	0.00	1
23.a Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage, or bone in the ulcer.	81	4	0.00	1
23.b Slough and/or eschar may be visible.	81	4	0.00	1
23.c Undermining and/or tunneling often occur.	81	4	0.00	1
24. Unstageable Pressure Injury				
Obscured full-thickness skin and tissue loss	81	4	0.00	1
24.a Full-thickness skin and tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar.	81	4	0.00	1
25. Deep Tissue Pressure Injury				
Persistent non-blanchable deep red, maroon, or purple discoloration	81	4	0.00	1
25.a Intact or non-intact skin with localized area of persistent non-blanchable deep red, maroon, purple discoloration, or epidermal separation revealing a dark wound bed or blood filled blister.	81	4	0.00	1
25.b The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer, or cooler as compared to adjacent tissue.	81	4	0.00	1
26. Mucosal Membrane Pressure Injury	81	4	0.00	1
26.a Mucosal membrane pressure injury is found on mucous membranes with a history of a medical device in use at the location of the injury. Due to the anatomy of the tissue these injuries cannot be staged.	81	4	0.00	1

a Rating scale scores: 4 = very relevant and appropriate; 3 = relevant but needs minor alteration; 2 = unable to assess relevance without revision; 1 = not relevant (appropriate). PU=pressure ulcer; CVI range = 0–1; CVI >0.70 = generally valid

The study provided content validation data and an overview of strengths and areas of challenge. CVI (0.90 out of 1.0) of the pressure injury prevention algorithm for use in adults were strong, suggesting the components were appropriate to the purpose of the instrument. Suggestions were recived for five decision point/steps; support surfaces should be explained, priority should be given to enteral feeding, the severity of the edema and the gode drop status should be added, the phrase “especially” should be added in front of “follow the age of 65

and above", and the value of prealbumin should be added. Otherwise, quantitative data analysis found that the algorithm components and inherent decision processes are appropriate.

Following a careful review of all results, several minor algorithm modifications were made. The severity of the edema was added to the pressure injury prevention algorithm with the recommendation of "The severity of the edema and the gode drop status should be added". "Especially" was added in front of the phrase "Follow the age of 65 and above" by the participants' suggestions. "Firstly enteral then parenteral" was added to the pressure injury prevention algorithm by the participants' suggestions. The value of prealbumin was added to the pressure injury prevention algorithm based on the participants' suggestions.

face management. Thus, we undertook the establishment of a more comprehensive pressure injury prevention algorithm. As a result, necessary arrangements were made and the algorithm was prepared in its final form (see Figure 1/2).

Participants comments were generally supportive and positive. The few negative comments were used to tweak the structure of the algorithm to support its effectiveness.

Limitations

The pressure injury algorithm was designed to focus on adults and cannot be suggested for safe use in pediatric and/or neonatal populations.

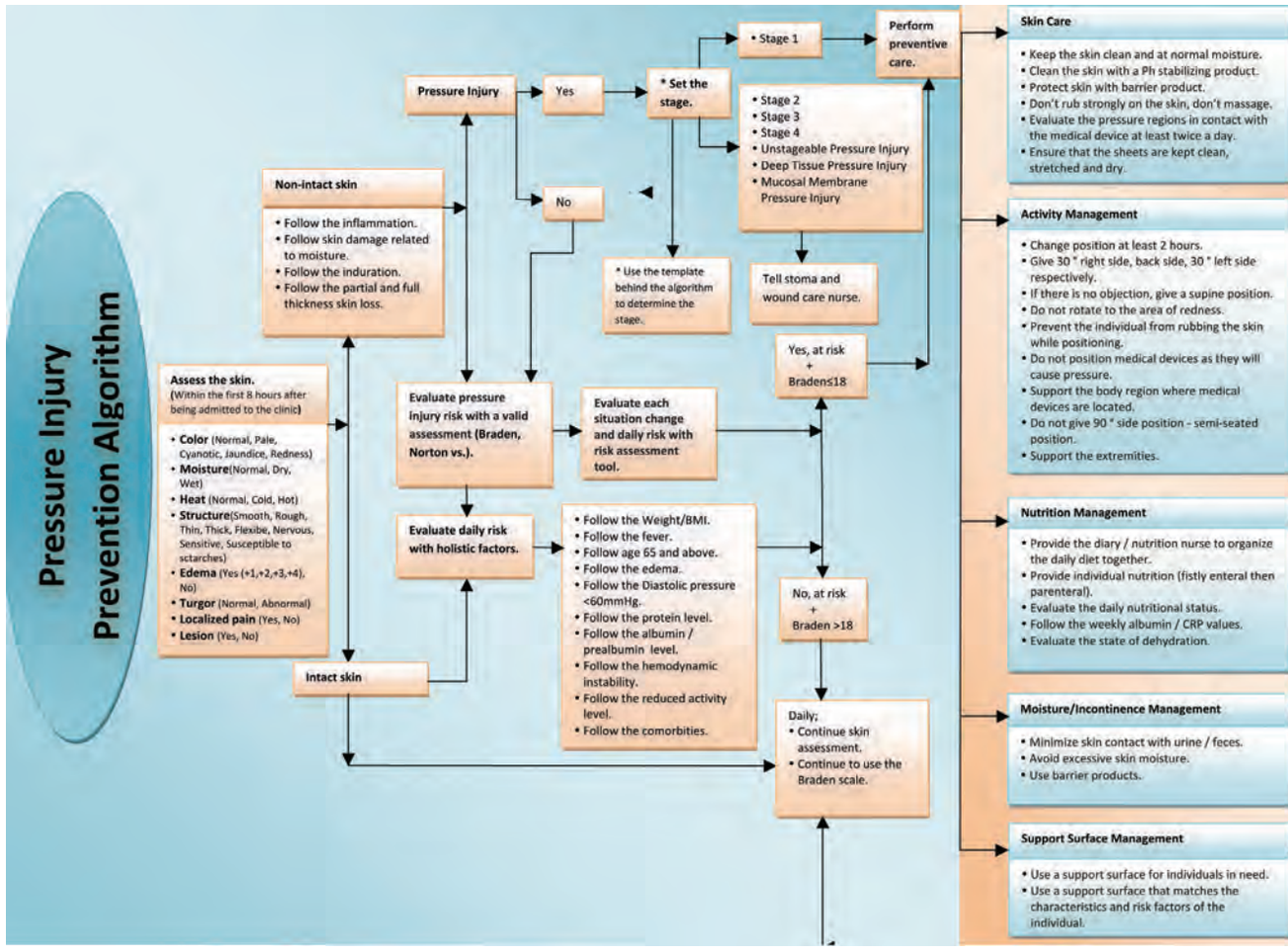


Figure 1. Pressure Injury Prevention Algorithm.

Since the support surface is not used in the institution, no information was reported on this issue. So the participants suggest explaining the support surfaces. Algorithms aren't comprehensive, but are ideal to identify appropriate management strategies, to communicate a complex set of conditional expressions, and to help translate research into clinical practice [25]. The other content validation study participants indicated they were pleased with the easy-to-follow steps and were interested in algorithmic guidelines, but that they would require more detail in some action steps [26]. In this study, an algorithm was created that includes a combination of preventive care stages such as skin care, activity management, nutrition management, moisture / incontinence management, and support sur-

Conclusion

In conclusion, strategies for preventing pressure injury include skin care, activity management, nutrition management, moisture/incontinence management, support surface management, registration, and training. Increased quality of care can be observed through the use of algorithms that were created through a combination of preventive care phases. In this study, the content validation of the algorithm created by the combination of preventive care stages was determined. The results of the study of content validation involving 81 intensive care nurses were similar to results in the literature. The algorithm's overall mean score was 3.02 (SD: 0.02). All except 1 of the 101 steps had a high CVI (average 0.90), indicating that the pressure injury pre-

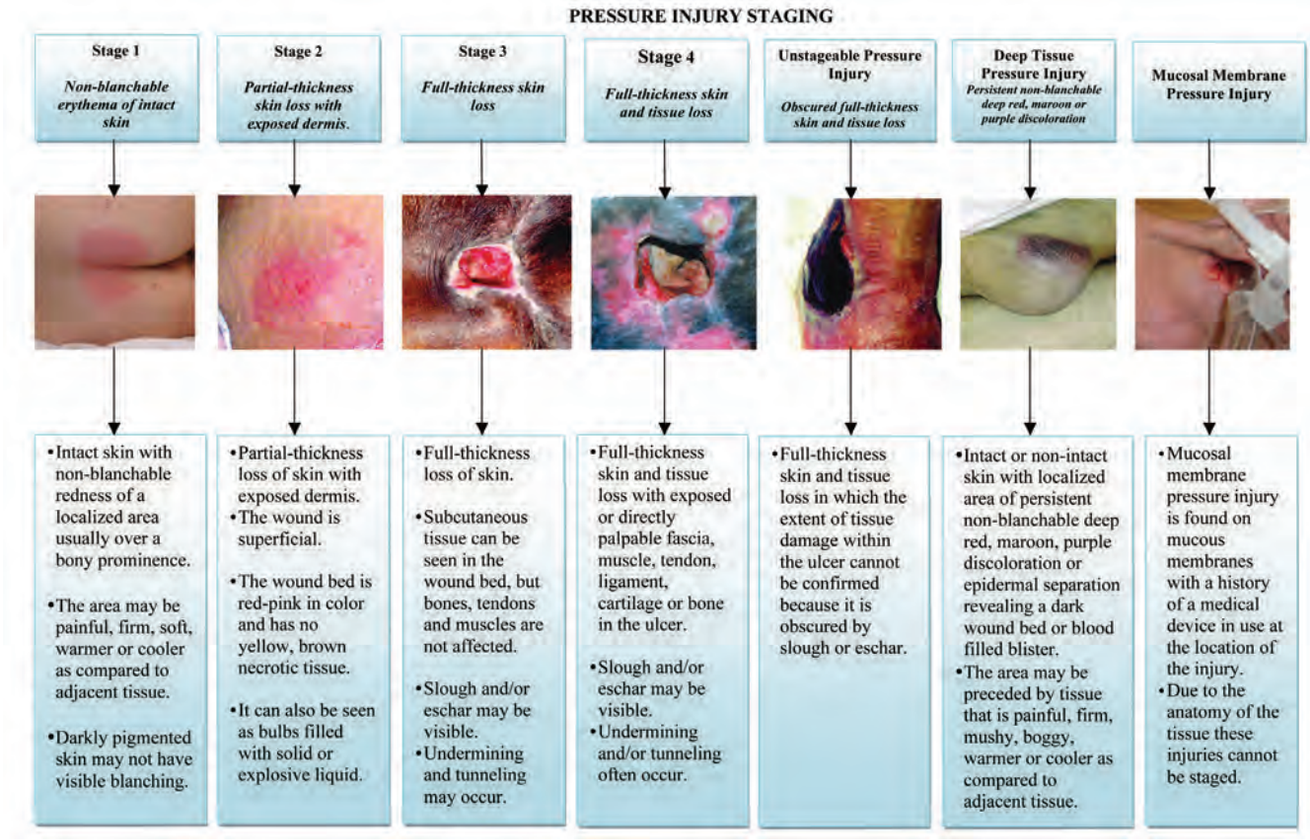


Figure 2. Pressure Injury Prevention Algorithm-Pressure Injury Staging

vention algorithm is valid and appropriate with the addition of the minor modifications. A construct validated pressure injury prevention algorithm may help nurses identify pressure injury and risks and also help them develop appropriate nursing interventions for intensive care patients. We recommend carrying out large-group studies involving the application and evaluation of the pressure injury prevention algorithm.

Competing interests

The authors declare that they have no competing interests.

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How to cite this article:
Yılmazer T, Bulut H. Content Validation of a Pressure Injury Prevention Algorithm in Turkey. J Clin Anal Med 2017;8(suppl 2): 175-81.