ASAUMS Press

AJAH
Avicenna Journal of Aging and Healthcare
Avicenna J Aging Healthc, 2023; 1(1):23-27. doi:10.34172/ajah.5
https://ajah.asaums.ac.ir

Original Article

The Effect of Planned Nursing Care on the Development and Severity of Pressure Ulcers in Elderly Patients: An Interventional Study

Zahra Razani[1], Marzieh Aslani[2*], Gholamhosein Falahinia[3], Alireza Soltanian[4], Mahnaz Khatiban[5]

[1]Department of Physiology, Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Mashhad, Iran
[2]Department of Nursing, Faculty of Paramedicine, Asadabad School of Medical Sciences, Asadabad, Iran
[3]Department of Internal Surgery Nursing, School of Nursing and Midwifery, Research Center for Chronic Disease Care at Home, Hamadan University of Medical Sciences, Hamadan, Iran
[4]Department of Biostatistics, Faculty of Health, Non-Communicable Disease Modeling Research Center, Hamadan University of Medical Sciences, Hamadan, Iran
[5]Department of Internal Nursing, Faculty of Nursing and Midwifery, Maternal and Child Care Research Center, Hamadan University of Medical Sciences, Hamadan, Iran

Article history:
Received: November 1, 2023
Accepted: November 13, 2023
ePublished: December 29, 2023

***Corresponding author:**
Marzieh Aslani,
Email: aslanm63@yahoo.com

Abstract

Introduction: Pressure ulcer is one of the common problems in hospitals, especially in long-stay inpatient departments and intensive care units. This study was conducted with the aim of investigating the effect of planned nursing care on the occurrence and severity of pressure ulcers in patients admitted to the intensive care units.

Methods: In this interventional study, 80 patients were gradually placed in two control and experimental groups. The participants of the experimental group received the care plan based, while the participants of the control group received only the daily and routine care plan. The rate of pressure ulcer development was evaluated based on the scale of the International Pressure Ulcer Society. The data were analyzed using chi-square test and Fisher's exact test in SPSS version 16 software.

Results: The relative and absolute frequency distribution of the research units according to the presence or absence of pressure ulcers after the intervention showed that pressure ulcers in the experimental group decreased significantly ($P \leq 0.05$). Also, the difference in the severity of pressure ulcers in the two groups indicated that the intervention reduced the degree, severity, and depth of pressure ulcers.

Conclusion: Carrying out planned care in patients who have a high risk of pressure ulcers will reduce the possibility of pressure ulcers, especially with high severity and degree. Therefore, applying the principles of pressure ulcer prevention by the care team is emphasized and recommended for patients who are not able to do this themselves.

Keywords: Intensive care unit, Nursing care, Pressure ulcer

Please cite this article as follows: Razani Z, Aslani M, Falahinia G, Soltanian A, Khatiban M. The effect of planned nursing care on the development and severity of pressure ulcers in elderly patients: an interventional study. Avicenna Journal of Aging and Healthcare, 2023; 1(1):23-27. doi: 10.34172/ajah.5

Introduction

Today, pressure ulcers are the third most expensive disease after cancer and cardiovascular diseases. Pressure ulcer is a potential complication of patients hospitalized in special departments, and its prevention is of great importance (1). Pressure ulcers can increase the quality of life due to pain, management methods and increased length of hospital stay. Therefore, any intervention that may help to prevent or treat pressure ulcers may be important to reduce the cost of care and increase the quality of life of the affected people (2). A pressure ulcer is created on the surface of the skin for a long time due to pressure more than the normal pressure of the capillaries (32 mm of mercury), and if it continues, it will cause necrosis of a part of the soft tissue (3). Every year, more than 1.3 million adults suffer from pressure ulcers (4). In Iran, the statistics of pressure ulcers in the intensive care unit (ICU) are 5.2 to 22.7 (5). Studies show that the prevalence of pressure ulcers is very high

among people aged between 61-80 years, most of which occur in the first 2 weeks of hospitalization (6). Patients admitted to the ICU are at a higher risk of developing pressure ulcers than patients admitted to the general care unit. Studies show that the prevalence of this disease in patients admitted to the ICU is 4%-49% (7). Patients hospitalized in this department are permanently confined to the bed for a long time and are limited in terms of physical activity and movement. Also, by reducing the ability to change its condition, their skin is exposed to long-term and intense pressure (8). Another issue that these patients face is the reduction of sensory perception due to anesthesia and receiving sedatives. Sensory perception is related to the level of consciousness and skin sensation the patient may not be able to understand the pain caused by intense pressure and independently change the position or request to change the position. This increases the risk of pressure ulcers (9). The prevalence of pressure ulcers and the death rate have a significant relationship with it. The death rate in these patients is 2% to 6% higher than in patients without wounds. The most common cause of death in patients with chronic pressure ulcers is kidney failure and amyloidosis, and in people with acute pressure ulcers, the presence of accompanying diseases (10). On the other hand, families, healthcare centers, and society are significantly affected by the physical, mental, financial, and social complications and consequences caused by pressure ulcers (11). Considering these cases, in this research we decided to evaluate the impact of planned nursing care on the development and severity of pressure ulcers in patients hospitalized in special wards.

Materials and Methods

The current research is a semi-experimental study that was carried out in Shahid Beheshti Medical Teaching Hospital in Hamadan in 2018, after the approval of the research project by the Ethical Committee of Hamadan University of Medical Sciences. The population of this research consisted of all patients hospitalized in the ICU of this hospital. The criteria for entering the study include not having a pressure ulcer at the beginning of the study, having a pressure ulcer risk score below 15 based on the Braden Scale, not having a history of diabetes and advanced cardiovascular diseases, not having an albumin level below 3 grams per deciliter, not having fever and having a body mass index (BMI) between 30 and 18. Also, people who died and were discharged during the study, people with severe water and electrolyte disorders, and people with food intolerance for more than two days were excluded from the study. Eighty qualified people were selected through gradual sampling and were placed in two experimental and control groups. Participants of both experimental and control groups were divided into two subgroups of very high risk (with Braden score of 6-10) and high risk subgroup (with Braden score of 10-15) based on the calculated Braden score. It should be noted that Braden's criteria measures the risk of developing pressure ulcers based on activity, mobility, sensory perception, nutrition, humidity, and friction. Each area in Braden's criteria is scored from good (4) to very bad (1). Low scores indicate the higher risk. Based on this score, patients are classified as low risk (16-18), medium risk (13-15) and high risk (12-10) (12). In the intervention group, the planned care program was set up and implemented based on the axis of the skin form monitoring scale, which includes changing the position every 3 hours according to the patients' position standards, using pressure-reducing surfaces with air rings in pressure points such as the heel. Sacrum and back of the head, observing the skin every shift and controlling and reducing its humidity every 3 hours, changing clothes and sheets if they are wet during the shift, using pillows to position the shoulders and legs to prevent bone areas from touching each other, checking the perineum area every 3 hours and washing and drying it if it is dirty, checking all the connections of the patient every 3 hours to prevent continuous contact with part of the patient's skin. In the control group, the care program was carried out in the form of what was routine and common in the department. In both groups, the rate of pressure ulcer formation in patients was checked by the researcher in each shift based on the scale of the International Association of Pressure Ulcers, and the result was entered in a special form. After collecting the data, the data were analyzed using statistical methods of chi-square test and Fisher's exact test by SPSS version 16 software.

Results

In general, there were 47 (58.75%) men and 33 (41.25%) women in this study, most of them were in the age range of 70-80 years. The average amount of albumin in the studied patients was evaluated as 3.58 and the average amount of hemoglobin at the time of entering the study was 12.36. Also, the average creatinine in these patients was 1.44 (Table 1).

In this study, 30% of all patients (40% of the control group and 20% of the experimental group) had pressure

Table 1. Demographic Information Related to the Research Subjects

Variable	Group		Total
	Experimental (%)	Control (%)	
Gender			
Female	17 (42.5)	16 (40)	33 (41.25)
Male	23 (57.5)	24 (60)	47 (58.75)
Age			
30-39	3 (7.5)	4 (10)	
40-59	9 (22.5)	8 (20)	
60-69	10 (25)	8 (20)	
70-80	18 (45)	20 (50)	
Variable	**Experimental (%)**	**Control (%)**	**Average**
Albumin	3.435 ± 0.353	3.28 ± 0.332	3.58
Hemoglobin	12.373 ± 2.763	12.354 ± 1.544	12.36
Creatinine	1.639 ± 1.549	1.241 ± 0.634	1.44

ulcers, and 70% were without ulcers, and using the chi-square test, a statistically significant difference between the two groups was observed ($P \leq 0.05$). Out of 24 people with pressure ulcers, 10 people (41.7%) experienced first-degree pressure ulcers during the five days of the study, of which 3 people were in the control group and 7 people were in the experimental group. On the other hand, 14 people (58.3%) developed second-degree pressure ulcers, the number of people in the control group was 13, and only one person from the experimental group showed second-degree pressure ulcers. Fisher's exact test evaluated this difference between the two groups as significant ($P < 0.05$; Table 2).

In relation to the location of the pressure ulcer, based on the observations, the highest percentage of ulceration occurred in the sacrum in both groups. All eight patients of the test group experienced a wound in the sacrum, while in the control group, the wound in the shoulder area after the sacrum accounted for the highest percentage. None of the patients in the test group had ulcers in the knee, ankle, shoulder, or earlobe. Although at least one patient with ulcers in these areas was observed in the control group. Using Fisher's exact test for all locations, there was no statistically significant difference ($P > 0.05$) in the percentage of ulcer formation and non-ulcer formation in the pressure ulcer sites of the studied patients in the two control and test groups (Table 3).

Discussion

In the current study, the effect of planned nursing care on the development and severity of pressure ulcers in patients admitted to the ICU of Shahid Beheshti Teaching-Therapeutic Hospital in Hamadan city was evaluated. With increasing age, the percentage of disease also increases. One of the diseases that occur in the elderly is pressure ulcer, because these people stay in bed for a long time due to their inability to move. Pressure ulcers have many complications not only for the patient, but also increase the workload of health workers, especially nurses (13). Therefore, prevention and treatment of pressure ulcers is of great importance. In this study, the incidence of pressure ulcers between the control and experimental groups showed a significant difference, which was in line with the study of Paryad et al in which, the research was conducted on 70 immobile patients prone to pressure ulcers and it was found that 87.1% of the patients had the optimal quality of care in the prevention of pressure ulcers and also between the number of days of hospitalization and the quality of the care process a significant difference was observed (14). Also, in a study conducted by Xiao et al in 2021 on 132 elderly patients over 65 years of age, the people in the experimental group who received integrated care in addition to routine care had significantly less pressure ulcers than in the control group, they showed less. In this research, 14 people out of 66 people in the control group had pressure ulcers, while this figure was only 2 people in the experimental group (15). Among the factors that cause pressure ulcers are friction, skin condition, and pressure, among which pressure mainly depends on the duration and force applied to a person's body (16). Among the factors that reduce the pressure on the patient's skin is changing the position. Still et al. state that changing the position of the patient can lead to a decrease in the depth and degree of the pressure ulcer, which can result from a decrease in the pressure on the patient's skin (17). Skin moisture plays an important role in the development of pressure ulcers. The amount of moisture increases where the body's skin is in constant contact with the bed (that is, the conditions faced by sedentary and elderly patients) (18). The moisture of the skin leads to a decrease in its power against risks such as tearing or damage caused by pressure. In fact, when the skin gets warm and moist, its mechanical strength is lost. For example, a temperature of 35°C leads to a 25% decrease in the mechanical

Table 2. Frequency Distribution of the Research Units According to Pressure Ulcer and the Severity of the Ulcer in the Control and Experimental Groups

Variable	Group		*P* Value
	Experimental (%)	Control (%)	
Pressure ulcer			≤0.05
Have not	32 (80)	24 (60)	
Have	8 (20)	16 (40)	
Severity of ulcer			<0.05
Grade 1	7 (87.5)	3 (18.8)	
Grade 2	1 (12.5)	13 (81.2)	

Table 3. Distribution of the frequency of research units according to the location of the pressure ulcer after the intervention

Location of the pressure ulcer		Group		*P* Value
		Experimental (%)	Control (%)	
Sacrum	Have not	0 (0)	1 (6.2)	>0.05
	Have	8 (100)	15 (93.8)	
Gluteal muscle	Have not	7 (87.5)	10 (62.5)	>0.05
	Have	1 (12.5)	6 (37.5)	
Ankle	Have not	8 (100)	14 (87.5)	>0.05
	Have	0 (0)	2 (12.5)	
Knee	Have not	8 (100)	14 (87.5)	>0.05
	Have	0 (0)	2 (12.5)	
Heel	Have not	7 (87.5)	11 (68.8)	>0.05
	Have	1 (12.5)	5 (31.2)	
Iliac	Have not	5 (62.5)	12 (75)	>0.05
	Have	3 (37.5)	4 (25)	
Auricle	Have not	8 (100)	13 (81.2)	>0.05
	Have	0 (0)	3 (18.8)	
Scapula	Have not	8 (100)	9 (56.2)	>0.05
	Have	0 (0)	7 (43.8)	
Scalp	Have not	7 (87.5)	12 (75)	>0.05
	Have	1 (12.5)	4 (25)	
Elbow	Have not	7 (87.5)	14 (87.5)	>0.05
	Have	1 (12.5)	2 (12.5)	

strength of the skin (19). On the other hand, textiles have an undeniable role in the healthcare sector. In many cases, the quality of life of disabled and elderly people can be improved by choosing better functional clothes and quality textile products. Because in elderly people, even relatively moderate friction on the skin can lead to pressure ulcers due to its fragile and delicate skin (20). The results of the current study showed a significant difference in the incidence and prevalence of pressure ulcers between the experimental and control groups. Considering that the special care program based on Skin's approach was carried out on the patients of the experimental group and considering the factors that cause pressure ulcers, which include pressure, moisture, friction, etc., it seems that the care program implemented on the people of the experimental group were effective in the prevention and treatment of pressure ulcers. But considering the fact that nurses' knowledge and attitude towards pressure ulcers are insufficient (21), it seems that it is necessary to focus on general and continuing education. Also, further development of educational programs can lead to significant improvement in the quality of care provided.

Conclusion

The obtained findings indicate that carrying out planned care in patients who have a high risk of pressure ulcers will reduce the possibility of pressure ulcers, especially with high severity and degree. Therefore, it is emphasized and recommended to use the principles of pressure ulcer prevention by the care team for patients who do not have the ability to do this themselves. Also, the use of new and appropriate methods in the form of implementation of planned care is important and necessary, which should be considered by the medical staff of hospitals.

Acknowledgments

Hereby, the researchers express their utmost gratitude and appreciation to the esteemed Vice Cancellor of research at Hamadan University of Medical Sciences, the officials and the medical staff of Shahid Beheshti Educational-Treatment Center in Hamadan.

Author's Contribution

Conceptualization: Marzieh Aslani, Gholamhosein Falahinia.
Data curation: Marzieh Aslani.
Formal analysis: Marzieh Aslani.
Funding acquisition: Gholamhosein Falahinia.
Investigation: Zahra Razani.
Methodology: Zahra Razani.
Project administration: Gholamhosein Falahinia.
Resources: Gholamhosein Falahinia.
Software: Marzieh Aslani.
Supervision: Gholamhosein Falahinia.
Validation: Alireza Soltanian.
Visualization: Alireza Soltanian.
Writing–original draft: Zahra Razani, Marzieh Aslani, Gholamhosein Falahinia, Alireza Soltanian, Mahnaz Khatiban.
Writing–review & editing: Zahra Razani, Marzieh Aslani, Gholamhosein Falahinia, Alireza Soltanian, Mahnaz Khatiban.

Competing Interests

This article has no conflict of interest.

Ethical Approval

This study approved by the Ethical Committee of Hamadan University of Medical Sciences with the ethical code IR.UMSHA.REC.1394.249.

Funding

This study was funded by Deputy of Research and Technology in Hamadan University of Medical Sciences with funding number 9406313539.

References

1. Dealey C, Brindle CT, Black J, Alves P, Santamaria N, Call E, et al. Challenges in pressure ulcer prevention. Int Wound J. 2015;12(3):309-12. doi: 10.1111/iwj.12107.
2. Saghaleini SH, Dehghan K, Shadvar K, Sanaie S, Mahmoodpoor A, Ostadi Z. Pressure ulcer and nutrition. Indian J Crit Care Med. 2018;22(4):283-9. doi: 10.4103/ijccm.IJCCM_277_17.
3. Gibbons W, Shanks HT, Kleinhelter P, Jones P. Eliminating facility-acquired pressure ulcers at Ascension Health. Jt Comm J Qual Patient Saf. 2006;32(9):488-96. doi: 10.1016/s1553-7250(06)32064-8.
4. Amirifar S, Reza Masouleh S, Pourshikhian M, Monfared A, Kazemnejad Leili E. Predictive value of Braden scale in pressure ulcer occurrence in hospitalized patients. J Holist Nurs Midwifery. 2013;23(2):8-15. [Persian].
5. Saifollahi Z, Bolourchifard F, Borhani F, Ilkhani M, Jumbarsang S. Correlation between nurses' knowledge and quality of nursing care for prevention of pressure ulcers in intensive care units. J Hayat. 2016;22(1):90-101. [Persian].
6. Pachá HHP, Faria JIL, Oliveira KA, Beccaria LM. Pressure ulcer in intensive care units: a case-control study. Rev Bras Enferm. 2018;71(6):3027-34. doi: 10.1590/0034-7167-2017-0950.
7. Shahin ES, Dassen T, Halfens RJ. Pressure ulcer prevalence and incidence in intensive care patients: a literature review. Nurs Crit Care. 2008;13(2):71-9. doi: 10.1111/j.1478-5153.2007.00249.x.
8. Choudry U, Murphy M, Boland P. Implementation of a successful pressure ulcer prevention (PUP) program in a tertiary care hospital. Plast Reconstr Surg. 2014;134(4 Suppl 1):104-5. doi: 10.1097/01.prs.0000455461.16690.aa.
9. Fleck C. Pressure ulcers: risks, causes, and prevention. Extended Care Product News. 2005;105:32-40.
10. Ahmadinejad M, Rafiei H. Pressure ulcer incidence in intensive care unit patients in Bahonar hospital, Kerman. J Iran Soc Anaesthesiol Intensive Care. 2011;57(10):10-6. [Persian].
11. Bansal C, Scott R, Stewart D, Cockerell CJ. Decubitus ulcers: a review of the literature. Int J Dermatol. 2005;44(10):805-10. doi: 10.1111/j.1365-4632.2005.02636.x.
12. Potter PA, Perry AG, Stockert PA, Hall A. Clinical Companion for Fundamentals of Nursing-E-Book. Elsevier Health Sciences; 2009.
13. Langemo D, Haesler E, Naylor W, Tippett A, Young T. Evidence-based guidelines for pressure ulcer management at the end of life. Int J Palliat Nurs. 2015;21(5):225-32. doi: 10.12968/ijpn.2015.21.5.225.
14. Paryad E, Jahanshahi M, Jafroodi S, Kazem Nezhad E. Survey of the quality of care in provided in prevention of pressure sores in hospitalized patients in orthopedic wards. J Guilan Univ Med Sci. 2005;14(53):36-42. [Persian].
15. Xiao F, Peng H, Li Y. The preventive effect of seamless nursing care on pressure ulcer and related complications in elderly inpatients. Am J Transl Res. 2021;13(4):3515-21.
16. Latimer S, Chaboyer W, Gillespie B. Pressure injury prevention strategies in acute medical inpatients: an observational

study. Contemp Nurse. 2016;52(2-3):326-40. doi: 10.1080/10376178.2016.1190657.
17. Still MD, Cross LC, Dunlap M, Rencher R, Larkins ER, Carpenter DL, et al. The turn team: a novel strategy for reducing pressure ulcers in the surgical intensive care unit. J Am Coll Surg. 2013;216(3):373-9. doi: 10.1016/j.jamcollsurg.2012.12.001.
18. Meinander H, Varheenmaa M. Clothing and Textiles for Disabled and Elderly People. VTT Tiedotteita; 2002.
19. Sikka MP, Garg S. Functional textiles for prevention of pressure ulcers–a review. Res J Text Appar. 2020;24(3):185-98. doi: 10.1108/rjta-10-2019-0047.
20. Cullum N, Deeks JJ, Fletcher AW, Sheldon TA, Song F. Preventing and treating pressure sores. Qual Health Care. 1995;4(4):289-97. doi: 10.1136/qshc.4.4.289.
21. Grešš Halász B, Bérešová A, Tkáčová Ľ, Magurová D, Lizáková Ľ. Nurses' knowledge and attitudes towards prevention of pressure ulcers. Int J Environ Res Public Health. 2021;18(4):1705. doi: 10.3390/ijerph18041705.