Medical Science

pISSN 2321–7359; eISSN 2321–7367

Evaluation of factors affecting pressure ulcers in patients with brain – Spinal injuries: A cross-sectional descriptive study

Masoud Hatefi[1], **Khalil Komlakh**[2]✉

To Cite:
Hatefi M, Komlakh K. Evaluation of factors affecting pressure ulcers in patients with brain – Spinal injuries: A cross-sectional descriptive study. Medical Science, 2022, 26, ms73e2056.
doi: https://doi.org/10.54905/disssi/v26i121/ms73e2056

Author Affiliation:
[1]Associate Professor of Neurology, School of Medicine, Emam Khomeini Hospital, Ilam University of Medical sciences, Ilam, Iran
[2]Assistant Professor of Neurosurgery, Department of Neurosurgery, School of Medicine, Imam Hossein Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran

✉**Corresponding author**
Assistant Professor of Neurosurgery, Department of Neurosurgery, School of Medicine, Imam Hossein Hospital,
Shahid Beheshti University of Medical Sciences, Tehran, Iran
Email: khalil.komlakh@yahoo.com

Peer-Review History
Received: 5 January 2022
Reviewed & Revised: 6/January/2022 to 13/February/2022
Accepted: 15 February 2022
Published: 23 February 2022

Peer-review Method
External peer-review was done through double-blind method.

URL: https://www.discoveryjournals.org/medicalscience

ABSTRACT

Background: Due to the importance of pressure ulcers (PUs), this study was performed to determine the status of pressure ulcers in patients admitted to hospitals in Ilam. *Methods:* This is a cross-sectional descriptive study that was conducted (sample size=220). Researchers obtained a list of discharged patients from hospitals and contacted patients or their companions. The instruments included a demographic profile form and the Braden Scale for Predicting PU Risks. Data analysis was SPSS ver. 16 software. *Results*: It showed most of the patients achieved scores in poor and low risk status. Also, the overall score for risk of Pus was low, moderate, and high, and very high in 28 (12.7%), 81 (36.7%), 105 (47.7%), and 6 (2.7%) of cases, respectively. The total mean ± SD of patients with and without Pus was 10.18 ± 0.77 and 13.01 ± 1.40, respectively. Also, there was a significant difference between patients with and without Pus in terms of the mean ± SD of scores obtained in all items of this instrument, except friction and shear ($P<0.05$). *Conclusions:* Due to the identification of factors affecting the development of pressure ulcers, it is necessary to take the necessary interventions to reduce them.

Keywords: Neuroscience, Pressure ulcers, Spinal cord injury

1. INTRODUCTION

Pressure ulcers (PUs) are one of the complications of chronic diseases among patients who are immobile and despite technological healthcare advances, the incidence of Pus is high and it is an important challenge and problem in the health care system (Anthony et al., 2020; Esparza et al., 2021). Pus is actually a type of tissue damage caused by pressure and can involve the skin, muscle, soft tissue, cartilage and bone. The prevalence of Pus has increased worldwide, which doubles the need to pay attention to this group. In this regard, results of a meta-analysis study on 5973 Iranian patients showed that the prevalence of Pus was 19% (Soozani & Raei, 2012). The main groups prone to Pus include in patients, especially surgical patients, seniors, ICU patients, patients with spinal cord injuries, as well as immobile patients such as stroke patients (Sallam et al., 2020; Xiao & Peng, 2021).

DISCOVERY SCIENTIFIC SOCIETY

One of the causes of Pus is trauma. Considering the current advanced world and the role of tools and machines in people's lives, trauma is important pathogens. Traumatic injury is an injury caused by the person him/herself or by a foreign object (Comeshtappeh & Ganji, 2018). Trauma is the most common cause of death until the fourth decade of life and one of the major problems of the healthcare system regardless of the economic and social status (Gad & Saber, 2012). The global prevalence of traumatic events may vary according to geographical population and be affected by factors such as terrorism, war, violence and natural disasters (Brunello & Davidson, 2021). There are different types of traumas, including vascular trauma, traumatic brain injury (TBI), vascular trauma, dental trauma, and congenital trauma, each of which has a significant prevalence. In this regard, results of previous systematic review studies in Iran show that the prevalence of birth trauma in 9 articles published in Iran is equal to 2.7% (Shokri & Nayyeri, 2021). Also, the prevalence of lower vascular trauma was 54.8% and the prevalence of subsequent death in these patients was 12.3% and in a review study by Karimian et al., (2021) on 15 studies entered into the meta-analysis stage, which indicates the importance of relevant studies in Iran.

Traumatic brain injury (TBI) is a major problem in countries such as Iran. TBI can cause a variety of disorders for patients, including physical, emotional, cognitive, and behavioral disorders, and can affect and challenge all aspects of a patient's daily life (Fakharian et al., 2016; Stevens et al., 2013). The prevalence of TBI-related mortality and disability depends on its severity and mechanism, but prevalence of its adverse outcomes; including severe disability, death, and coma have been reported to be nearly 20% (Bruns & Hauser, 2003). Head traumas include loss of consciousness, skull fracture, brain contusion, post-traumatic syndrome, subdural hematoma and are one of the important causes of mortality among inpatients (KSJKjon & KSJK, 2020).

Other bedsore risk factors includes stroke, which categorized into cerebrovascular diseases and is one of the main problems among the seniors and is the second leading cause of death in the world. This disease is one of the common diseases that require long-term care and can lead to long-term complications such as inactivity and disability (Nakipoğlu-Yüzer et al., 2009; Sire et al., 2022). The prevalence of stroke complications is reported to be about 40 to 96%, many of which can be prevented if diagnosed early (Atashi & Mohammadi, 2021). One of these complications is the development of PUs, which can cause various complications and problems for patients (Huang & Chang, 2021). Considering the importance of preventing the occurrence of Pus in improving the health status of patients, aim to determine the factors contributing Pus among brain – Spinal injuries patients.

2. METHODS

Study Design

This is a cross-sectional descriptive study that was conducted. The sample size was estimated 220 patients using similar studies. Researchers obtained a list of discharged patients from hospitals and contacted patients or their companions. They also explained the study objectives, and obtained their consent to participate in the study. All questionnaires were completed by interviewing the patient's main caregivers and observing patients (September 2020-December 2020).

Study Population

The present study was performed on TBI patients, including patients with SCI, patients, stroke and head trauma.

Inclusion and Exclusion Criteria

Inclusion Criteria

Inclusion criteria included willingness to participate in the study, participants between the ages of between 18 to 85 years, history of TBI.

Exclusion Criteria

Exclusion criteria included non-cooperation of the patient or the patient's family, patients weighted <40 kg or >140 kg, suffering from other chronic diseases except TBI, and the presence of a previous bedsore.

Ethical Approval

The present study was performed after obtaining the ethics code of IR.MEDILAM.REC.1397.132. The necessary training was given to the participants regarding the research objectives. They were also and the necessary assured about the confidentiality of information and anonymous reporting of their information.

Study Tools

The instruments included a demographic profile form and the Braden Scale for Predicting Pressure Ulcer Risks. Braden scale consists of 6 subsets, including sensory perception, activity, moisture, mobility, friction, and shear. The instrument items are scored based on a 4-point Likert scale ranging from 1(worst situation) to 4 (normal situation). The possible score range is 6 to 23. The scores for very high, high, moderate, low, and no risk of PU include 9>, 10-12, 13-14, 15-18, and >19, respectively. Also, the lowest score means the highest risk of PUsand vice versa (Bergstrom et al., 1998; Lyder et al., 1999).

Statistical Analysis

Data analysis was performed using descriptive statistical tests (including relative frequency, mean) and inferential statistics (correlation coefficient, logistic regression) in SPSS ver. 16 software.

3. RESULTS

The findings of Table 1 show demographic characteristics of the studied patients. According to the findings, most of the patients were female, had no history of smoking, were illiterate, had a stroke, had good economic status and were married (Table 1). Also, mean ± SD of participants' weight was 61.98 ± 15.67 kg. Also, the prevalence of PUs in the studied patients was 25%.

Table 1 Status of demographic variables in patients

Variable		N	%
Sex	Male	144	65.5
	Female	76	34.5
Smoking status	Yes	89	40.5
	No	131	59.5
Education	illiterate	109	49.5
	reading and writing	88	40
	Diploma	21	9.5
	Masters	2	0.9
Type of disease	SCI	59	26.8
	medium	108	49.1
	Good	53	24.1
Economic satisfaction	Yes	139	63.2
	No	81	36.8
Marital status	Married	159	72.3
	Single	61	27.7

Table 2 shows the scoring status of the Braden scale items. Also, most of the patients achieved scores in poor and low risk status. Also, the overall score for risk of PU was low, moderate, and high, and very high in 28 (12.7%), 81 (36.7%), 105 (47.7%), and 6 (2.7%) of cases, respectively (Table 2).

Table 2 Frequency distribution (percentage) of Braden tool items in the studied patients

-	Items	very bad	bad	Low risk	Excellent
		N (%)	N (%)	N (%)	N (%)
1	Perceptual senses	12(5.5)	61(27.7)	117(53.2)	30(13.6)
2	Skin moisture	22(10)	115(52.3)	67(30.5)	16(7.3)
3	activity	22(10)	107(48.6)	75(34.1)	16(7.3)
4	Movement	142(64.5)	69(31.4)	9(4.1)	0(0)
5	Nutrition	59(26.8)	126(57.3)	33(15)	2(9)
6	Friction and tension	70(31.8)	133(60.5)	17(7.7)	-

Table 3 shows the mean ± SD of status of the Braden scale items in the studied patients. According to the findings, the total means ± SD of patients with and without PUswas 10.18 ± 0.77 and 13.01 ± 1.40, respectively. Also, there was a significant difference

between patients with and without PUsin terms of the mean ± SD of scores obtained in all items of this instrument, except friction and shear (P<0.05) (Table 3). Figure 1 shows the dimensional status of wound areas in non-wound patients.

Table 3 Comparison of M(SD) of score obtained in patients with bed sores and without bed sores

-	Items	No wounds M(SD)	Haswounds (SD)	p	F	T
1	Perceptual senses	2.85(0.71)	2.24(0.76)	0.25	1.28	4.67
2	Skin moisture	2.45(0.73)	1.83(0.64)	0.006	7.60	4.71
3	activity	2.50(0.74)	1.78(0.58)	0.005	8.18	5.60
4	Movement	1.45(0.59)	1.10(0.31)	0.000	66.80	3.45
5	Nutrition	1.96(0.65)	1.56(0.64)	0.059	3.61	3.39
6	Friction and tension	1.78(0.58)	1.64(0.58)	0.33	0.919	1.26
7	Overall score of the tool	13.01(1.40)	10.18(0.77)	0.002	9.678	11.87

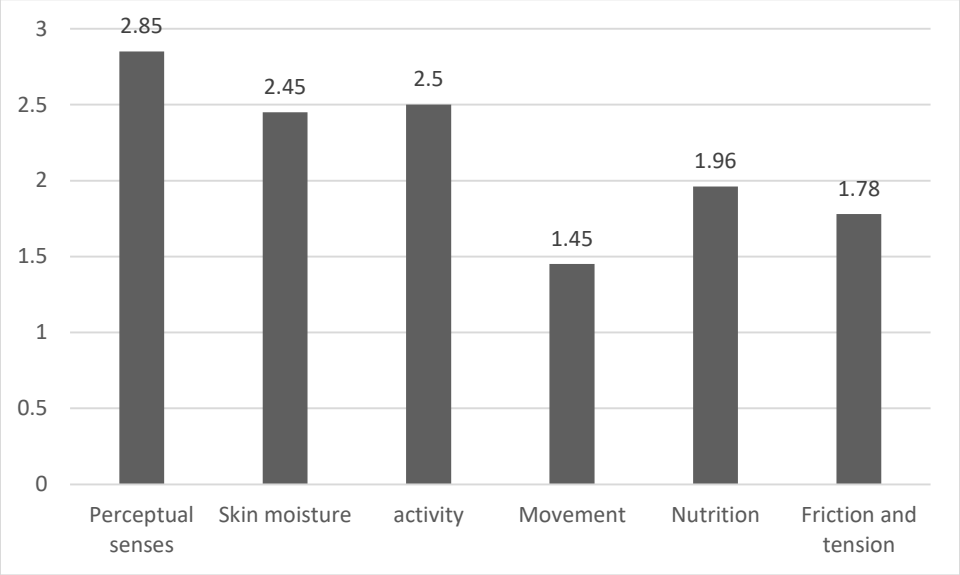

Figure 1 Graph related to the average score obtained by patients with non-wound

4. DISCUSSION

The occurrence of Pus depends on various factors and active prevention is necessary. To reduce the risk of PU, the at-risk population must be identified and the necessary measures must be taken to prevent the occurrence and spread of this type of ulcers. It is also necessary to use a tool for systematic and purposeful examination. There are several PU risk assessment scales, one of which is the Braden scale (Theeranut et al., 2021; Wei et al., 2020). The results showed that the PU was prevalent among 25% of the studied patients. The PU prevalence of was 9.6%, 14.9%, 18.7%, 8.1%, and 29% in previous studies by Assefa et al., (2021) in Ethiopia, Bereded et al., (2018), Cox et al., (2011) in the United States (Sample size= 347 patients), González Mendez et al., (2018) in Spain (Sample size= 335 patients), Gunningberg et al., (2001) in Sweden (Sample size= 101 patients), respectively. Also, relevant systematic review studies reported different prevalence rates for PU. For example, the above prevalence rate was 11.7%, and 12% in studies by Shiferaw et al., (2020) in Ethiopia, (Sample size= 1881 patients), and Borojeny et al., (2021) (Sample size= 37971patients).

According to the findings of the present study, the PU prevalence was higher in men than women. Similarly, González Mendez et al., (2021) showed in a study in Spain that there was a difference between men and women in terms of PU prevalence. Haileyesus Gedamu et al., (2020) also demonstrated in a study in Ethiopia that the prevalence of PU was 19.6% in men and 13.9% in women, which is consistent with the results of this study suggesting that there is a difference between men and women in terms of the PU prevalence. The relationship between age and factors contributing to PU risk was investigated and results showed that the risk of PU increases with increasing age, which is consistent with the results of a study by Lena Gunningberg et al., (2011) that showed a

higher PU prevalence in older people. Other variables contributing to the PU development is higher weight status, which is consistent with study by Cristiana Forni et al., (2021)

5. CONCLUSION

Most patients' scores in dimensions Movement, Friction and tension and Nutrition had bad and very bad scores. It is necessary to take preventive measures to prevent pressure ulcers, especially in these three dimensions. Due to the identification of factors affecting the development of PUs, it is necessary to take the necessary interventions to reduce them.

Informed Consent

Written informed consent was obtained in their native language (Persian).

Ethical Approval

The Ethics Committee of the Ilam University of Medical Sciences approved (IR.MEDILAM.REC.1397.132)

Authors' Contribution

MH, KK did study conception, data analysis, and manuscript writing. MH, KK did data collection and manuscript writing. MH, KK did data collection and manuscript writing. Both authors (MH, KK) contributed to all stages of the article.

Funding

This study has not received any external funding.

Conflict of interests

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

REFERENCES AND NOTES

1. Anthony D, Alosaimi D, Shiferaw WS. Prevalence of pressure ulcers in Africa: A systematic review and meta-analysis. J of Tissue Viability. Afr J Prim Health Care Fam Med 2021; 30(1):137-45. https://doi.org/10.1016/j.jtv.2020.10.003.
2. Assefa T, Mamo F, Shiferaw D. Prevalence of Bed Sore and its associated Factors among Patients admitted at Jimma University Medical Center, Jimma Zone, Southwestern Ethiopia, 2017 Cross-sectional study. Ortho Rheum Open Access 2017; 8(4): 555743. DOI: 10.19080/OROAJ.2017.08.555743.
3. Atashi V, Mohammadi F, Dalvandi A, Abdollahi I, Kazemi R. Effect of Slow Stroke Back Massage (SSBM) on Shoulder Pain and Hand Function in Patients with Stroke. J Hayat 2012; 18(2):47-56. doi: http://hayat.tums.ac.ir/article-1-30-fa.html.
4. Bereded DT, Salih MH, Abebe AEJBrn. Prevalence and risk factors of pressure ulcer in hospitalized adult patients; a single center study from Ethiopia. BMC Res notes 2018; 11(1):1-6 BMC research notes.
5. Bergstrom N, Braden B, Kemp M, Champagne M, Ruby E. Predicting pressure ulcer risk: a multisite study of the predictive validity of the Braden Scale. Nurs Res 1998; 47(5):261-9. doi: 10.1097/00006199-199809000-00005
6. Borojeny LA, Albatineh AN, Dehkordi AH. The Incidence of pressure ulcers and its associations in different wards of the hospital: A systematic review and meta-analysis. Int J Prev Med 2020; 11. doi: 10.4103/ijpvm.IJPVM_182_19.
7. Brunello N, Davidson JR, Deahl M. Posttraumatic stress disorder: diagnosis and epidemiology, comorbidity and social consequences, biology and treatment. Neuropsychobiol 2001; 43(3):150-62. doi: 10.1159/000054884. [PubMed: 11287794].
8. Bruns Jr J, Hauser WAJE. The epidemiology of traumatic brain injury: a review. Epilepsia J 2003; 44:2-10, https://doi.org/.1046/j.528-157.44.s10.3.x.
9. Cox J. Predictors of pressure ulcers in adult critical care patients. Am J Crit Care 2011; 20(5):364-75. doi: 10.4037/ajcc2011934.
10. De Sire A, Moggio L, Demeco A. Efficacy of rehabilitative techniques in reducing hemiplegic shoulder pain in stroke: Systematic review and meta-analysis. Ann Phys Rehabil 2022; 65(5):101602. https://doi.org/10.1016/j.rehab.2021.

11. Eom KSJKjon. The time-related trends in the presenting of traumatic head injury in a single institution. Korean J Neurotrauma 2020; 16(1):28. doi: 10.13004/kjnt.2020.16. e2.
12. Fakharian E, Mohammadzadeh M, Behdadmehr S, Repetitive traumatic brain injury in patients from Kashan, Iran. Trauma monthly 2016; 21(4). doi: 10.5812/traumamon .23869.
13. Forni C, Cerantola N, Ferrarelli G, Natali E, et al. Factors associated with pressure ulcer onset after knee replacement. J Wound Care 2021; 30(11): 924-9. https://doi.org/10.12968/jowc.2021.30.11.924.
14. Gad MA, Saber A, Farrag S, Shams ME. Incidence, patterns, and factors predicting mortality of abdominal injuries in trauma patients. N Am J Med Sci 2012; 4(3):129. doi: 10.4103/1947-2714.93889.
15. Gedamu H, Hailu M, Amano A. Prevalence and Associated Factors of Pressure Ulcer among Hospitalized Patients at Felegehiwot Referral Hospital, Bahir Dar, Ethiopia. Adv Nurs 2014; 2014:767358. https://doi.org/10.1155/2014/.
16. González-Méndez MI, Lima-Serrano M, Martín-Castaño C. Incidence and risk factors associated with the development of pressure ulcers in an intensive care unit. J Clin Nurs 2018; 27(5-6):1028-37. https://doi.org/10.111/jocn.14091.
17. Gunningberg L, Lindholm C, Carlsson M. Reduced incidence of pressure ulcers in patients with hip fractures: a 2-year follow-up of quality indicators. Int J Qual Health Care 2001; 13(5):399-407. https://doi.org/10.1093/intqhc/13.5.399.
18. Gunningberg L, Stotts NA, Idvall EJIwj. Hospital-acquired pressure ulcers in two Swedish County Councils: cross-sectional data as the foundation for future quality improvement. Int Wound J 2011; 8(5):465-73. https://doi.org/10.1111/j.742-481X.2011.00818.x.
19. Hernández-Martínez-Esparza E, Santesmases-Masana R, Román E. Prevalence and characteristics of older people with pressure ulcers and legs ulcers, in nursing homes in Barcelona. J Tissue Viability 2021; 30(1):108-15. https://doi.org/10.1016/j.jtv.2021.01.003.
20. Huang Y-C, Chang C-C, Yeh C-C. The protective effect of statins against pressure ulcers in stroke patients: A propensity-score matched study based on a real-world database. Atherosclerosis 2021; 317:22-8. https://doi.org/10.1016/j.atherosclerosis.2020.11.023.
21. Karimian M, Okhli A, Noormohammadi-Dehbalaee A. Prevalence of vascular trauma and related factors in Iran: A systematic review. Int J Med Toxicol Forensic Med 2021; 11(2):31441. https://doi.org/10.2598/ijmtfm.v11i2.
22. Lyder CH, Yu C, Emerling J, Mangat R. The Braden Scale for pressure ulcer risk: evaluating the predictive validity in Black and Latino/Hispanic elders. Appl Nurs Res 1999; 12(2):60-8. https://doi.org/10.1016/S0897-1897(99)80332-2.
23. Mozafari Comeshtappeh A, Esmaeilnejad Ganji S, Bahrami Feridoni, Prevalence of Musculoskeletal Pains and the Demographic Factors Related to the Pain Locations in Patients with Chronic Trauma. J Babol Univ Medical Sci 2018; 20(7):21-7. DOI: 10.18869/acadpub.jbums.20.7.21.
24. Nakipoğlu-Yüzer GF, Doğan-Aslan M, C. The effect of the stroke etiology on functional improvement in our geriatric hemiplegic patients. J Stroke Cerebrovasc Dis 2010; 19(3):204-8. https://doi.org/10.1016/j.jstrokecerebrovasdis.2009.04.008.
25. Sallam SAG, Dando LL, Velitario AM, Pardinas ALA, Dizon ML, Alcantara JC. Nurses' knowledge to pressure ulcer prevention at Hail hospitals in Saudi Arabia: A cross-sectional study. Medical Science 2020:24(106);4040-4052
26. Shiferaw WS, Aynalem YA, Akalu TY. Prevalence of pressure ulcers among hospitalized adult patients in Ethiopia: a systematic review and meta-analysis. BMC Dermatology 2020; 20(1):15. https://doi.org/0.1186/s12895-020-00112-z.
27. Shokri M, Nayyeri S, Salimi N, Prevalence of Neonatal Birth Trauma in Iran: a Systematic Review and Meta-analysis. Int J Pediatr 2021; 9(10):14520-31. doi 10.22038/IJP.2020.50652.4032.
28. Soozani A, Raei M, Montazeri A. The effect of education on knowledge and performance of nurses in prevention and control of pressure sore. J Mazandaran Univ Med Sci 2012; 9(1):202-10. doi: http://jmums.mazums.ac.ir/article-1-7507-fa.html.
29. Stevens LF, Perrin PB, Gulin S, Rogers HL, Examining the influence of three types of social support on the mental health of Mexican caregivers of individuals with traumatic brain injury. M J Phys Med Rehabil 2013; 92(11):959-67. doi: 10.1097/PHM.0b013e31828cd549.
30. Theeranut A, Ninbanphot S, Limpawattana PJNiCC. Comparison of four pressure ulcer risk assessment tools in critically ill patients. Nurs Crit Care 2021; 26(1):48-54. https://doi.org/10.1111/nicc.12511.
31. Wei M, Wu L, Chen Y, Fu Q, Predictive validity of the Braden scale for pressure ulcer risk in critical care: A meta-analysis. Nurs Crit Care 2020; 25(3):165-70. doi: http://dx.doi.org/10.1590/0034-7167-2019-0413.
32. Xiao F, Peng H, Li YJAJoTR. The preventive effect of seamless nursing care on pressure ulcer and related complications in elderly inpatients. Am J Transl Res 2021; 13(4):3515, PMCID: PMC8129310.