JURNAL KEDOKTERAN DIPONEGORO
(*DIPONEGORO MEDICAL JOURNAL*)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
DOI : 10.14710/dmj.v15i6.55668
JKD (DMJ), Volume 15, Number 6, November 2026 : 592-599

STATUS OF PRESSURE ULCER AMONG BEDRIDDEN PATIENTS AT A TERTIARY HOSPITAL IN BANGLADESH

Anup Mandal[1], Md Mahmudul Hasan[2*], Bijon Biswas[1]
[1] Physiotherapist, Dreamland Child and Rehabilitation Care, Dhaka, Bangladesh
[2] Research Investigator, Al-Basar International Foundation, Dhaka, Bangladesh

Keywords:
Pressure ulcer,
Bedridden patients,
Prevalence,
Prevention

Received: 17 February 2026
Revised: 2 March 2026
Accepted: 2 March 2026
Available online: 01 November 2026

Corresponding Author:
E-mail: octemon87@gmail.com

ABSTRACT

Background: A major healthcare issue and frequently avoidable complication of immobile patients is pressure ulcers (PUs), which is a sign of quality healthcare. In resource-constrained country such as Bangladesh, no data exists on PU burden in specialized care. **Objective:** This research attempted to profile the condition of PUs among bedridden patients in a large tertiary orthopedic and rehabilitation hospital in Bangladesh. **Methods:** Purposive sampling (113) was used to sample bedridden patients (admission ≥3 weeks). Socio-demographic and clinical profiles data, and preventive practices were gathered through semi-structured questionnaire and clinical assessment. Analysis was done through descriptive statistics and chi-square tests. **Results:** The PU prevalence was 12.4% (n=14/113). The average age of the group was 32.3 (±13.9) years, most (36.3%) of it consisted of young adults (19-28 years). Majority (74.3%) of the participants were males, most of rural origin (71.7%), with low educational status (30.1%) illiterate. Most of the ulcers were Stage I (78.6%), with most of them on the buttock (50%) and sacrum (42.9%). A most notable gap in prevention was identified: although 92% of the respondents mentioned having used preventive methods, 87.6% were not provided with a regular adjustment in posture. There was a significant finding of patient weight group with PU presence (p=0.036). **Conclusion:** The paper presents base findings about prevalence, distribution, and patient related factors of pressure ulcers in a dedicated tertiary care unit in Bangladesh, highlighting the importance of systematic surveillance and standardized preventive treatment measures.

Copyright ©2026 by Authors. Published by Faculty of Medicine, Universitas Diponegoro Semarang Indonesia. This is an open access article under the CC-BY-NC-SA (https://creativecommons.org/licenses/by-nc-sa/4.0/).

INTRODUCTION

Pressure ulcers (PU) or decubitus ulcers are skin and tissue wounds, which develop when an area of the body is pressured, friction, or sheared over an extended period.[1,2] They remain a massive issue across the globe, strongly impacting three million adults, and indicate the effectiveness of health care.[3] An examination of global statistics indicates that pressure ulcer incidence has a range of 0.4 percent to 38 percent among those undergoing surgery with approximately 2.5 million patients at risk annually in the United States and it creates approximately 60,000 deaths due to related issues .[4] Among hospitalized population, the rates of Africa stand between 3.8% and 19.3%.[4] Commenting on the general state, the average rate in hospitals is approximately 25-30% which indicates that it is still an issue noted after surgery.[4]

Pressure ulcers occur when soft tissue is compressed between a surface and a bone, and takes a long period of time to stop blood flow, eliminate cells, and possibly lead to tissue death.[1] The usual locations of these wounds are the back of the bottom (sacrum), heels, shoulders, elbows, hip bones (trochanters), and the back of the head (occiput) areas that remain compressed when a person is lying. The factors outside of the body (pressure, friction, shear and moisture) and those inside of the body (fever, low blood count, (anemia) , poor nutrition and blood vessel issues) influence the likelihood of developing a

JURNAL KEDOKTERAN DIPONEGORO
(*DIPONEGORO MEDICAL JOURNAL*)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
DOI : 10.14710/dmj.v15i6.55668
JKD (DMJ), Volume 15, Number 6, November 2026 : 592-599

wound.[1] Proper nutrition prevents and cures wounds. The lack of vitamins A, B, C, and E and such mineral as zinc and selenium decelerate the recovery of tissues .[5] Even several hours of immobility (as little as two hours) can result in severe tissue damage.[6]

All people can develop pressure ulcers, and due to chronic conditions, nerve disorders, improper feeding, or mobility, people are more prone to it, particularly those in hospitals or care facilities, such as older people, those after surgery, or very ill. Research demonstrates that stillness, blood vessel issues, nutrition, and lengthy surgeries rule the possibility of developing pressure ulcers.[7,8] Not all patients can be placed on regular hospital beds or chairs that do not alleviate pressure, which will aggravate skin conditions (particularly in friction or moisture).[9] Recent studies conclude that a holistic strategy; such as training of staff, improved nutrition, frequent turnover and equipment that disperses pressure are necessary in the reduction of the incidence of pressure ulcers whether in the short-run or the long-run care.[10]

Pressure ulcers are the cause of not only physical pain but emotional, social as well as financial issues. Patients experience severe pain and can hardly move and live a quality life. The families and caregivers experience a daily problem with taking care of them.[11] Increased morbidities, mortality, and increased health care expenses are also caused by the pressure ulcers.[12] They are usually avoidable and therefore nations are concentrating on preventive rather than treatment measures. A large number of health systems have interventions and initiatives to reduce the facility acquired pressure ulcers.[13]

Poor nutrition and old age increases the chances of getting a pressure ulcer.[14] Ulcer prevention is cheaper than care, which may be long term and consume a considerable number of resources. The number of ulcers can be significantly reduced with simple measures like turning patients, foam mattress, air mattress, and skin checking. According to a meta-analysis conducted in 2023, the combined prevalence in nursing homes was 11.6% and the combined incidence was 14.3%, indicating that pressure ulcers continue to pose a substantial issue in the field of long-term care globally.[15]

Pressure ulcers have been described and graded differently. Kottner and colleagues (2020) remarked that there is an ongoing worldwide debate around whether the same names and stages should be used.[16] Through the unanimity of definitions, the doctors and nurses are expected to be able to diagnose and communicate with each other more efficiently. Educating the staff on such definitions may enable them label the ulcers adequately and prevent them in a better manner.

The lack of resources and health system of Bangladesh is also weak and, therefore, prevention and treatment of pressure ulcers are particularly challenging. Many people that remain on beds due to some bone injuries, spinal cord damage, or surgery are treated by the National Institute of Traumatology and Orthopedic Rehabilitation (NITOR) in Dhaka. Such patients stand a high risk of receiving pressure ulcers. Understanding the prevalence, the extent of the problem, and its cause is essential for effective prevention plans and improved treatments.

In this paper therefore, the researcher examined the state of bedridden patients with pressure ulcers hospitalized in NITOR, Dhaka. The idea is to provide evidence to improve prevention, care and policies. The research is assumed to enable the doctors and nurses to be aware of the issue by revealing who is at risk and why, assist in the placement of prevention tools and lastly reduce the incidence of pressure ulcers in Bangladesh.

METHODS

The current cross-sectional study was conducted to determine the prevalence of pressure sore and its nature among bedridden patients in the National Institute of Traumatology and Orthopedic Rehabilitation (NITOR) in Dhaka, Bangladesh. Non-randomized purposive sampling strategy was used to recruit the participants. Though the original sample size calculation - according to an estimated prevalence of 13.4%, the 95% confidence level, and the 5% margin of error - would have provided a sample of 168 bedridden patients, practical considerations left 113 as the final sample size. The data gathering was limited to the NITOR facility and a specific period, including only patients who met the inclusion criteria of at least three weeks of admission, aged between 9 and 80 years, and were cooperative and medically stable.

The data collection was conducted through a face to face interview using a semi-structured pre-tested questionnaire that had been modified to fit the study topic. This instrument consisted of three main items,

JURNAL KEDOKTERAN DIPONEGORO
(*DIPONEGORO MEDICAL JOURNAL*)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
DOI : 10.14710/dmj.v15i6.55668
JKD (DMJ), Volume 15, Number 6, November 2026 : 592-599

including socio-demographic (e.g. age, sex, BMI, education, occupation), pressure ulcer (e.g. presence, stage, anatomical location, associated type of injury), and education/prevention (e.g. dietary intake, preventive measures, repositioning, physiotherapy) variables. All informed written consent was taken before enrolment at a sample of participants purposely chosen at the wards with the guarantee of confidentiality and the right to withdraw.

The data obtained were verified, coded and data keyed into SPSS version 24.0. Descriptive statistics were used to present the socioeconomic, demographic, and clinical attributes of the sample and the prevalence rates of the pressure ulcers. The relations between the occurrence of pressure ulcer and independent variables, including age, injury type, and length of bedriddenness, were investigated using analytical statistics, including chi-squares and some other suitable measures of association, which covered the specific objectives of the study. The management board of the concerned academic institution (Fareast International University) gave the required ethical approval (IRB No.Exp.FIS-MPH-2020/12 on 20th December 2020) to the study before it was carried out.

RESULTS

The following section provides the findings related to the socio-demographic, anthropometric, and pressure ulcer characteristics of the participants. In addition, the associated causes and the preventive measures and care related factors for the potential pressure ulcers are also highlighted in this segment. Further, inferential analysis between pressure ulcers and some selected variables are presented here for illustrating their relationship statistically.

Table 1 demonstrates age, gender, height, weight and other variables of 113 bedridden individuals. The mean age of this study's cohort was 32 (±13.86) years. There were 74.3% males and 25.7 females in the study group. The central tendency of the heights was 151.63 cm (±11.85) and the central tendency of weight was 53.14 kg (±10.79) making the normal BMI 22.53 (±3.74). Nearly half (49.6%), of them were overweight or obese with BMI of 23 or greater and nearly one in ten, 10.6%, were underweight. Socially, most of the participants came from rural areas, 71.7%. Most of the (69.9%) participants were literate and great number of them (68.1%) were employed.

Table 1. Socio-demographic and anthropometric characteristics of the study participants (n=113).

Variable	Category	n (%) or Mean ± SD
Age (years)	Minimum: 9; Maximum:88	**32.31 ± 13.86**
Gender	Male	84 (74.3)
	Female	29 (25.7)
Height (cm)	Minimum: 91; Maximum:180	**151.63 ± 11.85**
Weight (kg)	Minimum: 20; Maximum:89	**53.14 ± 10.79**
Body Mass Index (kg/m²)	—	**22.53 ± 3.74**
BMI Category	Underweight	12 (10.6)
	Normal	45 (39.8)
	Overweight/Obese	56 (49.6)
Educational Status	Illiterate	34 (30.1)
	Literate (Primary and above)	79 (69.9)
Residential Area	Rural	81 (71.7)
	Urban	32 (28.3)
Occupation	Student	31 (27.4)
	Employed*	77 (68.1)
	Other	5 (4.4)

*Employed includes business, service holder, day laborer, maid servant, and housewife.

JURNAL KEDOKTERAN DIPONEGORO
(*DIPONEGORO MEDICAL JOURNAL*)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
DOI : 10.14710/dmj.v15i6.55668
JKD (DMJ), Volume 15, Number 6, November 2026 : 592-599

Table 2. Pressure Ulcer Characteristics and Associated Causes among Respondents (n=113)

Variable	Category	Frequency (n)	%
Associated Cause	Orthopedic Condition	79	69.9
	Post-Surgical Complication	18	15.9
	Spinal Cord Injury (SCI)	17	15.0
Presence of Ulcer	Yes	14	12.4
	No	99	87.6
Pressure Ulcer Stage (n=14)*	Stage I	11	78.6
	Stage II	3	21.4
Most Common Sites (n=14)*	Buttock	7	50
	Sacrum	6	42.9
	Ankle	1	7.1

*Note: Denominator is the total number of reported ulcers or sites

In Table 2, the clinical profile of pressure ulcers among the study cohort was delineated and made clear that the general prevalence was 12.4% (n=14). In relation to underlying associated cause of bedridden status, orthopedic conditions formed almost three-quarters (69.9%) of all the cases, with the other 30.1% being post-surgery complications and spinal cord injury. Within the group of affected patients, there were the vast majority of patients (11 of 14) with Stage I ulcers (early tissue damage), and only three patients fell to Stage II. The buttock (50% of total ulcer patients) and the sacrum (42.9%), were the most likely anatomical locations of ulcers formation, which are in line with high-pressure sites in immobile patients.

Table 3. Preventive Practices and Care-Related Factors among Respondents (n=113)

Variable	Category	Frequency (n)	%
Takes Preventive Measures	Yes	104	92.0
	No	9	8.0
Type of Mattress Used	Soft	111	98.2
	Hard	2	1.8
Receives Physiotherapy	No	58	51.3
	Yes	55	48.7
Changes Posture Regularly	No	99	87.6
	Yes	14	12.4
Posture Change Interval (n=14)	Every 1 hour	7	6.2
	Every 30 minutes	3	2.7
	Every 2 hours	2	1.7
	≥ 3 hours	1	0.88

As Table 3 shows, there is a huge discrepancy between the level of awareness of preventive measures reported and their actual application by the participants. Although an overwhelming majority (92%) reported being proactive in its prevention, reflected in taking actions, and almost everybody (98.2%) was on a soft mattress, the actual compliance with two movement-related, deep-rooted interventions was extremely low. More than 51.3% were not receiving physiotherapy and most importantly 87. 6% of the total number of respondents were not keeping regular changes in their posture- a pressure ulcer preventive strategy. With the few (n=14) who did report changing position, there was variation in the intervals between changes, with only 6.2% of the total cohort changing position at the recommended rate of every hour.

JURNAL KEDOKTERAN DIPONEGORO
(DIPONEGORO MEDICAL JOURNAL)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
DOI : 10.14710/dmj.v15i6.55668
JKD (DMJ), Volume 15, Number 6, November 2026 : 592-599

Table 4. Association of Selected Factors with the Presence of Pressure Ulcers (n=113)

Factor		Pressure Ulcer Present (n=14)	p-value
Age Group	≤28 years	8	0.079
	≥29 years	6	
Gender	Male	8	0.088
	Female	6	
Weight Group	<60 kg	8	**0.036**
	≥60 kg	6	
Associated Cause	Orthopedic	9	0.250
	Others*	5	
Hospital Stay Duration	≤40 days	8	0.089
	>40 days	6	

*Others= Spinal cord injury, post-surgical condition

As shown in Table 4, the patient weight group is the only statistically significant factor that is associated with the existence of pressure ulcers (p=0.036). This was an indication that there was significant difference in the distributions of weight categories between patients who had ulcer and those who did not get ulcers. Conversely, there were no pronounced correlations between the presence of pressure ulcers and the age group of a patient (p=0.079), gender (p=.088), the cause of immobility underlying the ulcer (p=0.250) or the length of stay in the hospital (p=0.089).

DISCUSSION

The present investigation presents an in-depth description of the bedridden patients and the prevalence of pressure ulcers (PUs) in a tertiary orthopedic and rehabilitation center in Dhaka, Bangladesh. The most relevant results are that PUs prevalence is 12.4% and the cohort of patients is not typical of those worldwide, that there is a strong disconnect between knowledge and practice in relation to prevention, and that patient weight is a significant related variable.

This study had a prevalence percentage of 12.4 of PUs. It is greater than the 4.7 % of a seminal older study[17] but within the range of the rates of recent studies carried out in low-and middle-income countries (LMICs) and in specialized care settings. As an illustration, the prevalence was detected to be 11.7% in a 2020 study involving Ethiopian hospitals, where the increased burden lies in a resource-limited environment.[18] This high rate is probably due to the specific context of NITOR which is a referral center of complex orthopedic and spinal conditions that involve prolonged immobilization.

One of the most outstanding results is the demographic profile of patients. Unlike studies of western populations where the elderly carries the greatest prevalence of PUs,[16] PUs were most prevalent in this cohort with an average age of 32.3 years and more than one-third aged 19-28. This is characteristic of the institution and a more general trend in LMICs, with traumatic injuries associated with road traffic accidents or occupational hazard being a top cause of disability among younger adults.[19] This is further supported by the male prevalence (74.3%), since young males are affected by such trauma disproportionately. The majority were in rural locations (71.7%), and poorly educated, and such aspects are frequently associated with a late uptake of care, a worse health literacy concept, and socioeconomic difficulties, which might further complicate the risks of complications such as PUs. [20]

Anthropometrically, the average BMI was within a normal range (22.5 kg/m^2) but almost half (49.6%) of the sample population was overweight or obese. Weight group was found as a considerable force related to PU development (p=0.036) through statistical analysis. This is in line with present-day evidence that underfeeding as well as obesity are among the risk factors. Obesity raises pressure-point mechanical loads and complicates the ability to reposition and underweight condition (10.6% in this research) contains muscle atrophy and tissue loss.[21]

PUs were mostly at an early stage (78.6% in Stage I and 21.4% in Stage II) and the most frequent locations were buttocks (50%) and sacrum (42.9%) among the study subjects. This distribution is typical

JURNAL KEDOKTERAN DIPONEGORO
(*DIPONEGORO MEDICAL JOURNAL*)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
DOI : 10.14710/dmj.v15i6.55668
JKD (DMJ), Volume 15, Number 6, November 2026 : 592-599

of bedridden patients, and it correlates with the international statistics that show the greatest risks in the sacral and pelvic areas.[16] The high-state of early-stage ulcers is favorable, which implies the majority of them were diagnosed at the early stages of their severe infiltration. It also however highlights the golden time of intervention. The main underlying reasons of bedridden were orthopedic (69.9%), spinal cord injury and Post-surgery complications. Although there is no statistical difference between particular causes and the presence of PU in the case under consideration, the prevalence rate of 23.5% in the case of SCI patients (4 out of 17) is of clinical interest and aligns with the highly meditated susceptibility of their patients.[22]

The most critical insight from this study is the profound gap between awareness and practice in PU prevention. Although 92% of caregivers reported taking preventive measures and 98.2% used a soft mattress, essential, evidence-based mobility interventions were severely lacking. Alarmingly, 87.6% of patients did not have their posture changed regularly, and only 6.2% of the entire cohort were repositioned at the gold-standard interval of every 2 hours (or more frequently) recommended for at-risk patients.[23] Besides, fewer than fifty-five percent (51.3%) received physiotherapy. This demonstrates that most of them overly depend on basic support material such as soft mattresses and do not engage in patient-focused and active interventions that are required to eliminate difficulties. It implies that training may discuss more about equipment rather than the critical concept of mobility of people frequent to distribute pressure.

The most important lesson learned in this paper is the huge disparity between knowledge and action on PU prevention. However, whereas 92% of caregivers that participated claimed that they administered preventive interventions and 98.2 percent used a soft mattress, critical evidence-based mobility interventions were harshly deficient. Alarmingly, less than half of patients described posture change (87.6%), and just 6.2 percent of the overall sample were repositioned at the gold-standard of every 2 hours (or more) associated with at-risk patients.[23] In addition, 51.3% were not undergoing physiotherapy. This lack of connection points to possible overdependence on fixed support surfaces (such as soft mattresses) and without the necessary dynamic, person-centered care to realize effective prevention. It implies that the education might be based on equipment as opposed to the main principle of redistribution of pressure with the regular repositioning and mobilization.

CONCLUSION

This study assessed the status of pressure ulcers among bedridden patients admitted to a tertiary-level orthopedic and rehabilitation hospital in Bangladesh. The findings demonstrate that pressure ulcers were present in a notable proportion of patients, with an overall prevalence of 12.4%. Most identified ulcers were early-stage (Stage I) and commonly located at pressure-prone areas such as the buttock and sacrum. The affected population was predominantly young adult males from rural backgrounds with limited educational attainment, and orthopedic conditions were the leading cause of prolonged immobility. Although preventive measures were reportedly practiced, a substantial proportion of patients did not receive regular repositioning, indicating inconsistency in preventive care delivery. The significant association between body weight and pressure ulcer presence further highlights an important clinical characteristic within this population. Overall, the study provides baseline evidence on the prevalence, distribution, and patient-related characteristics of pressure ulcers in a specialized tertiary care setting in Bangladesh, underscoring the need for systematic monitoring and standardized preventive care practices.

ETHICAL APPROVAL

The management board of the Fareast International University, Bangladesh gave the required ethical approval (IRB No.Exp.FIS-MPH-2020/12 on 20th December 2020) to the study before it was carried out.

CONFLICTS OF INTEREST

None

FUNDING

This study was conducted without any external financial support

AUTHOR CONTRIBUTIONS

For Conceptualization: AM
Methodology: AM, MMH

JURNAL KEDOKTERAN DIPONEGORO
(*DIPONEGORO MEDICAL JOURNAL*)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
DOI : 10.14710/dmj.v15i6.55668
JKD (DMJ), Volume 15, Number 6, November 2026 : 592-599

Data curation: AM, MMH, BB
Writing original draft: AM
Writing review and editing: MMH

ACKNOWLEDGMENTS

The authors would like to show their gratitude to the authority of Fareast International University, Bangladesh and National Institute of Traumatology and Orthopedic Rehabilitation for their cordial support to complete this study in time.

REFERENCES

1. Zaidi SRH, Sharma S. Pressure Ulcer. [Updated 2024 Jan 3]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK553107/
2. Murugiah S, Ramuni, K, Das U, Hassan HC, Abdullah SKBF. (2020). The knowledge of pressure ulcer among nursing students and related factors. Enfermeria Clinica, 30 Suppl 5, 41–45. https://doi.org/10.1016/j.enfcli.2019.11.019
3. Priya M, Mohanasundari SK, Sathianathan P, Sathianathan P, Sandhya C. A quality improvement initiative programme to reduce the incidence of hospital-acquired pressure ulcer. J Patient Saf Infect Control. 2024;12(1):1–6. https://doi.org/10.4103/jpsic.jpsic_19_24
4. Beriso HB, Zemene W, Tesfaye E. Prevalence of pressure ulcers and associated factors among adult patients admitted at comprehensive specialized hospital, Northwest Ethiopia, 2023. Sci Rep. 2024;14:17290. https://doi.org/10.1038/s41598-024-67026-5
5. Saghaleini SH, Dehghan K, Shadvar K, Sanaie S, Mahmoodpoor A, Ostadi Z. Pressure ulcer and nutrition. Indian J Crit Care Med. 2018;22(4):283–289. https://doi.org/10.4103/ijccm.IJCCM_277_17
6. Stojadinovic O, Minkiewicz J, Sawaya A, Bourne JW, Torzilli P, de Rivero Vaccari JP, et al. Deep tissue injury in development of pressure ulcers: a decrease of inflammasome activation and changes in human skin morphology in response to aging and mechanical load. PLoS One. 2013;8(8):e69223. https://doi.org/10.1371/journal.pone.0069223
7. Dube A, Sidambe V, Verdon A, Phillips E, Jones S, Lintern M, et al. Risk factors associated with heel pressure ulcer development in adult population: a systematic literature review. J Tissue Viability. 2022;31(1):84–103. https://doi.org/10.1016/j.jtv.2021.10.007
8. Chen B, Yang Y, Cai F, Zhu C, Lin S, Huang P, et al. Nutritional status as a predictor of the incidence of pressure injury in adults: a systematic review and meta-analysis. J Tissue Viability. 2023;32(3):339–348. https://doi.org/10.1016/j.jtv.2023.04.005
9. Almutairi MN, Alghamdi MS, Almutairi KAM, Alotaibi AA, Alhafi AH, Alanazi MM, et al. Pressure ulcer: an updated review for healthcare professionals. Egypt J Chem. 2025;0(0):0–0. https://doi.org/10.21608/ejchem.2025.412132.12156
10. McMahon J, McInnes E, Wan CS, Straiton N, Lam L, Rodgers J, et al. Effectiveness of organisational strategies for pressure injury prevention and treatment in acute hospital settings: a systematic review. J Adv Nurs. 2025. Advance online publication. https://doi.org/10.1111/jan.17090
11. 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;2014:1–8. https://doi.org/:10.1155/2014/767358
12. Kaşıkçı M, Aksoy M, Ay E. Investigation of the prevalence of pressure ulcers and patient-related risk factors in hospitals in the province of Erzurum: a cross-sectional study. J Tissue Viability. 2018;27(3):135–140. https://doi.org/10.1016/j.jtv.2018.05.001
13. Brito PA, de Vasconcelos Generoso S, Correia MITD. Prevalence of pressure ulcers in hospitals in Brazil and association with nutritional status: a multicenter, cross-sectional study. Nutrition. 2013;29(4):646–649. https://doi.org/10.1016/j.nut.2012.11.008
14. Leaker SH. The role of nutrition in preventing pressure ulcers. Nurs Stand. 2013;28(7):66–68, 70. https://doi.org/10.7748/ns2013.10.28.7.66.e7855
15. Sugathapala RDUP, Latimer S, Balasuriya A, Chaboyer W, Thalib L, Gillespie BM. Prevalence

JURNAL KEDOKTERAN DIPONEGORO
(*DIPONEGORO MEDICAL JOURNAL*)
Online : http://ejournal3.undip.ac.id/index.php/medico
E-ISSN : 2540-8844
DOI : 10.14710/dmj.v15i6.55668
JKD (DMJ), Volume 15, Number 6, November 2026 : 592-599

and incidence of pressure injuries among older people living in nursing homes: a systematic review and meta-analysis. Int J Nurs Stud. 2023;148:104605. https://doi.org/10.1016/j.ijnurstu.2023.104605

16. Kottner J, Cuddigan J, Carville K, et al. Prevention and treatment of pressure ulcers/injuries: the protocol for the second update of the international clinical practice guideline 2019. J Tissue Viability. 2019;28(2):51–58. https://doi.org/:10.1016/j.jtv.2019.01.001
17. Allman RM, Laprade CA, Noel LB, Walker JM, Moorer CA, Dear MR, et al. Pressure sores among hospitalized patients. Ann Intern Med. 1986;105(3):337–342. https://doi.org/10.7326/0003-4819-105-3-337
18. Shiferaw WS, Aynalem YA, Akalu TY. Prevalence of pressure ulcers among hospitalized adult patients in Ethiopia: a systematic review and meta-analysis. BMC Dermatol. 2020;20:15. https://doi.org/10.1186/s12895-020-00112-z
19. Lilhare S, Swarnkar M. A study of injury characteristics in road traffic accidents by different road user category. Int Surg J. 2016;4(1):395. Available from: http://dx.doi.org/10.18203/2349-2902.isj20164477
20. Mervis JS, Phillips TJ. Pressure ulcers: Pathophysiology, epidemiology, risk factors, and presentation. J Am Acad Dermatol. 2019;81(4):881–90. Available from: http://dx.doi.org/10.1016/j.jaad.2018.12.069
21. Coleman S, Nixon J, Keen J, Wilson L, McGinnis E, Dealey C, et al. A new pressure ulcer conceptual framework. J Adv Nurs . 2014;70(10):2222–34. Available from: http://dx.doi.org/10.1111/jan.12405
22. Van der Wielen H, Post MWM, Lay V, Gläsche K, Scheel-Sailer A. Hospital-acquired pressure ulcers in spinal cord injured patients: time to occur, time until closure and risk factors. Spinal Cord . 2016;54(9):726–31. Available from: http://dx.doi.org/10.1038/sc.2015.239
23. European pressure ulcer advisory panel [Internet]. EPUAP org | European Pressure Ulcer Advisory Panel. EPUAP org; 2019 [cited 2025 Dec 10]. Available from: https://epuap.org/