Intensive Care Medicine • *Open Access* • Volume 47, Issue 2, Pages 160 - 169 • February 2021

Document type
Article • *Hybrid Gold Open Access* • *Green Open Access*

Source type
Journal

ISSN
03424642

DOI
10.1007/s00134-020-06234-9

Publisher
Springer Science and Business Media Deutschland GmbH

CODEN
ICMED

Original language
English

PubMed ID
33635356 ↗

View less ^

Prevalence, associated factors and outcomes of pressure injuries in adult intensive care unit patients: the DecubICUs study

Update notice

Correction to: Prevalence, associated factors and outcomes of pressure injuries in adult intensive care unit patients: the DecubICUs study (Intensive Care Medicine, (2021), 47, 2, (160-169), 10.1007/s00134-020-06234-9)

Intensive Care Medicine, Volume 47, Issue 4, Pages 503 - 520, April 2021

Labeau S.O.[a, b], Afonso E.[b, c], Benbenishty J.[d], Blackwood B.[e], Boulanger C.[f], Brett S.J.[g], Calvino-Gunther S.[h], Chaboyer W.[i], Coyer F.[k, l], Deschepper M.[m], François G.[n], Honore P.M.[o]

Show additional authors ↗ Save all to author list

[a] Nursing Department, Faculty of Education, Health and Social Work, HOGENT University of Applied Sciences and Arts, Ghent, Belgium

[b] Department of Internal Medicine, Faculty of Medicine and Health Science, Ghent University, C. Heymanslaan 10, Ghent, 9000, Belgium

[c] Neonatal Intensive Care Unit, Rosie Maternity, Cambridge University Hospitals NHS Trust, Cambridge, United Kingdom

[d] Hadassah Hebrew University Medical Center, Jerusalem, Israel

View additional affiliations ⌄

Abstract

Purpose: Intensive care unit (ICU) patients are particularly susceptible to developing pressure injuries . Epidemiologic data is however unavailable. We aimed to provide an international picture of the extent of pressure injuries and factors associated with ICU-acquired pressure injuries in adult ICU patients . Methods: International 1-day point-prevalence study ; follow-up for outcome assessment until hospital discharge (maximum 12 weeks). Factors associated with ICU-acquired pressure injury and hospital mortality were assessed by generalised linear mixed-effects regression analysis. Results: Data from 13,254 patients in 1117 ICUs (90 countries) revealed 6747 pressure injuries ; 3997 (59.2%) were ICU-acquired. Overall prevalence was 26.6% (95% confidence interval [CI] 25.9–27.3). ICU-acquired prevalence was 16.2% (95% CI 15.6–16.8). Sacrum (37%) and heels (19.5%) were most affected. Factors independently associated with ICU-acquired pressure injuries were older age, male sex, being underweight, emergency surgery, higher Simplified Acute Physiology Score II, Braden score [removed] 3 days, comorbidities (chronic obstructive pulmonary disease, immunodeficiency), organ support (renal replacement, mechanical ventilation on ICU admission), and being in a low or lower-middle income-economy. Gradually increasing associations with mortality were identified for increasing severity of pressure injury : stage I (odds ratio [OR] 1.5; 95% CI 1.2–1.8), stage II (OR 1.6; 95% CI 1.4–1.9), and stage III or worse (OR 2.8; 95% CI 2.3–3.3). Conclusion: Pressure injuries are common in adult ICU patients . ICU-acquired pressure injuries are associated with mainly intrinsic factors and mortality. Optimal care standards, increased awareness, appropriate resource allocation, and further research into optimal prevention are pivotal to tackle this important patient safety threat. © 2020, The Author(s).

Author keywords

Decubitus epidemiology; ICU; Morbidity; Mortality; Outcome ; Pressure injury ; Pressure ulcer; Risk factors

1 (2019) *Prevention and treatment of pressure ulcers: Clinical practice guideline*. Cited 183 times.
Cambridge Media, Osborne Park

2 (2014) *Prevention and treatment of pressure ulcers: clinical practice guideline*. Cited 793 times.
Cambridge Media, Osborne Park

3 Edsberg, L.E., Black, J.M., Goldberg, M., McNichol, L., Moore, L., Sieggreen, M.

Revised National Pressure Ulcer Advisory Panel Pressure Injury Staging System (Open Access)

(2016) *Journal of Wound, Ostomy and Continence Nursing*, 43 (6), pp. 585-597. Cited 356 times.
http://journals.lww.com/jwocnonline
doi: 10.1097/WON.0000000000000281

View at Publisher

4 (2017) *NPUAP Position Statement on staging—2017 Clarifications*. Cited 6 times.
. Accessed 25 Aug 2019
https://npuap.org/page/PositionStatements

5 Gefen, A.

How much time does it take to get a pressure ulcer? Integrated evidence from human, animal, and in vitro studies

(2008) *Ostomy Wound Management*, 54 (10). Cited 95 times.

6 Gorecki, C., Brown, J.M., Nelson, E.A., Briggs, M., Schoonhoven, L., Dealey, C., Defloor, T., (...), Nixon, J.

Impact of pressure ulcers on quality of life in older patients: A systematic review: Clinical investigations

(2009) *Journal of the American Geriatrics Society*, 57 (7), pp. 1175-1183. Cited 410 times.
doi: 10.1111/j.1532-5415.2009.02307.x

View at Publisher

7 Dealey, C., Posnett, J., Walker, A.

The cost of pressure ulcers in the United Kingdom

(2012) *Journal of Wound Care*, 21 (6), pp. 261-266. Cited 299 times.
http://www.internurse.com/cgi-bin/go.pl/library/article.cgi?uid=92375;article=JWC_21_6_261_266;format=pdf
doi: 10.12968/jowc.2012.21.6.261

View at Publisher

8 Demarré, L., Van Lancker, A., Van Hecke, A., Verhaeghe, S., Grypdonck, M., Lemey, J., Annemans, L., (...), Beeckman, D.

The cost of prevention and treatment of pressure ulcers: A systematic review

(2015) *International Journal of Nursing Studies*, 52 (11), art. no. 2618, pp. 1754-1774. Cited 207 times.
www.elsevier.com/locate/ijnurstu
doi: 10.1016/j.ijnurstu.2015.06.006

View at Publisher

9 Guest, J.F., Ayoub, N., McIlwraith, T., Uchegbu, I., Gerrish, A., Weidlich, D., Vowden, K., (...), Vowden, P.

Health economic burden that different wound types impose on the UK's National Health Service (Open Access)

(2017) *International Wound Journal*, 14 (2), pp. 322-330. Cited 223 times.
http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1742-481X
doi: 10.1111/iwj.12603

View at Publisher

10 Nguyen, K.-H., Chaboyer, W., Whitty, J.A.

Pressure injury in Australian public hospitals: A cost-of-illness study (Open Access)

(2015) *Australian Health Review*, 39 (3), pp. 329-336. Cited 100 times.
http://www.publish.csiro.au/nid/270.htm
doi: 10.1071/AH14088

View at Publisher

11 Padula, W.V., Delarmente, B.A.

The national cost of hospital-acquired pressure injuries in the United States (Open Access)

(2019) *International Wound Journal*, 16 (3), pp. 634-640. Cited 94 times.
http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1742-481X
doi: 10.1111/iwj.13071

View at Publisher

12 Orr, L., Klement, K.A., McCrossin, L., Drombolis, D.O., Houghton, P.E., Spaulding, S., Burke, S.

A systematic review and meta-Analysis of exercise intervention for the treatment of calf muscle pump impairment in individuals with chronic venous insufficiency

(2017) *Ostomy Wound Management*, 63 (8), pp. 30-43. Cited 18 times.
http://www.o-wm.com/
doi: 10.25270/owm.2017.08.3043

View at Publisher

13 Coyer, F., Miles, S., Gosley, S., Fulbrook, P., Sketcher-Baker, K., Cook, J.-L., Whitmore, J.

Pressure injury prevalence in intensive care versus non-intensive care patients: A state-wide comparison

(2017) *Australian Critical Care*, 30 (5), pp. 244-250. Cited 75 times.
http://www.elsevier.com/wps/find/journaldescription.cws_home/710660/description#description
doi: 10.1016/j.aucc.2016.12.003

View at Publisher

14 Soodmand, M., Moghadamnia, M.T., Aghaei, I., Ghasemzadeh, G., Kazemnejad Lili, E., Homaie Rad, E.

Effects of hemodynamic factors and oxygenation on the incidence of pressure ulcers in the ICU

(2019) *Advances in Skin and Wound Care*, 32 (8), pp. 359-364. Cited 5 times.
http://journals.lww.com/aswcjournal/pages/default.aspx
doi: 10.1097/01.ASW.0000553599.20444.f4

View at Publisher

15 Barakat-Johnson, M., Lai, M., Wand, T., Li, M., White, K., Coyer, F.

The incidence and prevalence of medical device-related pressure ulcers in intensive care: A systematic review (Open Access)

(2019) *Journal of Wound Care*, 28 (8), pp. 512-521. Cited 35 times.
http://www.internurse.com/cgi-bin/go.pl/library/issues.html?journal_uid=38
doi: 10.12968/jowc.2019.28.8.512

View at Publisher

16 Kahn, J.M., Le, T., Angus, D.C., Cox, C.E., Hough, C.L., White, D.B., Yende, S., (...), Carson, S.S.

The epidemiology of chronic critical Illness in the United States (Open Access)

(2015) *Critical Care Medicine*, 43 (2), pp. 282-287. Cited 197 times.
http://journals.lww.com/ccmjournal/pages/default.aspx
doi: 10.1097/CCM.0000000000000710

View at Publisher

17 Flaatten, H., de Lange, D.W., Artigas, A., Bin, D., Moreno, R., Christensen, S., Joynt, G.M., (...), Guidet, B.

The status of intensive care medicine research and a future agenda for very old patients in the ICU (Open Access)

(2017) *Intensive Care Medicine*, 43 (9), pp. 1319-1328. Cited 102 times.
link.springer.de/link/service/journals/00134/index.htm
doi: 10.1007/s00134-017-4718-z

View at Publisher

18 Laporte, L., Hermetet, C., Jouan, Y., Gaborit, C., Rouve, E., Shea, K.M., Si-Tahar, M., (...), Guillon, A.

Ten-year trends in intensive care admissions for respiratory infections in the elderly (Open Access)

(2018) *Annals of Intensive Care*, 8 (1), art. no. 84. Cited 34 times.
http://www.annalsofintensivecare.com/
doi: 10.1186/s13613-018-0430-6

View at Publisher

19 Llaurado-Serra, M., Afonso, E.

Pressure injuries in intensive care: What is new?

(2018) *Intensive and Critical Care Nursing*, 45, pp. 3-5. Cited 8 times.
http://www.elsevier-international.com/journals/iccn/
doi: 10.1016/j.iccn.2017.12.002

View at Publisher

20 Chaboyer, W.P., Thalib, L., Harbeck, E.L., Coyer, F.M., Blot, S., Bull, C.F., Nogueira, P.C., (...), Lin, F.F.

Incidence and Prevalence of Pressure Injuries in Adult Intensive Care Patients: A Systematic Review and Meta-Analysis

(2018) *Critical care medicine*, 46 (11), pp. e1074-e1081. Cited 68 times.
doi: 10.1097/CCM.0000000000003366

View at Publisher

21 Gall, J.-R., Lemeshow, S., Saulnier, F.

A New Simplified Acute Physiology Score (SAPS II) Based on a European/North American Multicenter Study

(1993) *JAMA: The Journal of the American Medical Association*, 270 (24), pp. 2957-2963. Cited 5280 times.
doi: 10.1001/jama.1993.03510240069035

View at Publisher

22 Bergstrom, N., Braden, B., Laquzza, A., Holman, V.
The Braden scale for predicting pressure sore risk—reliability studies
(1985) *Nurs Res*, 34, p. 383. Cited 3 times.

23 (2018) *R: a language and environment for statistical computing*. Cited 39317 times.
R Foundation for Statistical Computing, Vienna

24 Alderden, J., Rondinelli, J., Pepper, G., Cummins, M., Whitney, J.

Risk factors for pressure injuries among critical care patients: A systematic review (Open Access)

(2017) *International Journal of Nursing Studies*, 71, pp. 97-114. Cited 85 times.
www.elsevier.com/locate/ijnurstu
doi: 10.1016/j.ijnurstu.2017.03.012

View at Publisher

25 Lima Serrano, M., González Méndez, M.I., Carrasco Cebollero, F.M., Lima Rodríguez, J.S.

Risk factors for pressure ulcer development in Intensive Care Units: A systematic review

(2017) *Medicina Intensiva*, 41 (6), pp. 339-346. Cited 46 times.
http://www.doyma.es/medintensiva/
doi: 10.1016/j.medin.2016.09.003

View at Publisher

26 Sala, J.J., Mayampurath, A., Solmos, S., Vonderheid, S.C., Banas, M., D'Souza, A., LaFond, C.

Predictors of pressure injury development in critically ill adults: A retrospective cohort study

(2021) *Intensive and Critical Care Nursing*, 62, art. no. 102924. Cited 18 times.
http://www.elsevier-international.com/journals/iccn/
doi: 10.1016/j.iccn.2020.102924

View at Publisher

27 Edsberg, L.E., Langemo, D., Baharestani, M.M., Posthauer, M.E., Goldberg, M.

Unavoidable pressure injury

(2014) *Journal of Wound, Ostomy and Continence Nursing*, 41 (4), pp. 313-334. Cited 119 times.
http://journals.lww.com/jwocnonline
doi: 10.1097/WON.0000000000000050

View at Publisher

28 Manzano, F., Pérez-Pérez, A.M., Martínez-Ruiz, S., Garrido-Colmenero, C., Roldan, D., Jiménez-Quintana, M.D.M., Sánchez-Cantalejo, E., (...), Colmenero, M.

Hospital-acquired pressure ulcers and risk of hospital mortality in intensive care patients on mechanical ventilation

(2014) *Journal of Evaluation in Clinical Practice*, 20 (4), pp. 362-368. Cited 28 times.
http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1365-2753
doi: 10.1111/jep.12137

View at Publisher

29 Halfens, R.J.G., Bours, G.J.J.W., Van Ast, W.

Relevance of the diagnosis 'stage 1 pressure ulcer': An empirical study of the clinical course of stage 1 ulcers in acute care and long-term care hospital populations

(2001) *Journal of Clinical Nursing*, 10 (6), pp. 748-757. Cited 84 times.
doi: 10.1111/j.1365-2702.2001.00544.x

View at Publisher

30 Doerken, S., Mandel, M., Zingg, W., Wolkewitz, M.

Use of prevalence data to study sepsis incidence and mortality in intensive care units

(2018) *The Lancet Infectious Diseases*, 18 (3), p. 252. Cited 5 times.
http://www.journals.elsevier.com/the-lancet-infectious-diseases
doi: 10.1016/S1473-3099(18)30081-1

View at Publisher

Blot, S.I.; Department of Internal Medicine, Faculty of Medicine and Health Science, Ghent University, C. Heymanslaan 10, Ghent, Belgium; email:stijn.blot@UGent.be

About Scopus

What is Scopus

Content coverage

Scopus blog

Scopus API

Privacy matters

Language

日本語に切り替える

切换到简体中文

切換到繁體中文

Русский язык

Customer Service

Help

Tutorials

Contact us