

ORIGINAL ARTICLE

Organizational development and management factors involved in the prevention and effective therapy of pressure ulcers: The results of the national survey conducted among Hungarian public hospitals

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Abstract

The prevention of pressure ulcer (PU) or pressure injury (PI) wounds is of public health importance in developed countries, including Hungary. The study aimed to assess the PU/PI prevention and care practices of Hungarian public hospitals and identify organizational and management factors. In 2022, a national, questionnaire-based survey of inpatient institutions relevant to PU/PI care was conducted, providing a picture of the practices of 86 hospitals for the year 2019. The questionnaire was processed using descriptive statistics and regression analysis. The survey results show that good practices in Hungary are isolated, the reporting system is inhomogeneous, and documentation is not uniform across our institutional system. Of the 86 institutions, 71.0% operate a PU prevention team, 64.0% use prophylactic dressings, and 88.3% use an anti-decubitus mattress, with an average ratio of 26.1% to the number of beds. Less than half of the institutions reported the incidence of hospital acquired pressure injuries (HAPIs). In this sample, we found no significant association between hospital type and hospital size with the incidence of full-thickness HAPIs (stage III and IV wounds). Developing a comprehensive PU/PI reporting system and updating the national PU/PI prevention and care guidelines are essential in Hungary.

KEYWORDS

chronic wound care, injury prevention, pressure ulcer, pressure ulcer prevention team

Key Messages

- Statistical and regression analysis of the national questionnaire survey supported the need to develop criteria and indicators for a uniform institutional reporting system on pressure ulcer/pressure injury (PU/PI) to compare PU/PI prevention and care practices in institutions.

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- The good practices identified by committed nursing leaders, such as organizational development measures, modern preventive tool use and monitoring, raise the need to develop a comprehensive national program (training and support for tool procurement).
- An update of the national PU/PI prevention and care professional guideline is essential, which can provide a valuable framework for PU/PI prevention and care policies and practices in individual institutions.

1 | INTRODUCTION

The possibility of prevention of pressure ulcer (PU) or pressure injury (PI) wounds, the study of the prevention of PU/PI wounds and the dissemination of the preventive approach are the focus of international publications, and the research presented in this paper is also related to this topic. The prevention of PU/PI, which can be defined as nosocomial harm, and the care of an already established wound is a complex task requiring the cooperation of several sectors, from the assistant nurse to the graduate, university nursing competence levels, as an independent competence or in stages III-IV in cooperation with a physician.¹ Within the PU/PI classification system, the literature differentiates between full-thickness hospital-acquired pressure injuries (HAPIs), that is, stage III, IV, and unspecified stage PUs, according to their severity within the defined stages, which were also the focus of our research.²

In Hungary, in the past years, there have been pilots, programmes and improvement efforts in this field (e.g., the 'Bella programme', the 'NEVES programme', the 'EFOP-1.10.2-17 programme' for the creation of PU mobile teams).³⁻⁵ However, the professional protocol 'Risk assessment, prevention and management of decubitus ulcers' declared by the Ministry of Health expired on 30 June 2013. The national PU/PI-specific survey aimed to identify actual national institutional practices, which could provide a basis for developing a professional guideline.⁶

The prevalence and incidence of PU/PI is recognized as a quality indicator for patient safety and quality of care because most PUs are preventable if adequate measures are implemented and evaluated.⁷ The International Guidelines for the Prevention and Care of Pressure Ulcers leave it to each healthcare organization to define its central PU prevention program tailored to its population demographics, specific characteristics, and culture of care.⁸

In Hungary, there is no national professional protocol for preventing and treating PUs, and there is no uniform institutional reporting and monitoring system.¹ Recommendations on preventing and treating PUs can be found in a geriatric-specific guideline.⁹ The annual National Nosocomial Surveillance System (NNSR) reports of the National Public Health Centre (NPHC) do not include

data on the occurrence of PU/PI. The last time the health authority assessed the national PU/PI care practice in inpatient care was in 2007, in the context of a target audit, and made striking findings and recommendations for improving the situation.¹ The Ministry of Human Capacities (MHC) published its strategy for long-term care until 2030 in 2020 as a gap-filling measure.¹⁰ However, the strategy does not include any causal elements for preventing and treating PU/PI. Requirements for preventing and treating PU/PI are included in the Manual of Standards of Care in Health Care (MSCHC), officially published by the MHC.¹¹ PU care is regulated by institutions in written protocols. The names, technical content, and timeframe of protocols within institutions are not uniform.¹

Several authors suggest a decrease in the prevalence and incidence of HAPIs through the development of a multidisciplinary team.^{12,13} In their study, Miller et al. described that establishing a multidisciplinary PUP Team to systematically identify and monitor HAPIs and hospital-wide engagement to apply quality care successfully reduced HAPIs over a 3-year period.¹⁴ Characteristics of the Team included in the study: A certified wound care nurse and a plastic surgeon were co-leaders. Team members were from multiple practice areas and included physical and occupational therapy, nursing, clinical nurse specialists, quality and safety, process improvement, informatics, analytics, and supply chain/product analysis. The team goals were to document the occurrence of HAPIs across all hospital units, reduce preventable full-thickness PIs to zero, and recommend institution-wide changes as those opportunities were recognized. Miller et al. found that implementing a multidisciplinary PUP Team has improved patient outcomes by decreasing the number of preventable full-thickness HAPIs. Institutional awareness has increased and caused a culture shift around the importance of skin assessments.

In Hungary, there is no uniform standard and practice for the operation and composition of the PUP Team; they operate based on the healthcare institution's voluntary decision on care management. The establishment of mobile PUP Teams was supported through an EU funded call in 2017, and the vast majority of them was maintained

for years.⁴ The professional composition of the PUP Teams is actually not multidisciplinary (include mainly skilled nurses) in Hungary. Moreover, they typically operate at the central institutional level and under the direction of hospital nursing directors and in strong coordination with ward nurses and other professionals (physiotherapist, dietician, physicians, and mainly surgeons) in a territorially separate from the ward structure. Nurses working in the ward carry out risk assessment and bedside mobilization of patients. In the case of patients at high risk or when a wound is detected, an alert is sent to the central PUP Team. The Team is responsible for the systematic identification and follow-up of HAPIs, and the application of quality wound care and the provision of personalized nursing instructions to the ward nurses for further applicable activities of PU management.

PU/PI is a patient safety and public health problem due to reduced quality of life of the patients and high incidence of PUs, and has been shown to be costly for institutions, the healthcare system as a whole.^{14,15} Recent studies have identified the added value of incorporating prophylactic dressings into a prevention protocol.^{16,17} There is emerging evidence that applying preventive dressings to PU predilection sites and standard prevention helps prevent the development of PU patients.^{18–23} Preventive bandages are also recommended by the international guidelines on PU prevention and care.⁹ Foam alternatives to standard hospital mattresses reduce the incidence of PUs in people at risk especially people at high risk of developing PUs should use higher-specification foam mattresses rather than standard hospital mattresses.²⁴ Recent studies have compared support surfaces (foam surfaces and other surfaces, for example, reactive fibre surfaces, reactive gel surfaces, reactive foam and gel surfaces, or reactive water surfaces, alternating pressure [active] air surfaces and reactive air surfaces) specialized in PU prevention in terms of PU incidence, patient comfort, adverse events, and health-related quality.^{25–27}

In their study, Shi et al. found that foam surfaces may increase PU incidence compared to alternating pressure (active) and reactive air surfaces.¹⁴ Alternating pressure (active) air surfaces are probably more cost-effective than foam surfaces in preventing new PUs. According to Shi et al., current evidence suggests uncertainty, so future research in this area should consider the evaluation of the most essential support surfaces from the perspective of decision-makers.²⁸

In our study, we investigated the associations between the presence of a PUP Team in the national PU/PI survey focusing on three PU prevention factors from the results of the national decubitus survey, which depend on healthcare organizational and management decisions: the presence of a PUP team, the use of preventive dressings and

the supply of anti-decubitus mattresses as preventive tools concerning the prevalence of full-thickness HAPIs in health care institutions.

Our research aims to explore the extent to which the presence of the PU Prevention Team (PUP Team) and the use of preventive tools have been extended in Hungarian public hospitals as a function of management decisions and whether they have an impact on reducing the rate of full-thickness HAPIs (stage III, stage IV, and non-stage) acquired in the institution.

2 | MATERIALS AND METHODS

2.1 | Method of the national, questionnaire-based survey

The main research method was a questionnaire survey designed, prepared, and carried out by the authors in Hungary's inpatient specialist care institutions under public maintenance, which took place between 21 April 2022 and 5 May 2022. Nurses, biostatisticians, sociologists, health managers, and health economists were involved in developing the questionnaire.

The selection criteria were public hospitals (91 institutions) providing inpatient specialist care in Hungary. Exclusion criteria were: hospitals whose care specialization implies that they had fewer than 50 PU/PI cases per year. The questionnaire was sent out officially by the National Directorate General for Public Hospitals to the institutions' directors. The survey was comprehensive, providing a picture of 86 hospital practices (95% of all the Hungarian inpatient specialist care institutions). The authors' institution-level questionnaire was designed to map inpatient institutional care and prevention practices, was written in a non-advisory format for patient data and documentation and was based on self-report. The survey was created in Lime Survey and all the questions were compulsory. As a professional organization, the Hungarian Association of Nursing Directors reviewed and tested the questionnaire.

The questionnaire used in the research contained 54 questions with 13 main themes. The survey covered questions on nursing, human resources, facilities, reporting, training, organizational development and management. The technical structure of the questionnaire was structured as follows: general institutional data, contents of PU/PI prevention and care document, existence and characteristics of PUP Team, risk assessment and prophylactic dressing application practices, training, monitoring—data collection practices, contents of PU/PI Documentation used, impact of COVID-19 pandemic. Completion of the questionnaires was delegated to the directors of nursing by the heads of the institutions.

Our study focuses on the following explanatory and dependent variables to examine the data:

- hospital size (small under 350 beds, medium between 351 and 850 beds, large over 851 beds)
- type of hospital (county hospital, local hospital, chronic rehabilitation hospital, specialized hospital, and national institute)
- number of PU/PI/HAPI in the institution
- existence of PUP Team (yes/no)
- number of anti-decubitus mattresses
- use of prophylactic dressings (yes/no)

Dependent variable: number of PU/PI by stage (stage I, II, III, IV). It was assumed that an institution has good practices (well-functioning detection, monitoring and prevention) with a lower proportion of stage III and IV wounds than stage I and II in all reported PUs.

2.2 | Method of the data analysis

Descriptive statistics were reported in mean, standard deviation, and relative frequencies. Due to the small sample size and unequal groups, robust tests of independent samples *t*-test and one-way analysis of variance were used with Hedges' *g* and partial eta-squared effect size measurements to examine group differences. For testing independence, Fisher's exact test was applied with the phi coefficient as the strength of association, or Pearson's correlation coefficient was calculated. If the small sample size did not allow the statistical analysis, we reported descriptive data and interpreted the results based on practical significance. The level of significance was set a priori at 0.05. Statistical analysis and visualization were conducted using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp. Released 2017. Armonk, NY, USA: IBM Corp) and jamovi Version 2.3 (The jamovi project, 2023. Retrieved from <https://www.jamovi.org>).

3 | RESULTS

3.1 | Characteristics of hospitals in the variables studied

3.1.1 | Type and size of hospitals

The distribution of the types of 86 hospitals surveyed were: local 36.0% ($n = 31$), county 24.4% ($n = 21$), chronic rehabilitation hospital 18.6% ($n = 16$), specialized hospital 14.0% ($n = 12$), and national institution 7.0% ($n = 6$). The distribution of hospital size was small 41.9% ($n = 36$),

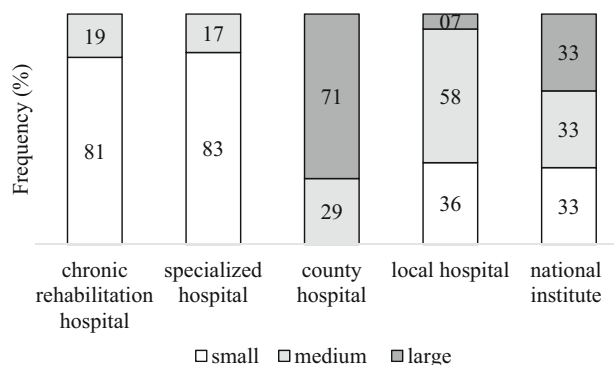


FIGURE 1 Public hospitals included in the study according to their size and type.

medium 36.0% ($n = 31$), and large 22.1% ($n = 19$). Understandably, there is some correlation between hospital size and type. The overwhelming majority of chronic rehabilitation hospitals (81.2%, $n = 13$) and specialized hospitals (83.3%, $n = 10$) are small institutions, the majority of county hospitals are large (71.4%, $n = 15$), more than half of local hospitals are medium-sized institutions (58.1%, $n = 18$), and finally, the size of national institutions is equally divided between small, medium and large institutions (33.3%, $n = 2$) (Figure 1).

3.1.2 | The existence of the PUP Team and its correlation with hospital type and size

Of the 86 hospitals surveyed, 61 (70.9%) have a PUP Team in place. The existence of a PUP Team is associated with the type and size of the hospital. When looking at type, most county hospitals, 90.5% ($n = 19$), had a PUP Team in place regardless of the institution's size. Local hospitals and chronic rehabilitation hospitals also had most PUP Teams, 77.4% ($n = 24$) and 68.8% ($n = 11$), respectively; for chronic rehabilitation hospitals, regardless of size, and for local hospitals, a higher proportion of small and large institutions (90.9% and 100.0%) than in medium-sized institutions (66.7%, $n = 12$). Nearly 40% of specialized hospitals have a PUP team (41.7%, $n = 12$) regardless of the size of the institution, and only one-third of the national institutions (33.3%, $n = 2$), typically only in large institutions (Table 1).

3.2 | Examining the preventive tools of PU/PI

3.2.1 | Anti-decubitus mattress use

The number of anti-decubitus mattresses was examined as a proportion of the number of reported working beds.

TABLE 1 The existence of the PUP Team and its correlation with the type and size of the hospital.

Type	PUP Team		Type × size × PUP Team		
	<i>n</i>	%	Institution size	<i>n</i>	%
County hospital (<i>n</i> = 21)	19/21	90.5	S: 6/21	5/6	83.3
			M: 15/21	14/15	93.3
Local hospital (<i>n</i> = 31)	24/31	77.4	S: 11/31	10/11	90.9
			M: 18/31	12/18	66.7
			L: 2/2	2/2	100
Chronic rehabilitation hospital (<i>n</i> = 16)	11/16	68.8	S: 13/16	8/13	61.5
			M: 3/16	3/3	100
Specialized hospital (<i>n</i> = 12)	5/12	41.7	S: 10/12	4/10	40
			M: 2/12	1/2	50
National institute (<i>n</i> = 6)	2/6	33.3	S: 2/6	0/2	0
			M: 2/6	0/2	0
			L: 2/6	2/2	100

Abbreviations: L, large; M, medium; S, small.

Overall, 88.4% of hospitals (*n* = 76) had an anti-PU mattress, with an average rate of 26.05% (SD = 22.41, min-max: 0–100). A higher proportion of facilities with a small effect ($t(74) = -0.714$, $p = 0.480$, $g = 0.20$) had a PUP Team ($M = 27.41$, $SD = 20.3$, no PUP Team: $M = 22.93$, $SD = 26.91$).

3.2.2 | Prophylactic dressing use

64.7% of the surveyed institutions (*n* = 55) use prophylactic dressings. There was no statistically significant association between the use of prophylactic dressings and the presence of a PUP Team ($\chi^2(1, N = 85) = 3.167$, $p = 0.085$, $\Phi = 0.19$). However, the frequency data showed a moderate effect, with a higher proportion (proportion/rate) of prophylactic dressings used in the presence of a PUP Team (70.5%, *n* = 43). Institutions without a PUP Team (*n* = 24) have a half/half ratio of prophylactic dressing use/non-use.

3.3 | The prevalence of PU/PI in Hungarian public inpatient specialized care institutions

Thirty-nine institutions provided data by PU/PI stage classification. The analyses investigated the percentage of full-thickness HAPIs (stage III and IV wounds) among all reported PU/PI cases. Overall, the institutions had a prevalence of stage III and IV wounds (Full-thickness HAPI rate) ranging from 4.4% to 95.0%, with a mean of 34.19% (SD = 14.95). When considering the type of hospital for

statistical analyses, national institutions were excluded as only one institution provided data with a full-thickness HAPI rate of 35.0%. Stage III and IV wound proportions did not show statistically significant differences by hospital type ($F(3, 34) = 2.471$, $p = 0.131$, $\eta_p^2 = 0.10$). However, with a small effect, the lowest incidence was in county hospitals compared to other types of institutions (Figure 2).

The proportion of full-thickness HAPIs did not show statistically significant differences by hospital size ($F(2, 36) = 0.133$, $p = 0.876$, $\eta_p^2 = 0.01$). Based on hospital size, the proportion of full-thickness HAPIs was small (*n* = 12)— 32.6 ± 13.3 , medium (*n* = 18)— 35.6 ± 18.2 , large (*n* = 9)— 33.6 ± 10.5 (Figure 3).

No statistically significant correlation was found between the percentage of full-thickness HAPIs and the presence of a PUP Team ($t(35) = -1.435$, $p = 0.213$, $g = 0.56$). It is worth noting that only 4 of the institutions did not have a PUP Team. In institutions without a PUP Team, the percentage of full-thickness HAPIs ranged from 23.9% to 38.9% ($M = 28.2$, $SD = 7.15$). In institutions with a PUP Team, the percentage ranged from 4.4% to 95% ($M = 34.88$, $SD = 15.51$).

Few institutions did not use preventive dressings (*n* = 9). The percentage of full-thickness HAPIs in these institutions ranged from 13.9% to 47.8% ($M = 30.2$, $SD = 11.18$). In institutions using preventive bandages, it ranged from 4.4% to 95.0% ($M = 35.4$, $SD = 15.9$). The difference between the two groups was not statistically significant ($t(37) = -1.099$, $p = 0.286$, $g = 0.35$) (Figure 4).

Finally, the number of anti-decubitus mattresses and the incidence rate of full-thickness HAPIs showed no significant relationship ($r(35) = -0.105$, $p = 0.536$).

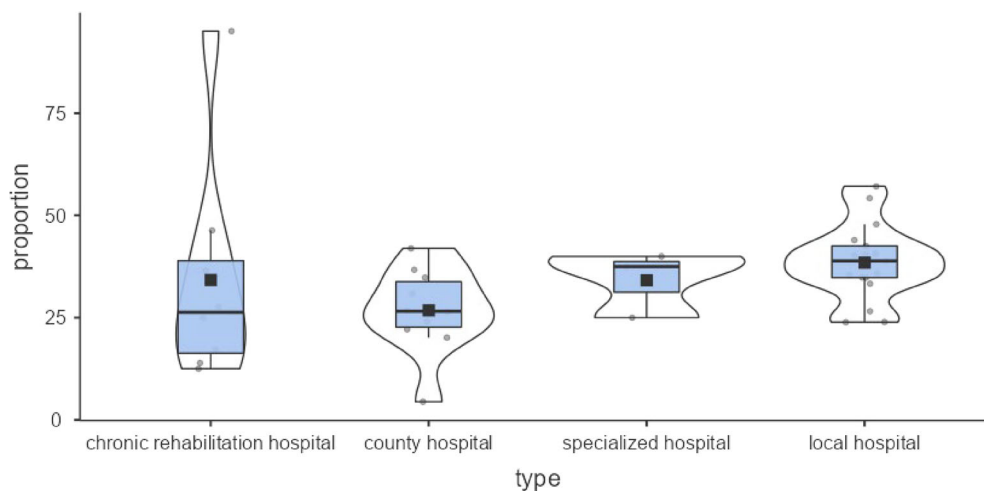


FIGURE 2 The proportion of full-thickness hospital acquired pressure injuries according to the type of hospitals. $M \pm SD$. Chronic rehabilitation hospital: 34.2 ± 27.1 , county hospital: 26.8 ± 10.4 , specialized hospital: 34.2 ± 8 , local hospital: 38.5 ± 9.3 .

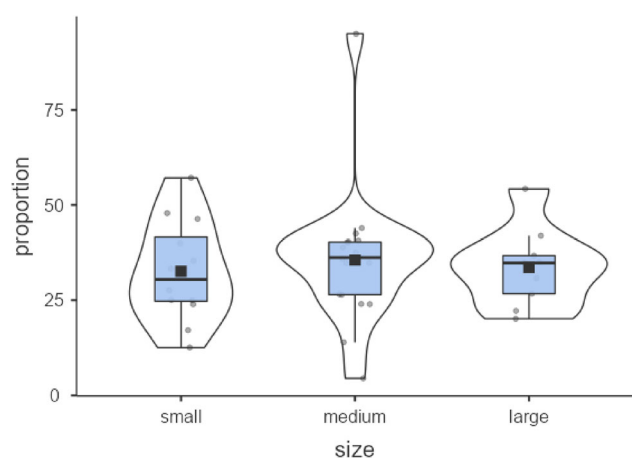


FIGURE 3 The proportion of full-thickness hospital acquired pressure injuries according to the size of the hospital.

4 | DISCUSSION

The study of the prevention of PU/PI wounds and the dissemination of the preventive approach is the focus of international publications.²⁹ Hommel et al. identified three main categories as successful factors in preventing PUs in hospitals: developing a good organization, maintaining continuous awareness (i.e., monitoring and feedback of results) and recognizing patient benefits (i.e., education and use of modern tools). In their opinion, the attitude and commitment of nurse managers are crucial for staff to work actively in PU prevention (Figure 5).⁷

In Hungary, the practical application of modern prevention and therapy tools is still inadequate, and the use of quality management tools is insufficient. These may be due to the low participation of Hungarian professionals in subject-specific international initiatives such as EWMA and EPUAP. A lack of knowledge and implementation of modern international trends and practices in wound care characterizes the nursing profession.³⁰ Public

hospitals are not adapting with sufficient speed and solutions to emerging innovations in PU prevention and care. 88.4% of the institutions have an anti-decubitus mattress, 20.6% of their operating beds, and 64.0% use prophylactic dressings. PUP Teams are in place in the larger and smaller local hospitals, and most county hospitals. Half of the medium-sized local hospitals, most specialized hospitals with a specific professional profile and most national institutes do not have an organized PUPP Team. No significant results were found for using preventive devices by hospital size and type. However, frequency data suggest that hospitals with a PUP Team have a higher proportion of preventive dressings and use of anti-decubitus mattresses.

The collection, monitoring, evaluation, and transparency of targeted PU/PI institutional data are not resolved. From institutional governance, organizational development, and management perspectives, we expected to find valuable correlations in our research between the existence of a PUP team and the use of preventive tools in Hungarian public hospitals regarding the incidence of full-thickness HAPIs, but no significant correlations were found. This may be because PU/PIs are recorded by stage classification in only 45.3% ($n = 39$) of the institutions, 4 of which do not have a PUP Team. The data, or lack thereof, suggests that senior managers of institutions are not interested in exploiting the efficiency reserves of PU/PI prevention and care.

There is a lack of professional supervision, a lack of professional guidelines on the topic, missing performance and quality indicators, as well targeted standardized data collection, and the DRG-based financing system does not provide direct incentives for preventing PU/PI. Systematic data collection would allow analyses of the effectiveness, cost-effectiveness of prevention and treatment of PU/PI, and thus also the comparison of international benchmark data. A complete effectiveness analysis of PU/PI prevention

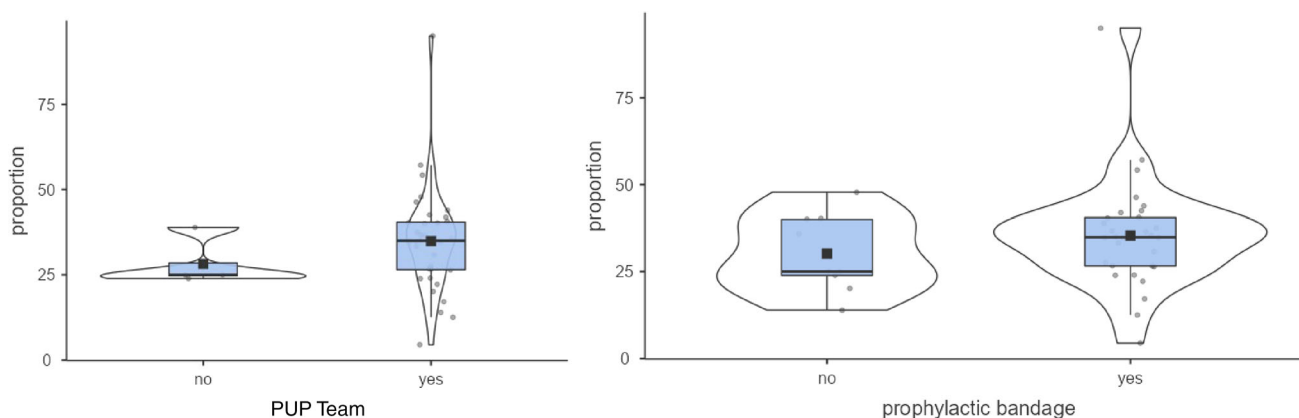


FIGURE 4 Proportion of full-thickness hospital acquired pressure injuries according to the presence of the PUP Team and the use of a prophylactic bandage.

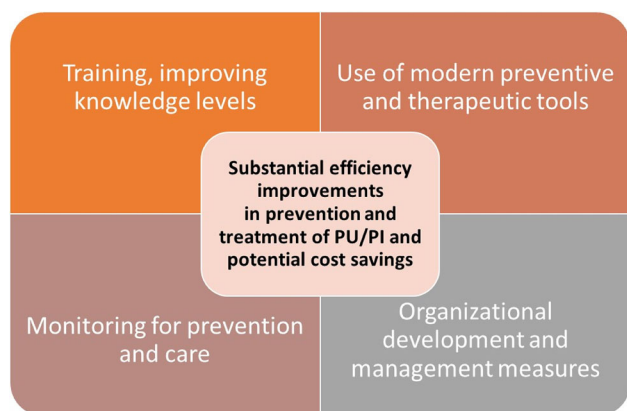


FIGURE 5 Success factors for the prevention and care of pressure ulcer/pressure injury (PU/PI), proper elaboration.

and treatment requires precisely defining relevant direct and indirect costs incurred. Associated costs include increased supplies, equipment, specialized beds, staffing, nutritional support, laboratory testing, laboratory testing, and hospital length of stay.

Among the Central European countries with similar economic and social development as Hungary, we did not find any PU/PI prevention policies or scientific analyses on PU/PI monitoring in Poland and Slovakia. As a result of the study by Grešš Halász et al., the knowledge and attitudes of nurses towards PU in Slovakia are also inadequate. Grešš Halász et al. also highlight the need to develop national programs and PU/PI monitoring.³¹ By contrast, detailed data on the prevalence and mortality of PU/PI in the Czech Republic have been available for more than 10 years, thanks to a national electronic register.^{32–35} The database allows for a wide range of analyses of factors influencing the quality of PU/PI prevention and care. Despite the existing register, Pokorná and

coworkers also recommend developing and operating a more valid and reliable monitoring system.³²

4.1 | Limitations of the analysis and survey

Self-reporting problem: It was also characteristic of our data collection that significant variability exists in reported incidence and prevalence data due to variability in data collection and injury recognition.¹⁴ Assessment of wounds was not based on EPUAP/NPIAP classification. Less than half of the institutions had data by stage classification, for which institutions used different validated scales. Risk assessment case counts were recorded sporadically, so we were not able to calculate risk assessment case counts. Further targeted research on the appropriate and targeted use of different types of decubitus mattresses and the effectiveness of their use is needed as part of a complete prevention portfolio, as our present research did not investigate such details.

5 | CONCLUSIONS

The present research has confirmed that it is recommended to include aspects of cost and performance measurement from the outset in efficiency studies that allow comparisons at institutional and organizational unit levels to facilitate their subsequent evaluation. The necessary organizational changes, the creation and continuous operation of PUP teams, as well as the regular training and up-to-date of the knowledge and practice of specialists involved in PU prevention and treatment are a sure strategy for achieving effective prevention and treatment. The use of modern prevention and therapeutic tools,

performance and quality monitoring at the institutional level, as well as measuring the cost-reducing effects of organizational development and management measures, which also might improve efficiency and cost-effectiveness, require further investigations. As a further research direction, we recommend introducing national-level PU/PI monitoring practices, publishing a national professional protocol, and implementing the intergovernmental guideline for Hungarian health policy decision-makers.

FUNDING INFORMATION

The national decubitus survey was financed by Mölnlycke HealthCare Ltd in 2022. The APC was financed by the Semmelweis University. The questionnaire was sent out officially by the National Directorate General for Public Hospitals to the institutions after the approval of the Health Secretariat of the Ministry of Human Capacities.

CONFLICT OF INTEREST STATEMENT

All authors were employed partly by Med-Econ Human Services Ltd. The national decubitus survey was financed by Mölnlycke HealthCare Ltd in 2022. The funder had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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