Impact pressure redistribution mattresses have on bed mobility and independence

Background: Current guidelines recommend changing position regularly and the use of pressure redistribution mattresses to lower risk of pressure ulcer (PU) development. To date there has been no clear exploration of any negative impacts mattresses may have upon mobility and independence.

Aim: Explore the perceptions of healthcare professionals (HCPs) on the impact pressure mattresses have on mobility and independence during bed transfers.
Methods: Cross-sectional survey shared online.

Results: A total of 145 participants, including physiotherapists (n=71), nurses (n=52), occupational therapists (n=20), and moving and handling practitioners (n=2) responded. Alternating air (n=119) and foam (n=114) mattresses were most used across 25 clinical areas. Overall, 87.5% reported challenges with pressure redistribution mattresses, with alternating air surfaces associated with the greatest adverse effects on mobility and independence.
Conclusions: Results highlighted challenges impacting mobility and independence with bed transfers were specific to air filled mattresses. Perceptions may be influenced by differing clinical roles; therefore, a multidisciplinary approach to mattress selection and use is advocated for PU prevention and management. Such an approach supports the optimisation of skin integrity, mobility and independence, while promoting patient-centred care.

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- Bed mobility
- Health care professionals
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- Pressure redistribution mattresses
- Pressure ulcers
- Survey

"A pressure ulcer (PU) is localised damage to the skin and/or underlying tissue… resulting from prolonged pressure or pressure in combination with shear" (NPIAP, EPUAP & PPPIA, 2025). They are painful and debilitating, impacting physical, social and psychological wellbeing along with length of stay. Incidence rates and associated implications have been debated, reflecting variations in reporting methods and the complexity of capturing both direct and indirect costs. Over the past two decades, there have been developments in PU management, including improved risk assessment, preventative strategies and advances in pressure-relieving equipment (Fletcher et al, 2021). Despite these improvements, PU prevalence remains a concern due to their implications for quality of life and associated costs. Between 2017 and 2019, approximately 202,000 PU incidences were reported in the United Kingdom (UK) National Health Service, with an estimated cost of £571.98 million, encompassing financial and human resource burdens (Guest et al, 2020).

To relieve pressure and reduce the risk of PU development, current guidelines recommend changing position regularly and the use of pressure redistribution mattresses (NICE, 2014; NPIAP, EPUAP & PPPIA, 2025). Pressure redistribution mattresses are designed to minimise friction and shear forces, while optimising and redistributing pressure across the skin and underlying tissues (McInnes et al, 2015). Various mattress types are available to accommodate differing risk levels and clinical needs, incorporating immersion, envelopment and alternating pressure. Although mattresses have been shown to reduce the risk of PUs, certain material types have been associated with adverse effects. Nixon et al (2019) suggests alternating air mattresses may be uncomfortable, with some patients requesting to change off them, conflicting with clinical guideline recommendations (Serraes et al, 2020).

One of the primary risk factors for PU development is a reduced ability to independently move and reposition, resulting in sustained pressure on tissues (National Health Service, 2020). Although repositioning relates to changing body position to redistribute pressure, it is closely linked to overall mobility

and functional independence. The ability to move and reposition independently contributes not only to pressure management, but physical, psychological and social wellbeing, reducing reliance on carers and equipment, and supporting autonomy (Gorecki et al, 2009; Lim et al, 2020; Theisen et al, 2012). Conversely, individuals who are unable to move or reposition regularly may spend long periods inactive, contributing to deconditioning, muscle weakness, joint stiffness and increasing dependence on assistance for bed mobility, transfers and activities of daily living.

Study aim

Pressure redistribution mattresses are suggested to aid in the prevention and management of PUs; however, literature has highlighted negative impacts upon an individual's wellbeing and mobility (Nixon et al, 2019). To date there has been no clear exploration of the negative impacts, specifically upon an individual's mobility.

This study forms part of a wider PhD project. The aim of this phase of the project was to explore the perceptions of HCPs on the impact pressure mattresses have on bed mobility and functional independence during bed transfers.

Methodology

Study design and approach

A cross-sectional survey was developed comprising three domains: demographic characteristics (domain one), pressure mattress type and usage (domain two), and perceived impact on mobility and functional independence (domain three). Demographic characteristics included clinical profession, years since qualification, geographical location and clinical experience.

Participants identified all mattress types used in their practice, based on standard classifications (NPIAP, EPUAP & PPPIA, 2025), including foam, alternating air, low air loss, overlays and hybrid surfaces, with an additional free-text option.

Perceptions of mattress impact were assessed using a five-point Likert scale, framed in terms of the mobility phase reducing independence. Five functional domains of bed mobility were evaluated, each with its own Likert scale: in-bed mobility (rolling), lying supine-to-sitting, sitting-to-standing, standing-to-sitting, and sitting-to-lying supine transitions. Each mattress type was rated across all domains, with an additional open-text field for further comments.

Participant recruitment

A convenience sample was recruited via the lead researcher's professional networks. The survey was distributed three times online to maximise geographical reach. Social media platforms were used, along with the Chartered Society of Physiotherapy discussion board.

Inclusion criteria required participants to be a registered HCP with either the Health and Care Professions Council or Nursing and Midwifery Council governing body. Full completion of the first domain, demographic information, was also required for results to be included. A pilot study with six clinical academics informed minor refinements, with completion time estimated at 15–20 minutes.

Data collection and analysis

Data was collected electronically. Quantitative data was analysed exploring descriptive statistics, using IBM SPSS Statistics version 28. Conventional qualitative content analysis using the principles by Hsieh and Shannon (2025) was used for the open text comments, with all responses included within analysis. Open text data was used to provide inductive category development by counting common words, which were then coded into themes and sub-themes.

Ethics

Ethical approval was obtained through the University of Huddersfield, School of Human and Health Sciences Research Ethics and Integrity Committee (SREIC/2022/080) prior to recruitment. Study information was provided online and participation was voluntary. Written, informed consent was obtained electronically at the start of the survey. Participants could withdraw from the study at any point during data collection by closing their browser. However, due to the anonymous nature of the data, retrospective withdrawal was not possible once the survey responses were submitted.

Results

A total of 163 participants accessed the survey; 18 responses were removed as they did not meet the inclusion criteria. For domain one and two, 'participant demographic characteristics' and 'mattress type and use', 145 full responses were included. Due to 17 incomplete questionnaire responses for domain three, only 128 out of the 145 possible responses were included within 'the perceived impact mattresses have upon mobility'.

Participant demographic characteristics (domain one)

The sample is summarised descriptively in Table 1. Physiotherapists make up the highest proportion (49%), with Nurses (35.8%),

Occupational Therapists (13.8%) and Moving and Handling Practitioners (1.4%) also completing the survey. Participants ranged from newly qualified to over 30 years experience. Participants were mainly from the UK, specifically England (94.5%). Those from outside of the UK had previously worked within the UK and were registered with their relevant governing bodies. A total of 25 clinical areas were reported, the most common being Elderly Care (n = 39) Community (n = 36), Tissue Viability (n = 26), Orthopaedics (n = 23), Rehabilitation Unit (n = 18), Critical Care (n=11) and Neurology (n=11). In total 145 participants responded to this domain; however, participants were asked to select current and previous clinical areas they had worked in, resulting in more than one area being selected for some.

Pressure mattress type and usage (domain two)

Participants were asked to select all that applied in relation to mattress types that they used in clinical practice. Alternating air was the most used (n=119), followed by foam (n=114) mattresses. Hybrid (n=50), overlays (n=42) and low air loss (n=39) were also reported to be used but were not as common.

Perceived impact mattresses have upon mobility (domain three)

A total of 112/128 (87.5%) participants reported that they had faced challenges when using pressure redistribution mattresses in relation to bed mobility and rehabilitation and 16 (12.5%) felt they did not face any challenges [Figure 1]. The reported challenges were specific to air filled mattresses and were not associated with foam mattresses.

Perceived impacts of pressure redistribution mattresses upon the five phases of bed mobility were explored using a Likert scale; median scores for each mattress type for the five bed mobility phases are shown in Table 2. Median scores ranged from 1-4, 4 indicated less challenges perceived and 1 indicated the most challenges perceived.

The largest difference was reported between the alternating air and foam mattresses, with the foam being perceived as having the least impact (median score = 3). Despite a median score of 3, no comments were made in relation to any challenges highlighted when using a foam surface. Alternating air mattresses were found to impact the most, specifically with the task of mobility within bed and transitioning from lying supine to sitting on the edge of the bed (median score = 1).

Open text results of HCPs perceptions of the impact on mobility and independence

Open text comments were provided by 102/145 total participants. All indicated they had faced challenges with pressure redistribution mattresses in relation to mobility and independence when using a surface with air in it. Common words were highlighted and counted throughout the data, and used to formulate six key themes and 22 subthemes, as shown in Table 3.

Alternating air mattresses were the most mentioned mattress type being described as a *'bouncy castle'*, *'too bouncy'*, *'wobbly'*, *'unstable surface'* and *'too soft'*, and were the primary focus of the open text comments and themes identified.

While six themes were identified from the open-text responses, only one (Table 3, key theme one) directly addressed this papers aim and will be expanded upon within the discussion. The remaining themes (Table 3, key themes two to six) reflect broader perspectives

Table 1. Participant demographic information (domain one total 145 responses).

Variable	Number	Percentage (%)
Healthcare profession		
Moving and Handling Practitioner (M&H)	2	1.4
Nurse (N)	52	35.8
Occupational Therapist (OT)	20	13.8
Physiotherapist (PT)	71	49.0
Experience (years)		
<1	5	3.4
1 – 10	42	29.0
11 – 20	42	29.0
21 – 30	34	23.4
>30	22	15.2
Regional area of current clinical practice		
England	137	94.5
Scotland	3	2.1
Northern Ireland	1	0.7
Other	4	2.7

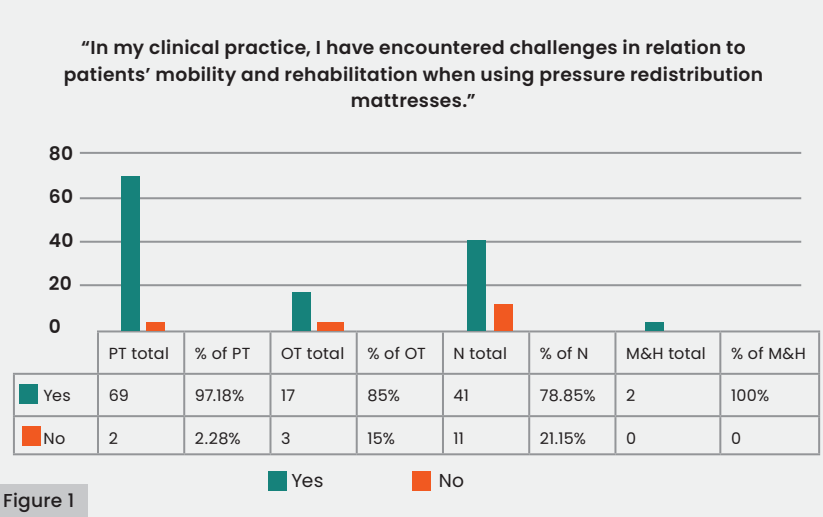


Figure 1

and experiences reported by HCPs. Together, these findings offer insight into wider considerations that extend beyond the primary focus of this paper; all themes merit further investigation and are explored in the wider PhD project completed by the lead author.

Discussion and exploration of open text comments

Pressure care has traditionally been situated within the nursing domain (Fletcher et al, 2021), yet recent guidelines emphasise the importance of multidisciplinary team (MDT)

Table 2. Median score for each mattress and bed mobility phase in response to the statement "patients' mobility ... is reduced with the following type of mattress".

Likert scale topics	Mattress type				
	Foam	Alternating Air	Low Air Loss	Hybrid	Overlays
Within the bed	3	1	2	2	2
Lie – Sit	3	1	2	2	2
Sit – Stand	3	2	2	2	2
Stand – Sit	3	2	2	2	2
Sit – Lie	3	2	2	2	2

Table 3. Key themes and subthemes from open text comments.

Key themes	Subtheme
1. Impact upon independence and bed mobility	• Reduced independence for transfers and bed mobility • Increased difficulty with transfers and bed mobility • Reduced sitting balance on edge of bed/mattress • Increased assistance required for transfers and bed mobility • Change in height of bed when sitting.
2. Impact upon therapy assessment and rehabilitation	• Reduced sitting balance • Early rehabilitation challenges • Difficulty in completing assessments • Increased fatigue on air mattress • Increased time to complete rehabilitation and length of stay in acute setting.
3. Staff limitations	• Decision making – relating to interprofessional and clinical choice around mattress provision • Staff knowledge • Staff reliance on equipment.
4. Equipment limitations	• Difference between acute and community provision • Issues with deflation and reinflation of dynamic mattresses • Mattress faults • Availability of mattresses.
5. Fear of the mattress	• Getting stuck/sinking into the mattress • Falling off the mattress.
6. Neurological impacts	• Impact on underlying movement disorders • Increased tone, spasticity and involuntary movements • Increased challenges in moving and handling of individuals with neurological conditions.

collaboration across HCPs (NPIAP, EPUAP & PPPIA, 2025). This study found HCPs across nursing and therapy roles perceived dynamic, alternating air mattresses to adversely affect mobility and independence. While this study is the first to specifically explore the impact mattresses have upon mobility and independence from an MDT perspective, findings align with previous research comments and suggestions (Nixon et al, 2019; Serraes et al, 2020). Incorporating the wider MDT reflects their role in current clinical practice, and provides a variation of perceptions and experiences.

Impact upon independence and bed mobility

Negative impacts upon an individuals bed mobility and independence were the most common key theme highlighted when using a support surface with air in it. All bed mobility tasks were highted in the comments, with impacts upon individuals' ability to relieve their own pressure also noted.

"The air mattress makes it harder to move, roll and shuffle. This means patients can't manage their pressure because they can't move independently due to the difficult surface" [PT].

Reducing an individual's ability to move independently has secondary implications on staff and carer time, and costs. Having to wait or ask for help can reduce patients feeling of self-worth, along with risks to deconditioning and pressure relief (Theisen et al, 2012).

Transfers were highlighted to be adversely affected when using alternating air mattresses, *"alternating mattress are difficult to transfer on/off of" [Nurse],* along with the change in bed height caused by using an alternating air mattress.

"Patients struggle to get off, move about on an air mattress, therefore becoming dependent on others = loss of independence and function… Not only does the content i.e. air, impact on independence and function, the mattress is often deep, so the height becomes an issue" [OT].

Alternating air mattresses were *"more difficult for patients to turn for cares/fitting slings and more difficult for all bed mobility including sitting on edge of bed" [OT].* Challenges for both patients and carers can increase time and effort to complete transfers.

Discussion

While most participants perceived pressure redistribution mattresses to have a negative impact upon mobility and independence, 12.5% did not. Although the 'no' responses were compromised from three HCP groups, their representation was not evenly distributed [Figure 1]. This pattern could suggest that perceptions are shaped by differing roles and levels of involvement in pressure care. Nurses, who are traditionally engaged in skin assessment, repositioning and PU prevention, may prioritise tissue viability over mobility considerations. In contrast, physiotherapists and occupational therapists, whose roles focus on movement, rehabilitation and functional performance, are more likely to identify mobility tasks. Consequently, the same intervention may be interpreted differently depending on whether the primary focus is risk prevention or mobility, contributing to variation in reported perceptions. It is therefore plausible to advocate for the inclusion of the wider MDT in pressure prevention and management. This not only aligns with current guideline recommendations but also enhances clinical decision-making and supports mattress choice and usage.

Conclusion

HCPs perceived pressure redistribution mattresses, specifically alternating air, to have adverse effects on bed mobility and functional independence. Adverse effects were most prevalent for in-bed movements (e.g. rolling) and supine lying to sitting transfers. Alternating air mattresses were perceived to provide the greatest challenges and impacts. Perceptions varied across clinical specialities, highlighting the importance of integrating MDT perspectives to support balanced decision-making that optimises both PU prevention, and the preservation of mobility and independence within patient-centred care.

Study limitations

A convenience sampling strategy was employed using social media and snowballing techniques, which may limit representativeness. Participants may also have had a pre-existing interest in pressure care, limiting generalisability to the wider HCP population. However, using multiple platforms enabled wider dissemination beyond the researcher's network, increasing reach. The questionnaire was study-specific and not previously validated; however, it was informed by existing literature and piloted with clinical academics to enhance clarity and minimise ambiguity.

Future research

Future research should further examine differences in HCP perceptions and the additional themes identified in this study. Exploration of 'Staff Limitations' and how PU knowledge can be better translated into practice may inform education and training, supporting patient care and clinical outcomes.

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References

Fletcher J, Jacklin A & Adderley U (2021) A brief history of pressure ulcer measurement in England: the last 20 years. *Wounds UK* 17(2): 14-19.

Gorecki C, Brown JM, Nelson EA et al (2009) Impact of Pressure Ulcers on Quality of Life in Older Patients: A Systematic Review. *Journal of the American Geriatrics Society* 57(97): 1175-1183.

Guest JF, Fuller GW & Vowden P (2020) Cohort study evaluating the burden of wounds to the UK's National Health Service in 2017/2018: update from 2012/2013. *BMJ Open* 10 (e045253).

Hsieh H-F, & Shannon SE (2005) Three Approaches to Qualitative Content Analysis. *Qualitative Health Research* 15(9): 1277–1288.

Lim SH, Ang SY, Ong HK et al (2020) Promotion of mobility among hospitalised older adults: An exploratory study on perceptions of patients, carers and nurses. *Geriatric Nursing* 41(5): 608-614.

McInnes E, Jammali-Blasi A, Bell-Syer SEM et al (2015) Support surfaces for pressure ulcer prevention. *Cochrane Database of Systematic Reviews* 9. CD001735.

National Health Service (2020) Pressure sores. https://www.nhs.uk/conditions/pressure-sores/

National Institute for Health and Care Excellence (2014) Pressure ulcers: prevention and management [NICE Guideline No. 179]. https://www.nice.org.uk/guidance/cg179.

National Pressure Injury Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Pressure Ulcers/Injuries: Definition and Etiology. In: Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline: Fourth Edition. Emily Haesler (Ed.). 2025. [cited: 19 June 2026]. Available from: https://internationalguideline.com.

Nixon J, Smith IL, Brown S et al (2019) Pressure Relieving Support Surfaces for Pressure Ulcer Prevention (PRESSURE 2): Clinical and Health Economic Results of a Randomised Controlled Trial. *EClinicalMedicine* 14: 42-52.

Serraes B, Van Hecke A, Van Tiggelen H et al (2020) An exploration of nursing home residents' experiences of a non-powered static air mattress overlay to prevent pressure ulcers. *International Wound Journal* 17: 1166-1182.

Theisen S, Drabik A & Stock S (2012) Pressure ulcers in older hospitalised patients and its impact on length of stay: a retrospective observational study. *Journal of Clinical Nursing* 21(3-4): 380-387.