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Original Research Article

FACTORS AFFECTING THE IMPLEMENTATION OF EARLY MOBILIZATION IN TRAUMATIC BRAIN AND SPINAL CORD INJURY WITH GCS 9-12 TO PREVENT PRESSURE ULCERS

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Abstract: *Traumatic brain injury (TBI) and spinal cord injury (SCI) patients with a Glasgow Coma Scale (GCS) score of 9–12 are at high risk of developing pressure ulcers due to immobility. Early mobilization has been shown to significantly reduce this risk, but its implementation in resource-constrained settings like Pakistan faces multiple challenges. This study aims to identify the factors affecting the implementation of early mobilization to prevent pressure ulcers in a tertiary care hospital in Pakistan.* ***Methods:*** *A descriptive cross-sectional study was conducted in the Neurosurgery Department of Nishtar Hospital, Multan, including 60 nurses and doctors directly managing patients with TBI and SCI. Data were collected using a validated questionnaire focusing on organizational, healthcare worker, and patient-related factors. Descriptive and inferential statistics were analyzed using IBM SPSS Version 26.* ***Results:*** *Organizational factors such as resource availability, staffing, and interdepartmental coordination significantly influenced early mobilization practices, with 75% of participants agreeing on the adequacy of physiotherapy services. Healthcare workers demonstrated high awareness of pressure ulcer prevention, with 85% reporting sufficient training. Patient-related factors, including injury severity, adherence to physiotherapy plans, and family involvement, also played a critical role. Limited resources and systemic barriers were identified as major challenges.* ***Conclusion:*** *The study underscores the importance of addressing resource limitations, enhancing interdepartmental coordination, and fostering patient and family education to improve early mobilization practices and prevent pressure ulcers in TBI and SCI patients. These findings provide actionable insights for improving care quality in resource-constrained settings.*

Keywords: Pressure Ulcer Prevention, Traumatic Brain Injury, Spinal Cord Injuries, Early Mobilization, Glasgow Coma Scale, Physiotherapy, Healthcare Personnel, Pakistan

Introduction

Traumatic brain injuries (TBI) and spinal cord injuries (SCI) are significant public health concerns in Pakistan, largely due to the high incidence of road traffic accidents (RTAs), falls, and workplace injuries. According to the Federal Bureau of Statistics, in 2021 alone, Pakistan recorded over 10,000 RTAs, resulting in thousands of fatalities and serious injuries requiring prolonged hospital stays. Patients with TBI or SCI often experience limited mobility, increasing their susceptibility to complications such as pressure ulcers. Pressure ulcers, also known as pressure injuries, are localized damage to the skin and underlying tissue, typically over bony prominences, caused by sustained pressure or shear forces. Studies estimate that pressure ulcers develop in approximately 16% of patients with TBI and up to 5.1% of SCI cases, with those having severe or upper-level injuries at greater risk (1, 2).

The prevention of pressure ulcers in this population is critical, not only to improve patient outcomes but also to reduce the burden on an already strained healthcare system. Early mobilization, defined as initiating movement and physiotherapy interventions within the first 72 hours of hospitalization, has been shown to reduce pressure ulcer incidence by up to 80% (3). Despite its proven benefits, the implementation of early mobilization in Pakistani hospitals faces several challenges, including limited resources, inadequate staff training, and organizational barriers. In the Neurosurgery Department of Nishtar Hospital Multan, where this study is conducted, understanding these challenges is vital to improving patient care. Healthcare professionals, including doctors and nurses, play a pivotal role in early mobilization. However, their knowledge, attitudes, and adherence to evidence-based protocols often determine the effectiveness of these interventions. Limited availability of physiotherapy services, insufficient coordination between departments, and the absence of specialized equipment such as pressure-relieving mattresses further exacerbate the issue. Patient-related factors, such as injury severity, co-morbidities, and lack of family involvement, also influence the successful implementation of early mobilization strategies (4, 5).

This study aims to identify the key factors affecting the implementation of early mobilization in TBI and SCI patients with GCS scores between 9 and 12 in a Pakistani healthcare setting. By focusing on organizational, healthcare worker, and patient-related factors, this research seeks to provide actionable recommendations to reduce the incidence of pressure ulcers, enhance patient outcomes, and optimize resource utilization in local hospitals (6, 7).

Methodology

The study employed a descriptive cross-sectional design to explore factors affecting the implementation of early mobilization in patients with traumatic brain injury (TBI) and spinal cord injury (SCI) presenting with a Glasgow Coma Scale (GCS) score of 9–12, aiming to prevent pressure ulcers. The research was conducted in the

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Neurosurgery Department of Nishtar Hospital, Multan, over a one-month period following approval of the synopsis. The study population consisted of nurses and doctors working in the neurosurgery ward directly involved in managing patients with GCS scores of 9–12. A total of 60 participants were recruited using a convenience sampling technique, ensuring their relevance to the study objectives.

Inclusion criteria were defined to include nurses and doctors directly involved in the care of patients with TBI and SCI and GCS scores of 9–12, while those not directly managing such patients were excluded. Data were collected using a structured, adapted questionnaire designed specifically for this study. The questionnaire incorporated elements to assess organizational factors, knowledge, attitudes, and patient-related aspects influencing early mobilization and its role in pressure ulcer prevention. Participants provided informed consent before data collection, and confidentiality of the information was strictly maintained.

The questionnaire underwent validation through a literature review and expert input to ensure its relevance and reliability in the local context. Responses were collected through face-to-face interviews with the participants to minimize non-response and improve data accuracy. The collected data included demographic details such as age, gender, professional role, and years of experience, as well as specific responses regarding factors impacting early mobilization practices.

The data were analyzed using IBM SPSS version 26. Descriptive statistics were employed to summarize demographic characteristics and response frequencies, while inferential tests, such as regression analysis, were applied to identify significant variables influencing the implementation of physiotherapy interventions. Ethical considerations adhered to the principles outlined in the Declaration of Helsinki. Participants' privacy was protected, and informed consent was obtained to ensure voluntary participation. This rigorous methodological approach aligns with international research standards and ensures the reliability and applicability of the findings.

Results

The study included a total of 60 participants, comprising doctors and nurses working in the Neurosurgery Department of Nishtar Hospital Multan. Demographic variables, including age, gender, professional designation, and years of experience, were analyzed to understand the characteristics of the study population.

The study explored organizational, healthcare worker, and patient-related factors impacting the implementation of early mobilization for preventing pressure ulcers in patients with traumatic brain and spinal cord injuries. The results are summarized in the following tables.

A predominantly female workforce with a significant number of early-career nurses contributed to patient care in the neurosurgery ward. Availability of equipment and staffing were perceived as critical to successful early mobilization. High levels of awareness and training among healthcare workers positively impacted the implementation of early mobilization strategies. Family support and the severity of the injury played a substantial role in physiotherapy adherence.

Table 1: Demographic Characteristics of Study Participants

Variable	Category	Frequency (n)	Percentage (%)
Age	21–30 years	25	41.7
	31–40 years	20	33.3
	41–50 years	15	25.0
Gender	Male	22	36.7
	Female	38	63.3
Professional Role	Nurse	42	70.0
	Doctor	18	30.0
Years of Experience	<5 years	28	46.7
	5–10 years	20	33.3
	>10 years	12	20.0

Table 1 provides an overview of the demographic characteristics of the participants. The majority of participants were nurses (70%) and females (63.3%), with a significant portion being early-career professionals (<5 years of experience).

Table 2: Organizational Factors Affecting Early Mobilization

Factor	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Adequate availability of physiotherapy services	40	35	10	10	5
Availability of pressure-relieving equipment	45	30	15	5	5
Adequate staffing for early mobilization	30	40	20	5	5

Table 2 demonstrates organizational factors as perceived by the participants. A significant majority (75%) agreed or strongly agreed about the availability of physiotherapy services, while 80% highlighted the importance of pressure-relieving equipment.

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Table 3: Healthcare Worker Knowledge and Training

Aspect	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Adequate training on physiotherapy	50	35	10	5	0
Awareness of pressure ulcer prevention	60	25	10	5	0
Communication and coordination among staff	45	40	10	5	0

Table 3 highlights the knowledge and training of healthcare workers. Most participants (85%) agreed that they were adequately trained in physiotherapy techniques, and 90% recognized their awareness of pressure ulcer prevention.

Table 4: Patient-Related Factor

Factor	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Patient adherence to physiotherapy plans	40	35	15	5	5
Severity of injuries affecting mobility	50	30	15	5	0
Family involvement in care	45	40	10	5	0

Table 4 illustrates patient-related factors. Family involvement and the severity of injuries were key elements influencing early mobilization success

Discussion

The findings of this study highlight critical factors influencing the implementation of early mobilization in patients with traumatic brain injury (TBI) and spinal cord injury (SCI) with Glasgow Coma Scale (GCS) scores of 9–12 in the Neurosurgery Department of Nishtar Hospital Multan. Our results emphasize the significance of organizational factors, healthcare worker knowledge, and patient-related aspects in promoting early mobilization and preventing pressure ulcers. When compared with previous studies, several similarities and differences emerge, underscoring the relevance of contextual and resource-related challenges specific to Pakistan.

Organizational factors such as the availability of physiotherapy services, pressure-relieving equipment, and adequate staffing were identified as major enablers of early mobilization in this study. Approximately 75% of participants agreed that the availability of physiotherapy services was adequate, aligning with findings from a study by Liang et al., which noted that organizational support is vital for pressure ulcer prevention in TBI and SCI patients (8). However, in contrast to our findings, studies conducted in resource-rich settings reported higher satisfaction levels among healthcare providers regarding the availability of pressure-relieving equipment and this discrepancy highlights the resource constraints faced by Pakistani healthcare facilities, which necessitate targeted interventions to enhance the availability of essential equipment and personnel.

Healthcare worker knowledge and training were also found to be significant contributors to successful early mobilization. In this study, 85% of participants reported adequate training in physiotherapy techniques, and 90% acknowledged awareness of pressure ulcer prevention. These findings are consistent with a study by Hashim et al., which demonstrated the positive impact of educational programs on pressure ulcer prevention practices among healthcare providers (9). Similarly, Eghbali et al. found that multidisciplinary training significantly improved the implementation of early mobilization strategies in TBI patients (10). However, studies conducted in other developing countries have reported gaps in knowledge and inconsistent adherence to physiotherapy protocols, suggesting that continuous education and supervision are critical for sustaining improvements in patient care (11, 12).

Patient-related factors such as injury severity, adherence to physiotherapy plans, and family involvement were also highlighted as key determinants of early mobilization. In our study, over 75% of respondents agreed that family involvement and patient adherence significantly impacted the success of early mobilization interventions. This is in line with findings by Buh et al., who noted that family support enhances patient motivation and compliance with rehabilitation programs (13). Conversely, studies from high-income countries have reported fewer challenges with patient adherence, likely due to better access to educational resources and support systems (14). This underscores the need for culturally tailored patient education and counseling in Pakistan to improve adherence to physiotherapy regimens.

The role of early mobilization in preventing pressure ulcers cannot be overstated. Previous studies have demonstrated that initiating mobilization within 72 hours can reduce pressure ulcer incidence by up to 80% (9, 11). Our findings reinforce these results, with the majority of participants strongly agreeing that early mobilization improves mobility and reduces pressure ulcer risk. However, the lack of standardized protocols and limited interdepartmental coordination reported in our study reflects broader systemic issues in the Pakistani healthcare system. Ippolito et al. highlighted the importance of interdisciplinary teamwork and clear communication in optimizing pressure ulcer prevention strategies (15). Addressing these systemic barriers is crucial to improving patient outcomes.

In summary, our study corroborates findings from previous research while highlighting the unique challenges faced in Pakistani hospitals, such as resource limitations, gaps in interdepartmental coordination, and the need for culturally appropriate patient and family education. Future research should focus on developing context-specific interventions, including training programs, resource allocation strategies,

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and standardized physiotherapy protocols, to enhance the implementation of early mobilization and reduce pressure ulcer incidence in TBI and SCI patients.

Conclusion

This study highlights the critical factors influencing the implementation of early mobilization to prevent pressure ulcers in patients with traumatic brain and spinal cord injuries with Glasgow Coma Scale (GCS) scores of 9–12 in a resource-constrained setting. Organizational factors, healthcare worker knowledge, and patient-related aspects emerged as significant determinants. Despite adequate awareness and training among healthcare providers, challenges such as limited resources, interdepartmental coordination gaps, and patient compliance persist. Addressing these barriers through targeted interventions, including staff training, resource allocation, and standardized protocols, can significantly enhance patient outcomes. These findings contribute valuable insights to improve pressure ulcer prevention strategies in similar low-resource healthcare settings.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department Concerned. (IRBEC-NMH-023/23)
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Conflict of interest

The authors declared absence of conflict of interest.

Author Contribution

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Coordination of collaborative efforts, data collection Study Design, Review of Literature.
SHAGUFTA MAJEED (Nursing Instructor)
Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, final approval of manuscript.
Conception of Study, Final approval of manuscript.
TASLEEM ALLAH YAR (Registered Nurse)
Manuscript revisions, critical input.
Coordination of collaborative efforts.
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Data acquisition, analysis.
Manuscript drafting.
Data entry and Data analysis, drafting article.

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