INPLASY

Postural Adjustment in wheel chair users based on seat back angles : A systematic review

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ADMINISTRATIVE INFORMATION

Support - Self.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - Postural adjustments in wheelchair users are directly influenced by the configuration of the seating system, particularly the seat back angle. Incorrect adjustments can result in significant physical and functional challenges, including discomfort, pressure ulcers, and impaired functional reach. Despite the extensive variability in user needs and wheelchair designs, there is limited evidence to guide the selection of seat back angles that optimize postural stability and functionality. The lack of a comprehensive synthesis of the available research complicates clinical decision-making and hinders the development of user-centered seating solutions. Therefore, a systematic review is needed to evaluate the biomechanical, functional, and clinical implications of seat back angles, providing a foundation for evidence-based practice and further research..

INPLASY registration number: INPLASY202540032

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 10 April 2025 and was last updated on 10 April 2025.

INTRODUCTION

Review question / Objective Objectives 1. To examine the relationship between different seat back angles and postural stability in wheelchair users.
2. To evaluate the effects of seat back angles on pressure distribution and the risk of pressure injuries.
3. To assess the influence of seat back angles on trunk alignment, pelvic positioning, and functional performance.
4. To identify gaps in the current evidence base and suggest directions for future research on wheelchair seating systems.

Rationale Wheelchair users often rely on their seating systems to maintain proper postural alignment, functional mobility, and comfort. Among the critical components of wheelchair design, the seat back angle significantly influences biomechanical alignment, pressure distribution, and trunk stability. Despite its importance, there is a lack of consensus and standardized guidelines regarding optimal seat back angles for various populations and functional needs. This gap in knowledge can lead to suboptimal seating adjustments, which may exacerbate issues such as pressure injuries, musculoskeletal strain, and compromised respiratory function. A systematic evaluation of the existing literature is essential to understand the interplay between seat back angles

and postural adjustments. This study addresses an urgent need to consolidate evidence in this area, offering insights for clinicians, therapists, and manufacturers to enhance wheelchair design and user outcomes..

Condition being studied
Statement of the Problem
Postural adjustments in wheelchair users are directly influenced by the configuration of the seating system, particularly the seat back angle. Incorrect adjustments can result in significant physical and functional challenges, including discomfort, pressure ulcers, and impaired functional reach. Despite the extensive variability in user needs and wheelchair designs, there is limited evidence to guide the selection of seat back angles that optimize postural stability and functionality. The lack of a comprehensive synthesis of the available research complicates clinical decision-making and hinders the development of user-centered seating solutions. Therefore, a systematic review is needed to evaluate the biomechanical, functional, and clinical implications of seat back angles, providing a foundation for evidence-based practice and further research.
Aims and Objectives of the Study
Aim
To systematically evaluate the existing literature on the impact of seat back angles on postural adjustments in wheelchair users and provide evidence-based recommendations for optimizing wheelchair design and seating interventions.
Objectives
1. To examine the relationship between different seat back angles and postural stability in wheelchair users.
2. To evaluate the effects of seat back angles on pressure distribution and the risk of pressure injuries.
3. To assess the influence of seat back angles on trunk alignment, pelvic positioning, and functional performance.
4. To identify gaps in the current evidence base and suggest directions for future research on wheelchair seating systems.

METHODS

Search strategy Tools to be Used 1. Databases for Literature Search: PubMed, Scopus, Web of Science, Cochrane Library, and Google Scholar..

Participant or population Research involving able-bodied participants or participants not reliant on wheelchairs for mobility.

Intervention Not reported.

Comparator Comparison between the theories established in previous studies across the world.

Study designs to be included Both experimental and observational study designs, including randomized controlled trials, cohort studies, and case-control studies.

Eligibility criteria I will be preparing thesis on the above mentioned topic for my graduation in Bachelors of Physiotherapy.

Information sources Databases for Literature Search: PubMed, Scopus, Web of Science, Cochrane Library, and Google Scholar.

Main outcome(s) Wheelchair users often rely on their seating systems to maintain proper postural alignment, functional mobility, and comfort. Among the critical components of wheelchair design, the seat back angle significantly influences biomechanical alignment, pressure distribution, and trunk stability. Despite its importance, there is a lack of consensus and standardized guidelines regarding optimal seat back angles for various populations and functional needs. This gap in knowledge can lead to suboptimal seating adjustments, which may exacerbate issues such as pressure injuries, musculoskeletal strain, and compromised respiratory function. A systematic evaluation of the existing literature is essential to understand the interplay between seat back angles and postural adjustments. This study addresses an urgent need to consolidate evidence in this area, offering insights for clinicians, therapists, and manufacturers to enhance wheelchair design and user outcomes.

Quality assessment / Risk of bias analysis Quality Assessment Tools: Newcastle-Ottawa Scale (NOS) for cohort studies, Cochrane Risk of Bias tool for randomized controlled trials, and the Critical Appraisal Skills Programme (CASP) checklist for qualitative studies.

Strategy of data synthesis Data synthesis: Qualitative approach, quantitative approach. A narrative synthesis will be used to summarize findings of studies not amenable to meta-analysis. A meta-analysis will be performed if there's sufficient homogeneity among the included studies regarding population, intervention, and outcomes utilizing RevMan software to pool the data and to quantify the estimates of effects of seat back angles on postural adjustments.

Subgroup analysis Bibliographic Analysis.

Sensitivity analysis Sensitivity analyses will be used to establish whether the results are robust and heterogeneity explored by using the I^2 statistic. Finally, the results will be interpreted and discussed in the context of the existing literature. Implications for clinical practice, wheelchair design, and future research will be highlighted. A comprehensive report will be presented to detail methods, findings, and conclusions, so the study can be of value to clinicians, therapists, and manufacturers of wheelchairs interested in maximizing wheelchair seating systems for different populations.

Language restriction English.

Country(ies) involved India.

Keywords Search TermsThe following search terms will be used to retrieve relevant articles from electronic databases:1. "Wheelchair seating systems".

Contributions of each author

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