UNIVERSITI TEKNOLOGI MARA

DESIGN AND FABRICATION OF A PATIENT TRANSFER AID FOR SEAMLESS BED TO WHEELCHAIR MOBILITY

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ABSTRACT

Wheelchair is most commonly used in assisting patients. However, the transfer process of patient from bed to wheelchair is quite risky. Thus, this project focuses on the design and fabrication of a patient transfer aid aimed at improving the efficiency and safety of transferring patients from beds to wheelchairs in healthcare settings. The primary objective is to create a device that enhances the safety, comfort, and independence of patients during transfers, reducing the physical strain on both patients and caregivers. The aid addresses the challenges faced by caregivers and enhances the comfort of patients with mobility impairments during transfers. Key design considerations include durability, ease of use, and affordability. The aid features a sliding mechanism for smooth transfers, and safety features such as locking wheels and secure belts. The project is achieved by product design using SolidWorks, material selection and testing as well as compliance with safety standards. Through rigorous testing and evaluation, the developed aid demonstrates its capability to meet safety standards and enhance the overall patient care experience. The target market for the patient transfer aid includes healthcare facilities such as hospitals, rehabilitation centers, nursing homes, and assisted living facilities. These environments commonly face challenges related to patient mobility, where caregivers frequently assist patients in transferring between beds, wheelchairs, and other surfaces. The aid is designed to meet the needs of healthcare professionals seeking efficient and safe solutions for patient handling, thereby reducing the risk of injury to both patients and caregivers.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

The wheelchair is one of the most commonly used assistive devices to promote mobility and enhance quality of life for people who have difficulties in walking.[1] Wheelchair mobility opens up opportunities for wheelchair users to study, work, engage in social activities and access services such as healthcare.[2] Wheelchairs assist people with disabilities to become productive members of their communities.

But despite the mobility, patient handling usually are manual activities and due to its nature, this activity poses ergonomic risks to those performing the job.[3] Previous studies have reported different types of musculoskeletal disorders that are prevalent among health professionals such as nurses in hospitals or caregivers in nursing homes.[5] The National Institute for Occupational Safety and Health reports that there are 75 lifting-related injuries for every 10,000 full-time hospital workers, and 107 injuries for every 10,000 workers at nursing homes and residential facilities. Hospital rates are nearly twice the national average for all industries, and nursing home rates are nearly three times as high.[4]

Various assistive devices are available to help wheelchair users with specific mobility tasks, reducing the need for manual assistance from caregivers.[6] Although, some assistive devices and mechanical lifts may be complex to operate such as the slide transfer board.[7] Caregivers who lack experience or confidence in using these devices may be reluctant to rely on them, leading to manual handling techniques that are less safe. Many of the assistive devices and mechanical lifts can be expensive such as the Electric Double Hydraulic Patient Transfer Lift, making them inaccessible to individuals or organizations with limited financial resources.[13] Hence, there is a need to design and fabricate a wheelchair for the ease of both caregivers and patients.