ACCEPTABILITY OF AN AUTOMATIC PIVOT DISC BY PHYSICAL THERAPIST AS A TOOL FOR TRANSFERRING PATIENTS IN A REHABILITATION FACILITY

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ABSTRACT

Introduction: As the generation gets modern, development of tools for the benefit of both Physical Therapists and patients are of great advantage, especially today that more technologies and devices materialize. Transferring patient care can be defined as moving a patient from one place to another. The most common patient transfers are from bed to stretcher and from bed to wheelchair. **Method**: The study aimed to assess the acceptability of an automatic pivot disc for physical therapists in a rehabilitation facility. Researchers used researcher made questionnaires to gather data on features, design, functionality, safety features, and materials. Likert scale was used to collect, measure, and analyze the data. A weighted mean was used to determine the overall acceptability of an automatic pivot disc in terms of features, design, functionality, safety features, material, and its overall acceptability. **Result**: The result of Acceptability of an Automatic Pivot Disc by Physical Therapist as a tool for Transferring Patients in a Rehabilitation Facility in terms of Features, Design, Functionality, Safety Features, and Materials of the Automatic pivot disc device were found to be Moderately Acceptable among licensed physical therapists. **Conclusion:** Based on the findings of the study the researchers concluded that the device needs enhancement and modification as to its elevating and pivoting features, smooth the edges, and add armrest, backrest, and footrest. With this modification and enhancements, the researchers conclude that the device can be used by a physical therapist on patient transfer in a rehabilitation facility.

Keywords: Patient transfer, Pivot disc, Rehabilitation Facility, Physical Therapist, Tool for transfer

INTRODUCTION

As the generation gets modern, development of tools for the benefit of both Physical Therapists and patients are of great advantage, especially today that more technologies and devices materialize. Transferring patient care can be defined as moving a patient from one place to another. The most common patient transfers are from bed to stretcher and from bed to wheelchair. While seemingly intuitive, successful patient transfer requires understanding each patient's specific needs while adhering to evidence-based guidelines.

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Patient care transfers can also be defined as patient transfers within the same facility (Dunn MJ, et. al, 2007). According to Marras, W. S., Knapik, G. G., & Ferguson, S., Moving a patient is not an easy task; patient handling remains a high-risk low back pain (LBP) task for healthcare workers. Giving has been shown. Patient lifts are considered a potential intervention. However, few biomechanical analyzes have examined spinal loading and LBP risk associated with these transfer devices.In rehabilitation institutions, more than 78% of physical therapists and their helpers have sustained work- related injuries while assisting with transfers. 10% of female nurses said they had missed more than one month of work due to low back pain that was related to their jobs(Koyama et al., 2020). The most frequent injury reported by healthcare professionals was back pain, and most of the back pain encountered by nurses was caused by transporting patients(Burkman J., Grindle G., Wang H., Kelleher A., Cooper R. A. 2017). Moreover, lifting heavy objects at work increases the risk of back pain. Best work practices are recommended to prevent back pain, but injuries are inevitable when lifting heavy loads or patients. Back pain is common. The resulting disability has a significant impact in terms of distress and economic costs of lost jobs and lost productivity(Martimo, K. -P., et al., 2008)].With the cited problems associated with patient transfer, the researchers developed a tool from a manual pivot disc to an automatic pivot disc that was used in transferring patients in a rehabilitation facility to help the Physical Therapists to efficiently transfer the patients and to reduce injuries associated with improper transfer techniques. The study focused on determining the level of acceptability of an automatic pivot disc by Physical Therapist as a tool for transferring patients in a Rehabilitation Facility.

LITERATURE REVIEW

Techniques Utilized by Physical Therapist in Transferring Patients

According to Budarick, A., Lad, U., Fischer, S., (2022), When executing a manual turn, the hand force needed by the turn-away caregiver was 93% of the calculated maximum allowable force. The turn-away caregiver's responsibility was decreased to positioning the proper wedging behind the patient after the aided turn was complete thanks to the use of a turn-assist surface, which eliminated the need for hand forces to begin the patient turn. This reduced the turn-away caregiver's shoulder moments by 21.3 Nm, reducing their exposure from 70% of their maximum shoulder strength capability to 15%.

In addition, using a turn-assist surface, spinal compression exposures for the turn-toward caregiver were reduced by 302.1 N. When handling patients, nurses are more likely to have musculoskeletal injuries to their shoulders or back. The physical strain and risk on caregivers can be decreased by using turn-assist surfaces. Furthermore, Understanding the patient's demands is necessary when transferring patients from a bed to a wheelchair. Always be in contact with the individual being transported to ensure that help is being given when it is needed and to allow the patient and the aide to coordinate their efforts. A one-person help may be used if the patient is able to support weight on both lower extremities and move predictably in modest increments. To securely move the patient, it could be required to use a mechanical lift, or a two-person transfer if these requirements are not met. (Bergman R., De Jesus O., 2021)

Problems Encountered by the Physical Therapist in Performing patient transfer

According to Study, unaided transfers might cause recurrent strain over time, which may necessitate caregiver assistance. Both people with disabilities and caregivers run a significant

risk of harm during caregiver-assisted transfers. The most frequent injury reported by healthcare professionals was back pain, and most of the back pain encountered by nurses was caused by transporting patients. Although lifting devices reduce the stresses applied on the lower back during transfers, research has shown that L5 is nevertheless subjected to forces ranging from 72.8 N to 3,500 N. The most physically demanding actions performed by caretakers are classified as transfers, such as shifting a person from a bed to a wheelchair. (Burkman J., Grindle G., Wang H., Kelleher A., Cooper R. A. 2017)

Furthermore, Wheelchair users' inability to perform transfers might complicate things for the caregiver, whether it is a family member or a healthcare professional. A caregiver must enable transfers for people who are unable to perform them on their own during routine tasks. Healthcare professionals and caregivers frequently sustain work-related injuries while transferring patients, according to a previous study. In rehabilitation institutions, more than 78% of physical therapists and their helpers have sustained work-related injuries while assisting with transfers. 10% of female nurses said they had missed more than one month of work due to low back pain that was related to their jobs. (Koyama et al., 2020)

According to studies, 2.5 million Americans suffer from pressure ulcers each year, which cost the country an additional 11 billion dollars in expenses each year. As per statistics, there were 1.5% incidence of pressure ulcers in the general ward and 5.1% incidents in the recovery ward in Japan. As per reports, 4.4 billion and 43 million JPY were spent on medical expenses for the treatment of leg ulcers and pressure sores. "Never Events" occur when "hospital-acquired pressure ulcers" progress to stages III-IV while a patient is in the hospital. The prevention of pressure ulcers is a crucial concern from the perspective of medical safety in Japan, where the elderly are more susceptible to sickness.

Given this context, the National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, and Pan Pacific Pressure Injury Alliance's Clinical Practice Guideline for Prevention and Treatment of Pressure Ulcer recommends repositioning and early mobilization. It describes how to move a person onto a wheelchair or bedside chair when they require full help, using a split leg sling mechanical lift where one is available and repositioning them to ease and distribute body pressure. After the transfer, take the sling off. Repositioning and early mobilization are crucial nursing skills for pressure ulcer care and prevention. (Nakagawa et al., 2017)

Emerging modern devices utilized by the physical therapist when performing patient transfers

According to Burnfield et al., (2013), Patient handling injuries at work are frequent. Sit-to-stand transfer devices have become one of the devices available to prevent injuries because of the introduction of no-lift laws. However, due to a lack of evidence-based data, it is impossible to assess the therapeutic value connected with sit-to-stand transfers with the aid of an assistive gear. According to Schoenfisch et al., (2019), The usage of accessible lift equipment and assistance devices is restricted despite training in their use. A complex combination of patient, worker, equipment, and situational variables can be found in the factors present at the time of lifts/transfers that may have an impact on the utilization of devices. Furthermore Only 40% of lifts and transfers involved the use of equipment, despite training in its use. During lifts/transfers, factors often present included patient unable to help with lift/transfer (91.3%) or of a size/weight where participant needed assistance to help lift/transfer (87.5%); availability of others who could assist with manual lift (86.3%) or use of

lift equipment (82.4%); and equipment functioning properly (86.4%), having supplies available (82.5%), and being easy to retrieve from storage (81.6%). Physical assistance from coworkers was given during repositioning duties "always/almost always" (83.3%) and was frequently thought of as "extremely useful" (92.6%) in lowering physical demands. Less frequently provided by patients was physical assistance (14.0% "always/almost always"), yet 66.3% still found it to be "extremely helpful". One fifth always utilized tools to reduce friction.

The Evaluation of the level of Acceptability of patient transfer devices

According to Law, M. J. J., et al. (2022) The poor usage of assistive technologies for patient transfers is partially responsible for the high incidence of musculoskeletal diseases (MSDs) among healthcare personnel. The purpose of this study was to assess how the nurses felt about their workload, how well they accepted technology, and how they handled their emotions while using the motorized patient transfer device and sliding board (SB) (MPTD). On a dummy patient, seven nurses carried out the MPTD and SB tasks. Throughout the study, the nurses' facial expressions were captured. Furthermore, evaluated were the NASA Workload Index and the technology acceptability survey. Generally, nurses accepted MPTD and had good impressions of it, even when they were upset.

Equipment advancements and state safety regulations contribute to increased acceptance of safe patient handling and movement (SPHM) programs. Improvements in the design of motorized lift equipment (Morse et al., 2008) make it easier for care providers to use and more comfortable to the patient. Equipment options include vertical and horizontal transfer lifts for moving patients from sitting to standing or from a bed to a gurney, ceiling mounted lifts to move patients throughout the room on the ceiling tracks, and equipment that allows a nurse or PT to support a patient as they walk.

Although mechanical transfer devices are shown to improve people’s feelings of safety and security, they still do not completely solve the issues involved with person transfer, especially for individuals living in residential settings. In a recent survey of over one thousand mobility-assistive technology users, better transfer devices were identified as an area of critical importance, indicating the need for additional research and development of these technologies. The use of the Self-standing Turning Transfer Device to perform bed-to-chair transfers reduces physical stress among caregivers of older patients in a middle-income developing country (Dicianno BE, Joseph J, Eckstein S, Zigler CK, Quinby E, Schmeler MR, Schein RM, Pearlman J, Cooper RA., 2018).

METHODOLOGY

Research Design

The study utilized a Descriptive type of research design to determine and emphasize the level of acceptability of an automatic pivot disc by Physical Therapist as a tool for transferring patients in a rehabilitation facility. The researchers conducted a study in which purposely developed and evaluated a device used for transferring patients.

Participants, Inclusion and Exclusion Criteria

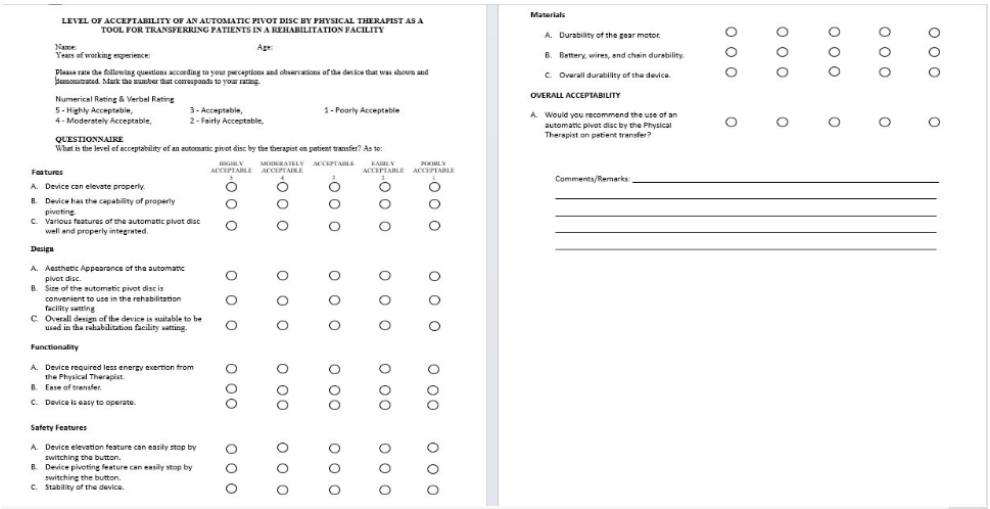
Total of forty-nine(49) Physical Therapist Registered in the Philippines (PTRP) who met the inclusion/exclusion criteria provided during the screening procedure were purposely selected.

The inclusion criteria include the following: 1) A licensed physical therapist that has at least 1–5 years of work experience in transferring patients in a rehabilitation facility. 2) 23-56 years old. 3) either Male or Female.

Research Instrument

The study made use of the automatic pivot disc (see fig. 1). It is a device used to assist in transferring patients in a rehabilitation facility. The researchers made a questionnaire that helped them analyze the response of the PT respondents. First there was a validation of the researcher-made questionnaire and device with the help of professionals and experts before proceeding to a pilot testing. Then there was prior pilot testing to finalize the device and questions on the questionnaire, pilot testing was held at the 2 (two) hospitals. Subsequently, the researcher disseminated the validated questionnaire to different facilities to gather data from the Physical Therapist's opinion on the device how convenient and acceptable it is for them to use in their daily life during patient transfer in a rehabilitation facility. The questionnaire (see fig. 2) focused on answering the statement of the problem and determining the level of acceptability of an automatic pivot disc by Physical Therapist as a tool for transferring patients to a rehabilitation facility. There are six (6) main questions namely: features, design, safety features, functionality, materials, and the overall acceptability of the device with five (5) sub-questions on each of the first five (5) main questions.

Automatic Pivot Disc (2D view)



LEVEL OF ACCEPTABILITY OF AN AUTOMATIC PIVOT DISC BY PHYSICAL THERAPIST AS A TOOL FOR TRANSFERRING PATIENTS IN A REHABILITATION FACILITY

Name: Age:
Years of working experience:

Please rate the following questions according to your perceptions and observations of the device that was shown and demonstrated. Mark the number that corresponds to your rating.

Numerical Rating & Verbal Rating
5 - Highly Acceptable, 3 - Acceptable, 1 - Poorly Acceptable
4 - Moderately Acceptable, 2 - Fairly Acceptable,

QUESTIONNAIRE
What is the level of acceptability of an automatic pivot disc by the therapist on patient transfer? As to:

	HIGHLY ACCEPTABLE 5	MODERATELY ACCEPTABLE 4	ACCEPTABLE 3	FAIRLY ACCEPTABLE 2	POORLY ACCEPTABLE 1
Features					
A. Device can elevate properly.	○	○	○	○	○
B. Device has the capability of properly pivoting.	○	○	○	○	○
C. Various features of the automatic pivot disc well and properly integrated.	○	○	○	○	○
Design					
A. Aesthetic Appearance of the automatic pivot disc.	○	○	○	○	○
B. Size of the automatic pivot disc is convenient to use in the rehabilitation facility setting	○	○	○	○	○
C. Overall design of the device is suitable to be used in the rehabilitation facility setting.	○	○	○	○	○
Functionality					
A. Device required less energy exertion from the Physical Therapist.	○	○	○	○	○
B. Ease of transfer.	○	○	○	○	○
C. Device is easy to operate.	○	○	○	○	○
Safety Features					
A. Device elevation feature can easily stop by switching the button.	○	○	○	○	○
B. Device pivoting feature can easily stop by switching the button.	○	○	○	○	○
C. Stability of the device.	○	○	○	○	○
Materials					
A. Durability of the gear motor.	○	○	○	○	○
B. Battery, wires, and chain durability.	○	○	○	○	○
C. Overall durability of the device.	○	○	○	○	○
OVERALL ACCEPTABILITY					
A. Would you recommend the use of an automatic pivot disc by the Physical Therapist on patient transfer?	○	○	○	○	○

Comments/Remarks: _____

Sample of Researcher-made Questionnaire

Research Procedure

These study was conducted into 3 phase. Prior to research implementation the researcher secured an approval letter countersigned by the research adviser submitted to the Dean of the College of Physical Therapy to allow the researcher to conduct the study. In pre-implementation phase, the researchers set and conducted a meeting among the intended respondents who met the inclusion criteria and became part of the study. The researcher secured a consent letter among the respondents prior to implementation. Orientation among the respondents consisted of the discussion on the goals of the study and the procedure. During the implementation phase, the researcher introduced the automatic pivot disc to the respondents and discussed and explained how to operate and use the device for patient transfer. After which the researcher-made questionnaires on the level of acceptability of an automatic pivot disc in terms of its features, design, functionality, safety features and materials were distributed among the respondents. A total of forty-nine (49) out of sixty (60) respondents were included in the study, five (5) of the respondents did not meet the inclusion criteria and six (6) respondents failed to attend the implementation since they were on leave, day off and absent. For these reasons they were excluded from the study. In the post-implementation phase the researchers gathered and compiled the result from the researcher-made questionnaire regarding the level of acceptability of an automatic pivot disc by physical therapist as a tool for transferring patients in a rehabilitation facility. The results were collected by the researchers and statistical treatment of data followed. The researchers checked, analyzed, and interpreted the results of the gathered data provided by the statistician to determine the level of acceptability of an automatic pivot disc by physical therapist as a tool for transferring patients in a rehabilitation facility.

Statistical Treatment of Data

For the analysis of data gathered, Weighted mean was utilized to determine the level of acceptability of an automatic pivot disc in terms of its features, design, functionality, safety features, material, and its overall acceptability.

RESULTS

The result of Acceptability of an Automatic Pivot Disc by Physical Therapist as a tool for Transferring Patients in a Rehabilitation Facility in terms of Features, Design, Functionality, Safety Features, and Materials of the Automatic pivot disc device were found to be Moderately Acceptable among licensed physical therapists. Among the parameters, Materials got the highest rating with an average weighted mean of 4.33, Followed by Safety Features which got an average weighted mean of 4.20, Followed by Features and Functionality which both got an average weighted mean of 4.18, The lowest was Design with an average weighted mean of 3.86. and the overall level of acceptability of an Automatic Pivot Disc by Physical Therapist as a tool for Transferring Patients in a Rehabilitation Facility was found to be Moderately Acceptable with a weighted mean of 3.98.

Table1.1 level of acceptability of an automatic pivot disc by the therapist on patient transfer in a rehabilitation Facility in terms of features

Features	Weighted mean	Interpretation	Rank
A.Devicecanelevateproperly.	4.18	ModeratelyAcceptable	2
B.Devicehasthecapabilityofproperlypivoting.	4.22	ModeratelyAcceptable	1

C. Various features of the automatic pivot disc are well and properly integrated.	4.14	ModeratelyAcceptable	3
Overallweightedmean	**4.18**	**ModeratelyAcceptable**	

Table 1.2 level of acceptability of an automatic pivot disc by the therapist on patient transfer in a rehabilitation facility in terms of design

Design	Weighted mean	Interpretation	Rank
A.AestheticAppearanceoftheautomaticpivotdisc.	3.86	ModeratelyAcceptable	2
B.Sizeoftheautomaticpivotdiscisconvenienttouseinthe rehabilitation facility setting.	3.90	ModeratelyAcceptable	1
C. Overall design of the device is suitable to be used in the rehabilitation facility setting.	3.82	ModeratelyAcceptable	3
Overallweightedmean	**3.86**	**ModeratelyAcceptable**	

Table 1.3 level of acceptability of an automatic pivot disc by the therapist on patient transfer in a rehabilitation facility in terms of functionality

Functionality	Weighted mean	Interpretation	Rank
A.DevicerequiredlessenergyexertionfromthePhysical Therapist.	4.18	ModeratelyAcceptable	2
B.Easeof transfer.	3.94	ModeratelyAcceptable	3
C.Deviceiseasyto operate	4.41	ModeratelyAcceptable	1
Overallweightedmean	**4.18**	**ModeratelyAcceptable**	

Table 1.4 level of acceptability of an automatic pivot disc by the therapist on patient transfer in a rehabilitation facility in terms of safety features

SafetyFeatures	Weighted mean	Interpretation	Rank
A. Device elevation feature can easily stop by switching the button.	4.31	ModeratelyAcceptable	1.5
B. Device pivoting feature can easily stop by switching the button.	4.31	ModeratelyAcceptable	1.5
C.Stabilityofthedevice.	4.00	ModeratelyAcceptable	3
Overallweightedmean	**4.20**	**ModeratelyAcceptable**	

Table 1.5 level of acceptability of an automatic pivot disc by the therapist on patient transfer in a rehabilitation Facility in terms of materials

Materials	Weighted mean	Interpretation	Rank
A.Durabilityofthegear motor	4.29	ModeratelyAcceptable	3
B.Battery,wires,andchaindurability	4.37	ModeratelyAcceptable	1
C.Overalldurabilityofthedevice	4.33	ModeratelyAcceptable	2
Overallweightedmean	**4.33**	**ModeratelyAcceptable**	

Table 2 overall acceptability of an automatic pivot disc by the therapist on patient transfer in a rehabilitation facility

OverallAcceptability	Weighted mean	Interpretation
A.Wouldyourecommendtheuseofanautomaticpivotdiscbythe Physical Therapist on patient transfer?	3.98	ModeratelyAcceptable

DISCUSSION

In this study, which aimed to develop and determine the acceptability of an automatic pivot disc by physical therapist as a tool for transferring patients in a rehabilitation facility, it was hypothesized that it is an acceptable device among licensed physical therapist. Two (2) research questions must be addressed to answer this hypothesis. The first question focused on determining the extent of acceptability of an automatic pivot disc by physical therapist as a tool for transferring patients in a rehabilitation facility. All parameters in terms of features, design, functionality, safety features and materials.

Here, it was found that all parameters were moderately acceptable. Of all parameters, materials got the highest weighted mean of 4.33, and safety features came in second with a weighted mean of 4.20. Features and functionality ranked third with a weighted mean of 4.18. Design ranked last with a weighted mean of 3.69. On the other hand, the second question focused on determining the extent of overall acceptability of an automatic pivot disc by physical therapist as a tool for transferring patients in a rehabilitation facility. The overall acceptability obtained a weighted mean of 3.98 among forty-nine licensed physical therapist and was interpreted as moderately acceptable as transferring device on rehabilitation facilities.

Even though the result of this study seems acceptable, researchers have found limitations during implementation and with the recommendations of the respondents. Modification of pivoting feature and elevation that fits to high beds. The height of the device's backrest should also be adjustable to accommodate different individuals. Instead of square shape base make it circle and smoothen its edge to make its pivot feature run smoothly. It was therefore recommended that future studies conduct a similar study with a larger sample size.

CONCLUSION

Based on the findings of the study the researchers concluded that the device needs enhancement and modification as to its elevating and pivoting features, smooth the edges, and add armrest, backrest, footrest. The overall level of acceptability of an automatic pivot disc by physical therapist on patient transfer was moderately acceptable. This concludes that the device after its enhancement and modification can be used by a physical therapist on patient transfer in a rehabilitation facilities, and clinics.

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