



CORRELATION BETWEEN WHEELCHAIR SKILLS AND PHYSICAL PERFORMANCE AMONG COMMUNITY-DWELLING MANUAL WHEELCHAIR BOUNDED INDIVIDUALS: A PILOT STUDY

Physiotherapy

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ABSTRACT

Background:- Wheelchair offers the opportunity to play active roles in society to individuals with mobility limitations. While carrying out various wheelchair skills there are chances of falls due to less knowledge of those skills. So, it is necessary to assess wheelchair skills. At the same time it is also important to measure the physical performance of wheelchair users. Hence this study aimed to see the correlation between wheelchair skills and physical performance among community-dwelling manual wheelchair bounded individuals. **Objectives:-** To assess wheelchair skills and physical performance by using wheelchair skill test (WST) and slalom test respectively and to find out the correlation between two. **Setting:-** Community setting. **Methodology:-** Wheelchair bounded individuals were included according to the inclusion criteria. After taking informed consent and demographic details wheelchair skills and physical performance were assessed by using WST(version 5.2) and slalom test respectively. **Result:-** The present study showed the significant negative correlation between WST and slalom test among community dwelling manual wheelchair bounded individuals. **Conclusion:-** The study concluded that physical performance depend on the capacity score of wheelchair skills.

KEYWORDS

Wheelchair skills, physical performance, wheelchair bounded.

INTRODUCTION:-

There are over 65 million wheelchair users worldwide^[1] The wheelchair is among the most important therapeutic devices used in rehabilitation.^[2] The most common type of wheelchair used for everyday mobility by persons with spinal cord injuries (SCI) is a manual wheelchair.^[3] Manual wheelchairs are used to enhance the mobility of individuals with disabilities.^[4] as well as to promote independence with their mobility and social participation.^[5] and allow them to engage in major life activities by increasing independence, providing more choice in activities and improving satisfaction with participation in many activities.^[6] Many individuals with a spinal cord injury (SCI) rely on their wheelchairs to complete daily mobility tasks.^[7] Proficiency in functional manual wheelchair skill is a key to independence among many individuals with a spinal cord injury.^[8] Problems with ambulation mean that most long-term care residents use wheelchairs as their primary means of mobility.^[9] To maneuver through their home and community environments independently, manual wheelchair users must be able to perform certain wheelchair skills.^[10] However, travelling long distances at fast speeds and uphill and traversing uneven terrain and stairs are highly physically demanding for the user and can expose the user to the risk of injuries and limit mobility.^[11] A validated and reliable wheelchair skills test is necessary as a guiding instrument in the rehabilitation process of people with spinal cord injury and those with lower limb impairments.^[12] To refine therapeutic interventions and to differentiate or detect change in manual wheelchair propulsion capacity, especially when individuals are judged to be independent at baseline the assessment of their physical performance is also necessary.^[13] Compared with propelling a manual wheelchair along a straight trajectory propelling a manual wheelchair along a slalom trajectory is expected to require application of greater asymmetric forces. Because among these individuals, rapidly changing directions when manually propelling their wheelchair is frequent in natural environments.^[14] To overcome these limitations the use of performance based manual wheelchair propulsion test appears to be relevant for research protocol.^[13]

Procedure:-

After obtaining Institutional Ethical Clearance a convenience sample of seven manual wheelchair bounded individuals with age ≥ 14 years were included. They were eligible to participate if they used a wheelchair as their primary means of mobility. Potential participants were excluded if they had any unstable medical conditions and who already received any wheelchair skill training programme. After obtaining written informed consent wheelchair skills were assessed using WST (version 5.2). It is a standardized method of evaluating a wheelchair user's ability to effectively complete skills of varying levels of difficulty. 0-3 score is given for each of the total 32 wheelchair skills. Physical performance was assessed using slalom test (reliability= 0.98)^[14]. This test was performed along slalom trajectory

(total length 18 m). The individuals were instructed to propel their wheelchair around 7 heavy cones aligned at 3m, 2m and 1m apart from each other. The time to perform the test was then measured (in sec).



Figure No. 1 showing slalom test

Data Analysis:-

Data were analyzed using Graph In stat 3. Descriptive statistics were used to analyze the demographic and clinical details of all the participants. Spearman correlation test was used to find out the correlation between physical performance and wheelchair skills.

RESULT:-

Table No. 1 :- Demographic and Clinical data of all participants (n=7)

Table No. 1 shows mean age of the participants (years) was 22.4 while for duration of wheelchair use (months) was 8.85 \pm 6.71

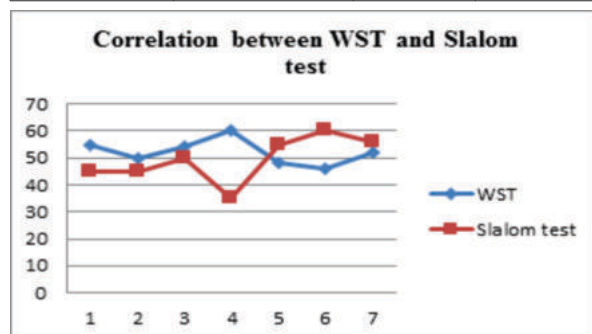
Parameters	Mean \pm SD	Data type	Values
Age (years)	Mean \pm SD	22.42 \pm 7.02	
Duration of wheelchair use (months)	Mean \pm SD	8.85 \pm 6.71	
Diagnosis	Spinal Cord Injury	n	5
	Cerebral Palsy	n	1
	Hereditary sensorimotor neuropathy	n	1

Table No. 2:- Individual scores for WST and Slalom test

Participants	Diagnosis	WST (%)	Slalom test (sec)
1.	SCI (T12)	55	45
2.	SCI (C7)	50	45
3.	HSMN	54	50
4.	SCI (T12)	60	35
5.	CP	48	55
6.	SCI (C7)	46	60
7.	SCI (T10)	52	56

Table No. 3 :- Showing correlation between wheelchair skills and physical performance

	Mean = SD	r value	p value
WST	52.14±4.7	- 0.77	0.04
Slalom test	49.42±8.5		

**Graph 1:-** Showing correlation between WST and slalom test.**DISCUSSION:-**

The study examined the capacity of manual wheelchair bounded individuals for wheelchair skills and physical performance as well as the relation of these two. In our study we found that manual wheelchair bounded individuals faced difficulty in performing wheelchair skills like ascend and descend incline, ascend and descend curbs as well as stairs. While the skills like rolling forward, backward, turning and transfers are performed well by individuals.

Table No. 2 shows the individual scores for WST (%) and the slalom test (sec). The percentage score for wheelchair skills is found to be greater in individuals with thoracic level of injury as compared with other diagnosis and also shows decrease in time to perform slalom test. Possible reasons for greater WST score and lesser time for slalom test are different level of spinal cord injury, duration of wheelchair use. Shahla et. al compared the WST and quality of life. They found the higher success rates for specific and total manual WC skills predict higher QOL as measured by better self-perceived health, higher life satisfaction, and more community participation.^[15]

Table No. 3 show the negative correlation(r value = - 0.77) between WST and slalom test which is statistically significant (p value = 0.04). This means as the score for WST increases the time to perform slalom test decreases as shown in graph 1 which means physical performance of wheelchair bounded individuals depend on their capacity to perform various wheelchair skills. The study conducted by Dany et. al to find out the effectiveness of slalom test for individuals with spinal cord injury. They have found the slalom test is a safe, reliable, and accurate performance-based outcome measure that can be administered easily in individuals with SCI who rely on a manually propelled wheelchair for mobility.^[14]

CONCLUSION:-

The study concluded that the physical performance and wheelchair skills capacity score demonstrates inverse relationship with one another as the score increases the time to perform slalom test decreases. Future studies should also examine the impact of duration of wheelchair use and type of wheelchair with large sample size.

Study Limitations:-

The study included the small sample size so the generalizability of the study may be threatened.

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