ORIGINAL ARTICLE

Factors Affecting the Outcomes of Activities of Daily Living (ADLs) Based Intervention on Spastic Hemiplegic Cerebral Palsy

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ABSTRACT

Objective: To observe the effects of different factors on activities of daily living (ADLs) based intervention in spastic hemiplegic cerebral palsy.

Study Design: The observational study.

Place and Duration of Study: The study was conducted at the Department of Developmental and Behavioral Pediatrics, Children Hospital, Lahore, PSRD (Pakistan Society of Rehabilitation for Disabled), and Private Clinical Setups. This study was completed in 6 months.

Material and Methods: A total of 37 patients were taken into observation to fill out the questionnaire. The patients taken in this study were all spastic hemiplegic cerebral palsy, with under-going interventions based on ADLs technique.

Results: A total of 37 patients were taken according to sample size. The result shows that the education of parents/guardians, financial status/monthly income of the parents of the child, working status of the mother, vaccination course, time given in each session, follow-up sessions, family history of the disease, area of living, availability of time has an insignificant impact on the functional independence of the patient. While the number of sessions, involvement and compliance of the patient, having comorbidities, level of severity, and performance of tasks under observation has a significant impact on the functional independence outcomes of the patient.

Conclusions: This study concluded that the number of sessions per week, involvement and compliance of patients, having comorbidities other than cerebral palsy, the severity of impairment, and guardians or professional observation during sessions have a significant impact on the outcomes of activities of daily living (ADLs) based intervention in hemiplegic cerebral palsy.

Key Words: *ADLs (activities of daily living), Sessions, Cerebral palsy*.

INTRODUCTION

Occupational therapy plays a crucial role in the care of individuals with cerebral palsy. The approach includes neurological recovery, identification, and treatment of additional health

conditions (such as epilepsy, cognitive impairment, visual and auditory issues, and problems with growth and digestion). As a result, the approach is collaborative, with the doctor leading the care alongside a group of rehabilitation specialists.[1]

The therapist is essential in every part of the treatment of kids with cerebral palsy. It is important to motivate the parents right away to participate actively in their child's therapy plan.[2]

Occupational therapy is an important component in the rehabilitation process of individuals with hemiplegic cerebral palsy. It significantly contributes to the patient's ability to perform primary activities of daily living (ADLs), extended ADLs and engage in social participation. Each patient undergoing therapeutic intervention presents unique circumstances that can influence the effectiveness of the therapy.

Different research papers were included, each receiving a score between 6 and 9 on the PEDro scale. A total of 12 (75%) of these papers were classified as high-quality, while the remaining 4 (25%) were considered fair. The research included both positive and negative outcomes, which were evaluated against the review's goals, showing that the studies demonstrated an enhancement in upper extremity (UE) functions following Task-oriented training (TOT) rehabilitation. In summary, combining TOT with other therapeutic exercises improved UE function and strength after a stroke. The current evidence suggests that TOT can result in better motor skills and significantly aid in activities post-stroke.[3]

Sufficient proof shows that involvement in work and tasks, methods used both inside and outside settings, and guidance and constructive criticism enhance involvement and achievement in activities of daily living and mobility. Adequate proof backs the approach of setting shared objectives, demonstrating actions, and supervised engagement in recreational activities. Additionally, it backs the use of technological aids for activities of daily living, recreation, and leisure activities.[4]

The impact of task-oriented training and evaluation at home (TOTE Home) on individuals with stroke was examined. This study utilized a single-subject approach with a total of 30 participants, each attending a 1-hour session daily at their residences. It was observed that there was a measurable improvement in the outcome measures, although the level of enhancement differed among the participants. The TOTE program not only enhances motor but also facilitates continued improvement beyond intervention.[5]

In this study, various factors were explored/ identified that can affect the outcomes of ADLs-based intervention in hemiplegic cerebral palsy. The general factors that differ from person to person have their impact that can improve or regress the desired outcomes. These factors can interact and influence therapy sessions in various ways, from affecting the content and structure of sessions to impacting client engagement and overall progress.

MATERIAL AND METHODS

This observational study was conducted at the Department of Developmental and Behavioral Pediatrics, Children's Hospital, Lahore and PSRD (Pakistan Society of Rehabilitation for Disabled). A total of 37 patients with spastic hemiplegic cerebral palsy were taken into observation with age range of 5-15 years to fill out the questionnaire. The patients taken in this study were all undergoing interventions based on the ADLs technique for at least 6 months. Patients with age range below the age of 5 years and above 15 years were excluded. Patients having upper extremity issues due to any other disease were not included. Patients having previous orthopedic surgery in the UL were excluded. To gather data for this study, a demographic questionnaire was designed and it was approved by Institutional Review Board under the IRB number 1305/SAHS. This demographic questionnaire was designed to find out the factors that may have a positive or negative impact on the outcomes of task-oriented techniques in children with hemiplegic cerebral palsy. The demographic data consisted of almost 15 factors involved in the study to meet the requirements of the study. Parents/guardians filled out this demographic questionnaire at the hospital or other clinical settings. The Barthel Index scale was used to evaluate the level of dependency of patients in their Activities of daily living.

RESULTS

A total of 37 patients were taken according to

sample size. The result shows that the education of parents/guardians, financial status/monthly income of the parents of the child, working status of the mother, vaccination course, time given in each session, follow-up sessions, family history of the disease, area of living, availability of time has an insignificant impact on the functional independence of the patient. While the number of sessions, involvement, and compliance of the patient, having comorbidities, level of severity, and performance of tasks under observation has a significant impact on the functional independence outcomes of the patient.

The table below shows all the factors and their significance with the functional independence of the patient. The factors having p-value <0.05 are considered statistically significant, which are number of sessions per week, involvement, and compliance of the patient, having other comorbidities, level of severity, and performance of tasks under observation. While others having p-value >0.05 are considered to be insignificant.

TABLE 1: Correlation of functional independence of patient with different factors and their significance

Factors	p value
Education of the parents/guardians of the child	>0.05
Financial status/monthly income of the parents	>0.05
Working status of mother	>0.05
Complete or Incomplete Vaccination	>0.05
Time given in each session	>0.05
Number of sessions per week	<0.05
Regular or irregular follow up sessions	>0.05
Involvement of the patient	<0.05
Compliance of the patient	<0.05
Having other comorbidities or not	<0.05
The severity of the impairment	<0.05
Family history of disease in present or not	>0.05
Area of living (distance from hospital or rehab center)	>0.05
Availability of required tools/equipment	>0.05
Tasks performed under observation or not	<0.05

The following graphs represent all six factors that have a significant impact on the functional outcome of the patient's independence.

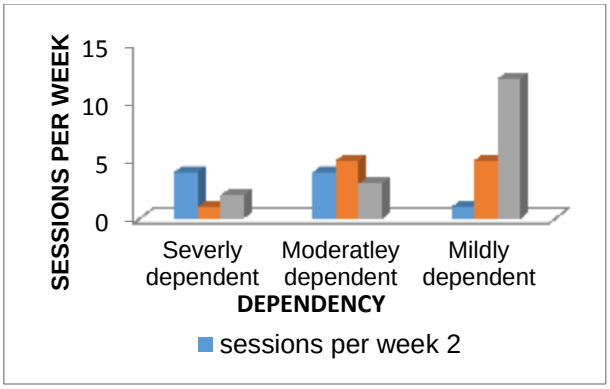

Fig 1.1: Sessions per week

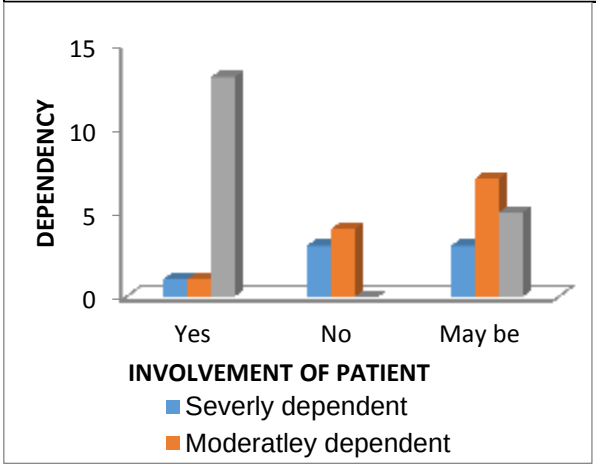

Fig 1.2: Involvement of patient

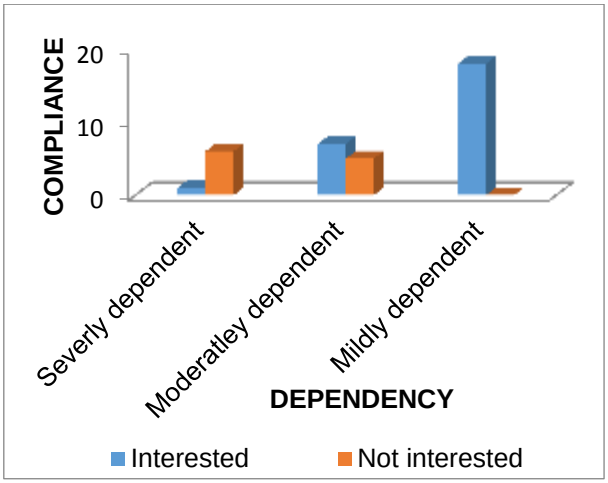

Fig 1.3: Compliance

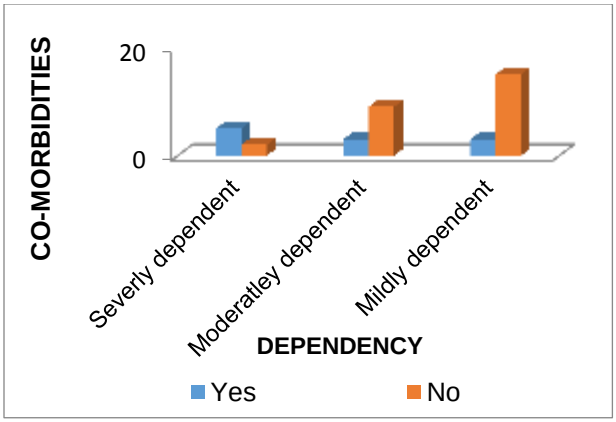

Fig 1.4: Co-morbidities

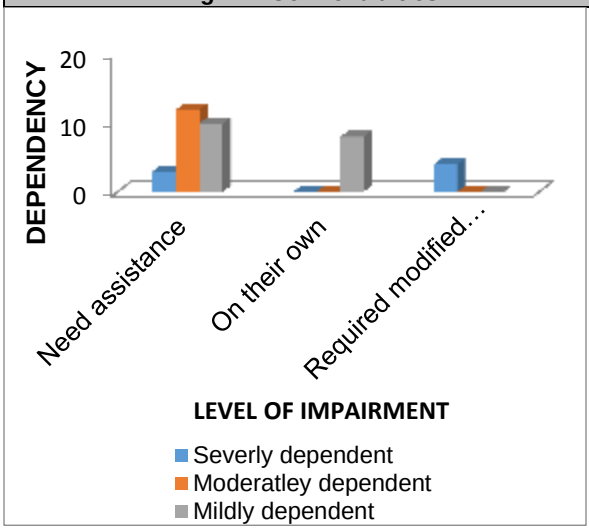

Fig 1.5: Level of impairment

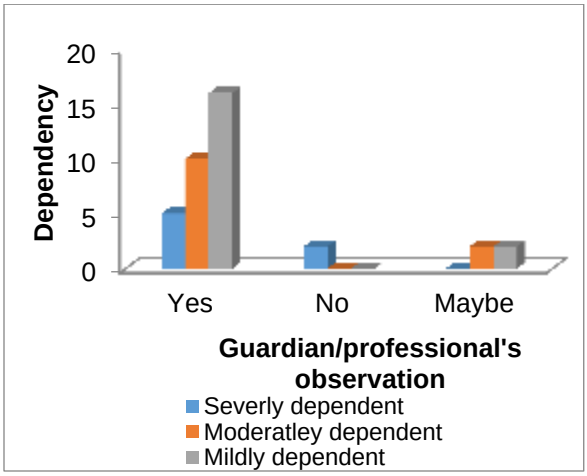

Fig 1.6: Guardian/professional's observation

DISCUSSION

The results are in agreement with other studies suggesting that task-oriented techniques/ADLs-based intervention shows better results in performing ADLs. A few general factors were taken into observation to find out their effectiveness on ADL performance. Other studies supported these factors and their impacts as well.

Task-oriented training (TOT) can greatly enhance gross motor skills, balance abilities, and daily living tasks in kids with cerebral palsy when compared to traditional rehabilitation methods.[6]

Integrating biofeedback with activity-focused exercises can enhance a child's ability to balance, reduce muscle spasms, improve hand movement, boost developmental progress, and improve the ability to stand and walk in children with spastic cerebral palsy. This approach also increases the level of satisfaction reported by the parents of these children.[7]

The study found that parents' education of a child with cerebral palsy has a very minor effect on the success of therapy. This is in line with another research that showed parents with less education have a lower chance of having a child with cerebral palsy compared to those with more education. Although there were some hints that a mother's education could influence other health issues during pregnancy, the findings from this research suggest that it might not be the main reason for the link between a parent's education and the risk of having a child with cerebral palsy. Therefore, there was no strong proof that a parent's level of education directly affects the risk of their child developing cerebral palsy.[8]

A research study backs up the idea that a person's financial situation and how it affects their therapy results. This study includes 17 different research pieces, each involving over 165,000 patients, who were assessed for at least one aspect of their Socio-Economic Status (SES) and how it relates to their mental health therapy results. Out of these, 12 studies discovered clear connections between SES indicators and mental health outcomes. Specifically, six studies that looked into job status had enough data to perform a comprehensive analysis. The overall impact of having a job was not found to be significant

(−0.66, confidence interval (CI) −1.33, 0.02). However, when the analysis was narrowed down to just five studies (sensitivity analysis), there was a slight effect found (−0.22, CI −0.36, −0.09) of employment on the success of therapy. There's some indication that being economically disadvantaged is linked to less successful therapy outcomes, but the limitations of the data should be considered as a preliminary finding.[9]

Our research found that the employment status of the mother does not significantly affect the progress and results of therapy. A different study looked into how working mothers view, how their employment affects their children's growth and development. This study focused on mothers who were working and had children aged between 0 and 5 years, using a non-probability judgmental sampling method. From one community, 12 mothers who agreed to participate were chosen. The findings showed that working mothers have less time to spend with their children, which negatively affects the children's emotional well-being, feeding habits, relationships, and connections with other kids.[10]

Getting fully vaccinated has a minimal effect on the results of the ADLs-focused program. A subsequent research was carried out involving 189 families with kids facing developmental challenges. In total, these children had 114 typically developing elder siblings and 50 typically developing younger siblings. The rates of complete vaccination among the kids with developmental challenges and those with younger siblings were noticeably lower than those with older siblings ($p< 0.01$). Similarly, the rates of MMR (mumps, measles, and rubella) vaccination among the kids with developmental challenges and those with younger siblings were also noticeably lower than those with older siblings ($p< 0.001$). The study's results indicate that there's a widespread trend of lower vaccination rates among families with children facing developmental challenges. This significant drop in vaccination rates among these children could leave them at risk during outbreaks.[11]

The duration of therapy sessions doesn't significantly affect the results of therapy. A research study that included a meta-analysis found that longer exercise therapy sessions lead to slight but positive changes in daily living activities, as assessed by the Barthel Index (SES 0.13; CI 0.01–0.25; $Z = 2.15$; $p = .03$). These benefits were also seen to last for 6 months (SES 0.15; CI 0.05–0.26; $Z = 2.8$; $p = .00$). This study supports the idea that extra, targeted exercise for the lower body improves lower body function and walking speed.[12]

The frequency and consistency of therapy sessions greatly influence the results of treatment. A research study confirms that individuals who participate in weekly sessions experience clinically meaningful progress more quickly compared to those in fortnightly groups. Nonetheless, there were minor variations in the overall change observed across both groups. These results align with previous research on how often sessions should occur, reinforcing the idea that more frequent sessions lead to quicker recovery. Therefore, the number of sessions is a crucial factor in providing effective therapy.[13]

The degree to which patients participate and adhere to their therapy sessions significantly influences the effectiveness of the therapy, as indicated by the current research. This is also backed by another study that found that when patients are actively engaged in setting their own physical therapy objectives, it can lead to positive outcomes in treatment and improve how patients evaluate the care they receive. More research, including involving additional physical therapists and extending the duration of follow-up, is needed.[14]

Patients suffering from additional health conditions in addition to hemiplegic CP experience a notable effect on their ability to function independently. Another study also found that individuals with a higher number of health conditions tend to have poorer functional results following a stroke, highlighting the need to take into account the presence of these conditions when designing rehabilitation plans. More studies are required to determine the most effective rehabilitation strategies and treatments for individuals with multiple health conditions, aiming to enhance their functional abilities post-stroke.[15]

The degree of disability has a notable effect on the results of activities of daily living (ADLs) interventions in this research, which is backed by another study indicating a strong link between

stroke-related disability and motor Functional Independence Measure (FIM) scores. However, the relationship between cognitive scores on the FIM at the time of discharge and motor disability was not found to be significant, despite a slight improvement in cognitive function. This suggests that the ability to perform daily physical tasks and walk after a stroke is primarily influenced by the level of motor disability.[16]

Research indicated that a family history of the disease showed had a negligible impact on the success of treatment. Findings revealed that as the stress on caregivers increased, the overall well-being of the family decreased. Conversely, a reduction in caregiver stress was linked to an improvement in the family's quality of life. The well-being of siblings was negatively affected when compared to their typically developing peers, with older siblings being more severely impacted. Additionally, as caregiver stress rose, the well-being of the family improved, and as the family's quality of life increased, the well-being of the siblings also improved.[17]

The element that connects the living space (Time required to reach the rehabilitation center) to the effectiveness of the therapy has a negligible effect on the continuous treatment. However, a different research encompassed 108 additional studies, which yielded varied findings. Out of these, 77% of the studies suggested a correlation known as distance decay, indicating that individuals residing farther from the healthcare facilities they needed to visit experienced poorer health results compared to those living closer. This included factors such as survival rates, duration of hospital stays, and the likelihood of not attending follow-up appointments. Conversely, six studies found a different pattern, known as distance bias, where individuals living further away had better health outcomes. The remaining 19 studies did not find any connection. It was noted that the link between traveling longer distances and experiencing poorer health outcomes cannot be completely dismissed and should be taken into account during discussions on the location of healthcare services.[18]

The treatment facilities equipped with the necessary tools/equipment do not demonstrate a notable impact on the outcome of the intervention, as summarized in this research. However, a subsequent study was connected to these findings. The findings from this study suggest that the condition of facilities, the quality of equipment, and the overall condition and quality of facilities and equipment were statistically significant and could be indicative of successful healthcare service delivery.[19]

The impact of tasks carried out under observation was found to have a notable influence on the outcomes of activities of daily living (ADLs) therapy. This finding is backed by another study's result, which indicated that there were positive links between behavior during sessions and how participants viewed their relationship with the therapist and their progress, both at the beginning and later stages of therapy. A binary logistic regression analysis revealed that successful outcomes, characterized by agreement from both the therapist and family members regarding overall progress and a decrease in problem severity, were significantly influenced by positive individual behavior (such as active participation in the therapeutic process, emotional bond with the therapist, and feeling safe within the therapeutic environment) in the initial session and by productive family interactions (a shared sense of purpose within the family) in the later sessions.[20]

CONCLUSION

This study concluded that the number of sessions per week, involvement and compliance of patients, having comorbidities other than cerebral palsy, the severity of impairment, and guardians or professional observation during sessions have a significant impact on the outcomes of activities of daily living (ADLs) based intervention in hemiplegic cerebral palsy.

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Conflict of interest: None

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