AATCC Review

09 October 2024: Received
04 January 2024: Revised
02 February 2025: Accepted
06 February 2025: Available Online

https://aatcc.peerjournals.net/

Original Research Article

Open Access

Evaluating functional independence with the Effect of Age and Gross Motor Function Classification System on Activities of daily livings of Children with cerebral palsy

Shweta Rai*[1], Tulika Borah[1] and Varidmala Jain[2]

[1]*Assam Agricultural University, India*
[2]*Secretary Trishla Foundation, India*

ABSTRACT

Background: *Cerebral palsy is a neurological condition which basically affects the gross motor and fine motor functions of children; therefore, children need assistance in performing their activities of daily livings (ADL). In the Indian context, family-centered care is not seen commonly, and the sole care is shouldered by the parents, mostly mother, which has an adverse effect on overall well-being of the family. A comprehensive picture of the characteristics of the children with CP, shedding light on their age distribution and motor function levels can assist to determine the extent of the problem, and develop systems to address issues pertaining to ADL.*

Methods: *Activities of daily living (ADL) problem faced by children were done through the use of a LTCS WeeFIM Score sheet -Brain Injury- July 2011 popularly used to assess the problem related to self-care, mobility, and cognition. In the present study self-care and mobility domains were assessed in children with cerebral palsy. The Gross Motor Function Classification System Expanded & Revised (GMFCS-E&R), a five-level classification system developed by Palisano et al. (2007), was employed to characterize the gross motor function of children with cerebral palsy across different age groups.*

Children with cerebral palsy who were undertaking rehabilitation services in Trishla Foundation were selected purposely as sample for the study. The sample of the study consisted of 250 children who were undertaking rehabilitation services in the Trishla Foundation located at Prayagraj town of Uttar Pradesh, India. Out of these 250 children, 175 were above 3 years of age. Further, it was found that out of 175 children, only 65 children were in GMFCS I-III levels and rest were in GMFCS IV or V levels, who were omitted as per the criteria of the study. Again, among the 65 children selected for the study, only 61 parents gave consent for their children to participate in the study. So finally, data were collected from 61 respondents.

Conclusion: *The study highlighted significant differences in the levels of independence and support needed by individuals with cerebral palsy for various activities of daily living, depending on their age group and GMFCS level.*

While interviewing the children and their parents, there was a lot of challenges regarding their behaviour like after responding once, they did not want to respond again. This study contributes to raising awareness among parents of children about new assistive devices, such as hand grip spoons and cut cups, which aid in performing daily living activities.

Keywords: *Cerebral Palsy, Assistive device, Self-care, Mobility, Assistance needed, and WeeFIM*

Background

CP is the most prevalent neuro-developmental disorder in childhood, with an estimated prevalence of 2–3 per 1000 live births worldwide [1]. Cerebral palsy is a neurological condition which affects muscle tone, posture, and body movement. It basically affects the gross motor and fine motor functions of children; therefore, children need assistance in performing their activities of daily livings. Performance of children is majorly dependent on the level of Gross Motor Function Classification System (GMFCS) and age, although age is not directly involved with their performance. It is also dependent on the intensity of the spasticity which is again dependent on the age of initiation of intervention. There exists a robust correlation between level of GMFCS and the degree of spasticity in children with cerebral palsy aged 6-12 years [2].

*Corresponding Author: ***Shweta Rai***

DOI: https://doi.org/10.21276/AATCCReview.2025.13.01.245

Another study findings suggested that even in children with severe spastic cerebral palsy, the level of spasticity is only moderately associated with gross motor capability[3].

[4] stated that the development of self-care skills is intricately linked to the acquisition of motor skills, and achieving independence becomes challenging when there are significant impairments in both fine and gross motor skills. It is widely recognized that children diagnosed with cerebral palsy often face difficulties in mastering various self-care tasks. A Similar study also stated that for children with CP aged 7 years and older, mobility plays a crucial role in gaining self-care skills [5].

The study aimed to evaluate the challenges encountered by children with cerebral palsy in developing self-help skills. The self-care activities and mobility functions were considered in the present study.It was assumed that with appropriate training and potential modifications to the environment or activities, some children may gain increased independence. However, for those with severe impairments, consistent care may be an ongoing need. Even in cases where continual assistance is required, parents can undergo training and receive support to enable children to participate to the fullest extent possible in Activities of daily living (ADL).

Methods

Activities of daily living (ADL) problem faced by children were assessed by quantitative method. The quantitative assessment of ADL was done through the use of a LTCS WeeFIM Score sheet - Brain Injury- July 2011 made under the Lifetime Care and Support (Catastrophic Injuries) Act 2014, s 98 Authorized by the ACT Parliamentary Counsel. This test is popularly used to assess the problem related to self-care, mobility, and cognition. WeeFIM serves as a valuable tool for evaluating functional independence in children ranging from 6 months to 7 years old. Additionally, it applies to children with developmental disabilities within the age range of 6 months to 21 years. Scores in each item were given against the seven response options. Higher score in any type of area indicated that the children required no helper for that particular skill. Likewise, the scores of all the respondents against each type of area were calculated and their needs of help were assessed. The permission to use the scale for the study was received from LTCS. In the present study self-care and mobility domains were assessed in children with cerebral palsy.

To find out the severity level of GMFCS, the Gross Motor Function Classification System Expanded & Revised (GMFCS-E&R), a five-level classification system developed by Palisano *et al.* (2007), was employed to characterize the gross motor function of children and adolescent with cerebral palsy across different age groups: under 2years, 2-4 years, 4-6 years, 6-12 years, and 12-18 years.

Level I- Walks independently without limitations
Level II- Walks with some limitations
Level III- Walks using a hand-held mobility device
Level IV- Self-mobility with limitations, may utilize powered mobility devices
Level V- Transported in a manual wheelchair

Children who demonstrate motor difficulties akin to those categorized in Level I usually can walk with few limitations but may encounter restrictions in mastering more complex motor skills. Conversely, children classified at Level V typically encounter substantial limitations in their ability to move independently, even with the assistance of technology. The permission to use the scale for the study was received from CanChild. In this study, data analysis focused on only three GMFCS levels - I, II, and III. GMFCS levels play a pivotal role in the activity of daily living (ADLs), including self-care and mobility, among children with cerebral palsy.

Sampling procedure

Non-random sampling technique was used for the study.

Selection of district: Prayagraj district of Uttar Pradesh was selected for the study through purposive sampling method, as a maximum number of rehabilitation centers were present in the district.

Selection of rehabilitation centers/special schools: There were four rehabilitation centre in Prayagraj district, out of these two rehabilitation centre, did not give permission to conduct the study, and in one centre children with Cerebral palsy were not found. During survey of the centers, it was found that maximum number of children were attending Trishla foundation. Therefore, Trishla foundation was selected purposely for the present study. The data were collected from children as well as from parents.

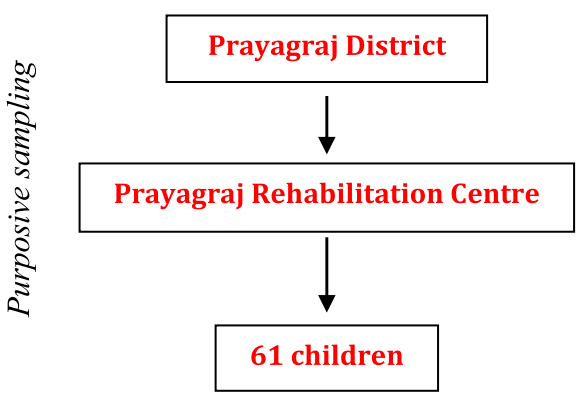
Children with cerebral palsy who were undertaking rehabilitation services in Trishla foundation and those who fulfilled the inclusive criteria set for the study were selected purposely as sample for the study.

The inclusion criteria were- (1) aged 3-18 years, (2) regular in rehabilitation centres, (3) children of Gross Motor Function Classification System (GMFCS) I, II, & III level of CP

The sample of the study consisted of 250 children who were undertaking rehabilitation services in the Trishla Foundation located at Prayagraj town of Uttar Pradesh, India.

Out of these 250 children, 175 were above 3 years of age. Further, it was found that out of 175 children, only 65 children were in GMFCS I-III levels and rest were in GMFCS IV or V levels, who were omitted as per the criteria of the study. Again, among the 65 children selected for the study, only 61 parents gave consent for their children to participate in the study. So finally, data were collected from 61 respondents.

The diagrammatic representation of the sampling procedure is given below-



Consent and Ethics approval

Ethical approval was obtained before conducting the research from institutional ethical committee for research on human participants, Trishla foundation, Prayagraj. Written informed consent was obtained from the parents of the respondents, as the respondents.

Result and Discussion

1. Assessment through WeeFIM score sheet test

In the present study, self-care and mobility domains were assessed in children with cerebral palsy. Scores in each item were given against the seven response options. Higher score in any type of area indicated that the child required no assistance for that particular skill. Likewise, the scores of all the respondents against each type of area were calculated and their needs of assistance were assessed.

In case of need of assistance in self-care of children with cerebral palsy There were five sub-areas viz., eating, grooming, bathing, dressing upper body, dressing-lower body and 3 subareas in sphincter (control) viz., toileting, bladder management and bowel management. In regard of mobility there were 3 subareas related to transfers viz., transfers from chair/wheelchair to bed, transfers from chair/wheelchair to toilet and transfers from chair/wheelchair to tub and 2 subareas of locomotion, viz., walk/wheelchair/crawl and climbing stairs.

Table1 (a): Effect of age on eating activity of children with cerebral palsy

Age (yrs)	(a) Assistance needed in eating activity						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	5 (19.2%)	8 (30.8%)	3 (11.5%)	7 (26.9%)	0 (0.0%)	0 (0.0%)	3 (11.5%)
7-10	0 (0.0%)	2 (8.7%)	5 (21.7%)	4 (17.4%)	1 (4.3%)	0 (0.0%)	11 (47.8%)
11-14	1 (9.1%)	2 (18.2%)	0 (0.0%)	2 (18.2%)	0 (0.0%)	0 (0.0%)	6 (54.5%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.00%)

Table1 (a) presented the data about self-care problem (eating) from different age groups. Complete independence in eating was found in the age group of 14 -18 years (100%) followed by the majority of children (54.5%) in the age group of 11-14years. Also, there were children in the age group of 3-6 years (26.9%) who required minimal assistance. Overall, this data shows that with increase in age children can achieve complete independence in self-eating.[4] also suggested that functional skills tend to improve with age among children categorized at higher-functioning levels of MACS and GMFCS. It was also found in the present study that those children who were under continuous training for eating provided by a therapist achieved complete independence in self- eating. Similarly, study by[6]also reported that a training program has a beneficial effect on improving feeding practices of children with CP and their caregivers after ten training sessions, with positive consequences for both child and caregiver. As it was found that maximal assistance was required in the age group of 3-6 years, due to difficulty in neck and trunk stability, it may be one of the reasons behind feeding difficulty. Studies indicated that a significant correlation was observed between trunk control and oral motor functions in children with CP and the eating function of children [7].

Table1 (b) Effect of age on grooming activity of children with cerebral palsy

Age (yrs)	(b) Assistance needed in Grooming						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	11 (42.3%)	7 (26.9%)	3 (11.5%)	4 (15.4%)	0 (0.0%)	0 (0.0%)	1 (3.8%)
7-10	10 (43.5%)	1 (4.3%)	3 (13.0%)	4 (17.4%)	1 (4.3%)	0 (0.0%)	4 (17.4%)
11-14	7 (63.6%)	0 (0.0%)	0 (0.0%)	1 (9.1%)	0 (0.0%)	0 (0.0%)	3 (27.3%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)

Grooming problems in different age groups of children with CP are presented in **Table 1 (b)**The majority of children needed total assistance in grooming (63.6%) from the age group of 11-14 years, followed by complete independence in grooming (27.3%) and minimal assistance in grooming (9.1%). This data highlights the dynamic nature of grooming challenges among individuals with cerebral palsy across different age groups. Similar to the findings of the present study, the study conducted by[8]revealed that in grooming skills 50 percent of patients lacked the ability of independent dressing, while 34 per cent required assistance, and 16 percent demonstrated independence in this aspect. It was found in the present study that,100 percent of children of the age group 14-18 years had complete independence in grooming, it may be because the children had undergone hand specific therapy.[9]also stated that enhancing hand muscle strength and practicing dexterity exercises could be beneficial for improving manual abilities in children with cerebral palsy.

Table1 (c) Effect of age on bathing activity of children with cerebral palsy

Age (yrs)	(c) Assistance needed in Bathing						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	8 (30.8%)	6 (23.1%)	4 (15.4%)	5 (19.2%)	1 (3.8%)	1 (3.8%)	1 (3.8%)
7-10	5 (21.7%)	5 (21.7%)	5 (21.7%)	2 (8.7%)	2 (8.7%)	0 (0.0%)	4 (17.4%)
11-14	3 (27.3%)	3 (27.3%)	0 (0.0%)	1 (9.1%)	1 (9.1%)	0 (0.0%)	3 (27.3%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)

Table1 (c)shows that none of the respondents achieved complete independence in bathing, but a few in the age group of 14-18 years (100%), 7-10 years (8.7%), 11-14 years (9.1%) and 3-6 years (3.8%) were able to bath under supervision, whereas, most of the children across all the age groups required total to maximal assistance in bathing. In a similar study by[10]the findings stated that within the self-care domain more than fifty percent of children diagnosed with cerebral palsy required total assistance to supervision (scoring 1-5) in tasks related to grooming, bathing, dressing, and toileting. As in the present study, it was found that the majority of the respondents needed assistance in bathing activity across all the age groups, it may due to the lack of appropriate assistive devices available for self-care activities. The study conducted by[11]also suggested that the utilization rate of devices designed to assist with self-care activities was notably lower compared to those intended for positioning and mobility, and their usage exhibited a significant correlation with the child's age. It was found in the present study that locally made devices were not available, and some of the devices available in market were unaffordable for the parents. A study also indicated that the absence of adequate support contributed to the financial burden on parents, hindering their ability to access appropriate care for their child [12].

Table 1(d) Effect of age on dressing upper body activity of children with cerebral palsy

Age (yrs)	(d) Assistance needed in Dressing upper body						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	21 (80.8%)	3 (11.5%)	2 (7.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
7-10	9 (39.1%)	6 (26.1%)	2 (8.7%)	3 (13.0%)	1 (4.3%)	0 (0.0%)	2 (8.7%)
11-14	5 (45.5%)	2 (18.2%)	0 (0.0%)	3 (27.3%)	0 (0.0%)	0 (0.0%)	1 (9.1%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)

The data in **Table 1 (d)** represents the diverse nature of dressing upper body abilities among individuals with cerebral palsy at different stages of development. The respondents from the age group of 14-18 years had complete independence (100%) in dressing upper body, whereas the majority of respondents from the age group of 3-6 years (80.8%) needed total assistance in dressing upper body. Assistance in dressing upper body and wearing comfortable easy to wear clothes may attribute to complete independence in dressing upper body. [13], suggested that intervention with lycra garments positively impacted the functional abilities of the individuals. It was found that 80 percent of respondents who required total assistance were not trained in this particular skill, additionally their developmental delays were also one of the reasons behind this. Findings of study by [14] revealed that children with cerebral palsy can acquire dressing skills through integrating skill training into play activities within their natural environment.

Table 1(e) Effect of age on dressing lower body activity of children with cerebral palsy

Age (yrs)	(e) Assistance needed in Dressing lower body						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	16 (61.5%)	7 (26.9%)	3 (11.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
7-10	10 (3.5%)	5 (21.7%)	1 (4.3%)	0 (0.0%)	3 (13.0%)	0 (0.0%)	4 (17.4%)
11-14	5 (45.5%)	2 (18.2%)	0 (0.0%)	3 (27.3%)	0 (0.0%)	0 (0.0%)	1 (9.1%)
14-18	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Table 1 (e) showed the difficulty of respondents in dressing lower body across different age groups. Majority of children (61.5%) from the age group of 3-6 years required total assistance in dressing their lower body, substantially, 45.5 percent children needed total assistance in dressing lower body from the age group of 11-14 years. The data reveals that the need of assistance was found more in dressing lower body than upper body. The respondent needed total assistance to maximal assistance in dressing their lower body depending on their age and level of disability. It was seen during the study that those children who started taking the rehabilitation services at early age, achieved mastery in this particular activity at an appropriate age.[15], suggested that to enhance functionality in children and young individuals with cerebral palsy, intervention should encompass goals chosen by the client and requires comprehensive task practice of those goals. It was found that those children who were doing hand-oriented tasks like holding the ball and throwing were able to wore pants with elastics.[16] also suggested that the transition involves shifting from goals related to dressing and leisure activities in the youngest children to goals focused on personal care and eating for those aged 6-11 years. Findings of a study suggested that the CRP (Centre for the Rehabilitation of the Paralysed) program demonstrates significant effectiveness in enhancing a child's capacities and skill [17].

Table 1(f) Effect of age in toilet control, bladder management, and bowel management activity of children with cerebral palsy

Age (yrs)	(f) Assistance needed in Toileting						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	7 (26.9%)	0 (0.0%)	0 (0.0%)	3 (11.5%)	2 (7.7%)	0 (0.0%)	14 (53.8%)
7-10	1 (4.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (4.3%)	21 (91.3%)
11-14	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (9.1%)	0 (0.0%)	10 (90.9%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)

Age (yrs)	(g) Assistance needed in Bladder management						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	7 (26.9%)	0 (0.0%)	0 (0.0%)	3 (11.5%)	2 (7.7%)	0 (0.0%)	14 (53.8%)
7-10	1 (4.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (4.3%)	21 (91.3%)
11-14	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (9.1%)	0 (0.0%)	10 (90.9%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)

Age (yrs)	(h) Assistance needed in Bowel management						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	7 (26.9%)	1 (3.8%)	0 (0.0%)	2 (7.7%)	2 (7.7%)	0 (0.0%)	14 (53.8%)
7-10	1 (4.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (4.3%)	21 (91.3%)
11-14	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (9.1%)	0 (0.0%)	10 (90.9%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)

Table 1(f) depicts sphincter control (toileting) of respondents from different age groups. The respondents in the age group of 14-18 years had complete independence (100%) in toileting, followed by respondents of the age group of 7-10 years (91.3%) and 11-14 years (90.9%).The findings indicated that as the children grow older, they achieved complete independence in sphincter (toilet) control. Similar to the findings of current study,[18]also stated that children with cerebral palsy exhibited lower WeeFIM scores in comparison to their healthy counterparts. The subset scores related to sphincter control in children with cerebral palsy increased with age.

Data **(Table 1 (g))** indicates that the majority of the respondents of higher age group had complete independence in bladder management - age groups of 14-18 years (100%), 11-14 years (90.9%) and 7-10 years (91.3%);whereas, respondents from the age group of 3-6years (26.9%) needed total assistance. This shows increase in the capacity of bladder management abilities among individuals with cerebral palsy with age. Similar to the findings of the study,[19] also suggested that children with cerebral palsy achieved bladder and bowel control at a later age compared to their siblings and healthy peers. Another findings from the study by[20]indicated that by the age of 6 years, 54 percent of individuals with spastic tetraplegia and 80 percent with spastic hemiplegia or diplegia achieved urinary continence spontaneously.

Similar to the bladder management ability, the bowel management ability **(Table 1(h)**) of respondents was found to increase with age. Respondents of age group of 14-18 years (100%) had complete independence in bowel management, followed by the age group of 11-14 years (90.9%) and 7-10 years (91.3%). The present study found that majority of the children had complete independence in terms of controlling the bowel and not spoiling the clothes or beds. Also, it was found that every child had suffered from the constipation. Similarly, the study conducted by [21] mentioned that constipation is a prevalent issue among children with cerebral palsy and as a result, bowel control is ranked as the second concern. The occurrence of constipation is often attributed to a combination of factors, including poor mobility and inadequate oral food intakes. To understand constipation in this context, it's essential to recognize the role of sphincters. Sphincters are muscles that contract to close body openings. In the context of bowel control, the anal sphincter is crucial. For successful and consistent use of the potty, both the anal and urinary sphincters need to be physically mature. This maturity is an important developmental milestone that influences a child's readiness for successful potty training.

Table 1(i) Effect of age in transfer from wheelchair to bed activity of children with cerebral palsy

Age (yrs)	(i) Assistance needed in transfer from wheelchair to bed						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	1 (3.8%)	4 (14.4%)	10 (38.5%)	4 (15.4%)	3 (11.5%)	3 (11.5%)	1 (3.8%)
7-10	2 (8.7%)	3 (13.0%)	3 (13.0%)	2 (8.7%)	3 (13.0%)	7 (30.4%)	3 (13.0%)
11-14	1 (9.1%)	2 (18.2%)	1 (9.1%)	2 (18.2%)	2 (18.2%)	2 (18.2%)	1 (9.1%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)

Table 1(j) Effect of age in transfer from wheelchair to toilet activity of children with cerebral palsy

Age (yrs)	(j) Assistance needed in transfer from wheelchair to toilet						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	7 (26.9%)	7 (26.9%)	6 (23.1%)	5 (19.2%)	1 (3.8%)	0 (0.0%)	0 (0.0%)
7-10	4 (17.4%)	2 (8.7%)	4 (17.4%)	4 (17.4%)	3 (13.0%)	3 (13.0%)	3 (13.0%)
11-14	2 (18.2%)	3 (27.3%)	0 (0.0%)	2 (18.2%)	2 (18.2%)	1 (9.1%)	1 (9.1%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)

Table 1(k)Effect of age in transfer from wheelchair to tub activity of children with cerebral palsy

Age (yrs)	(k) Assistance needed in transfer from wheelchair to tub						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	11 (42.3%)	2 (7.7%)	8 (30.8%)	2 (7.7%)	1 (3.8%)	1 (3.8%)	1 (3.8%)
7-10	9 (39.1%)	2 (8.7%)	2 (8.7%)	2 (8.7%)	3 (13.0%)	2 (8.7%)	3 (13.0%)
11-14	4 (36.4%)	1 (9.1%)	0 (0.0%)	1 (9.1%)	1 (9.1%)	1 (9.1%)	3 (27.3%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)	0 (0.0%)

Table 1 (i) shows data pertaining to transfer from wheelchair to bed in different age groups. The respondents from the age group of 14-18 years (100%) and the respondents in the age group of 7-10 years (30.4%) have modified independence in transfer activities while many of the respondents in the age group of 3-6 years (38.5%) needed moderate assistance in transfer activities. Variation in the need of assistance during the transfer from wheelchair to bed was found among the respondents. Further, the findings indicated that, age was not a factor in the need of assistance during the transfer from wheelchair to bed but fear of falling was a factor. Research by [21] also indicated that a notable percentage, ranging from 2-15 percent of inpatient children with CP experienced at least one fall, and approximately 30 percent of these falls result in serious injuries. Falls are identified as a significant risk, and according to the Institute for Healthcare Improvement (IHI), they are a leading cause of death in people with disabilities. The majority of falls tend to occur within rooms and bathrooms. This highlights the importance of creating environments that support safe transfers for children with CP, particularly in areas prone to falls. Beyond the immediate physical impact, experiencing a fall can lead to a fear of falling again. This fear, in turn, increases the risk of future falls, creating a potential cycle of heightened vulnerability.

Table 1 (j)shows data on activities about transfer from wheel chair to toilet in different age groups of children with CP. The data sheds light on the diverse patterns of toilet transfer needs across different age groups.

The data indicates that the need of total assistance is greater during early ages (26.9% in the age group of 3-6 years) as compared to later ages (17.4% in the age group of 7-10 years and 18.2% in the age group of 11-14 years). Various factors, including the impact of cerebral lesions on IQ, bladder functions, and mobility, may also contribute to urinary dysfunction. The study by [22] stated that the prevalence of urinary system symptoms and neurogenic bladder is elevated within the cerebral palsy population.

The data Table 1 (k)provides valuable insights into the varied needs of assistance during the transfer into the tub among individuals with cerebral palsy across different age groups. For those aged 14-18 years, the need for supervision highlights the specific challenges individuals in this age group face during this particular activity. The need for total assistance across the ages underscores the substantial support required by children with CP. The presence of various assistance levels and modified independence further highlights the diversity in transfer capabilities. The coexistence of complete independence, along with the need for maximal, minimal, and supervised assistance, indicates a dynamic range of transfer abilities within this age bracket. This variation emphasizes the evolving nature of transfer capabilities and the need for tailored support across different developmental stages. In Indian circumstances very few parents were using tub for bathing due to the difficulty in transfer activity and parents use commonly available materials like buckets and mugs. Children were trained by parents and trainers to use wheelchairs to reach to bathroom by themselves.

Findings of a study indicated that following training, pediatric wheelchair users exhibited an immediate enhancement in transfer skills, with TAI (Transfer Assessment Instrument) score changes comparable to those observed in adult wheelchair users post training. These improvements could potentially contribute to the long-term preservation of upper extremity function [23].
The findings of the study highlighted that very few respondents irrespective of their age could achieve complete independence in transfer activities.

Table 1 (l)Effect of age in locomotion activity of children with cerebral palsy

Age (yrs)	(l)Assistance needed in locomotion						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	2 (7.7%)	6 (23.1%)	3 (11.5%)	7 (26.9%)	2 (7.7%)	2 (7.7%)	4 (15.4%)
7-10	0 (0.0%)	5 (21.7%)	4 (17.4%)	2 (8.7%)	3 (13.0%)	5 (21.7%)	4 (17.4%)
11-14	0 (0.0%)	3 (27.3%)	0 (0.0%)	3 (27.3%)	2 (18.2%)	3 (27.3%)	0 (0.0%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)

Table 1 (l) presents data on the locomotion abilities of respondents in different age groups. In the age group of above 14-18 years 100 percent had modified independence in locomotion. Further, in the age group of 11-14 years, some respondents (27.3%) needed maximal assistance and the same needed minimal assistance to modified independence, and a few (18.2%) needed supervision during locomotion. Similarly, from the age group of 7-10 years, some of the respondents (21.7%) needed maximal assistance and modified independence in locomotion; also few respondents (17.4%) needed moderate assistance and complete independence, while few (13.0%) needed supervision and minimal assistance (8.7%) in locomotion. Most of the respondents from the age group of 3-6 years needed assistance in locomotion ranging from minimal assistance (26.9%), maximal assistance (23.1%), moderate to total assistance (11.5%) and need supervision (11.5%), but a few respondents (15.4%) had complete and modified independence (11.5%) in locomotion. The data shed light on the diverse locomotion needs among respondents across the age groups. The array of need of assistance in locomotion from total assistance, minimal assistance, supervision to complete independence, illustrates the varied mobility labels within the age bracket. In the present study, it was seen that with growing age and proper treadmill training children can achieve modified independence in their walking pattern. Similarly, the findings from the study conducted by [24]indicated that children under the age of 4 years with cerebral palsy can enhance their gross motor function, walking speed, and walking endurance through intensive locomotor treadmill training.

Table 1 (m) Effect of age in climbing stairs activity of children with cerebral palsy

Age (yrs)	(m)Assistance needed in climbing stairs						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
3-6	4 (15.4%)	6 (23.1%)	5 (19.2%)	6 (23.1%)	1 (3.8%)	3 (11.5%)	1 (3.8%)
7-10	4 (17.4%)	4 (17.4%)	2 (8.7%)	7 (30.4%)	0 (0.0%)	5 (21.7%)	1 (4.3%)
11-14	3 (27.3%)	1 (9.1%)	1 (9.1%)	2 (18.2%)	1 (9.1%)	2 (18.2%)	1 (9.1%)
14-18	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)

Table 1 (m)shows that 100 percent of respondents from the age group of 14-18 years had acquired modified independence in climbing stairs. Most of the respondents (27.3%) from the age group of 11-14 years needed total assistance, while most respondents (30.4%) from the age group of 7-10 years needed minimal assistance. Substantially, most of the respondents (23.1%) from the age group of 3-6 years needed maximal or minimal assistance, but a few (11.5%) had modified independence or complete independence in climbing stairs.

Many underlying factors may contribute in the ability to climb stairs by children with CP, like age, type and level of disability, training, assistive devices used etc. [25] proposed that achieving independence in using a walker/wheelchair can contribute to reduction in the risk of falling down stairs and enhance the overall integration of children. This suggests that when children with cerebral palsy attain proficiency in using a walker or wheelchair for mobility, they are less likely to face the risk of falling when navigating stairs.

1. Assessment through Gross Motor Function Classification System

In this study, data analysis focused on GMFCS levels I, II, and III only. GMFCS levels play a pivotal role in the activity of daily living (ADLs), including self-care and mobility, among children with cerebral palsy.

Table 2 (a) Level of assistance required in eating as per GMFCS level of children with cerebral palsy

GMFC Level	(a)Assistance needed in eating						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
Level II	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (100.0%)
Level III	6 (10.7%)	12 (21.4%)	8 (14.3%)	13 (23.2%)	1 (1.8%)	0 (0.0%)	16 (28.6%)

Table 2 (a)outlines information on assistance required in eating based on Gross Motor Function Classification System (GMFCS) levels. Respondents in GMFCS level II displayed a noteworthy degree of complete independence (100.0%) in eating, emphasizing their ability to manage this aspect of daily living autonomously. For individuals classified under GMFCS level III, ranges of eating assistance needs were observed, viz. 28.6 percent exhibited complete independence in eating, while 23.2 percent needed minimal assistance, 21.4 percent required maximal assistance, 14.3 percent sought moderate assistance, 10.7 percent needed total assistance, and 1.8 percent needed supervision. This information emphasizes the significance of acknowledging the diverse range of eating abilities among individuals with cerebral palsy, especially when taking into account the GMFCS levels. Along with the GMFCS levels, the type and nature of food served to children with CP can also be an important factor. Findings of a study by [26]found that children in GMFCS levels IV and V exhibited lower capabilities across various food textures (pureed, ground/lumpy, cut up/chunky) compared to those in GMFCS level I. Similarly, children in levels II and III faced challenges specifically with cut-up/chunky foods when compared to those in level I.

Table 2(b) Level of assistance required in grooming as per GMFCS level of children with cerebral palsy

GMFCS Level	(b)Assistance needed in grooming						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
Level II	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (100.0%)
Level III	28 (50.0%)	8 (14.3%)	6 (10.7%)	9 (16.1%)	1 (1.8%)	0 (0.0%)	4 (7.1%)

Table 2 (b)indicates the grooming skills of the respondents. Among those classified under GMFCS level II, 100 percent exhibited complete independence in grooming. For individuals falling under GMFCS level III a range of grooming assistance needs were observed, but most of the respondent (50%) required total assistance. This data underscores the importance of recognizing the individual variations in grooming abilities among individuals with cerebral palsy, particularly when considering the GMFCS levels. Because of spasticity, it was seen that children were unable to lift their hands to comb hair and brushing the teeth. Similarly, study by [31] proclaimed that spastic cerebral palsy results in limitations in gross motor function and overall functional abilities.

Table 2(c) Level of assistance required in bathing as per GMFCS level of children with cerebral palsy

GMFCSLevel	(c)Assistance needed in bathing						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
Level II	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	0 (0.0%)	3 (60.0%)
Level III	16 (28.6%)	14 (25.0%)	9 (16.1%)	8 (14.3%)	3 (5.4%)	1 (1.8%)	5 (8.9%)

Table 2(c)outlines information regarding bathing. Notably, individuals in GMFCS level II displayed a significant degree of complete independence (60.0%) in bathing, highlighting their capacity to manage this aspect of daily living autonomously. Simultaneously, a considerable proportion (40.0%) required supervision, indicating the need for some level of support within this group. Again the prevalence of respondents needing total assistance (28.6%) emphasizes the substantial challenges faced by some in this category. Children required assistance while bathing may be due to the reason of not using a shower bench or appropriate tub which increased the workload of mothers. [27] reported that appropriate bath or shower seats can enhance children's independence and alleviate the burden of care giving.

Table 2(d) Level of assistance required in dressing upper body as per GMFCS level of children with cerebral palsy

GMFCSLevel	(d)Assistance needed in dressing upper body						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
Level II	1 (20.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (20.0%)	0 (0.0%)	3 (60.0%)
Level III	34 (60.7%)	11 (19.6%)	4 (7.1%)	6 (10.7%)	0 (0.0%)	0 (0.0%)	1 (1.8%)

Table 2(d)reveals that the majority of the respondents (60.0%) under GMFCS level II demonstrated complete independence, while a few (20.0%) required total assistance and supervision in dressing the upper body. For those falling under GMFCS level III, the majority (60.7%) needed total assistance in dressing the upper body. Similar to other activities of daily living, individuals in GMFCS level II displayed a significant degree of complete independence in dressing their upper body, while majority of respondents classified under GMFCS level III needed total assistance.

Table 2(e) Level of assistance required in dressing lower body as per GMFCS level of children with cerebral palsy

GMFC Level	(e)Assistance needed in dressing lower body						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
Level II	1 (20.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (20.0%)	0 (0.0%)	3 (60.0%)
Level III	30 (53.6%)	15 (26.8%)	4 (7.1%)	3 (5.4%)	2 (3.6%)	0 (0.0%)	2 (3.6%)

Table2(e) provides information on dressing lower body among the respondents. Majority of the respondents (60.0%) classified under GMFCS level II demonstrated complete independence, while for those falling under GMFCS level III, the majority (53.6%) needed total assistance. The findings of present study can be correlated with a study conducted by [4]to investigate the acquisition of self-care and mobility skills in children with cerebral palsy (CP) in relation to their manual ability and gross motor function. It was found that children classified as GMFCS levels I or II scored higher than children in GMFCS levels III to V on both the self-care and mobility domains with significant differences, thus indicating that GMFCS level can be useful when discussing expectations of, and goals for, the development of functional skills.

Table 2(f) Level of assistance required in toilet control as per GMFCS level of children with cerebral palsy

GMFC Level	**(f)Assistance needed in toilet control**						
	Total assistance	**Maximal assistance**	**Moderate assistance**	**Minimal assistance**	**Supervision**	**Modified independence**	**Complete independence**
Level II	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (100.0%)
Level III	8 (14.3%)	0 (0.0%)	0 (0.0%)	3 (5.4%)	3 (5.4%)	1 (1.8%)	41 (73.2%)

Table2(f) data pertaining to toileting control shows that respondent classified under GMFCS level II exhibited complete independence (100.0%) in toileting, followed by those falling under GMFCS level III (73.2%). Further, the need for assistance in toilet was found to be diverse, some (14.3%) required total assistance, some needed minimal assistance (5.4%) and a few (1.8%) had modified independence in toileting. The ability to achieve varying levels of independence, even with certain modifications, underscores the adaptability and individualized nature of toileting abilities within this group. Similar to the findings of present study [28]underscored the significance of manual ability in the context of self-care activities for children dealing with cerebral palsy. According to their research, the child Engagement in Daily Life Measure: performance in self-care (version 2) is capable of detecting changes over time in children aged 3 to 9 with cerebral palsy, irrespective of whether they are classified as level I, II, or III. However, for children classified as level I or II, who demonstrate independent performance in all activities with a perfect score of 100, significant changes may not be readily apparent.

Table 2(g) Level of assistance required in bladder management as per GMFCS level of children with cerebral palsy

GMFCS Level	**(g)Assistance needed in bladder management**						
	Total assistance	**Maximal assistance**	**Moderate assistance**	**Minimal assistance**	**Supervision**	**Modified independence**	**Complete independence**
Level II	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (100.0%)
Level III	8 (14.3%)	0 (0.0%)	0 (0.0%)	3 (5.4%)	3 (5.4%)	1 (1.8%)	41 (73.2%)

Table2(g) illustrates the bladder management patterns among the respondents. Majority of the respondents irrespective of GMFCS levels demonstrated complete independence in bladder management (100% in GMFCS level II and 73.2% GMFCS level III). The data sheds light on the diverse level of independence and assistance needs in bladder management in accordance to the GMFCS levels of children with CP. The study by [32]also asserted that as the gross motor functional level of individuals with CP increased, voiding dysfunction increased, on the other hand, functional independence and quality of life decreased.

Table 2(h) Level of assistance required in bowel management as per GMFCS level of children with cerebral palsy

GMFC Level	**(h)Assistance needed in bowel management**						
	Total assistance	**Maximal assistance**	**Moderate assistance**	**Minimal assistance**	**Supervision**	**Modified independence**	**Complete independence**
Level II	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (100.0%)
Level III	8 (14.3%)	1 (1.8%)	0 (0.0%)	2 (3.6%)	3 (5.4%)	1 (1.8%)	41 (73.2%)

Table2(h) presents data of bowel management of the respondents classified under various GMFCS levels. Respondents classified under GMFCS level II displayed complete independence in bowel management. Among respondents falling under GMFCS level III, majority of respondents (73.2%) achieved complete independence, while some (14.3%) required total assistance, needed supervision (5.4%), sought minimal assistance (3.6%) and required maximal assistance (1.8%). Early introduction of bowel management trainings, constant training about controlling sphincter and emotional support may facilitate attaining proficiency in bowel management.

The study conducted by [33] suggested that urotherapy-based incontinence training has emerged as a viable treatment for urinary incontinence in children with cerebral palsy. However, within the present cohort, the effectiveness rate of incontinence training was comparatively lower, and the observed changes occurred at a slower pace in children with cerebral palsy when compared to their typically developing counterparts.

Table 2(i) Level of assistance required in transfer from wheelchair to bed as per GMFCS level of children with cerebral palsy

GMFC Level	(i)Assistance needed in transfer from wheelchair to bed						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
Level II	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (60.0%)	2 (40.0%)
Level III	4 (7.1%)	9 (16.1%)	14 (25.0%)	8 (14.3%)	8 (14.3%)	10 (17.9%)	3 (4.4%)

Table2(i) regarding transfers from a wheelchair to a bed indicates that 60 percent of respondents classified under GMFCS level II demonstrated modified independence while 40 percent exhibited complete independence in the transfer from a wheelchair to a bed. For individuals falling under GMFCS level III, a variety of assistance needs were observed. The insights provide a nuanced understanding of the assistance levels required for transfers from a wheelchair to a bed, particularly among individuals with different Gross Motor Function Classification System (GMFCS) levels.

Table 2(j) Level of assistance required in transfer from wheelchair to toilet as per GMFCS level of children with cerebral palsy

GMFC Level	(j)Assistance needed in transfer from wheelchair to toilet						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
Level II	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	0 (0.0%)	1 (20.0%)	2 (40.0%)
Level III	13 (23.2%)	12 (21.4%)	10 (17.9%)	9 (16.1%)	6 (10.7%)	3 (5.4%)	3 (5.4%)

Unlike other activities of daily living, only 40 percent respondents categorized under GMFCS level II exhibited complete independence and equally 40 percent respondents required minimal assistance during toilet transfers (Table2(j)). This indicates that children in GMFCS level II can achieve complete independence or may need minimal assistance in moving from wheelchair to toilet transfers, emphasizing the need for training in ADL from an early age.

Table 2(k) Level of assistance required in transfer from wheelchair to tubas per GMFCS level of children with cerebral palsy

GMFC Level	(k)Assistance needed in transfer from wheelchair to tub						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
Level II	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (20.0%)	1 (20.0%)	1 (20.0%)	3 (60.0%)
Level III	24 (42.9%)	5 (8.9%)	10 (17.9%)	4 (7.1%)	5 (8.9%)	4 (7.1%)	4 (7.1%)

Table 2 (k)Regarding the transfer from wheelchair to tub, majority of the respondents categorized under GMFCS level II exhibited a high level of independence (60.0%) achieving complete independence during the transfer wheel chair to tub. Within those classified under capital GMFCS level III, the majority faced greater challenges in the transfer from a wheelchair to a tub, specifically 42.9 percent needed total assistance. The findings illuminate the diverse range of challenges and abilities associated with the transfer from wheelchair to tub among children with different GMFCS levels. [34] reported that the WeeFIM scores for mobility and self-care indicates the type of assistance needed. Findings emphasize the importance of recognizing the individualized nature of transfer abilities among individuals with cerebral palsy. Notably, self-care activities such as sit-to-stand tasks (toileting and bathing) necessitated more assistance compared to self-care tasks that typically do not involve sit-to-stand actions (eating and grooming).

Table 2(l) Level of assistance required in locomotion activity as per GMFCS level of children with cerebral palsy

GMFC Level	(l)Assistance needed in locomotion						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
Level II	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	3 (60.0%)
Level III	2 (3.6%)	14 (25.0%)	7 (12.5%)	12 (21.4%)	7 (12.5%)	9 (16.1%)	5 (8.9%)

Table2(l) indicates information about locomotion, specifically in walking, wheelchair use, and crawling. Among individuals classified under GMFCS level II, the majority demonstrated a high level of independence, with 60 percent achieving complete independence, while 40 percent exhibited modified independence in their locomotion abilities. For those respondents falling under GMFCS level III, varied needs for assistance were observed, some (25.0%) required maximal assistance, some (21.4%) needed minimal assistance and a few (12.5%) needed moderate assistance. Also there were respondents (8.9%) who could attain complete independence in locomotion. Similar to the findings of the present study that GMFCS levels influences on locomotion, study by Frances et al. (2006) also stated that individuals with lower levels of mobility impairment, as classified by the GMFCS, showed faster walking speeds. [29]

found distinctions between the capability and actual performance of mobility in a group of children with cerebral palsy and the execution of mobility techniques exhibited variations across home, school, and outdoor or community settings. Similarly, [35] indicated that most children demonstrated independent walking in various settings such as their home, school, and communal environments, among those walking independently; the majority belonged to GMFCS level I, while the highest proportion of wheelchair users fell into GMFCS level IV and V.

Table 2(m) Level of assistance required in ease of climbing stairs as per GMFCS level of children with cerebral palsy

GMFC Level	(m)Assistance needed in climbing stairs						
	Total assistance	Maximal assistance	Moderate assistance	Minimal assistance	Supervision	Modified independence	Complete independence
Level II	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	0 (0.0%)	2 (40.0%)	1 (20.0%)
Level III	11 (19.6%)	11 (19.6%)	8 (14.3%)	13 (23.2%)	2 (3.6%)	9 (16.1%)	2 (3.6%)

Table2(m) provides insights into the diverse levels of assistance and independence observed in locomotion in respect to GMFCS levels, specifically level II and III. For those classified under GMFCS level II, the prevalence of minimal assistance (40.0%) suggests a considerable degree of self-sufficiency, with a notable portion achieving modified independence (20.0%). This implies that individuals in this category possess varying degrees of mobility and adaptability when climbing stairs. On the other hand, individuals classified under GMFCS level III exhibited a broader spectrum of assistance needs. The portion of respondents requiring minimal assistance (23.2%) implies a minimal degree of independence, while those needing total or maximal assistance (19.6%) indicate more challenges. The presence of modified independence (16.1%) suggests a capacity for adapted or assisted mobility. Intriguingly, despite the challenges, there were instances of complete independence observed in this group, highlighting the capability to acquire functional abilities among individuals with GMFCS III. This nuanced understanding of climbing on stairs among individuals with cerebral palsy emphasizes the importance of tailored interventions and support structures. It underscores the need for personalized approaches to address the specific challenges and capabilities of each individual, ensuring optimal mobility and independence in daily activities. Similarly, findings of [30] suggested that the environmental context is a crucial factor to consider in evaluating and intervening mobility of children with cerebral palsy. In the case of non-ambulatory children, it is essential to address the requirements of caregivers and key factors influencing the success of powered mobility.

Conclusion

The study identified significant differences in the independence and support required by individuals with cerebral palsy for various activities of daily living, based on age groups and GMFCS levels. Locally produced, user-friendly assistive devices or need-based modification can enhance device usage rates and affordability.

Customized approaches and support structures are essential to address the changing needs and abilities at different stages of development, promoting optimal assistance and independence in daily activities. This information can guide healthcare professionals, caregivers, and educators in developing effective strategies to meet the unique challenges individuals with cerebral palsy face as they age, considering their Gross Motor Function Classification System levels.

Author Contributions

S.R.: Data curation, writing- original draft, review and editing and T.B.: Supervision, Validation and V.J.: Review and editing.

Funding

This research received no external funding.

Future scope of the study

The findings of the present study highlight that assistive devices are highly beneficial for children's daily activities. Future research could focus on developing affordable assistive devices to further enhance their quality of life.

Declarations

Ethics approval and consent to participate

This study was approved by the IRB committee of Trishla Foundation Cerebral Palsy &PediatricOrthopedic Treatment Center and all participants were informed and consented.

Competing interest

The authors declare no competing interest.

Acknowledgement

S.R. was responsible for data curation and drafting the original manuscript and writing- reviewing and editing. T.B. Supervised, validated and V.J. review and editing. All authors have read and approved the final manuscript.

** This was an observational study not a clinical study. So there is no clinical trial number.*

References

1. S. McIntyre *et al.*, "Global prevalence of cerebral palsy: A systematic analysis," *Dev. Med. Child Neurol.*, vol. 64, no. 12, pp. 1494–1506, 2022.

2. I. Rosdiana and A. Ariestiani, "The Correlation between Gross Motor Function Classification System and Spasticity in Children with Cerebral Palsy," *J. Adv. Multidiscip. Res.*, vol. 2, no. 2, p. 70, 2021.

3. A. Katusic and S. Alimovic, "The relationship between spasticity and gross motor capability in nonambulatory children with spastic cerebral palsy," *Int. J. Rehabil. Res.*, vol. 36, no. 3, pp. 205–210, 2013.

4. A. M. Öhrvall, A. C. Eliasson, K. Löwing, P. Ödman, and L. Krumlinde-Sundholm, "Self-care and mobility skills in children with cerebral palsy, related to their manual ability and gross motor function classifications," *Dev. Med. Child Neurol.*, vol. 52, no. 11, pp. 1048–1055, 2010.

5. K. Kim, J. Y. Kang, and D. H. Jang, "Relationship between mobility and self-care activity in children with cerebral palsy," *Ann. Rehabil. Med.*, vol. 41, no. 2, pp. 266–272, 2017.

6. O. Omar, M. Khalil, H. Abd El-Ghany, A. Abdallah, and T. . Omar, "Intervention program to improve feeding, swallowing, and nutritional problems in children with cerebral palsy," *Alexandria J. Pediatr.*, vol. 30, no. 3, p. 85, 2017.

7. G. Acar, N. Ejraei, D. Turkdoğan, N. Enver, G. Öztürk, and G. Aktaş, "The Effects of Neurodevelopmental Therapy on Feeding and Swallowing Activities in Children with Cerebral Palsy," *Dysphagia*, vol. 37, no. 4, pp. 800–811, 2022.

8. S. Saleem, E. Ullah, H. Noreen, M. S. G. Khan, S. Ashraf, and A. Tahir, *Frequency of Problems in Activities of Daily Livings in Children with Cerebral Palsy*, vol. 10, no. 01. 2022, pp. 16–21.

9. C. Arnould, Y. Bleyenheuft, and J. L. Thonnard, "Hand functioning in children with cerebral palsy," *Front. Neurol.*, vol. 5 APR, no. April, pp. 1–10, 2014.

10. V. Wong *et al.*, "Correlation of Functional Independence With Clinical or Demographic Risk Factors," pp. 887–893, 2004.

11. R. D. Moen and S. Østensjø, *Understanding the use and benefits of assistive devices among young children with cerebral palsy and their families in Norway: a cross-sectional population-based registry study*, vol. 0, no. 0. Taylor &Francis, 2023, pp. 1–9.

12. I. T. Elangkovan and S. Shorey, "Experiences and Needs of Parents Caring for Children with Cerebral Palsy: A Systematic Review," *J. Dev. Behav. Pediatr.*, vol. 41, no. 9, pp. 730–739, 2020.

13. J. H. Nicholson, R. E. Morton, S. Attfield, and D. Rennie, *Assessment of upper-limb function and movement in children with cerebral palsy wearing lycra garments*, vol. 43, no. 6. University of Virginia Health Sciences Library, 2001, pp. 384–391.

14. S. Guidetti and I. Söderback, "Description of self-care training in occupational therapy: Case studies of five Kenyan children with cerebral palsy," *Occup. Ther. Int.*, vol. 8, no. 1, pp. 34–48, 2001.

15. M. Jackman *et al.*, "Interventions to improve physical function for children and young people with cerebral palsy: international clinical practice guideline," *Dev. Med. Child Neurol.*, vol. 64, no. 5, pp. 536–549, 2022.

16. R. J. M. Lemmens, Y. J. M. Janssen-Potten, A. A. A. Timmermans, A. Defesche, R. J. E. M. Smeets, and H. A. M. Seelen, "Arm hand skilled performance in cerebral palsy: Activity preferences and their movement components," *BMC Neurol.*, vol. 14, no. 1, pp. 1–10, 2014.

17. "EFFECT OF HAND ACTIVITIES GROUP THERAPY PROGRAM ON ADL PERFORMANCE OF CHILDREN WITH CEREBRAL PALSY AT CENTRE FOR THE REHABILITATION OF THE PARALYSED (CRP) By Zahra Tahsin February , 2019 Bachelor of Science in Occupational Therapy Bangladesh Health Prof," 2019.

18. G. Erkin, C. Aybay, M. Kurt, I. Keles, A. Cakci, and S. Ozel, "The assessment of functional status in Turkish children with cerebral palsy (a preliminary study)," *Child. Care. Health Dev.*, vol. 31, no. 6, pp. 719–725, 2005.

19. M. Ozturk *et al.*, "Bladder and bowel control in children with cerebral palsy: Case-control study," *Croat. Med. J.*, vol. 47, no. 2, pp. 264–270, 2006.

20. L. E. G. Roijen, K. Postema, V. J. Limbeek, and V. H. J. M. Kuppevelt, "Development of bladder control in children and adolescents with cerebral palsy," *Dev. Med. Child Neurol.*, vol. 43, no. 2, pp. 103–107, 2001.

21. M. A. Himaid, S. A. Saleh, and N. M. Ghanem, "The impact of rehabilitation programs on the functional independence level of cerebral palsy children: A descriptive study," *Proc.-Int. Conf. Assist. Rehabil. Technol. iCareTech* pp. 71–75, 2020.

22. S. Ünsal Delialioğlu, C. Çulha, H. Tunç, M. Kurt, S. Özel, and A. Atan, "Evaluation of lower urinary system symptoms and neurogenic bladder in children with cerebral palsy: Relationships with the severity of cerebral palsy and mental status," *Turkish J. Med. Sci.*, vol. 39, no. 4, pp. 571–578, 2009.

23. L. A. Rice, J. L. Dysterheft, E. Sanders, and I. M. Rice, "Short-term influence of transfer training among full time pediatric wheelchair users: A randomized trial," *J. Spinal Cord Med.*, vol. 40, no. 4, pp. 396–404, 2017.

24. K. Mattern-Baxter, S. Bellamy, and J. K. Mansoor, "Effects of intensive locomotor treadmill training on young children with cerebral palsy," *Pediatr. Phys. Ther.*, vol. 21, no. 4, pp. 308–318, 2009.

25. B. Steenbergen and A. M. Gordon, "Activity limitation in hemiplegic cerebral palsy: Evidence for disorders in motor planning," *Dev. Med. Child Neurol.*, vol. 48, no. 9, pp. 780–783, 2006.

26. K. A. Weir *et al.*, "Reported eating ability of young children with cerebral palsy: Is there an association with gross motor function?," *Arch. Phys. Med. Rehabil.*, vol. 94, no. 3, pp. 495–502, 2013.

27. K. M. Korpela, "Adolescents' favourite places and environmental self-regulation," *J. Environ. Psychol.*, vol. 12, no. 3, pp. 249–258, 1992.

28. R. J. Palisano, L. A. Chiarello, L. Avery, and S. Hanna, "Self-Care Trajectories and Reference Percentiles for Children with Cerebral Palsy," *Phys. Occup. Ther. Pediatr.*, vol. 40, no. 1, pp. 62–78, 2020.

29. B. L. Tieman, R. J. Palisano, E. J. Gracely, and P. L. Rosenbaum, "Gross Motor Capability and Performance of Mobility in Children with Cerebral Palsy: A Comparison Across Home, School, and Outdoors/Community Settings," *Phys. Ther.*, vol. 84, no. 5, pp. 419–429, 2004.

30. R. J. Palisano *et al.*, "Effect of environmental setting on mobility methods of children with cerebral palsy," *Dev. Med. Child Neurol.*, vol. 45, no. 2, pp. 113–120, 2003.

31. Rahman, M. (2018). *Measuring the gross motor function and Functional limitation among the children with Spastic cerebral palsy* (Doctoral dissertation, Bangladesh Health Professions Institute, Faculty of Medicine, the University of Dhaka, Bangladesh.).

32. Türker, A., & Özkeskin, M. (2023). Investigation of urinary disorders, functional independence, and quality of life in children with cerebral palsy. *Neurourology and Urodynamics*, *42*(3), 597-606.

33. Samijn, B., Van den Broeck, C., Plasschaert, F., Pascal, A., Deschepper, E., Hoebeke, P., & Van Laecke, E. (2022). Incontinence training in children with cerebral palsy: A prospective controlled trial. *Journal of Pediatric Urology*, *18*(4), 447-e1.

34. Chaovalit, S., Dodd, K. J., & Taylor, N. F. (2022). Caregivers' perceptions of a high repetition Sit-To-Stand Exercise Program for children with cerebral palsy who have mobility limitations. *Physical & occupational therapy in pediatrics*, *42*(5), 566-578.

35. Sindre, S. E. (2019). *Children with cerebral palsy and preferred functional mobility method: A population-based cross-sectional study* (Master's thesis, OsloMet-storbyuniversitetet. Institutt for fysioterapi).