

Hand Function and Life Area Participation among the Children with Cerebral Palsy: A Cross-Sectional Study

By

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**Bangladesh Health Professions
Institute (BHPI)
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Students Declaration

- This research proposal has not previously been accepted in substance for any degree and is not concurrently submitted in candidature for any degree.
- This research proposal results from my independent work/investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references. A Bibliography is appended.
- I confirm that if anything is identified in my work that I have done is plagiarism or any form of cheating, that will directly awarded me a failure. I am subject to disciplinary actions of the authority.

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List of Abbreviations

ADLs	Activity of Daily Living
CI	Confidence Interval.
CP	Cerebral Palsy
CRP	Centre for the Rehabilitation of Paralysed.
IADLs	Instrumental Activity of Daily Living
IRB	Institutional Review Board
MACS	Manual Ability Classification System
SPSS	Statistical Package for Social Science
WMTS	William and Marie Tailor School.

Abstract

Background: Participation is a complex, context-dependent concept shaped by factors such as severity of CP, age, self-management abilities, and functional mobility. Children's engagement in daily activities largely depends on these factors and varies widely. Hand function plays a critical role in determining their level of participation across life areas. Understanding this relationship is essential for designing comprehensive rehabilitation and supportive interventions.

Aim: To find out the impact of hand function on Life Area Participation among Children with Cerebral Palsy.

Methods: This cross-sectional quantitative study surveyed 102 school-going children with CP in Dhaka city and Savar using face-to-face interviews. Standardized tools, the Children Participation Questionnaire (CPQ) and the Manual Ability Classification System (MACS) were used to assess life areas participation and hand function. Data was analyzed using SPSS version 26 for both descriptive and inferential statistics.

Result: The mean age of children with CP was 9.18 ± 1.89 years, with most classified at MACS level II. Participation scores were diversity 42.51 ± 4.85 , intensity 121.08 ± 33.27 , with whom 168.29 ± 38.85 , enjoyment 185.84 ± 31.85 , and parent satisfaction 163.69 ± 39.25 . Children receiving more than three weekly therapy sessions had poorer hand function than those receiving fewer ($P < .032$), and quadriplegic CP showed the poorest hand function and participation ($P < .001$). All participation domains except "with whom" were negatively correlated with MACS level ($P < .001$), while the "with whom" domain showed a strong positive correlation ($P < .001$).

Conclusion: Children with CP who attended three or fewer weekly therapy sessions demonstrated better hand function, while those with quadriplegic CP showed poorer performance. Upper extremity function was strongly linked to participation across life areas, especially parental satisfaction. Improving hand function, along with caregiver training and environmental support, can significantly enhance overall participation in children with CP.

Keywords: Cerebral palsy; Manual ability; Life area participation; Occupations; Hand function.

CHAPTER I: INTRODUCTION

1.1 Background

Cerebral palsy (CP) is characterized by non-progressive abnormalities in the developing brain that create a cascade of neurologic, motor, and postural deficits in the developing child (Case-Smith & O'Brien, 2013). Patel et al, 2020, said that Cerebral palsy (CP) is primarily a neuromotor disorder that affects the development of movement, muscle tone and posture. The underlying pathophysiology is an injury to the developing brain in the prenatal through neonatal period. Although the initial neuropathologic lesion is non-progressive, children with CP may develop a range of secondary conditions over time that will variably affect their functional abilities. Based on the international census, the CP refers to a group of permanent disorders of movement and posture, causing activity limitation, that is attributed to nonprogressive disturbances that occur in the developing fetal or immature brain. Disturbances of sensation, perception, cognition, communication, and behavior, epilepsy, and secondary musculoskeletal problems often accompany the motor disorders of CP (Patel et al., 2020).

In 1843, William Little first reported cerebral palsy. At that time, little attention was paid to joint contractures and deformities resulting from long-standing spasticity and paralysis (Kurt, 2016). On the other hand, cerebral palsy (CP) comprises a heterogeneous group of early-onset, non-progressive disorders caused by insult to the developing brain (Khandaker et al., 2018). The prevalence of cerebral palsy in the world has been estimated to be 2.0 per 1000 live births, and globally, CP is estimated at 17 million (Jahan et al., 2020; Khandaker et al., 2018). CP is a leading cause of disability among children (Khandaker et al., 2018). In Bangladesh, the prevalence of cerebral palsy was

estimated to be 3.4 (95% CI 3.2–3.7) per 1000 children, which approximates ~234,000 children with CP in a country out of 166 million people (Al-Imam et al., 2021).

Children with cerebral palsy (CP) are definitely restricted in their daily activities and ability to participate. Their condition not only limits their social participation and life areas like ADLs and IADLs but is also a crucial aspect that decides their overall quality of life. Affected children's activity and participation vary depending on the severity of their condition, age, self-management, and movement and function in society (Lee, 2017). Cerebral palsy affects both the upper and lower limbs of a child. Upper limb function is impaired in almost 50% of children with cerebral palsy, and this is considered the main factor contributing to decreased activity and participation in everyday activities of daily living (ADL) (Van Zelst et al., 2006).

Rehabilitation services are important for children with cerebral palsy. One important outcome of rehabilitation services is optimizing children's participation in different situations, such as at home, school, and in the community. Participation in family and recreational activities provides avenues for children to play, learn skills, make friendships, and develop self-confidence and belonging (Alghamdi et al., 2017). Hand function skills are critical for participating in different life areas. Manual Ability Classification System (MACS) is a recently developed classification describing how children with cerebral palsy (CP) use their hands in daily life (Öhrvall et al., 2012). MACS finds out the current manual ability and limitations of the manual abilities of a CP child. The MACS designates five levels of manual function; the lowest level (level I) corresponds to the ability to handle objects easily, and the highest level (level V)

indicates severe restrictions in handling objects (Marzieh Pashmdarfard & Reza Shervin Badv, 2019).

Functional classification systems play an important role in planning and managing CP, distinguishing characteristics of functional abilities and setting treatment/rehabilitation goals (Burç et al., 2024). On the other hand, the functional classification system does influence the life area participation of children with cerebral palsy. In Bangladesh, children with cerebral get rehabilitation services, but there has been no established evidence on the functional classification of CP.

Therefore, this study aimed to find out the impact of the Manual Ability Classification System (MACS) on Life Area Participation among Children with Cerebral Palsy who receive rehabilitation services from the Centre for the Rehabilitation of the Paralysed (CRP). As this study provides an overview of the impact of the Manual Ability Classification System (MACS) on Life Area Participation, the study findings address the importance of this issue for both rehabilitation professionals and children with cerebral palsy or other relevant stakeholders.

1.2 Rationale of the study

Cerebral palsy (CP) is the most common chronic disability that restricts participation in occupations or life areas. CP children face different problems in their daily lives, which is why they need comprehensive rehabilitation services for independence in daily life activities. In the field of rehabilitation, an occupational therapist is an important team member who provides rehabilitation services to children with CP. The aim of the rehabilitation is the participation of CP children in all areas of occupations or life areas (Marzieh Pashmdarfard & Reza Shervin Badv, 2019).

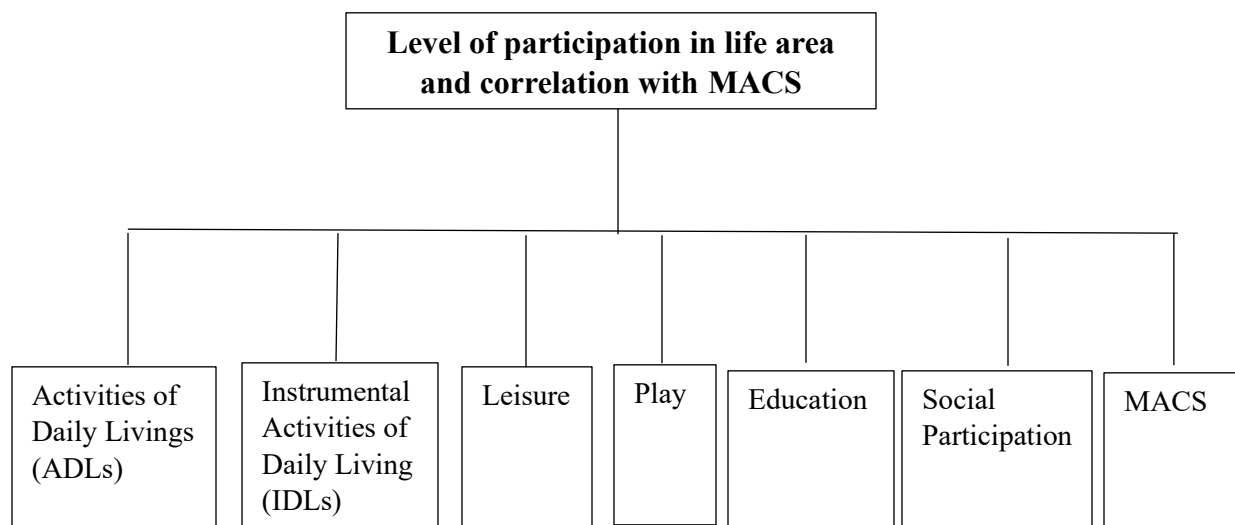
I work as a clinical occupational therapist at William Marie & Tylor School in CRP. Here, I conduct occupational therapy sessions with children with CP every day. During the sessions, I noticed that most of the children with cerebral palsy are not able to perform their occupational tasks properly. I also noticed that children's life area activities differ from child to child. So, it is important to identify the level of life area participation of children with CP and also find the association between life area participation and its factors that help healthcare professionals develop an appropriate treatment plan for children with CP. This research aims to determine the level of Life Area Participation among Children with Cerebral Palsy. These findings will assist healthcare professionals in planning rehabilitation programs and helping children with CP. So, this study is being proposed to assess the level of Area Participation and its associated factors among Children with Cerebral Palsy in Bangladesh.

CHAPTER II: LITERATURE REVIEW

This chapter covers information regarding the level of life area participation and correlation with the Manual Ability Classification System (MACS) among Children with Cerebral Palsy. In terms of life area participation, this chapter has information from the existing literature about Activities of Daily Living (ADLs), Instrumental Activities of Daily Living (IADLs), Leisure, Play, Education, and Social Participation. It also includes information about the level of participation in the life area and its correlation with MACS. Google Scholar, PubMed, Embase, Scopus and Google have been searched for articles published within the last 5-15 years.

Figure 2.1

Overview of the literature findings



2.1 Activities of Daily Livings (ADLs):

One Cross-sectional research was conducted in Iran in 2023 among 4-6-year-old Children with Cerebral Palsy. This study was conducted among 116 children with different types of CP and their parents, 61 boys and 55 girls, who were selected non-randomly. This study aimed to identify the influential factors in the independence level of children with

CP in Activities of Daily Living (ADL) (self-care) and Instrumental Activities of Daily Living (IADL) (home participation), which is measured by the different scales like Gross Motor Function Classification System, Manual Ability Classification System, Communication Function Classification System, and Iranian-Children Participation Questionnaire. This study revealed that children's age was correlated with the level of activities of daily living (ADLs) (Faeze Alvandi et al., 2023).

Another study was conducted in Turkey in December 2018-June 2019 among forty children with dyskinetic cerebral palsy (23 males, 17 females), and their age range was 5-18 years. This study aimed to find out the relationship between the Gross Motor Function Classification System (GMFCS), the Manual Ability Classification System (MACS), the Eating and Drinking Ability Classification System (EDACS), the Communication Function Classification System (CFCFS), dyskinetic movements, and participation levels in children with dyskinetic cerebral palsy (DCP) to attain a comprehensive functional profile of DCP. This study reported that activities of daily living were negatively correlated with the MACS, where $P < 0.05$. This study also noted that MACS increases by .64 times when the activity of daily living decreases by one point where $P < 0.007$ (Burç et al., 2024). A study found that MACS scores show a tendency toward better functional movement and, therefore, may be able to participate in daily activities effectively (Lee, 2017).

Another cross-sectional study was conducted in the USA in 2010 among sixty-one school-going children with CP. This study aimed to investigate the relationship between the manual abilities of children with cerebral palsy (CP) and the children's performance of self-care activities at home, which were measured by the Manual Ability

Classification System (MACS) and Pediatric Evaluation of Disability Inventory (PEDI). This study shows that the correlation coefficient between the MACS and the self-care domain of the PEDI Caregiver Assistance Scale was high and statistically significant ($r = .72$) (Kuijper et al., 2010). Another study reported that MACS levels were significant and independent factors of self-care (Masaki et al., 2023).

2.2 Instrumental Activity of Daily Livings (IADLs)

Faeze Alvandi et al., 2023 reported that the Manual Ability Classification System (MACS) is the most correlated with home participation (IDLs). Lee, 2017 reported that MACS influences the domestic activity or IDLs of children with cerebral palsy. A cross-sectional study was conducted in Iran in 2018 among 274 children with cerebral palsy parents. This study aimed to assess the relationship between the upper extremity function level of children with cerebral palsy (all types of cerebral palsy and severity) and their participation in different life areas using the MACS and Children Participation Assessment Scale-Parent version (CPAS-P) scales. They found out strong correlation between the upper extremity function of children with CP and their participation in Instrumental Activities of Daily Living (IADL) ($0.5 < 0.6$) (Marzieh Pashmdarfard & Reza Shervin Badv, 2019).

2.3 Leisure

A cross-sectional study reported that the level of upper extremity function was moderately correlated with statistically significant leisure activity where $P < 0.05$ (Marzieh Pashmdarfard & Reza Shervin Badv, 2019).

2.4 Play

Marzieh Pashmdarfard & Reza Shervin Badv, 2019 reported that the level of upper extremity function was moderately correlated with statistically significant play activity where $P < 0.05$.

2.5 Education

A cross-sectional study was conducted in Republican in Korea in 2017 among 77 children with spastic cerebral palsy, and this study aimed to evaluate the relationship between gross motor function, measured using the Gross Motor Function Measure (GMFM), Gross Motor Function Classification System (GMFCS), Manual Ability Classification System (MACS), and Functional Independence Measure for Children (WeeFIM), and Function, and Activity and Participation components of the International Classification of Functioning, Disability, and Health-Child and Youth Check List (ICF-CY) in children with spastic cerebral palsy (CP). This study shows that if MACS scores were better, functional movement, therefore, may be able to participate in school activities effectively (Lee, 2017). Another study reported that the degree of functioning, which depends on the degree of the disability, significantly influences the activity and participation of children in school (Lee et al., 2015).

2.6 Social Participation

According to Burç et al. (2024), social participation negatively correlated with the Manual Ability Classification System (MACS), where $P < 0.005$. In this study, the regression model shows that MACS increases 0.71 times when social participation decreases at one point where $p < 0.001$. Another study reported that social participation

was influenced by the manual ability of the classification system of children with cerebral palsy (Lee et al., 2015).

2.7 The Manual Ability Classification System (MACS)

A study found out the level of manual ability classification system among the forty children with dyskinetic cerebral palsy where Level I (5%), Level II (40%), Level III (17.5%), Level IV (27.5%), and Level V (10%) (Burç et al., 2024). Another study shows that the manual ability classification system among the 274 parents whose child age range was 6-12 years where MACS levels were level I (20.8%), level II (28.8%), level III (17.9%), level IV (15.3%), and level V (17.2%) (Eliasson et al., 2006).

2.8 Key gaps

- The majority of studies did not determine the impact of hand function on life area participation among children with cerebral palsy.
- So far, numerous studies have been conducted to assess the correlation between the hand function and life area participation among Children with Cerebral Palsy in the United States of America, Canada, the UK and Iran.
- However, no studies have been conducted in Bangladesh to determine the impact of hand function on Life Area Participation among Children with Cerebral Palsy.

CHAPTER III: METHODOLOGY

3.1 Study Question, Aim, Objective

3.1.1 Study Question

What is the impact of hand function on Life Area Participation among Children with Cerebral Palsy?

3.1.2 Study Aim

To find out the impact of hand function on Life Area Participation among Children with Cerebral Palsy.

3.1.3 Study Objectives

- To assess the level of hand function among the children with cerebral palsy.
- To find out the level of life area participation among the children with CP.
- To find out the correlation between hand function and life area participation.
- To assess the socio-demographic characteristics of children with cerebral palsy.

3.2 Study Design

3.2.1 Study method

The researcher followed the quantitative method. Quantitative research involves collecting data so that information can be quantified and subjected to statistical treatment to support or refute alternative knowledge claims (Apuke, 2017). In the research, the researcher will collect data by numerical value from the participants, then perform a statistical test to measure the outcome, and the result will represent a numerical interpretation. Therefore, quantitative design will be the fittest method for this study.

3.2.2 Study Approach

In this study, the researcher used a cross-sectional approach. The researchers surveyed a population of children with cerebral palsy who were taken to the rehabilitation service from the Centre for the Rehabilitation of the Paralysed. A cross-sectional study was chosen because the research was focused on a specific group within the population, and data were collected at a single point in time to find out the impact of the Manual Ability Classification System (MACS) on Life Area Participation among Children with Cerebral Palsy. This is why the researcher chose the cross-sectional approach for this study.

3.3 Study setting

The data were collected from William and Marie Taylor School (WMTS), an inclusive school of the Centre for the Rehabilitation of Paralysed (CRP), Savar, Dhaka Proyas, and other selected special schools (SAND, TARA) of Dhaka, Bangladesh.

3.4 Study Period

The study period was from January 2025 to November 2025.

3.4 Study Participants

3.4.1 Study population

Parents of Children with Cerebral Palsy.

3.4.2 sampling technique

To conduct the study, participants were selected through a purposive sampling process based on specific inclusion and exclusion criteria. The researcher chose this type of sampling because the study included defined inclusion and exclusion criteria (Liamputtong, 2013). Therefore, purposive sampling was considered the most suitable method for selecting study participants.

3.4.3 Inclusion criteria

- Children with Cerebral Palsy whose age is 6-12 years.
- Children with CP who received rehabilitation services.
- School-going children with CP.

3.4.4 Exclusion criteria

- Children with Cerebral Palsy with the diagnosis of other conditions such as Intellectual disability, behavioral problems, microcephalus, and hydrocephalus.

3.4.5 Sample size

The formula of one sample population is used to calculate the sample size:

$$n = \frac{z^2 pq}{d^2}$$

Here,

n = desired sample size

z = standard normal deviate; usually set at 1.96, which corresponds to 95% Confidence Interval (CI).

*p = 0.34

q = (1 – p) = (1 – 0.34) = 0.66

d = degree of accuracy desired, usually set at 0.05

Then, z=1.96, p=0.34, q=0.66 and d=0.05

So, according to the equation,

$$\begin{aligned} n &= \frac{z^2 pq}{d^2} \\ &= \frac{(1.96)^2 \times 0.34 \times 0.66}{(0.05)^2} \end{aligned}$$

$$= \frac{0.862}{0.0025}$$

$$= 345$$

Non-response 10% will be added. So, sample size is = $\{345 + (10\% \text{ of } 345)\}$

$$= (345 + 34) = 379$$

$$\approx 379$$

Therefore, the total sample size is 379.

3.4.5 Participants Recruitment Process

First, the researcher prepared an initial list of potential participants based on the inclusion and exclusion criteria from the Centre for the Rehabilitation of the Paralysed (CRP) and selected specialized schools. Then, basic information about the study and its purpose was provided to the participants and their caregivers verbally. When the participants and their caregivers expressed interest in participating in the study, the researcher collected information from the parents of children with cerebral palsy through a face-to-face survey using standardized tools. Data collection continued until the required sample size was reached.

3.4.6 List of variables

Socio-demographic variables

- Age of the child
- Sex
- Living area
- Occupational status of parents

Activity of Daily Livings (ADLs)

- Dressing

- Showering/Bathing
- Brushing teeth
- Toileting
- Eating with cutlery
- Other activity

Instrumental Activity of Daily Living (IADLs)

- Taking part in organizing the room/house
- Taking part in Meal preparation/ setting the table.
- Operating electronic devices (TV, DVD, phone).
- Shopping in grocery stores.
- Taking care of pet
- Other activity.

Leisure

- Choosing a leisure activity
- Playing on playground equipment
- Riding a bike.
- Playing ball games.
- Listening to a story.
- Watching TV
- Doing arts and crafts at home.
- Using art and craft materials.
- Going for a day trip, picnic, camping.
- Going to a live event.

Play

- Choosing a game
- Playing with construction toys (building blocks, puzzles)
- Playing games with rules (cards, board games)
- Playing computer games
- Taking part in pretend or make-believe play

Education

- Attending circle time
- Playing in the schoolyard
- Taking part in social play
- Eating in mealtime
- Attending sports and music class in kindergarten
- Doing arts and crafts
- Using arts and crafts materials
- Attending kindergarten ceremonies/parties
- Taking sport/dancing lessons-afternoon
- Taking music/art lessons-afternoon
- Taking self-improvement classes (science, languages)
- Other activities (e.g. movie, theatre)
- Other activity

Social Participation

- Playing with a friend
- Visiting at a friend's house

- Inviting and hosting a friend
- Attending friend's birthday parties
- Going to family events
- Sleeping over at the family house
- Sleeping over at a friend's house
- Talking on the phone
- Other activity

Manual Ability Classification System (MACS)

- Objects are handled easily and successfully
- Handles most objects but with some reduced quality and speed
- Handles objects with difficulty – the child will need help to prepare and/or modify activities.
- Handles a limited selection of easily managed objects and always requires some help from others.
- The child is not able to handle objects or to complete even simple actions with their hands.

3.4.7 Data Sources and Measurement

First, the researcher was create an initial list of potential participants, taking into account the inclusion and exclusion criteria from the Pediatrics Department, School, and Neurology unit of the CRP. Then, information about potential participants was collected. After that, the researcher was contacted with their parents, and to provide basic information about the research and the research's purpose verbally. When the parents

with cerebral palsy show interest in participating in the study, then the data was collected from them using standardized tools.

3.5 Ethical Consideration

3.5.1 Ethical Approval from IRB

The ethical issues were sought from the Institutional Review Board (IRB) with the explanation of the aim, objective, and purpose of the study through the Department of Occupational Therapy, Bangladesh Health Professions Institute (BHPI). The IRB form number is CRP-BHPI/IRB/05/2025/1084 (see in detail appendix-A). Permission was taken from the study side of CRP. The study followed ethical guidelines set forth by the World Medical Association (World Medical Association, 2022).

3.5.2 Informed consent

The researcher explained the aim, objective, and purpose of the study to the participants through an information sheet. The participants, who feel willingly interested in participating in the survey, will collect their data. Written consent was obtained from the participants during the face-to-face survey.

3.5.3 Right to Refusal to Participate or Withdraw

Participants were free to choose whether to participate or not in this study. The withdrawal form was attached to the consent form so that the participants can withdraw their participation from the study within two (02) weeks from the time of data collection.

3.5.4 Confidentiality

The student researcher was highly concerned about the confidentiality of the participant's information. The researcher will not include any personal information such as name or address in the questionnaire about their identity. Their information was not disclosed to

anyone except for the supervisor, which was clearly stated in the information sheet. Besides, any identical information about the participants was not revealed for future use, such as in report writing, publications, conferences, media, or any written or verbal discussion. The participants were clearly informed about confidentiality by the information sheet.

3.5.5 Unequal Relationship

The researcher collected data following a standardized questionnaire, and the participants filled it out by themselves; there was no scope for bias in the respondents. Therefore, the power relationship was strictly prevented.

3.5.6 Risk and Beneficence

Participation in this study did not involve any risk or benefit. There was no monetary or any other benefit involved in this study.

3.6 Data Collection Process

3.6.1 Data collection methods

The researcher used a face-to-face survey for data collection. During the data collection, using structured questionnaires allowed the investigator to briefly describe the terms of the questionnaire according to the needs and understanding level of the participants so they would be able to respond and answer appropriately (Szolnoki & Hoffmann, 2013).

3.6.2 Data collection instruments

- Based on the objectives for collecting socio-demographic information from the respondents, a self-administered semi-structured questionnaire will be developed.
- Children Participation Questionnaire (CPQ).

The CPQ is a parent-completed questionnaire that evaluates participation in children. CPQ measures participation as an outcome for 44 activities in six areas of occupations: activities of daily living, instrumental activities of daily living, play, leisure, social participation, and education. Parents report on the intensity, child's independence level, and their child's enjoyment and their satisfaction (Shirley et al., 2019). Each subscale has five items, which are measured along a 5-point rating scale, 0=never, 1=once in three months, 2= once a month, 3= once a week, 4= twice a week, and 5= every day. High scores indicate higher participation (Rosenberg et al., 2010).

- The Manual Ability Classification System (MACS)

The Manual Ability Classification System (MACS) has been developed to classify how children with cerebral palsy (CP) use their hands when handling objects in daily activities. The classification is designed to reflect the child's typical manual performance, not the child's maximal capacity. MACS has five leveling systems that identify manual ability (Eliasson et al., 2006).

3.7 Data management and analysis

- The data was analyzed by using the latest version of the software Statistical Package for Social Science (SPSS) version 26.
- Descriptive data was analyzed by simple frequency distribution (mean, standard deviation, percentage).
- An inferential statistical test was performed to find out the association (such as a Parametric or non-parametric test)
- Cross-tabulation was used to determine the difference between dependent and independent variables. Statistical significance will be set at a 95 % confidence interval (CI).

CHAPTER IV: RESULTS

A cross-sectional study was conducted impact of hand function on Life Area Participation among Children with Cerebral Palsy. This chapter presents the study's findings in tables and figures, with an emphasis on the socio-demographic information, level of hand function, level of life area participation, and correlation between hand function and life area participation of Children with Cerebral Palsy in Bangladesh.

4. 1 Sociodemographic characteristic

Table 4.1

Distribution of sociodemographic characteristics regarding Children with CP

Variable	Frequency (n)	Percentage (%)
Child Age	≤10 years	74
	10> years	28
	Mean (SD)= 9.18 (1.86) years, Minimum = 6 years, Maximum = 12 years	
Gender of the child	Boy	62
	Girl	40
Living area	Urban	77
	Semi-Urban	25
Sibling status	Yes	65
	No	37
Type of CP	Quadriplegia	30
	Diaplegic	29
	Hemiplegic	13
	Monoplegic	11
	Athetoid	8
	Ataxic	11
Dominant hand	Right Hand	69
	Left Hand	33
Therapy session per week	≤3 Therapy sessions	69
	3> Therapy session	33

Note: Performed descriptive statistics

Table 4.1 presents an overview of the socio-demographic characteristics of children with cerebral palsy (CP). The study included 102 children with CP parents, of whom 60.8% (n = 62) were boys and 39.2% (n = 40) were girls. The average age of the children was 9.18

years ($SD = \pm 1.89$), with a minimum age of 6 years and a maximum age of 12 years. A majority of the children (75.5%, $n = 77$) lived in urban areas, while 24.5% ($n = 25$) lived in semi-urban areas. Among them, 63.7% ($n = 65$) had siblings, and 36.3% ($n = 37$) had no siblings. Regarding the type of CP, 29.4% ($n = 30$) of the children had quadriplegic CP, 28.4% ($n = 29$) had diplegic CP, 12.7% ($n = 13$) had hemiplegic CP, and 10.8% ($n = 11$) had monoplegic or ataxic CP. Additionally, 7.8% ($n = 8$) of the children had athetoid-type CP. The dominant hand was right in 67.6% ($n = 69$) of the children and left in 32.4% ($n = 33$). In terms of therapy frequency, 67.6% ($n = 69$) of the children attended ≤ 3 therapy sessions per week, while 32.4% ($n = 33$) attended more than 3 sessions per week.

Table 4.2

Distribution of sociodemographic characteristics regarding Children with CP Parents

Variable		Frequency (n)	Percentage (%)
Marital status of mother	Married	98	96.1
	Divorced	3	2.9
	Widow	1	1.0
Educational status of the mother	Less than PSC	6	5.9
	Complete PSC	7	6.9
	Less than SSC	8	7.8
	Complete SSC	29	28.4
	Complete HSC	20	19.6
	Complete BSc	20	19.6
	MSc	12	11.8
Occupational status of mother	House wife	80	78.4
	Service holder	18	17.6
	Student	2	2.0
	Business	2	2.0
Father's educational status	Less than PSC	4	3.9
	Complete PSC	4	3.9
	Less than SSC	6	5.9
	Complete SSC	13	12.7
	Complete HSC	22	21.6
	Complete BSc	23	22.5
	MSc	30	29.4
Fathers occupation	Farmer	4	3.9

	Service holder	60	58.8
	Business	25	24.5
	Immigrant	11	10.8
	Unemployed	2	2.0
Main earning member	Father	82	80.4
	Mother	3	2.9
	Both	17	16.7
Family monthly income	≤50000 tk	77	75.5
	50000> tk	25	24.5
	Mean (SD)= 44107.84 (28756.37) tk, Minimum = 9000 tk, Maximum = 150000 tk		
Family member	≤4 persons	70	68.6
	4> Persons	32	31.4
Disable child	Yes	6	5.9
	No	96	94.1

Note: Performed descriptive statistics

Table 4.2 presents the socio-demographic information of the parents of children with cerebral palsy (CP). The majority of the mothers 96.1% (n = 98) were married, while only 1% (n = 1) was widowed. Regarding educational status, 28.4% (n = 29) of mothers had completed secondary education. In terms of occupation, 78.4% (n = 80) were housewives, while only 2% (n = 2) were students. Among the fathers, 29.4% (n = 30) had completed a Master's degree, and 58.8% (n = 60) were employed in service positions, whereas 2% (n = 2) were unemployed. The main earning member in most families was the father (80.4%, n = 82). Additionally, 75.5% (n = 77) of families reported a monthly income of ≤50,000 BDT. Most respondents 68.6% (n = 70) reported that their families consisted of ≤4 members, and 94.1% (n = 96) stated that they had no other children with disabilities.

4.2 Overview of MACS Level.

Figure 4.1

MACS Level among the children with cerebral palsy

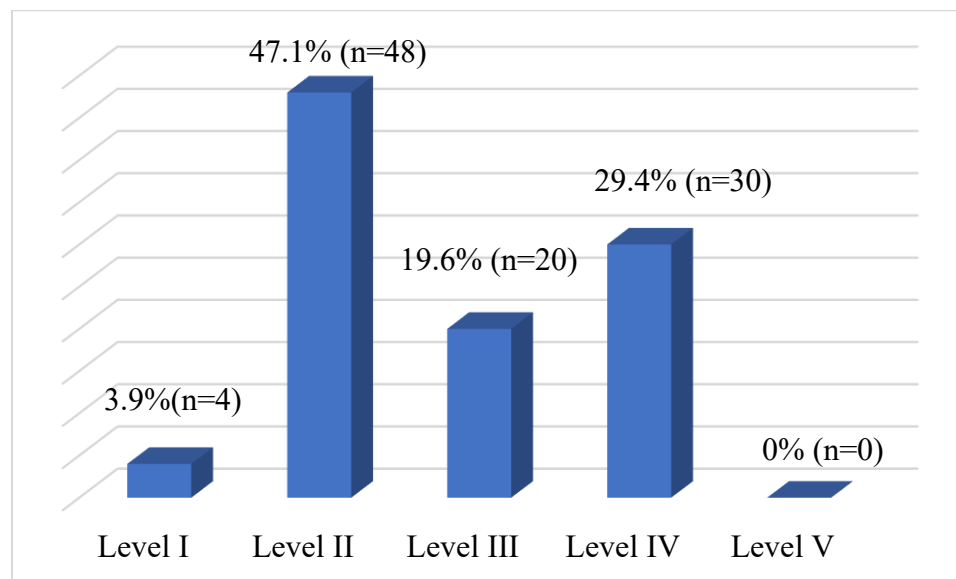


Figure 4.1 illustrates the distribution of hand function levels among children with cerebral palsy (CP). Nearly half of the children (47.1%, $n = 48$) had hand function at Level II, followed by 29.4% ($n = 30$) at Level IV, 19.6% ($n = 20$) at Level III, and only 3.9% ($n = 4$) at Level I.

4.3 Level of life area participation

Table 4.3

Level of life area (activity of daily living, instrumental activity of daily living, leisure, play, education, social participation) participation among the children with CP.

Area of occupation	Objective dimension	Mean	SD	Score range
Total participation	Diversity	42.51	4.85	0-49
	Intensity	121.08	33.27	49-245
	With whom	168.29	38.85	49-294
	Enjoyment	185.84	31.85	49-294
	Parent satisfaction	163.69	39.25	49-294
Activity of Daily Living (ADLs)	Diversity	5.88	.40	0-6
	Intensity	17.83	6.71	6-30
	With whom	18.23	7.15	6-36

Instrumental Activity of Daily Living (IADLs)	Enjoyment	24.65	5.18	6-36
	Parent satisfaction	20.04	6.69	6-36
	Diversity	4.37	1.58	0-6
	Intensity	10.51	5.95	6-30
	With whom	25.03	5.67	6-36
	Enjoyment	18.69	5.45	6-36
Leisure	Parent satisfaction	14.83	5.34	6-36
	Diversity	9.21	.60	0-10
	Intensity	28.68	6.62	10-50
	With whom	30.29	8.18	10-60
	Enjoyment	43.25	7.36	10-60
	Parent satisfaction	39.62	8.59	10-60
Play	Diversity	4.35	.74	0-5
	Intensity	13.07	3.89	5-25
	With whom	15.99	4.51	5-30
	Enjoyment	18.43	4.29	5-30
	Parent satisfaction	17.39	4.68	5-30
	Diversity	11.13	1.71	0-13
Education	Intensity	29.44	9.60	13-65
	With whom	46.02	10.96	13-78
	Enjoyment	45.41	10.69	13-78
	Parent satisfaction	40.30	12.04	13-78
	Diversity	7.57	1.19	0-9
	Intensity	21.52	6.23	9-45
Social Participation	With whom	32.74	7.39	9-54
	Enjoyment	35.41	7.05	9-54
	Parent satisfaction	31.51	7.44	9-54
	Diversity	7.57	1.19	0-9

Note: Performed descriptive statistics, SD= Standard Deviation

Table 4.3 shows the level of participation in life areas among children with CP. For overall participation, the diversity mean $\pm$ SD was 42.51 ± 4.85 , indicating good participation in life area occupations. The intensity mean $\pm$ SD was 121.08 ± 33.27 , which indicates that the frequency of participation was poor across different life skill areas. The mean scores for “with whom” and parental satisfaction were 168.29 ± 38.85 and 163.69 ± 39.25 , respectively, suggesting that children required more assistance during participation in occupations, and parental satisfaction was low. However, the children enjoyed the activities, as reflected by a mean score of 185.84 ± 31.85 .

In Activities of Daily Living (ADLs), the diversity mean was 5.88 ± 0.40 , indicating good participation in ADLs. On the other hand, the frequency of participation

in ADLs was below average, with a mean of 17.83 ± 6.71 . However, the children required less assistance to perform ADLs, enjoyed these activities during participation, and parental satisfaction was high, with mean scores of 18.23 ± 7.15 , 24.65 ± 5.18 , and 20.04 ± 6.69 , respectively.

In Instrumental Activities of Daily Living (IADLs), the diversity mean was 4.37 ± 1.58 . The mean scores for intensity, with whom, enjoyment, and parental satisfaction were 10.51 ± 5.95 , 25.03 ± 5.67 , 18.69 ± 5.45 , and 14.83 ± 5.34 , respectively. The high score indicate higher intensity, with whom, enjoyment, and parental satisfaction.

In leisure activities, the level of diversity was good, with a mean score of 9.21 ± 0.60 . However, the intensity was below average, with a mean of 28.68 ± 6.62 , indicating that more assistance was needed for leisure activities, where mean was 30.29 ± 8.18 . The levels of enjoyment and parental satisfaction in leisure activities were high, with mean scores of 43.25 ± 7.36 and 39.62 ± 8.59 , respectively.

In play activities, the mean scores for diversity, intensity, with whom, enjoyment, and parental satisfaction were 4.35 ± 0.74 , 13.07 ± 3.89 , 15.99 ± 4.51 , 18.43 ± 4.29 , and 17.39 ± 4.68 , respectively. Higher scores indicate greater participation in leisure activities, higher frequency, less assistance, greater enjoyment, and higher parental satisfaction. On the other hand, the education mean score for diversity, intensity, with whom, enjoyment, and parental satisfaction were, 11.13 ± 1.71 , 29.44 ± 9.60 , 46.02 ± 10.96 , 45.41 ± 10.69 , and 40.30 ± 12.04 .

In social participation, the mean diversity score was 7.57 ± 1.19 , indicating that the child's social participation was high. However, the intensity was low, with a mean score of 21.52 ± 6.23 . In leisure activities, the child required less assistance (mean =

32.74 $\pm$ 7.39), and both enjoyment (mean = 35.41 $\pm$ 7.05) and parental satisfaction (mean = 31.51 $\pm$ 7.44) were high.

4.4 Group means differences between socio-demographic characteristics and MACS level, life area participation

Table 4.4

Group differences analysis: Socio-demographic characteristics with MACS Level.

Variable		MACS Level (Hand Function)			
		Frequency (n)	Mean rank	Z/Chi-square	P value
Age	≤ 10 years	74	51.53	-.016	.987
	$10 >$ years	28	51.43		
Gender	Boy	62	50.97	-.243	.808
	Girl	40	52.33		
Dominant hand	Right Hand	69	51.62	-.062	.951
	Left Hand	33	51.26		
Therapy session per week	≤ 3 Therapy session	69	47.46	-2.148	.032
	$3 >$ Therapy session	33	59.95		
Type of CP	Quadriplegia	30	82.50	80.982	.001
	Diplegic	29	32.02		
	Hemiplegic	13	38.96		
	Monoplegic	11	19.05		
	Athetoid	8	81.25		
	Ataxic	11	43.95		

Note: Mann-Whitney U test, Kruskal-Wallis H test

Table 4.4 presents the group mean differences in the level of hand function (MACS level) across age, gender, dominant hand, therapy sessions per week, and type of CP. The table shows that the mean MACS score was significantly higher among participants who attended more than three therapy sessions per week and those with quadriplegic-type CP.

Table 4.5

Multivariate regression analysis predicting towards the MACS level

Predictor		MACS level (Hand Function)				
		B	SE	β	t	P value
Therapy session per week	≤ 3 Therapy session	Ref.	-	-	-	-
	$3 >$ Therapy session	.422	.193	.213	2.181	.032
Type of CP	Quadriplegia	Ref.	-	-	-	-
	Diplegic	-1.697	.110	-.827	-15.467	.001
	Hemiplegic	-1.492	.140	-.538	-10.670	.001
	Monoplegic	-2.164	.148	-.725	-14.573	.001
	Athetoid	-.050	.168	-.015	-.298	.766
	Ataxic	-1.345	.148	-.451	-9.062	.001

Note: Performed linear regression B=unstandardized regression coefficient; SE=Standard error; β =standardized regression coefficient

Table 4.5 presents the linear regression analysis using the variables that showed statistically significant group mean differences. The predictor factor of therapy sessions per week indicates that participants who received $3 >$ Therapy sessions per week had MACS levels 0.422 times higher than those who received ≤ 3 Therapy sessions per week, which is statistically significant ($B=.422$, $P<.032$). For the type of CP, participants with Diplegic CP ($B = -1.697$, $P < .001$), Hemiplegic CP ($B = -1.492$, $P < .001$), Monoplegic CP ($B = -2.164$, $P < .001$), and Ataxic CP ($B = -1.345$, $P < .001$) had significantly lower MACS levels compared to those with Quadriplegic CP, and these differences were statistically significant.

Table 4.6

Group differences analysis: Socio-demographic characteristics with the Level of life area participation

	Variable	Diversity		Intensity		With whom		Enjoyment		Satisfaction	
		Frequency (n)	Mean rank	Frequency (n)	Mean rank	Frequency (n)	Mean rank	Frequency (n)	Mean rank	Frequency (n)	Mean rank
Age	≤10 years	74	50.78	74	49.78	74	53.41	74	49.89	74	50.14
	10> years	28	53.41	28	56.05	28	46.45	28	55.75	28	55.09
Gender		Z value=-.402, P value=.688		Z value=-.956, P value=.339		Z value=-1.061, P value=.289		Z value=-.892, P value=.372		Z value=-.754, P value=.451	
	Boy	62	52.69	62	51.83	62	49.80	62	52.04	62	52.28
	Girl	40	49.65	40	50.99	40	54.14	40	50.66	40	50.29
		Z value=-.509, P value=.611		Z value=-.141, P value=.888		Z value=-.723, P value=.470		Z value=-.230, P value=.818		Z value=-.332, P value=.740	
Dominant hand	Right Hand	69	51.86	69	50.17	69	52.38	69	49.80	69	49.51
	Left Hand	33	50.76	33	54.29	33	49.67	33	55.06	33	55.65
		Z value=-.176, P value=.861		Z value=-.658, P value=.510		Z value=-.433, P value=.665		Z value=-.841, P value=.401		Z value=-.980, P value=.327	
Therapy session per week	≤3 Therapy session	69	54.64	69	55.35	69	46.70	69	52.78	69	54.92
	3> Therapy session	33	44.94	33	43.45	33	61.55	33	48.82	33	44.35
		Z value=-1.553, P value=.120		Z value=-1.900, P value=.057		Z value=-2.372, P value=.018		Z value=-.633, P value=.527		Z value=-1.688, P value=.091	
Type of CP	Quadriplegia	30	28.98	30	21.90	30	82.73	30	27.35	30	21.47
	Diplegic	29	57.66	29	65.00	29	36.33	29	61.98	29	62.09
	Hemiplegic	13	66.08	13	78.19	13	31.27	13	81.92	13	81.27
	Monoplegic	11	71.86	11	75.05	11	24.41	11	70.64	11	77.27
	Athetoid	8	49.13	8	26.63	8	76.50	8	31.75	8	37.44
	Ataxic	11	60.82	11	59.64	11	39.14	11	49.00	11	54.77
		Chi-square=28.284 P value=.001		Chi-square=60.114, P value=.001		Chi-square=64.011 P value=.001		Chi-square=45.628, P value=.001		Chi-square=58.079, P value=.001	

Note: Mann-Whitney U test, Kruskal-Wallis H test

Table 4.6 presents the group mean differences in the level of different domains of participation across age, gender, dominant hand, therapy sessions per week, and type of CP. The table shows that the mean with whom score was significantly higher among participants who attended more than three therapy sessions per week and domains of participation with quadriplegic-type CP.

Table 4.7

Multivariate regression analysis predicting diversity, intensity, with whom, enjoyment, and parental satisfaction toward the life area participation

			Life area participation														
			Diversity			Intensity			With whom			Enjoyment			Satisfaction		
Predictor			B	t	P value	B	t	P value	B	t	P value	B	t	P value	B	t	P value
Therapy session per week	≤3	Therapy session							Ref.	-	-						
	3>	Therapy session							19.72	2.45	.016						
Type of CP	Quadriplegia		Ref.	-	-	Ref.	-	-	Ref.	-	-	Ref.	-	-	Ref.	-	-
	Diplegic		5.06	4.68	.001	51.79	9.513	.001	-65.40	-11.22	.001	36.10	5.744	.001	54.138	7.804	.001
	Hemiplegic		6.12	4.44	.001	63.62	9.165	.001	-69.00	-9.28	.001	59.79	7.459	.001	79.154	8.949	.001
	Monoplegic		6.92	4.73	.001	60.47	8.207	.001	-77.05	-9.72	.001	45.95	5.401	.001	70.182	7.475	.001
	Athetoid		1.82	1.10	.272	8.30	.999	.320	-8.73	-.98	.329	3.49	.364	.717	20.000	1.887	.001
	Ataxic		5.56	3.80	.001	46.38	6.294	.001	-60.77	-7.70	.001	24.04	2.826	.006	47.091	5.015	.062

Note: Performed linear regression B=unstandardized regression coefficient; SE=Standard error; β=standardized regression coefficient

Table 4.7 presents the linear regression analysis using the variables that showed statistically significant group mean differences. The predictor factor of therapy sessions per week indicates that participants who received $3 >$ Therapy sessions per week had with whom 19.72 times higher than those who received ≤ 3 Therapy sessions per week, which is statistically significant ($B=19.72, P<.016$). For the type of CP, participants with Diplegic CP ($B = 5.06, P < .001, B = 51.79, P < .001, B = 36.10, P < .001, B = 54.13, P < .001$), Hemiplegic CP ($B = 6.12, P < .001, B = 63.62, P < .001, B = 59.79, P < .001, B = 79.15, P < .001$), Monoplegic CP ($B = 6.92, P < .001, B = 60.47, P < .001, B = 45.95, P < .001, B = 70.18, P < .001$), and Ataxic CP ($B = 5.56, P < .001, B = 46.38, P < .001, B = 24.04, P < .006, B = 47.091, P < .001$) had significantly higher in diversity, intensity, enjoyment, parental satisfaction compared to those with Quadriplegic CP, and these differences were statistically significant. Diplegic, Hemiplegic, Monoplegic, and Ataxic CP were 65.40, 69.00, 77.05, and 60.77 times less assistance compared to those with Quadriplegic CP, which is statistically significant.

4.5 Correlation matrix among the hand function and life area (ADLs, IADLs, Leisure, Play, Education, Social Participation) participations

Table 4.8

Spearman correlation matrix between life area participation and MACS level

Area of occupation	Objective dimension	MACS Level (Hand Function)	
		ρ	<i>P</i> value
Activity of Daily Living (ADL)	Diversity	-.409	.001
	Intensity	-.840	.001
	With whom	.816	.001
	Enjoyment	-.563	.001
	Parent satisfaction	-.769	.001
Instrumental Activity of Daily Living (IADL)	Diversity	-.584	.001
	Intensity	-.765	.001
	With whom	.773	.001
	Enjoyment	-.570	.001
	Parent satisfaction	-.632	.001
Leisure	Diversity	-.520	.001
	Intensity	-.687	.001
	With whom	.739	.001
	Enjoyment	-.540	.001
	Parent satisfaction	-.691	.001
Play	Diversity	-.292	.003
	Intensity	-.609	.001
	With whom	.632	.001
	Enjoyment	-.505	.001
	Parent satisfaction	-.598	.001
Education	Diversity	-.272	.006
	Intensity	-.542	.001
	With whom	.701	.001
	Enjoyment	-.436	.001
	Parent satisfaction	-.605	.001
Social Participation	Diversity	-.352	.001
	Intensity	-.516	.001
	With whom	.695	.001
	Enjoyment	-.345	.001
	Parent satisfaction	-.624	.001

Note: Performed Spearman Correlation test, ρ = Raho

Table 4.8 shows the Spearman correlation among the different domains of life skills and hand function. The results indicate a weak positive correlation between MACS and “with whom,” which is statistically significant ($\rho = .816, P < .001$). On the other hand, diversity and enjoyment show moderate negative correlations with MACS level, both statistically significant ($\rho = -.409, P < .001$ and $\rho = -.563, P < .001$, respectively). The table also shows that intensity and parental satisfaction have strong negative correlations with MACS ($\rho = -.840, P < .001$ and $\rho = -.769, P < .001$, respectively). In the Instrumental Activities of Daily Living (IADL) domain, diversity, intensity, with whom, enjoyment, and parental satisfaction were correlated with MACS. A strong positive relationship was found between MACS and with whom ($\rho = .773, P < .001$). The other IADL domains showed moderate negative correlations with MACS, all of which were statistically significant ($\rho = -.584, P < .001$; $\rho = -.765, P < .001$; $\rho = -.570, P < .001$; and $\rho = -.632, P < .001$).

In the leisure domain, diversity, intensity, enjoyment, and parental satisfaction showed moderate negative correlations with MACS, all of which were statistically significant ($\rho = -.520, P < .001$; $\rho = -.687, P < .001$; $\rho = -.540, P < .001$; and $\rho = -.691, P < .001$). On the other hand, the with whom domain showed a strong positive correlation with MACS, which was also statistically significant ($\rho = .739, P < .001$). A strong positive relationship was found between MACS and with whom of play ($\rho = .632, P < .001$). The other play domains showed moderate negative correlations with MACS, all of which were statistically significant ($\rho = -.272, P < .001$; $\rho = -.609, P < .001$; $\rho = -.505, P < .001$; and $\rho = -.598, P < .001$). Educational domain diversity, intensity, enjoyment, and parental satisfaction were weak negatively correlated with MACS which is statistically significant ($\rho = -.272, P < .001$; $\rho = -.542, P < .001$; $\rho = -.436, P < .001$; and $\rho = -.605, P < .001$). In social participation domain diversity, intensity, enjoyment, and

parental satisfaction were weak negatively correlated with MACS which is statistically significant ($\rho = -.352, P < .001$; $\rho = -.516, P < .001$; $\rho = -.345, P < .001$; and $\rho = -.624, P < .001$). However with whom domain of social participation is positively correlated with MACS where $\rho = .695, P < .001$.

Table 4.9

Spearman correlation between hand function and life area participation

	MACS level	Diversity	Intensity	With whom	Enjoyment	Satisfaction
MACS level	1	-	-	-		
Diversity	-.507**	1	-	-	-	-
Intensity	-.745**	.708**	1	-	-	-
With whom	.792**	-.642**	-.902**	1	-	-
Enjoyment	-.610**	.442**	.772**	-.631**	1	-
Satisfaction	-.739**	.616**	.842**	-.775**	.832**	1

Note: Performed Spearman Correlation test

Table 4.9 illustrated that the life area participation domains diversity, intensity, enjoyment, and parental satisfaction—were strongly negatively correlated with hand function (MACS level), and these correlations were statistically significant ($\rho = -.507, p < .001$; $\rho = -.745, P < .001$; $\rho = -.610, P < .001$; and $\rho = -.739, P < .001$). However, the “with whom” domain showed a positive correlation with hand function, which was also statistically significant ($\rho = .792, P < .001$).

Table 4.10

Linear regression analysis predicting the MACS level towards the life area participation

		Predictor		
		MACS Level (Hand Function)		
		B	R Square	P value
		Unadjusted		
Life area participation	Diversity	-2.950	.320	.001
	Intensity	-27.926	.609	.001
	With whom	34.881	.697	.001
	Enjoyment	-21.289	.386	.001
	Parent satisfaction	-31.290	.550	.001

Note: Performed linear regression B=unstandardized regression coefficient

Table 4.10 shows the linear regression analysis, using these variables, which was statistically significant in Spearman correlation. This result indicates that diversity, intensity, enjoyment, and parental satisfaction decrease by 2.95, 27.92, 21.28, and 31.29 times when the MACS level increases by one point, which is statistically significant. However, with whom or assistance, 34.88 times increases when MACS level increases by one point, which is statistically significant.

CHAPTER V: DISCUSSION

The study aimed to find the impact of hand function on Life Area Participation among Children with Cerebral Palsy. Data was collected through face-to-face interviews, and data was collected from 102 participants. However, achieving this number was challenging due to a few participants and organisations not interested in providing data, which hindered the study's data collection efforts.

Marzieh Pashmdarfard & Reza Shervin Badv, 2019, reported that the mean age of the child was 8 years and 8 months old, and the minimum age was 6 years, and the maximum age was 12 years. This also reported that most of the children were boys, 171 (62.4%), while girls were 103 (37.6%). These findings are very similar to my study findings. The current study revealed that most of the children live in an urban area with their siblings. The majority of children were diagnosed with Quadriplegia and Diplegic CP. Recent research shows that Quadriplegia and Diplegic CP were more than other types of CP where Diplegia 95 (34.7%), and Quadriplegia 78 (28.5%) (Marzieh Pashmdarfard & Reza Shervin Badv, 2019). On the other hand, another study reported that Hemiplegic and Diplegic CP were more than other types of CP (Faeze Alvandi et al., 2023). This study found that most of the children had right-hand dominance and attended therapy sessions three times per week or fewer.

The current study reported that all of the mothers were married; among them, 2.9% were divorced and 1% were widowed. Mothers' education levels ranged from SSC, HSC to BSc. A few mothers were employed, while most were housewives. On the other hand, most fathers had completed tertiary-level education and were employed. The study also showed that the majority of families had a monthly income of less than fifty thousand taka, with the father being the main earning member.

A study reported that most participants had MACS levels II and III (Lee et al., 2015; Marzieh Pashmdarfard & Reza Shervin Badv, 2019; Faeze Alvandi et al., 2023). The results of the current study are consistent with these findings.

The results of this study showed that the level of participation across different life areas was generally good. The highest level of participation was observed in activities of daily living, while the lowest was in educational activities. Similar findings were reported by Marzieh Pashmdarfard and Reza Shervin Badv, 2019. Children with cerebral palsy (CP) often engage more in activities of daily living (ADLs), such as self-care tasks, because these activities are essential and fundamental life skills. As a result, children with CP tend to participate more frequently in ADLs compared to other areas of daily functioning (Engel-Yeger et al., 2009).

This study reported that Children with CP who have poor hand function they take more therapy sessions per week. Children with CP who have poor hand function they have need to more therapy sessions due to therapy sessions improve the hand function to children with CP (Mohamed et al., 2022). This study also revealed that in Quadriplegia, the Athetoid type of CP children's hand function is poorer than other groups of CP. A study reported that children with quadriplegic and diplegic types of CP have poor hand function and perform poorly in activities of daily living (Lee, 2017). Mutlu et al. 2010 reported that most of the spastic type of CP MACS level I and II, which indicates the spastic type of CP hand function was good, whereas the dyskinetic type of CP hand function was poor rather to other groups of CP types. This result indicates that children who required higher levels of assistance needed more therapy sessions per week. The current study also found that children with diplegic, hemiplegic, athetoid, and ataxic types of CP showed better participation across various life areas (including diversity, intensity, enjoyment, and parental satisfaction) compared to those with quadriplegic CP. Children with

quadriplegic CP required more assistance to perform activities of daily living (ADLs), instrumental activities of daily living (IADLs), play, leisure, educational, and social participation activities than children in other CP groups. This finding is supported by previous studies reporting that children with quadriplegic CP generally exhibit more severe motor impairments and lower functional independence compared to other CP types (Beckung & Hagberg, 2002). Another study reported that fine motor function improves the independence of the children for participation in different life areas will also improve too and the caregiving burden reduces for parents (Boztepe et al., 2018).

The results of this study showed that the upper extremity function of children with CP was strong and moderately correlated with the total score of their participation in different life areas. In this study, the highest correlation was found between the upper extremity function of children with CP and their participation in Activities of Daily Living (ADLs) ($0.4 < r < 0.8$), and the least correlation was found between the upper extremity function of children with CP and their participation in activities related to play and social participation ($r < 0.6$). Marzieh Pashmdarfard and Reza Shervin Badv, 2019, found that the highest correlation was found between the upper extremity function of children with CP and their participation in Instrumental Activities of Daily Living (IADLs). In the present study, the upper extremity function of children with CP has a significant relationship with all dimensions of life area participation. If children's upper extremity function increases, their life area participation will increase, reduce the assistance for participation, and increase parental satisfaction. A study revealed that Children with CP who have impaired upper extremity function they have face problems in performing ADL activities, and improving the upper extremity function of these children could improve their participation in the activities related to ADL (Klotz et al., 2013).

CHAPTER VI: CONCLUSION

6.1 Strengths and Limitations

6.1.1 Strength

- The data collection from participants and the data entry process were non-biased.
- The researcher collected the data through face-to-face interviews.
- For data safety and validation, all the data used in this study will be destroyed.
- These findings will help in planning the treatment of children with CP.
- This study's findings assist rehabilitation health professionals in creating a comprehensive rehabilitation service plan for children with Cerebral Palsy.

6.1.2 Limitations

There are some limitations of the study. They are,

- The participants were based in a specific special school, which cannot be generalized.
- Some of the organizations could not give the data.
- The student researcher excluded adolescent and adult Cerebral Palsy.
- Sometimes, there was a long waiting period for data collection.
- The study could not reach the intended sample size

6.2 Practice Implication

6.2.1. Recommendation for Future Practice

- Upper extremity hand function is an important predictor that influences the life area participation of children with Cerebral Palsy. So, when making a rehabilitation plan for children with CP, cases largely consider this predictor. Occupational therapists play a vital role in enhancing the hand function of Children with Cerebral Palsy. When hand function is enhanced in time, the life area of participation is enhanced.

- Hand function is an important predictor of reduced caregiver assistance, increased activity enjoyment, and increased parental satisfaction. So, when planning rehabilitation, treatment must be focused on hand function activity.

6.2.2 Recommendation for Future Research

- Conduct a study on the level of life area participation among adolescent and adult CP.
- Conduct psychometric properties of the Children Participation Questionnaire.
- Find out the barriers and associated factors of life area participation among Children with Cerebral Palsy.
- Conduct research on how hand function contributes to the quality of life, self-esteem, and social interaction among children with CP.

6.3 Conclusion

The primary objective of this research was to assess the impact of hand function on life area participation among children with cerebral palsy (CP). The study revealed that hand function is correlated with life area participation, reduces the level of caregiver assistance required, and increases both activity enjoyment and parental satisfaction. Children with CP who attended three or fewer therapy sessions per week demonstrated better hand function, whereas those with quadriplegic CP showed poorer hand function. Therefore, improving upper extremity function in children with CP can enhance their participation in various life areas. In addition to strengthening manual ability, other factors such as caregiver training and environmental modifications should also be addressed to further promote the participation of children with CP.

CHAPTER VII: REFERENCE

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APPENDICES

Appendix A: Ethical Approval Form



বাংলাদেশ হেলথ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
(The Academic Institute of CRP)

Ref: CRP-BHPI/IRB/05/2025/1084 Date: 15.05.2025

To,
 Most. Farea Afroze
 M.Sc. in Occupational Therapy, Part-II
 Roll: 09, Student ID:12123023
 BHPI, CRP, Savar, Dhaka-1343.

Subject: Approval of the thesis proposal “**Hand Function and Life Area Participation among the Children with Cerebral Palsy: A Cross-Sectional Study**” by ethics committee.

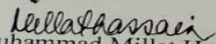
Dear Most. Farea Afroze
 Congratulations.

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal investigator and Prof. Sk. Moniruzzaman, Professor and Head of the Dept. of Occupational Therapy in Bangladesh Health Professions Institute (BHPI) as thesis supervisor. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Dissertation/thesis/research Proposal
2	Questionnaire (English & / or Bengali version)
3	Information sheet & consent form.

The purpose of the study is to determine the level of hand function and Life Area Participation among the Children with Cerebral Palsy. Adopted Bengali Version of the manual ability classification system (MACS) and children participation questioner (CPQ) Scale will be used in the study which will take about 10 to 15 minutes. Data collectors will receive informed consent from all participants and collected data will be kept confidential. The study involves use and there is no likelihood of any harm to the participants and participation in the study may benefit the participants. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at **09:00 AM** on **13/04/ 2025** at BHPI (**48th IRB Meeting**).

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. This Ethics committee is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

 Muhammad Millat Hossain
 Member Secretary, Institutional Review Board (IRB)
 BHPI, CRP, Savar, Dhaka-1343, Bangladesh

সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ। ফোন: +৮৮ ০২ ২২৪৪৪৫৪৬৪-৫, +৮৮ ০২ ২২৪৪৪১৪০৪, মোবাইল: +৮৮ ০১৭৩০ ০৫৯৬৪৭
 CRP-Chapain, Savar, Dhaka-1343, Bangladesh. Tel: +88 02 224445464-5, +88 02 224441402, 168112/2025 09:14
 REDMI NOTE 13 Mail : principal-bhpi@crp-bangladesh.org, Web: bhpi.edu.bd

Appendix B: Permission Letter for Scale

On Thursday, March 13, 2025, <limbo@bezeqint.net> wrote:

Dear Most. Farea Afroze,
There is no limitation, you can use the CPQ
See attachments
Best Regards
Limor

On Saturday, March 15, 2025, Ann-Christin Eliasson <ann-christin.eliasson@ki.se> wrote:

Macs is free to use for anyone
Anki

Ann-Christin Eliasson
Senior professor
Institutionen för kvinnor o barns hälsa
Karolinska Institutet
Tel 0702 538648
Hämta [Outlook för iOS](#)

Appendix C: Permission Letter for Data Collection

3rd June, 2025

To

Head of the Department

Department of Occupational Therapy

Bangladesh Health Professions Institute (BHPI)

CRP-Chapain, Savar, Dhaka-1343.

Subject: Prayer for permission to collect data for the research project.

Sir,

With due respect, I would like to draw your kind attention that I am a student of M.Sc. in Occupational Therapy, Part-II at Bangladesh Health Professions Institute (BHPI), Centre for the Rehabilitation of the Paralysed (CRP). In this Master's Program, I have to submit a research project to the University of Dhaka in partial fulfillment of recruitments of the degree of Master of Science in Occupational Therapy. The area of my research title is "Level of hand function on life area participation among children with cerebral palsy: A Cross-Sectional Study". As it is Quantitative research, I would like to conduct the interview of children and parents whose children are continuing schooling and receive rehabilitation services from selected special school in Dhaka, Bangladesh.

So, I therefore, pray and hope that you would be kind enough to grant me permission to collect data for my study and oblige thereby.

Sincerely yours,

Faree

Most. Faree Afroze
M.Sc. in Occupational Therapy, Part-II
Roll: 09, Student ID:121230023
BHPI, CRP, Savar, Dhaka-1343.

Comments and Signature of Head of the department:

S. M. Moniruzzaman

Prof. Sk. Moniruzzaman
Professor & Head of the Department
Dept. of Occupational Therapy
Bangladesh Health Professions Institute (BHPI)
CRP-Chapain, Savar, Dhaka-1343.

Appendix D: Information Sheet and Consent Form with Withdrawal Form [English Version]

Information sheet

I am Most. Farea Afroze, MSc in Occupational Therapy, part-II student at Bangladesh Health Professions Institute (BHPI). In order to fulfill the requirements of the M.Sc. in Occupational Therapy, according to the course curriculum, it is necessary to conduct research; I would like to invite you to take part in my research study. The title of this research is “Impact of Hand Function on Life Area Participation among Children with Cerebral Palsy: A cross-sectional study.” This study aims to find out the impact of hand function on Life Area Participation among Children with Cerebral Palsy.

In this study, your participation is voluntary, and you have the full right to not participate or withdraw information from the study at any time without any hesitation. Investigators don't provide any financial or economic support for participation, which might not benefit you directly. This research has no harmful effects on the participants but the possibility of little risk, such as feeling bored or angry, due to its conduct with people with mental illness.

Data will be collected using a standardized questionnaire. It will take around 10-15 minutes. It is important to inform you that the confidentiality of all data will be maintained, and all details will be only accessible to me and my supervisor. Your identity will not be disclosed in any presentation or publication without your permission.

If you have any questions about the study, please feel free to ask. I am accountable to answer all questions regarding this study.

Investigator: Most. Farea Afroze

M.Sc.in Occupational Therapy Student

Department of Occupational Therapy

BHPI, CRP- Chapain, Savar, Dhaka-1343

E-mail: most.fareaafroze.ot@gmail.com

CONSENT FORM

Research title: Impact of Hand Function on Life Area Participation among Children with Cerebral Palsy: A cross-sectional study.

Student investigator: Most. Farea Afroze

I have been asked to take part in the research project specified above. I have read and understood the Explanatory Statement and I hereby consent to participate in this project.

I consent to the following	Yes	No
Participating in face-to-face interview lasting approximately one at a location to be determined.	☐	☐
Have you had an opportunity to discuss this study and ask any question	☐	☐
Do you understand that you are free to withdraw from the study at any time, without having to give a reason?	☐	☐
Do you have sufficient time to come to your decision about participation	☐	☐
Do you agree to take part in this study?	☐	☐

Name of participant: _____

Signature of participant/ thumb print: _____

Date: _____

WITHDRAWAL OF CONSENT FORM

Research title: Impact of Hand Function on Life Area Participation among Children with Cerebral Palsy: A cross-sectional study.

Student investigator: Most. Farea Afroze

I, _____ (the participant),
wish to WITHDRAW my consent to the use of data arising from my participation. Data arising from my participation must NOT be used in this research project as described in the Information and Consent Form. I understand that data arising from my participation will be destroyed provided this request is received within four weeks of the completion of my participation in this project. I understand that this notification will be retained together with my consent form as evidence of the withdrawal of my consent to use the data I have provided specifically for this research project.

Name of participant: _____

Signature of participant/ thumb print: _____

Date: _____

Appendix E: Information Sheet and Consent Form with Withdrawal Form [Bangla Version]

তথ্যপত্র

আমি মোছা. ফারিয়া আফরোজ, বাংলাদেশ হেলথ প্রফেশনস ইনস্টিটিউট (বিএইচপিআই)-এর এম.এস.সি ইন অকুপেশনাল থেরাপি পাট-টু-এর শিক্ষার্থী। কোর্স কারিকুলাম অনুযায়ী ডিগ্রির চূড়ান্ত শর্ত পূরণে একটি গবেষণা পরিচালনা করা প্রয়োজন। আমি আপনাকে আমার গবেষণায় অংশগ্রহণের জন্য আমন্ত্রণ জানাচ্ছি। এই গবেষণার শিরোনাম হলো: “সেরিব্রাল পালসি আক্রান্ত শিশুদের জীবনের অংশগ্রহণে হাতের কার্যকারিতার প্রভাব: একটি ক্রস-সেকশনাল স্টাডি।”

এই গবেষণার উদ্দেশ্য হলো সেরিব্রাল পালসি আক্রান্ত শিশুদের জীবনের বিভিন্ন ক্ষেত্রে অংশগ্রহণে হাতের কার্যকারিতার প্রভাব নির্ণয় করা।

এই গবেষণায় অংশগ্রহণ সম্পূর্ণ স্বেচ্ছাসেবাভিত্তিক, এবং আপনি ইচ্ছা করলে যে কোনো সময় অংশগ্রহণ থেকে বিরত থাকতে পারবেন বা আপনার দেওয়া তথ্য প্রত্যাহার করতে পারবেন। এতে অংশগ্রহণের জন্য কোনো আর্থিক সুবিধা প্রদান করা হবে না এবং এটি সরাসরি আপনাকে উপকার নাও করতে পারে। এই গবেষণায় কোনো ক্ষতির সম্ভাবনা নেই, তবে মানসিক ক্লান্তি বা বিরক্তি হতে পারে।

তথ্য সংগ্রহের জন্য একটি মানসম্পন্ন প্রশ্নপত্র ব্যবহার করা হবে, যা পূরণ করতে প্রায় ১০-১৫ মিনিট সময় লাগবে। আপনার সকল তথ্য গোপন রাখা হবে এবং শুধুমাত্র আমি ও আমার সুপারভাইজার তথ্যগুলো দেখতে পারবো। আপনার নাম বা পরিচয় কোনো প্রতিবেদনে প্রকাশ করা হবে না, যদি না আপনি অনুমতি দেন।

যদি এই গবেষণা সম্পর্কে আপনার কোনো প্রশ্ন থাকে, তাহলে নির্দিধায় জানতে পারেন। আমি আপনার সকল প্রশ্নের উত্তর দিতে বাধ্য থাকবো।

গবেষক: মোছা. ফারিয়া আফরোজ
এম.এস.সি ইন অকুপেশনাল থেরাপি শিক্ষার্থী
অকুপেশনাল থেরাপি বিভাগ
বিএইচপিআই, সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩
ই-মেইল: most.fareaafroze.ot@gmail.com

সম্মতি পত্র

গবেষণার শিরোনাম: সেরিৱাল পালসি আক্রান্ত শিশুদের জীবনের অংশগ্রহণে হাতের কার্যকারিতার প্রভাব: একটি ক্রস-সেকশনাল স্টাডি।

গবেষক: মোছা. ফারিয়া আফরোজ

আমি উপরোক্ত গবেষণায় অংশগ্রহণের জন্য অনুরোধ পেয়েছি। আমি ব্যাখ্যামূলক বিবৃতিটি পড়েছি এবং বুঝেছি। আমি এই প্রকল্পে অংশগ্রহণে সম্মতি দিচ্ছি।

সম্মতির বিষয়	হ্যাঁ	না
আপনি সরাসরি সাক্ষাৎকারে অংশগ্রহণে রাজি কি না (সময় আনুমানিক এক ঘণ্টা)	☐	☐
আপনি কি এই গবেষণা সম্পর্কে আলোচনা করে প্রশ্ন করার সুযোগ পেয়েছেন?	☐	☐
আপনি কি জানেন যে যেকোনো সময় গবেষণা থেকে সরে আসা যাবে?	☐	☐
আপনি কি সিদ্ধান্ত নেওয়ার জন্য পর্যাপ্ত সময় পেয়েছেন?	☐	☐
আপনি কি গবেষণায় অংশগ্রহণে সম্মত?	☐	☐

অংশগ্রহণকারীর নাম: _____

স্বাক্ষর / আঙুলের ছাপ: _____

তারিখ: _____

সম্মতি প্রত্যাহারের ফর্ম

গবেষণার শিরোনাম: সেরিব্রাল পালসি আক্রান্ত শিশুদের জীবনের অংশগ্রহণে হাতের কার্যকারিতার প্রভাব: একটি ক্রস-সেকশনাল স্টাডি।

গবেষক: মোছা. ফারিয়া আফরোজ

আমি, _____ (অংশগ্রহণকারী),

এই গবেষণায় আমার অংশগ্রহণ থেকে উদ্ভূত তথ্য ব্যবহারের জন্য দেওয়া সম্মতি প্রত্যাহার করতে চাই। আমার অংশগ্রহণ থেকে প্রাপ্ত কোনো তথ্য এই গবেষণা প্রকল্পে ব্যবহার করা যাবে না। আমি জানি, আমার অংশগ্রহণের সমাপ্তির চার সপ্তাহের মধ্যে এই অনুরোধ গ্রহীত হলে, আমার দেওয়া তথ্য ধ্বংস করে ফেলা হবে। এই ফর্মটি আমার সম্মতি প্রত্যাহারের প্রমাণ হিসেবে মূল সম্মতি ফর্মের সাথে সংরক্ষিত থাকবে।

অংশগ্রহণকারীর নাম: _____

স্বাক্ষর / আঙুলের ছাপ: _____

তারিখ: _____

Appendix F: Questionnaire [English Version]

Section 1: Socio-demographic part

1. Name of the admitted child:
2. Name of child, father's name:
3. Name of the child, mother's name:
4. Cell number:
5. Address:
6. Age of the child: (in years)
7. Gender status of children
 1. Boy
 2. Girl
8. Marital status of mother
 1. Married
 2. Divorced
 3. Widowed
9. Educational status of mother
 1. Less than primary
 2. Completed primary
 3. Less than secondary
 4. Completed secondary
 5. Completed higher secondary
 6. Completed bachelor's degree
 7. Completed master's degree
 8. Illiterate
10. Occupational status of mother
 1. Housewife
 2. Employee
 3. Student
 4. Business

11. Education status of father

1. Less than primary
2. Completed primary
3. Less than secondary
4. Completed secondary
5. Completed higher secondary
6. Completed bachelor's degree
7. Completed master's degree
8. Illiterate

12. Occupational status of father

1. Housewife
2. Employee
3. Student
4. Business

13. Living area:

1. Urban
2. Semi-urban
3. Rural

14. Does he/she have any brothers or sisters?

1. Yes
2. No

15. Which number child is this for you?

1. First
2. Second
3. Third
4. Fourth

16. Do any of your other children have a disability?

1. Yes
2. No

17. Number of the family member:.....

18. Main earning family member

1. Father
2. Mother
3. Both

19. Family monthly income:.....tk

20. Types of CP

1. Quadriplegic
2. Diplegic
3. Hemiplegic
4. Monoplegic
5. Athetoid
6. Ataxic

21. Dominant of the child:

1. Right
2. Left

22. Do you receive therapy?

1. Yes
2. No

23. If Q 22 yes, how many therapy sessions are received per week?.....

Section 2: Manual Ability Classification System (MACS)

Level	Description
I	Objects are handled easily and successfully.
II	Handles most objects but with some reduced quality and speed
III	Handles objects with difficulty – the child will need help to prepare and/or modify activities.
IV	Handles a limited selection of easily managed objects and always requires some help from others.
V	The child is not able to handle objects or to complete even simple actions with their hands.

Appendix G: Questionnaire [Bangla Version]

সেকশনঃ ১- আর্থ-সামাজিক প্রশ্ন

১. ভর্তি শিশুর নাম:
২. পিতার নামঃ
৩. মাতার নামঃ
৪. মোবাইল নাম্বারঃ
৫. ঠিকানা:
৬. বাচ্চার বয়সঃ (বছর)
৭. লিঙ্গ
 - ১। ছেলে
 - ২। মেয়ে
- ৮। মায়ের বৈবাহিক অবস্থা
 - ১। বিবাহিত
 - ২। তালাকপ্রাপ্ত
 - ৩। বিধবা
- ৯। মায়ের শিক্ষাগত যোগ্যতা
 - ১। প্রাথমিক থেকে কম
 - ২। প্রাথমিক সম্পন্ন
 - ৩। মাধ্যমিক থেকে কম
 - ৪। মাধ্যমিক সম্পন্ন
 - ৫। উচ্চ মাধ্যমিক সম্পন্ন
 - ৬। স্নাতক সম্পন্ন
 - ৭। স্নাতকোত্তর
 - ৮। অশিক্ষিত
- ১০। মায়ের পেশা
 - ১। গৃহিণী
 - ২। কর্মচারী
 - ৩। শিক্ষার্থী
 - ৪। ব্যবসা
- ১১। বাবার শিক্ষাগত যোগ্যতা

- ১। প্রাথমিক থেকে কম
 - ২। প্রাথমিক সম্পন্ন
 - ৩। মাধ্যমিক থেকে কম
 - ৪। মাধ্যমিক সম্পন্ন
 - ৫। উচ্চ মাধ্যমিক সম্পন্ন
 - ৬। স্নাতক সম্পন্ন
 - ৭। স্নাতকোত্তর
 - ৮। অশিক্ষিত
- ১২। বাবার পেশা
- ১। কৃষক
 - ২। কর্মজীবী
 - ৩। দিনমজুর
 - ৪। ব্যবসা
- ১৩। বসবাসের স্থান
- ১। শহর
 - ২। অর্ধশহর/ছোট শহর
 - ৩। গ্রাম
- ১৪। তার কি কোন ভাই বোন আছে?
- ১। হ্যাঁ
 - ২। না
- ১৫। এটা আপনার কততম বাচ্চা?
- ১। প্রথম
 - ২। দ্বিতীয়
 - ৩। তৃতীয়
 - ৪। চতুর্থ
- ১৬। আপনার অন্য কোন বাচ্চার কি অক্ষমতা আছে?
- ১। হ্যাঁ
 - ২। না
- ১৭। পরিবারের সদস্য সংখ্যা কতজন
- ১৮। পরিবারের উপার্জনকারী কে?
- ১। বাবা

২। মা

১৯। পরিবারের মাসিক আয়ঃ টাকা

২০। সেরিব্রাল পালসির ধরন

১। কোয়াদ্রিপ্লেজিক

২। ডায়াপ্লেজিক

৩। হেমিপ্লেজিক

৪। মনোপ্লেজিক

৫। এথেটয়েড

৬। এটাক্সিক

২০। আপনার বাচ্চা কোন হাত বেশি ব্যবহার করে?

১। ডান

২। বাম

২১। থেরাপি নেন কি?

১। হ্যাঁ

২। না

২২। যদি ২১ নং প্রশ্ন হ্যাঁ হয়, তাহলে সাপ্তাহে কয়টা থেরাপি সেশন নেন.....।

সেকশন ২: ম্যানুয়াল অ্যাবিলিটি ক্লাসিফিকেশন সিস্টেম (MACS)

লেভেল	বর্ণনা
I	বস্তু সহজেই এবং সফলতার সঙ্গে পরিচালনা করা যায়।
II	বেশিরভাগ বস্তু পরিচালনা করা যায়, তবে কিছুটা মান এবং গতি কম।
III	বস্তু পরিচালনা করতে অসুবিধা হয়, কার্যক্রম প্রস্তুত করতে বা সংশোধন করতে সাহায্য প্রয়োজন।
1V	সহজে ব্যবস্থাপনা করা যায় এমন সীমিত বস্তু পরিচালনা এবং অন্যের সাহায্য প্রয়োজন।
V	শিশু কোনো বস্তু পরিচালনা করতে বা হাতে সাধারণ ক্রিয়াগুলোও সম্পন্ন করতে অক্ষম।

Appendix H: Supervision Record Sheet




Bangladesh Health Professions Institute (BHPI)

Department of Occupational Therapy
Course: Master of Science in Occupational Therapy

Supervision Contact

Name of student: Most. Farea Afroze
Name and designation of thesis supervisor:
 Professor SK Moniruzzaman
 Professor & Head
 Department of Occupational Therapy
 BHPI, CRP, Savar, Dhaka-1343

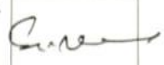
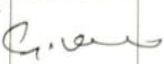
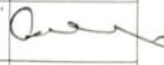
Thesis Title: Impact of Hand Function on Life Area Participation among Children with Cerebral Palsy: A cross-sectional study

Appointment No.	Date	Place	Topic of discussion	Duration (Minutes/Hours)	Student's Comments/ Takeaway/ Further Plan	Student's signature	Thesis supervisor's signature
01.	4.01.25	CRP	MAX & CPQ scale with Monir sir MACS	1 hour	Got clear idea about study questions	Farea	Monir
02.	25.01.25	CRP	Title, Aim, Objectives with Monir sir	30 min.	Got clear idea about study	Farea	Monir

1

03.	8.2.25	CRP	Introduction to other parts for research proposal with Monir sir	30 min.	Finalize the documents according to guidelines	Fareed	Q. No. 1
04.	8.2.25	CRP	Final Checking research proposal with Monir sir	30 min.	Finalize the documents for submission	Fareed	Q. No. 2
05.	22.2.25	CRP	Title finalization, formatting for research study	30 min.	Finalize the study title	Fareed	Q. No. 3
06.	23.2.25	CRP	Discuss about title , aim objectives and research proposal with Monir sir	30 min.	Update the research proposal	Fareed	Q. No. 4
07.	5.4.25	CRP	IRB presentation sharing with Monir sir	30 min.	Sharing and update the research	Fareed	Q. No. 5
08.	12.4.25	CRP	Aim, Objectives finalization for research study with Monir sir	30 min.	Got clear idea about the study	Fareed	Q. No. 6
09.	26.4.25	CRP	Data collection permission issue for IRB with Monir sir	30 min.	Prepare letter for IRB permission	Fareed	Q. No. 7
10.	15.4.25	CRP	Literature review part with Monir sir	1 hour	Got clear idea about literature review part	Fareed	Q. No. 8
11.	29.4.25	CRP	Methodology part with Monir sir	1 hour	Got clear idea about methodology part	Fareed	Q. No. 9
12.	17.5.25	CRP	Methodology part sample calculation with Monir sir	1 hour	Got clear idea about sample size calculation	Fareed	Q. No. 10
13.	25.5.25	CRP	Data collection tool demographic questions with supervisor with Monir sir	1 hour	Need to update demographic questions	Fareed	Q. No. 11
14.	01.05.25	CRP	Title finalization, formatting for research	30 min.	Need to update the documents	Fareed	Q. No. 12

			study with Saddam Sir				
15.	15.5.25	CRP	Data collection tool, demographic questions with Abu Taleb sir	30 min.	Need to update the documents	Fareen.	
16.	8.5.25	CRP	Data collection tool, demographic questions with Saddam sir	30 min.	Need to update the documents	Fareen.	<i>[Signature]</i>
17.	4.5.25	CRP	Data collection tool, demographic questions with Habib sir	30 min.	Need to update the documents	Fareen.	<i>[Signature]</i>
18.	17.5.25	CRP	Discuss with data collection difficulties with Habib sir	30 min.	Need to find out alternative solution	Fareen.	<i>[Signature]</i>
19.	28.6.25	CRP	Data set final checking and Orientation with Abu Taleb sir	1.5 hour	Finalize the data set of result part	Fareen.	
20.	30.6.25	CRP	Data set final checking and Orientation with Saddam sir	2.5 hour	Finalize the data set of result part	Fareen.	<i>[Signature]</i>
21.	6.7.25	CRP	Data set final checking and orientation with Monir sir	1 hour	Finalize the data set of result part	Fareen.	<i>[Signature]</i>
23.	9.7.25	CRP	Crosschecking the data set for final checking and orientation with Saddam sir	1 hour	Finalize the data set of result part	Fareen.	<i>[Signature]</i>
24.	13.7.25	CRP	Crosschecking the data set for final checking and orientation with Monir sir	2.5 hour	Finalize the data set of result part	Fareen.	<i>[Signature]</i>
25.	16.8.25	CRP	Discussion about test result for final analysis with Saddam sir	1 hour	Analysis of the data for result	Fareen.	<i>[Signature]</i>

26.	7.09.25	CRP	Discussion about test result for final analysis with Monir sir	1 hour	Analysis of the data for result	Fareen	
27.	21.09.25	CRP	Discussion about test result for final analysis with Monir sir	1 hour	Analysis of the data for result	Fareen	
31.	11.09.25	CRP	Analysis part cross check with Monir sir	4 hours	Final cross check the analysis	Fareen	
32.	25.10.25	CRP	Check discussion and conclusion part with Monir sir	2 hour	Finalize the write up discussion and conclusion part	Fareen	
33.	8.11.25	CRP	Research feedback from Saddam sir	2 hour	Need to update the full study for final checking	Fareen	
34.	9.11.25	CRP	Research feedback from Habib sir	2 hour	Need to update the full study for final checking	Fareen	
36.	25.11.25	Online	Final checking full research with Saddam sir	1.5 hour	Finalize the full research for print	Fareen	

Please note that as a student of the M.Sc. in OT program, it is mandatory for you to receive 35 hours of supervision from your assigned supervisor. Please note that this hour counts does not include the hour you received supervision from the Course Coordinator of M.Sc. in OT during your proposal development period. If required, you may add additional rows to record all the supervision hours. Remember to include all the supervision contacts in the Appendix section of your thesis. Please do not edit or remove this note. Thank you.