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Research Article

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Factors Associated with Low Adherence to Physiotherapy Treatment for Children with Cerebral Palsy

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ABSTRACT

Background: Cerebral palsy (CP) is a non-progressive irreversible lesion of the brain or injury of the brain during labor, at the time of birth, or during delivery. Children with cerebral palsy required regular-based rehabilitation care.

Objectives: The study aimed to identify the factors related with low adherence to physiotherapy intervention for children with CP in Bangladesh.

Methods: A convenience sampling technique was used to carry out the cross-sectional study. The samples were collected from the 9 Centre for the Rehabilitation of the Paralysed (CRP) at the different divisions of Bangladesh. A total of 280 CP children were selected through face-to-face interviews. The study was carried out between July 2022 and June 2023. The Adherence in Chronic Diseases Scale (ACDS) was used to measure the level of adherence. The Chi square test was used for analysis through the Statistical Package for Social Sciences (SPSS) version 25.0.

Results: The maximum of respondents (61.4%) were males, while the majorities (58.6%) were from rural areas. The majority of respondents (60.4%) adherence category was medium, and multiple co-morbidities were 6.8%. The level of motivation and level of adaptation of the participants were 67.1% and 53.6%, respectively. The study results found association between adherence category with level of motivation ($p = 0.02$) and feeding problem ($p = 0.05$).

Conclusion: Adherence to physiotherapy treatment is very important to improve the functional ability, physical activity, and quality of life for the children with CP. The awareness about the importance of physiotherapy treatment should increase gradually among the mass people.

Keywords: Adherence, Cerebral Palsy, Physiotherapy, Rehabilitation

Main Text

Introduction

Cerebral palsy (CP) is a non-progressive irreversible lesion in one or more areas of the developing brain that results from brain damage sustained during labor, delivery, or birth [1]. It is caused by damage to or abnormalities in the developing brain, specifically in areas that control motor function [2]. It is the most prevalent neurodevelopmental condition, starting in the early neonatal stage and lasting throughout life [3].

According to Vincer et al [4]. the prevalence of CP is significantly higher in preterm infants than in full-term infants. The prevalence of cerebral palsy is 2.5 per 1,000 live births worldwide [5]. In developing nations, the prevalence of cerebral palsy is 5 to 10 times higher [6]. Bangladesh is a developing nation, and there were 3.7 cases of cerebral palsy for every 1,000 live births there [7]. In Bangladesh, the prevalence of impairment caused by cerebral palsy was estimated to be 70/1,000 for all severity levels and 22/1,000 for substantial disability in a group of children ages 2 to 9 from both urban and rural populations [8]. In Africa, the prevalence varied greatly from country to country from approximately 2-10 per 1000, but it is suggested

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to be higher than in western countries [9,10]. There is lack of study on the prevalence of CP in the Ethiopian context [11,12]. The prevalence of CP in Saudi Arabia has been estimated to be 23.4-26.3 per 10,000 live births [13].

Physiotherapy is an integral aspect of growth and development for many children who have CP. Although CP is considered to be a non-progressive disorder, prolonged adherence with physiotherapy is often considered necessary throughout childhood to reduce complications or slow deteriorations associated with the condition [14]. As the prevalence of CP increases, so does the longer life expectancy, so the need for therapeutic intervention is also important [15].

Patients with CP must adhere to their physiotherapy regimen since it has a substantial impact on their general health, functional capabilities, and quality of life. Damage to the developing brain is the source of the neurological condition known as cerebral palsy, which causes a variety of motor deficits and problems with movement and coordination. In order to manage CP and maximize one's chances of functional independence and mobility, physiotherapy is crucial. Regular attendance at physiotherapy sessions aids in creating more effective movement patterns, strengthening weak muscles, and improving muscular tone and flexibility [16].

Physiotherapy aids cerebral palsy patients in gaining more freedom in their everyday activities by focusing on specific motor impairments and resolving mobility issues. Physiotherapy focuses on enhancing social and communicative skills in addition to treating motor problems [17]. It focuses on enhancing fundamental abilities such as sitting, standing, walking, and carrying out functional duties so that patients can take a more active role in their personal and social lives. Improved motor function and movement control is the goal of physiotherapy therapies like balance training, strengthening exercises, and stretching routines [16]. There are several factors that can contribute to non-adherence to treatment, including patient characteristics, the disease itself, the medications taken, and interactions between patients and medical staff. The World Health Organization (WHO) estimates that the overall population has a non-adherence rate to long-term treatment of about 50.0% [18].

Physiotherapy plays a vital role in managing cerebral palsy and improving the functional abilities of affected individuals. Low adherence to treatment can lead to suboptimal outcomes and hinder progress. By identifying the factors that contribute to low adherence, healthcare providers can develop strategies to improve patient compliance and, consequently, enhance treatment outcomes. Children with CP require ongoing multidisciplinary care. But occasionally they are unable to continue their physiotherapy. Due to therapy discontinuity, several patients are not improving as intended. Researchers wish to investigate the reasons behind the discontinuity. If these factors are identified, then required actions could be taken to address the issues. The study aims to find out the factors associated with low adherence to physiotherapy treatment for children with cerebral palsy in Bangladesh.

Methodology

Study Designs

The purpose of this cross-sectional study was to examine the variables linked to children with CP failing to adhere to their physiotherapy programs. The convenience sampling technique was used to collect data from 280 participants. The population of this study was children with CP whom were receiving physiotherapy treatment in the outpatient pediatric unit of the Centre for the Rehabilitation of the paralysed (CRP), Savar, Dhaka, Bangladesh.

Study populations

The research was carried out from May to July of 2023. In this study, the researcher also considered eligibility criteria, which helped the researcher select suitable and appropriate participants for this study. Children with CP had an age less than 12 years who were receiving physiotherapy treatment and willingly participated in this study and met the inclusion criteria. The participants who had associated neurological disorder likely hydrocephalus and had age more than 12 years were excluded from the study.

Outcome Measurements

Data was collected by using a structural-type questionnaire. The survey was designed taking into account the characteristics and goals of the current investigation. The questionnaire had two basic sections. The first part contained questions on socio-demographic information. There was a questionnaire for acquiring the participant's demographic information, including age, sex, living area, mother's educational status, mother's occupation, level of motivation, level of adaptation, emotional state, having disability members among the participants, co-morbidities, and taking of rehabilitation services. The researcher collected data through an individual interviewing process in a calm environment.

The second part included the Chronic Disease Adherence Scale (ACDS), a 7-item questionnaire that is associated with 5 predefined propositions of answers. The total score of ACDS ranges from 0 to 28 points. Three levels of adherence were considered (low: scores of 0 to 20; medium: 21 to 26; high: >26). The ACDS is a new tool to assess the implementation of the treatment plan [19]. The ACDS is a practical, reliable, consistent, and well-validated instrument for identifying specific obstacles to medication adherence. Its simplicity means that it can be successfully applied in daily practice by health care professionals [20].

Data analysis

The collected data were inputted into a computer and analyzed using Statistical Package for Social Sciences (SPSS) version 25.0 and Microsoft Office Excel 2013. Categorical variables were presented as percentages and frequencies, and continuous variables as mean and standard deviation (SD), and the chi-square test was used to determine the level of significance between two or more variables. The null hypothesis was ruled out at the $p < 0.05$ threshold for analysis. Before participating, patients got complete information about the research objectives and protocol and provided signed informed consent.

Design and Ethics

The ethical requirements of the World Health Organization (WHO), Bangladesh Medical Research Council (BMRC), and Centre for the Rehabilitation of the Paralysed (CRP) were

adhered to. Prior to participation, patients were informed about the research aims and protocol and provided signed informed consent. Administrative entities of the CRP ethics committee of the Bangladesh Health Professions Institute (BHPI) and the Institutional Review Board (IRB) authorized the project. The registration number is CRP/BHPI/IRB/03/2023/691.

Results

In the current observational study, two hundred and eighty mothers of children with CP were participated the survey. The study consists of almost all the information needed for the study. Table 1 represents the distribution of the participant's socio-demographic and clinical characteristics. The mean age ± SD of the children with CP was 3.53 ± 2.10. The maximum age of the children with CP was 8.6 years. Out of 280 respondents, the majorities (61.4%) were males, and (38.6%) were females. The maximum respondents (58.6%) were from rural areas and 41.4% were from urban areas. The majority of participants (60.4%) adherence category was medium, and multiple co-morbidities were 6.8%. The maximum respondent's educational qualification was secondary level (29.6%) and occupation was housewife (78.2%). The level of motivation and level of adaptation of the participants were 67.1% and 53.6%, respectively. The respondents had other disabled family members and parents had emotional stress at 34.6% and 18.9%, respectively. The majority of the participants (82.5%) home distance was far from rehabilitation centers and faced difficulties in transport (58.9%).

Table 1: Socio-Demographic and Clinical Characteristics of the Participants (n = 280)

Demographic	% (n)	Demographic	% (n)	Demographic	% (n)
Adherence Category		**Co-Morbidities**		**Mother's education**	
Low (<20)	30.4% (85)	No co-morbidities	69.3% (194)	Illiterate	12.9% (36)
Medium (21-26)	60.4% (169)	Single	23.9% (67)	Primary	18.2% (51)
High (>27)	9.3% (26)	Multiple	6.8% (19)	Secondary	29.6% (83)
Living area		**Mother's occupation**		Higher secondary	21.8% (61)
Rural	58.6% (164)	Housewife	78.2% (219)	Honors	15.4% (43)
Urban	41.4% (116)	Service holder	21.8% (61)	Masters	2.1% (6)
Gender		**Feeding problem**		**Epileptic sign**	
Male	61.4% (172)	Yes	32.9% (92)	Yes	38.9% (109)
Female	38.6% (108)	No	67.1% (188)	No	61.1% (171)
Level of adaptation		**Family member with disability**		**Emotional states of parent's**	
Poor adaptation	46.4% (130)	Yes	18.9% (53)	Normal	65.4% (183)
Good adaptation	53.6% (150)	No	81.1% (280)	Abnormal	34.6% (97)
Level of motivation		**Transport Hazard**		**Hospital distance**	
High	67.1% (188)	Yes	58.9% (165)	Near (1-2 km)	17.5% (49)
Low	32.9% (92)	No	41.1% (115)	Far (>2km)	82.5% (231)

In this study associations were analyzed between adherence category with gender, living area, occupation of mother, feeding problem, epileptic sign, level of adaptation, level of motivation, emotional states, distance of residence, transport hazard, family support, family member with disability. The study results found association between adherence category with level of motivation ($p = 0.02$) and feeding problem ($p = 0.05$). There has no association between adherence category with gender, living area, occupation of mother, epileptic sign, level of adaptation, emotional states of parents, distance of residence, transport hazard, family support, and family member with disability (Table 2).

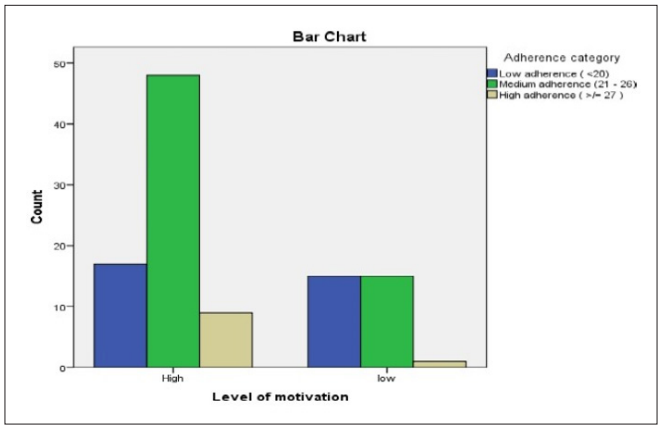

Figure 1: Association Between Adherence Category and Level of Motivation

In summary, the study's results emphasize the complexity of factors influencing adherence to medical or therapeutic protocols and highlight the importance of motivation as a potential factor in adherence behavior. Further investigation and tailored interventions may be needed to understand and improve adherence patterns among different subgroups within the population studied.

One noteworthy outcome from the analysis was the identification of a weak association between adherence categories and the level of motivation as the Cramer's V = 0.266. This indicates that an individual's motivation level may play a subtle role in their adherence to the prescribed treatment or regimen. Further exploration into this specific relationship could yield valuable insights into strategies for improving adherence among certain individuals (Figure 1).

Table 2: Association of Adherence Category with Different Socio-Demographic Variables

Variable 1	Variable 2	Pearson Chi square co-efficient value ($\chi 2$)	Fisher's exact co-efficient value	Significant level (p value)
Adherence Category -High (>27) -Medium (21-26) - Low (<20)	Level of motivation	7.451		0.024
	Living area	0.317		0.835
	Mother's occupation	1.111		0.467
	Feeding problem	5.775		0.056
	Epileptic sign	1.338		0.519
	Level of adaptation	0.901		0.698
	Family member with disability	5.177		0.08
	Emotional states	1.971		0.376
	Family support	0.636		0.812
	Transport hazard	3.528		0.195
	Distance of residence		2.131	0.357
	Gender	0.152		0.698

Discussion

The study purposed to find out the factors associated with low adherence to physiotherapy intervention for the children with CP. The mean age ± SD of the children with CP was 3.53 ± 2.10. A study observed the mean age ± SD of the participants was 5.9 ± 3.5 years [21]. A similar study conducted in Bangladesh explored the mean age ± SD of the CP mothers was 48.6 ± 30.55 [22]. A statistical significance was found only in the age of mothers with adherence to physical therapy [21].

Out of 280 respondents, the majority (61.4%) were males, and 38.6% were females. More than half of the children with CP were boys (59.6%), whereas the remaining were girls (40.4%) [21]. The maximum respondents (58.6%) were from rural areas and 41.4% were from urban areas. Even though the majority of the participants were from rural areas, they adhered to their physiotherapy treatments fairly well. In a study identified, the maximum 114 (54.8%) of the participants were boys, and 45 (20.0%) of the respondents had good adherence to physiotherapy from the village area [22].

In this study, the majority of participants (60.4%) adherence categories were medium; 30.4% and 9.3% adherence category was low and high, respectively. Usman et al [23]. did a study on the factors that influence caregivers' attendance at physical therapy appointments. The study found a total of 28 (46.7%) adherents and 32 (53.3%) non-adherents. In another study, only 33.9% of mothers followed the physiotherapist's recommendations for child exercises, while 66.1% had poor adherence [21].

The maximum respondent's educational qualification was secondary level (29.6%) and occupation was housewife (78.2%). According to a similar study, the majority of CP mothers were housewives with SSC as their highest level of education. The degree of education of the caregivers and adherence were shown to be significantly correlated (P = 0.05). The educated parents or caregivers have higher levels of adherence than uneducated or illiterate people [22,23]. A similar finding was observed in another study where the majority had a secondary education [21].

Those who have had family support have strong levels of adherence, which is crucial for CP patients to receive regular treatment. The level of motivation and level of adaptation of the participants were 67.1% and 53.6%, respectively. The study results found association between adherence category with level of motivation (p = 0.02) and feeding problem (p = 0.05). The level of motivation depends on several factors, like social factors, family support, financial support, emotional state, food problems, and transport hazards. The respondents had other disabled family members, and parents had emotional stress at 34.6% and 18.9%, respectively. A study noticed a significant depressive symptom, which had a major effect on the attendance of therapy sessions [21].

The majority of the participants (82.5%) home distance was far from rehabilitation centers and faced difficulties in transport (58.9%). When comparing with various factors, the main obstacle to patients adhering to their treatment is the distance to the clinic. The expense of therapy and transportation also likely has an impact on patients' adherence to treatments [24]. Another study revealed a significant relationship (P = 0.05) between CP knowledge and adherence [23].

The low socioeconomic levels and academic experiences of the majority of defaulting mothers were shown to have had a significant impact on their insight into the child's health and the benefits of physiotherapy, hence the defaulting. Due to

physical, financial, and emotional obstacles, caregivers found it challenging to attend therapy sessions on time, which led to them skipping sessions [21]. According to the WHO, there are five factors influencing adherence, which include social and economic factors, health system-related factors, therapy-related factors, disease-related factors, and patient-related factors [22].

Limitation

The tiny sample size was the drawback of the study. It would be more effective if a large number of samples were taken. Time was one of the major limitations. Hence, it is highly advised to raise the number of samples throughout Bangladesh. The shorter duration of the study and site of data collection was the limitation. The study's findings may not be generalizable to the entire population of Bangladesh, particularly considering the sample size, short duration of study, and geographical areas.

Conclusion

Adherence to physiotherapy treatment is very important to improve the functional ability, physical activity and improve the quality of life for the children with CP. The study results found association between adherence category with level of motivation and feeding problem. Poor adherence to physiotherapy may be experienced by patients with co-morbidities and feeding problems, as indicated. Furthermore, the role of family income in ensuring the continuity of physiotherapy treatment was emphasized, with a higher income level being conducive to patient adherence. The awareness about the importance of physiotherapy treatment should increase gradually among the mass people.

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Ethical Consideration

The article paid attention in all ethical concepts.

Author Contribution

All authors contributed equally to preparing the article.

Conflict of interest

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