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A Survey of Urinary and Faecal Incontinence Among Children with Cerebral Palsy in Selected Tertiary Hospitals in South-West Nigeria

Zaki Desmond A.[1], Karaga Mahmud A.[2], Christopher Raphael[3], Saleh Baba A.[4], John-Chu Cindy G.[5], Adeleke Joana O.[6], Akintunde Ireoluwa T.[7]

[1,2,3]Federal University Wukari, Taraba State, Nigeria; [4,5]Yobe State University, Damaturu, Yobe State, Nigeria; [6,7]Bowen University, I wo, Osun State, Nigeria

desmond.zaki@gmail.com

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Abstract

Background: Previous studies have investigated the prevalence of Urinary Incontinence (UI) in children with cerebral palsy (CP), and yet a very few others have looked at Faecal incontinence (FI) in this population. However, there is a notable dearth of research on the association between UI and FI amongst this population particularly in the South-west Nigeria. **Aim:** To examine the prevalence of UI and FI in children with CP, as well as the association between UI and FI among this population in South-west Nigeria. **Methods:** Consecutive sampling technique was used to enlist 77 participants attending outpatient physiotherapy clinics in tertiary hospitals in Oyo, Osun, Ondo, Lagos and Ekiti states in south-western Nigeria. ICIQ-CLUTS questionnaire, Wexner/Cleaveland Clinic Florida Incontinence Score, Gross Motor Function Classification System (GMFCS) were administered to the participants through their primary caregivers. Descriptive statistics was used to summarize participants' socio-demographic data. Inferential statistics of chi-

square was used to determine the association between selected socio-demographic characteristics and each of UI, FI and GMFCS among participants. Spearman correlation was used to test the relationship between selected socio-demographic characteristics and each of UI, FI and GMFCS among participants. Data was analyzed using SPSS version 21.0 at 0.05 alpha level. **Results:** Among the participants, 51.9% were females and 48.1% were males, the mean age was 2.08 ± 0.82. Prevalence of UI amongst children with CP showed majority (79.2%) experiencing moderate symptoms, (19.5%) severe symptoms and (1.3%) experienced extremely severe symptoms. Prevalence of FI showed moderate symptoms in (62.3%), mild symptoms in (31.2%) and severe symptoms in (5.2%). However, no significant relationship or association was found among socio-demographic variables and (UI, FI, GMFCS). **Conclusion:** This study shows a 100% prevalence of UI and 98.7% of FI among children with Cerebral Palsy, underscoring the urgent need for comprehensive care and management strategies. The associated physical, psychological, and social implications for both the child and family cannot be overemphasized.

Keywords: Urinary incontinence, Faecal incontinence, Cerebral palsy

INTRODUCTION

Cerebral palsy (CP) is a common motor disorder, associated with lifelong disability [(1)]. Traditionally regarded as a childhood condition, it is better recognized as a lifespan disorder, with adults with CP outnumbering children 3:1 in some countries [(2)]. The underlying pathophysiology is an injury to the developing brain in the prenatal through neonatal period [(3)]. It is prevalent in 3 to 4 per 1000 and most common motor disability in childhood among children in the United States [(4)]. It is also characterized by heterogeneity in risk factors, underlying specific etiology, clinical features, severity of functional limitations, associated and secondary conditions, treatment options, and evolution of the condition over the lifespan of the individual [(4).] Faecal incontinence (FI) is defined as the voluntary or involuntary defecation in an inappropriate place during children's developmental age of 4 years or above [(5)]. In children, the rates of FI vary from 1.6% to 4.4% [(6)]. FI in children is classified into two major groups: functional and organic [(7)]. Often, urinary incontinence in the CP population is widely attributed to diminished cognition or simply an inability to achieve continence, rather than a potential dysfunction of the urinary tract. As a result, urinary tract care is often reactionary instead of proactive. 70-80% of

children with cerebral palsy have issues with incontinence while 85% have bladder over activity due to neurological impairment.

Cerebral palsy incontinence may also be caused by damage to the nervous system that affects the detrusor muscle in a condition called neurogenic bladder. Neurogenic detrusor over activity and reduced bladder capacity are the most common urodynamic findings in children with cerebral palsy [8]. Neurogenic bladder occurs when there is lack of proper bladder control due to problems with the brain, spinal cord, or other nerves [5]. Renal and urinary tract dysfunction is multifactorial in the population of children with CP [9]. When looking at the CP population, there is a high incidence of bladder and bowel dysfunction (BBD) with continence achieved later, compared to the general population [10]. BBD encompasses almost all lower urinary symptoms (LUTS) characterized by bowel complaints and represents up to 40% of pediatric urology visits [11]. In children with typical development, the incidence of daytime enuresis by 12 years old was between 2– 19.2% [12]. Additionally, night time enuresis is between 3–20% by ten years old [12]. The incidence of constipation in children is 22.6%, and encopresis is 4.4% [13]. In children with CP, the incidence of daytime enuresis ranges between 8.8–40.8% and nighttime enuresis between 6.5–25.5% [14]. The incidence of faecal incontinence was reported by [14] [15] to be 39.2–54%. Also, Marciniak and others in 2015 reported constipation in 26–74% of the study population [16]. However, none of these studies reviewed above established any relationship among UI and FI in children with CP, hence, the reason for this study.

METHODS

Participants of this study were Consenting parents of children with cerebral palsy aged between 2 and 12 years living in south west Nigeria who attended Physiotherapy outpatient clinics at Oni and sons children memorial hospital Ibadan, Federal medical Centre Abeokuta, Bowen university teaching hospital Ogbomosho, and UNIOSUN Teaching Hospital. However, children with other comorbid medical conditions were excluded from this cross sectional survey. Consecutive sampling technique was used to select participants while Slovin's formula was employed to determine sample size n = 77 [17]. Ethical approval was obtained from the Bowen University Teaching Hospital Health Research and Ethics Committee (BUTH-HREC) before commencing the study. Informed consent was sought and obtained from participants prior to participating in the study. The questionnaires below

were administered by researcher and collected immediately after completion. International Consultation on Incontinence Questionnaire-Paediatric Lower Urinary Tract Symptoms (ICIQ-CLUTS): is a self-administered questionnaire with 12-item screening questionnaire for paediatric Lower Urinary Tract Symptoms (LUTS). It consists of 9 specific items investigating LUTS and 1 asks about weekly defecation frequency. The Wexner/Cleveland Clinic Florida Incontinence Score (CCFIS): It consists of an item multiplied by frequency matrix designed to assess FI severity. The CCFIS is composed of five items (solid, liquid, gas, wears pad, and lifestyle alteration) and five frequencies (never = 0, rarely = 1, sometimes = 2, usually = 3, always = 4), for a total score ranging from 0 for full continence to 20 for complete incontinence.

The Gross Motor Function Classification System (GMFCS) is a way to categorize how well someone with cerebral palsy moves. It focuses on gross motor skills like sitting and walking, and classifies them into five levels in ascending manner; walks without limitation, can walk with limitation, walks using a hand-held mobility device, Self-mobility with limitations; may use powered mobility, and transported in Manual Wheelchair. Descriptive statistics of mean, standard deviation, frequency, percentages, and tables were used to summarise the socio-demographic variables. Inferential statistics of Chi-square test was used to test the association between the selected socio-demographic characteristics and (urinary incontinence, faecal incontinence and gross motor function) among the children. Inferential statistics of spearman correlation was used to test the relationship between age and urinary incontinence, age and faecal incontinence, between Gross motor function and urinary incontinence, Gross motor function and faecal incontinence. All statistical analysis was conducted using Statistical Package for Social Sciences (SPSS) version 21.0 software (SPSS Inc., Chicago, IL) at 0.05 Alpha level.

RESULTS

A total of 77 questionnaires were administered and duly completed by primary caregivers of children with cerebral palsy. Based on obtained data, males were 37 (48.1%) while females 40 (51.9%). The mean age of the participants was 2.08 ± 0.82, with significant proportion 22(28.6%) of children being above 10 years of age. The distribution of urinary incontinence among children with cerebral palsy reveals varying degrees of severity with majority 61(79.2%) of the children experience moderate urinary incontinence, while

15(19.5%) showed severe symptoms. Extremely severe symptoms were less common, reported in only one child (1.3%) Table 1. Based on age group, no symptoms or mild symptoms were reported across children in all age groups, highlighting a significant prevalence of moderate to severe urinary incontinence across all ages as shown in Table 2. In terms of gender, 28(75.7%) of males and 33(79.2%) of females reported moderate symptoms while extremely severe symptoms were rare, with only 1(2.7%) of males and 1(1.3%) of females experiencing this level of UI (Table 2). Most children experienced some level of fecal incontinence, with majority falling into the moderate 48(62.3%) or mild 24 (31.2%) categories. A small percentage experienced severe symptoms 4(5.2%), while one child (1.3%) was reported to have normal fecal incontinence Table 1. The prevalence of fecal incontinence shows a pattern across different age groups. In the youngest group (2-5) years most children 16(69.6%) experienced moderate symptoms, children aged 6-9 years 14(56.0%) also had moderate symptoms, similarly, 18(62.1%) among those older than 10 years also reported moderate symptoms.

Overall, moderate fecal incontinence was the most common across all age groups, with severe symptoms being less frequent. Among males, Mild symptoms were present in 13(35.1%) of males, moderate symptoms in 20(54.1%), and severe symptoms in 4(10.8%). Similarly, mild symptoms were observed in 11(27.5%) of females, while the majority, 28(70.0%), experienced moderate symptoms. Generally, moderate fecal incontinence is most common for both genders (Table 3). In terms of gross motor function, most participants 37(48%) are self-mobile with limitations or may use powered mobility device. However, no participant walks without limitation or needs manual wheel chair for transportation (Table 4). There were no significant associations between respondents' age and UI ($p=0.095$), gender and UI ($p=0.506$), age and FI ($p=0.769$), gender and FI ($p=0.094$), age and Gross motor function ($p=0.633$), gender and Gross motor function ($p=0.939$), UI and FI ($p=0.495$), gross motor function and UI ($p=0.692$), between gross motor function and FI ($p=0.747$). Furthermore, no significant relationship was found between respondents' age and UI ($r=-0.088$, $p=0.448$), age and FI ($r=-0.188$, $p=0.102$), between gross motor function and UI ($r=-0.033$, $p=0.776$), between gross motor function and FI ($r=0.135$, $p=0.243$) (Table 5).

Table 1: Prevalence of Urinary and Faecal Incontinence

		Frequency	Percentage
Urinary incontinence	No symptoms	0	0
	Mild	0	0
	Moderate	61	79.2
	Severe	15	19.5
	Extremely severe	1	1.3
Fecal incontinence	Normal	1	1.3
	Mild	24	31.2
	Moderate	48	62.3
	Severe	4	5.2

Table 2: Prevalence of UI by Age and Gender

Age Group	No Symptoms (%)	Mild (%)	Moderate (%)	Severe (%)	Extremely Severe (%)
2-5	0(0)	0(0)	21(91.3)	1(4.4)	1(4.3)
6-9	0(0)	0(0)	17(68)	8(32)	0(0)
>10	0(0)	0(0)	23(79.3)	6(20.7)	0(0)
Gender					
Male	0(0)	0(0)	28(75.7)	8(21.6)	1(2.7)
Female	0(0)	0(0)	33(79.2)	15(19.5)	1(1.3)

Table 3: Prevalence of FI by Age and Gender

Gender	Normal (%)	Mild (%)	Moderate (%)	Severe (%)
Male	0(0)	13(35.1)	20(54.1)	4(10.8)
Female	1(2.5)	11(27.5)	28(70.0)	0(0)
Age Group				
2-5	0(0)	6(26.1)	16(69.6)	1(4.3)
6-9	1(4.0)	8(32.0)	14(56.0)	2(8.0)
>10	0(0)	10(34.5)	18(62.1)	1(3.4)

Table 4: Gross Motor Function of the participants

Item			Frequency	Percentage
Gross motor function	Level 1	Walks without Limitations	0	0
	Level 2	Walks with Limitations	4	5.2
	Level 3	Walks using a Hand-Held Mobility Device	36	46.8
	Level 4	Self-Mobility with Limitations, May Use Powered Mobility	37	48
	Level 5	Transported in manual Wheelchair	0	0

Table 5: Association between UI, FI, Sociodemographic variables and GMFCS

	Variable	X^2	Df	P-value
UI	Age	7.91	4	0.095
	Gender	1.36	2	0.506
FI	Age	3.31	6	0.769
	Gender	6.39	3	0.094
Gross motor Function	Age	5.48	4	0.633
	Gender	0.13	2	0.939
Gross motor Function	UI	2.24	5	0.692
Gross motor Function	FI	3.48	6	0.747

DISCUSSION

This study was designed to investigate the association between Urinary Incontinence (UI) and Faecal incontinence (FI) among children with Cerebral Palsy (CP) in South-West Nigeria. A total of 77 Children with CP aged between 2 and12 were consecutively recruited into via their primary caregivers. Findings from this study showed that the higher proportion of the participants were female. This is contrary to the finding from a similar study conducted by [18]. The difference was purely coincidental as gender representation was not considered in sampling the participants. The participants recruited are within the

age range of 2 to 12, with the mean age being 2.08 ± 0.82 years which is in contrast to the study conducted by Ayanniyi and Abdulsalam which reported participants' age ranges from 18months to 12years [18]. This study shows that the prevalence of UI among children with cerebral palsy varies in degrees of severity where majority 61(79.2%) of the children with cerebral palsy experienced moderate UI, while 15(19.5%) showed severe symptoms.

In a study conducted among a similar population in Turkey found that children with CP experienced higher rates of enuresis compared to healthy controls, among which enuresis was present in 11 of 34 children aged ≥5 years [19]. This supports the findings from this study implying that urinary incontinence is a common problem in this population. Findings from this study shows that most children experienced some level of FI, with a majority falling into the moderate 48(62.3%) or mild 24(31.2%) categories. As seen in this study, male children with CP have more severe FI symptoms than females. This finding is consistent with the report by [10] which states that boys with CP were more likely to experience fecal incontinence than girls. Findings from this study indicate no significant association between gender and the occurrence and severity of UI, in addition to its relative consistency across different age groups. This suggests that the severity of incontinence does not necessarily improve or worsen as children with cerebral palsy grow older. These findings are consistent with a report by [10] which showed that among the children aged ≥5 years; UI was present in 11 of 34 children with cerebral palsy and he noted that children with CP often gain bladder control at an older age than their peers. While this study did not directly compare age groups, it provides additional context on the prevalence of incontinence in older children with CP. Additionally, a study done in 2017 indicates that boys may be more prone to certain types of urinary dysfunction compared to girls [20]. This aspect remains an area for further exploration, as understanding gender differences could inform more tailored management strategies. Findings from this study showed that the socio-demographic factors (age and gender) do not play a critical role in the prevalence of fecal incontinence.

There were no significant association between respondents' age and FI. Also, there was no significant association between respondents' gender and FI. These findings are in contrast with a study done by [15] who found that the median age for daytime bowel and bladder continence was 5.4 years, significantly later than the typical age of 2.4 years in healthy controls. According to the authors, by 13.8 years of age, only 59.4% of children with bilateral cerebral palsy were continent during the day, compared to nearly all controls. This

suggests that as children with cerebral palsy age, their ability to achieve continence may be delayed. Here, there is a linear relationship between age and urinary incontinence is that as age increases, the ability to achieve continence increases also. In support of the findings of this study, a study done by [15] titled "Bladder and bowel continence in bilateral cerebral palsy: A population study" found that gender did not show a significant impact on bladder and bowel control attainment. This suggests that boys and girls with CP may experience similar challenges regarding incontinence, indicating that gender may not be a significant factor in this context. This study showed that gender and age does not have a significant effect on the Gross Motor Function scores of the respondents. This implies that boys and girls with cerebral palsy have similar levels of gross motor function, and neither gender nor age plays a significant role in determining these abilities. Contrary to this, a study by a study by Rosenbaum and colleagues indicated that as children with CP age, their motor function typically improves, particularly with appropriate interventions [21]. Also, contrary to the findings of this study a study done by [22] have reported that boys may exhibit different patterns of motor development compared to girls, potentially due to anatomical and physiological differences. Findings from this study suggest that, among children with CP, the presence of one type of incontinence does not necessarily predict or correlate with the presence of the other. This result is in contrasts with the study done by [10] found that that urinary and fecal incontinence are prevalent in children with cerebral palsy, with estimates suggesting that 70-80% of these children experience some form of both UI and FI concurrently.

Findings from this study shows that, the level of gross motor function (GMFCS) does not appear to influence the likelihood of experiencing urinary and fecal incontinence This implies that regardless of the level of motor function impairment, children with cerebral palsy may experience similar rates of incontinence. In contrast to this, a study by [10] showed that children with GMFCS levels III-V had higher rates of enuresis and encopresis compared to those with levels I-II which suggests that as motor function increases, the likelihood of incontinence increases. Findings from this study revealed no significant relationship between age and urinary incontinence, as well as no significant relationship between age and fecal incontinence it also suggests that the severity or occurrence of urinary and fecal incontinence does not change meaningfully with age among the children with CP. Similarly, it is also noted that children with CP may take longer to develop these skills due to motor impairments and neurological factors [23]. Findings from this study

showed that there was no significant relationship between gross motor function and urinary incontinence; also between gross motor function and faecal incontinence this indicates that gross motor function does not significantly influence the occurrence of urinary incontinence and fecal incontinence which is consistent with a study done by [10] found that children with varying degrees of motor impairment experienced urinary incontinence, but did not establish a direct correlation between the level of motor function and the severity of incontinence.

CONCLUSION

The findings of this research underscore the importance of early intervention and interdisciplinary care involving healthcare professionals, caregivers, and educators in developing tailored management plans, including bowel and bladder programs, as well as providing adequate support and education to parents are crucial for improving the quality of life for these children. Furthermore, identifying specific risk factors, exploring the efficacy of different treatment modalities, and assessing the long-term outcomes of interventions are essential steps towards optimizing care. Investing in research, education, and support services is recommended to alleviate the burden of urinary and faecal incontinence on children with cerebral which will enhance their overall well-being.

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