



Original Article

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Interrelationship Between Musculoskeletal Pain, Anxiety, and Depression Among Mothers of Children with Cerebral Palsy Attending Two Tertiary Hospitals in Ibadan, Nigeria: A Cross-Sectional Study.

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Abstract

Introduction: Cerebral palsy (CP) is the most prevalent motor disability in children and often requires long-term caregiving. Mothers, who are the primary caregivers, are particularly vulnerable to physical and psychological challenges. Musculoskeletal pain (MSP), anxiety, and depression are common but understudied coexisting conditions in this population, especially in low-resource settings such as Nigeria. This study examined the prevalence and interrelationship of MSP, anxiety, and depression among mothers of children with CP in southwestern Nigeria. **Methods:** A descriptive cross-sectional study was conducted among 114 mothers recruited from physiotherapy outpatient clinics at the University College Hospital and Oni Memorial Children's Hospital, Ibadan. Data were collected using a socio-demographic questionnaire, the Nordic Musculoskeletal Questionnaire, Generalized Anxiety Disorder-7, and Patient Health Questionnaire-9. Descriptive statistics summarized characteristics, while Chi-square tests and Spearman's rank correlation assessed associations at $p < 0.05$. **Results:** Approximately half of the participants reported no-to-mild MSP (50.9%), while 19.3% and 29.8% experienced moderate and severe pain, respectively. Anxiety symptoms were present in 44.7% of mothers, and most reported mild depressive symptoms (mean PHQ-9 score = 5.20, SD = 4.86). MSP showed a significant positive correlation with anxiety ($r = 0.348$, $p < 0.001$), while anxiety was significantly associated with depression ($r = 0.316$, $p = 0.001$). No significant associations were found between MSP and depression or caregiving duration. **Conclusion:** Mothers of children with CP experience considerable musculoskeletal and psychological burden. The observed relationships between MSP, anxiety, and depression highlight the need for integrated physiotherapeutic and psychosocial interventions to improve caregiver well-being and quality of care.

Keywords: cerebral palsy; caregiver burden; musculoskeletal pain; anxiety; depression

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Introduction

Neurological disorders affecting children often result in long-term physical, cognitive, and emotional challenges. Among these conditions, cerebral palsy (CP) remains the most common motor disability in childhood, with a global prevalence of approximately 2–3 per 1,000 live births [Christensen et al., 2014](#); [Oskoui et al., 2013](#). Other neurological conditions such as Erb's palsy, injection palsy, and epilepsy also contribute to childhood disability, particularly in low-resource settings where ob-

stetric complications and unsafe injection practices remain concerns [Lagerkvist et al., 2010](#).

Beyond the direct impact on affected children, neurological disorders impose substantial physical, emotional, and financial burdens on families. In many contexts, mothers serve as the primary caregivers and are responsible for daily handling activities such as lifting, carrying, positioning, and assisting with mobility. These repetitive physical tasks increase the risk of musculoskeletal pain (MSP), while the continuous emotional demands of caregiving may predispose mothers to anxiety and de-

pression Pousada et al., 2013; Yamaoka et al., 2016.

Evidence suggests that the physical and psychological health of caregivers is closely interconnected. Chronic musculoskeletal pain can intensify emotional distress, while anxiety and depression may heighten pain perception, creating a reciprocal cycle that negatively affects overall well-being Pousada et al., 2013. Studies from Saudi Arabia and Egypt have reported high levels of psychological distress among mothers of children with neurological disorders, with depression ranging from 39.5% to 85.1% and anxiety from 41.0% to 85.8% Alsaad et al., 2023. Similarly, musculoskeletal pain among caregivers has been widely documented, particularly affecting the lower back, shoulders, and neck due to repetitive child-handling activities Sharan & Rajkumar, 2018; Terzi & Tan, 2016.

In Nigeria, studies have reported notable levels of psychological distress among caregivers of children with neurological disorders, including anxiety and depression Babalola et al., 2014. However, limited research has examined the combined occurrence and interrelationship between musculoskeletal pain, anxiety, and depression among mothers of children with cerebral palsy, particularly within the Nigerian healthcare context. Contextual factors such as cultural caregiving expectations, socioeconomic constraints, and limited access to support services may further influence caregiver well-being Olagunju et al., 2017.

Therefore, this study investigated the prevalence and interrelationship of musculoskeletal pain, anxiety, and depression among mothers of children with cerebral palsy attending tertiary healthcare facilities in southwestern Nigeria.

Methods

Study Design and Setting

This cross-sectional descriptive study investigated the prevalence and interrelationship of musculoskeletal pain (MSP), anxiety, and depression among mothers of children with cerebral palsy. Participants were recruited purposively from the physiotherapy outpatient clinics of the University College Hospital and Oni Memorial Children's Hospital in Ibadan, southwestern Nigeria.

Study Population and Sampling

Eligible participants were mothers aged 18 years and above who had served as primary caregivers for at least six months. Mothers with previously diagnosed chronic musculoskeletal disorders or psychiatric conditions prior to assuming caregiving responsibilities were excluded to reduce potential confounding.

The sample size was determined from a population of 138 eligible mothers attending both clinics, resulting in a minimum sample of 103 participants. After accounting for possible non-response, a total of 114 mothers were recruited.

Data Collection Instruments

Data were collected using a socio-demographic questionnaire, the Nordic Musculoskeletal Questionnaire (NMQ) to assess musculoskeletal pain, the Generalized Anxiety Disorder-7 (GAD-7) scale for anxiety, and the Patient Health Questionnaire-9 (PHQ-9) for depression. These instruments are standardized tools with established validity and reliability.

Data Analysis

Data were analyzed using *IBM SPSS Statistics* version 27. Descriptive statistics were used to summarize participant characteristics and prevalence rates. Chi-square tests were employed to assess associations between categorical variables, while Spearman's rank correlation was used to examine relationships among MSP, anxiety, depression, and caregiving duration. Statistical significance was set at $p < 0.05$.

Results

A total of 114 completed questionnaires were analyzed, representing a response rate of 95%. The majority of respondents were aged 20–29 years (48.2%), most were married (93%), and over half had attained tertiary education (54.4%). Approximately 70.2% were self-employed. Regarding the clinical profile of their children, most were born full-term (82.5%), and bilateral spastic cerebral palsy was the predominant subtype (72.8%). Nearly half of the children had moderate gross motor function limitations, and 76.3% required assistance during feeding.

Table 1: Sociodemographic Characteristics of Participants (n = 114)

Characteristic	Frequency (n)	Percentage (%)
Mother's Age (years)		
20–29	55	48.2
30–39	47	41.2
40–49	8	7.0
≥50	4	3.5
Age of Child (months)		
6–12	40	35.1
13–24	40	35.1
25–32	1	0.9
>32	33	28.9
Educational Level		
No formal education	5	4.4
Primary	13	11.4
Secondary	34	29.8
Tertiary	62	54.4
Marital Status		
Married	106	93.0
Single/Widowed/Others	8	7.0
Employment Status		
Unemployed	9	7.9
Self-employed	80	70.2
Employed	25	22.0
Severity of Cerebral Palsy		
Mild	42	36.8
Moderate	53	46.5
Severe	19	16.7
Type of Cerebral Palsy		
Spastic	92	80.7
Ataxic	3	2.6
Unclassified	19	16.7
Feeding Ability of Child		
Feeds self	27	23.7
Requires assistance	87	76.3
Cognitive Impairment		
Yes	27	23.7
No	87	76.3

Assessment of anxiety using the Generalized Anxiety Disorder-7 indicated that most mothers experienced minimal anxiety (55.3%), while 37.7% and 7.0% reported mild and moderate anxiety, respectively. Similarly, depressive symptoms assessed using the Patient Health Questionnaire-9 were generally mild, with a mean score of 5.20 (SD = 4.86). Musculoskeletal pain was commonly reported among the participants: 50.9% reported no-to-mild pain, 19.3% reported moderate pain, and 29.8% experienced severe pain.

Analysis of relationships among study variables showed a weak but statistically significant positive correlation between the child's gross motor dysfunction and maternal anxiety ($r = 0.193$, $p = 0.040$). However, no significant relationship was observed between motor dysfunction and maternal depression.

Musculoskeletal pain demonstrated a significant association with maternal anxiety ($\chi^2 = 17.938$, $p = 0.001$; $r = 0.348$, $p < 0.001$). In contrast, no significant relationship was found between musculoskeletal pain and depression. A significant positive relationship was identified between anxiety and depression ($\chi^2 = 23.815$, $p < 0.001$; $r = 0.316$, $p = 0.001$), indicating co-occurrence of emotional distress among caregivers. Finally, caregiving duration was not significantly associated with musculoskeletal pain, anxiety, or depression.

Discussion

The findings of this study demonstrate that mothers of children with cerebral palsy experience considerable physical and psychological demands associated with caregiving. The socio-demographic characteristics revealed that caregiving responsibilities were predominantly undertaken by young and economically active mothers, most of whom were self-employed. Similar observations have been reported in previous studies indicating that younger caregivers may experience greater physical and emotional strain due to limited caregiving experience and financial pressures [Adejoh et al., 2024](#); [Yamaoka et al., 2016](#). In the Nigerian context, where formal caregiver support systems re-

Table 2: Distribution of Anxiety Severity among Participants Based on GAD-7 Scores ($n = 114$)

Anxiety Category	GAD-7 Score Range	Frequency (n)	Percentage (%)
Minimal Anxiety	0–4	63	55.3
Mild Anxiety	5–9	43	37.7
Moderate Anxiety	10–14	8	7.0
Severe Anxiety	≥ 15	0	0.0

Note: GAD-7 = Generalized Anxiety Disorder-7 scale. Scores range from 0 to 21, with higher scores indicating greater anxiety severity.

Table 3: Distribution of Depression Severity among Participants Based on PHQ-9 Scores ($n = 114$)

Depression Category	PHQ-9 Score Range	Frequency (n)	Percentage (%)
Minimal Depression	0–4	60	52.6
Mild Depression	5–9	38	33.3
Moderate Depression	10–14	12	10.5
Moderately Severe Depression	15–19	4	3.5
Severe Depression	20–27	0	0.0

Note: PHQ-9 = Patient Health Questionnaire-9. Scores range from 0 to 27, with higher scores indicating greater severity of depressive symptoms.

main limited, these challenges may be further intensified.

Table 4: Prevalence of Musculoskeletal Pain among Mothers of Children with Cerebral Palsy ($n = 114$)

Pain Severity	Frequency (n)	Percentage (%)
None–Mild (0–2)	58	50.9
Moderate (3–5)	22	19.3
Severe (>5)	34	29.8

Musculoskeletal pain emerged as a common complaint among participants, reflecting the physical strain associated with repetitive child-handling activities such as lifting, carrying, and repositioning children with cerebral palsy. These findings align with previous studies which identified caregiving-related physical tasks as a major contributor to chronic musculoskeletal discomfort among caregivers [Matsuda et al., 2020](#); [Terzi & Tan, 2016](#). Ergonomic training and caregiver-focused physiotherapy interventions have therefore been recommended as practical strategies for reducing physical strain and improving caregiver functionality.

Although most mothers reported minimal to

mild anxiety and depressive symptoms, the presence of psychological distress remains clinically relevant. Studies have shown that chronic caregiving responsibilities, financial strain, and social isolation contribute to elevated levels of anxiety and depression among caregivers of children with disabilities [Matsuda et al., 2020](#); [Priel et al., 2020](#). Support systems, including financial stability and social support networks, have been identified as protective factors that can significantly reduce psychological distress among caregivers [Mahani et al., 2023](#).

The study also demonstrated important inter-relationships among the examined variables. Musculoskeletal pain was significantly associated with anxiety, suggesting that persistent physical discomfort may contribute to heightened psychological stress among caregivers. Additionally, the significant relationship between anxiety and depression highlights the frequent coexistence of emotional distress among mothers caring for children with cerebral palsy, consistent with previous findings [Soliman et al., 2019](#); [Toulgui et al., 2016](#). However, the absence of a strong relationship between child motor severity and maternal depression suggests that psychological outcomes may be influenced more by broader socioeconomic and psy-

chosocial factors than by the child's functional limitations alone. These findings emphasize the importance of multidisciplinary caregiver support programs that address both physical and psychological aspects of caregiver well-being.

Limitations

This study has several limitations. The cross-sectional design prevents establishing causal relationships between musculoskeletal pain, anxiety, and depression. Data were obtained through self-reported questionnaires, which may be subject to recall bias and social desirability influences. The sample was drawn from tertiary healthcare facilities, limiting generalizability to wider populations. Potential confounding factors such as social support, comorbidities, and access to rehabilitation services were not controlled. In addition, the absence of a comparison group of mothers with typically developing children restricts the ability to attribute the observed outcomes solely to caregiving for children with cerebral palsy.

Conclusion

The study revealed a high prevalence of musculoskeletal pain, anxiety, and depression among mothers of children with cerebral palsy, highlighting the significant physical and psychological burden of caregiving. Musculoskeletal pain showed a significant association with anxiety, while depression appeared to be influenced more by broader psychosocial and socioeconomic factors. These findings emphasize the need for multidisciplinary, family-centered interventions that integrate physiotherapy, ergonomic education, mental health support, and community-based assistance to improve maternal well-being and ultimately enhance rehabilitation outcomes for children with cerebral palsy.

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for-profit sectors.

Conflict of Interest Statement

The authors declare no conflict of interest.

What is Known About This Topic

Caring for a child with cerebral palsy can take a serious toll on mothers' physical and emotional health. This study found that many mothers in southwestern Nigeria experience significant musculoskeletal pain, anxiety, and depression. Importantly, mothers with more severe pain were more likely to feel anxious, and anxiety was closely linked with depression. These results highlight the need for holistic care approaches that support not only children with cerebral palsy but also their caregivers. Integrating physical, ergonomic, and psychological support into rehabilitation services can help improve the well-being of mothers and the quality of care their children receive.

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Authors' Contributions

Margaret Bukola Fatudimu: Conceptualization, study design, data collection, data analysis, and manuscript drafting. Purity Alabi: Data collection, data analysis, and critical revision of the manuscript. Yusuff Tunde Gbonjubola: Study supervision, interpretation of results, and critical revision of the manuscript. All authors read and approved the final manuscript.

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