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Original Research Paper

Factors Associated with Caregiver Burden in Children With Cerebral Palsy in Developing Countries: A Systematic Review

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Abstract

Background: Cerebral palsy is a chronic condition requiring long-term care, leading to a high burden on caregivers, particularly in developing countries where access to cerebral palsy care remains inadequate. **Objective:** This study aims to identify factors influencing the burden on caregivers of children with cerebral palsy in developing countries. **Methods:** A systematic review following PRISMA was conducted. From inception to August 2024, 173 records were retrieved from PubMed and ScienceDirect. Studies were screened against predefined inclusion/exclusion criteria, and study and evidence quality were appraised. **Results:** A total of 10 articles were included. Depression, fatigue levels, and quality of life were identified as moderate-quality evidence for caregiver-related factors contributing to caregiver burden. GMFCS levels and spastic type were also identified as moderate-quality evidence for patient-related factors contributing to caregiver burden. Several factors with 'moderate' evidence quality include caregiver depression, fatigue levels, caregiver quality of life, GMFCS levels of cerebral palsy, and spastic type. **Conclusion:** Understanding these factors can guide the implementation of interventions to reduce caregiver burden, potentially improving caregivers' quality of life and positively impacting the care and therapy of patients with cerebral palsy.

Keywords: *caregiver burden; cerebral palsy; children; GMFCS; quality of life; developing countries*

Introduction

Cerebral palsy is characterized by movement and posture disorders resulting from non-progressive brain damage during brain development[1]. This condition is one of the leading causes of motor disability in children worldwide. The prevalence of cerebral palsy varies significantly between developed and developing countries. In developed countries, the prevalence is approximately 1.6 per 1,000 live births, while in developing countries, it reaches 3.4 per 1,000 live births[1]. This disparity is attributed to differences in health factors and limited recording systems in developing countries. Factors such as inadequate early detection, restricted access to healthcare services[2,3], and the inaccessibility of rehabilitation facilities exacerbate the condition of individuals with cerebral palsy in developing nations. As a lifelong condition, cerebral palsy requires continuous care, demanding physical, psychological, and economic resources.

The high prevalence of cerebral palsy in developing countries imposes a significant burden on caregivers, both physically, psychologically, and economically[4]. The limited availability of therapy facilities and early interventions exacerbates this burden. Insufficient healthcare services result in cerebral palsy patients failing to achieve optimal functional abilities, requiring

caregivers to provide extra attention[4,5]. A negative correlation exists between caregiver burden and patients' quality of life, indicating that more significant caregiver burden leads to lower patient quality of life[6]. Unfortunately, research on cerebral palsy predominantly focuses on patients, while the issues faced by caregivers under constant pressure are often overlooked. This lack of attention aggravates the negative cycle that hinders the success of therapy for cerebral palsy patients[7].

This research is essential because caregivers are key in caring for cerebral palsy patients. However, the burden they experience is often neglected[8]. This situation leads to inadequate service for patients and negatively impacts therapy outcomes. Developing countries face significant challenges regarding healthcare resources and access to therapy facilities, making caregivers central to the care system[9,10]. Addressing caregiver burdens directly will not only improve their quality of life but also the quality of care received by patients.

This study shares similarities with previous research focusing on caregiver burdens for children with cerebral palsy. It includes identifying factors influencing these burdens and understanding the relationship between cerebral palsy conditions and their impact on primary caregivers. Like the study by Yousaf et al.[11], this research focuses on caregiver burdens. However, this study employs a literature review approach to analyze relevant studies, while Yousaf et al[11]. conducted a cross-sectional design with quantitative measurements using the Caregiver Difficulties Scale (CDS). Similarly, this study aligns with Liu et al[4]. in investigating factors related to caregiver burden through a systematic approach. However, while Liu et al.[4] used a systematic review method with a global perspective, this study focuses on developing countries. Furthermore, it shares commonalities with Dlamini et al.'s research[12], which takes a holistic approach to caregivers' experiences. However, Dlamini et al.[12] conducted a meta-synthesis on qualitative caregiver experiences using four electronic databases and a thematic approach. At the same time, this study highlights specific factors influencing caregiver burdens through quantitative and qualitative analyses of various articles without employing a meta-synthesis approach.

This study aims to identify factors influencing the burden of caregivers for cerebral palsy patients in developing countries through a comprehensive literature review. Based on the literature gap identified, this study seeks to answer the following research question: What factors are associated with caregiver burden among caregivers of children with cerebral palsy in developing countries?. This research offers significant contributions by highlighting specific factors affecting caregivers of children with cerebral palsy in developing countries, which face challenges such as limited access to healthcare services and social support. Using a literature-based approach with a PRISMA flow diagram, this study provides a comprehensive overview of the unique conditions in developing countries, serving as a guide for policymakers and healthcare providers in designing effective interventions. Additionally, this study contributes academically by addressing the research gap that has predominantly focused on patients while laying the groundwork for developing more appropriate support programs for caregivers.

Materials and Methods

Study Design

This study employed a systematic literature review (SLR) design following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. The

literature search strategy was conducted using two peer-reviewed databases, PubMed and ScienceDirect, by combining synonyms, MeSH terms, and Boolean operators to broaden the search scope. The literature search was carried out up to August 16, 2024.

Sample

The studies included focused on cerebral palsy patients aged 0–18 years, with the primary caregiver defined as the individual providing the main care. The studies were limited to developing countries based on the Organisation for Economic Co-operation and Development (OECD) classification.

Data Collection Technique

The search query in PubMed was ((((caregiver*) OR (parent*)) OR (mother*)) AND (((burden) OR ("caregiver burden")) OR ("caregiver burden"[MeSH Terms]))) AND (("cerebral palsy"[MeSH Terms]) AND (child[MeSH Terms])). Meanwhile, in ScienceDirect, the query used was ("Caregiver burden" OR "Caregiver stress") AND ("Children with cerebral palsy" OR "Pediatric cerebral palsy"), filtered for English-language research articles. The article selection process was illustrated in a PRISMA flow diagram. Articles from the search results were examined for duplicates and then screened based on titles and abstracts. Articles meeting the inclusion criteria proceeded to a full-text eligibility assessment. Extracted data included authors, year of publication, country, study design, sample size, and caregiver burden measurement tools.

Data Analysis Technique

The quality of the studies was assessed using the *Criteria for Assessment of Methodological Quality of Observational Studies*, as referenced in the survey by Ge and Mordiffi[13]. This assessment included five criteria: population size, subject selection, study design, outcome assessment, and data analysis. Studies were categorized into high quality (if multivariate analysis was conducted and the quality score was >7), moderate quality (if multivariate analysis was conducted with a quality score <7 or if no multivariate analysis was conducted but the quality score was >5), and low quality (if no multivariate analysis was conducted and the quality score was <5). The evidence level for each factor was assessed using the *Criteria for Assessment of Quality Level of Studies and Best-Evidence Synthesis*[13]. To ensure transparency and consistency in the review process, data screening, extraction, and synthesis were managed using Covidence systematic review. This platform facilitated duplicate removal, study selection, and critical appraisal, thereby minimizing bias and human error in the review process.

Ethical Considerations

This study was conducted as a systematic literature review and did not involve direct interaction with human subjects or the collection of sensitive data. Therefore, ethical clearance was not required. Nevertheless, all procedures were performed in accordance with established ethical research principles. These principles include ensuring transparency in the selection and analysis of studies, avoiding plagiarism, properly attributing all sources, and objectively reporting findings to maintain the validity and integrity of the review process.

Results

The search identified 173 studies from two databases. After identifying and removing duplicates and screening titles, abstracts, and full texts, 10 studies were eligible for extraction (Figure 1).

Ten eligible studies conducted between 2015 and 2024 came from five developing countries (Table 1). Almost all studies were cross-sectional, with only one study utilizing a

mixed-methods design, combining quantitative and qualitative analyses.

These ten studies involved a total of 1,585 caregivers. Each study employed different measurement tools to assess caregiver burden, all of which had been validated and tested for validity and reliability. The most commonly used tool was the Zarit Burden Index (ZBI).

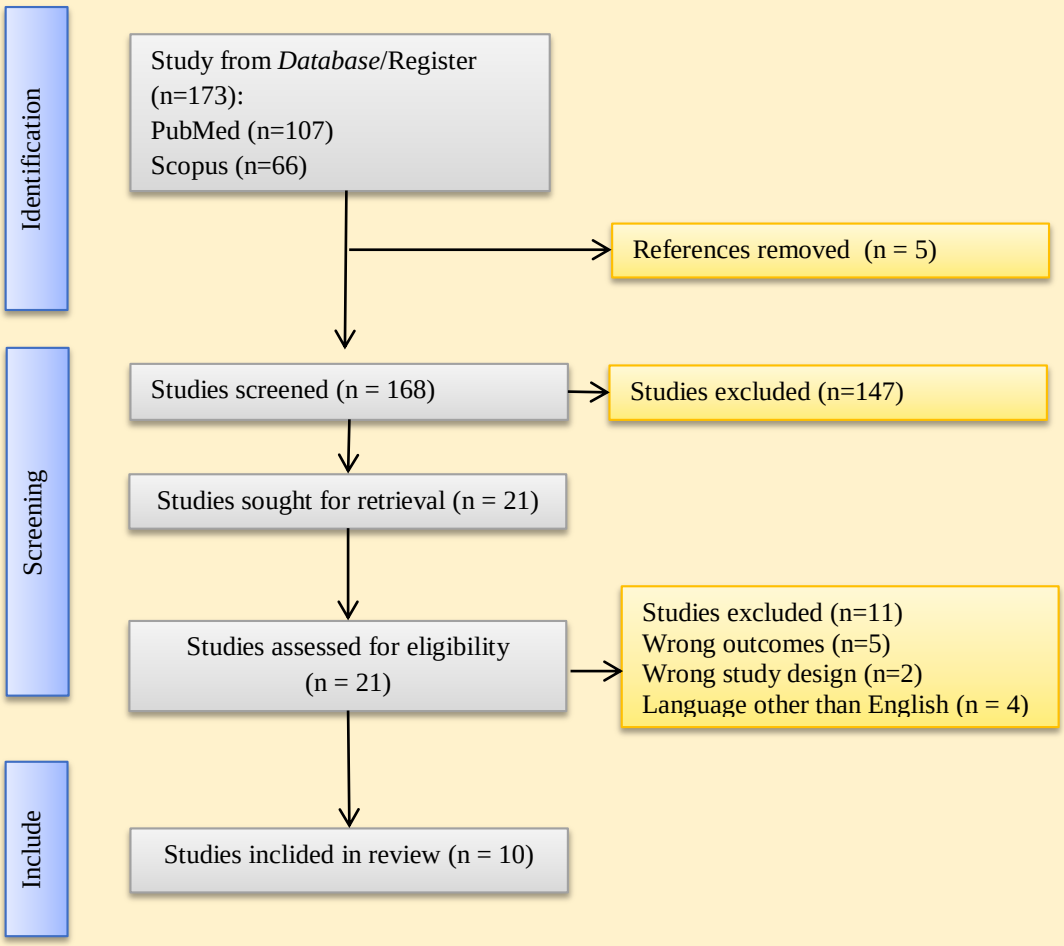

Figure 1. PRISMA Diagram Flow

Table 1. Data Extraction

Author (year)	Location	Study Design	Subject	Burden Measurements Tools
Albayrak *et al.* (2019) [14]	Turkey	Cross-sectional	168	ZCBS
Wijesinghe *et al.* (2015)[15]	Sri Lanka	Cross-sectional	375	CDS
Barutcu *et al.* (2021)[16]	Turkey	Cross-sectional	109	Zarit-CBS
Chiluba *et al.* (2017)[17]	Zambia	Mixed-method (Cross-sectional and Qualitative)	25	MCSI
Dertli *et al.* (2024)[18]	Turkey	Cross-sectional	122	ZBI
Mohammed *et al.* (2024)[5]	Egypt	Cross-sectional	138	ZBI-A
Farajzadeh *et al.* (2020)[19]	Iran	Cross-sectional	203	CDS
Yigman *et al.* (2020)[20]	Turkey	Cross-sectional	144	ZBI
Tuncay *et al.* (2024)[21]	Turkey	Cross-sectional	181	ZCBS
Ozkan, Y. (2018)[6]	Turkey	Cross-sectional	120	ZBI

Quality of Studies

Out of 10 studies, 3 were high-quality studies, 6 were of moderate quality, and 1 was of low quality (Table 2). The low-quality study was still included in this review, but its significance was considered lower than the high- and moderate-quality studies.

Table 2. Quality Assessment

Study	Population	Subject Selection	Study Design	Assessment Of Outcome	Data Analysis & Presentation	Total Score	Quality Study
Albayrak et al. (2019)[14]	1	1	1	1	2	6	Moderate
Barutcu et al. (2021)[16]	1	1	1	1	2	6	Moderate
Chiluba dan Moyo (2017)[17]	0	0	1	1	2	4	Low
Dertli, Aydin dan Gunay, (2024)[18]	1	1	1	1	2	6	Moderate
Farajzadeh, Maroufizadeh dan Amini (2020)[19]	1	1	1	1	3	7	High
Mohammed et al. (2024)[5]	1	1	1	1	2	6	Moderate
Ozkan (2018)[6]	1	1	1	1	2	6	Moderate
Tuncay dan Sarman, (2024)[21]	1	1	1	1	2	6	Moderate
Wijesinghe et al. (2015)[15]	1	1	1	1	3	7	High
Yığman, Aykın Yığman dan Ünlü Akyüz (2020)[20]	1	1	1	1	3	7	High

Factors Related to Caregiver Burden

The factors associated with caregiver burden can be categorized into caregiver factors and patient factors. The level of evidence for each group of factors can be seen in the tables of caregiver factors and patient factors (Table 3 and Table 4).

Table 3. Caregiver's Factors

Factor	Measurements Scale	Burden Measurement	Bivariate Analysis	Bivariate Value	Multivariate Analysis	Reference	Level Of Evidence
Education	Illiterate/literate/elementary education/secondary education/university/post-graduate	Zarit-CBS	Spearman	0.064	-	Barutcu *et al.* (2021)[16]	NS
	Illiterate/literate/elementary education/secondary education/university/post-graduate	ZCBS	Kruskal-Wallis	1.794	-	Tuncay dan Sarman, (2024)[21]	
	Illiterate/primary education/high school/bachelor or above	CDS	ULR	1.986	-	Wijesinghe *et al.* (2015)[15]	
	Postprimary or less/secondary or tertiary						
	University/grade 12/ grade 9/ grade 7/Never been school	MSCI	One-way Anova	0.761	-	Chiluba *et al.* (2017)[17]	
Caregiver's age	Years	Zarit-CBS	Pearson	0.197*	-	Barutcu *et al.* (2021)[16]	Conflicting
	Years	ZCBS	One-way Anova	3.876*	-	Tuncay dan Sarman, (2024)[21]	
	Years	ZCBS	Pearson	0.202*	-	Albayrak *et al.* (2019) [14]	

Factor	Measurements Scale	Burden Measurement	Bivariate Analysis	Bivariate Value	Multivariate Analysis	Reference	Level Of Evidence
Number of Children	Years	CDS	ULR	-0.016	-	Wijesinghe *et al.* (2015)[15]	Conflicting
	Years	MSCI	One-way Anova	0.043	-	Chiluba *et al.* (2017)[17]	
	1/2/3/≥4	Zarit-CBS	Spearman	0.091	-	Barutcu *et al.* (2021)[16]	
	1/2/3/≥4	ZCBS	Kruskal-Wallis	9.541*	-	Tuncay dan Sarman, (2024)[21]	
	1/2/≥3	CDS	ULR	2.188	-	Wijesinghe *et al.* (2015)[15]	
Number of Disability Children	1/≥2	Zarit-CBS	Independent t-test	4.45*	-	Barutcu *et al.* (2021)[16]	Limited
Number of Caregiver	1/2	Zarit-CBS	Spearman	0.119	-	Barutcu *et al.* (2021)[16]	NS
Income	<2000/2000-5000/>5000 Turkey Lira	Zarit-CBS	Spearman	0.230	-	Barutcu *et al.* (2021)[16]	Conflicting
	Low income	CDS	ULR	8.648*	3.694*	Wijesinghe *et al.* (2015)[15]	
Time Spent for Caregivin	Hours	ZCBS	Pearson	0.062	-	Albayrak *et al.* (2019)[14]	NS
Pain	NRS	ZCBS	Pearson	0.362*	-	Albayrak *et al.* (2019)[14]	Limited
Depression	BDI	ZCBS	Pearson	0.699*	-	Albayrak *et al.* (2019)[14]	Moderate
	BDI-II	CDS	Pearson	0.641*	-	Farajzadeh, Maroufizadeh dan Amini (2020)[19]	
Sleep quality	PSQI	ZCBS	Pearson	0.387*	-	Albayrak *et al.* (2019) [14]	Conflicting
	Regular/irregular	ZCBS	Independent T-test	0.618	-	Tuncay dan Sarman, (2024)[21]	
Fatigue level	CIS	ZCBS	Pearson	0.664*	-	Albayrak *et al.* (2019)[14]	Moderate
	FSS	CDS	Pearson	0.400*	-	[8]	
Quality of Life	SF-36 Physical component	ZCBS	Pearson	-0.207*	-	Albayrak *et al.* (2019)[14]	
	SF-36 Mental component	ZCBS	Pearson	-0.151	-	Albayrak *et al.* (2019)[14]	
	WHOQoL-BREF – Physical health	CDS	Pearson	-0.594*	-	Farajzadeh, Maroufizadeh dan Amini (2020)[19]	
	WHOQoL-BREF – Physiological	CDS	Pearson	-0.675*	-	Farajzadeh, Maroufizadeh dan Amini (2020)[19]	Moderate
	WHOQoL-BREF – Social relationships	CDS	Pearson	-0.683*	-	Farajzadeh, Maroufizadeh dan Amini (2020)[19]	
	WHOQoL-BREF – Environment	CDS	Pearson	-0.625*	-	Farajzadeh, Maroufizadeh dan Amini (2020)[19]	
Social support	MSPSS	ZBI	Pearson	0.034	0.005	Dertli *et al.* (2024)[18]	NS
Coping	COPE-R	ZBI	Pearson	0.099	0.132	Dertli *et al.* (2024)[18]	Conflicting

Factor	Measurements Scale	Burden Measurement	Bivariate Analysis	Bivariate Value	Multivariate Analysis	Reference	Level Of Evidence
	Individual coping (religion/recreation)	CDS	ULR	-1.438	-	Wijesinghe *et al.* (2015)[15]	
	Seeking social support	CDS	ULR	-8.993*	-	Wijesinghe *et al.* (2015)[15]	
	Spouse as primary support	CDS	ULR	-7.444*	-	Wijesinghe *et al.* (2015)[15]	
Life Satisfaction	SWLS	ZBI	Pearson	-0.540*	-	Dertli *et al.* (2024)[18]	Limited
Dietary Habits	Regular/eats little/eats a lot	ZCBS	Kruskal-Wallis	3.753	-	Tuncay dan Sarman, (2024)[21]	NS
Caregiver's Chronic Diseases	Available/none	ZCBS	Mann-Whitney U test	0.803	-	Tuncay dan Sarman, (2024)[21]	NS
When was your child diagnosed	First month/1-6 month/≥7 month	ZCBS	One-way Anova	3.873*	-	Tuncay dan Sarman, (2024)[21]	Limited
Spiritual orientation	SOS	ZCBS	Pearson	-0.493*	-	Tuncay dan Sarman, (2024)[21]	Limited
Geographical Area	Rural area	CDS	ULR	6.265*	5.351*	Wijesinghe *et al.* (2015)[15]	Limited
Emotional Expression	EES	ZBI	Pearson	0.53*	-	Yığman, Aykın Yığman dan Ünlü Akyüz (2020)[20]	Limited
Gender of Caregiver	Male/female	MSCI	One-way Anova	1.897	-	Chiluba *et al.* (2017)[17]	NS
Marital Status	Married/divorce	MSCI	One-way Anova	0.12	-	Chiluba *et al.* (2017)[17]	NS
Employment Status	Formally employed/unemployed/self-employed	MSCI	One-way Anova	0.211	-	Chiluba *et al.* (2017)[17]	NS
Medical Comorbid	None/≥1	CDS	ULR	12.750*	-0.438	Wijesinghe *et al.* (2015)[15]	Limited

BDI, Beck Depression Inventory; BDI-II, Beck Depression Inventory-II; CDS, Caregiver Difficulties Scale; CIS, Checklist individual strength; COPE-R, Coping Orientation to Problems Experienced Inventory; EES, Expressed Emotional Scale; FSS, Fatigue Severity Scale; MSCI, Modified Caregiver Strain Index; MSPSS, Multidimensional Scale of Perceived Social Support; NRS, Numeric Rating Scale; PSQI, Pittsburgh Sleep Quality Index; S, Spearman's Linear Correlation; SF-36, Short Form Surfey-36; SOS, spiritual orientation scale; SWLS, Satisfaction with Life Scale; ULR, Univariate Linear Regression; WHOQoL-BREF, World Health Organization Quality of Life Brief Version; Zarit-CBS, Zarit Cornell-Brown Scale; ZBI, Zarit Burden Index; ZCBS, Zarit Caregiver Burden Scale; *, signifikan

Table 4. Patient's Factors

Factor	Measurement Scale	Burden Measurement Tool	Bivariate Analysis	Bivariate Value	Multivariate Analysis	Reference	Level Of Evidence
Gender	Male	Zarit-CBS	Spearman	0.441	-	Barutcu *et al.* (2021)[16]	Conflicting
	Female	CDS	ULR	3.599*	3.500*	Wijesinghe *et al.* (2015)[15]	
Patient's age	1-5/6-12/>12 years	Zarit-CBS	Spearman	0.106	-	Barutcu *et al.* (2021)[16]	
	Years	ZCBS	Pearson	0.184	-	Albayrak *et al.* (2019)[14]	NS
	Years	ZCBS	One-way Anova	0.729	-	Tuncay dan Sarman, (2024)[21]	
	Years	CDS	ULR	0.384	-	Wijesinghe *et al.* (2015)[15]	
BMI	kg/m2	ZCBS	Pearson	0.195	-	Albayrak *et al.* (2019)[14]	NS

Factor	Measurement Scale	Burden Measurement Tool	Bivariate Analysis	Bivariate Value	Multivariate Analysis	Reference	Level Of Evidence
	ZCBS	Kruskal-Wallis	37.994*	-	Tuncay dan Sarman, (2024)[21]		
Level 1-5	ZCBS	Pearson	0.424*	-	Tuncay dan Sarman, (2024)[21]		
Level 1-5					Yığman, Aykın		Moderate
Level 1-5	ZBI	Pearson	0.49*	2.05	Yığman dan Ünlü Akyüz (2020)[20]		
MACS	Level 1-5	ZBI	Pearson	0.50*	2.10	Yığman, Aykın Yığman dan Ünlü Akyüz (2020)[20]	Limited
CFCS	Level 1-5	ZBI	Pearson	0.44*	0.18	Yığman, Aykın Yığman dan Ünlü Akyüz (2020)[20]	Limited
Spastic type	Unilateral/ diplegic/ quadriplegic	ZBI	One-way Anova	nr*	-	Mohammed et al. (2024)[5]	
	Hemiplegia/ diplegia/ quadriplegia	ZBI	One-way Anova	nr*	-	Ozkan (2018)[6]	Moderate
	Spastic quadriplegia	CDS	ULR	10.620*	-	Wijesinghe *et al.* (2015)[15]	
Number of Functional Deficits	1-10	CDS	ULR	3.972*	2.649*	Wijesinghe *et al.* (2015)[15]	Limited
Child Quality of Life	PEDQL – Physical functioning	ZBI	Pearson	-0.546*	-	Ozkan (2018)[6]	
	PEDQL – emotional functioning	ZBI	Pearson	-0.595*	-	Ozkan (2018)[6]	
	PEDQL – Social functioning	ZBI	Pearson	-0.489*	-	Ozkan (2018)[6]	Limited
	PEDQL – School functioning	ZBI	Pearson	-0.464*	-	Ozkan (2018)[6]	
	PEDQL – Phychosocial health	ZBI	Pearson	-0.400*	-	Ozkan (2018)[6]	

CDS, Caregiver Difficulties Scale; CFCS, Communication Function Classification System; GMFCS, Gross Motor Function Classification System; MACS, Manual Ability Classification System; nr, nor reported; PEDQL, Pediatric Quality of Life; ULR, Univariate Linear Regression; Zarit-CBS, Zarit Cornell-Brown Scale; ZBI, Zarit Burden Index; ZCBS, Zarit Caregiver Burden Scale; *, significant

Discussion

Cerebral palsy is a chronic condition that requires lifelong care. The time-intensive care required for individuals with cerebral palsy often demands caregivers to dedicate most of their time solely to managing the needs of the patient. Caregivers frequently have to make significant adjustments to their daily lives, such as resigning from work, limiting participation in social activities, forgoing recreational activities, and experiencing a decline in quality of life[12]. In developing countries, caring for patients with cerebral palsy presents even greater challenges due to inadequate therapeutic facilities and support compared to developed nations[1]. This review identifies

factors associated with caregiver burden in developing countries.

Depression, fatigue levels, and caregiver quality of life have moderate evidence as factors linked to caregiver burden. A positive correlation between depression and caregiver burden was found in two articles included in this study[14,19]. These findings align with other research that has also identified a significant relationship between depression and caregiver burden[4,22,23]. Caregivers of individuals with cerebral palsy face mental health challenges, with 12.5% experiencing moderate depression and 19% experiencing severe depression.23 Caring for a chronic condition like cerebral palsy results in prolonged stress, a risk factor for caregiver depression[14,24]. The high mental and physical demands of caregiving, particularly over a long period, are major sources of adverse effects[25,26]. Depression in caregivers also impacts the condition of the patients they care for. For example, depression in caregivers of dementia patients has been linked to a decline in the cognitive status of the patients[27]. High levels of maternal depression have also been correlated with lower quality of life in children with cerebral palsy. Therefore, detecting and intervening in caregiver depression is essential, as it also influences the success of cerebral palsy therapy[28].

A positive correlation was also found between fatigue levels and caregiver burden[14,19]. This finding is consistent with previous research[5,14,24]. Caregivers of children with cerebral palsy report higher fatigue levels compared to caregivers of healthy children[9,19] . Several factors contribute to caregiver fatigue, including low physical activity levels, increased perceived social support needs, the use of maladaptive coping strategies like self-blame, and the significant time demands of medical appointments and therapies[14,19,24]. These challenges are exacerbated in developing countries, where access to therapy and assistive technology is often limited[24]. Increased caregiver fatigue can negatively affect the effectiveness of cerebral palsy treatment programs[14].

Caregiver quality of life is negatively correlated with caregiver burden[14,19]. This finding is consistent with previous research[4]. The quality of life among caregivers of children with cerebral palsy is significantly lower than that of control groups[14,29]. The substantial physical burden leads to a decline in the caregivers' physical health. Caregivers often engage in physically demanding activities such as assisting with mobility, lifting, bathing, dressing, and performing other routine tasks, which diminish their physical well-being[14]. The time caregivers dedicate to caring for individuals with cerebral palsy leaves little room for social activities, self-care, and rest, reducing their quality of life[14,19,29]. Caregiver quality of life is a key determinant of the quality of life for children with cerebral palsy.

Patient-related factors with moderate evidence linked to caregiver burden include the Gross Motor Function Classification System (GMFCS) and the spastic type of cerebral palsy. The GMFCS is a classification of cerebral palsy's severity, consisting of five levels based on gross motor function abilities, functional limitations, and the need for assistive technology and wheeled mobility. Three studies found a significant relationship between GMFCS levels and caregiver burden[14,20,21]. However, one study found no significant relationship after multivariate analysis[20]. A significant relationship between disease severity and caregiver burden was also found in other studies[4]. A moderate positive correlation was found between GMFCS and caregiver burden[20]. GMFCS level 5 caused the highest burden on caregivers[21]. Children with more severe disabilities require greater attention and care, which demands more time and effort from

caregivers, thereby increasing caregiver burden[4,30].

A significant relationship was also found between the spastic type of cerebral palsy and caregiver burden, with moderate evidence[5,6,15]. These findings align with previous research[4]. The highest caregiver burden was reported for quadriplegic cerebral palsy, and the lowest for unilateral cerebral palsy[5]. Another study found the highest burden scores in the quadriplegic group, followed by the diplegic group, and the lowest in the hemiplegic group[30]. Increased motor disability in children leads to greater difficulty and fatigue in caregiving, thereby increasing caregiver burden[5,30].

Conflicting evidence was found for factors such as caregiver age, number of children, income, sleep quality, coping strategies, and patient gender. Some studies suggest that older caregivers are more prone to physical issues, increasing their burden[14,16,21]. Conversely, other studies indicate that younger caregivers are less patient and attentive when caring for cerebral palsy patients, resulting in higher burden levels[15,17]. Discrepancies in the relationship between coping strategies and caregiver burden may stem from differences in how coping is measured; some studies use questionnaires combining all coping aspects,[18] while others evaluate coping based on separate sub-items[18]. Variations were also found regarding the relationship between patient gender and caregiver burden. One study found that male patients were associated with increased caregiver burden, possibly due to their greater strength and activity levels[15], although other studies found no significant relationship between patient gender and caregiver burden[16]. Some factors, due to the limited number of studies, have only limited evidence. Further research is needed to determine the influence of these factors on caregiver burden.

Strengths and Limitations

This review is the first to assess factors associated with caregiver burden in developing countries. Evaluating these factors in developing countries is considered essential because the lack of early detection and intervention capabilities, as well as limited cerebral palsy therapy facilities, may result in differences in factors associated with caregiver burden between developing and developed countries.

There are several limitations to this review. The authors' limited access to databases resulted in a lack of references available for review. Additionally, the cross-sectional study design used in all reviewed articles is a limitation, as it does not allow for the assessment of causal relationships.

Conclusion

This study identifies moderate evidence linking caregiver depression, fatigue, quality of life, GMFCS severity, and spastic cerebral palsy type to increased caregiver burden in developing countries. Depression and fatigue are particularly critical as they reduce caregiver well-being and compromise patient therapy effectiveness. Addressing these issues requires early detection, adequate healthcare access, and community-based interventions such as coping skills training, physical assistance, and psychological support to improve both caregiver welfare and the quality of care. Further studies are encouraged to validate these findings across diverse developing country contexts.

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