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Research Article

Investigating the Predictive Factors of Life Balance in Mothers of Children with Cerebral Palsy

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ABSTRACT

Introduction: Having a child with cerebral palsy (CP) is a stressful experience for the family, particularly mothers. Caring for these children occupies great time and energy from the family. The balance of life may be decreased by the influence of factors related to the child or mother. Accordingly, this study investigates the predictive factors affecting the life balance of mothers with CP.

Materials and Methods: This cross-sectional descriptive-analytical research was conducted in Ahvaz City, Iran, in 2021. A total of 135 mothers (mean age=33.37 [7.93]) with at least one child under the age of ten suffering from CP participated in this research. The data were collected using the life-balance index, general health questionnaire, time management quality, and demographic information checklists. The gross motor function classification system was expanded and revised, and the manual ability classification system was used to determine the gross motor and manual ability function levels. Generalized univariate linear models were used to investigate the effects of predictor variables on the quantity of life balance.

Results: The life balance of mothers of children with CP was heavily unbalanced (45.2%) or unbalanced (35.6%). Based on the regression coefficient of each variable, it was determined that manual ability classification system (β=0.192), comorbidity in the children with CP (β=0.187), gross motor function (β=0.137), general health (β=0.024), and maternal age (β=0.01), respectively, contributed the most in the prediction of life balance variances.

Conclusion: Life balance is a seriously affected domain in mothers caring for CP children. Child-related factors had a more effective role in predicting the life balance of mothers of CP children than mother-related factors.

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Introduction

Daily activities of people consist of different aspects, such as self-care, family care, social communication, leisure, work, and education [1]. Maintaining a balance between these activities results in a healthier and balanced life. Life balance is a satisfying pattern of daily occupations and activities that helps people maintain their well-being. The life balance focuses on five domains: Well-being, relationships, challenges, personality, and time management [2]. The study of Nazi et al. (2017) showed the deterioration of the life balance of mothers with CP children [1].

Based on the Snyder theory, depression, disability, and a lack of interest in doing daily activities are common feelings of mothers of children with disabilities [3]. Additionally, the study of Crew et al. (2006) showed that mothers of children with CP gain remarkably lower scores in time management tests than mothers of normal children. Furthermore, studies on these subjects have shown that mothers of children with disabilities spend less time on social engagement and entertainment; consequently, they feel less satisfaction in life, and they are at serious risk for mental health conditions [4].

Based on the family-centered approach and the International Classification of Functioning, Disability, and Health's emphasis on the role of the family as the main environmental factor, interventions for mothers as caregivers of disabled children can improve the quality of life of the entire family and the disabled child [5]. Accordingly, the domain of the study on mothers with disabled children is critical.

Cerebral palsy (CP) is the most prevalent neurologic condition which causes chronic motor and intellectual disabilities. This condition can occur before, after, or during the time of birth. This condition could cause various sensory-motor, postural, musculoskeletal, cognitive, and communicational impairments [6]. CP's prevalence is estimated at 1.5 to 2.5 cases in every 1000 live births [7]. Children with CP face many independently challenging situations in their daily lives, such as wearing clothes, using the bathroom, and eating [8]. These limitations result in the requirement to spend more time and energy with their caregivers. Therefore, having a child with CP could affect the daily patterns of the entire family negatively. Based on the studies, mothers of these children as the primary caregivers are especially at risk for deterioration of everyday activities [9, 10].

Considering the findings of previous studies, mothers of children with CP are at risk for life balance deterioration. Hence, as the management goal is programming to prevent wasting financial and human resources and productivity reduction, investigating the factors influencing maternal life balance is essential. Therefore, this study aims to predict life balance factors in mothers of children with CP.

Materials and Methods

Study participants

This was a cross-sectional study. A total of 135 mothers with at least one child with CP participated in this cross-sectional study. The participants were selected from the rehabilitation centers of Ahwaz City, Iran, in 2021. The inclusion criteria were having at least one child with CP fewer than ten years old and lacking any physical, intellectual, or neurologic conditions. Furthermore, the participants did not have a child with any other disabilities. Mothers were excluded from the study in the case of a lack of cooperation or not to fill out questionnaires completely.

Outcome measures

General health questionnaire of Goldberg

The Persian version of the general health questionnaire of Goldberg (GHQ-28) was used in this study. Its test-retest reliability was calculated at 58%, and its internal consistency was 95%. It consists of 28 Likert multiple-choice questions (much worse than usual, worse than expected, same as usual, as usual, and better than usual). The answers were graded from 0 to 3 in this questionnaire, and the sum of scores was calculated as the total score. The subscales of GHQ-28 were physical symptoms, anxiety, lack of sleep, disturbed social function, and depression [11].

The life balance inventory

The life balance inventory (LBI) was designed by Matuska in 2012, and the Persian version of this scale was used in this study. Its internal consistency was calculated at 89% to 97% and has good content validity. This scale examines the level of consistency between the intended time and the actual time a person spends on different activities. It consists of four subscales and examines 52 other activities. The questions were answered in two steps. The first step comprised a "Yes/No" question, and when the first answer was yes, the person should have

been answering the second step of that question among the multiple-choice answers. The mean score of 1 to 1.5 represented a very unbalanced level. Furthermore, the score ranges of 1.5 to 2, 2 to 2.5, and 2.5 to 3 were representative of unbalanced, moderate unbalanced, and balanced levels [1].

Mother time use questionnaire

The mother time use questionnaire was used to measure the quality of the time management variable. This questionnaire has a test-retest reliability of 0.78 to 0.89 and content validity. The quality of time management subtest consists of 15 questions scored using a 4-point Likert (always, never, often, and sometimes). This questionnaire covers seven concepts of self-care, rest, child affairs, leisure time, homework, job, and social participation. The total score is the sum of the points [5].

Gross motor function classification system expanded and revised

The gross motor function classification system expanded and revised (GMFCS E&R) focuses on determining the level of abilities and limitations of gross motor function in children and adolescents with CP. It is based on spontaneous movement, emphasizing standing, gait, and mobility assistive devices. Through this classification system, level I indicates the best motor performance, and level V is representative of severe movement limitation. GMFCS E&R is widely accepted by researchers and professionals in CP. The Persian version of this GMFCS E&R was translated into Persian by Dehghan et al. [12].

Manual ability classification system

The manual ability classification system (MACS) focuses on how children with CP use their hands to control objects daily; for children between 4 to 18 and 1 to 4 years, the MACS and mini MACS versions were used, respectively. Both versions consider five levels for manipulating objects. In this scale, level I indicates the best manual ability, and level V indicates the children's lack of active manual ability. The inter-rater reliability of the Persian version of this scale was high. The intraclass coefficient (ICC) was 0.96 (ranging from 0.94 to 0.97) among occupational therapists and parents. The total agreement was between the GMFCS E&R and the MACS [13].

Study procedure

The data were collected in rehabilitation centers where mothers were present with their children to use therapeutic services. After taking the informed written consent, the instructions to fill out the questionnaires described for mothers to fill it in the place. In the case of a lack of literacy ability, the questions were read aloud in a private room for mothers to answer, and the researcher recorded the answers. The questionnaires included demographic information, LBI, mother time use questionnaire (MTUQ), and GHQ-28. The order of presenting the questionnaires was selected randomly for each participant. An occupational therapist evaluated the children's gross motor and manual ability function using GMFCS E&R and MACS.

Data analysis

The data were analyzed using the SPSS IBM software, version 24. The significant level for all statistical analyses was considered 0.05. Generalized linear models were recruited to investigate the role of independent variables in predicting the response variable.

Results

The data were collected from 135 mothers and 142 children with CP. The demographic data are demonstrated in Table 1.

In addition to the above information, descriptive statistics for quantitative measures are shown in Table 2. Furthermore, the assessment of demographic factors of mothers showed the following results: 35% of mothers went to work, and most of them (79.26%) were dissatisfied with the economic conditions. Only 39(28.88%) mothers were covered by insurance, and 12(8.89%) mothers cared for their children alone.

Generalized univariate linear models were used to investigate the effect of predictor variables on the quantity of life balance. The results of this analysis are reported in Table 3. According to these analysis results, general health measures, number of children with CP, maternal age, child age, comorbid disorders, and maternal education had a remarkable role in predicting the life balance variances. Investigating maternal education revealed that education was remarkably related to the life Balance. Therefore, mothers' life balance means score in the undergraduate group (mean=1.58) was significantly lower than those with a university education (mean=2.04). The data also revealed a remarkable posi-

Table 1. Demographic characteristic of mothers (n=135) and CP children (n=142)

Variables		Max	Min	Mean±SD
Maternal age (y)		52	20	33.37±7.93
Child's age (m)		9	114	54.96±29.88
		Count	Percent	
Type of CP	Spastic	84	59.14	
	Dyskinesia	39	27.46	
	Ataxia	19	13.38	
GMFCS	I	19	13.38	
	II	39	27.46	
	III	44	30.98	
	IV	32	22.53	
	V	8	5.63	
MACS	I	34	23.94	
	II	36	25.34	
	III	49	34.50	
	IV	17	11.97	
	V	6	4.20	
Education of mothers	Primary and middle school	76	56.3	
	High school	46	34.1	
	University degree	13	9.6	
Number of CP children	1	128	94.8	
	2	7	5.2	
Comorbid disorders	Yes	114	84.4	
	No	21	15.6	
Order of CP childbirth	1st	50	37.0	
	2nd	75	55.6	
	3rd or more	10	7.4	

JMR

Abbreviations: Max: Maximum; Min: Minimum; SD: Standard deviation; CP: Cerebral palsy; GMFCS: Gross motor function classification system; MACS: Manual ability classification system.

tive role of time management quality in predicting maternal life balance.

According to analyses for both measured motor skills, being in mild levels of movement disorder was a predictor of maternal life balance. In this regard, mothers whose children were at mild levels of gross motor function disorder were more likely to have higher life balance than those whose children were at severe disorder levels.

Table 2. Descriptive statistics for quantitative measures

Variables	Mean±SD	Median	Minimum	Maximum
LBI	1.70±0.44	1.61	1.08	2.93
GHQ	41.81±15.21	45.00	9.00	69.00
MTUQ	37.90±8.69	36.00	19.00	56.00

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Abbreviators: LBI: Life balance inventory; GHQ: General health questionnaire; MTUQ: Mother time use questionnaire.

According to univariate linear analyses, insurance coverage (P=0.05), receiving rehabilitation services (P=0.10), being employed (P=0.17), being a single parent (P=0.42), having a child with CP (P=0.73), and social welfare coverage (P=0.10) did not play a remarkable role in predicting life balance variances.

Finally, multiple generalized models were used to investigate the simultaneous effect of life balance variables of mothers with children with CP. Based on the results of this analysis and the regression coefficient of each variable, it was determined that object manipulation skills (β=0.192), the presence of comorbidity in the child with CP (β=0.187), gross motor function (β=0.137), general health (β=0.024), and maternal age (β=0.01), respectively, contributed the most in the prediction of life balance variances.

Discussion

This study aimed to investigate the predictor factors of life balance of mothers with at least one child with CP. To achieve this goal, 135 mothers were examined for life balance. Also, a range of possible predictors related to mothers, children, and families was assessed. In the following, we will interpret the results of the present study.

In the collected data, the majority of mothers had a heavily unbalanced (45.2%) or unbalanced (35.6%) life, which was in line with the study of Nazi et al. In

Table 3. Univariate generalized simple linear analysis (n=135)

Variables	Value	β	SE	Wald Confidence Interval		Hypothesis Test		
				Lower	Upper	Wald X^2	df	P
GHQ		-0.025	0.0014	-0.028	-0.022	335.420	1	<0.001
MTUQ		0.034	0.0033	0.028	0.041	105.897	1	<0.001
Maternal age		-0.014	0.0047	-0.023	-0.004	8.393	1	0.004
Child age		-0.058	0.0147	-0.087	-0.030	15.813	1	<0.001
Number of CP children		-0.360	0.1708	-0.695	-0.025	4.447	1	0.035
Comorbid disorder		-0.610	0.0923	-0.791	-0.429	43.638	1	<0.001
Maternal education	<12	-0.460	0.1262	-0.707	-0.213	13.287	1	<0.001
GMFCS E&R	I	0.698	0.1165	0.470	0.927	35.965	1	<0.001
	II I	0.532	0.1076	0.321	0.743	24.405	1	<0.001
MACS & Mini MACS		0.543	0.1841	0.182	0.904	8.697	1	0.003
	II	0.369	0.1774	0.022	0.717	4.332	1	0.037

JMR

Abbreviations: SE: Standard error; GHQ: General health questionnaire; MTUQ: Mother time use questionnaire; CP: Cerebral palsy; GMFCS E&R: Gross motor function classification system; MACS: Manual ability classification system.

that study, in the same group, mothers were divided into only two categories: Highly unbalanced and unbalanced. However, in the present study, a few percentages are categorized in the balanced and heavily balanced groups, and a larger number of participants can be considered the reason for this contrast. Besides, the study of Nazi et al. [1] was mothers of children with severe motor problems; however, in the present study, there was no such inclusion criterion. In this regard, results revealed that children's gross motor and manual ability functions were negatively related to life balance.

The level of gross motor and manual ability function of CP had the strongest role in predicting their life balance. As in both skills, mothers whose children were in the first and second levels had significantly more life balance than mothers in the following motor levels. Accordingly, with the increase in the severity of motor disorders in children, the level of maternal life balance decreased, which is in line with the study by Riyahi et al. [13]. The condition of children with disabilities requires more time, energy, and money from parents, especially mothers. Therefore, this factor can negatively affect maternal life balance. There are also many studies on the relationship between children's motor skills and the concept of maternal quality of life [14-16].

Another finding of this study was the considerable role in the presence of comorbid disorders with the CP condition in children and the life balance of their mothers. No study was found in this area, but the probable reason is that mothers have to spend more time and energy when their children's disorders become more complicated.

The results showed that the general health of the mothers was another predictor factor in their life balance. In this regard, obtaining a lower score in the general health questionnaire predicts a lower level of life balance in these mothers. Meanwhile, one of the subtests of the LBI questionnaire is the level of well-being. On the other hand, the GHQ mainly measures the factors affecting the level of mental health. Therefore, mothers with a lower level of general health also scored lower in response to questions related to the health test of the LBI questionnaire. Similar to our finding, Gunal reports a negative correlation between occupational balance and domain of health in mothers of children with CP [17].

Maternal age was another important factor in predicting the level of life balance variances. As the results showed, their life balance decreases with the increasing age of mothers CP children. This finding contradicted the study of Nazi et al. (2017) [1]. Regarding the cause of this discrepancy, the participants in the present study were in the broader age range (20 to 52 years); however, in the study of Nazi et al., the age range was 26 to 45 years. Therefore, the source of this discrepancy is examined in mothers with higher ages who have obtained a lower life balance score. On the other hand, as mentioned before, the participants of the study of Nazi et al. included only mothers with unbalanced and heavily unbalanced life, which is in contrast with our data. Studies by Stanka et al. and Kuipers et al. [18, 19] have also confirmed a significant relationship between maternal age and life balance.

Children's age, number of CP children, quality of time management, and the level of education in mothers showed a considerable relationship with life balance. Still, it was not included in multiple generalized models. Regarding children's age, it was in line with the results of a study by Kuiper et al. (2019) [19]. In studies such as Crow et al., [4] Curran et al., [20] and Abanto et al. [21], it was found that the age of a child with a disability can negatively affect mothers' social participation. This can be due to various reasons, such as increased moving problems, moving to rehabilitation centers, schools, and home care. Since social participation is one of the subtests related to mothers' life balance, the present study's findings can be explained. Therefore, increasing the age of children can negatively affect mothers' life balance due to the reduction of mothers' social participation. Also, mothers who were less satisfied with the quality of their time management had significantly lower levels of life balance. The results of previous studies indicate that mothers with CP children have a lower life balance compared to mothers with normal children [3]. On the other hand, the study of Ahmadi et al. (2012) showed that mothers with CP children spend more time on child-related matters than mothers of normal children and consequently had lower time management quality [5]. In addition, according to the life balance model, the concept of time management is one of the essential aspects that shapes the quantity of life balance. Therefore, in justifying the findings of the present study, mothers with CP children have problems with time management ability, which consequently can negatively affect the life balance. There was a negative relationship between the results of the number of CP children and the maternal life balance. Based on the results, mothers who had more than one child had a higher level of life balance compared to mothers with one CP child. Another finding was that with increasing the level of education in mothers, their life balance increased. No other studies were observed in this field. Due to the COVID-19 pandemic, the participants hardly cooperated due to the fear of get-

ting infected. Quarantine because of the pandemic also affected family routines and could change the use of time in mothers. In the absence of a comparison group of mothers of children without disabilities, it is not possible to determine whether the findings apply only to mothers of children with CP or whether they apply to all mothers or all mothers of children with disabilities. The design of this study was cross-sectional; therefore, the research team suggests that longitudinal studies be conducted to determine the impact of each of the predictive factors.

In total inclusion, according to the family-centered approach and the international classification of functioning, disability, and health, the mother of a child with CP is an integral part of the intervention team. Balancing occupations improves the performance of persons. However, life balance is a seriously affected domain in mothers caring for CP children. Factors that predict life balance variances of these mothers have different shares. Child-related factors were more effective in depressing the life balance than mother-related factors. A rehabilitation team could help these mothers manage factors and increase life balance.

Ethical Considerations

Compliance with ethical guidelines

The current research is approved by the Ethics Committee of the Ahvaz Jundishapur University of Medical Science (Code: IR.AJUMS.REC.1398.816). Informed consent was taken from all participants and participants could enter and leave the study.

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Authors' contributions

Conceptionalisation: Leyla Basmati and Seifolah Jahantabi-Nejad; Data acquisition: Leyla Basmati; Appraise and synthesis of results: Roya Ghasemzadeh; Literature search and writing the initial draft of the manuscript: Maimanat Akbari and Maryam Dastoorpour; Data analysis and data interpretation: Maryam Dastoorpour; Supervision, study design and final revision of the manuscript: Seifolah Jahantabi-Nejad.

Conflict of interest

The authors declared no conflict of interest.

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