

Quality of Life and Gross Motor Function in Children with Cerebral Palsy (aged 4-12)

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Objectives: Most definitions equate Quality of Life with motor function. The aim of this study is to examine the association between gross motor function and Quality of Life for children with cerebral palsy.

Methods: In this analytical cross-sectional study, 60 children with cerebral palsy aged 4-12 were selected through convenience sampling based on inclusion criteria from occupational therapy clinics in Hamadan. Cerebral Palsy- Quality of Life questionnaires were completed by the parents of the participants, and the gross motor function of all children was evaluated by the Gross Motor Function Measure. All data was analyzed by SPSS 16.

Results: The analysis of the data showed statistical significance between gross motor function and Quality of Life domains such as (social well-being and acceptance ($p=0.017$), feeling about functioning ($p=0.003$), participation and physical health ($p=0.003$), pain and feelings about disability ($p=0.018$), access to services ($p=0.009$)), while there wasn't any relationship seen between them in emotional well-being ($p=0.54$) and family health ($p=0.796$).

Discussion: Based on the findings of this research, there isn't any relationship between gross motor function and the psychosocial domains of Quality of Life. It means that children with cerebral palsy have the potential to have a high psychosocial Quality of Life score even if they have poor motor function.

Key words: Cerebral Palsy, Movement, Quality of Life, Child

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Introduction

Cerebral palsy (CP) is one of the most common childhood postural-motor disorders that causes lesions in the brain during development, approximately occurring at a rate of 2-2.5 per 1,000 live births. It begins early in life, but it affects all dimensions of life (1). These children may experience postural, coordination, sensory and intellectual disorders in their life. In general, cognitive and motor impairments may limit the participation of these patients (2,3). Most people with CP have limitations in walking and other physical activities. The general opinion is that experiencing such restrictions cause a reduction in Quality of Life (QOL) (1). Children with CP are dependent on others, due to motor limitations in terms of mobility and self-care, and these limitations

impact on their daily activity participation and QOL (4,5). The WHO defines QOL as individual's perception of their position in life, in the context of the cultural and value systems in which they live, and in relation to their goals, expectations, standards, and concerns. QOL is a multidimensional construct and is an overall assessment of health in all areas. Although most of definitions equate QOL and motor function, there are different views between theory and practice, and this equivalence to motor functioning needs to be evaluated (2,6). Many QOL questionnaire for children assess the activities the child can do, rather than assessing their overall well-being (7).

In a review of articles, Livingston et al. concluded that measurements of QOL and health-related QOL in the past were focused more on performance and

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health rather than concerned with their individual welfare (8,9). There are different conclusions to studies, due to the differences in the assessment of QOL. The differences seen in studies are due to the differences of the instruments used to assess QOL, so choosing the type of instrument that is used to measure QOL is important. In the past, for assessing QOL, Peds QOL (Pediatrics Quality of Life) was used, which focuses more on performance and health, while YQOL (Youth Quality of Life) focuses on aspects of QOL that are independent of physical health, and Cp-QOL (Cerebral Palsy-Quality of Life) examined both the physical and psychosocial aspects of QOL (2,10). A few studies of children with CP have examined the relationship between motor function and QOL. These studies have demonstrated that although function is correlated with the physical domains of QOL, there is a non-significant or weak relationship between function and the psychosocial domains of QOL. The weak or non-significant relationship between these two variables may be due to the majority of the QOL questionnaire being related to the child and their ability to perform daily activities, rather than assessing their overall well-being (11-13). Therefore, in order to investigate the relationship between QOL and gross motor function, the present study used the Cerebral Palsy-QOL questionnaire. This questionnaire has a greater emphasis on well-being, as it actually measures how the child feels about his/her life. This questionnaire has been used as a tool for the evaluation of QOL. The present research results will provide a practical guide for clinicians in selecting appropriate interventions to be used to enhance QOL for these children. The aim of this study is investigating the relationship between quality of life and gross motor function in children with cerebral palsy.

Methods

In this analytical cross-sectional study, 60 children aged 4-12 with a diagnosis of CP were selected through convenience sampling, based on inclusion criteria from occupational therapy clinics in Hamadan. The sample size was calculated using $n = [(Z_{1-\alpha} + Z_{1-\beta})^2 / Z_0^2] + 3 = 58$
 And $1-\alpha = 0.975$ $1-\beta = 0.90$ $r = Z_0 = 0.15$.
 Participants were selected through convenience sampling from the list of registered names or files in centers, and by checking patients records in the hospital, and according to the following inclusion criteria: 1- Children must be aged 4-12 years;

2- Possessing a diagnosis of CP by a neurologist. The exclusion criteria were as follows: 1- Refractory epilepsy or seizure disorder; 2- Other neuromuscular diseases; 3- Having had Botox injections and/or orthopedic surgery in the last 12 months; 4- The child was blind; and 5- The child was deaf. After informing the participants' parents about the study, written informed consent was obtained. The gross motor function of the children participating in the study were evaluated with the use of the GMFM (Gross Motor Function Measure) tool, and the QOL of children were measured using CP-QOL questionnaire. SPSS software was used for data analysis. The distribution of variables was analyzed with the Kolmogorov-Smirnov test. Due to the normal distribution of variables that were examined, Pearson's correlation test was used. In this study, QOL was the dependent variable and gross motor function was an independent variable.

The Quality of Life Questionnaire (Cp-QOL) contains 65 questions in seven dimensions: Social well-being and acceptance; Participation and physical health; Functioning; Emotional well-being; Pain and impact of disability; Access to services; and family health. The validity and reliability of the survey was conducted in Iran in 2010 by Rassafiani and Nobakht. The correlation coefficient for the subscale was calculated, with scores ranging from 0.84 to 0.47 (14). The GMFM-66 test consists of 66 items. This test is as an accurate measure for assessing the "motor development" of the child, and can be used for all children with motor delay, especially for children with CP. The scale uses the following scores for assessment: 0- lack of movement, 1- movement commenced, 2- movement incomplete, 3- motion complete. The reliability and validity of GMFM- 66 was conducted in Iran by Mahmoud Mahmoodian Harris in the Rehabilitation School (15). A demographic and QOL questionnaire was completed by the participants' parents, while the GMFM tool which measures gross motor function was assessed by a researcher working with the patients.

Results

In this study, the participants were 60 children with CP aged 4-12, consisting of 38 boys and 22 girls. The children's demographic characteristics are shown in table (1).

Table 1. Demographic data of studied children

Demographic Information	Frequency or mean
Age	9±7
Types of Cerebral Palsy	
Diplegia	16
Hemiplegia	12
Quadroplegia	18
Athetoid	4
Hypotonia	2
Ataxia	8

As can be seen in table (2), correlation coefficients were calculated between gross motor function and functioning (0.003), social well-being and acceptance (0.017), participation and physical health (0.003), pain and impact of disability (0.018), access to services (0.009). All domains of QOL, except for emotional well-being and self-esteem (0.54) and family health (0.796), were found to be statistically

significant. This means that an increase or decrease in gross motor function in children with CP has a considerable effect on their functioning, social well-being and acceptance, participation and physical health, pain and impact of disability, access to services, but not on the emotional well-being and family health domains of QOL.

Table 2. Correlation coefficient and significance between the scores of QOL and gross motor function

Variables	Correlation coefficient	Significance	Standard error
Social well-being and acceptance	0.131	0.017	102.012
Functioning	0.380	0.003	18.779
Participation and physical health	0.376	0.003	20.495
Emotional well-being and self esteem	0.355	0.54	5.717
Access to Services	0.336	0.009	5.901
Pain and impact of disability	0.305	0.018	187.558
Family health	0.049	0.796	72.851

Discussion

QOL is the foremost variable for evaluating the impact of interventions on children with cerebral palsy. Different functional programs and various therapeutic techniques are used, which can solve many physical and motor problems in these children by facilitating neuro-developmental stages. These interventions have shown the capability to improve physical function in targeted children. However, it is not clear whether motor improvements in the neuro-developmental process can lead to an increase in QOL in CP children. While the end goal of rehabilitation is improving QOL in affected patients, we aimed to study the effects of neuro-developmental therapies on QOL in CP children. Based on the results of previous studies, the QOL of people with CP has been reported as being lower than in healthy subjects (16). Studies also show a high correlation between motor function and QOL. However, studies based on parents' reports which were conducted in the past decade to evaluate QOL demonstrated a non-significant relationship between gross motor function and the psychosocial domains of QOL (11). This difference between studies may be related to the selection of evaluation tools, since

many QOL questionnaires for children assess the activities the child can do rather than evaluating their overall well-being (17).

In 2008, a survey was conducted among young people with CP and young people with normal development. There was no significant difference between the two groups in QOL (2). The researchers concluded that, although motor function is correlated with the physical domain of QOL, there is a weak or non-significant relationship between function and the psychosocial domains of QOL. Livingston and colleagues, in their literature review, concluded that previous studies had focused more on the motor function of the individual rather than measuring their overall well-being (18). Many QOL questionnaires for children evaluate the activities the child can do rather than assessing their overall well-being. This is one of the few studies, as defined by the World Health Organization, which examines the association between motor function and the QOL domains for children with CP using a special QOL questionnaire that focuses on well-being rather than on function.

As the results of this study show, there is a significant relationship between motor function and all domains of QOL except for emotional well-being

and self-esteem, and family health (which are psychosocial aspects) (Table 2). The results of past studies have shown that QOL was assessed on the basis of motor abilities. Since the psychosocial aspects of QOL were not assessed by those studies, they are not comparable with our research. The present study is consistent with recent studies that were based on parents' reports (19). The study by Liu and colleagues in 2009, which investigated the relationship between gross motor function and QOL in children with CP, demonstrated no significant relationship between gross motor function and the psychosocial domains of QOL. Thus, gross motor function is a good predictor for the physical domains and a poor predictor for the psychosocial domains of QOL. In explaining these findings, it can be stated that according to previous studies, the lack of correlation between motor function and the psychosocial aspects of QOL may be due to the adaptability of these people to their status, or may be due to a supportive environment. In other words, having a supportive environment (family, community) can result in a high QOL, in spite of the disability (20). Present research results indicate that even if a tool is used which focuses on well-being rather than function, there is no significant relationship between function and psychosocial functioning, separately from the physical domains. In fact, an improvement in gross motor function had an effect on the physical domains of QOL but not on its psychosocial domains. The results showed that the assessment of QOL by objective tools, for example instruments that measure gross motor function, cannot be determined, and that a subjective assessment of life (self-perception) is necessary. This is the important part of this investigation. Although many definitions equate QOL and motor function, the results of this study indicate that, due to the lack of correlation between gross motor function and the psychosocial domains of QOL, we cannot judge people's QOL according to motor function. A fundamental principle of study about QOL is the subjects self-reporting their QOL (1). A common problem that many researchers face, when dealing with disability in children with CP, is that

researchers are forced to rely on information provided by the caregivers of these children. However, a number of studies have shown that parents' reports of their children's QOL can be affected by their own mental health (4). Teachers and caregivers may poorly report about their children, due to limited information. However, they have extensive experience with this type of children, therefore they can provide a framework for the assessment of these children. Relying on only one type of information leads to an incomplete assessment of QOL. When we obtain information from several sources, they may help us to understand the differences in frameworks, and the other factors that can cause differences.

Conclusion

This is a limited study to examine the correlation between motor function and QOL domains for children with CP, using a specific Cerebral Palsy-QOL instrument. Although many definitions equate QOL with function, the results of this study demonstrated no significant relationship between motor function and the psychosocial domains of QOL. A person with poor motor function may still score highly in the psychosocial domains of QOL. Due to the limited access to clients, and the lack of cooperation of some parents, sampling was done with difficulty. Due to the children's linguistic and cognitive problems, an assessment of QOL by the children was not possible, so the evaluation was conducted using the parent version. These findings point to the importance of other factors that have an impact on QOL. Because there are a multitude of factors that influence the QOL of children with CP, the need to conduct research as a clinical guideline to determine the exact effect of these factors on the QOL of CP children is greater than ever.

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