

Sibel Yeniay ¹
Özdemir Atar ²
Gökmen Özen ^{3,*}
Hürmüz Koç ²

THE EFFECT OF AEROBIC EXERCISES ON THE PHYSICAL AND PSYCHOLOGICAL CONDITIONS OF MOTHERS OF CHILDREN WITH CEREBRAL PALSY

VPLIV AEROBNE VADBE NA FIZIČNO IN PSIHOLOŠKO STANJE MATER OTROK S CEREBRALNO PARALIZO

ABSTRACT

The aim of study is to examine the physical and psychological effects of aerobic exercises applied to mothers of children with CP. The study was conducted with 27 mothers of children with CP and diagnosed with Spastic Quadriplegia. During exercises, muscular strength, muscular endurance, flexibility and cardiac exercises were applied. The "SF-36 Quality of Life Scale" was used to obtain health-related data. In order to measure muscle strength, manual muscle test and dynamometer measurements were used. Before and after the exercises, which were held three days a week for 8 weeks, measurements were made. T-test for dependent groups was performed in order to identify the difference between measurements. According to SF-36 Quality of Life Scale, significant differences were observed in terms of the variables of physical function, physical role difficulty, pain, vitality, social functionality, mental health, emotional role difficulty, and perception of general health ($p < 0.05$). Moreover, it was determined that the difference between the variables of the leg, back and left-hand grip was significant $p < 0.05$, but the difference in the measurement of the right-hand grip was not significant ($p > 0.05$). When the pretest and posttest scores obtained from the manual muscle test were compared, significant differences were determined in right arm supination, left arm supination, right arm pronation, and left arm pronation ($p < 0.05$). It was determined that various exercises performed had positive effects in terms of eliminating functional deficiencies, alleviating pain, socialization, and beck health in individuals who experienced problems related to physical and psychological health. **Keywords:** cerebral palsy, exercise, physical-psychological health

¹*School of Graduate Studies, Çanakkale Onsekiz Mart University, Çanakkale, Türkiye*

²*Faculty of Sport Sciences, Çanakkale Onsekiz Mart University, Çanakkale, Türkiye*

IZVLEČEK

Namen študije je bil preučiti fizične in psihološke učinke aerobne vadbe za matere otrok s cerebralno paralizo (CP). V raziskavi je sodelovalo 27 mater otrok s CP in diagnozo spastične kvadriplegije. Med vajami so bile uporabljene vaje za mišično moč, mišično vzdržljivost, gibljivost in srčno-dihhalno vzdržljivost. Za pridobivanje podatkov o oceni kakovosti življenja je bil uporabljen vprašalnik SF-36, za merjenje mišične moči pa manualno tesiranje mišic in dinamometrija. Vadba je potekla trikrat tedensko 8 tednov. Pred začetkom in po koncu študije so bile opravljene meritve za ugotavljanje razlik med meritvami je bil uporabljen T-test za odvisne vzorce. Glede na lestvico kakovosti življenja SF-36 so bile ugotovljene statistično pomembne razlike pri spremenljivkah telesna funkcija, težavnost telesne vloge, bolečina, vitalnost, socialna funkcionalnost, duševno zdravje, težavnost čustvene vloge in zaznavanje splošnega zdravja ($p < 0.05$). Poleg tega je bilo ugotovljeno, da prihaja do statistično značilnih razlik pri spremenljivkah moči nog, hrbeta in stiska leve roke $p < 0.05$. Pri primerjavi rezultatov, pridobljenih pri manualnem testiranju mišic pred in po testu, so bile ugotovljene statistično pomembne razlike pri supinaciji in pronaciji obeh rok ($p < 0.05$). Aerobna vadba ima pozitivne učinke na odpravo funkcionalnih pomanjkljivosti, lajšanja bolečin, socializacije in zdravja pri osebah, ki so imele težave povezane s telesnim in duševnim zdravjem.

Ključne besede: cerebralna paraliza, vadba, fizično in duševno zdravje

³*Faculty of Sport Sciences, Çanakkale Onsekiz Mart University, Çanakkale/Türkiye*

Corresponding author:* Gökmen Özen,
Faculty of Sport Sciences, Çanakkale Onsekiz Mart University, Çanakkale/Türkiye
E-mail: gokmenozen44@gmail.com

INTRODUCTION

Cerebral Palsy (CP) manifests itself as a developmental disorder. The damage developing in the central nervous system of children leads to disorders in nerve, muscle, skeleton, and sensory systems. These disorders cause deficiency in the posture and movements of the child, as a result of secondary disorders such as musculoskeletal system deformities and the addition of tertiary disorders to the picture with the effect of different compensation mechanisms over time, the development and functional independence levels of children are adversely affected. Although the damage itself is not progressive, the consequences of deficiencies and disability are progressive. CP defines a group of permanent impairments in movement and posture development, resulting in activity limitations, due to non-progressive disorders that occur in the developing fetal and neonatal brain (Rosembaum et al., 2007).

Children with CP experience more emotional and behavioral problems compared to children with normal development, as well as physical problems such as joint limitations, muscle weakness, and muscle tone disorder. They suffer damage physically, socially and emotionally, and the quality of life and well-being of themselves and their families are affected (Ozcan, 2005; Lee, Matthews and Park, 2019). Dealing with children who are in need of continuous care leads to a challenging and stressful life for families (Sungur, 2002). Having a disabled child causes families to make changes in their family lives in physical, psychological, social and economic terms (Raina et al., 2005). The disability degree of the child determines the degree of the change in the family in terms of adaptation (Kaya, 2010). This situation affects the individual who takes of the care of the disabled child the most. In the Turkish society, it is the mothers who generally assume this responsibility (Alaee et al., 2015). Care of the child is a challenging and stressful process. As she spends most of her time by providing care to the child and meeting his/her needs, the mother makes sacrifices from her own life (Friedrich et al., 1981). The disability degree of the child also reveals the degree of his/her dependence on the individual who takes care of him/her (Ercan et al., 2019). As a result of continuously repeated movements and accumulating traumas while taking care of the disabled child, there occur changes in muscles, joints, tendons and bone structures, and consequently holistic health problems such as physical and psychological issues emerge. It is known that physical problems in various parts of the body are caused by lifting the child who gains weight over time, inability to transfer the child from a place to another ergonomically, monotonous life, muscular strength deficiencies, and movements that require frequent repetitions. In many studies conducted, it is reported that waist and back pains are prevalent in the mothers of disabled children. It is seen

that these pains determined are closely associated with the care of the child with CP (Aki et al., 2003).

The special needs of the children with CP, and the duration of care being long and challenging negatively affect the psychology of parents (Bozkurt, 2019). When the literature is examined, it is stated that the physical pains that people experience also result from psychological problems (Linton, 2000). It is reported that as the mother blames herself for the condition of her child with CP, over time, she experiences psychological disorders such as disappointment, hopelessness, burnout, depression, desperation, despair, and increase in anxiety level (Olsson and Hwang, 2003). In this process, uncertainties regarding the future of the child cause mothers neglecting themselves, feeling of loneliness, and increase in despair. These problems experienced mostly affect the quality of life and general health (Işıkhan, 2006).

It is stated that regular exercises have many protective effects in terms of especially health, as well as being a healing medical application for various diseases and health problems. Especially recently, in addition to the protective effect of physical exercise in terms of health, its healing effect has been emphasized with the slogan "exercise is a remedy", and various studies are being carried out (Ozen, 2020). Doing exercise is an important activity for people to protect their physical and mental well-being (Bouchard et al. 1994). Increasing muscle strength by exercising is a recommended method in order to alleviate and terminate pain. The main hypothesis of the study is that as a result of exercise and consequent strengthening of the muscles, physical health will be improved, the deteriorated quality of life will be restored, and a positive contribution will be made to the psychological process and general health of the individual. Accordingly, in the study, the physical and psychological effects of the physical exercises applied to the mothers who had children with CP were investigated, and the rehabilitating effect of the exercise on the pains experienced by mothers in this process of life was examined.

METHODS

Procedure

This study has an experimental design. The study was conducted by taking permission from the Academic Board of Turkey Spastic Children Foundation at Private Metin Sabancı Special Education and Rehabilitation Center affiliated with Turkey Spastic Children Foundation and

Private Hıfzı Özcan Special Education and Rehabilitation Center. Ethical approval for the study was obtained from Çanakkale 18 Mart University "Ethical Committee of Clinical Research" on 07.05.2020 (Protocol No: 2020-07). Also, the Academic Board of Turkey Spastic Children Foundation evaluated the application for the study and deemed the study appropriate to be conducted at their center (Protocol No: TSCV.200.020.166). Prior to the study, informed consent was taken from the voluntary participants by informing them about the application and measurements.

Participants

A total of 30 mothers of children with CP and diagnosed with Spastic Quadriplegia voluntarily participated in the study. The average age range of participants was 35.03 ± 4.02 years. Mothers with a child diagnosed with CP had clinically defined physical and psychological health complaints. As three mothers left the study of their own accord, the study was completed with 27 voluntary mothers. Regarding the inclusion and exclusion criteria of the study, 30 mothers who had children diagnosed with CP and Quadriplegia, had physical and psychological health complaints for at least 6 months, had no physical problem that would prevent them from doing exercise were included in the study on a voluntary basis. Mothers who were on regular medication, had experienced an injury and not completely rehabilitated, presented to a physician with pain complaints and receiving medicine treatment, were in the orthopedically disadvantaged group from birth, and participated in a sportive exercise program in the last 6 months were not included in the study.

Data Collection

By applying SF-36 Quality of Life Scale (Short Form SF-36) to the participants, data related to health were collected (Ware, 1992; Koçyiğit et al., 1999). The scale that can be applied to voluntary participants consists of 8 subscales as physical function, physical role difficulty, pain, general health, vitality, social function, emotional role difficulty, and mental health. The first four of these are known as physical component score, and the last four as mental component score. Each subscale is scored between 0-100 points, higher scores refer to higher quality of life (Koçyiğit et al., 1999). Before and after the 8-week application planned for the study, a questionnaire was applied.

The questionnaire and measurements were completed in the pre and post application period of the 8-week study. All physical measurements were conducted after a 10 min standardized dynamic warm-up. For back, leg and grip measurements, Takei brand dynamometer was used.

Each measurement was repeated three times and the best score was recorded. For back strength, by standing on the platform of the dynamometer with their arms and legs stretched, their back straight, and their body slightly inclined towards the front, the participants pulled up the bar of the dynamometer forcefully with their maximum power. For leg strength, the chain of the dynamometer was arranged in the desired knee angle of the participants on the platform of the dynamometer. The participants applied their maximum power with their legs bent 130-140 degrees, their palms facing their body, by holding the handle of the dynamometer and stretching their knees slowly and forcefully without using their back muscles. For the grip power measurement, the participants stood with their middle finger lined with the middle part of the dynamometer. With the tool being kept by the side in a parallel position without being moved, maximum power possible was applied at a time (Sogabe et al., 2009; Tamer, 2000; Günay et al., 2006; Orchard et al., 1997).

Manual Muscle Test: Forearm supinators, participants in sitting position, Moderate (3), Good (4) and Normal (5). While the arm is adjacent to the body, elbow in 90° flexion, and forearm in pronation, it is moved to supination. While the forearm is being moved to supination, if there is no resistance, it is scored as 3 points, and if there is resistance, it is scored as 5 points. Weak (2), Trace (1) and None (0): If only half of the supination movement can be performed, it is scored as 2 points, if contraction is obtained when the muscle is palpated, it is scored as 1 point, and if no contraction is obtained, it is scored as 0 point. Forearm pronators, participants in sitting position, Moderate (3), Good (4) and Normal (5). While the arm is adjacent to the body, elbow in 90° flexion, and forearm in supination, it is moved to pronation. While the forearm is being moved to pronation, if there is no resistance, it is scored as 3 points, and if there is resistance, it is scored as 4 or 5 points. Weak (2), Trace (1) and None (0): If only half of the pronation movement can be performed, it is scored as 2 points, if contraction is obtained from pronator teres tendons, it is scored as 1 point, and if no contraction is obtained, it is scored as 0 point (Bohannon, 1997).

For the exercise protocol, American Medical Society for Sports Medicine has stated that sedentary adult individuals have to do medium-intensity activity at least three days a week with a minimum of 30 minutes (Pate et al., 1995; ACSM, 2018). A 60-minute exercise program of 8 weeks for 3 days a week was applied to the participants with 60-70% rate of the maximum pulse. Aerobic step, Zumba, Tae Bo balance, Pilates, breathing exercise and yoga were included in the exercise program (Table 1).

Table 1. Weekly Exercise Program Applied.

Weekly Exercise Program (60 min)		
Monday	Wednesday	Friday
Practice (5 min)	Practice (5 min)	Practice (5 min)
Aerobics - Pilates Exercises (50 min)	Zumba - Breathing Exercises (50 min)	Tai-Bo Balance - Yoga Exercises (50 min)
Regeneration after exercise (5 min)	Regeneration after exercise (5 min)	Regeneration after exercise (5 min)

Step aerobics is a workout type performed with music in order to gain condition, to lose weight and to rehabilitate (Hoeger, 2010). Zumba is an activity that is enriched with the blending of basic steps of Latin dances with aerobic exercises and is performed in order to increase calorie burn and endurance, and to develop cardiovascular system (Ljubojevic et al., 2014). Tae Bo Balance is a workout type that is performed with the combination of aerobics, dance, kick box, and dumbbell exercises, and contributes to the development of cardiovascular system, muscle power and flexibility (<https://www.fitolsam.com>, 2020). Pilates is a workout type consisting of floor exercises that is performed in order to provide the body with a good shape, to develop flexibility, balance and coordination, and psychological and physical health, as well as to ensure resistance by using equipment (Karter, 2004). Breathing exercise is a technique which is combined with the meditative effects of the eastern philosophy, that supports psychological and physical relaxation, which ensures that the body takes more oxygen, and that is performed to improve both physiological and psychological health (<https://nptipmerkezi.com>, 2020). Yoga is a spiritual workout type which aims to ensure a harmony between the mind and the body. Yoga is known as a recommended method that provides protection from diseases and supports correcting all types of disruptions related to health (Bhavanani, 2009).

Statistical Analyses

The raw data obtained from the scales used in the study were converted into standard scores. Following the conversion to standard scores, the result of each scale was evaluated. The data obtained from pretest and posttest measurement results were evaluated through SPSS statistical package program. Shapiro-Wilk test was used to determine whether the data showed normal distribution. Measurement results were presented as arithmetic mean and standard deviation. In comparing measurements, t-test for dependent groups was used. $p < 0.05$ was accepted as significant.

RESULTS

Table 2. Descriptive Statistics of the Participants.

Variables	n	Min	Max	Mean	S _D
Age (years)	27	26,00	40,00	35,0370	4,02379
Height (m)	27	1,55	1,78	1,6474	0,06455
Body Weight (kg)	27	52,00	92,00	67,8889	10,45258
BMI (kg / m ²)	27	19,50	33,80	25,0519	3,88115

Table 3. Distribution of Pretest - Posttest Weight and BMI Values (n=27).

Variables		Mean	S _D	t	p
Body Weight (kg)	Pre-test	67,8889	10,45258	2,980	0,006**
	Post-test	65,2222	8,58592		
BMI (kg/m ²)	Pre-test	25,0519	3,88115	2,624	0,008**
	Post-test	24,0672	2,8922		

**p<0,01

When the pretest and posttest weight and BMI values were compared, the difference between the measurements was found to be statistically significant (p<0.05).

Table 4. Distribution of Pretest - Posttest Muscle Power Values (n=27).

Variables		Mean	S _D	t	p
Back Strength (kg)	Pre-test	47,4259	14,76919	-2,797	0,010*
	Post-test	48,5667	14,83268		
Left Strength (kg)	Pre-test	102,0370	32,42919	-2,268	0,032*
	Post-test	103,4259	34,44916		
Left Hand Grip Strength (kg)	Pre-test	62,5778	7,49976	-2,705	0,012*
	Post-test	63,70370	7,863571		
Right Hand Grip Strength (kg)	Pre-test	57,4556	7,95170	0,242	0,810
	Post-test	57,0478	13,17725		

*p<0.05

When the pretest and posttest scores of the participants were compared, it was determined that the difference between the variables of leg, back and left hand grip was significant $p < 0.05$, and the difference in the measurement of the right hand grip was not significant ($p > 0.05$).

Table 5. Distribution of Pre-test – Post-test Manual Arm Muscle Test Values (n=27)

Variables		Mean	S _D	t	p
Right Arm Supination	Pre-test	3,5185	0,75296	-2,798	0,010*
	Post-test	3,8889	0,89156		
Left Arm Supination	Pre-test	2,9630	0,51750	-3,606	0,001**
	Post-test	3,2963	0,66880		
Right Arm Pronation	Pre-test	3,3333	0,62017	-5,586	0,000**
	Post-test	4,0000	0,67937		
Left Arm Pronation	Pre-test	2,9259	0,54954	-4,647	0,000**
	Post-test	3,4444	0,69798		

* $p < 0,05$ ** $p < 0,01$

When the pretest and posttest scores of the participants were compared, it was determined that the difference between right arm supination values was significant at $p < 0.05$ level, and that the difference between left arm supination, right arm pronation, and left arm pronation values was significant at $p < 0.01$ level.

Table 6. Distribution of Pre-test – Post-test SF-36 Quality of Life Scale (n=27).

Variables		Mean	S _D	t	p
Physical Function	Pre-test	64,0741	23,98064	-3,695	0,001**
	Post-test	78,0556	23,43499		
Physical Role Challenge	Pre-test	28,7037	44,23696	-3,760	0,001**
	Post-test	67,0370	38,31196		
Ache	Pre-test	38,9815	24,67344	-5,863	0,000**
	Post-test	55,2963	25,00510		
General Health	Pre-test	52,8333	20,80172	-2,618	0,015*
	Post-test	58,3519	18,18168		
Vitality	Pre-test	30,9259	22,78820	-5,732	0,000**
	Post-test	49,8593	19,17922		
Social Functionality	Pre-test	42,1370	25,76318	-3,665	0,001**
	Post-test	56,5741	20,53548		
Emotional Role Difficulty	Pre-test	31,9630	39,73867	-4,233	0,000**
	Post-test	77,6667	32,55116		
Mental Health	Pre-test	40,8519	20,60004	-5,485	0,000**
	Post-test	56,1963	19,57849		

* $p < 0,05$ ** $p < 0,01$

When the pretest and posttest scores of the participants were compared, it was determined that the difference between the values of general health features was significant at $p < 0.05$ level, and that the difference between the values of physical function, physical role difficulty, pain, vitality, social functionality, emotional role difficulty, and mental health was significant at $p < 0.01$ level.

DISCUSSION

In the study, in which the rehabilitating effect of the exercise on the pains resulting from life process experienced by mothers of children with CP was investigated, it was determined that mothers who took over the responsibility of caring for the child mostly suffered from back pain. The needs of physically disabled children for their mothers increases in line with their dependence on their mothers. Depending on the degree of dependence, due to the physical burden on the mother, it is believed that musculoskeletal system disorders will emerge more easily. Besides, it has been stated in various scientific research that having a disabled child increases depressive symptoms, and that these factors negatively affect physical health. Scientific findings shows that the risk of back pain in individuals who primarily assume the responsibility of caring for the physically disabled child is high. In the study of Brown and Gerberich (1993), which investigated the physical health problems experienced by 440 people working in the child care business, their findings revealed that 34% of the total physical problems were in the back area, 20% in the lower extremities, 12% in the upper extremities, and 13% in more than one areas, and that 49% of the total back injuries were associated with lifting the child. Also, the risks related to physical health problems for those who worked in child care were examined. The situations where the employees experienced the most difficulty were identified as postural work such as lifting, bending, and crouching while giving the child daily care. It was argued that having a disabled child increased depressive symptoms, deteriorated mental health, and that these factors negatively affected physical health (Owen et al., 1994). In a previous similar study conducted on women who suffered from back pain, Arıkan et al. (2010) discussed how the standard of life of those who suffered from chronic back pain could be improved by alleviating the pain through various interventions. The back school program was handled as an alternative for clinical treatment, and the back school group were applied information and exercise program. While improvement in three criteria was observed in the clinical group in terms of body pain, vitality, and mental health, more improvements were

observed in the exercise group, and exercises were more effective in increasing the life standards of the patients. In the study conducted by Tonga et al. (2008), it was determined that the dependence of the disabled child on the mother increased in proportion to the intensity of the pain the mother suffered from. It was determined that mothers who had a child with CP and was unable to walk experienced more pain for longer periods.

In our study, the ambulatory statuses of the children were determined according to KMFSS classification system, and it was observed that the physical pains of the mothers who had highly dependent children at 4-5 levels intensified due to the increase in the burden on the mother. As can be seen in many studies conducted, in our study too, it was determined that as the caregiving burden increased, the physical pains of the mothers increased, which consequently led to a decrease in their quality of life (Albayrak et al., 2019). In the study conducted by Ozmen et al. (2012), it was revealed that the needs of the disabled children for their mothers increased depending on their degree of dependence on their mothers, and that due to the physical burden on the mother depending on the degree of dependence, musculoskeletal system disorders would emerge more easily. The child with CP gaining weight, long and repeated movements, bending that puts a pressure on the back, and activities such as lifting and carrying can also increase the risk. Keeping the child away from the body while carrying increases the burden applied on upper extremities, shoulders and the back. As the child grows up, his/her weight will increase, and it will be harder for the mother to carry her child. Therefore, the physical problems of the mother will also increase. As can be seen in many researches, it can be concluded that as the weight of the child increases, the intensity of recurring physical problems of the mother will also increase.

In another study conducted on caregivers, Brehaut et al. (2004) made a physical and psychological evaluation. They concluded that back pain was observed in 35% of the caregivers who took care of children with CP, and this type of pain was observed only in 12.2% of the caregivers of healthy children. In a study he conducted, Kutuluş (2010) stated that back pain seen in mothers varied according to the child's degree of independence. Accordingly, the child being disabled increases the risk of back pain observed in mothers. He also determined a relationship between psychological and psychosocial risk factors and physical health problems. In the research they conducted, Tong et al. (2003) concluded that physical health problems experienced by the individual were related with psychological and physical factors. According to Tong et al. (2003), the psychological status of the individual who takes over care is related with his/her physical pains. Similarly, in another study, it was stated that psychological health

problems not only caused chronic pains, but also led to the transformation of acute pain into chronic problems. Kırılmaz et al. (2016) evaluated the issue from a different perspective and determined that psychological and psychosocial risk factors were directly associated with physical health problems. Callaghan et al. (1993) found that regular exercise decreased the individual's depressive status and improved his/her general health status and well-being. In their study, Kırılmaz et al. (2016) determined a direct relationship between psychological and psychosocial risk factors and physical health problems. In the present study, when the differences between pain and general health status before and after exercise were compared, it was revealed that there were positive and significant results.

Scientific findings show that being the mother of a child with CP is a condition that reduces the quality of life and especially causes giving up on healthy living habits (Lee, Matthews and Park, 2019). In the study conducted by Akmeşe et al. (2011), in which the quality of life of mothers who had children with CP was evaluated, the general SF-36 mean score except the social function and energy parameters was found to be significantly low compared to mothers who had healthy children. As a result of the compilation study, in which they investigated the relationship between exercise approaches and subjective quality of life in adult patient and healthy populations, Gillison et al. (2009) showed that an increase was achieved in general quality of life through mild exercises performed in groups, and that improvement in physical quality of life was achieved mostly through moderate intensity exercise programs. As a result of the compilation study they conducted, Bize et al. (2007) determined that there was a significant relationship between physical activity level determined by the individual and health-related quality of life, and they generalized that in adults with high physical fitness level, quality of life followed a course at high values. In the present study, it was determined that strength, endurance and flexibility exercises applied led to the improvement of general health and improvements and decreases in psychological problems, and that as a consequence of these improvements, increases were recorded in quality of life measurements.

Many studies in the literature emphasize the importance of external support in increasing the quality of life of mothers with CP in terms of physical and mental health (Wang, Huang and Kong, 2020). Today, it is an accepted fact that regular physical activity and exercise has positive effects on physical and mental health and increases the quality of life for people of all age groups (Paluska and Schwenk, 2020). In the study they conducted on middle-aged women and men by using Short Form-36 to measure quality of life, Imayama et al. (2011) determined that 60-minute aerobic exercises three days a week changed the quality of life of overweight

individuals. Our findings also revealed that regular physical exercise for mothers with children with CP affects physical and psychological health positively, and therefore it is a very important method for increasing their quality of life. Moreover, studies conducted in recent years show that even web-based interventions for regular physical exercise have a significantly positive effect on the quality of life and pain of mothers of children with CP (Nobakth et al., 2020).

Through some measurements made before and after the exercise program, work and housework, general health, personal care, lifting weight, walking, sitting, standing, social life and parameters were evaluated in terms of functional deficiency, and as a result of these measurements, significant differences were found in physical health after the exercise. It was determined that various exercises performed had positive effects in terms of eliminating functional deficiencies, alleviating pain, socialization, and beck health in individuals who experienced problems related to physical and psychological health. It was determined that exercise improved the current status of the individuals experiencing physical health problems as well as creating significant effects on social and psychological status. 158ort his reason, exercise is an important tool in increasing the life quality of individuals who experience problems in terms of physical health.

CONCLUSION

In conclusion, having a disabled child is a wearisome process for parents. Protecting physical and psychological health will increase both the quality of life and efficiency during the care of the disabled child. In line with these positive developments, it is believed that exercise is a significant factor in solving the physical and psychological health problems experienced by mothers of children with CP and in reducing negative effects. It is thought that a one-hour period allocated by the mother for exercise will bring physical and psychological comfort and will be sufficient for increasing the quality of life.

Note

This study was produced from the author Sibel Yeniay's master's thesis.

Ethical statement

"We declare that the research reported in the paper was undertaken in compliance with the Helsinki Declaration of 1975, revised 1983 year."

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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