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CONTENTS / CUPRINS

The Benefits of Unified Football in Children with Mental Disabilities. A Pilot Study

Beneficiile Fotbalului Unificat la Copiii cu Dizabilități Mintale. Studiu Pilot

Enikő Gabriela PAPP [1], Răzvan CIMPEAN [1], Maria Paula CHERHAT [2], Victoria RUS [3]

Abstract

Introduction: The game has a key role in the development of children, but even more so in children with functional and special needs. To be able to play is a right and a duty, both in the case of physical disability and mental disability, because in addition to being a way to facilitate inclusion with other children, it can also be a powerful tool for the rehabilitation of various physical and mental deficits given by the functional diversity presented by each child; *Objective:* The main purpose of the paper was to test and evaluate the aerobic fitness, the maximum oxygen absorption and the evaluation by specific tests of the level of practical expression of skill in children with special needs; as well as the evaluation of the degree of social inclusion of children with disabilities through the method of the unified football game; *Methods:* Two groups of 6 children each were included in the study and participated in the Special Olympics Unified Football Championships, and during the training sessions they were tested using the Cooper Test, the adapted version for children with special needs and were questioned before and after training on social inclusion; *Conclusion:* The results recorded by students with special needs showed a statistically significant development of aerobic fitness and a significantly higher degree of social inclusion and empathy following the unified game.

Keywords: *disability, unified sports, children with special needs*

Rezumat

Introducere: Jocul are un rol cheie în dezvoltarea copiilor, dar cu atât mai mult la copiii cu nevoi funcționale și speciale. Jocul, este un drept și o datorie, atât caz de handicap fizic cât și de handicap mental, deoarece în afară de ceea ce înseamnă o modalitate de facilitare a incluziunii cu alți copii, poate reprezenta și un instrument puternic pentru reabilitarea

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diferitelor deficite fizice și mentale date de diversitatea funcțională prezentată de fiecare copil; *Obiectiv:* Scopul principal al lucrării a fost testarea și evaluarea fitness-ului aerob, a absorbției maxime de oxigen și evaluarea prin teste specifice a nivelului de exprimare practică a îndemânării la copii cu nevoi speciale; precum și evaluarea gradului de incluziune socială a copiilor cu dizabilități prin metoda jocului de fotbal unificat; *Metode:* Două loturi de câte 6 copii au fost incluse în studiu și au participat la campionatele de fotbal unificat Special Olympics, iar pe durata antrenamentelor au fost testați folosind Testul Cooper varianta adaptată pentru copii cu nevoi speciale și au fost chestionați înainte și după antrenamente referitor la incluziunea socială; *Concluzii:* Rezultatele înregistrate de către elevii cu nevoi speciale participanţi arată o dezvoltare semnificativă din punct de vedere statistic a fitness-ului aerob și un nivel semnificativ mai ridicat de incluziune socială și empatie în urma practicării jocului unificat.

Cuvinte cheie: *dizabilitate, sport unificat, copii cu nevoi speciale*

Introduction

Even if it does not receive the attention it deserves, play has an essential role in children's development, both cognitively and emotionally, as well as physically. Through games, children practically know the world around them and experience situations that can occur in real life. Depending on the age, the child will respond to certain games and will get acquainted with various situations through play [1-3]. The game helps children build team spirit and teaches children to behave nicely with each other. A study published in 2009 [4] in the Journal of Early Childhood Education revealed that free play or adult-guided play helps preschoolers become aware of the feelings of those around them. The game also helps them learn to control their own emotions, a skill that will be useful throughout their lives. The fact that they can experience new things without suffering because of the consequences of their actions is a huge benefit for children, according to psychologists. They also claim that play allows children to learn certain roles and learn social rules, and this benefit cannot be neglected either.

It's no secret that football has received its fair share of negative publicity. There has been a strong push to inform current and potential players about the dangers of the sport, especially head injuries. But despite the obvious risks of injury, we believe that football remains one of the most rewarding sports a child can play. The game of football, like other sports, offers various health benefits for a child. It is a physically demanding game that offers players an opportunity to improve their speed, agility, endurance, hand-eye coordination and overall cardiovascular endurance.

The friendship built between a team of football players is different from any other sport due to the large volume of teammates. With dozens of players working towards a common goal, a connection

that children develop with each other, it is invaluable. This camaraderie is a lifelong benefit for children, as they will quickly appreciate the importance of developing close relationships with others. Football is a game of stature and this margin of error requires special attention to detail from everyone on the field. A wrong step, a past step or a mental error can negatively affect any given game. Children who play football will learn the importance of discipline in everything they do. Football is truly a team game. With more players on each side of the ball, everyone is considered to play their individual role. There is a great deal of responsibility required for each player to have a specific role in each game. This teamwork helps children get used to working with others, a skill needed in almost all professions.

In addition to physical endurance, it takes a great mind to play football. Whether they are struggling with minor injury or overcoming adversity after an attack or a mistake, children often develop mental resilience that they may never otherwise discover. The game has a key role in the development of children, but even more so in children with functional and special needs. Because, in addition to representing a way of socio-educational learning, they are an effective tool for psychomotor stimulation to improve their development. Numerous scientific studies show that children's play facilitates the child's creative development and personality.

But when we talk about children with a kind of physical and mental disability, play can become therapeutic, because it is a multisensory channel that brings them benefits at the level: motor, sensory, cognitive, social, and emotional. The game has a key role in the development of children, but even more so in children with functional and special needs [5]. Because, in addition to representing a way of socio-educational learning [1-3], they are an effective tool for psychomotor stimulation to improve their development.

Numerous scientific studies show that children's play facilitates the child's creative development and personality, but we must also take into account a number of general and specific recommendations related to the selection and adaptation of toys for children with physical and mental disabilities. Some authors point out that a common ground that underlies children's play is extremely important, just as the design of the toy is "design for all", so that children with and without disabilities can use the same games in similar or shared conditions [6-10].

As the present study shows, the unified football game can offer children with mental disabilities multiple benefits, provided that they are adapted to their needs for physical and psychosocial development. Play, as we know, is a right and a duty, both in the case of physical disability and mental disability, because in addition to what it means to facilitate inclusion with other children, it can also be a tool strong for rehabilitation the various physical and mental deficits given by the functional diversity presented by each child.

The hypotheses from which this study was based were the following:

- The capacity of aerobic fitness can be significantly developed through the method of the unified football game.
- The level of social inclusion of children with special needs can be significantly improved by the unified football game method.

The first goal set is to test and evaluate aerobic capacity / aerobic fitness and maximum oxygen absorption. The second objective focuses on assessing the degree of social inclusion of children with disabilities through the method of the unified football game.

Material and Method

Study design

In order to achieve the objectives and test the hypothesis of our study, the students of the football team of the School Center for Inclusive Education No. 2 in Târgu Mureș, and the students of the football team of the National College "Unirea" Gymnasium Târgu Mureș trained together for participating in the unified football championship held by the Special Olympics Romania Foundation. The representative football team of the School Center for Inclusive Education No. 2 consists of students aged between 12 and 14 and performs two training sessions per week on the school sports field.

The research took place for 9 weeks between September 22 and December 15, 2019. The planning and scheduling of the training of the group of students included two trainings per week. During each training, they were allocated time to perform exercises in order to develop skill and endurance. The exercises proposed in this regard are specific to the game of football or include certain movements, actions, elements or technical procedures specific to the game. After consulting the literature in the field, some of the exercises were collected from the bibliographic materials studied and others were designed or adapted specifically to the medical condition (diagnosis) of students and the material base / conditions available in the school sports base. The initial testing was performed on September 22 and the final testing on December 15, 2019.

The first group of subjects of this study were students with special needs with a medium degree of mental disability, members of the football team of the School Center for Inclusive Education No. 2 in Târgu Mureș. The football team of the school trained in order to participate in the local, regional and national school championships, including the championship organized by the Special Olympics Romania Foundation. The students members of the representative team were selected following the annual organization of the school football championship, but also following the continuous selection made by the physical education teacher and the physiotherapist of the school.

The second group of subjects of this research are students without disabilities members of the football team of the Gymnasium of the National College "Unirea" Târgu Mureș.

All members of the representative teams performed the medical check-up, without which they cannot participate in competitions.

Table1. Table of students with special needs members of the football team of the School Center for Inclusive Education No. 2 in Târgu Mureș

No. of students	Age	Gender	Handicap degree	Primary / secondary diagnosis	No. of diagnostics
Subject 1	12 years	Male	Medium	Moderate mental retardation	1
Subject 2	12 years	Male	Medium	Moderate mental retardation	1
Subject 3	13 years	Male	Medium	Severe delay in the development of expressive language	1
Subject 4	13 years	Male	Medium	Moderate mental retardation, Moderate delay in language development	2
Subject 5	13 years	Male	Medium	Moderate mental retardation, Behavioral disorders	2
Subject 6	13 years	Male	Medium	Moderate mental retardation, Behavioral disorders	2

Inclusion criteria:

- Students aged 12-14 years;
- The favorable opinion of the three institutions for participating in this unified football game championship;
- The agreement of the parents / guardians / legal representatives of the students;
- The approval of the doctor of the school cabinet of the 2 institutions, for participating in sports activities.

Table 2. Table of students without disabilities, members of the football team of the "Unirea" National College Gymnasium, Târgu Mureș

No of students	Age	Gender
Subject 1	12 years	Male
Subject 2	12 years	Male
Subject 3	13 years	Male
Subject 4	13 years	Male
Subject 5	13 years	Male
Subject 6	14 years	Male

When choosing the subjects, the Regulations of the Unified National Football Championship [11] were taken into account and respected. Also, for the favorable approach of this evaluation I collaborated in the multidisciplinary team with the psychologist of the National College "Unirea", doctors of the

schools of the institutions involved and with the psychologist, physiotherapist of the School Center for Inclusive Education.

Complex model of adapted physical exercises in our study:

- *Working group:* value groups; running in varied tempo: 40 m tempo 2/4, 30 m running tempo ¾; 20 m running 4/4, 40 m running tempo 2/4, 60 m walking, 3-4 x, active break 2-3 min (the 60 m walking) [12].
- *Work training:* students are divided into value groups; 100 m run time 2/4, 100 m run time 3/4; 20 m running tempo 4/4, 100 m walking 3-4 x, active break 3-3 ½ min [12].

The following tests were implemented at the initial and final evaluation:

1. Cooper Test

Standard Cooper Test is a maximum test of physical fitness, which falls within the range of aerobic endurance tests [13]. It was designed by Kenneth H. Cooper in 1968 for testing and use in the US military sector [13, 14]. In its original form, the purpose of the test is to assess / test your aerobic / fitness for running as much as possible within 12 minutes. Rhythm is important because the participant will not cover a maximum distance if he starts with a pace too close to a full sprint. The result is based on the distance traveled by the person being tested, their age and gender.

Adapted Cooper Test. As the study group of this research consisted of including children with special needs, we decided to adapt the Standard Cooper Test as follows:

- In order to prevent injuries, the test was performed in the physical activity / sports room.
- The duration of the test has been changed, the standard time of 12 minutes, has been adapted to a time of 6 minutes.

2. Assessment of social inclusion

- For a clearer reflection of the level of acceptance of children with special needs, we designed a questionnaire with 10 questions that assesses the opinion of students at the National College "Union" on the interaction with children with disabilities. This questionnaire was applied to students before and after training.
- Also for the evaluation of the level of social inclusion, we designed a questionnaire of 8 questions which evaluates the opinion of students with special needs with a medium degree of disability, members of the football team of the School Center for Inclusive Education No. 2 in Târgu Mureș interaction with children who do not have disabilities. This questionnaire was applied to students before and after training.
- A scoring system was not developed for the interpretation of the questionnaire, but the interpretation was based on the frequency of answers to the questions in the questionnaire.

Analysis and Interpretation of Results

GraphPad Prism V.6.0 statistical software was used to statistically process the data. Significance tests for independent and dependent data were applied. The Kolmogorov Smirnov test was used to test the normality of the distribution curves of the measured variables. The significance tests applied were the Student's t test for paired and unpaired data. To compare the proportions we used the Chi square for trend test. The significance threshold chosen was alpha = 0.05, considering statistical significance when p was less than or equal to alpha = 0.05. The results are expressed as absolute frequencies, relative frequencies, mean +/- DS (standard deviation).

Results

Interpretation of results for the Cooper Test

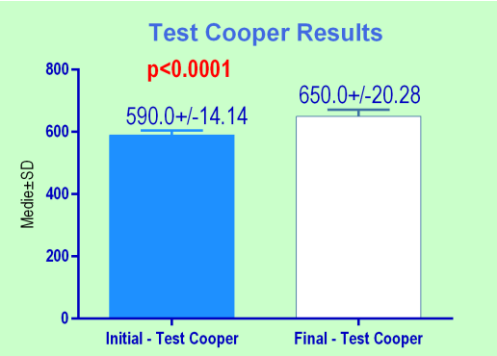

Figure 1. Comparison of Cooper Test Results - total sample (distance traveled in meters)

In Figure 1, the comparison of the results obtained at the Cooper Test for the total group of children with special needs, the results of the initial test and the results of the final test after training are highlighted. It can be seen that there is a statistically significant difference between the averages of the results before and after, 590.0 +/- 14.14 meters vs. 650.0 +/- 20.28 meters, p <0.0001, which means that the children's fitness improved after the training period, as they ran several meters in the final Cooper test.

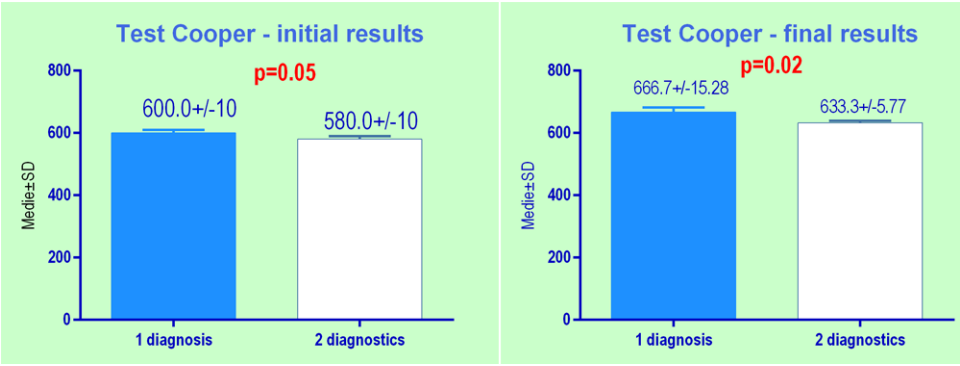

Figure 2. Comparison of initial and final Cooper Test Results according to number of diagnostics (distance in meters)

Comparison of the results of the initial Cooper Test according to number of diagnosis is shown in Figure 2, noting a significant difference between the outcome of children with a diagnosis and the outcome of children with 2 diagnoses (600.0 +/- 10 meters vs. 580 +/- 10 meters, p = 0.05), indicating that children with a diagnosis they ran a longer distance in 6 minutes, compared to children with 2 diagnoses.

Comparison of the results of the final Cooper Test according to number of diagnosis is shown in Figure 2, noting a significant difference between the outcome of children with a diagnosis and the outcome of children with 2 diagnoses (667.0 +/- 15.28 meters vs. 633 +/- 5.77 meters, p = 0.02), indicating that although the result improved from the initial test in all students, children with a diagnosis ran a significantly longer distance in 6 minutes, compared to children with 2 diagnoses.

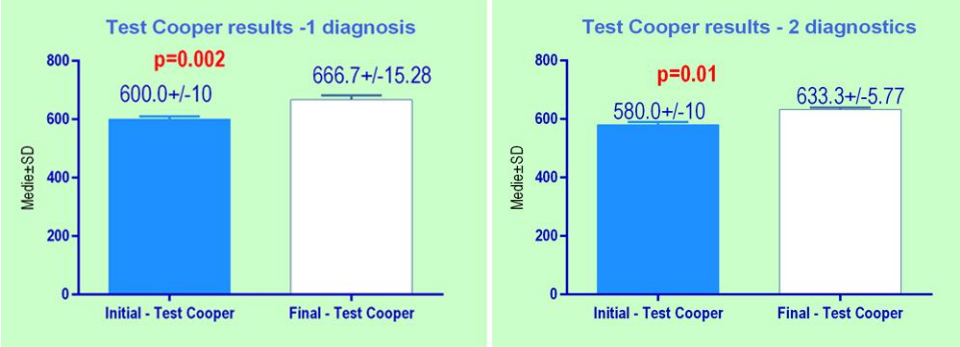

Figure 3. Comparison of Cooper Test results in children with 1 and 2 diagnostics (distance in meters)

Figure 3. highlights the results of children with a single diagnosis on the initial Cooper test, indicating that the results improved statistically significantly from the initial test to the final test, with children running a significantly longer distance to the final test that took place after unified training (600.0 +/- 10 meters vs. 666.7 +/- 15.28 meters, p = 0.002). Also, Figure 3 shows the results of children with two diagnoses on the initial Cooper test, indicating that the results improved statistically significantly from the initial test to the final test, with children running a significantly longer distance to the final test that took place after unified training (580.0 +/- 10 meters vs. 633.3 +/- 5.77 meters, p = 0.001).

Interpretation of results for Social Inclusion Assessment Questionnaires

Table 3 presents the comparison of the answers to the questionnaire for evaluating the level of social inclusion before and after training, applied to students from the School Center for Inclusive Education No. 2 in Târgu Mureș. After analyzing the results, in *"Question 3: What impact do you think the meeting with the children of the Unirea gymnasium will have on you? How do you think you will feel, what do you think will be your first reaction?"*After the test of comparing the answers before and after training, we obtained a significantly different results. Namely to the questionnaire applied before: only 16.7% of the children stated that they will feel included, in the final questionnaire the proportion changed to 66.7%; also to the questionnaire applied before 16.7% of the children stated that they will feel scared by the interaction with other children, this proportion being maintained at

the final questionnaire. Also, a percentage of 33.3% do not know how they will feel / what will be their first reaction to the meeting with the other children at the initial questionnaire, this changing at the final questionnaire, children becoming more confident, p = 0.04.

Table 3. Comparison of the answers to the questionnaire before and after training - School Center for Inclusive Education No. 2 in Târgu Mureș

Questions		**Before**	**%**	**After**	**%**	**Test/p**
Q1	Yes	3	50.0	5	83.3	0.65
	Not	3	50.0	0	0.0	
	I do not know	0	0.0	1	16.7	
Q2	Yes	1	16.7	5	83.3	0.17
	Not	5	83.3	0	0.0	
	I do not know	0	0.0	1	16.7	
Q3	I will feel included	1	16.7	4	66.7	***0.04***
	I will be reluctant	0	0.0	0	0.0	
	I will be scared	1	16.7	1	16.7	
	I will have no reaction	2	33.3	1	16.7	
	I do not know	2	33.3	0	0.0	
Q4	Easy	0	0.0	1	16.7	0.35
	Hard	2	33.3	0	0.0	
	Applicant	0	0.0	2	33.3	
	Acceptable	1	16.7	3	50.0	
	I do not know	3	50.0	0	0.0	
Q5	They will play very well	3	50.0	4	66.7	0.49
	They will play acceptable	1	16.7	1	16.7	
	We won't be able to sync	0	0.0	0	0.0	
	I don't think they will play very well	0	0.0	0	0.0	
	I do not know	2	33.3	1	16.7	
Q6	Yes	5	83.3	6	100.0	0.29
	Not	1	16.7	0	0.0	
	Little bit	0	0.0	0	0.0	
	I do not know	0	0.0	0	0.0	
Q7	Yes	1	16.7	2	33.3	0.75
	Not	2	33.3	2	33.3	
	I do not know	3	50.0	1	16.7	
	Slightly better	0	0.0	1	16.7	
Q8	They will feel good	2	33.3	6	100.0	**0.04**
	They will not feel well	0	0.0	0	0.0	
	I do not know	4	66.7	0	0.0	

Question 8: Before this experience, how do you think the children of Unirea Gymnasium will feel?

A share of 66.7% expressed insecurity before training stating that they do not know how other children will feel when interacting with them, and 33.3% said they will feel good.

And at the final questioning, all 6 children stated that they think that the other students from the National College "Unirea" felt good at the training and unified football games they played together, p = 0.04.

Table 4. Comparison of the answers to the questionnaire before and after training - "Unirea" National Gymnasium

Questions		**Before**	**%**	**After n**	**%**	**Test/p**
Q1	Yes	4	66.7	6	100.0	0.12
	Not	2	33.3	0	0.0	
	I do not know	0	0.0	0	0.0	
Q2	Yes	2	33.3	5	83.3	0.37
	Not	4	66.7	0	0.0	
	I do not know	0	0.0	1	16.7	
Q3	I will feel empathy	2	33.3	1	16.7	0.31
	I will feel ashamed	0	0.0	0	0.0	
	I will be reluctant	1	16.7	0	0.0	
	I will be scared	0	0.0	0	0.0	
	I will have no reaction	3	50.0	5	83.3	
	I do not know	0	0.0	0	0.0	
Q4	Easy	4	66.7	3	50.0	0.71
	Hard	0	0.0	0	0.0	
	Applicant	0	0.0	0	0.0	
	Acceptable	1	16.7	3	50.0	
	I do not know	1	16.7	0	0.0	
Q5	They will play very well	2	33.3	4	66.7	0.1
	They will play acceptable	2	33.3	2	33.3	
	We won't be able to sync	0	0.0	0	0.0	
	I don't think they will play very well	0	0.0	0	0.0	
	I do not know	2	33.3	0	0.0	
Q6	Normal, it won't be anything	5	83.3	6	100.0	0.29
	I'm skeptical about this interaction	1	16.7	0	0.0	
	I don't know if I'll be able to get along	0	0.0	0	0.0	
Q7	Yes	0	0.0	0	0.0	***0.03***
	Not	0	0.0	3	50.0	
	Little bit	2	33.3	2	33.3	
	I do not know	4	66.7	1	16.7	
Q8	Yes	0	0.0	0	0.0	0.12
	Not	4	66.7	6	100.0	
	I do not know	2	33.3	0	0.0	
Q9	Yes	4	66.7	2	33.3	0.34
	Not	0	0.0	0	0.0	
	Slightly better	1	16.7	3	50.0	
	I do not know	1	16.7	1	16.7	
Q10	They will feel good	4	66.7	2	33.3	0.9
	They will feel ashamed	0	0.0	0	0.0	
	They will feel that they belong to the	0	0.0	4	66.7	
	They will not feel included / accepted	0	0.0	0	0.0	
	I do not know	2	33.3	0	0.0	

Discussion and Conclusion

The results recorded by students with special needs participating in the our research show a statistically significant development of aerobic fitness. The results of the present research being very similar with the results highlighted in other similar studies [15, 16].

The methods and means implemented in the process of preparing the group of students with special needs that make up the representative football team have proven to be effective. We believe that these methods and means can be enriched and improved.

In studies conducted Weiss J and Klein T, it was reported that children with special needs participating in Special Olympics showed high self-esteem, high social adjustment, visibly high physical competence and peer acceptance compared to non-participating children [17, 18].

Regarding the level of social inclusion of children with disabilities, our results indicate that although before the start of training for the unified football championship, both groups of students both those from the National Gymnasium "Unirea" and students with special needs, felt in uncertainty, and they had more negative opinions about the interaction they will have during training, instead in the final testing / questioning we identified significant differences, both groups of students significantly changing their opinion about their peers. They manifest feelings of social inclusion, empathy, well-being and the absence of difference (non-difference), our results confirming the findings of authors Kelly L, and Addams D, in the studies published 2011 and 2017 [5, 19].

Moreover, the results obtained in the present research reinforce the results obtained by Dykens EM in his research which concluded that participating in sports improves the psychological well-being of children with disabilities by providing opportunities to form friendships, express their creativity, and develop a self-identity [20].

The study conducted by Murphy N. [21], et al published in 2008 shows that the psychosocial consequences of physical inactivity include decreased self-esteem, decreased social acceptance, and ultimately a greater dependence on others for daily life. Also, this study emphasizes that the participation of children with disabilities in sports and physical activities can reduce the complications of immobility.

Following the analysis of the results we can say that the hypotheses of the study, the capacity of aerobic fitness can be significantly developed by the unified football game method and the level of social inclusion of children with special needs can be significantly improved by the unified football game method, were confirmed.

We also consider it beneficial to create a permanent program that promotes the exchange of experience and interaction between students with disabilities and students without disabilities in the

training process because through current research we have identified that the effects are significantly positive.

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Limiting Factors on the Rehabilitation Potential in the Elderly Postoperative Period in Orthopedic – Traumatology Patients of Geriatric Profile

Factori Limitativi ai Potențialului de Reabilitare în Perioada Postoperatorie la Pacienții Ortopedici – Traumatologici de Profil Geriatric

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Abstract

Introduction: Falls in the elderly are public health problem, with injuries in people over the age of 75 at increased risk of death. Various aspects and consequences of surgical intervention in the elderly often lead to a temporary limitation of the rehabilitation potential of patients and a delay in their functional recovery, at the same time as an increase in hospital stay. *Aim:* The aim of the study is to determine the most common clinical factors limiting the rehabilitation potential of orthopedic - traumatological patients of geriatric profile in the early postoperative period. *Material and methods:* A total of 8087 patients for surgical treatment. In the period 2017 - 2021, a total of 8087 patients for surgical treatment passed through the base of the Clinic of Orthopedics and Traumatology at the University Hospital - Kaneff. Of these, 4973 (61.49%) aged 65-85. Distribution by age: 65 – 70 years: 22% (n=1121), 70 – 75 years: 30% (n=1476), 75 – 80 years: 27% (n=1328), 80 – 85 years: 21% (n=1048). By location of the trauma: with fractures of the upper limb and spine 57.45% (n = 2857) and with fractures of the pelvis and lower limbs - 42.25% (n = 2116). *Results:* Those who lay more than 2 days preoperatively (2-5) were 16.37% (n = 273), postoperative blood transfusions were 13.97% (n = 233), with established postoperative cardiac disorders were 22.55% (n = 376), in perioperative delirium the average (2 - 8 days) was 9.47% (n = 158), with elevated body temperature postoperatively above 37.5 - 39.83% (n = 664). *Discussion:* Prognostic factors for the final result are the time for the perioperative period, the length of hospital stay and postoperative complications. Delayed surgery is associated with a higher risk of complications and increased mortality. Postoperative complications, in turn, increase both short-term and long-term mortality. Prolonged preoperative bed, perioperative blood loss, perioperative delirium and elevated body temperature (hyperthermia) are also factors influencing the outcome of the surgery. *Conclusion:* The results of the study show that that the main limiting factors on the rehabilitation potential of orthopedic-trauma patients of geriatric profile are perioperative delirium, long preoperative bed rest and cardiovascular postoperative complication.

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Keywords: *geriatric, rehabilitation, limiting factors*

Rezumat

Introducere: Căderile la vârstnici reprezintă o problemă de sănătate publică, cu leziuni la persoanele peste 75 de ani, având risc crescut de deces. Diverse aspecte și consecințe ale intervenției chirurgicale la vârstnici conduc adesea la o limitare temporară a potențialului de reabilitare a pacienților și la o întârziere a recuperării funcționale a acestora, concomitent cu o creștere a zilelor de spitalizare. *Scop:* Scopul studiului este de a determina cei mai frecvenți factori clinici care limitează potențialul de reabilitare al pacienților ortopedici - traumatologici de profil geriatric în perioada postoperatorie precoce. *Material și metode:* În perioada 2017 - 2021, prin baza Clinicii de Ortopedie și Traumatologie de la Spitalul Universitar – Kaneff au trecut în total 8087 de pacienți pentru tratament chirurgical dintre care 4973 (61,49%) cu vârstă de 65-85 de ani. Distribuția după vârstă a fost: 65 – 70 ani: 22% (n=1121), 70 – 75 ani: 30% (n=1476), 75 – 80 ani: 27% (n=1328), 80 – 85 ani: 21% (n=1048). Distribuția subiecților după localizarea traumatismului a fost: cu fracturi ale membrului superior și ale coloanei vertebrale 57,45% (n = 2857) și cu fracturi ale bazinului și membrelor inferioare - 42,25% (n = 2116). *Rezultate:* Cei care au stat la pat mai mult de 2 zile preoperator (2-5) au fost de 16,37% (n = 273), transfuziile de sânge postoperatorii au fost de 13,97% (n = 233), cu tulburări cardiace postoperatorii stabilite au fost de 22,55% (n = 376), în delirul perioperator media (2 - 8 zile) a fost de 9,47% (n = 158), cu temperatura corporală crescută postoperator peste 37,5 - 39,83% (n = 664). *Discuție:* Factorii de prognostic pentru rezultatul final sunt timpul pentru perioada perioperatorie, durata spitalizării și complicațiile postoperatorii. Intervenția chirurgicală întârziată este asociată cu un risc mai mare de complicații și cu o mortalitate crescută. Complicațiile postoperatorii, la rândul lor, cresc mortalitatea atât pe termen scurt, cât și pe termen lung. Statul la pat prelungit preoperator, pierderea de sânge perioperatorie, delirul perioperator și temperatura corporală crescută (hipertermia) sunt, de asemenea, factori care influențează rezultatul intervenției chirurgicale. *Concluzie:* Rezultatele studiului arată că principalii factori limitanți ai potențialului de reabilitare al pacienților ortopedici - traumatizați de profil geriatric sunt delirul perioperator, repausul preoperator prelungit la pat și complicațiile cardiovasculare postoperatorii.

Cuvinte cheie: *geriatrie, reabilitare, factori limitativi*

Introduction

Falls in the elderly are common, with injuries in people over the age of 75 at increased risk of death [1]. According to the literature, 33% of people over the age of 65 suffer falls [2]. The traumatic moment superimposed on osteoporotic bone structures almost always leads to a fracture [3]. The increased incidence of fractures of the femoral neck, vertebrae and forearms is attributed to osteoporosis in people over 50 years of age [4]. In a large percentage of cases,

surgical treatment is the first choice as an option for faster and more reliable functional recovery, despite the existing peri- and postoperative risk for patients. The largest number of surgeries are those after a fracture of the lower limbs. Very often they are accompanied by severe injuries, prolonged treatment and a long recovery time [5]. However, various aspects and consequences of surgical intervention in the elderly often lead to a temporary limitation of the rehabilitation potential of patients and a delay in their functional recovery, at the same time as an increase in hospital stay. Rehabilitation potential is determined based on a combination of cognitive functions, medical status, motivation, social support and economic resources of the patient [6]. Among the literature we studied in the database of SCOPUS, Web of Science and ELSEVIER (search period 2011 - 2021) we found data on postoperative factors that increase the risk of mortality and prolongation of hospital stay, but we did not find studied and systematized clinical factors, limiting the rehabilitation potential of patients with geriatric profile with orthopedic - traumatological operations in the early postoperative period.

The aim of the present study is to determine the most common clinical factors limiting the rehabilitation potential of orthopedic - traumatological patients of geriatric profile in the early postoperative period.

Material and methods

During the period 2017 - 2021, a total of 8087 patients for surgical treatment passed through the base of the Clinic of Orthopedics and Traumatology at the University Hospital - Kaneff. Of these, 4973 (61.49%) aged 65-85, of which 2652 women (53.32%) and 2321 men (46.67%) by sex. Distribution by years: 65 – 70 years: 22% (n=1121), 70 – 75 years: 30% (n=1476), 75 – 80 years: 27% (n=1328), 80 – 85 years: 21% (n=1048). (figure1)

By location of the trauma: with fractures of the upper limb and spine 57.45% (n = 2857) and with fractures of the pelvis and lower limbs - 42.25% (n = 2116). Patients were followed from admission to the orthopedics and traumatology clinic until their discharge.

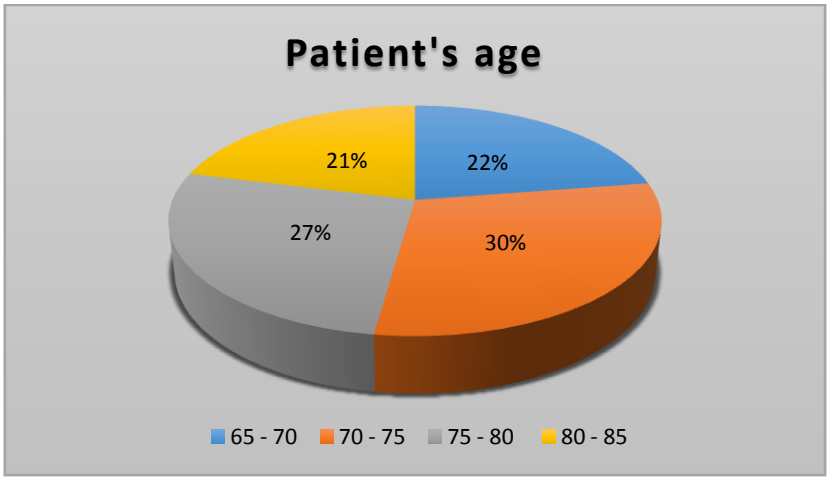

Figure 1. - Patient's age distribution

From this patient contingent we differentiated the most common postoperative restrictions that prevent the implementation of rehabilitation measures. A total of 35.31% (n = 1756) of patients aged 65 to 85 years (mean 74.8 years) were observed. Of these, 87.24% (n = 1532) had fractures of the lower limb or pelvis and 12.76% (n = 244) had fractures of the upper limb. Those who lay more than 2 days preoperatively (2-5) were 16.37% (n = 273), postoperative blood transfusions were 13.97% (n = 233), with established postoperative cardiac disorders were 22.55% (n = 376), in perioperative delirium the average (2 - 8 days) was 9.47% (n = 158), with elevated body temperature postoperatively above 37.5 - 39.83% (n = 664). (figure 2)

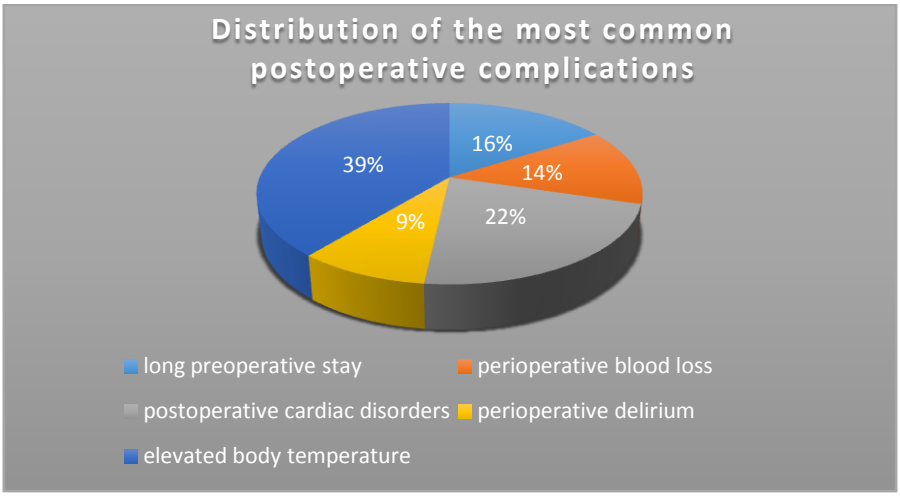

Figure 2. - Distribution of the most common postoperative complications

Postoperative complications such as hypostatic pneumonia (n = 6), deep vein thrombosis (n = 3) and others were also encountered, but their frequency was rare and therefore not included in the study. Deceased patients were also excluded (n = 5). Patients who lays more than 2 days preoperatively, with postoperative blood transfusion, with established postoperative cardiac disorders, in perioperative delirium and with elevated body temperature postoperatively above 37.5 were included in experimental group (n = 1705). The control group consisted of patients operated within 12 hours of their reception and did not show postoperative complications (n = 528).

Statistical Analysis

For statistical analysis SPSS 15.0 was used. Values are presented as means and standard deviation (SD).

Results

The hospital stay in the orthopedics and traumatology clinic of the examined patients was on average 11 days (+/- 3). During this time, their rehabilitation program included breathing exercises, passive exercises, active movements, gradual verticalization performed twice a day in good general condition of the patients and the lack of immediate contraindications for the use of physiotherapy. Blood pressure, pulse rate and body temperature were measured twice - before

and after the physiotherapy procedure (PT). The obtained data of the patients from the studied contingent were again compared with the patients from the control group, operated on up to 12 hours after their admission and did not show peri- or postoperative complications until their discharge from the clinic. (table 1)

Table 1 - Average values and standart deviation of blood pressure, puls rate and body temperature

Group	Index	Blood pressure (mm/Hg)		Puls (min)		Body temperature (degrees)	
		before PT	after PT	before PT	after PT	before PT	after PT
Experimental	pre-operative stay more 2 days (n=273)	127±7/ 72±8	143±15/ 84±12	65±8	72±9	36.2±0.7	36.7±0.2
	blood transfusion (n=233)	122±10/ 68±8	145±12/ 87±10	60±9	85±11	36.4±0.3	36.8±0.5
	cardiovascular complications (n=376)	138±11/ 73±13	153±9/ 89±11	68±10	92±13	36.1±0.4	36.7±0.3
	perioperative delirium (n=158)	127±9/ 79±8	141±12/ 81±9	65±8	89±6	36.0±0.5	36.6±0.3
	high body temperature >37,5^{o} (n=664)	136±6/ 76±5	139±8/ 83±9	68±4	76±9	37.8±0.2	38.8±0.1
Control	without complications (n=528)	124±8/ 65±10	132±12/ 75±9	62±8	75±9	36.4±0.3	36.8±0.2

The mean values of the measured indicators of blood pressure, pulse rate and body temperature show sensitivity to varying degrees in different groups of patients. Changes in blood pressure values before and after the rehabilitation procedure are most pronounced as expected in patients with cardiovascular complications, and with the lowest dynamics of the indicators are in those with fever. However, compared to the mean values of patients who did not show postoperative complications, in all other groups there were more serious differences in the values of systolic and diastolic blood pressure before and after exercise. In the case of the pulse rate indicator, the reasonably changes in the mean values in the different groups of patients are analogous to those observed in the measurement of blood pressure. The results obtained in this way show that in patients from the groups with postoperative complications, the standard rehabilitation measures have a more stressful effect on the cardiovascular system. At the mean values of the body temperature indicator dynamics is observed only in the patients from the group with fever, as the mean values rise by 1 degree and lead to a state of general fatigue of the patients, rapid fatigue and exhaustion of the rehabilitation potential. In addition, fever increases the preconditions for the development of subsequent local postoperative infection.

Pre-operatively and at the end of their hospital stay, the patients were assessed by the Barthel's

test for the degree of functional independence, as a reliable test for assessment in adult patients with fractures [7]. The results were compared between the experimental and control groups pre- and postoperatively. (table 2), (table 3)

Table 2. –Preoperative Barthel's score patients results in control and experimental groups

Index	pre-operative experimental group score *mean values and SD* (n=1705)	pre-operative control group score *mean values and SD* (n=528)	p ≤ 0,05
Total Barthel score	96,5±2.03	95,7±3.11	p = 0.000
feeding	9.18±0.53	9.21±0.18	p = 0.001
bathing	4.28±0.51	3.87±1.24	p = 0.000
grooming	3.94±1.10	4.01±0.62	p = 0.000
dressing	9.26±0.18	9.19±0.25	p = 0.001
bowels	8.75±1.25	8.18±1.01	p = 0.000
bladder	9.02±0.85	8.56±1.03	p = 0.001
toilet use	9.23±0.66	9.41±0.28	p = 0.001
transfers	12.56±2.51	11.89±3.02	p = 0.000
mobility	13.04±1.56	12.85±1.28	p = 0.000
stairs	9.25±0.41	8.98±1.02	p = 0.001

The data obtained from the preoperative testing shows similar values both in the overall result and in the individual components of the Barthel test. Patients in both groups showed a high level of self – care and functional independence. The similar results give grounds to claim that the two groups of patients are comparable and the results obtained from postoperative testing will be reliable.

Table 3. – Postoperative Barthel's score patients results in control and experimental group at the end of the hospital stay

Index	postoperative experimental group score *mean values and SD* (n=1705)	postoperative control group score *mean values and SD* (n=528)	p ≤ 0,05
Total Barthel score	43.09± 10.32	75.14±11.95	p = 0.001
feeding	6.13±2.13	9.36±2.35	p = 0.005
bathing	1.39±1.02	4.21±1.42	p = 0.001
grooming	3.30±1.51	4.23±1.79	p = 0.000
dressing	2.98±1.18	4.65±2.05	p = 0.001
bowels	7.16±2.42	8.67±2.53	p = 0.001
bladder	6.99±2.18	9.21±1.85	p = 0.003
toilet use	4.79±1.36	8.76±1.22	p = 0.001
transfers	5.34±2.47	9.26±0.56	p = 0.000
mobility	3.91±1.75	10.58±3.24	p = 0.000
stairs	1.09±0.81	6.21±1.76	p = 0.001

Postoperative testing shows significant differences in the overall result and the individual components between the two groups. In order to be more precise in the analysis of the reasons for this, we examined in detail the obtained average values for each subgroup in the experimental group. (table 4)

Table 4. –Detail Barthel's results in experimental group

Index	pre-operative stay more 2 days *mean values and SD* (n=273)	blood transfusion *mean values and SD* (n=233)	cardiovascular complications *mean values and SD* (n=376)	perioperative delirium *mean values and SD* (n=158)	high body temperature > 37,5° *mean values and SD* (n=664)
Total Barthel score	40.55±3.25	49.24±1.05	42.58±2.82	24.22±2.36	58.85±4.21
feeding	6.22±1.05	7.24±1.02	6.12±1.2	2.52±1.1	8.56±1.5
bathing	0.06±0.01	2.46±0.5	0.52±0.21	0.05±0.7	3.85±0.8
grooming	3.17±1.2	3.25±1.02	3.50±1.1	2.83±1.1	3.76±1.2
dressing	2.15±1.02	3.15±1.8	3.74±0.9	1.56±1.2	4.28±0.9
bowels	7.61±1.0	7.86±1.9	7.52±2.2	4.62±0.6	8.21±1.6
bladder	6.85±1.05	7.21±2.01	7.36±1.8	5.18±1.1	8.36±1.1
toilet use	4.53±0.8	5.16±1.5	4.86±1.2	3.24±0.4	6.18±1.6
transfers	5.18±1.4	6.39±1.02	5.24±0.6	2.63±1.3	7.24±1.2
mobility	4.28±1.9	4.96±1.4	3.52±2.1	1.54±0.2	5.27±2.3
stairs	0.5±0.2	1.56±1.1	0.2±0.1	0.05±0.01	3.14±1.5

After the observations and the Barthel test, it is clear that the most limited rehabilitation potential is observed in patients with perioperative delirium, followed by patients who lay postoperatively for 2 or more days and those with postoperative cardio-vascular complications. Slightly more limited is the rehabilitation potential in patients who underwent blood transfusion and the highest rehabilitation potential of the studied contingent is observed in patients with elevated postoperative body temperature above 37.5.

Discussion

Basic risk factors for mortality in patients with hip fractures in special are chronic obstructive pulmonary disease, heart failure, dementia and malignancies. Prognostic factors for the final result are the time for the perioperative period, the length of hospital stay and postoperative complications. Preoperative comorbidities are significant risk factors for postoperative complications [8, 9]. Delayed surgery is associated with a higher risk of complications and increased mortality. Postoperative complications, in turn, increase both short-term and long-term mortality [10, 11].

Prolonged preoperative bed rest leads to hypokinesia, muscular hypotrophy, congestion in the cardiopulmonary system, risk of hypostatic pneumonia, orthostatic reaction in subsequent late

attempt at verticalization, a serious prerequisite for disruption of trophism of certain soft tissue areas and related wounds. The long period of bed rest of the patients preoperatively leads to general atony of the patient and significantly delays the terms for mobilization, verticalization, self-care and functional recovery.In addition, delaying surgery by up to 48 hours increased the risk of mortality in patients with proximal femur fractures by 7% to 15.8% [12].

Perioperative blood loss leads to a breakdown in hemodynamics, expressed to varying degrees in each patient. Given the geriatric profile of patients and related comorbidities such as hypertension, chronic congestive heart failure, valvular prosthetics, stents, shunts, etc., along with chronic obstructive pulmonary changes, the large blood loss during surgery puts the compensatory test seriously of the cardiopulmonary system of patients in the early postoperative period. As a result, the values of blood pressure and pulse rate in the first days after surgery are highly variable, which severely limits the rehabilitation capabilities of the rehabilitation procedure in these patients. Another major factor that has a direct impact on the effectiveness of rehabilitation measures is the value of hemoglobin [13].

Perioperative delirium is common in orthopedic patients - 5% to 67%, especially in patients with pelvic fractures - up to 73%. Delirium is a complex multiplier phenomenon affecting the central nervous system [14]. It is manifested by a hyperactive or hypoactive form. The object of drug treatment is most often the hyperactive form. Delirium is diagnosed in conditions associated with the presence of a sudden, acute change in the patient's behavior, which shows a tendency to fluctuate from minutes to hours during the day; changes in the way of thinking, attention, consciousness, orientation, perceptions and memory; changes in psychomotor skills; disturbances in the waking cycle - sleep; there is concrete evidence that mental changes are due to an acute somatic illness, the intake or abrupt cessation of medications and substances (e.g. alcohol), or a combination of both [15]. Thereisnoconvinceevidenceforthetreatmentofdelirium [16, 17]. Carrying out a physiotherapy procedure without the active participation and assistance of a conscious patient is ineffective and inexpedient. Very often the psychotic component in patients in a state of delirium hinders rehabilitation activities, and inadequate or aggressive behavior reduces the possibility of conducting a physiotherapy procedure to zero. All this leads to an increase in the days of hospital stay and a delay in functional recovery after surgery [18].

Elevated body temperature (hyperthermia) is a result from abnormal temperature regulation [19]. Elevated body temperature above 37.5 degrees of unknown origin is among the general contraindications for physiotherapy. The reason for this is that the activation of the muscles and the movement of the body or parts of it accelerate the local and general blood flow, which leads to hyperemia and an increase in local and general body temperature. As a result, in the presence of an already increased one, the expected result is for an even greater increase in values.In addition, the unexplained origin gives an indication of local or general infection of bacterial or viral type. Accelerated blood flow and an active muscle pump contribute to the rapid spread of the infection, which would significantly complicate its control and lead to deterioration of the general condition of the patient.On the other hand, the use of active cooling therapy is also not

recommended in patients without sedation with moderate temperature, as it does not reduce the core temperature, but increases the rate of metabolism, activates the autonomic nervous system and provokes thermal discomfort [20].

Conclusion

Based on the results of the study, we can conclude that the main limiting factors on the rehabilitation potential of orthopedic - traumatological patients of geriatric profile are perioperative delirium, long preoperative bed rest and cardiovascular postoperative complications. The large perioperative blood loss, as well as to some extent the postoperative fever, also have a negative impact on the rehabilitation potential.All these complications limit the rehabilitation potential of patients, and this leads to a delay in functional recovery, limit the degree of independence and delay the return to daily life.

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The Importance of Vojta Therapy in the Rehabilitation Process of Patients with Lumbar Disc Herniation

Importanța Terapiei Vojta în Recuperarea Pacienților cu Hernie de Disc Lombară

Monica Elena IOSUB [1], Liviu LAZĂR [2]

Abstract

There are many certified therapies even alternative therapies that can reduce or maintain the level of a herniated disc.The results of the tests depend on the clinical response of the patients, as well as on the chosen therapies. In the chosen study i compared the results of two groups of patients, in the first group the patients performed physiotherapy together with Vojta Therapy and in the second group, the patients performed only physiotherapy. I chose to use Vojta Therapy in the recovery of patients, because it acts on the Central Nervous System (CNS), and patients have involuntary muscle reactions, instead physiotherapy is based only on voluntary muscle contactions. The response of the patients to the treatment was a positive one regarding both groups, but with better scores within the group that also performed Vojta Therapy.

Keywords: *lumbar disc herniation, lower back pain, physiotherapy, Vojta Therapy*

Rezumat

Există numeroase terapii atestate chiar și terapii alternative care pot reduce sau menține nivelul herniei de disc. Rezultatele testelor depind de răspunsul clinic al pacienților, cât și de terapiile alese. În studiul ales am comparat rezultatele a două loturi de pacienți, în primul lot pacienții au efectuat kinetoterapie împreună cu Terapia Vojta și în al doilea lot, pacienții au efectuat doar kinetoterapie. Am ales să folosesc Terapia Vojta în recuparareа pacienților, pentru că ea acționează asupra Sistemului Nervos Central (SNC), iar pacienții au reacții musculare involuntare, în schimb kinetoterapia se bazează doar pe contacții musculare voluntare. Răspunsul pacienților la tratament a fost unul pozitiv privind ambele loturi, dar cu scoruri mai bune în cadrul lotului care a efectuat și Terapia Vojta.

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Cuvinte cheie: *hernie de disc lombară, durere lombară joasă, kinetoterapie, Terapia Vojta*

Introduction

Lumbar disc herniation (HDL) is a common problem among the population, especially the professionally active [5, 7, 8, 9, 13]. Epidemiological studies have shown that about 80% of the population experience lower back pain in their lifetime [8, 10, 11, 13]. The herniated disc is a fissure in the fibrous ring of the disc, which allows the gradual movement of the nucleus pulposus to the spinal canal, causing compression on the nerve roots. The vertebral bodies and intervertebral discs are connected to each other anteriorly by the anterior longitudinal ligament (stronger) and posteriorly by the posterior longitudinal ligament (thinner, which explains the appearance of disc herniations at this level).The most common disc herniation occurs in the last two lumbar vertebral discs, where the pressure on the vertebral discs is greatest. The symptoms depend on where the hernia occurs. Depending on the level of the disc herniation and the degree of hernia, symptoms may occur in the lower back, buttocks, thighs, calves or toes, usually unilaterally. Due to the fact that the nerve roots lead both the motor impulse to a certain area of the foot and the sensations from the peripheral level to the spinal cord, numbness, feeling of weakness, tingling may occur. The aim of this study was to prove the benefits of Vojta therapy in decreasing low back pain, and increasing quality of life of the pacients with herniated lumbar disc. [7, 11, 12, 13, 14]

Material and Methods

A prospective 6-month comparative study was performed on 80 patients with lumbar disc herniation, of which: 40 patients underwent physiotherapy and Vojta exercises (study group) and 40 patients underwent physiotherapy (control group) between 2019 and 2020.

We used the method of observation and recording of data - which consisted of measuring the established parameters, obtained in the complete evaluation of patients, according to a known methodology [5, 6, 7, 9, 10, 11, 12, 14], which complied with international standards, applied in our country; the data were recorded over a period of 6 months for each case, the evaluation taking place at the beginning of the study - and at its conclusion.

The method of statistical-mathematical processing of the obtained data was used, which consisted of: processing of the obtained results, of the mathematical values, of the physiological parameters measured, according to the calculation methods, determination of the scales used, interpretation of all results based on existing standard norms.

In both groups (table 1), women predominated (65.00% vs. 62.50%, p = 0.817), the ratio of women / men being 1.9: 1, respectively 1.7: 1.

Table 1: Gender distribution

GENDER	Study group		Group control	
	Nr.	%	Nr.	%
Women	26	65,00	25	62,50
Man	14	35,00	15	37,50
Total	**40**	**100,00**	**40**	**100,00**

Most patients in both groups were active (45.00% vs 50.00%, p = 0.656), sedentary lifestyle being declared by 22.50%, respectively 25.00% of patients (p = 0.786). (table 2)

The most frequently adopted position during the day was both sitting and orthostatism (45.00% vs 70.00%, p = 0.025).

Table 2: Distribution according to activity and position

	Study group		Group control	
	Nr.	%	Nr.	%
Activity				
Very activ	13	32,50	10	25,00
Activ	18	45,00	20	50,00
Sedentary	9	22,50	10	25,00
Pozition				
Sitting	8	20,00	7	17,50
Standing	14	35,00	5	12,50
Both	18	45,00	28	70,00

Over 60% of the patients in the two groups (table 3) had a disease of less than 10 years (62.50% vs. 67.50%, p = 0.641). The mean age was significantly higher in the study group compared to the control group (11.08 years vs. 10.38 years, p = 0.758).

Table 3: The age of the disease

	Study group		Group control	
	Nr.	%	Nr.	%
<5 years	15	37,50	16	40,00
6-10 years	10	25,00	11	27,50
11-15 years	6	15,00	2	5,00
> 15 years	9	22,50	11	27,50
Average age (years)	11,08±10,99		10,38±9,14	

In over 80% of the patients in the two groups (table 4), the pain was subacute or chronic (42.0% vs 40.00%, p = 0.821).

Table 4: The type of pain

	Study group		Group control	
	Nr.	%	Nr.	%
Acute	6	15,00	8	20,00
Subacute	17	42,50	16	40,00
Chronic	17	42,50	16	40,00

Table 5: The moment of the onset of pain

	Study group		Group control	
	Nr.	**%**	**Nr.**	**%**
Sleep	0	0,00	2	5,00
Sleep + awakening	2	5,00	1	2,50
Sleep + activity	6	15,00	1	2,50
Awakening	2	5,00	4	10,00
Awakening + activity	6	15,00	2	5,00
Activity	22	55,00	27	67,50
Sleep + awakening + activity	2	5,00	3	7,50

Most of the patients in the two groups (table 5), pain occurs during activity (90.00% vs. 82.50%, p = 0.333). Upon awakening, the pain appears in 25.00%, respectively 17.50% of the patients (p = 0.415), and during sleep at 25.00%, respectively 25.00% (p = 0.619).

Results

At the initial evaluation (table 6), the average value of the FPS-R score was insignificantly lower in the study group compared to the control group, and at the evaluation at 6 months it was insignificantly higher (6.45 vs. 6.78, p = 0.507, respectively 3.85 vs. 3.33, p = 0.280). The mean value of the FPS-R score decreased significantly in both groups (from 6.45 to 3.85, p <0.001, respectively from 6.78 to 3.33, p <0.001). The effect of treatment on the FPS-R score was major in both groups (ES = 1.07 and ES = 1.83, respectively).

Table 6: Scale FPS-R

Scale FPS-R	**Study group**	**Group control**	**p**
Initially	6,45±2,44	6,78±1,89	0,507
At 6 months	3,85±2,25	3,33±2,07	0,280
p	<0,001	<0,001	
ES	1,07	1,83	

The Seze sign was initially present in 65.00% of the patients in the study group and in 62.50% of those in the control group (p = 0.817). (table 7)

At the evaluation from 6 months, the presence of the Seze sign decreased significantly in both groups (from 65.00% to 32.50%, p = 0.004, respectively from 62.50% to 27.50%, p = 0.002).

Table 7: The Seze sign

Semnul Seze	**Study group**		**Group control**		**p**
	Nr	**%**	**Nr.**	**%**	
Initially	26	65,00	25	62,50	0,817
At 6 months	13	32,50	11	27,50	0,628
p	0,004		0,002		

The Bragard sign was initially present in 95.00% of the patients in the study group and in 87.50% of those in the control group (p = 0.238). (table 8)

At the 6-month assessment, the presence of the Bragard sign decreased significantly in the study group (with associated Vojta therapy) (from 95.00% to 72.50%, p = 0.007) and decreased insignificantly in the control group (from 87.50% to 72.50%, p = 0.096).

Table 8: The Bragard sign

Bragard sign	**Study group**		**Group control**		**p**
	Nr.	**%**	**Nr.**	**%**	
Initially	38	95,00	35	87,50	0,238
At 6 months	29	72,50	29	72,50	-
P	0,007		0,096		

At the initial evaluation, the Bonnet sign was present in 72.50% of the patients in the study group and in 62.50% of those in the control group (p = 0.343). (table 9)

At the evaluation at 6 months, the presence of the Bonnet sign decreased significantly in both groups (from 72.50% to 30.00%, <0.001, respectively from 62.50% to 27.50%, p = 0.002).

Table 9: The Bonnet sign

Bonnet sign	**Study group**		**Group control**		**p**
	Nr.	**%**	**Nr.**	**%**	
	29	72,50	25	62,50	0,343
	12	30,00	11	27,50	0,807
Initially	<0,001		0,002		

In the study group (table 10), at the initial evaluation cruralgy was present at 20.00% (at 5.00% in association with sciatalgy and at 7.50% in association with sciatalgy), and at 6 months the percentage was significantly reduced to 5, 00% (at 2.50% in association with sciatalgy) (p = 0.044). In the control group, at the initial evaluation, cruralgy was present at 7.50%, and at 6 months the percentage decreased insignificantly to 5.00% (p = 0.646). Both initially and at 6 months, there are no significant differences between the two groups in terms of prevalence of cruralgy (p = 0.107).

Table 10: Lassegue test

Lassegue test	**Study group**		**Group control**		**p**
	Nr.	**%**	**Nr.**	**%**	
Initially					
Cruralgy	8	20,00	3	7,50	0,107
Ischialgy	19	47,50	24	60,00	0,265
Scialgy	17	42,50	9	22,50	0,058
At 6 months					
Cruralgy	2	5,00	2	5,00	-
Ischialgy	21	52,50	22	55,00	0,824
Sciatalgy	12	30,00	7	17,50	0,192
p	0,044		0,646		
	0,657		0,653		
	0,248		0,579		

In the study group, ischialgy was present at the initial assessment at 47.50% (at 5.00% in association with cruralgy), and at 6 months the percentage increased insignificantly to 52.50% (p = 0.657). In the control group, at the initial evaluation, the sciatica was present at 60.00%, and at 6 months the percentage decreased insignificantly to 55.00% (p = 0.653). Both initially and at 6 months, there are no significant differences between the two groups in terms of the prevalence of ischialgy (p = 0.264, respectively p = 0.824). At the initial evaluation, the prevalence of sciatalgy in the study group was 42.50% (at 7.50% in association with cruralgy), and at 6 months the percentage decreased insignificantly to 30.00% (p = 0.248). In the control group, at the initial assessment, scialgy was present at 22.50%, and at 6 months the percentage decreased insignificantly to 17.50% (p = 0.579). Initially, the prevalence of scialgy was slightly higher in the study group (42.50% vs 22.50%, p = 0.058), and at 6 months, the difference is insignificant between the two groups (30.00% vs 17, 50%, p =0.192).

Discussions

Significant improvements were noted after both treatments in indices for pain, disability, and flexibility according to the Roland-Morris test (p = 0.066). Improvements in radiculopathy (Làsegue sign) were only observed with Vojta (p = 0.031). An overall decrease in scores obtained after Vojta was observed with respect to those obtained after TENS (difference V-T): pain according to the Visual Analog Scale (V-T = 2.84; p = 0.033) or Oswestry back pain (V-T = 2.67; p = 0.030) and leg pain tests (V-T = 3.25; p = 0.063); disability according to Oswestry (V-T = 28.33; p = 0.005) and Roland-Morris (V-T = 5.67; p = 0.044); flexibility according to Schöber (average gain V-T = 0.43; p = 0.292) and the fingertips to floor distance test (V-T = 7.5; p = 0.016). [2]

The active stimulation was perceived as more unpleasant than the control stimulation. Heart rate variability parameters demonstrated almost identical autonomic responses after both stimulation types, showing either modest increase in parasympathetic activity, or increased heart rate variability with similar contribution of parasympathetic and sympathetic activity. [3]

Pain intensity was reduced to 0 over 3-12 days. The angle of lordosis increased by 7.6°. The lateral spinal curvature was reduced by 8.92 mm. There was a reduction of 4.64° in trunk torsion. Surface rotation was reduced by 1.61° and pelvic obliquity was reduced by 3.78°.[4]

First, the analysis of the demographic data showed that, in both groups, the majority of patients were women, with an average age of 48-49 years. Sedentary lifestyle was registered in approximately 25% of patients (23-25%), and the most frequently adopted position during the day was both sitting and orthostatism (45-70%). Obesity had a prevalence of 25.00% and 32.50%, respectively, without cases of morbid obesity. Over 60% of the patients in the two groups had a disease of less than 10 years (62.50% vs. 67.50%). The pain was subacute or chronic (40-43%), bilateral (48, -53%), manifested locally (40-48%), in the form of a stab (33-48%), and its occurrence was in especially during the activity (83-90%).

The Seze sign was initially present in 63-65% of patients, the percentage decreasing significantly at 6 months (28-33%). The Bragard sign was initially present in 88-95% of patients, the percentage decreasing significantly in the study group and insignificantly in the control group. At the initial evaluation, the Bonnet sign was present in 63-73% of patients, the percentage decreasing significantly at 6 months (28-30%). The Lassegue test reveals that at the initial assessment ischialgy was the most common form (48-60%), percentages that increased and decreased insignificantly at 6 months (53-55%).

Conclusions

Therefore a good prognosis for improvement and rehabilitation can be given in a large number of disorders, irrespective of age [1]. Vojta Therapy led to significantly greater improvements in pain, disability, flexibility, and radiculopathy. [2]

The results demonstrate changes of cardiac autonomic control in both active and control stimulation, without evidence for a significant difference between the two. [3]

In discopathic patients, postural parameters comprising angle of lumbar lordosis, lateral deviation, trunk torsion, vertebral rotation and pelvic obliquity fail to reach Hartzmann's physiological reference ranges. A therapeutic intervention based on the Vojta therapy may normalize the posture to physiological reference ranges and is effective in the treatment of patients with back pain. [4]

The pacients that had as a therapy Vojta therapy had a direct impact on the elimination of the back pain, on the rate of results obtained after having carried out the study, being directly proportional to the Vojta Therapy.

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Investigation of the Effects of Physical Therapy and Spa Treatment on Pain and Sleep Quality in Patients with Osteoarthritis

Investigarea Efectelor Kinetoterapiei și ale Tratamentului Balnear asupra Durerii și Calității Somnului la Pacienții cu Osteoartrită

***Aysel Gürcan ATÇI*[1]**

Abstract

Introduction: Osteoarthritis (OA) is a very common degenerative process that increases with age, is slowly progressive, and leads to articular cartilage destruction. It has been determined that especially falling asleep, frequent sleep interruption, and waking up early are the main sleep problems in patients with arthritis. In the international treatment guidelines of patients with osteoarthritis, follow-up is primarily done by combining pharmacological treatments with non-pharmacological treatments. Another important treatment method is spa therapy. In this study, we tried to understand the effectiveness of the treatment by following the sleep quality index and Visual Analogue Scale (VAS) score values of the patients with osteoarthritis who received physical therapy or spa treatment in an inpatient or outpatient setting. *Materials and Methods:* This prospective, randomized controlled study was conducted in Kütahya Yoncali Physical Therapy and Rehabilitation Hospital on 122 patients diagnosed with osteoarthritis between 2012 and 2014 and admitted to the inpatient or outpatient program. The cases were divided into 5 groups. Group 1 is the control group. Group 2 consisted of outpatient physical therapy. The third group consisted of 16 patients who received outpatient spa treatment. The fourth group was hospitalized for 15 days and 1-hour physical therapy. The fifth group consisted of 31 patients who received inpatient spa treatment. The patients were evaluated before the treatment (1st measurement), at the end of the treatment (2nd measurement). Pain assessments (VAS), physician's and patient's global assessment were made with the Pittsburgh Sleep Quality Index (PSQI). *Results:* According to the cut-off value of the PSQI total score, a decrease in sleep quality was detected in 86.5% of the patients (PSQI>5). A significant difference was found especially between the entry and exit PSQI values in group 4 cases. ($p< 0.05$). *Discussion:* As a result, OA is a degenerative process that is frequently encountered in daily practice and that impairs sleep quality, as sleep quality disorder increases, movement disorders and pain that limit daily life increase. One of the most

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effective treatments in non-pharmacological treatment is spa and balneotherapy. As a result of our observations and study, we think that inpatient physical therapy and spa treatment made a significant improvement in the patient's pain scores and contributed positively to the treatment process by increasing the sleep quality.

Keywords: *osteoarthritis, spa treatment, sleep quality*

Rezumat

Introducere: Osteoartrita (OA) este un proces degenerativ foarte frecvent a cărui incidență crește odată cu vârsta; evoluează lent, progresiv și duce la distrugerea cartilajului articular. S-a stabilit că în special adormirea, întreruperea frecventă a somnului și trezirea devreme sunt principalele probleme de somn la pacienții cu artrită. În ghidurile internaționale de tratament ale pacienților cu osteoartrită, continuarea tratamentului se face în primul rând prin combinarea tratamentelor farmacologice cu tratamente non-farmacologice. O altă metodă importantă de tratament este terapia balneară. În acest studiu, am încercat să înțelegem eficacitatea tratamentului urmărind indicele de calitate a somnului și valorile scorului Visual Analog Scale (VAS) la pacienții cu osteoartrită care au urmat un program de kinetoterapie sau tratament balnear în regim de spitalizare sau în ambulatoriu. *Materiale și Metode:* Acest studiu prospectiv, randomizat controlat, a fost realizat la Kütahya Yoncali Physical Therapy and Rehabilitation Hospital pe 122 de pacienți diagnosticați cu osteoartrită între 2012 și 2014, care fie au fost internați în spital fie s-au prezentat la serviciul ambulatoriu. Cazurile au fost împărțite în 5 grupuri. Grupul 1, grupul de control. Grupul 2 a urmat programul de kinetoterapie în ambulatoriu. Al treilea grup a fost format din 16 pacienți care au primit tratament spa în ambulatoriu. În al patrulea grup au fost pacienți spitalizați timp de 15 zile și care au făcut câte 1 oră de kinetoterapie zilnic. Al cincilea grup a fost format din 31 de pacienți care au primit tratament balnear. Pacienții au fost evaluați înainte de tratament (prima evaluare), la sfârșitul tratamentului (a doua evaluare). Evaluarea durerii (VAS) și evaluarea globală au fost făcute cu Pittsburgh Sleep Quality İndex (PSQI). *Rezultate:* Conform valorii de limită a scorului total PSQI, a fost detectată o scădere a calității somnului la 86,5% dintre pacienți (PSQI>5). O diferență semnificativă a fost găsită în special între valorile PSQI de intrare și de ieșire în grupul 4 ($p<0,05$). *Discuție:* Ca urmare, OA este un proces degenerativ care este frecvent întâlnit în practica zilnică și care afectează calitatea somnului, pe măsură ce tulburarea calității somnului crește, tulburările de mișcare și durerile care limitează viața de zi cu zi cresc. Una dintre cele mai eficiente abordări în terapia non-farmacologică este spa-ul și balneoterapia. Ca rezultat al observațiilor și studiului nostru, credem că kinetoterapia și tratamentul balnear în regim de internare au adus o îmbunătățire semnificativă a scorurilor durerii pacientului și au contribuit pozitiv la procesul de tratament prin creșterea calității somnului.

Cuvinte cheie: *osteoartrita, tratamentul balnear, calitatea somnului*

Introduction

Osteoarthritis (OA) is a very common degenerative process that increases with age, is slowly progressive, and leads to articular cartilage destruction. It is frequently seen in the knee, hip, and waist joints in the joints that are significantly loaded. The frequency is higher in women [1]. It can completely affect individuals' quality of daily life and increase mortality and morbidity rates with age. The pain experienced by patients with osteoarthritis affects every aspect of their lives, and as a result of limited mobility, some patients cannot be very mobile and live dependent on home. As a result, this process leads to mental problems, sleep quality deteriorates in patients, and this process lowers the pain thresholds of patients [2].

It has been reported in publications that sleep disorder accompanies many rheumatic diseases. It has been determined that especially falling asleep, frequent sleep interruption, and waking up early are the main sleep problems in patients with arthritis [3]. It is also known that disturbed sleep can have negative effects on pain, fatigue and psychological state; therefore, there is a relationship between sleep quality and clinical and psychological symptoms of the disease, there is a multifaceted interaction [4].

In the international treatment guidelines of patients with osteoarthritis, follow-up is primarily done by combining pharmacological treatments with non-pharmacological treatments. Since OA is seen especially in elderly patients, the side effects of pharmacological treatments limit the use of drugs in these patients. Non-pharmacological treatments include: patient education, diet and weight loss, exercise, acupuncture, transcutaneous electrical nerve stimulation (TENS), laser, pulsed electromagnetic field (EMF), ultrasound (US), insoles, orthotic devices (knee brace/patellar tape/elastic bandage).

Another important treatment method is spa therapy. In the rheumatic diseases diagnosis and treatment guidelines published in our country in recent years, it has been reported that at least two weeks of balneotherapy and/or SPA treatment can be applied in combination with physical therapy agents and exercises, provided that the physical therapy physician approves [1]. It can be combined with physical therapy or it can be given independently.

The term balneotherapy comes from the Latin *balneum* (bath). Thermal waters generally refer to mineral-rich waters with an average temperature of 34 degrees. With Hydrostatic forces (Archimedes' principle) as its mechanism of action, water provides relative pain relief by reducing the load on the painful and arthritic joint. In addition, it is also used to reduce oedema and pain relief in painful joints. Taking a bath at certain intervals in mineral or thermal water has soothing, decongestant, muscle relaxant, analgesic, regenerative and vasodilator effects [2]. In addition, considering the sulphur-rich hot spring waters, the effect of sulphur compounds on joint tissues and reducing rheumatic symptoms may be effective.

In this study, we tried to understand the effectiveness of the treatment by following the sleep quality index and Visual Analogue Scale (VAS) score values of the patients with osteoarthritis who received physical therapy or spa treatment in an inpatient or outpatient setting.

Materials and Methods

Design

This prospective, randomized controlled study was conducted in Kütahya Yoncalı Physical Therapy and Rehabilitation Hospital on 122 patients diagnosed with osteoarthritis between 2012 and 2014 and admitted to the inpatient or outpatient program. Approval was obtained from the Clinical Research Ethics Committee of Kütahya Faculty of Medicine in 2014.

Participants

122 patients diagnosed with Osteoarthritis and admitted to the inpatient or outpatient program in Kütahya Yoncalı Physical Therapy and Rehabilitation Hospital between 2012 and 2014 were evaluated by the researcher for suitability for the study.

Inclusion Criteria:

1. Between the ages of 40-70;
2. Diagnosed with primary knee, hip, shoulder, waist osteoarthritis according to the diagnostic criteria of the American College of Rheumatology;
3. Those who have not received spa treatment or balneotherapy in the last 1 year.

Exclusion Criteria:

1. Those with secondary osteoarthritis due to various diseases
2. Having obvious pathology in the waist, hip and ankle joint that will affect the results,
3. With decompensated organ failure,
4. With active tumours,
5. Having a disease progressing with bleeding,
6. Having an infectious disease with fever,
7. Those who have undergone severe trauma or surgery for osteoarthritis in the last 6 months
8. Patients with advanced hypertension, coronary artery disease, chronic obstructive pulmonary disease.
9. Those who have a known psychiatric disease and receive medical treatment.

All patients with CAD, HT and COPD were treated if physical therapy and or spa treatment were allowed after the opinion of a cardiology and chest diseases specialist.

Randomization

122 patients who met the study criteria and approved the patient information form were divided into groups using a random numbers table on the computer using the simple randomization method. It was then evaluated by the physician and statistician who performed the study.

Attempt

The cases were divided into 5 groups.

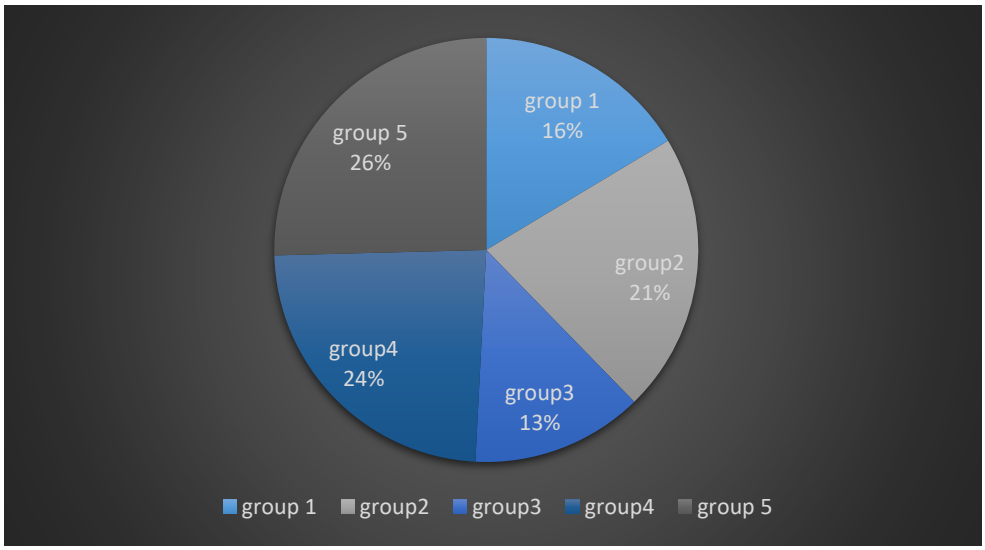
Group 1 is the control group and was not included in the spa or physical therapy protocol. Physical therapy protocol - a total of 10 sessions of physiotherapy were applied to the patients for 10 days, one session per day. Treatment applications were applied in order of hot pack, TENS, short wave diathermy. The physiotherapy program did not include exercise. First, a hot pack was applied to the diseased joint for 20 minutes. Then, TENS between 60-100 Hz was applied to the diseased joints for 20 minutes, with a pulse duration of 60 ms. The frequency was increased until it reached the frequency that the patient felt comfortable and did not cause contraction. It was applied as continuous short-wave diathermy at 27.12 MHz frequency for 20 minutes. Group 1 was followed up for 15 days and paracetamol 500 mg twice a day was started in cases with severe pain. It consisted of 20 patients.

Group 2 consisted of outpatient physical therapy. Total consisted of 26 patients. The patients received outpatient physical therapy for 1 hour, 5 days a week.

The third group consisted of 16 patients who received outpatient spa treatment.

The fourth group was hospitalized for 15 days and 1 hour of Physical therapy was applied in a single session 5 days a week. It consisted of 29 patients in total.

The fifth group consisted of 31 patients who received inpatient spa treatment. (Graphic 1)



Graphic 1: Patients in study groups.

The patients in the second group (Traditional application group = Group 2) received spa treatment for 2 weeks, 5 days a week (10 sessions in total), and the patients in the third group (Alternative application group: Group 3) received spa treatment 2 times a week for 5 weeks (10 sessions in total). In the treatment, a plain water bath at 38°C was applied in the pool for 20 minutes a day. The spring outlet temperature of Yoncalı Thermal Water is 40-44 degrees and the total mineral concentration is 782.565 mg/lt. In Table 1, thermal water properties and mineral concentrations are indicated. All patients were allowed to take a maximum of 2 g/day oral paracetamol in proportion to the severity of pain.

Table 1: Yoncalı Thermal Water mineral concentration

Parameter	**Scale unit**	**Result**
Sodium	Mg/L	107,4
Chlorine	Mg/L	10,9
Sulfate	Mg/L	162,2
Magnesium	Mg/L	31,64
Calcium	Mg/L	111,8
Fluoride	Mg/L	1,92
Bicarbonate	Mg/L	429,4
Cilicate acid	Mg/L	50,3

Evaluation of the Patients

The patients were evaluated before the treatment (1st measurement), at the end of the treatment (2nd measurement), and at the 12th week after the treatment (3rd measurement); pain assessment (VAS), physician's and patient's global assessment (VAS) were made with the Pittsburgh sleep quality index (PSQI).

The VAS consists of a 10 cm (or 100 mm) long line drawn on the horizontal or vertical axis. The distance from the lowest VAS value to the patient's mark is measured in mm (0-100) [5].

The Pittsburgh Sleep Quality Index evaluates sleep quality over the last month in 19 questions. It consists of seven components that assess subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction. The response of each is scored between 0-3 according to symptom frequency. The total score ranges from 0-21 (range = 0-21). Scores of six or higher indicate impaired sleep quality [6].

Statistical analysis

Statistical analyses were performed using IBM SPSS for Windows, version 22.0 (IBM Corporation, Armonk, NY, USA). The normality of continuous numerical variables was investigated using the Shapiro–Wilk test. The results of numerical variables were presented as mean ± standard deviation. Because the variables were not normally distributed, non-parametric tests were used for intergroup comparisons. To find the level of significance between the groups, the Kruskal–Wallis test was used for continuous variables and the Chi square test or Fisher’s exact test was

used for categorical variables to compare the data. Correlations were evaluated using Spearman's rho correlation coefficient. A p value of <0.05 was considered to be statistically significant.

Results

Our study was conducted on a total of 122 patients. Group 1 was the control group and no treatment was given. Group 2 was the outpatient physical therapy group and the total number of patients was 26. Group 3 was the outpatient spa patients and the number of patients was 16.

Group 4 is the group in which inpatient physical therapy and rehabilitation is applied, and the total number of patients is 29. Group 5 is the group in which inpatient spa treatment is applied, and the total number of patients is 31. The mean age of patients with OA was 57.35DI. 79.5% of the patients were female, 85% of the female patients were in the postmenopausal period, 86% of the patients with OA were married. 65 of 122 patients had gonarthrosis, 38 had coxarthrosis and gonarthrosis, and 17 patients had coxarthrosis.

There was Hypertension accompanying OA in 35 patients, Hypertension and Diabetes in 11 patients, hyperthyroidism in 3 patients, coronary artery disease in 3 patients, asthma in 2 patients and Diabetes in 18 patients.

According to the cut-off value of the PSQI total score, a decrease in sleep quality was detected in 86.5% of the patients (PSQI>5). A significant difference was found especially between the entry and exit PSQI values in group 4 cases (p< 0.05). (Table 2)

Table 2: Clinical and demographic characteristics of patients diagnosed with OA and healthy controls (mean ± SD, or n, %) .

	Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**
Age, years (mean±SD)	**57**±4.25	**56.9**±5.18	**58.5**±4.13	**57.36**±5.36	**56.65**±5.14
Gender	F:16 M:4	F:16 M:10	F:12 M:4	F:25 M:4	F:28 M:3
Education **Illiterate** **Basic education** **High school/ University**	 8 10 2	 12 14	 7 9	 9 13 3	 14 17
Disease Duration	---	4.4 years	3.1 years	3.9 years	3.2 years
Smoking **Yes** **No**	 5 15	 7 19	 3 15	 7 18	 9 24
VAS Score	-------	B:7,6±3.06 A:5.48±2.02 P:0.224	B:7,75±2.19 A:5,08±1.82 P :0.212	B:7,28±1.94 A:4,8±1.49 p:0.212	B:8,16±2.78 A:4,80±1.44 P: 0.212

Group 1: Control group. Group 2: Patients coming to outpatient daily physical therapy. Group 3: Patients coming to outpatient spa treatment. Group 4: Inpatient Physical therapy Group 5: Patients who were hospitalized and treated with spa treatment. B: Before treatment. A: After treatment. P<0.05 was considered statistically significant.

***Table 2**: Mean PSQI scores of patients with osteoarthritis and controls (mean ± SD) Data are presented as mean ± standard deviation (median). P<0.05 was considered statistically significant.*

	Group 1	**Group 2**	**Group 3**	**Group 4**	**Group 5**
Sleep quality	0.40±0.11	B:1.32±0.75 A:1.02±0,28	B:1,77±0.71 A:1.55±0.60	B:2.35±0.50 A:1.60±0.10	B:2.20±0.70 A:1.10±0.35
Sleep latency	0.13±0.09	B:1.62±0.66 A:1,32±0.40	B:2.10±0.32 A:1,10±0.21	B:1.92±0.70 A:1,05±0.25	B:1.85±0.54 A:0.90±0.15
Sleep efficiency	0.40±0.21	B:0.82±0.66 A:0,53±0.12	B:1.51±0.66 A:1,11±0.32	B:1.96±0.66 A:1,20±0.58	B:1.17±0.66 A:0,90±0.59
Sleep duration	0.20±0.04	B:1.44±0.66 A:1,12±0.49	B:2,21±0.70 A:1,51±0.56	B:1.56±0.70 A:1,41±0.32	B:2.27±0.62 A:1,11±0.32
Sleep medication	0.0	B:0.20±0.11 A:0.20±0.11	B:0.15±0.14 A:0,15±0.02	B:0.52±0.05 A:0,42±0.02	B:0.12±0.09 A:0,12±0.02
Daytime sleep dysfunction	0.18±0,074	B:1.78±0.70 A:1,54±0.32	B:1.61±0.40 A:1,12±0.12	B:1.92±0.61 A:1,23±0.35	B:1.36±0.70 A:0,46±0.28
Sleep disturbance	0.51±0.25	B:1,94±0.70 A:1,44±0.43	B:1,84±0.32 A:1,34±0.20	B:2,25±0.72 A:1,20±0.36	B:2,14±0.49 A:1.05±0.17
Total score **P value**	1.83±0.92 P>0.05	Before:9.12 After:7.17 P>0.05	Before:11.25 After:7,83 P>0.05	B:13.8 A:8.04 P>0,05	B:12.6 A:6.01 **P<0.05**

Discussion

OA and sleep disturbance are very common. Sleep problems occur in approximately two-thirds of patients with osteoarthritis. The prevalence of sleep disorders in people of the same age group is 2 times higher in individuals with OA. Pain has been identified as the main cause of sleep disturbance. They associated increased daytime pain with poor quality sleep, and it was found that the pain increased after one day.

In studies involving OA and sleep quality analysis, it was reported that OA was impaired in sleep quality in a study involving knee and hip OA patients over 60 years of age [7, 8]. Hawker et al. reported that knee OA patients over 60 years of age had problems falling asleep (31%), maintaining sleep (81%), waking up early in the daytime (51%) at least once a week [7]. Also, this study reported that sleep was disturbed in 66% of patients with knee and hip OA, and also determined the severity of arthritis, pain, depressive symptoms, and restless legs syndrome as independent risk factors for sleep disturbance.

In a study conducted on 2682 patients with a diagnosis of knee and hip OA, sleep disturbance was reported to be an important problem in the patient group, and it was shown that regardless of the symptoms, only radiographic knee osteoarthritis did not affect sleep quality [9]. In another study comparing patients with knee OA and patients without radiographic knee OA, it was stated that both groups had similar sleep problems, and it was also emphasized that knee pain was the main factor causing sleep disturbance [10].

In our study, the average sleep quality index scores of the patients before the treatment were determined as 12.3. In particular, the patients stated that they had difficulty falling asleep and sleeping problems, which supports the literature, and stated that they woke up more tired the

next day and more painful than the previous day. They reported that the patients in our study had difficulty in maintaining their normal routine life the next day, when the sleep disorder lasted more than 3 days a week. This situation increases the pain that will occur the next day and puts the patient in a vicious circle. Breaking this cycle should be the main treatment practice in OA patients, both to reduce the patient's pain and to provide mental relief. The sleep disorder in question cannot be treated with medical treatment alone. For this reason, it is obvious that spa and SPA treatment, which can both reduce the patient's pain and relieve the patient spiritually, is a very important modality in the current and most effective treatment. However, when the literature was reviewed, no comprehensive study was found on the sleep quality index for OA, including physical therapy and spa treatment.

In OA cases, the frequency of spa treatment can be determined by determining the method and dose, and it can be applied at regular and repeated intervals, in various forms such as bathing, drinking and inhalation, and in combination with other treatments (such as physical therapy agents, exercise [11, 12]. The mechanism of action of spa treatments has not been fully explained today. It is stated that the therapeutic and relaxing effect can be mechanical, chemical and thermal effects. Thermal therapy has beneficial effects on muscle tone, joint mobility. A series of chemical and physical reactions occur in a person immersed in 35-degree spa water. Diuresis, natriuresis and cardiac output increase. However, literature studies have reported a decrease in the circulating values of Prostaglandin E2 (PGE2) and leukotriene B4 (LTB4) a parameter that increase in inflammation after spa therapy. In addition, there is literature in which adipocytokines, which play an important role in the pathophysiology of OA, especially with their proinflammatory effects and cause joint and cartilage deterioration, regress after spa treatment [13, 14, 15]. As it can be understood from the literature review, spa treatment has efficacy in the non-pharmacological treatment of OA.

In studies where the effect of applying thermo-mineral waters of various heat and chemical properties as a bath for 3-6 weeks and for an average of 20 minutes in patients with knee, hip and vertebral OA who were followed up due to OA, pain severity, analgesic drug use, It has been reported that there is a significant improvement in functional status and quality of life [16].

In addition, in another study comparing spa treatment applied only as a bath with home exercise program and non-steroidal drug use, it was shown that spa treatment applied for 1-3 weeks was superior in terms of pain level and functionality. [17]

In our study, a significant decrease was found in the mean VAS scores after the spa treatment. The best results were obtained in the group that received physical therapy together with the spa treatment.

Conclusion

As a result, OA is a degenerative process that is frequently encountered in daily practice and that impairs sleep quality, as sleep quality disorder increases, movement disorders and pains that limit

daily life increase. One of the most effective treatments in non-pharmacological treatment is spa and balneotherapy. As a result of our observations and study, we think that inpatient physical therapy and spa treatment made a significant improvement in the patient's pain scores and contributed positively to the treatment process by increasing the sleep quality.

Ethics: Written informed consent was obtained from the participants in accordance with the Helsinki Declaration. Approval was obtained from the Clinical Research Ethics Committee of Kütahya Faculty of Medicine in 2014.

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Author Contribution: The study was planned, executed, concluded and written by the author.

Conflict of Interest: The author has no conflicts of interest to declare.

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Awareness Regarding Obesity and Healthy Lifestyle Practices among School Students in a Sub Urban Centre

Conștientizarea privind Obezitatea și Practicarea unui Stil de Viață Sănătos în Rândul Elevilor dintr-un Centru Suburban

Santosh Kumar KAMALAKANNAN [1], Subramaniam VALLIAPPAN [2]

Abstract

Introduction: Obesity and non-communicable diseases (NCDs) have become the emerging pandemic of the 21st century and this has been because of the changes in the life style that has happened over the past three to four decades because of the modernization and cultural changes in the past few years. Obesity is an important risk factor for development of metabolic syndrome and other non-communicable disease. Healthy life style practices play an important role in prevention and control of the Non communicable diseases. Awareness about the disease & healthy lifestyle practices is the first step in prevention and management of NCDs. This study was taken up to assess the awareness about obesity and healthy lifestyle practices among school students in sub urban parts of Chennai. *Methods:* This cross-sectional study was conducted in August 2019 to November 2019 among 244 school students of class 10 to class 12 in and around Saveetha Medical College, by interview method using a semi-structured, pre-tested questionnaire. *Results:* The study revealed that 105 (43.03%) knew the difference between obesity and overweight. 20 (8.2%) knew about the use of Body Mass Index for diagnosis of obesity. All the study participants knew about healthy lifestyle. 201 (82.3%) knew that healthy lifestyle includes balanced diet & regular physical activity. *Conclusion:* Awareness regarding obesity was poor. While the students knew about some healthy lifestyle practices, their knowledge on the whole was inadequate.

Keywords: *awareness, obesity, healthy lifestyle practices, college students*.

Rezumat

Introducere: Obezitatea și bolile netransmisibile au devenit pandemia emergentă a secolului 21, acest lucru datorându-se schimbărilor în stilul de viață care au avut loc în ultimele trei până la patru decenii din cauza modernizării și schimbărilor culturale din

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ultimii ani. Obezitatea este un factor de risc important pentru dezvoltarea sindromului metabolic și a altor boli netransmisibile. Practicarea unui stil de viață sănătos joacă un rol important în prevenirea și controlul bolilor netransmisibile. Conștientizarea bolii și a practicării unui stil de viață sănătos este primul pas în prevenirea și gestionarea bolilor netransmisibile. Acest studiu a fost efectuat pentru a evalua gradul de conștientizare cu privire la obezitate și practicarea unui stil de viață sănătos în rândul elevilor din zonele suburbane ale orașului Chennai. *Metode:* Acest studiu transversal a fost realizat în perioada august 2019 – noiembrie 2019 în rândul a 244 de elevi din clasa a 10-a până la clasa a 12-a ai Colegiului Medical Saveetha și din zonele învecinate, prin metoda interviului, folosind un chestionar semistructurat, pre-testat. *Rezultate:* Studiul a arătat că 105 elevi (43,03%) cunoșteau diferența dintre obezitate și supraponderalitate. 20 elevi (8,2%) știau despre utilizarea indicelui de masă corporală pentru diagnosticarea obezității. Toți participanții la studiu știau despre stilul de viață sănătos. 201 elevi (82,3%) știau că stilul de viață sănătos include o dietă echilibrată și activitate fizică regulată. *Concluzie:* Conștientizarea cu privire la obezitate a fost slabă. În timp ce elevii știau despre unele practici de stil de viață sănătos, cunoștințele lor în general erau inadecvate.

Cuvinte cheie: *conștientizare, obezitate, practici de viață sănătoasă, elevi de liceu.*

Introduction

Obesity and non-communicable diseases (NCDs) have become the next big pandemic that is going to affect the mankind in the near future due to the changes in the lifestyle and cultural practices which have been brought about by the urbanization and modernization [1, 2, 3, 4]. There has been a dramatic advance in the technology which has contributed significantly in reducing the physical activities of the humans and thus resulting in a sedentary lifestyle. In the current scenario, NCD and metabolic syndrome has emerged as one of the leading causes of mortality. Worldwide NCDs kill close to 40 million people every year [2, 3, 4]. Cardiovascular deaths account for 17.5 million deaths annually, cancers 8.2 million, respiratory diseases 4 million and diabetes 1.5 million deaths annually; collectively these 4 diseases account for 82% of all NCD deaths [2, 3, 4]. Behavioral problems like substance abuse, physical inactivity and unhealthy diet increases the risk of dying from an NCD. India is experiencing a rapid health transition with a rising burden of NCDs causing significant morbidity and mortality both in urban and rural population with considerable loss in potentially productive years of life between 35-64 yrs. Among adults in India, prevalence of diabetes is 7.2%, hypertension is 22.9%, obesity is 4.0%, overweight is 18.9%, tobacco consumption 12.9% and decreased physical activity is 12.1%. An important way to reduce NCDs is to focus on lessening the common modifiable risk factors associated with these diseases like tobacco use, unhealthy diet & physical inactivity and alcohol consumption [5, 6, 7].

Healthy lifestyle measures when followed properly will help in control of risk factors causing NCDs. Awareness about NCDs and their risk factors has an important role in prevention and management strategies. Various studies done in India have concentrated on awareness among individuals with

diseases like either diabetes or hypertension or cancer and healthy lifestyle practices followed among the diseased [5, 6, 7, 8, 9].

Very few studies have been conducted regarding the awareness about NCDs and its risk factors among general population [10]. Giving guidance and educating degree school students will help in bringing modification in their own lives and also, they disseminate information to others [11]. Hence, the present study was taken up to assess the awareness of obesity and healthy lifestyle practices for its prevention and control among school students in and around Saveetha Medical College.

Methods

Study design: Descriptive cross-sectional study

Study population: School students between classes 10 to 12

Study period: August 2019 to November 2019

Sample size: 244 (Convenient sample size)

Aim of the study

To determine the awareness, knowledge about obesity and healthy lifestyle practices

Methodology

The study was a cross sectional study conducted during the period of 1st August 2019 to 30th November 2019 at Schools located in and around Saveetha Medical College. The necessary permission was taken from Institutional Scientific Committee, Institutional Ethics Committee and School Principals prior to study. The sample size was a convenient sample size. All the students who consented to participate in the study were included. Those not willing were excluded. The total study participants were 244.

Data was entered into Microsoft Excel software and analyzed using descriptive statistics like mean, proportion and inferential statistics like chi-square test. A pre-tested, semi structured questionnaire was used for data collection by interview method after taking informed consent. The interview was conducted by the researchers individually for the participants and the interview time being 5- 8 min for each participant. The questionnaire consisted of 3 parts. The 1st part collected their sociodemographic details like their name, age, sex, Class. The 2nd part collected information regarding their awareness on various aspects of obesity. Questions pertaining to etiology, symptoms, diagnosis and treatment of obesity were asked. The 3rd part collected information regarding their awareness on healthy lifestyle practices, adequate physical activity and balanced diet.

Results

There was a total of 278 students, among whom 244 agreed to participate in the study. 101 (41.39%) were females and 143(58.61%) were males.

Knowledge about terms like obesity and overweight and risk factors associated with it

Everybody had heard the term obesity (100%). The term "overweight" was heard by 219 (89.75%). While 168 (68.9%) students knew the difference between overweight and obesity, only 74 (30.32%) knew what the difference was. Among those who knew the difference, 36 (48.64%) thought obesity means more weight, 24(32.43%) thought obesity has increased cholesterol, 14 (18.9%) thought obesity is disease while overweight is not a disease. With respect to awareness regarding risk factors for obesity; 226 (92.6%) perceived eating oily food, 215 (88.11%) eating junk food, 211 (86.47%) eating more than required are the risk factors for developing obesity (refer to figure 1).

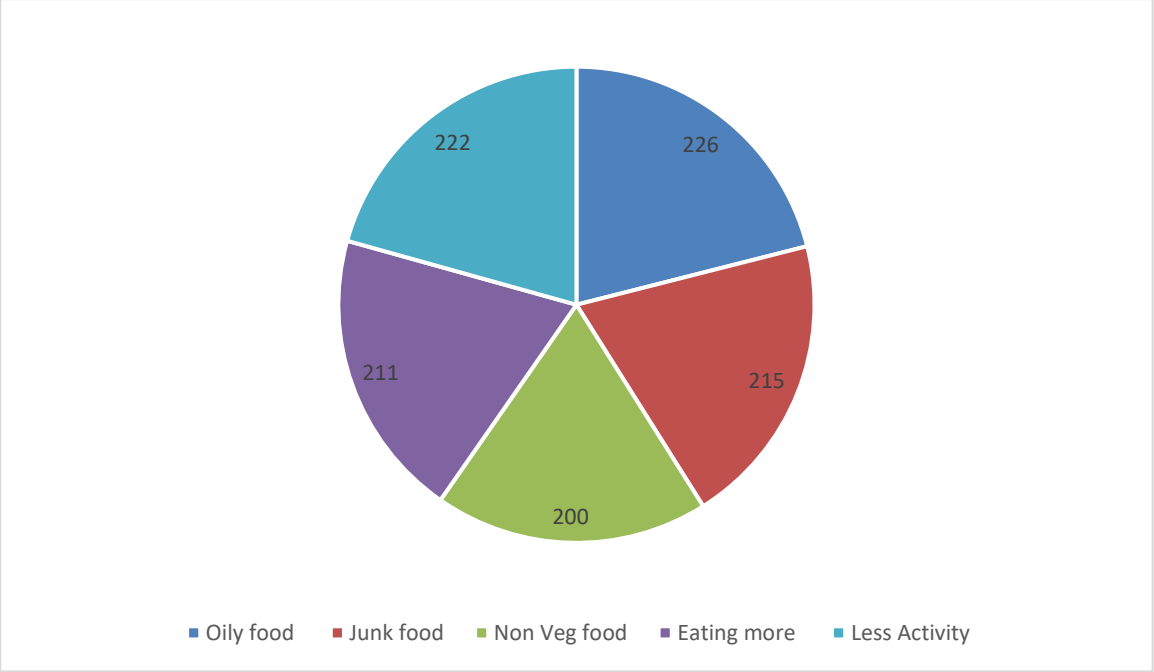

Figure 1. Risk Factors for Obesity

Students' knowledge regarding problems arising due to obesity

209 (85.65%) thought difficulty in walking as problem, 190 (77.8%) difficulty in climbing stairs, 138 (56.5%) thought they will not look beautiful, 127 (52.04%) breathing difficulty as problem of being obese. 214 (87.7%) of students thought checking weight, 227 (93.02%) checking blood cholesterol level, 168 (68.88%) measuring waist and hip circumference, 35 (14.34%) calculating Body Mass Index (BMI) as means of diagnosing obesity. 148 (60.06%) of them thought obesity can be cured and 138 (56.55%) thought it can only be controlled.

Table 1: Awareness regarding preventive measures to prevent obesity

Preventive measures	**N (%)**
Regular physical activity	223(91.3%)
Eating less oily food	191(78.27%)
Avoiding junk foods	188(77.04%)
Yoga	167(68.44%)
Skipping meals	79(32.37%)
Eating green leafy vegetables	199(81.55%)
Eating fruits	187(76.62%)
High fibre diet	180(73.77%)

Out of study participants 68(27.9%) of them knew that obesity leads to complications. Among them 44 (64.7%) thought it causes diabetes mellitus, 32 (47.05%) felt hypertension as a complication, 25 (36.7%) cardiovascular disease & stroke and 18 (26.5%) thought cancer as complication of obesity.

Awareness about treatment options for obesity was perceived to be doing physical activity by 107 (43.85%), avoiding junk and oily foods 54 (22.13%), taking tablets 23 (9.4%) and getting surgical treatment by 13 (5.3%) of participants.

Awareness about prevention of Obesity

Students' awareness regarding prevention of obesity was found that 223 (91.3%) thought doing regular physical activity as a way of preventing obesity (refer to table 1). All the study participants had heard about healthy lifestyle practices and majority 225 (92.21%) thought healthy lifestyle has a role to play in health. 214(87.70%) of them knew healthy lifestyle includes balanced diet and regular physical activity.

Knowledge about what constitutes healthy lifestyle

144 (59.01%) knew the correct duration of adequate physical activity to be done i.e., doing moderate intensity physical activity 21/2 hours over 4 to 5 days in a week or doing vigorous intensity physical activity 1½ hours over 4 to 5 days in a week. 219 (89.7%) participants thought healthy lifestyle practices prevents diabetes mellitus, 205 (84.1%) thought hypertension, 186 (76.22%) heart disease 128 (52.04%) stroke and 66 (27.05%) thought it prevents cancer.

Table 2: Knowledge regarding what constitutes physical activity

Measures	N (%)
Walking	213(87.3%)
Climbing stairs	188(77.04%)
Cycling	195(79.94%)
Jogging	166(68.03%)
Swimming	83(34.01%)
Gardening	88(36.05%)
Household chores	225(92.2%)

Discussion

NCDs are distributed all over the world irrespective of the socio-economic status and are found to be showing an increasing trend in low- and middle-income countries. There is Variation in awareness regarding these NCDs among different age groups and among urban and rural people, among different socioeconomic groups and also among those affected and not affected by NCDs. These variations are largely because of the knowledge, heath care facilities available to them, media coverage, literacy status etc. This study was conducted among school students in and around Saveetha Medical College to assess awareness regarding obesity and healthy lifestyle practices among college students. In our study awareness regarding risk factors for obesity was found to be satisfactory. Majority knew the risk factors of obesity. Their knowledge regarding diagnosis and complications of obesity were low. Awareness regarding what constitutes healthy lifestyle practices were good, however awareness regarding various types of physical activity and the duration of doing physical activity were poor. Awareness was better among our study participants when compared to previous studies done by Divakaran and Anju Ade [12, 13]. Study conducted by Kusum SM found that awareness was poor among government school students of Davangere but in our study the awareness if found to be higher probably because of the media attention in the recent years and campaigns by government using social media and radio in the recent years [14].

Conclusion

Awareness regarding obesity was adequate in certain aspects but further efforts need to be taken to enhance the knowledge and attitude towards obesity prevention and health promotion. Health education should be provided to students regarding risk factors of NCDs and how to reduce the risk by following healthy lifestyle practices.

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Burden of Caregivers of Traumatic Spinal Cord Injury in a Tertiary Care Centre in South India -A Descriptive Cross-sectional Study

Povara Îngrijitorilor Persoanelor cu Leziuni Traumatice ale Măduvei Spinării într-un Centru de Îngrijire Terțiară din Sudul Indiei - Un Studiu Transversal Descriptiv

Sankavi Santosh KUMAR [1], Santosh Kumar KAMALAKANNAN [2]

Abstract

Background: Spinal cord injuries (SCI) carry significant morbidity and are associated with significant loss of productive years in the life of a victim. It results in significant burden to the families, caregivers, health care system and the community as a whole. Rehabilitation of these patients requires expertise and the results are not entirely satisfactory even in the best of the centres. Burden faced by the caregivers is often neglected. This study was done to determine the burden faced by the caregivers of traumatic spinal cord injury and to correlate their burden with their quality of life using different scales such as Caregivers Burden Inventory for Spinal Cord Injury (CBI-SCI), Burden Assessment Score (BAS), and Adult Carer Quality of Life Index (AC-QoL). *Materials and methods:* A descriptive cross-sectional observational study was carried out on 40 primary caregivers of SCI patients. The inclusion criteria were primary caregivers of SCI patients aged between 20 to 55 years of age. Caregivers with major psychiatric illness and comorbidities were excluded. Information about socio-demographic characteristics were collected. Demographic data was represented with mean and standard deviation. Pearson's correlation of coefficients was used to assess the caregiver's burden. *Results:* The results of Pearson correlation of coefficients demonstrated there exist a strong negative correlation between burden of the caregiver and his quality of life. This is demonstrated by R^2 values of- 0.858 and -0.718 for BAS and CBI-SCI respectively which is very unlikely to occur by chance. *Conclusion:* This study shows that caregiver burden is an important factor to be considered as a part of every rehabilitation effort for traumatic SCI patients. Assessment of burden would guide medical professionals to prevent burnout of caregivers and help them to provide long-term care for their patients.

Keywords: traumatic spinal cord injury; caregiver burden; Burden Assessment Score (BAS), Caregivers Burden Inventory for Spinal Cord Injury (CBI-SCI), Adult Carer Quality of Life Index (AC-QoL)

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Rezumat

Introducere: Traumatismele vertebra-medulare (TVM) au o morbiditate semnificativă și sunt asociate cu pierderea unui număr semnificativ de ani de productivitate în viața unei victime. Cauzează o povară semnificativă pentru familii, îngrijitori, sistemul de sănătate și pentru comunitatea în ansamblu. Reabilitarea acestor pacienți necesită expertiză și rezultatele nu sunt pe deplin satisfăcătoare chiar și în cele mai bune centre. Povara cu care se confruntă îngrijitorii este adesea neglijată. Acest studiu a fost realizat pentru a determina sarcina cu care se confruntă îngrijitorii persoanelor cu leziuni traumatice ale măduvei spinării și pentru a corela sarcina lor cu calitatea vieții lor, utilizând diferite scale, cum ar fi inventarul sarcinii pentru îngrijitori (CBI), scorul de evaluare a sarcinii (BAS) și calitatea îngrijitorilor pentru adulți. Indicele vieții (AC-QoL). *Materiale și metode:* Am efectuat un studiu observațional descriptiv, transversal, pe 40 de îngrijitori primari ai pacienților cu TVM. Criteriile de includere au fost îngrijitorii primari ai pacienților cu TVM cu vârsta cuprinsă între 20 și 55 de ani. Au fost excluși îngrijitorii cu boli psihiatrice majore și comorbidități. Au fost colectate informații despre caracteristicile socio-demografice. Sarcina îngrijitorului a fost documentată utilizând Scara de evaluare a sarcinii (BAS) și Inventarul de sarcină a îngrijitorilor (CBI) și calitatea vieții acestora a fost evaluată prin Indicele calității vieții pentru îngrijitorii adulților (AC-QoL). Datele demografice au fost reprezentate prin medie și abatere standard. Corelația coeficienților lui Pearson a fost utilizată pentru a evalua sarcina îngrijitorului. *Rezultate:* Rezultatele corelației Pearson a coeficienților au demonstrat că există o corelație negativă puternică între sarcina îngrijitorului și calitatea vieții acestuia. Acest lucru este demonstrat de valorile R^2 de -0,858 și -0,718 pentru BAS și respectiv CBI-SCI, ceea ce este foarte puțin probabil să apară întâmplător. *Concluzie:* Acest studiu arată că sarcina îngrijitorului este un factor important care trebuie luat în considerare ca parte a oricărui efort de reabilitare pentru pacienții cu TVM. Evaluarea poverii ar ghida profesioniștii medicali pentru a preveni epuizarea îngrijitorilor și îi poate ajuta să ofere îngrijire pe termen lung pacienților lor.

Cuvinte cheie: traumatism vertebra-medular; povara îngrijitorilor; Scala de evaluare a sarcinii (BAS); Inventarul de sarcină a îngrijitorilor (CBI); Indicele calității vieții pentru îngrijitorii adulților (AC-QoL)

Introduction

Spinal cord injury (SCI) is associated with significant functional disability. SCI has both short term and long term impact the life of the victims and also on their family and caregivers [1]. Almost all the domains of the life namely physical, psychological, social, financial, emotional are significantly affected leading to multiple medical, social and vocational complications. This causes burden and suffering not only to the patients but also to their families, caregivers, to the health care system and to the community as a whole. The human and financial costs and implications of SCI are enormous [1, 2]. Despite the devastating physical, social and emotional consequences of SCI, a comprehensive

rehabilitation program can often enable these individuals to function independently, comfortably, and productively.

Caregiver burden refers to the physical, psychological, social and financial impact of caring for another person who is ill, disabled or otherwise functionally impaired [3]. Caregivers can be a member of the family or can be a person hired to care of the victim [4]. But generally, the term is used in reference to informal caregivers i.e., person acting in an unpaid, non-professional capacity such as family members. To a great extent now, family members are responsible for a wide range of services provided formally by traditional health care providers.

There are few studies which have attempted to assess the burden of caregivers of victims of spinal cord injury from India. With the available limited information about the impact of care giving post SCI injury very little efforts have been taken by the health care system and government organisations to help these caregivers emotionally and financially [5, 6].

This study was done to focus on the burden faced by the caregivers of the SCI. During initial phase of the rehabilitation, the major focus is on the patient. Caregivers are often the forgotten half of the rehabilitation process. It is well known fact that caregivers bear substantial amount of burden on them which needs to be addressed. Further it is a well understood that the well-being of the caregiver is likely and directly tied to the well-being of individuals with spinal cord injury.

Results from assessment of caregiver burden would provide evidence that can be utilised in the development of beneficial services and programs for the caregivers. With respect to SCI victims this may identify adequate resources and prevent institutionalisation and abandonment.

Materials and Methods

Type of study: Descriptive cross sectional

Place of study: Government Institute of Rehabilitation medicine, Madras Medical College Chennai.

Duration of the study: August 2017 to January 2018

Objectives of the study:

1. To assess the burden in caregivers of traumatic spinal cord injured patients.
2. To correlate caregiver burden with patient's disability, handicap status and quality of life.

A descriptive cross-sectional study was conducted on caregivers of individuals with Spinal Cord Injury (SCI), admitted in the Government Institute of Rehabilitation medicine, Chennai. Data was collected in Microsoft excel 2010 Statistical analysis was done using the IBM SPSS statistics for Windows version23. To describe the descriptive statistics frequency analysis and percentage analysis was done for categorial variables and mean and SD was used for continuous variables. Pearson's Correlation of Coefficients was obtained to demonstrate the degree of correlation.

Inclusion Criteria

1. Primary caregivers of SCI patients
2. Aged between 20 to 55 years.

Exclusion Criteria

1. Caregivers with major psychiatric illness
2. Caregivers with Co-morbid physical or cognitive problems.

Those who met the above criteria were contacted and the nature of the study was explained. Informed consent was taken from the caregiver. Information about socio-demographic characteristics of the caregivers-age, gender, occupation, education and relationship with the patient were collected.

A total of 40 caregivers were interviewed during the study period.

Scales used:

1. Burden assessment scale (BAS) [7]
2. Caregivers burden inventory –Spinal cord injury (CBI-SCI) [8]
3. Adult Carer Quality of Life Index (AC-QoL)

Burden assessment scale

Initially developed by the Schizophrenia centre for research foundation (SCARF) to assess the burden of caregivers of schizophrenia patients, but has been modified by the WHO and used to assess caregiver's burden in other situations also. It consists of a total of 40 questions in total covering various domains of their burden. Each question has a score between 0 to 3.

Caregivers burden inventory –Spinal cord injury (CBI-SCI)

The Caregiver Burden Inventory comprises 24 closed questions divided into five dimensions: time-dependence, developmental, physical, social and emotional burden. There are five items in each dimension except for physical burden, which has four items dedicated to. Each item is given a score between 0 (not at all descriptive) and 4 (very descriptive), where higher scores indicate greater caregiver burden; there are no cut-off points for classifying burden. Therefore, total scores for factors one, two, four and five can range from zero to 20. An equivalent score for physical burden can be obtained by multiplying the sum of items in this dimension by 1.25

Adult Carer Quality of Life Index (AC-QoL)

The Adult Carer Quality of Life Questionnaire (AC-QoL) is a 40-item instrument that measures the overall quality of life for adult carers, and subscale scores for eight domains of quality of life:

1. Support for caring: This subscale measures the extent of support carers perceive that they receive encompassing emotional, practical and professional support.

2. Caring choice: This subscale measures the extent to which carers feel that they have control over their own life, and are able to choose ventures outside caring, such as social activities.
3. Caring stress: This subscale measures the mental and physical stress from caring, such as exhaustion and depression.
4. Money matters: This subscale measures how carers feel about their financial situation.
5. Personal growth: This subscale measures how much the carer feels they have grown and developed, and the positive experience of the carers' circumstances.
6. Sense of value: This subscale measures the extent to which the carer feels they are valued and respected, and the positive relationship between the carer and the person they are caring for.
7. Ability to care: This subscale measures the extent to which the carer is able to provide care for the person they care for, how they cope with the caring role, and how they feel about their competency to care.
8. Carer satisfaction: This subscale measures the extent to which the carer is satisfied with their life and role as a carer, and how they feel about being a carer.

Results

A total of 40 primary caregivers of spinal cord injury patients were studied. Majority of the caregivers were females mostly the spouse and in the age group 20 to 40 years, which is the most productive age group. Majority of the caregivers are females and mostly the spouse. There is a good positive correlation between the two burden assessment scores used in the study namely CBI-SCI and BAS with a R2 value of 0.985. There exists a strong negative correlation between burden of the caregiver and his quality of life. This is demonstrated by R2 values of- 0.858 and -0.718 for BAS and CBI-SCI respectively.

Table 1. Demographic characteristics of the Caregivers

Varaible	**Number (n)**	**Percentage (%)**	**Mean±SD**
Age in yrs			(33.44±8.59)
Up to 20	2	5.0	
21-30	8	20.0	
31-40	18	45.0	
41-50	8	20.0	
51-60	4	10.0	
Gender			
Male	11	27.5	
Female	29	72.5	
Relation to patient			
Father	4	10.0	
Mother	7	17.5	
Wife	19	37.5	
Husband	2	5.0	
Brother	2	5.0	
Sister	1	2.5	
Son	2	5.0	
Daughter	1	2.5	
Cousin/Nephew	1	2.5	
Uncle/Aunt	1	2.5	

Table 2. Caregivers burden assessed using the various scores

Parameter	NUMBER (n=40) (Mean ±SD)	95%CI	P value (Two tailed Hypothesis)
BAS scores	**55.25±25.8**	**55.25 ±7.995 (±14.47%)**	< .00001
CBI SCI scores	**46.62±22.6**	**46.6154 ±7.09 (±15.21%)**	< .00001
ACQOL Scores	**61±27.31**	**61 ±8.463 (±13.87%)**	< .00001

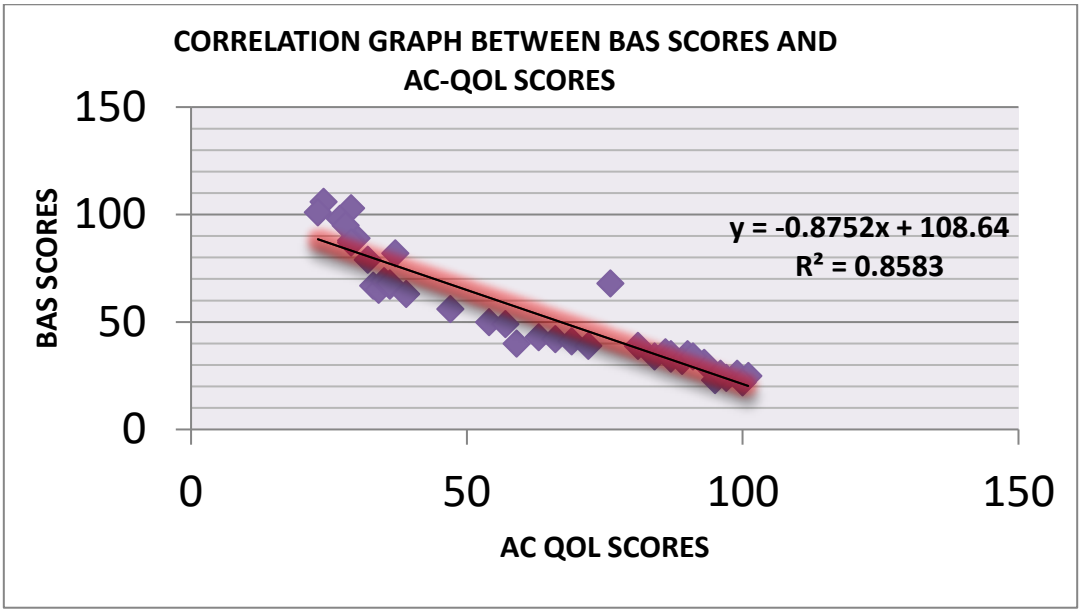

Figure 1. Correlation between BAS score and AC-QOL Scores

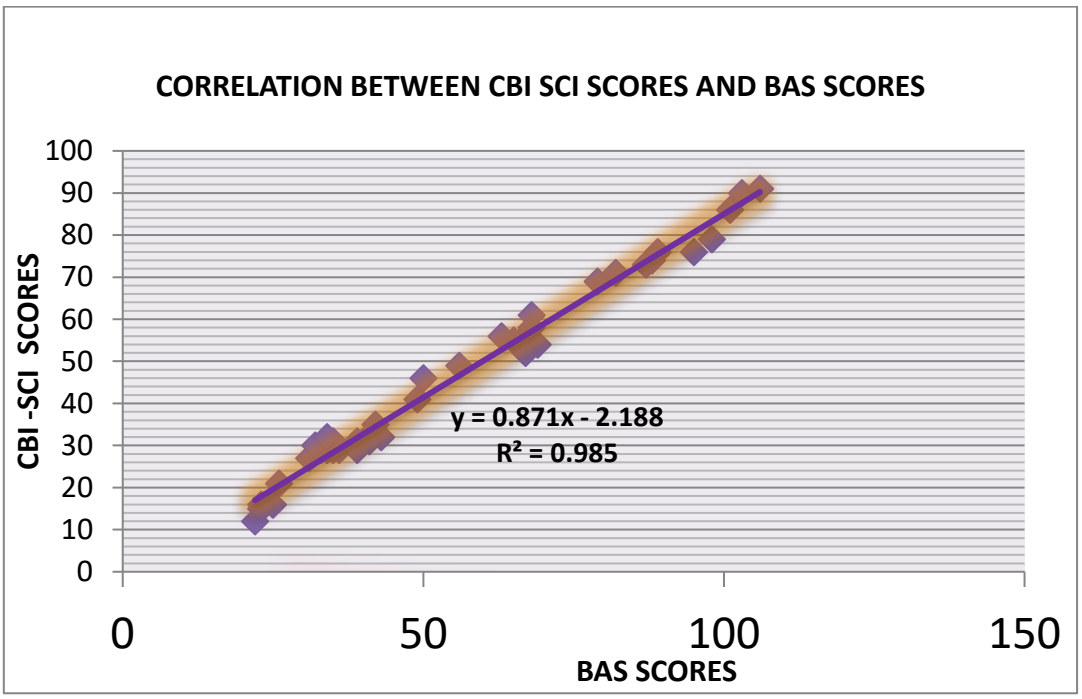

Figure 2. Correlation between BAS score and CBI SCI

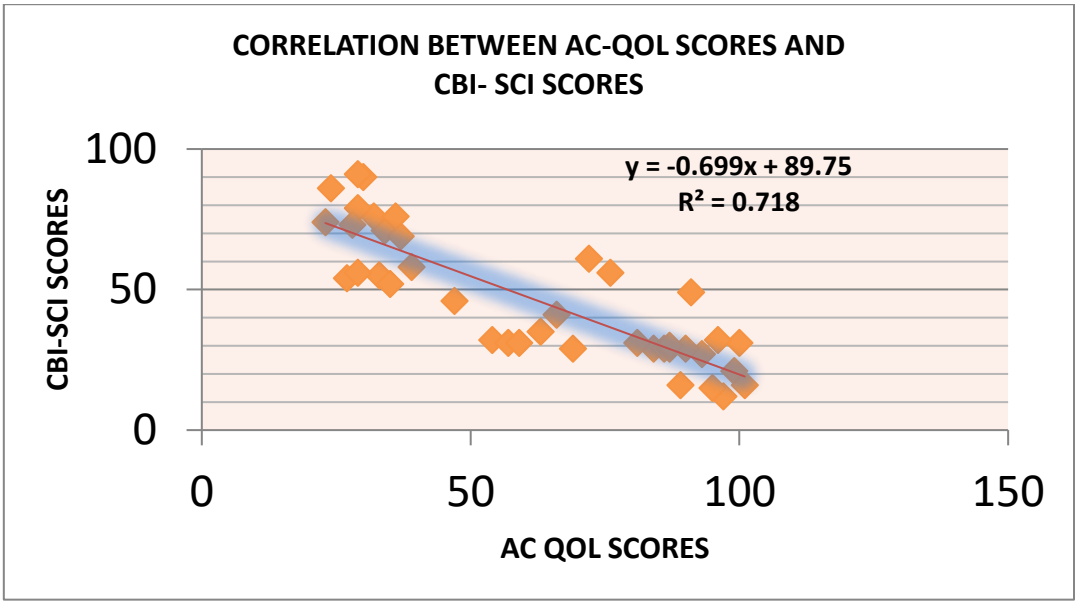

Figure 3. Correlation between AC-QOL Scores and CBI-SCI scores

Discussion

Post spinal cord injury the injured person requires assistance to carry out his activities of daily life. This can range from help in carrying out bathing, dressing to doing one's bowel and bladder activities or providing transportation. The health and well-being of the SCI caregiver is very important, as this can affect the well-being of the individuals with SCI.

The assessment of caregiver's burden is defined as the extent to which Caregivers perceived their emotional/physical health, social life and financial status to have changed as a result of caring for a person with SCI. This will help clinicians to investigate the factors affecting the level of stress and design appropriate intervention strategies to further improve the outcomes of SCI patients.

The caregiver burden was assessed using Caregiver burden inventory (CBI-SCI), the most commonly used and well validated questionnaire. Apart from this another common questionnaire that was used was the burden assessment scale (BAS). The quality of life of the caregiver was assessed by adult carer quality of life index (AC-QoL). In our study, forty caregivers of SCI patients were assessed for caregiver burden and the scores showed significant negative correlation with patient's quality of life.

Similar results were obtained by Timothy Elliot et al. in their study where they found that caregivers experience high levels of distress and burden impact the patient's QOL. Primary caregivers of people with SCI showed significantly lower QOL than people who were not caregivers.

In another study by Marcel Post et al. it was reported that burden is higher with older and female caregivers and caregivers of persons with more disability experience heavy burden. The study population in our study also showed a predominance of female caregivers but we did not analyse the burden with respect to the gender and age distribution.

Marcel Post et al. report that burden is higher with older and female caregivers and caregivers of persons with more disability experience heavy burden. [10]

The outcome of patients SCI is significantly dependent on the adequate social support and caregiver's attitude towards the patients. Susan Mockus found that younger the patient, higher the level of burden perceived by caregiver [11].

Faison et al reported that caregivers experiencing high levels of burden negatively impact patient's QOL [12]. The caregiver burden shows significant correlation with patients' disability in the current study.

Chan et al reported that partners of persons with SCI perceived more distress than patient's themselves [13].

Conclusion

The results show the need for the assessment of caregiver's burden which needs to be incorporated in the comprehensive rehabilitation program of SCI patients. Better care of caregivers will ensure their continued participation in the welfare of traumatic SCI patients. Steps need to be taken to plan for community-based support to the care givers in form of self-support groups. Financial support and aid from governmental and non-governmental organisations will play a significant role in the overall rehabilitation of the SCI victims.

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Neuroimaging, Etiology, Clinical Findings, and Evaluation of Associated Problems in Children with Cerebral Palsy

Neuroimagistică, Etiologie, Constatări Clinice și Evaluarea Problemelor Asociate la Copiii cu Paralizie Cerebrală

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Abstract

Introduction: Cerebral palsy (CP) is the most common cause of motor impairment in childhood. Its incidence in our country is 4.4/1000 live births. Although motor dysfunction forms the basis of the clinic in cerebral palsy, epilepsy, speech, hearing, vision, nutrition and learning disorders, and many orthopedic problems may accompany this condition. *Aim:* This study examined CP types, neuroimaging findings, etiologies, clinical findings, and nutritional status of pediatric patients with CP who applied to our hospital. *Material and methods:* The files of patients aged 1-18 years with CP who applied to Hatay Mustafa Kemal University Medical Faculty Hospital between 01/09/2019-01/09/2020 were retrospectively scanned. The etiology, clinical findings, additional problems accompanying the clinic, and brain magnetic resonance images (MRI) of the patients included in the study were evaluated. *Results:* Forty eight patients were included in the study. Of the patients with a mean age of 4.9±3.5 years, 33 (68.8%) were male. Spastic CP was present in 93.7% of the patients. Considering the subgroups of patients with spastic type CP, the most common was quadriplegic CP (42.2%). The most common etiological factor was prematurity (56.4%). When we look at the accompanying problems, malnutrition was the most common problem with (72.9%) and epilepsy with a rate of (54.2%). Then came hearing, vision, and speech problems, respectively. When the cranial MRI images of the patients were examined, periventricular leukomalacia (PVL) was the most common MRI finding, with 70.8%. *Discussion:* We found that prematurity was the most common cause in the patients with cerebral palsy we followed in our region. With the improved newborn conditions, even babies born at short weeks have the opportunity to live. *Conclusion:* Considering the imaging findings, the first rank of PVL is proportional to prematurity. PVL is a common imaging finding in premature infants.

Keywords: *cerebral palsy, etiology, nutrition problems.*

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Rezumat

Introducere: Paralizia cerebrală (PC) este cea mai frecventă cauză a deficienței motorii în copilărie. Incidența sa în țara noastră este de 4,4/1000 de născuți vii. Deși disfuncția motrică formează baza clinicii în paralizia cerebrală, epilepsia, tulburările de vorbire, auz, vedere, nutriție și învățare și multe probleme ortopedice pot însoți această afecțiune. *Scop:* Acest studiu a examinat tipurile de PC, constatările neuroimagistice, etiologiile, constatările clinice și starea nutrițională a pacienților pediatrici cu PC care au fost tratați la spitalul nostru. *Material și metode:* Dosarele pacienților cu vârsta cuprinsă între 1 și 18 ani cu PC care s-au tratat la Spitalul Facultății de Medicină din cadrul Universității Mustafa Kemal din Hatay în perioada 01/09/2019-01/09/2020 au fost scanate retrospectiv. Au fost evaluate etiologia, constatările clinice, problemele suplimentare care însoțesc clinica și imaginile prin rezonanță magnetică cerebrală (RMN) ale pacienților incluși în studiu. *Rezultate:* Patruzeci și opt de pacienți au fost incluși în studiu. Dintre pacienții cu vârsta medie de 4,9±3,5 ani, 33 (68,8%) au fost bărbați. CP spastică a fost prezentă la 93,7% dintre pacienți. Luând în considerare subgrupele de pacienți cu PC de tip spastic, PC tetraplegică a fost cea mai frecventă (42,2%). Cel mai frecvent factor etiologic a fost prematuritatea (56,4%). Dacă avem în vedere problemele asociate, malnutriția a fost cea mai frecventă problemă (72,9%) și epilepsia cu o rată de 54,2%. Apoi au apărut problemele de auz, de vedere și, respectiv, de vorbire. Când au fost examinate imaginile RMN craniene ale pacienților, leucomalacia periventriculară (LPV) a fost cea mai frecventă constatare RMN, cu 70,8%. *Discuție:* Am constatat că prematuritatea a fost cea mai frecventă cauză la pacienții cu paralizie cerebrală pe care i-am urmărit în regiunea noastră. Cu condițiile îmbunătățite ale nou-născuților, chiar și bebelușii născuți în săptămâni scurte au posibilitatea de a trăi. *Concluzie:* Având în vedere rezultatele imagistice, primul rang al LPV este proporțional cu prematuritatea. LPV este o descoperire imagistică comună la copiii prematuri.

Cuvinte cheie: *paralizie cerebrală, etiologie, probleme de nutriție.*

Introduction

Cerebral palsy (CP) is a non-progressive movement and posture disorder resulting from irreversible damage to the developing brain. It is the most common cause of motor disorders in childhood [1]. While its incidence is 2.5/1000 live births globally, this rate is 4.4/1000 live births in our country [2, 3]. The etiology of CP is complex. The risk roles in etiology are 70–80 percent prenatal, 10 percent – 20 percent natal, and 10 percent postnatal, and in some situations, the etiology cannot be proven [4]. It is known that the most common causes of CP are premature birth and hypoxia. The lower the gestational age, the higher the risk. Asphyxia is the most common cause in term babies [4, 5]. The etiology of the remaining 8% of the cases is often trauma or infection [6]. It has been stated that more than one risk factor accompanies premature and low birth weight infants, and the most critical risk factor for CP is periventricular leukomalacia (PVL) and intraparenchymal hemorrhage.

Although motor dysfunction is the basis of the clinic in cerebral palsy, epilepsy, speech, hearing, vision, nutrition, learning disabilities, and many orthopedic problems may accompany this condition [7, 8]. For this reason, CP treatment should be planned with a multidisciplinary approach in which many specialists such as pediatricians, pediatric neurologists, physiotherapists, orthopedists, pediatric gastroenterologists, and language and speech therapists come together. Although the damage to the brain itself is not progressive, secondary and tertiary problems arising from the damage are essential for careful planning of the rehabilitation process. Focusing on a single point in the treatment and rehabilitation process and ignoring many other factors causes treatment failure. For this reason, it is crucial to detect and consider the presence of accompanying problems in the treatment of CP and planning the rehabilitation.

In this study, CP types, neuroimaging findings, etiologies, clinical findings, and nutritional status of pediatric patients with CP who applied to our hospital were examined, and it was aimed to determine the frequency of other accompanying conditions besides movement disorder.

Material and Method

The files of patients aged 1-18 years with CP who applied to Hatay Mustafa Kemal University Faculty of Medicine Hospital between 01/09/2019 and 01/09/2020 were retrospectively scanned. Ethics committee approval required for the study was granted by the Clinical Research Ethics Committee of Hatay Mustafa Kemal University. Patients without follow-up, applications to the health board, and those with missing information in their files were excluded from the study. The etiology, clinical findings, additional problems accompanying the clinic, and brain magnetic resonance images (MRI) of the patients included in the study were evaluated.

Cerebral Palsy Classification

CP classification was divided into three according to the localization of the lesion in the brain and the affected body parts. Spastic, dyskinetic, and ataxic subtypes were determined. Individuals with spastic type CP were also classified as unilateral and bilateral involvement [9].

Nutrition Evaluation

Bodyweight and height for age, and body weight for height ratios were calculated by measuring the height, body weight, and head circumference of the patients. Neyzi et al. malnutrition status was determined by comparing the rates calculated with the help of percentile charts [10].

Statistical Analysis

IBM SPSS 21 for Windows program was used for statistical analysis. As descriptive statistics, mean ± standard deviation was given for numerical variables, and frequency and percentage values were given for categorical variables.

Results

It was determined that 186 patients entered our hospital 338 times in 1 year. Twenty eight patients who did not come to follow-up regularly and 110 patients who entered a committee for their health report were excluded from the study. Thus, 48 patients were included in the study. While 35 (72.9%) of the patients were Turkish nationals, 13 (27.1%) patients were Syrian nationals. With a mean age of 4.9±3.5 years, 33 (68.8%) of the patients were male, and 15 (31.2%) were female. Spastic CP was present in 93.7% of the patients. When the subgroups of patients with spastic type CP were examined, it was seen that bilateral involvement was higher, and according to the topographic distribution, the majority of this was composed of quadriplegic (42.2%) individuals. When the etiological factors were examined, it was determined that the most common etiological factor was 27 (56.4%) prematurity, followed by hypoxia with a rate of 12 (25%). (Table 1)

Table 1: Demographic and clinical findings of the patients

Age (year, mean±SD)	4,9±3,5	
	n	%
Sex		
Male	33	68,8
Female	15	31,2
Nationality		
Turkish	35	72,9
Syrian	13	27,1
CP type		
Spastic	45	93,7
Unilateral	13	27,1
Bilateral	32	66,6
Atetoid	3	6,3
Etiology		
Prematurity	27	56,4
Hypoxia	12	25
Hyperbilirubinemia	3	6,2
Cerebrovascular	3	6,2
Other	3	6,2

When we look at the accompanying problems, malnutrition was the first with 35 (72.9%), while epilepsy was the second most common problem with 26 (54.2%) comorbidities. Then, it was determined that hearing, visual and speech disorders were accompanied, respectively.

When the cranial MRI images of the patients were examined, it was determined that periventricular leukomalacia was the most common MRI finding, with a rate of 34 (70.8%). This was followed by hyperintensity in the basal ganglia, corpus callosum atrophy and cystic encephalomalacia (Table 2).

Table 2: Problems accompanying CP and imaging findings of the patients

Associated problems	N	%
Malnutrition	35	72,9
Epilepsy	26	54,2
Hearing disorders	5	10,5
Visual disorders	3	6,3
Speech disorders	1	2,1
MRI Finding	n	%
Periventricular leukomalacia	34	70,8
Basal ganglia hyperintensity	6	12,5
Corpus callosum atrophy	5	10,5
Cistic encephalomalacia	5	10,5

Discussion

Cerebral palsy is a condition that should be handled multidisciplinary because of various problems that occur in other systems besides movement disorder. For this reason, it is very important to determine the problems of patients with CP and to solve these problems in the treatment to ensure the success of the treatment process and to increase the quality of life of the individuals. Prematurity was in the first place in the aetiology of patients with CP that we followed in our clinic. It is known that the most common cause of CP, with an incidence of 2/1000 live births all over the world, is prematurity [11, 12]. Due to the developing prenatal, natal and postnatal care conditions, survival rates increase in babies born prematurely or with low birth weight.

It is known that the risk of CP increases, especially in those born before the 28th gestational week and/or in babies born under 1500 g [13]. A variety of risk factors contribute to the development of CP in a premature newborn after delivery. Intraventricular haemorrhage, periventricular leukomalacia, bronchopulmonary dysplasia, hyperbilirubinemia, hypocarbia, newborn sepsis, hypoxia, and apnea are some of the symptoms [14]. On the other hand, it was determined that the second most common etiological factor was hypoxia. It's linked to a higher chance of brain injury as well as long-term and neurodevelopmental problems such cerebral palsy (CP), cognitive impairment, behavioral issues, vision or hearing loss, and epilepsy [15]. While spastic type CP was found in 93.7% of our patients, the remaining rate was athetoid type CP. Spastic type CP is the most common type of CP and appears to be associated with premature birth or intrauterine growth retardation. Athetoid type CP can be seen either with the spastic type or alone. While severe hypoxia is more common in babies with spastic and athetoid type CP together, pure athetoid type CP is frequently seen in babies with hyperbilirubinemia [16].

In our study, most of our patients consisted of babies born prematurely or exposed to hypoxia. In addition, there was a history of hyperbilirubinemia in three of our babies. It is thought that this may be related to the fact that healthcare professionals are informed about hyperbilirubinemia and that its treatment is carried out effectively. Considering the imaging findings, periventricular leukomalacia (PVL) was in the first place. PVL is encountered more frequently in brain imaging of babies born prematurely than those born at term. In severe hypoxia, PVL and multicystic encephalomalacia can be seen together [17]. At the same time, clinical studies show that it is associated with maternal/fetal infection and inflammation [18]. In our study, premature patients and patients with a history of hypoxic birth constitute most of the patient group. Therefore, it is expected to see PVL in imaging findings. As a result of our study, it was determined that malnutrition and epilepsy were the first among the problems accompanying CP. As a result of the multicenter study conducted by Aydın et al. in our country, the malnutrition rate in patients with CP was reported as 94.3% and the epilepsy rate as 55.3% [19]. In our study, these rates were 72.9% and 54.2%, respectively. Although the incidence of epilepsy was the same, there was a significant difference between malnutrition rates. This disparity in our center's favor can be attributed to the fact that diet has long been an essential aspect of treating children with CP.

Conclusion

Our study is valuable in emphasizing the detection and treatment of accompanying problems in patients with CP. As a result of our study, it was determined that prematurity was the most influential etiological factor, PVL occurred in most of the babies, and accordingly, spastic bilateral type CP was the most common. Although malnutrition was the most common condition accompanying CP, it was determined that it was at a lower rate than in national studies. The fact that malnutrition is less common than in our country suggests that this view is gaining traction. Although our study was conducted in a single-center, the results of Turkish and Syrian children could be revealed. This result can be considered one of the strengths of our study. The detection of etiology and imaging findings at the same rate as the literature is another valuable point of our study.

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