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Differences in the levels of physical fitness of individuals with moderate Intellectual Disabilities participating and not participating in school-based physical activities

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Abstract

In Turkey individuals with intellectual disabilities, receiving supportive education services, are provided with individual and/or group training in Special Education and Rehabilitation Centers for a maximum of 8 lessons per month and 3 lessons per day. However, games, sports and physical activity classes are not conducted in these centers. In the tier-1 Special Education Application Center, which is the other educational institution where we conducted our study, games, sports and physical activity lessons are, instead, carried out three hours a week. This study aims to examine the differences in the levels of physical fitness of individuals with moderate intellectual disabilities participating and not participating in school-based physical activities. This study uses the causal-comparative research method. The participants of this study were 32 students with moderate intellectual disability who were educated at the Muş Special Education Application Center (n = 16) and at Special Education and Rehabilitation Centers (n = 16). Body Mass Index (BMI), flexibility, sitting height, arm span, standing long jump, and the throwing distance of the medicine ball of the participants were measured and the

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two groups were compared between each other. The Mann-Whitney U test was used for the independent comparison of the measured scores of the study. While the research findings revealed a statistically significant difference in favor of students who were educated at the Muş Special Education Application Center in terms of the variable measuring flexibility ($p < .05$), no statistically significant difference was found between the two groups in terms of BMI, standing long jump, sitting height, arm span, and the medicine ball throwing variables ($p > .05$). The results of the study show that the levels of physical fitness in students attending the Muş Special Education Application Center are better. It is thus recommended to implement school-based physical activity practices to increase the levels of physical fitness in students attending special education and rehabilitation centers.

Keywords: Moderate Intellectual Disabilities; Physical Activity; Physical Fitness.

1. Introduction

It is known that performing physical activity leads to positive changes in the fitness and motor skills of children and paves the way for their abilities to develop (Çayır, 2019). However, it is claimed that children whose movement span is restricted for specific reasons have difficulties in participating to events that include physical activities (Özdemir, 2019) and that disabled individuals are more significantly affected by this situation (Esatbeyoğlu & Güven Karahan, 2014). Previous studies have shown that children with intellectual disabilities, who make up a significant portion of disabled people, cannot participate in physical activities as much as their normally developing peers and/or as people with other disability groups, which increases their existing inadequacies even more (Özer, 2010; Günaydın, 2016; Kurt & Coşkun, 2018; Şenlik & Atılgan, 2019). Intellectual disability is defined as significant limitations in both mental functions and adaptive behaviors expressed as conceptual, social and practical adaptation skills (American Psychiatric Association, 2013). Children with intellectual disabilities are a heterogeneous group and are divided, according to the level of disability, into the following four groups: mild intellectual disability (50-55 to 70 IQ), moderate intellectual disability (30-35 to 50-55 IQ), severe intellectual disability (20-25 to 35-40 IQ), and profound intellectual disability (under 20-25 IQ) (Yarımkaya & Töman, 2021).

As results from the literature, individuals with intellectual disabilities are exposed to various diseases, such as heart respiratory problems, obesity, cardiac diseases, high cholesterol, and musculoskeletal disorders, in addition to their existing disorders, since they lack regular physical activity (Tunç & Kin İşler, 2007; Özer, Etker, Baran, Nalbant, & Top, 2008; Savucu & Biçer, 2009). Insufficient physical fitness promotes the inadequate development of individuals with intellectual disabilities and is an obstacle to their participation in physical activities, so these individuals should have sufficient physical fitness levels to carry out daily activities likewise individuals with normal development (Bağdatlı & Deliceoğlu, 2014). Accordingly, it is suggested that there is a significant decrease in physical fitness of both children with normal development and those with special education needs due to insufficient physical activity (Sansi & Özer, 2019).

The relevant Turkish state agencies direct the individuals in need of special education to educational institutions based on their educational needs and disability types and degrees (Yerlikaya, 2019). To this end, the education of individuals in need of special education is performed in educational institutions affiliated with the Ministry of Education (MEB) and in Special Education and Rehabilitation Centers (SERCs) as a supportive education (MEB, 2018). Individuals with intellectual disabilities receive special education services in special classrooms, private schools, inclusive education practices, supportive education rooms, Special Education Application Centers (SEACs), vocational practice schools, home education, and SERCs (Metin, 2018; Erdin, 2019). Children with intellectual disabilities are predominantly directed to SEACs (Tumeğ & Sazak Pınar, 2016; Kara, 2017) and all disabled individuals who need support education, including those with intellectual disabilities who are part of other disability groups, are led to SERCs among the described educational institutions (MEB Regulation on Special Education Institutions, 2012; Dağlı, 2019).

Some studies highlighted that there are problems concerning both the quality of the education provided and the direction of individuals to special education institutions, which aim to contribute to improve the lives of individuals in need of special requirements (Kutlu, Schreglmanni, & Cinisli, 2018) as independent individuals in the society (Akkaş, 2017; Aydın, 2017; Işıkhan, 2017; Sadan, 2018). As revealed by the literature, the quality of education given in special education institutions, which is of great importance in terms of contributing to independent living and to the development of individuals with special education needs, is discussed and criticized for various reasons (Uşaklı, 2009; Şahin, 2012; İlik, 2017; Sarı, Atbaşı, & Çitil 2017; Nalbant & Izgar, 2018; Ünlü, Melekoğlu, & Ünlü, 2019).

The lack of a sufficient physical activity in special education institutions, which have the duty to fulfill the needs of students with special education needs who cannot find enough physical activity opportunities in out-of-school environments, is stated to negatively affect the levels of physical fitness in these students, while regular physical activities have been shown to contribute to the development of such individuals and improve their physical fitness (Bülbül Kardaş, Tezcan Kardaş, & Sadık, 2017; Orhan, Yarımkaya, & İlhan, 2018; Güvenç, 2019). In this sense, educational institutions stand out as strategically important locations to provide physical activity facilities and, consequently, to positively contribute to improving the levels of physical fitness (Özdemir, 2019).

Although it is known that physical activities should be promoted for people with intellectual disabilities in special education institutions (Savucu & Biçer, 2009; İlhan, Kırımoğlu, Tunçel, & Altun, 2015; Nalbant & Izgar, 2018; Orhan *et al.*, 2018), which play an important role in ensuring that individuals with intellectual disabilities have an adequate amount of physical activity, improving their physical, motor, and social development and reducing the negative effects of environmental conditions (Usta, 2010), some studies have, however, highlighted that the activity and exercise practices are not sufficiently covered, qualified sports instructors are not employed (Dönmez & Kaya, 2018; Nalbant & Izgar, 2018), and the settings of these institutions are not appropriate for physical activities (Aydın, 2017; Er, 2018; Kaplan & Aksoy, 2019).

As revealed by the literature, there is a need for evidence-based studies to evaluate the learning outcomes of students with special education needs in the educational institutions to where they are directed and to determine the achievements of these students; knowing how much the education and activities provided in these institutions benefit the students for a higher quality special education planning is of great importance (Camadan, Özer, & Şen, 2011; World Health Organization, 2011; Atmaca, 2019; Yenigün, 2019). Besides, determining the physical fitness level, which is closely related to the physical activity level, is seen as a beneficial way to monitor the development of individuals with intellectual disabilities and to address their educational planning (Saygın, Karacabey, & Saygın, 2011; Tokgöz, 2011; Yüksek, Akpınar, Ayan, & Ölmez, 2017).

Individuals with intellectual disabilities, receiving supportive education services in SERCs (Sadan, 2018), are provided with individual and/or group training for a maximum of 8 lessons per month and 3 lessons per day (MEB, 2012). Studies in the literature have shown that these time intervals are insufficient to meet the educational needs of individuals with special needs, physical activity is not sufficiently included in SERCs, institutional buildings are not suitable for physical activity, and sports trainer employment (physical education teacher-trainer) is optional in SERCs. Thus, it is stated that there are no sports trainers in these centers most of the time (Uşaklı, 2009; Aydın, 2017; Er, 2018; Nalbant & Izgar, 2018; Orhan *et al.*, 2018). In the tier-1 SEAC, which is the other educational institution where we conducted our study, games, sports, and physical activity lessons are carried out by the special education teachers three hours a week.

In line with the information described above, the aim of this study was to evaluate the differences in levels of physical fitness of individuals with moderate intellectual disabilities participating and not participating in school-based physical activities. The results were discussed in the framework of the literature and recommendations were made.

2. Methodology

2.1. Study design

The causal-comparative method was used in the study. Causal comparison is a research method that aims to determine the causes and consequences of the differences between the groups without any intervention on the participants (Büyüköztürk, Akgün, Karadeniz, Demirel, & Kılıç, 2013). The comparisons we made based on the causal-comparative method enabled us to explore the differences in the levels of physical fitness of individuals with moderate intellectual disabilities participating and not participating in school-based physical activities.

2.2. Participants

The participants of the research consisted of 32 students with moderate intellectual disabilities, 16 (8 males, 8 females) of which were attending the tier-1 Muş SEAC and the other 16 (8 males, 8 females) who were attending SERCs. The criterion sampling method, which is one of the purposive sampling methods, was used to determine the parents. The criterion of participation to the study was determined as follows: a) accepting to participate in the study voluntarily and b) having a diagnosis of moderate intellectual disability. The Ethical Committee approval was received from the Muş Alparslan University Scientific Research and Ethical Committee Headship with resolution number dated 02.03.2020 – E3504 for the implementation of the research. The permission approval regarding the implementation was received from the Muş Governorship Provincial Directorate of National Education dated 14.04.2021 and numbered 20200220368014370. Parental consent forms were submitted to the families of the children participating in the research and their written consent for the participation of their children in the research was obtained. The information on the participants was obtained from the corresponding special education classroom teachers and the school administration, while physical fitness parameter measurements of the participants were quantified and recorded through the Physical Fitness Test Information Form.

2.3. Data collection

2.3.1. Age, height, and weight measurement

The age of the participants was determined according to the birth dates as stated in the official records of the educational institutions during the interview with the subjects. Participants' weights were measured by using a Fakir brand electronic weighing scale with a sensitivity of .01 kg and a capacity of 150 kg. During the measurements, the children were weighed with their sports outfits without the shoes, socks on or off, with their head upright, the soles flat on the weighing scale, knees tense, the heels adjacent, and the body upright. The results were measured in kilograms and recorded in the Physical Fitness Test Information Form. To measure their height, students were asked to stand without shoes, with the heels adjacent, body and head upright, and eyes looking across. The height value obtained was measured in centimeters when the sliding caliper apparatus touched the head and was recorded in the Physical Fitness Test Information Form (Ministry of Youth and Sports, 2019).

2.3.2. Body Mass Index (BMI)

Body mass index (BMI) was calculated by dividing the body weight (kg) by the square of the height (m) (Zorba & Saygın, 2017; Ministry of Health, 2020).

2.3.3. Flexibility (sit-and-reach) test

In the sit-and-reach test used for flexibility measurements, the students were asked to place their soles on the resting part of the flexibility board without shoes. They were further instructed to reach forwards with both arms without bending their knees, to slowly push the ruler on the flexibility board with their fingertips, take it to the furthest point, and wait for 1-2 seconds. The test was repeated twice and the best reaching level was recorded in the Physical Fitness Test Information Form (Ministry of Youth and Sports, 2019).

2.3.4. Standing long jump

The student's feet were kept even, tiptoes behind the starting line, and the point of closest contact to the starting line was marked following a strong jump with the arms forwards in a horizontal position. The test was repeated twice and the longest jump was recorded in the Physical Fitness Test Information Form (Zorba, 2001).

2.3.5. Arm span measurement

The students were seated on the measuring bench and their backs were allowed to lean against the measuring scale in an upright position. The students' arms were stretched out to the sides, parallel to the floor. The distance between the middle fingertips of both arms was measured in centimeters and recorded in the Physical Fitness Test Information Form (Ministry of Youth and Sports, 2019).

2.3.6. Sitting height measurement

The students were seated, resting on the measuring bench, with their back upright and the eyes looking across. The sliding measuring apparatus on the bench was adjusted according to the student and the foot level was adjusted after the desired sitting position was achieved on the bench. The distance between the bench ground and the top of the head was measured in centimeters and recorded in the Physical Fitness Test Information Form (Ministry of Youth and Sports, 2019).

2.3.7. Medicine ball throwing

After the subjects took their positions behind the starting line with their feet parallel to each other, they were asked to throw a 1-kilogram medicine ball with both hands to the furthest possible distance by taking their arms back above the head. The distance between the starting line and the place where the medicine ball first touched the ground was measured in centimeters. The test was repeated twice by allowing the required resting interval and the longest throws were recorded in the Physical Fitness Test Information Form (Ongül, Bayazıt, Yılmaz, & Güler, 2017).

2.4. Data collection process

Parents and teachers were informed of the measurements after obtaining the approval of the ethics committee and the official permission of the Ministry of National Education. The measurements were completed by taking mask and hygiene measures in March and the first week of April, when schools were open due to the pandemic. The measurements were taken by the researchers by going to the institutions where the students were educated. Each measurement was explained to each student by the researchers, it was shown as a model and the student was asked to do the movement. The movement to be made was explained again, with partial physical assistance, for the students who could not perform the movement in the correct way and they were then asked to repeat it independently. Each student was given 2 attempts and the best score was written.

2.5. Data analysis

The analysis of the data was conducted using the SPSS 22.0 package software. Percentage and frequency values were calculated to evaluate the demographic characteristics of the participants. Moreover, since the participants' age, height, weight, and values of body mass index presented ordinal characteristics, median values and quartile deviation values were used. The Mann-Whitney U Test was used to determine the difference between the two groups. The statistical significance level obtained from the analyses was set as $p < .05$ and the findings were laid out in tables.

3. Results

As results from the table below, participants were equally distributed between males and females (50%) both in the SEAC and in the SERC (see Tab. 1 for more details). In terms of level of income, most participants presented a moderate income (37.5% in the SEAC, 50% in the SERC) followed by a poor income (31.3% in both institutions); a higher percentage of participants of the SEAC (31.3%) presented a good level of income compared to those of the SERC (18.8%; refer to Tab. 1 for more details). Interestingly, the two educational institutions were opposite in terms of early education (see Tab. 1). In fact, most participants (62.5%) of the SEAC started early education before the age of 5 as opposed to those of the SERC (12.5%).

Table 1 – *Statistical distribution of participants between the two educational institutions based on their demographic characteristics*

Educational Institutions	Variables		*n*	%
Special Education Application Center	Gender	Male	8	50.0
		Female	8	50.0
		Total	16	100
	Level of income	Poor	5	31.3
		Moderate	6	37.5
		Good	5	31.3
		Total	16	100
	Early education	Yes	10	62.5
		No	6	37.5
		Total	16	100

Special Education and Rehabilitation Center	Gender	Male	8	50.0
		Female	8	50.0
		Total	16	100
	Level of income	Poor	5	31.3
		Moderate	8	50.0
		Good	3	18.8
		Total	16	100
	Early education	Yes	2	12.5
		No	14	87.5
		Total	16	100

Age, height, weight, BMI, flexibility, standing long jump, sitting height, arm span length, and the values of the throwing of the medicine ball of the participants in both institutions were measured and the minimum and maximum values, mean and quartile deviation are shown in Tables 2 and 3.

Table 2 – *Statistical distribution of participants in the Special Education Application Center based on the variables of the data collection*

Variables	Min	Max	Mean	quartile deviation
Age	7	11	9	1
Height (cm)	110	133	123.3	7
Weight (kg)	17	28	25.5	2.63
BMI	13.15	19.7	16.48	1.25
Flexibility	10	28	17	2.5
Standing long jump	8	103	61.5	31.38
Sitting height	58	72	65.5	3.25
Arm span length	103	133	122	9.25
Medicine ball throwing	90	360	180	70.63

Table 3 – *Statistical distribution of participants in the Special Education and Rehabilitation Center based on the variables of the data collection*

Variables	Min	Max	Mean	quartile deviation
Age	8	11	9	.88
Height (cm)	115	147	127.5	5.38
Weight (kg)	19	41	26	5.12
BMI	13.58	23.53	15.38	2.34
Flexibility	1	20	13	3.88
Standing long jump	2	115	49	27.5
Sitting height	56	74	63.5	4.25
Arm span length	101	133	121	8.88
Medicine ball throwing	10	330	157	66.25

The Mann-Whitney U test revealed a statistically significant difference between the students of the SEAC and those of the SERC in terms of flexibility ($U = 72.5$, $p < .05$), as is shown in Table 4. However, no statistically significant difference was found in terms of BMI ($U = 119.5$, $p > .05$), standing long jump ($U = 121.0$, $p > .05$), sitting height ($U = 114.0$, $p > .05$), arm span length ($U = 123.5$, $p > .05$) and medicine ball throwing ($U = 127.5$, $p > .05$).

A more detailed analysis of Table 4 revealed that the mean BMI (Mean Rank = 17.03), flexibility (Mean Rank = 19.97), standing long jump (Mean Rank = 16.94), and sitting height (Mean Rank = 17.38) of students of the SEAC were higher than the mean BMI (Mean Rank = 15.97), flexibility (Mean Rank = 13.03), standing long jump (Mean Rank = 16.06) and sitting height (Mean Rank = 15.63) of students of the SERC. In contrast, the mean arm span length (Mean Rank = 16.22) and the medicine ball throwing (Mean Rank = 16.47) of SEAC students were lower than the mean arm span length (Mean Rank = 16.78) and the medicine ball throwing (Mean Rank = 16.53) of SERC students.

Table 4 – *Comparison of the physical fitness levels of the participants according to their educational institutions*

Variables	Educational Institutions	*n*	Rank mean	Rank sum	*U*	*z*	*p*
	SEAC	16	17.03	272.50			
BMI	SERC	16	15.97	255.50	119.5	-.32	.749
	Total	32					
	SEAC	16	19.97	319.50			
Flexibility	SERC	16	13.03	208.50	72.5	-2.10	.036*
	Total	32					
	SEAC	16	16.94	271.00			
Standing long jump	SERC	16	16.06	257.00	121.0	-.26	.792
	Total	32					
	SEAC	16	17.38	278.00			
Sitting height	SERC	16	15.63	250.00	114.0	-.53	.597
	Total	32					
	SEAC	16	16.22	259.50			
Arm span length	SERC	16	16.78	268.50	123.5	-.17	.865
	Total	32					
	SEAC	16	16.47	263.50			
Medicine ball throwing	SERC	16	16.53	264.50	127.5	-.20	.985
	Total	32					

Note: SEAC = Special Education Application Center; SERC = Special Education and Rehabilitation Center.
$*p < .05$.

4. Discussion and conclusions

Literature often points out how students with special educational needs are affected by education and how important it is to minimize their inadequacies and support their development (Camadan *et al.*, 2011; Atmaca, 2019; Yenigün, 2019). In line with this information, in this study we examined the effect of education given to students with intellectual disabilities attending SEACs and SERCs on their level of physical fitness with respect to a number of research variables from the literature.

As revealed by Table 4, no significant difference emerged when comparing the BMI values of the participants in both the SEAC and SERC ($p > .05$). Our results were in line with previous findings. In fact, as reported by the literature, Demir (2006), Nalbant (2011), Top (2015), Uçan and colleagues (Uçan, Buzdağlı, & Ağgön, 2018) and Ayan and co-workers (Ayan, Boyalı, Ergin, & Ulaş, 2019) found no significant difference when comparing the BMI values of the participants in their studies. However, it is interesting to note that, in contrast to our results, Tokgöz (2011), Karakoç (2015), and Şahin (2011) found a significant difference in the comparison of the BMI values of the participants included in their studies. As suggested by the results described in Tables 2 and 3, the participants attending the SEAC had a higher mean BMI than the participants attending the SERC, but both groups still presented normal values (Ministry of Health, 2020). These findings thus suggest that the weights of the students attending both educational institutions were within normal values, they did not have obesity risks and expressed similar characteristics. As previously reported, it is considered normal for individuals between the ages of 7-10 to have a similar body weight before adolescence (Uçan *et al.*, 2018), although individuals with intellectual disabilities encounter a higher risk of obesity during adulthood due to inactivity. Predisposing individuals with intellectual disabilities to gain regular physical activity habits since childhood is thus considered to be of great importance (Tokgöz, 2011). As previously reported, children with intellectual disabilities continue to have normal BMI values even in future years of their lives when exposed to educational institutions that offer wider opportunities to participate in physical activities (Hollar, Messiah, Lopez-Mitnik, Hollar, Almon, & Agatston, 2010; Tanır, 2013).

In our study, when comparing the flexibility values of the participants in the SEAC and SERC, we found a significant difference ($p < .05$) in favor of SEAC students (refer to Tab. 4 for more details). It is thus clear that the participants of the SEAC, who were exposed to a higher level of physical activity, had a higher level of flexibility than the participants of the SERC. Our results were in line with previous findings. As suggested by other authors, individuals with intellectual disabilities participating in regular physical activity had a higher level of flexibility compared to individuals with insufficient physical activity (Demir, 2006; Demirci, 2009; Yılmaz, 2012; Karakoç, 2015; Akın & Yüksel, 2016; Atan, Eliöz, Çebi, Ünver, & Atan, 2016; Uçan *et al.*, 2018; Yılmaz & Soyer, 2019). The level of flexibility is thus reported to improve proportionally to the level of physical activity and to reduce and worsen when physical activity decreases (Demirci, 2009; Top, 2015). Accordingly, the literature indicates that physical activities are not given the priority they deserve in the SERC (Emir, 2018; Şenlik & Atılgan, 2019).

Our study revealed no statistically significant difference between the two groups when comparing the standing long jump values of the participants ($p > .05$), confirming previous reports. Çoknaz, Eskicioğlu and Şemsek (2003), Ayan and colleagues (Ayan *et al.*, 2019) and Yılmaz (2012), in fact, also found no significant difference in the comparison of the standing long jump levels of individuals with intellectual disabilities. It is interesting to note that the standing long jump skill, which is an anaerobic feature, does not become clear enough in the 7-10 age group. Thus, we cannot have a high level of expectation regarding this skill. We should also note that individuals with intellectual disabilities have significant difficulties in performing the standing long jump skill (Demirci & Demirci, 2014). However, we can assert that the standing long jump skill, which can be improved to a certain extent with physical activity, gives a considerable clue concerning the level of physical activity (Çayır, 2019). To this end, we found that the mean standing long jump values of SEAC students was higher than that of SERC students (Tab. 2-4). According to this finding, it is clear that the standing long jump skills of SEAC students were better than those of SERC students. The literature also shows that the standing long jump skills of individuals with intellectual disabilities who participated in sufficient physical activity improved significantly (Bayazıt, 2006; Demir, 2006; Yılmaz & Soyer, 2019).

Our study revealed no statistically significant difference between the two groups when comparing the sitting height and arm span length values of the participants ($p > .05$), consistent with previous findings. In his study comparing the anthropometric characteristics of individuals with intellectual disabilities who did and did not exercise, Tokgöz (2011) did not find a significant difference in the measurements of the forearm, upper arm, head, and thigh circumferences of the participants. Table 4 shows that the mean rank value of the sitting height variable of SEAC participants was higher than that of SERC participants while the opposite was observed for the arm span length. We can hypothesize that this difference in both groups may be explained by variations in the activities they performed as different physical activities have been shown to have different effects in the height and body structures of individuals (Baran, 2012; Yüksek *et al.*, 2017). Therefore, we can state that the different activities of the participants, studying in different educational institutions, may have affected the sitting height and arm span values differently. Moreover, as results from the literature, anthropometric characteristics, such as height and leg length, may be more linked to genetic factors than environmental conditions and that these characteristics may also have higher values in sedentary individuals regardless of physical activity (Malina, 1983; Saygın *et al.*, 2011). Moreover, bone development is demonstrated to be negatively affected by a sedentary lifestyle and regular physical activities have a positive effect on development itself (Hekim, 2016). We can thus conclude that the differences in sitting height and arm span length in our research groups may have been affected both by the level and difference of physical activity and by genetic and environmental factors.

No statistically significant difference emerged between the two groups (SEAC vs SERC participants) also in terms of the distances reached following medicine ball throwing ($p > .05$). However, when analyzing the mean rank values of the medicine ball throwing of both groups, we observed that SERC participants had higher mean rank values than SEAC participants. As previously reported, individuals with intellectual disabilities have difficulties in skills, such as throwing a ball, which requires the coordination of two movements (Jankowicz, Mikolajczyk, & Wojtanowski, 2012; Demirci & Demirci, 2014; Işık, 2016). However, the throwing skills of individuals with intellectual disabilities appear to improve significantly when exposed to a sufficient physical activity (Coknaz *et al.*, 2003; Demir, 2006). Based on our research findings and the information provided in the literature, it is possible to hypothesize that SERC students may have performed more object-controlling activities than SEAC students, which may explain the poorer performance of SEAC students in the distances reached following medicine ball throwing.

When examining the physical fitness mean rank values of the participants of this study, which compared the effects of school-based physical activities on the physical fitness levels of students enrolled at a SEAC vs SERC, it clearly emerged that SEAC students scored higher values in four out of six physical fitness variables while SERC students performed better in two out of six variables. As reported by the literature, socio-economic status and early education are important factors on the level of physical activity and physical fitness (Akınoğlu & Köse, 2018), which are related to each other (Gezen, 2019). It emerged that the families of the students participating in our research presented a similar financial income, but the students of the SEAC received more early education than the students of the SERC. Thus, the fact that most (62.5%) SEAC students had received early education could have contributed to this result. Hence, as the literature suggests, individuals with intellectual disabilities who receive early education can be more effective and productive in their daily care and in terms of acquiring independent living skills (Camadan *et al.*, 2011; Sarı *et al.*, 2017).

In our study, our *a priori* expectation was to reveal that the students with intellectual disabilities, who regularly received training at a tier-1 SEAC 5 days a week and participated in physical activities 3 times a week, would have significantly higher physical fitness levels than SERC students who did not participate in any physical activity in their educational institution. However, the fact that only one out of six physical fitness parameters scored a significantly different level reveals the need to question the education given as well as the physical activities performed in these institutions.

Individuals with intellectual disabilities receiving supportive education services in SERCs (Sadan, 2018) are provided with individual and/or group training for no more than 8 lessons per month and 3 lessons per day (MEB, 2012). As revealed by studies in the literature, this short period is insufficient to meet the educational needs of individuals with special needs, physical activity is not sufficiently included in SERCs, institutional buildings are not suitable for physical activity, and sports trainer employment (physical education teacher-trainer) is optional in these centers. Thus, it is stated that there are no sports trainers in these centers most of the time (Uşaklı, 2009; Aydın, 2017; Er, 2018; Nalbant & Izgar, 2018; Orhan *et al.*, 2018). In the tier-1 SEAC, which is the other educational institution where we conducted our study, games, sports, and physical activity lessons are carried out by the special education teachers three hours a week as a necessary class for the motor and physical development of individuals with intellectual disabilities according to the Ministry of Education's Regulation on Special Education Services (2018). Although it is clear that physical activities have shown to positively contribute to the development and physical fitness of individuals with intellectual disabilities, it is also clear that physical activities are not adequately included in special education rehabilitation centers (Nalbant & Izgar, 2018). Studies have reported that physical activities should be carried out with an interdisciplinary understanding (Kirimoğlu, Filazoğlu Çokluk, İlhan, & Öz, 2016), that special education and classroom teachers have difficulties in carrying out the physical activities necessary for the development of motor skills and physical fitness of individuals with intellectual disabilities (Güven & Yıldız, 2014; Akbal, 2016; Günaydın, Mirzeoğlu, & Acar, 2019) and that there is not enough employment of physical education teachers in tier-1 SEACs and SERCs (MEB, 2012; 2018). These limiting factors influence our research findings and highlight the importance of the issue.

Based on the results of our research, we can conclude that including physical education teachers in physical education classes at tier-1 SEACs, employing physical education teachers in SERCs and increasing the level of school-based physical activities can positively affect the level of physical fitness of individuals with intellectual disabilities. Moreover, making the buildings of SERCs more appropriate for the organization of physical activities could also positively contribute to the development of the physical fitness of individuals with intellectual disabilities.

References

Akbal, E. (2016). *The study of physical education lesson practices in special education practice schools (Kırıkkale example).* Institute of Health Sciences in Kırıkkale University. (Master's Thesis). Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Akın, S., & Yüksel, O. (2016). The Evaluation of Athlete and Non-Athlete Mentally Retarded Children's Dynamic Balance Level. *Sports Perspective: Journal of Sports and Educational Sciences*, *3* (1), 33-40. Retrieved from: https://dergipark.org.tr/tr/pub/sbsebd/issue/31661/347127.

Akınoğlu, B., & Köse, N. (2018). Determination of Physical Fitness Level in Children with Hemiparetic and Diparetic Cerebral Paralysis. *Turkish Journal of Physiotherapy and Rehabilitation*, *29* (1), 11-18. https://doi.org/10.21653/tjpr.416609.

Akkaş, S. (2017). Job Satısfactıon of Teachers Workıng in Specıal Educatıon and Ecıa Classes. *Journal of Civilization Educational Research, 1* (1), 53-65. Retrieved from: https://dergipark.org.tr/tr/pub/mead/issue/30039/321968.

American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders (5th ed.)*. Arlington, VA: American Psychiatric Publishing.

Atan, T., Eliöz, M., Çebi, M., Ünver, Ş., & Atan, A. (2016). Investıgatıon of the Effect of Basketball Traınıng on Motorıc Skılls of the Educable Mentally Retarded Chıldren. *Journal of Sport and Performance Studies, 7* (1), 29-35. https://doi.org/10.17155/spd.78754.

Atmaca, U. (2019). *The Opinions of Teachers Working in Special Education and Rehabilitation Centres About the Support Services for Individuals with Hearing Loss* (Master’s Thesis). Institute of Educational Sciences in Anadolu University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Ayan, S., Boyalı., E., Ergin, M., & Ulaş, M. (2019). An Investıgatıon of Selected Physıcal and Basıc Motor Parameters of Students wıth Specıal Needs in Terms of Age and Gender Varıables. *The Journal of International Social Research, 12* (62), 968-978. http://dx.doi.org/10.17719/jisr.2019.3110.

Aydın, S. (2017). *Educational and administrative inadequacy that are lived in special education institutes and their solution offers* (Master’s Thesis). Institute of Social Sciences in Istanbul Sabahattin Zaim University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Bağdatlı, Ş., & Deliceoğlu, G. (2014). Identification of Certain Physical Fitness Parameters of Persons with Educable Intellectual Disabilities (Kırıkkale Case). *Hacettepe Journal of Sport Sciences, 25* (2), 67-78. Retrieved from: https://dergipark.org.tr/en/pub/sbd/issue/16370/171309.

Baran, F. (2012). *The effect of practice variability in the acquisition, retention and transfer of learning of motor skills in individuals with intellectual disabilities* (Master's Thesis). Institute of Health Sciences in Akdeniz University. Retrieved from: https://tez.yok.gov.tr/UlusalTez Merkezi/tezSorguSonucYeni.jsp.

Bayazıt, B. (2006). *The effect of the psychomotor features of the entertaining fun athletics training programme on mentally retarded children* (Master's Thesis). Institute of Health Sciences in Kocaeli University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonuc Yeni.jsp.

Bülbül Kardaş, S., Tezcan Kardaş, N., & Sadık, R. (2017). Investigation of Children's Task for Sportive Effects of Individual Retarded Children. *National Journal of Sport Sciences, 1* (2), 34-43. Retrieved from: https://dergipark.org.tr/en/pub/usbd/issue/33585/337987.

Büyüköztürk, Ş., Akgün, Ö. E., Karadeniz, Ş., Demirel, F., & Kılıç, E. (2013). *Scientific Research Methods*. Ankara: Pegem Academy.

Camadan, F., Özer, R., & Şen, G. (2011). Assessment of Educatıon of the Students wıth Mental Retardatıon (Rıze Sample). *Journal of Bayburt University Faculty of Education, 6* (1), 9-20. Retrieved from: https://dergipark.org.tr/en/pub/befdergi/issue/23152/247321.

Çayır, Ç. (2019). *The effect of different sporsal activities on motor development of 7-8 years old children* (Master's Thesis). Institute of Health Sciences in Selcuk University. Retrieved from: https://tez.yok.gov.tr/ UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Çoknaz, H., Eskicioğlu, Y., & Şemsek, Ö. (2003). Investıgatıon of some Motorıc Characterıstıcs of Mentally Retarded Boys Playıng Basketball. *Journal of Physical Education and Sport Sciences, 5* (3), 6-10. Retrieved from: https://dergipark.org.tr/en/download/article-file/297238.

Dağlı, E. (2019). *Examination of leadership styles of principales working in special education and rehabilitation centers* (Master's Thesis). Institute of Social Sciences in Maltepe University. Retrieved from: https://tez.yok.gov. tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Demir, R. (2006). *The effect on some of motor abilities of 10 weeks training programs of educationable mentally male adolescences* (Master's Thesis). Institute of Social Sciences in Niğde University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Demirci, H. (2009). *The effects of the flexibility training upon activity improvement of the children with educable mental disabilities* (Master's Thesis). Institute of Social Sciences in Sakarya University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Demirci, N., & Demirci, P. (2014). Analysis of the attainments gained by the students ın need of Special Education during the course of games and physical activities. *Inonu University, Journal of Physical Education and Sport Sciences, 1* (1), 25-34. Retrieved from: https://dergipark.org.tr/en/pub/inubesyo/issue/8687/108561.

Dönmez, K. H., & Kaya, E. (2018). Special Education and Rehabilitation Students' Home Therapeutic Exercise Situation. *Black Sea Journal of Social Sciences, 10* (19), 485-490. Retrieved from: https://dergipark.org.tr/en/pub/ksbd/issue/41531/501811.

Emir, A. (2018). *Investigation of posture, balance and upper extremity functionality in individuals with intellectual impairment* (Master's Thesis). Institute of Health Sciences in Istanbul Medipol University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Er, Ö. (2018). *Examınatıon of the Relatıonshıp Between the Qualıty of Lıfe and the Movement Educatıon and Educatıonal Game for Chıldren wıth Autısm* (Master's Thesis). Health Scıences Instıtute in Hıtıt Unıversıty. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Erdin, G. (2019). *The Opınıons of Parents Concerned in Educatıonal Subjects whose Chıldren are Mentally Dısabled* (Master's Thesis). Socıal Scıences Instıtute in Unıversıty of Trakya. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Esatbeyoğlu, F., & Güven Karahan, B. (2014). Perceived Participation Barriers to Physical Activity among Individuals with Disabilities. *Journal of Sport Sciences, 25* (2), 43-55. Retrieved from: https://dergipark.org.tr/en/pub/sbd/issue/16370/171307.

Gezen, M. (2019). *Examination of the relationship between physical activity level and quality of life of barrier-free life special education and rehabilitation center employees* (Master's Thesis). Institute of Educational Sciences in Bursa Uludag University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Günaydın, B. (2016). *Evaluating the physical education curriculum of the students with mental disabilities according to the opinions of the parents and teachers in terms of the content, implementation and problems* (Master's Thesis). Institute of Educational Sciences in Abant İzzet Baysal University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tez SorguSonucYeni.jsp.

Günaydın, B., Mirzeoğlu, N., & Acar, H. (2019). Evaluation of the Content and Practices of the Physical Education Lessons for the Mentally Disabled. *Abant İzzet Baysal University Journal of the Faculty of Education*, *19* (1), 235-242. https://doi.org/10.17240/aibuefd.2019.19.43815-470414.

Güven, Ö., & Yıldız, Ö. (2014). Expectatıons of the Classroom Teachers from Play and Physıcal Actıvıtıes Lesson. *Kastamonu Journal of Education*, *22* (2), 525-538. Retrieved from: https://dergipark. org.tr/en/pub/kefdergi/issue/22602/241509.

Güvenç, G. (2019). *The problems and expectations related to these problems of teachers working in special education and rehabilitation centers in context of students' education* (Master's Thesis). Institute of Educational Sciences in Akdeniz University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Hekim, M. (2016). Physical Education, Sports and Game Participation Effectiveness Evaluation in Bone Development in Children. *Gumushane University Journal of Health Sciences, 5* (2), 66-71. Retrieved from: https://dergipark. org.tr/en/pub/gumussagbil/issue/23824/253816.

Hollar, D., Messiah, S. E., Lopez-Mitnik, G., Hollar, T. L., Almon, M., & Agatston, A. S. (2010). Effect of a two-year obesity prevention intervention on percentile changes in body mass index and academic performance in lowincome elementary school children. *American Journal of Public Health, 100* (4), 646-653. https://doi.org/10.2105/AJPH.2009.165746.

İlhan, L., Kırımoğlu, H., Tunçel, M., & Altun, M. (2015). The Effect of Special Athletics Training to Self-Care Skills' Level on Mentally Retarded Children. *Journal of Ahi Evran University Kirsehir Education Faculty, 16* (3), 145-160. Retrieved from: https://dergipark.org.tr/en/pub/kefad/issue/59449/854078.

İlik, Ş. Ş. (2017). Examination and evaluation of individualized education programs prepared for intellectual disability students. *Journal of Human Sciences*, *14* (4), 4898-4909. Retrieved from: https://www.j-humansciences.com/ojs/index.php/IJHS/article/view/5027.

Işık, M. (2016). *The effects of the game hemsball on the motor skills proficiency results of mentally disabled children* (Master's Thesis). Institute of Health Sciences in Gazi University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Işıkhan, V. (2017). Investigation the Effects of the Burnout Levels of Personnel Working in Special Education Institutions. *Journal of Society and Social Work*, *28* (1), 7-26. Retrieved from: https://dergipark.org.tr/tr/pub/tsh/issue/38637/448564.

Jankowicz, A., Mikolajczyk, E., & Wojtanowski, W. (2012). The effect of physical training on static balance in young people with ıntellectual disability. *Research in Developmental Disabilities*, *33* (2), 675-681. https://doi.org/10.1016/j.ridd.2011.11.015.

Kaplan, G., & Aksoy, V. (2019). An Examination of the Physical Environment at Special Education Centres in Eskişehir Based on Universal Design Principles. *Journal of Education for Life*, *33* (2), 169-186. https://doi.org/10.33308/26674874.2019332126.

Kara, B. (2017). Educatıon in Mental Dısabılıtıes in Turkey and in the World. *The Journal of Academic Social Science Studies, 61*, 277-288. Retrieved from: https://docplayer.biz.tr/105283931-Dunyada-ve-turkiye-de-zihinsel-engellilerde-egitim.html.

Karakoç, B. (2015). *12 weeks of recreational physical investigation of the effects on the activity program of educable children and their families* (Master's Thesis). Institute of Health Sciences in Dumlupınar University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Kirimoğlu, H., Filazoğlu Çokluk, G., İlhan, E. L., & Öz, A. Ş. (2016). The effect of physical education and sports program on the positive growth and coping strategies of the adolescent with mental retardation. *SHS Web of Conferences*, *26*: 01086. https://doi.org/10.1051/shsconf/20162601086.

Kurt, Ö., & Coşkun, İ. (2018). An Examination of Physical Activity Levels of Children in Families with Mentally Handicapped Adult Members. *Balkan and Near Eastern Journal of Social Sciences, 4* (3), 1-9. Retrieved from: http://www.ibaness.org/bnejss/2018_04_03/01_Kurt_and_Coskun.pdf.

Kutlu, M., Schreglmanni, S., & Cinisli, N. A. (2018). The Opinions of Special Education Teachers on the Use of Assistive Technologies in Special Education. *Journal of Yüzüncü Yıl University, Faculty of Education, 15* (1), 1540-1569. Retrieved from: https://dergipark.org.tr/en/pub/yyuefd/issue/40566/499065.

Malina, R. M. (1983). Human growth, maturation, and regular physical activity. *Acta Medica Auxologica, 15* (1), 5-27.

Metin, N. (2018). Mentally Handicapped Children. In N. Metin (Ed.), *Children with Special Needs* (pp. 71-114). Ankara: Memoir Publishing.

Ministry of Education (2012). *Regulation on making changes in the Special Education Services Regulation.* Retrieved from: https://orgm.meb.gov.tr/meb_iys.../2012.../27113614_ozelegitim21temmuz2012.doc.

Ministry of Education (2018). *Special Education Services Regulation*. Retrieved from: https://orgm.meb.gov.tr/meb_iys_dosyalar/2020_06/24163215_ozel_eYitim_yonetmeliYi_son_hali.pdf.

Ministry of Health (2020). *General Directorate of Public Health*. Retrieved from: https://hsgm.saglik.gov.tr/tr/beslenmehareket-hesaplamalar/beslenmehareket-cocuk-beden-kitle-indeksi.html.

Ministry of Youth and Sports (2019). *Anthropometric Measurement and Performance Test Protocols.* Retrieved from: https://yetenektaramasi.gsb.gov.tr/Sayfalar/3436/3430/antropometri%CC%87k-ve-motori%CC%87k-testler-test-protokolu%CC%88.aspx.

Nalbant, S. (2011). *The effects of 14 weekly physical activity program on motor development and daily living activity in children with Down Syndrome* (Master's Thesis). Institute of Health Sciences in Akdeniz University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Nalbant, S., & Izgar, N. (2018). Perspective of Special Education and Rehabilitation Institutions on Physical Education Teacher Employment. *National Journal of Sport Sciences, 2* (1), 68-83. https://doi.org/10.30769/usbd.420781.

Ongül, E., Bayazıt, B., Yılmaz, O., & Güler, M. (2017). The Effect on the Selected Motoric Characteristics of Children in the Game and Physical Activities Lesson. *Journal of Sport Sciences Researches, 2* (1), 45-52. https://doi.org/10.25307/jssr.309716.

Orhan, B. E., Yarımkaya, E., & İlhan, E. L. (2018). Examınatıon of the Physıcal Actıvıty Profile of Two Specıal Educatıon and Rehabılıtatıon Centers. *Journal of Sports and Performance Researches, 9* (2), 110-126. https://doi.org/10.17155/omuspd.324105.

Özdemir, M. (2019). *Comparison of health-related physical compatibility levels of physical education and elective sport activities and school based physical activity applications* (Master's Thesis). Institute of Educational Sciences in Mersin University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Özer, D. S. (2010). *Physical Education and Sport for the Disabled*. Ankara: Nobel Publication Distribution.

Özer, D., Etker, Ö., Baran, F., Nalbant, S., & Top, C. (2008). Investıgatıon of Partıcıpatıng Status Chıldren wıth Intellectual Dısabled to Physıcal Actıvıty. *Gazi Journal of Physical Education and Sports Sciences, 13* (1), 3-12. Retrieved from: https://dergipark.org.tr/en/pub/gbesbd/issue/28040/297821.

Sadan, A. (2018). Determining the Expectations of the Teachers who Work in Special Education and Rehabilitation Centers from the Guidance and Research Centers. *International Journal of New Approaches in Special Education, 1* (1), 66-89. Retrieved from: https://dergipark. org.tr/en/pub/ijnase/issue/42139/508209.

Şahin, M. (2011). *Effect of eight-week ski training on the physical fitness levels of children with mental disabilities* (Master's Thesis). Institute of Health Sciences in Istanbul University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Şahin, N. (2012). *Design principles of educational structures for disabled and analysis of case studies* (Master's Thesis). Graduate School of Natural and Applied Sciences in Haliç University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Sansi, A., & Özer, D. (2019). Examination of Physical Fitness Levels of Young People With Down Syndrome by Comparing Typical Development Peers. *Gaziantep University Journal of Sport Sciences, 4* (4), 491-503. https://doi.org/10.31680/gaunjss.640772.

Sarı, H., Atbaşı, Z., & Çitil, M. (2017). Working in Special Education and Rehabilitation Centers The Competences of Teachers on Family Education Determination. *Journal of Kirsehir Education Faculty, 18* (3), 668-684. Retrieved from: https://dergipark.org.tr/tr/pub/kefad/issue/59420/853409.

Savucu, Y., & Biçer, S. Y. (2009). The Importance of Physical Activities in Mentally Handicapped. *Turkey Clinics Journal of Sports Sciences*, *1* (2), 117-122. Retrieved from: https://www.cabdirect.org/cabdirect/abstract/20103114750.

Saygın, E., Karacabey, K., & Saygın, Ö. (2011). Investigation of physical activity and physical fitness of children. *International Journal of Human Sciences, 8* (2), 921-35. Retrieved from: https://core.ac.uk/download/pdf/268072654.pdf.

Şenlik, M., & Atılgan, E. (2019). The effect of regular exercise program on motor skills in adolescents with mild mental retardation. *Journal of Exercise Therapy and Rehabilitation*, *6* (3), 140-148. Retrieved from: https://dergipark.org.tr/en/pub/jetr/issue/51781/435983.

Tanır, H. (2013). *The effect of physical activity level and certain antropometric characteristics on academic achievement among the pupils at grade eight in primary schools* (Master's Thesis). Institute of Health Sciences in Kırıkkale University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Tokgöz, N. S. (2011). *Physical antropometry of athletes with mental retardation participating special olympics* (Master's Thesis). Institute of Health Sciences in Trakya University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Top, E. (2015). *Analysis of the influence of a twelve-month swimming exercise on mentally disabled individuals' physical fitness level* (Master's Thesis). Institute of Health Sciences in Dumlupınar University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Tümeğ, S., & Sazak Pınar, E. (2016). The Effectiveness of Simultaneous Prompting Teaching Procedure on Teaching Coins to Students with Intellectual Disabilities by a Peer with Intellectual Disabilities. *Ankara University Faculty of Educational Sciences Journal of Special Education, 17* (3), 269-297. doi: 10.21565/ozelegitimdergisi.267317.

Tunç, E., & Kin İşler, A. (2007). Evaluatıon of Physıcal Actıvıty Levels of Hıgh-School and Unıverstıy Students accordıng to Age and Gender. *Gazi Journal of Physical Education and Sports Sciences, 12* (2), 11-18. Retrieved from: https://dergipark.org.tr/en/download/article-file/284493.

Uçan, İ., Buzdağlı, Y., & Ağgön, E. (2018). Research of the Effect of Physıcal Fıtness on Sports in Chıldren. *Journal of Physical Education and Sport Sciences, 20* (3), 123-133. Retrieved from: https://dergipark.org.tr/en/pub/ataunibesyo/issue/39710/455591.

Ünlü, Ö., Melekoğlu, M. A., & Ünlü, E. (2019). Review of Researches Related to Competencies of Special Education Teachers Graduated from Alternative Certification Programs. *Elementary Education Online, 18* (4), 1609-1640. doi:10.17051/ilkonline.2019.632528.

Uşaklı, H. (2009). Needs Analysis of Private Education Institutions: Sinop Sample. *Black Sea Journal of Social Sciences, 1* (1), 1-8. Retrieved from: https://dergipark.org.tr/en/pub/ksbd/issue/16230/169966.

Usta, A. (2010). *The educational difficulties of the physical educational teachers who work in the schools for the disabled* (Master's Thesis). Institute of Health Sciences in Gazi University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

World Health Organization (2011). *World Disability Report. WHO Library and Publication Catalog Data.* Ankara: Anıl Group Printing House. Retrieved from: https://static.ohu.edu.tr/uniweb/media/portallar/engelsizuniversite/duyurular/1345/diwnu3i5.pdf.

Yarımkaya, D., & Töman, U. (2021). Exploring Turkish parents' lived experiences on online science lessons of their children with mild intellectual disability amid the COVID-19 pandemic. *International Journal of Developmental Disabilities*. https://doi.org/10.1080/20473869.2016.1147679.

Yenigün, E. (2019). *Practitioners' perspectives about the support services offered to inclusive students at special education and rehabilitation centres* (Master's Thesis). Institute of Social Sciences in Anadolu University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Yerlikaya, M. (2019). *Psychological empowerment for teachers working in special education and rehabilitation centers* (Master's Thesis). Institute of Educational Sciences in Gaziantep University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Yılmaz, H. (2012). *Evaluation of effects of physical training and sports lectures on biometric properties of educable mentally retarded students* (Master's Thesis). Institute of Health Sciences in Süleyman Demirel University. Retrieved from: https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp.

Yılmaz, A., & Soyer, F. (2019). *The Effect of Physical Education and Play Practices on Physical Fitness, Educational Performance and School Social Behaviors of Children with Mild Intellectual Disabilities.* Ankara: Gazi Bookstore.

Yüksek, S., Akpınar, E., Ayan, V., & Ölmez, C. (2017). The Investigation of Relationship between Anthropemetric Features and Backstroke Swimming Performance in 14-16 Years of Age Swimmers. *Istanbul University Journal of Sport Sciences, 7* (2), 13-26. Retrieved from: https://dergipark.org.tr/en/pub/iuspor/issue/32815/347926.

Zorba, E. (2001). *Physical Fitness* (*2nd ed*.). Ankara: Gazi Bookstore.

Zorba, E., & Saygın, Ö. (2017). *Physical Activity and Physical Fitness*. Ankara: Sports Federation for All.