Received: 2015.06.17
Accepted: 2015.07.28
Published: 2015.11.15

Physical Education Lessons and Activity Status of Visually Impaired and Sighted Adolescents

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

ABCDEF 1 **Funda Demirturk**
BD 2 **Mustafa Kaya**

1 Department of Physiotherapy and Rehabilitation, Gaziosmanpaşa University, School of Health, Tokat, Turkey
2 School of Physical Education and Sports, Gaziosmanpaşa University, Tokat, Turkey

Corresponding Author: Funda Demirturk, e-mail: fundapt@yahoo.com
Source of support: Departmental sources

Background: This study investigated participation in physical education and sports lessons of visually impaired adolescents and their sighted peers and compared their physical activity levels.

Material/Methods: A total of 22 visually impaired children of mean age 13.59 ± 1.14 years and 31 sighted children aged 13.61 ± 0.50 years participated in the study. A questionnaire prepared for this study was used to investigate participation of visually impaired adolescents and their sighted peers in physical education and sports lessons at school and the problems they encounter while doing sports. The Turkish version of the International Physical Activity Questionnaire – short-form (IPAQ-SF) was used to evaluate the physical activity level of the subjects.

Results: The results of our study suggest that physical activity levels of visually impaired children and their sighted children were similar ($p > 0.05$). Totally blind children had lower IPAQ scores than those with low vision ($p < 0.05$), and girls were less active physically than boys ($p < 0.05$). There were few differences in physical education lessons of the groups, in taking part in sports-related organizations, and future plans.

Conclusions: Children in secondary school, especially visually impaired children, need to be more motivated and more encouraged to take part in various sports or physical activities.

MeSH Keywords: **Motor Activity • Questionnaires • Visually Impaired Persons**

Full-text PDF: <http://www.medscimonit.com/abstract/index/idArt/895038>

3385 3 — 21

Background

Physical activity is very important for health and helps to protect from many chronic diseases. In addition to its contribution to development of motor skills, it is necessary for socialization and self-confidence, especially in childhood and adolescence [1].

Many guidelines commonly state that children between the ages of 6 and 17 years should participate in 60 min or more of moderate-to-vigorous intensity physical activity daily [2,3].

Visually impaired subjects are reported to be less active physically when compared to their sighted peers. Difficulty in adaptation to a new environment, safety problems, and economic issues are suggested to be responsible of the limited participation in physical activity of visually impaired children [4–6], which can negatively affect motivation and cause social disengagement.

Although the literature indicates a lack of activity in visually impaired children, some studies report that physical activity levels of many sighted children and adolescents are also insufficient to promote health benefits [7–9]. The reasons for this need to be seriously questioned and strategies must be devised to improve children's and adolescents' activity levels.

Some authors, however, indicated that the recommended 60 min or more of the physical activity can be obtained in a cumulative manner in school during physical education lessons, playtime, recess, intramural activities, and programs before and after school [2].

Structured physical education lessons in schools seem to offer an ideal opportunity to provide physical activity for students [3]. Participation of visually impaired children in these lessons is therefore essential.

But, to the best of our knowledge, there exists no study in the literature investigating the participation of visually impaired adolescents and their sighted peers in physical education and sports lessons, and comparing their condition in terms of problems, attitude, and targets.

So, in this study we had 3 objectives:

1. To investigate participation of the visually impaired children and their sighted peers in physical education and sports lessons, in terms of many aspects such as problems, attitude, and targets;
2. To compare their physical activity status;
3. To find out if physical education and sports lessons are sufficient enough to meet the major part of the recommended activity level for visually impaired children and their sighted peers.

Material and Methods

Subjects

This study included 22 visually impaired adolescents (7 girls and 15 boys) at Mehmet Akif Ersoy Secondary School for the Visually Impaired, Tokat (Turkey), and 31 sighted counterparts (14 girls and 17 boys) at a government school.

Group I was composed of visually impaired students and Group II included their sighted peers.

The school for the visually impaired in Tokat is a boarding school and it is the only one in the Black Sea region of Turkey. The school had a total of 22 students in 5th, 6th, 7th and 8th grades, so the whole universe was included in this study.

Outcome measures

The demographic data including age, height, and weight were recorded. In the visually impaired group, information about vision loss – the reason of vision loss (congenital/ acquired), duration (year), and degree of vision loss (blind/low-vision) – was obtained.

We used a questionnaire prepared to investigate participation of visually impaired adolescents and their sighted peers in physical education and sports lessons at their school and the problems they encounter while doing sports.

Subjects answered the following questions as “yes” or “no” (*except the 12th question and the second part of the 13th question*):
Do you participate in physical education and sports lessons in your school?

Do you participate in sports lessons willingly?

Do you think the sports education you receive in your school is sufficient?

Do you think you are offered sufficient materials for you to do sports?

Do you think you are offered a sufficient playing field for you to do sports?

Do you think the precautions for your safety while doing sports are sufficient?

Do you think your parents are supportive enough for your participation in sports activities?

Do you think the physical education and sports lessons in your school are sufficient to meet your sports demands?

Have you ever participated in a sport organization like sports tourney or inter-/intra- school matches?

Have you ever been injured while doing sports?

Do you have any problems while doing sports in the lessons?

What are the problems you encounter while doing sports in the lessons?

Table 1. Physical characteristics of the subjects.

	Groups		p*
	Group I (n: 22)	Group II (n: 31)	
	Mean ±SD	Mean ±SD	
Age (year)	13.59±1.14	13.61±0.50	0.933
Height (m)	1.55±0.09	1.58±0.07	0.182
Body weight (kg)	46.86±9.97	53.58±10.36	0.022
Body Mass Index (kg/m ²)	19.53±3.25	21.50±3.58	0.045

* Independent Samples T test.

Dou you have any specific target for the future in terms of sports? (and if so, what is it?)

IPAQ-SF

There are tools which can be used to assess physical activity level of an individual, such as field tests, laboratory tests and questionnaires. In our study we aimed to assess the activity level of the groups by using the Turkish version of the IPAQ.

The International Physical Activity Questionnaire (IPAQ) was designed for epidemiological studies by a multinational working group [10]. Long (31 items) and short (7 items) versions of the IPAQ are available and the short version (IPAQ-SF) in particular has gained wide acceptance [11]. The short form assesses physical activities like domestic activities, work-related activities, recreationally performed and/or transport-related activities, and sitting [10].

The Turkish version of the IPAQ-SF was used to evaluate the physical activity level of the subjects in this study. The validity and reliability study of the Turkish version was created by Saglam and reported that the Turkish versions of the IPAQ short and long forms were reliable and valid in assessment of physical activity [12].

In the short form, activities that are assessed are walking, moderate-intensity activities, and vigorous-intensity activities. Frequency (measured in days per week) and duration (time per day) were recorded for each specific type of activity. Because the subjects were students, the 'work' domain was changed to the 'school' domain while asking the questions. Data were gathered about the activities performed during the last 7 days [13].

Separate scores on walking, moderate-intensity activities, and vigorous-intensity activities are combined into a total score to determine overall level of activity. The scores are used in a formula to create a MET value. The MET values and formulae

for computation of MET-minutes were derived from the IPAQ validity and reliability study [10].

In their international study, Craig et al. demonstrated that reliable and valid physical activity data can be collected by the IPAQ instruments in many countries. They also stated that the short form is feasible to administer, and there was no difference between the reliability and validity of the short and long IPAQ forms [10].

Statistical analysis

Continuous data are expressed as mean ±standard deviation. Independent-sample t test was used to compare the continuous normal data between groups. The Mann-Whitney U test was used to compare IPAQ scores between groups, between genders, and between totally blind children and children with low vision. Categorical variables are presented as count and percentage. Chi-square tests were used to compare the categorical variables between VI and Control groups. A p value <0.05 was considered significant. Analyses were performed using SPSS 19 (IBM SPSS Statistics 19, SPSS inc., IBM Co., Somers, NY).

Results

Physical characteristics of the subjects are presented in Table 1. Mean ages of the visually impaired and the sighted children were 13.59±1.14 and 13.61±0.50 years, respectively ($p>0.05$). Eighth grade students formed the majority in both groups. Groups were different only in terms of body weight ($p<0.05$).

In group I, total duration of vision loss was 13.02±1.94 years (min: 6 years; max: 16 years); 81.8% of the cases (n: 18) were congenitally impaired, 4 cases (18.2%) were totally blind, and the remainder had low vision (n: 18; 81.8%).

Students in both groups reported that they received 1 h per week of physical education and sports lessons in their schools.

Table 2. Sports related targets of the groups.

	Group I (n: 22)		Group II (n: 31)		p*
	n	%	n	%	
To play in a team	7	46.7	1	6.7	0.002
Perform another sport branch	6	40.0	2	13.3	
To win a prize	1	6.7	0	0.0	
To be a professional	1	6.7	8	53.3	
To be a sports teacher	0	0.0	4	26.7	

* Chi-Square test.

Table 3. International Physical Activity Questionnaire Scores of the groups.

	Group I (n: 22)		Group II (n: 31)		p*
	Median [IQR]		Median [IQR]		
Vigorous intensity	0.00	[0.00–840.00]	0.00	[0.00–720.00]	0.984
Moderate intensity	0.00	[0.00–160.00]	0.00	[0.00–240.00]	0.51
Walking	148.50	[61.87–1212.75]	346.50	[165.00–594.00]	0.158
Total Score	1356.00	[441.37–3252.00]	777.00	[462.00–1606.50]	0.422

* Mann-Whitney U test.

All of the children in both groups reported that they participated in physical education and sports lessons in their school and all indicated that their participation was willing.

Most of the children in both groups (in Group I n: 20; 90.9% and in Group II n: 23, 74.2%) thought that the education they received about sports was sufficient (χ^2 : 0.166; p: 0.118).

All of the visually impaired children stated that the area and the equipment required to perform sports were sufficient. Most of the children in Group II (83.9%) also reported that the equipment was sufficient (χ^2 : 0.068; p: 0.059); but that the area was not (n: 13; 41.9%) (χ^2 : 10.064, p: 0.002).

All of the children in Group I indicated that the authorities took required precautions for their safety while doing sports. In Group II, most of the children (n: 26; 83.9%) also reported that the precautions were sufficient. Therefore, no significant difference was observed between the groups (χ^2 : 0.068; p: 0.059).

Except for 2 students in the sighted group (6.5%), all of the children in both groups mentioned that their parents were supportive enough of their participation in sports activities (χ^2 : 0.505; p: 0.337).

Nine children (40.9%) in the visually impaired group and 11 children (35.5%) in the sighted group thought that the physical education and sports lessons in their school were not sufficient to meet their sports needs (χ^2 : 0.013; p: 0.909).

Sighted children were found to participate more in sports organizations (χ^2 : 6.325; p: 0.012). Two children (9.1%) in the visually impaired group reported participation and 14 children (45.2%) in Group II said they participated in a sports organization.

The percentage of children who had a sports injury before in the visually impaired group was surprisingly lower than that of the sighted ones – 22.7% (n: 5) and 41.9% (n: 13), respectively, but the difference was not statistically significant (χ^2 : 1.347; p: 0.246). Falls were the most common cause of injury in the visually impaired children and contact injuries were the leading cause in the sighted group.

Four visually impaired children (18.2%) and 12 sighted counterparts (38.7%) indicated that they had some problems while doing sports in the lessons (χ^2 : 1.691; p: 0.193). When they were asked to define the problems, they stated that “fear of injury” was their major problem, but in Group II the causes of injury were being in a hurry (n: 1; 8.3%), getting tired early (n: 1; 8.3%), and fighting with friends (n: 1; 8.3%). Pain after

sports (n: 5; 41.7%) was reported, in addition to the fear of injury (n: 4; 33.3%) (χ^2 : 5.333, p: 0.255).

Groups were found to be similar in terms of ratio of children having a specific sports target for the future (χ^2 : 1.326; p: 0.250); 15 children (68.2%) in Group I and 15 children in Group II (48.4%) indicated that they wanted to engage in sports in the future.

The desires of the children were to be a player in a team, to achieve success in the branch of sports performed, to be a professional in sports, to be a sports trainer, and to participate in a different sport.

Groups were found to be different in terms of sports-related targets (χ^2 : 16.944; p: 0.002). To play on a team (n: 7; 46.7%) and play a different sport (n: 6; 40%) were the most desired targets among visually impaired children, but the sighted children wanted to be a professional in sports (n: 8; 53.3%) (Table 2).

Physical activity status of the groups were found to be similar according to IPAQ scores (p>0.05) (Table 3).

The level of total physical activity of the visually impaired children examined expressed by arithmetic mean reached the value of 1997 MET-min/week. The total activity value was 1596 MET-min/week for the sighted children.

For all children in both groups, girls were found to be less active physically than boys (u: 495.500, p: 0.004). When the total IPAQ scores were analyzed according to gender in each group, no gender difference existed in the visually impaired group (u: 75.500, p: 0.105). In sighted children, girls were less active than boys (u: 183.000, p: 0.011).

Totally blind students had lower total IPAQ scores than the children with low vision (u: 6000, p: 0.011).

Discussion

This study investigated the participation in physical education and sports lessons of the visually impaired adolescents and their sighted peers and compared their physical activity levels using the International Physical Activity Questionnaire – Short Form.

Although limited to 1 Secondary School for the Visually Impaired, which included just 22 students (as it is the only one in Black Sea region of Turkey), this study, to the best of our knowledge, is the first to focus on the sports lessons of visually impaired adolescents and compare their situation with sighted children. We believe that our study offers many

insights that may be inspirational for researchers interested in “visually impaired people and sports” issues.

The result in our study was a surprise because related literature reports that visually impaired children are not as active physically as their sighted peers [4,14], and the low physical fitness level and impaired motor skills of visually impaired children are suggested to arise from limited participation in physical activities [5].

Although the activity status was similar between the groups in our study, it must be remembered that most of the children in both groups were in 8th grade. In Turkey, children in 8th grade take 2 main exams centrally administered by the National Education Ministry – 1 in the middle of autumn semester and 1 in middle of the spring semester. The distribution of students to various high schools is determined based on their total exam score. These exams are important for children and their families, and children spend most of their out-of-school time preparing for these exams by continuing to study at home or by going to after-school courses.

While completing the activity questionnaire, many children, especially the girls in Group II, reported that they did too little physical activity, even in sports lessons. They indicated that all they did during several weeks was to sit and study their lessons.

There are no specific high schools for visually impaired children in Turkey, and visually impaired children also take these exams. But we think there are some differences in the preparation process of the visually impaired children and their sighted peers; therefore, spending most of the time by sitting and studying lessons in Group II may lead these children to stay sedentary and have activity levels similar to the visually impaired children.

Total scores of the students in our study were not high. In addition, girls were found to be less active physically than boys and had lower total energy expenditure. These results are compatible with previous study results [15–17].

Bergier et al. assessed physical activity levels of Polish adolescents aged 16–18 years and the factors that conditioned this level. They reported that the participation of schoolchildren in physical exercise classes was a factor that conditioned the level of total physical activity, and that dismissing adolescents from physical exercise classes, especially adolescent girls, was common [15]. However, in their study, students attended sports classes up to 5 h a week, and some students had even more than 5 h a week, so the exercise lessons in their study seem sufficient to increase average total activity level (2387 MET-min/week) of the children.

The Centers for Disease Control recommends daily quality physical education for all age groups, from kindergarten through grade 12 [3].

In our study children received just 1 h of sports lessons a week in both schools and all of the children stated that they willingly participated in physical education lessons, but the ratio of children who felt a need to have more sports lessons was not high. Total activity level was 1997 MET-min/week for the visually impaired children and 1596 MET-min/week for their sighted peers in this study.

In our opinion, this level of activity cannot be maintained with this frequency and duration of sports lessons. The total activity level in the study, we suppose, was achieved in a cumulative manner in school during physical education, recess, intramural sports, and before- and after-school activities. We suggest more frequent participation in physical education classes, as 1 h of lessons is insufficient to fulfill the recommended level of physical activity.

The literature has conflicting results regarding the activity level of totally blind children and children with low vision. Atasavun and Dulger stated that the motor skills of children with low vision were higher than those of the blind children in their study [18].

Aslan et al., on the contrary, found that blind children and adolescents did light activities for longer periods and moderate activities for shorter periods when compared to low-vision children and adolescents, but no difference was found when 1-mile run/walk test durations of low-vision and blind children were analyzed [4].

In another study by Atasavun, it was reported that children with normal vision had significantly better test scores than the low-vision and totally blind groups ($p < 0.05$) when their mobility levels were compared by the Independent Mobility Questionnaire. Nevertheless, they found no significant differences between low-vision and blind children's mobility levels [19].

In our study, totally blind children had lower total IPAQ scores than the children with low vision ($p < 0.05$).

Visually impaired children in the study seemed to have no marked problems other than fear of injury. They thought that the precautions were satisfactory and the family support was full. Equipment and playing field required to perform sports in the lessons were found to be sufficient among visually impaired children, while sighted ones thought that the area was not sufficient. This may arise from the difference in using a smaller playground space due to the lack of visual perception.

An important difference between the groups existed in terms of participation in sports organizations. Although they had similar activity levels with the sighted children, unfortunately, very few of the visually impaired children indicated that they took part in a sports organization. We think these children need to be motivated more about playing on a team and participating in sports events such as tournaments or interschool matches.

Although not significant, the percentage of children who had a previous sports injury in the visually impaired group was surprisingly lower than that of the sighted ones. While falls were found to be the most common injury cause in the visually impaired children, contact injuries were the leading reason in the sighted group. This result confirms the responses of the visually impaired children about security precautions. Visually impaired children are thought to be well-directed and protected from harmful environmental factors while they were doing sports in the lessons.

While fear of injury seemed to be the only problem for Group I, various problems such as delayed onset of soreness or early fatigue existed in Group II. The pain and fatigue problem might be due to the differences in activity type. Although the total activity scores of the groups were similar, visually impaired children were more likely to perform moderate activity or walking, but the sighted children were more likely to perform moderate or vigorous activities.

Goalball and torball are the games especially designed for the blind and low-sighted individuals [20,21]. Students in our study reported that they usually played goalball and torball, but if they had the chance, they would like to play different games or do another sport/activity like swimming, dancing, or yoga, or to play on a team. Unlike these modest wishes, being a trainer or a professional player are the leading goals among the sighted children. Visually impaired children must be encouraged more regarding participation on a team or must be offered appropriate options in terms of physical activity.

Conclusions

We found that visually impaired students had similar physical activity levels as sighted children. The sample size of our study was too small to draw conclusions concerning the whole population of visually impaired children. Therefore, to understand if the activity level of the visually impaired children and their sighted peers are really similar or if it is a temporary situation specific to the 8th grade students, comparison should be made with larger samples or with students in other grades, for example, in high schools.

We also think that children in secondary school, especially the visually impaired ones, need to be more motivated and more encouraged to take part in various sports or physical activities to make them increase their activity level to the recommended levels that promote health benefits.

Finally, frequency of physical education and sports lessons in a week can be increased, because it appears that 1 h of sports lesson per week is insufficient to fulfill the recommended level of physical activity.

References:

- Guinhouya BC, Samouda H, Beaufort C de: Level of physical activity among children and adolescents in Europe: a review of physical activity assessed objectively by accelerometry. *Public Health*, 2013; 127: 301–11
- Strong WB, Malina RM, Blimkie CJR et al: Evidence based physical activity for school-age youth. *J Pediatr*, 2005; 146: 732–37
- Sit CHP, McManus A, McKenzie TL, Lian J: Physical activity levels of children in special schools. *Prev Med*, 2007; 45: 424–31
- Aslan UB, Calik BB, Kitis A: The effect of gender and level of vision on the physical activity level of children and adolescents with visual impairment. *Res Dev Disabil*, 2012; 33: 1799–804
- Chen CC, Lin SY: The impact of rope jumping exercise on physical fitness of visually impaired students. *Res Dev Disabil*, 2011; 32: 25–29
- Tabrett DR, Latham K: Factors influencing self-reported vision-related activity limitation in the visually impaired. *Invest Ophthalmol Vis Sci*, 2011; 52(8): 5293–302
- Sallis JF: Age-related decline in physical activity: a synthesis of human and animal studies. *Med Sci Sports Exerc*, 2000; 32: 1598–600
- Rachele JN, McPhail SM, Washington TL, Cuddihy TF: Practical physical activity measurement in youth: a review of contemporary approaches. *World J Pediatr*, 2012; 8(3): 207–16
- Currie C, Zanotti C, Morgan A et al: Social determinants of health and well-being among young people: Health behavior in school-aged children (HBSC) study: International Report from the 2009/2010 Survey. In WHO Policy Series: Health Policy for Children and Adolescents. Copenhagen: WHO Regional Office for Europe, 2012
- Craig CL, Marshall A L, Sjoström M et al: International Physical Activity Questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc*, 2003; 35: 1381–95
- Hagströmer M, Bergman P, Bourdeaudhuij ID et al: Concurrent validity of a modified version of the International Physical Activity Questionnaire (IPAQ-A) in European adolescents: The HELENA Study. *Int J Obes*, 2008; 32: S42–48
- Saglam M, Arikan H, Savci S et al: International physical activity questionnaire: reliability and validity of the Turkish version. *Percept Mot Skills*, 2010; 111(1): 278–84
- Lee PH, Macfarlane DJ, Lam TH, Stewart SM: Validity of the international physical activity questionnaire short form (IPAQ-SF): A systematic review. *Int J Behav Nutr Phys Act*, 2011; 8: 115
- Houwen S, Hartman E, Visscher C: Physical activity and motor skills in children with and without visual impairments. *Med Sci Sports Exerc*, 2009; 41(1), 103–9
- Bergier B, Bergier J, Paprzycki P: Level and determinants of physical activity among school adolescents in Poland. *Ann Agric Environ Med*, 2014; 21(1): 75–78
- Riddoch CJ, Bo AL, Wedderkopp N et al: Physical activity levels and patterns of 9- and 15-yr-old European children. *Med Sci Sports Exerc*, 2004; 36, 86–92
- Trost SG, Pate RR: Physical activity in children and youth. In: Rippe JM (ed.), *In Lifestyle Medicine*. Malden MA: Blackwell Science, 1999; 663–673
- Atasavun SU, Dulger T: A comparison of motor skills in Turkish children with different visual acuity. *Turkish Journal of Physiotherapy Rehabilitation*, 2011; 22(1): 23–29
- Atasavun Uysal S, Aki E: Investigation of mobility levels in visually impaired children: a pilot study. *Fizyoter Rehabil*, 2009; 20(3): 201–6
- Di Cagno A, Iuliano E, Aquino G et al: Psychological well-being and social participation assessment in visually impaired subjects playing Torball: A controlled study. *Res Dev Disabil*, 2013; 34: 1204–9
- Caliskan E, Pehlivan A, Erzeybek et al: Body mass index and percent body fat in goalball and movement education in male and female children with severe visual impairment. *Neurology, Psychiatry and Brain Research*, 2011; 17: 39–41