

Motor Development and Self-Esteem of Children and Adolescents with Visual Impairment

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Abstract

The aim of the present study was to evaluate and investigate the relationship between motor development and self-esteem in 37 children and adolescents only with visual impairment and no other impairment, and in 37 children and adolescents with typical development. The chronological age of the participants was between 8 and 14 years old. The short form of the Bruininks-Oseretsky Test of Motor Proficiency (BOT-2), (Bruininks & Bruininks, 2005) was used to assess the participants' motor development. Self-esteem was measured via the Self-esteem Inventory developed by Coopersmith (1987). Statistical analysis was performed via the SPSS version 20.0. The results indicated that the children's and adolescents with visual impairment scores on motor development and self-esteem were lower compared to those of the typical participants. In addition, the results indicated interaction between motor development and self-esteem in visually impaired participants.

The present study was a necessity to be conducted, because there was a research gap and there have not been conducted similar researches in Greece and internationally. It is important for educational community to know if the motor development and self-esteem of children and adolescents with visual impairment are covariates.

Keywords: visual impairment, children and adolescents, self-esteem, motor development.

1. Introduction

Vision is among the most important senses and loss or decrease is associated with severe consequences in people's life and development (Angelopoulou-Sakantami, 2002). Children with visual impairment face several difficulties in their everyday life in the cognitive, social and motor domains of their development (Kotsis & Andreou, 2004). With respect to the motor domain, even a small decrease in vision can significantly impair one's motor performance, as it is closely related to motor activity, programming and execution of movements (Brambring, 2006; Navarro, Fukujima, Fontes, Matas, & Prado, 2004).

According to the World Health Organization (WHO) blindness is defined as 'a person's inability to count hand's fingers from a distance less than ten feet' whereas 'partial blindness is defined as 'the inability of those with visual deficit to count hand's fingers from a distance less or equal to twenty feet' (Polychronopoulou, 2003:238).

According to Gallahue (2002) motor development can be defined as the gradual change in a person's motor behavior, which is the result of the interaction between the person's characteristics and the environment, as well as the motor task at hand.

Self-esteem corresponds to 'a sense of personal value which is established through personal experiences as well as other people's judgments and attitudes' (Chountoumadi, Pateraki, & Xenaki, 2008:89). Coopersmith (1967) defines self-esteem as the person's self-evaluation. This evaluation indicates approval or disapproval and reflects the degree to which the person perceives himself/herself as competence, valuable, important and successful.

Bigelow (2003) argued that a deficit in one of a child's domains of development will inevitably influence the development of the remaining personality domains. Indeed, past evidence has shown that children with visual impairment demonstrate deficits in their motor development (Houwen, Visscher, Lemmink, & Hartman, 2008; Ray, Horvat, Keen, & Blasch, 2005; Warren, 2005; Hovart et al., 2003; Wyver & Livesey, 2003; Brambring, 2001; Levtzion- Korach, Tennenbaum, Schnitzer, & Ornoy, 2000), as well as in their self-esteem (Soulis, Andreou, & Xristodoulou, 2012; Soulis & Christodoulou, 2010; Warren, 2004; Tuttle, 2004; Webster & Roe, 1998; Poncillia & Poncillia, 1996).

The consequences of poor physical conditioning and motor abilities observed in children with visual impairment include exclusion and marginalization from peers (Lieberman & McHugh, 2001; Kalloniatis & Jonston, 1994). This results in feelings of insecurity, loneliness, and disappointment (Lieberman & McHugh, 2001). Past evidence has shown children with visual impairment develop egocentrism and social exclusion (Tuttle & Tuttle, 2004; Warren, 1994). Beaty (1991, 1992) demonstrated that visual impairment may be the cause of feelings of impotence and inferiority, as well as a negative self-image compared to typical peers.

Summarizing past evidence, children and adolescents with visual impairment also demonstrate

developmental deficits, fear and insecurity, lack of self-confidence (Webster & Roe, 1998; Wyatt & Ng, 1997; Shephard, Ward, & Lee, 1987, cited in Giagazoglou, 2005), feelings of addiction, inferiority and passiveness (Webster & Roe, 1998), lack of social approval, poor academic performance and poor social adaptation (Beaty, 1992; 1991). The above consequences are expected to inhibit the development of positive self-esteem and self-concept in children with visual impairment (Tuttle & Tuttle, 2004; Ponchillia & Ponchillia, 1996; Beaty, 1992; 1991). As a consequence low self-esteem results in the development of physical and mental deficits, isolation and depression (López-Justicia, 2006). Therefore, these children experience a poor quality of life (Chia et al., 2004). The majority of these consequences is not inherent to visual impairment, but is ascribed to the combined effect of the child's family and social environment.

The image that children with visual impairment develop of themselves becomes an important element of their personality and influences their social interactions and their inclusion in the social environment. Shapiro, Moffett, Lieberman, & Dummet (2005) investigated the perceptions and performance of 43 children and adolescents with visual impairment, aged 8-21 years old, in relation to their physical appearance, physical ability and social approval. The findings of the study indicated that the low scores of the participants in physical ability may imply children's low self-esteem in performing motor tasks.

Soulis & Christodoulou (2010) examined the self-esteem of children with and without visual impairment, aged 8-12 years old. The findings of the study indicated that children with visual impairment scored lower in self-esteem as compared to their typical peers. Furthermore, Soulis, Andreou, & Xristodoulou (2012) investigated self-esteem and empathy in 46 children and adolescents with visual impairment aged 8-15 years old. Both self-esteem and empathy were found to be lower in children and adolescents with visual impairment compared to their typically seeing peers. In addition, a positive correlation between self-esteem and empathy emerged.

López-Justicia, Pichardo, Amezcua, & Fernández (2001) investigated whether children in Spain with visual impairment since birth would demonstrate lower self-esteem compared to typical children. Children with visual impairment aged 4-11 demonstrated a trend for lower scores in all dimensions of the self compared to their peers with typical vision. With respect to adolescents aged 12-17 significant differences were found in the dimension of physical appearance.

Papadopoulos, Kartasidou, Papakonstantinou, Koutsoklenis, & Koustriava (2009), examined differences in adults' with and without visual impairment self-esteem. Participants were 102 visually impaired adults ages 18-73 years old ($M = 36.39$, $S.D. = 13.57$) and 150 typically seeing adults. The Rosenberg Self-esteem Scale (1965) was used to measure self-esteem. The results of the analyses indicated that adults with low vision scored lower in self-esteem compared to seeing ones. However, there were no significant differences between participants with varying levels of impairment.

In contrast to the findings of the aforementioned studies, several researchers argued that children with visual impairment do not show low self-esteem (Lifshitz, Hen, & Weisse, 2007; Griffin-Shirley & Ness, 2005; Alexander, 1996; Pierce & Wardle, 1996). More specifically, Lifshitz, Hen, & Weisse (2007) examined compared the self-esteem levels of 40 visually impaired adolescents with that of 41 adolescents without visual impairment. This study indicated a similar pattern of self-esteem in both groups.

Visual impairment greatly influences how a person perceives information, communicates and performs physical activities (Papadopoulos, 2005). It has a significant impact on physical and mental health (Houven, Hartman, & Visscher, 2009; AHRQ, 2004; Warren, 1994). Thus, it should be examined jointly with its emotional, social and psychological consequences for the person itself and social environment (Mason & McCall, 2005).

In line with the previously mentioned studies the influence of vision on the development of motor skills, emotional development and everyday life is deemed important to be further investigated, in conjunction with the parameters of children and adolescents' motor development and self-esteem. The main purpose of the study was to examine whether there is a correlation between motor development and self-esteem in visually impaired children and adolescents aged 8-14 years old.

More specifically, the following research questions were addressed:

1. Is there a difference in the motor development of children and adolescents with or without vision impairment?
2. Is there a correlation between the parameters of the children and adolescents' gender with or without vision impairment and motor development?
3. Is there a correlation between the parameters of the degree of visual impairment and motor development in children and adolescents with a visual impairment?
4. Is there a correlation between the variables of chronological age and motor development in children and adolescents with a visual impairment?
5. Is there a difference in the self-esteem of children and adolescents with and without vision impairment?

6. Is there a correlation between the variables of gender in children and adolescents with visual impairment and self-esteem?

7. Is there a correlation between the variables of the degree of visual impairment and the self-esteem of children and adolescents with a visual impairment?

8. Is there a correlation between the variables of chronological age and self-esteem in children and adolescents with a visual impairment?

The conduct of this research is particularly important given the fact that compared to other populations of children and young people with disabilities the literature on issues related to children and adolescents with visual impairments has received less interest (Capelle-McDonnall, 2007). In addition, the amount of research in Greece regarding the overall motor development and self-esteem of children and adolescents with visual impairment is limited.

2. Methodology

2.1. Participants

The study included 74 children and adolescents aged 8-14-years-old. Of these, 37 were visually impaired, without the simultaneous presence of other concomitant disability ($M = 10.24$, $S.D. = 2.19$) and the remaining 37, assigned to the control group showed no visual impairment ($M = 10.16$, $S.D. = 2.25$). Participants in the control group were matched in all characteristics with children and adolescents with visual disabilities, except vision.

As far as the selection of children and adolescents with visual disabilities, those were children and adolescents enrolled in Special Schools for the Blind in Greece. A key criterion for exclusion from the group of participants was the simultaneous existence of other related disabilities in the same person. The group of participants of this survey is representative, because it consists of all of the visual impaired population in Greece.

From the total number of children and adolescents 22 (59%) were males and 15 (40%) were female. Of the participants in this study 25 (67.6% share) were assigned to age group 1 (8-12 years) and 12 (32.4% share) to age group 2 (12-14 years).

As far as the degree of vision impairment, participants included 19 children and adolescents with severely impaired vision (rate 51.4%) and 18 with partial vision loss (rate 48.6%).

The following table summarizes the characteristics of the participants with visual impairment.

Table 1. Participants' characteristics

	N	Percentage	N
<i>Chronological age</i>			37
8-12 years old	25	67,6 %	
12-14 years old	12	32,4 %	
<i>Gender</i>			37
Boys	22	59,5%	
Girls	15	40,5%	
<i>Level of visual impairment</i>			37
Total	19	51,4 %	
Partial	18	48,6 %	

2.2. Instruments of Assessment

After a comparative study and evaluation - based on the instruments' psychometric characteristics - the Coopersmith self-assessment instrument for measuring self-esteem was selected (Self-esteem Inventory, 1987). Similarly, in order to assess the motor development of respondents used the Bruininks-Oseretsky Test of Motor Proficiency was utilized (BOT-2), (Bruininks & Bruininks, 2005).

3. Results

While investigating the relationship between the variables motor development of children and adolescents with visual disabilities and children and adolescents of typical growth (One-Sample Test), a statistically significant correlation was found ($sig. = .00$, p value $< .05$). Children and adolescents with visual impairments scored in overall motor development $M = 31.54$, $S.D. = 7.50$ (with the highest possible score being equal to 80), while their typically developed peers scored $M = 69.27$, $S.D. = 6.00$ (Table 2). It is clear from the results that the children and adolescents with visual disabilities lagged significantly in terms of overall motor development compared to children and adolescents of the corresponding typically developed age group.

Table 2. Motor development of children and adolescents with and without visual impairment.

Total motor development	N	M	SD
With visual impairment	37	31.54	7.50
Without visual impairment	37	69.27	6.00

While investigating the relationship between the variables of motor development in children and adolescents with visual disability and gender (Independent Samples Test) there was a statistically significant correlation found (sig. = .02, p value <.05), (Table 3).

Table 3. Gender-based motor development of children and adolescents with visual impairment.

Gender	N	M	S D
Boys	22	32.77	8.59
Girls	15	29.73	5.31

It appears that boys with visual disabilities outweighed girls with visual disabilities in overall motor development. The difference in favor of boys with visual disabilities can be explained by the fact that girls with visual disabilities are overprotected in comparison with the boys in the same age group. However, deficits in motor development are a minor problem. Typically developed individuals precede similar age groups with impairments as far as motor development.

While investigating the relationship between the motor development of children and adolescents with visual impairments and chronological age, there was not a statistically significant relationship found (sig. = .17, p value > .05). However, there was observed a tendency for the predominance of adolescents with vision impairment (12-14 years) (M = 33.25, S.D. = 8.94) in overall motor development compared with children aged 8-12-years-old (M = 30.72, S.D. = 6.75).

Also, while investigating the relationship between motor development of children and adolescents with visual impairment and degree of visual disability, no statistically significant relationship was found (sig. = .63, p value > .05). However, a tendency was observed towards superiority in performance of children and adolescents with partial vision loss (M = 33.22, S.D. = 6.88), compared with children and adolescents with complete loss of vision (M = 29.94, S.D. = 7.89).

While investigating the relationship between the self-esteem of children and adolescents with visual disabilities, and children and adolescents with typical development (One-Sample Test), a statistically significant correlation was found (sig. = .00, p value <.05). Children and adolescents with visual impairments scored on average in self-esteem M = 53.70, S.D. = 13.87 (with higher performance scores being equal to 100), while typically developed peers scored on average M = 76.62, S.D. = 12.36 (Table 4). It is clear from the results of children and adolescents with visual disabilities score significantly below in the variable self-esteem relative to children and adolescents of typical development in similar age group.

Table 4. Self-esteem of children and adolescents with and without visual impairment.

Self-esteem	N	M	SD
With visual impairment	37	53.70	13.87
Without visual impairment	37	76.62	12.36

While investigating the relationship between the self-esteem of children and adolescents with visual disability and gender (Independent Samples Test) there was no statistically significant correlation (sig. = .51, p value > .05). In addition, the relationship between the self-esteem of children and adolescents with visual impairments and chronological age was also not statistically significant (sig. = .98, p value > .05). More specifically, children aged 8-12-years-old scored in equal esteem M = 53.68, S.D. = 15.71, whereas adolescents aged 12-14 scored in equal esteem M = 53.75, S.D. = 9.53.

Similarly, while investigating the relationship between the self-esteem of children and adolescents with visual impairment and the degree of visual disability was not statistically significant (sig. = .94, p value > .05). There was only a tendency detected showing a superiority in the performance of children and adolescents with total vision loss against children and adolescents with partial vision loss. More specifically, participants with complete loss of vision scored in equal esteem M = 57.42, S.D. = 16.29, while participants with partial vision loss scored on average M = 49.77, S.D. = 9.72.

Between the variables motor development of children and adolescents with visual impairment and self-esteem of children and adolescents with visual impairment, there was a low correlation with a positive direction (r = .34), suggesting the covariation of these variables. The above finding is particularly important, as it seems that when a person improves his/her motor development improves simultaneously his/her self-esteem and vice versa.

4. Discussion

The discussion that follows will try to both present a recap of what has been reported so far and to provide an interpretation of the findings of this research. The findings of this study are in accordance and confirm partially the findings of other similar investigations.

As it was mentioned in the "Results" section the statistical analysis of the data showed that the performance of children and adolescents with visual impairment in both motor development and in their self-esteem, are lower compared with the performance of their sighted peers ($p < .05$).

More specifically, as far as the overall motor development of children and adolescents with visual impairments showed much lower performance scores on average ($M = 31.54$, $S. D. = 7.5$), compared with the average scores of the performance of children and adolescents without visual impairment ($M = 69.27$, $S.D. = 6.00$). It is evident that the performance of children with visual impairments lagged significantly compared with the corresponding performance of their sighted peers. In other words, based on the results of the correlation of performance in motor development among participating children and adolescents with and without visual disabilities and based on the descriptive categories of psychometric instrument manufacturers of the BOT-2 (Bruininks & Bruininks, 2005), it was found that the performance of children and adolescents with visual disabilities falls into the category "below average", as opposed to the performance of children and adolescents of typical development, which came in the narrative category "above average".

Therefore, the null hypothesis according to which the motor development of children and adolescents with visual impairments will not vary from the motor development of children and adolescents without visual impairment, is rejected.

This finding was expected, based on the population of individuals in which the survey was conducted and the literature that has been reviewed. Vision is a dominant sense in humans and plays a very important role in the acquisition of motor skills (Hashemi, Dehghani, Saboonch, Roozbahani, & Roonasi (2012) and the development of kinesthesia (Navarro et al., 2004). Absence or incomplete functionality creates vision problems and limitations in the way the person moves, perceives his/her environment and how he/she is defined by it. Deficits observed in the overall motor development of children and adolescents with visual impairments versus their sighted peers are probably caused by the worst physical condition of the former. Children with visual disabilities have lower fitness levels (Aslan, Calic, & Kitis, 2012; Houwen, Hartman, & Visscher, 2009; Lieberman et al., 2006; Kozub & Oh, 2004; Grommo & Angellab, 2001; Lieberman & McHugh, 2001; Longmuir & Bar Or, 2000; Meek & Maguive, 1996; Blessing, McCrimmon, Stovall, & Willford, 1993) and develop less their motor skills compared to sighted children of corresponding chronological age. Similarly, deficits in children and adolescents with visual impairments that have been identified in motor skills compared with typically developed peers have emerged in previous studies as well (Atasavum, Usal, & Aki, 2012; Aki, Atasavum, & Kayihan, 2008; Juodzbalienė & Muckus, 2006; Navarro et al., 2004; Wyver & Livesey, 2003; Bouchard & Tetrault, 2000).

Another important finding of this research is to highlight the existence of a significant relationship ($\text{sig.} = .02$, $p < .05$), between the motor development of children and adolescents with visual disability and gender. On the basis of these findings, the corresponding null hypothesis, that the motor development of children and adolescents with visual disabilities do not have a statistically significant relationship with the gender of the child or adolescent, is rejected.

More specifically, the results indicated that boys with visual disabilities were superior in overall motor development ($M = 32.77$, $S.D. = 8.59$), compared to girls with visual disabilities ($M = 29.73$, $S.D. = 5.31$). A plausible explanation for the preponderance of boys is that girls with visual disabilities are overprotected compared to boys, and thus are denied many opportunities for active participation in activities that promote motor skills. Of course, the views of researchers are divided on the impact of the variable of gender on motor development in children and adolescents. The finding of this study is in contrast with the findings of research conducted by Cameto & Nagle (2007), which focused on investigating the mobility and orientation of adolescents and young people with visual disabilities, aged 14 to 18 years old. Those researchers based on their findings did not identify differences related to gender, chronological age or nationality in the performance of the participants.

Pereira (1990) also investigated the static and dynamic balance in children with visual disabilities aged 6-13 years old and found no correlation between gender and motor skills. Similar were the results of research conducted by Ribandi, Rider, & Toole (1987) who investigated the correlation between balance (static and dynamic) and gender in adolescents with congenital visual impairment

While investigating the relationship between motor development of children and adolescents with visual impairments and age, as mentioned above, there was a statistically significant relationship ($\text{sig.} = .04$, $p < .05$). The older the participants, the better the performance of participants in overall motor development. Therefore, the corresponding null hypothesis according to which, the motor development of children and adolescents with visual disabilities does not have a statistically significant relationship with age, is rejected. This

finding does not confirm the findings of previous research carried out by Cameto & Nagle (2007), who did not identify differences in motor development of the participants related to age.

By contrast, while investigating the relationship between the dependent variable of motor development in children and adolescents with visual impairments and the independent variable degree of visual impairment (sig. = .63, p value > .05) no statistically significant relationship was found. Therefore, the corresponding null hypothesis according to which, the motor development of children and adolescents with visual disabilities does not have a statistically significant relationship with the degree of visual disability, is not rejected.

From the statistical analysis of the variable self-esteem, a big difference was found between the self-esteem of children with and without visual impairment, with children and adolescents without visual disabilities being superior. Children and adolescents without visual impairment scored higher in the self-esteem scale ($M = 76.62 > 70$), while the participants with visual impairments scored lower ($M = 53.70 < 70$). This finding confirms previous research conducted by Soulis, Andreou, & Xristodoulou (2012); Soulis & Christodoulou (2010); Warren (2004); Tuttle (2004); Webster & Roe (1998); Poncillia & Poncillia (1996). But it comes in contrast with the findings by Lifstiz, Hen, & Weisse (2007), the Loed & Sarigiani (1986), the Griffin-Sirley & Nes (2005) and the Pierce & Wardle (1996), according to which the self-esteem of these two groups did not differ at all or at least did not differ in a significant way.

Furthermore, the statistical analysis of the data revealed that the self-esteem of children and adolescents with visual impairment does not differ significantly according to gender (sig. = .51 > .05). Consequently, the null hypothesis according to which, the self-esteem of children and adolescents with visual disabilities is not related to gender, is not rejected. This finding confirms the results of previous research conducted in a population of people with visual disabilities by Soulis, Andreou, & Xristodoulou (2012); Soulis & Christodoulou (2010) and by Lopez-Justicia & Pichardo (2001). By contrast, the results do not confirm the findings of research conducted by Bowen (2010), in her effort to study the levels of self-esteem of children with visual disabilities. Bowen concluded that the participating girls in both age groups showed higher levels of self-esteem compared to boys. Also, the present finding does not confirm the results of Garaigordoni & Vernaras (2009) research of people with visual disabilities from, which showed statistical significant differences in both gender's self-esteem, with teenage girls scoring lower than the rest of the adolescents. In addition, Tanos (1985) supported the statistical significant finding that girls assigned negative feelings towards themselves more than boys. A plausible interpretation based on research data could be that the observed differences in self-esteem for both genders are related rather to environmental than genetic factors (Leontari, 1998).

Regarding the investigation of the relationship between the self-esteem of children and adolescents with visual impairment and the degree of loss or visual impairment, there was no correlation found (sig. = .94 p > .05). Therefore, the null hypothesis according to which the self-esteem of children and adolescents with visual disabilities is not related to the degree of loss or visual impairment is not rejected. The above result is in accordance with the findings of research conducted by Soulis, Andreou, & Xristodoulou (2012) and Soulis & Christodoulou (2010). Simultaneously it contrasts the results of research carried out by Meigan (1971) in adolescents with complete loss of vision and adolescents with partial vision loss, as well as the findings of the investigation conducted by Browen in children with visual impairment (2010). In fact Bowen (2010) does argue that the degree of visual impairment can affect self-esteem.

As mentioned above, the present research investigated the relationship between the self-esteem of children and adolescents with visual impairments and chronological age. There was not a statistically significant relationship found (sig. = .98, p value > .05). Therefore, the null hypothesis according to which, the self-esteem of children and adolescents with visual disabilities is not related to chronological age, is not rejected. The results are in accordance with the findings of research conducted by Soulis, Andreou, & Xristodoulou (2012), but it comes in contrast with the findings by Robins, Trzesniewski, Tracy, Gosling, & Potter (2002) and by Marsh, Parker, & Barnes (1985). Research conducted by Robins, Trzesniewski, Tracy, Gosling, & Potter (2002) indicated that during the child's transition from childhood and prepuberty (9-12 years), to adolescence (13-17 years), as well as during puberty, self-esteem declines. In addition, according to Marsh, Parker, & Barnes (1985) self-esteem weakens during the transition of individuals from childhood to adolescence as well.

5. Conclusions

The acquisition of motor skills, as well as the building of positive self-esteem is for every person of primary importance and more so for people with visual disabilities, due to the fact that to a large extent this specify the level of independence / autonomy, the degree of adequacy of adaptive behavior as well as the quality of their life. In order to accomplish the above, a person with a visual disability must compensate in order to function and properly manage his disability, so as to minimize the limitations arising as a direct consequence from the loss of that sense. Towards this direction timely and accurate diagnosis can be effective, as well as early intervention and appropriate design intervention programs. The design of appropriate motor response programs, even in younger children may contribute significantly to minimize and compensate for the differences / deficits observed

in the motor development of children and adolescents with visual impairments versus their peers without visual disabilities.

Based on this significant finding of the present investigation, according to which the motor development and self-esteem of children and adolescents with visual disabilities covariate, one may intervene and optimize the motor development of children and adolescents with visual impairment, while helping indirectly to improve their self-esteem. Furthermore, if one takes into account the findings of research conducted by Soulis, Andreou, & Xristodoulou (2012), where it was found that self-esteem and empathy for children and adolescents covariate, one could argue that the improvement of motor development in this specific population improves not only self-esteem, but also empathy and consequently the social skills of the individual.

In instances when the environment is supportive of the child, the child is then aided to create and maintain his/her positive self-esteem. The child experiences feelings of adequacy, internal completeness, self-efficacy, self-acceptance and is internally balanced (Kakavoulis, 2008; Coopersmith, 1967). On the contrary, when the child's environment is not supportive, the child believes is worth nothing, that is not important, has no self-confidence, and as a result his/her self-esteem is very low to negative, with all that these feeling entail (Kakavoulis, 2008; Ekeland, 2004; Coopersmith, 1967).

It is essential for all of those involved in the treatment and education of children with visual impairment and especially of the "significant others" to assist in promoting motor development and secondly, to instill a sense of confidence very early. Children who develop their motor skills and believe they are skillful, have confidence (Yusof, Aiman, Zawi, Hasan, & Radzi, 2013) and thereby are more willing to participate in physical activity in games, being involved peer groups, and participate in creative and sport activities. More specifically, the aforementioned objectives can be an effective and practical tool for teachers, who should focus on creating an educational climate and an interpersonal-interactive area, in order to ensure the appropriate conditions for adequate development of motor skills, along with the development of positive self-esteem and empowerment of the students with visual disability.

As far as the limitations of this study and the research gaps in literature, this research should be replicated with a larger number of participants in order to explore in greater depth the research questions of this survey. Furthermore, it would be important to conduct an investigation which questions the impact of music education on improving motor skills in children with visual disabilities, due to the fact that similar investigations in children without visual impairment showed improvement in motor skills (Gruhm, 2002). It would be of great importance to confirm these findings from studying people with visual disabilities, due to the exceptional importance motor skills have on their level of independence and their quality of life.

Finally, another issue could be the subject of future research is to investigate the effect of applying customized Physical Education programs to improve the psychological parameters (such as self-esteem and empathy) and quality of life of children and adolescents with visual impairment.

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