Self-esteem in Deaf Children and Adolescents: A Review

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Abstract

The purpose of this study is to examine the self-esteem of deaf children and adolescents with particular interest in physical self-esteem. It summarizes research studies which have been published since 1996. Specifically, it describes the effect of family hearing status and communication methods, types of school placement and two different intervention approaches on the self-esteem of deaf children and adolescents. Three major areas of methodology limitations: study objectives, samples, and instruments are discussed.

Future research is needed to focus on the measure of physical self-esteem in deaf children and adolescents and on the important role of exercise. It is necessary the use of appropriate instruments created for deaf populations including all the factors which influence the self-esteem of deaf children and adolescents.

Key words: Self-esteem, physical self-esteem, review

Introduction

Historically, studies about the self-concept were conducted using a uni-dimensional model. Researchers represented self-concept as a single score (Rosenberg, 1979). They believed that a general measure of self gives information about relative areas of self-concept (Harter, Marold, 1991). Shavelson, Hubner and Stanton (1976) opposed this model and proposed a multidimensional model of self-concept which consists of academic and non-academic domains. Marsh (1986), based on this theory, created the Self-Description Questionnaire (SDQ) in order to evaluate dimensions of the self-concept. According to the model of Marsh and Shavelson (1985), there is a hierarchical ordering in which general self-esteem is at the top, global physical self-esteem is at the next level, and the specific components of physical self-esteem are at the third level (Marsh, 1996). According to Fox (1997), two components of physical self-concept are physical appearance and perceived physical. Harter (1997) found that the most important predictor of general self-esteem is physical appearance. According to earlier theories of self-esteem, many studies have been conducted in order to examine the self-esteem in deaf populations. The literature argues that there are many factors that influence deaf people's self-esteem: age at onset of deafness, cause and degree of hearing loss, type of school placement, family communication methods and parental hearing status, and use of hearing aid (Jambor & Elliott, 2005). Many different types of measures have been applied in studies with deaf people in order to get more valid results: instruments based on uni-dimensional and multi-dimensional

theory, observations, drawings, sociometric techniques, appropriately modified instruments or instruments exclusively created for deaf populations or instruments which have been created for hearing population. The aim of this paper is to examine self-esteem in deaf children and adolescents and to try to draw conclusions about their physical self-esteem. We focused mainly on the family and school factors which are the issues that the researchers have examined most. This study may aid physical educators involved with persons who are deaf or hard of hearing to develop an understanding of their self-esteem and the factors affecting it.

Methods

The search was based on the on-line electronic databases ERIC and PsycINFO. We chose the international databases of psychology and educational sciences as representative resources in order to collect useful information about self-esteem in deaf students. We also included references reported in the articles and we did manual searches in Journal of Deaf Studies and Deaf Education (1996-2007). Several criteria determined whether a study was included in this review: Searches were restricted to empirical studies and to articles written in English, with a publication date from 1996 to 2007. The target population were deaf, hard of hearing or cochlear implanted children and adolescents. The following main key words were used: "self-concept AND deaf" or "hearing impairment AND self-concept" or "deafness AND self-esteem."

Results

Thirteen studies were included. Four studies were carried out in the USA, three in Spain, two in Turkey, one in England, one in Canada, one in Iran and one in China. We included four studies from ERIC and one from PsycINFO. Two studies were found in both data bases. The other studies were found from references reported in the articles. The studies included 1,666 deaf participants aged from 6 to 19 years. Of those, 68 had a cochlear implant. The hearing study population was 202, aged from 9 to 15 years. One study included 29 students with special needs without mentioning the number of deaf children. The included studies examined the effect of family communication methods, school factors, parental hearing status, medical and school intervention on self-esteem of deaf children and adolescents (Table 1).

Factors influencing self-esteem in deaf children's and adolescents

Family factors

The communication between parents and their deaf children and the hearing parent's status play a very important role in the psychosocial development of the children. Hilburn et al. (1997) compared the self-esteem of deaf children with hearing parents to deaf children with deaf parents and hearing children with hearing parents. The sample consisted of 39 students, aged 10 to 15 years. Of these, 17 deaf students had hearing parents, 5 deaf students had deaf parents and 17 hearing children had hearing parents. The students completed the Culture-Free Self-Esteem Inventories-2 for children

([CFSEI-2], Nunnally, 1978). The questionnaire was translated in sign language for deaf students. The findings of this study showed a difference in social self-esteem ($F(2,36) = 5,15$), $p < 0,01$). Deaf children with hearing parents had significantly lower social self-esteem scores ($M = 5,76$, $SD = 1,95$) than the hearing children with the hearing parents ($M = 7,94$, $SD = 2,19$), but not significantly lower than the group of deaf children with deaf parents ($M = 6,80$, $SD = 0,80$).

Van Gurp's study (1997) showed different results. She found no significant differences in self-concept between 9 deaf students with deaf parents and 66 deaf students with hearing parents.

Desselle and Pearmutter (1997) examined the effect of the hearing parents' communication methods with their deaf children on their Self-Esteem Inventory. The participants were students in a residential school for deaf children and their ages ranged from 13 to 19 years. They were prelingually deafened and had severe to profound deafness. The parents answered 10 questions about the communication methods that they used with their children. The deaf participants completed the Modified Self- Esteem Inventory ([MSEI], Kelliher, 1976) and the Subject Communication Questionnaire ([SCQ), Kelliher, 1976). This study showed that the family communication method affected the self-esteem of deaf children ($F(1,0) = 7,14$, $p < .01$). Deaf children whose hearing parents used "total communication methods" had a higher self-esteem ($M = 31,63$, $SD = 4,77$) whereas the deaf children whose parents didn't know how to use the sign language had lower self-esteem ($M = 27,97$, $SD = 4,58$).

Woolfe and Smith (2001) examined the relationship between deaf children's self-esteem and the hearing status of their parents and their siblings and also the perceived cohesion with family members. The participants were 45 deaf children, aged 10 to 14 years. Of those, 10 children had deaf parents and hearing siblings; four had deaf parents and hearing siblings; 11 had hearing parents and deaf siblings; and 20 had hearing parents and hearing siblings. The Battle Self-Esteem Inventory (Form A: Battle, 1981) was used to measure the Self-Esteem and the Family Systems Test ([FAST], Gehring and Wyler, 1986; Gehring, et al., in press) to measure the family cohesion. The findings showed that the parental hearing status influenced children's self-esteem ($F(1,41) = 15,54$, $p < 0,001$). Children with deaf parents had higher self-esteem scores ($M = 23,4$) than those with hearing parents ($M = 17,2$). The hearing status of their siblings did not have a significant effect on their self-esteem ($F(1,41) = 0,86$, ns).

Polat (2003) found that deaf children with deaf parents had better psychosocial adjustment than deaf children with hearing parents.

Type of school placement

Findings on the effect of different school settings on the self-esteem of deaf individuals are inconsistent.

Fung et al. (1997) compared the self-esteem of (moderately) severely hearing impaired students (56 to 70 db) and hearing students from ordinaries schools in Hong-Kong. The study sample consisted of 45 deaf secondary students, averaging 15 years old, and 300 normally hearing secondary students, averaging 14 years old. They used the Chinese version of the Self-Description Questionnaire-1 ([SDQ-1], Chung & Watkins, 1992). This study showed that the hearing impaired children had higher self-esteem than the hearing children. Significant differences between the hearing and the hearing impaired group ($p < 0,01$) were found on physical appearance ($F(1, 344) = 15,43$, $p < 0,1$) and parental relationships ($F(1, 344) = 8,63$, $p < 0,.1$). For gender, significance difference were found on physical ability ($F(1,344) = 21,37$, $p < 0,1$) and mathematics ($F(1,344) = 18,84$, $p < 0,01$).

Table 1
Characteristices of studies

Study	Objective	Participants	Age	Instrument
Hilburn and Kusche (1997)	Comparison of self-esteem between deaf children with deaf, hearing parents and hearing children with hearing parents	17 deaf children with hearing parents 5 deaf children with deaf parents 17 hearing children with hearing parents	10 to 15 years	Culture-Free Self-Esteem Inventories for Children (CFSEI-2)
Desselle and Pearlmutter (1997)	Effect of parental communication methods on self-esteem of deaf children	53 deaf students	13 to 19 years	Modified Self-Esteem Inventory (MESI) Subject Communication Questionnaire (SCQ)
Fung and Watkins (1997)	Comparison of self-esteem between hearing impaired and hearing students	45 deaf students	15 years	Self-Description Questionnaire-1 (SDQ-1) (Chinese version)
Greenberg and Kushe (1998)	Effect of an intervention program on the social, cognitive, behavioral status of deaf children	57 deaf children	5.5 to 12 years	Meadow/Kendall Assessment Inventory for Deaf students (MKSEAI)
Kluwin (1999)	Investigation of social outcomes of coteaching program	36 deaf students 39 hearing students		Piers-Harris Children's Self-Concept Scale Childhood Loliness Scale My Class Inventory
Suarez (2000)	The effect of an intervention program on the social competence in deaf students	18 deaf students 18 hearing students	9.1 to 13.6 years	Meadow/Kendall Emotional Assessment Inventory for Deaf Students (MKSEAI) Children's Assertive Behavior Scale (CABS) Cuestionario Sociametrico
Van Gurp (2001)	Examination of the effects of different educational settings on self-cocept of deaf children	90 deaf students	not reported	The Self-Description Questionnaire-1 (SDQ-1)
Woolfe and Smith (2001)	The effect of heaing status of both parents and siblings on self-esteem and perceived cohesion with family members	10 deaf students with deaf parents and siblings 4 deaf students with deaf parents and hearing siblings 11 deaf students with hearing parents and deaf siblings 20 deaf students with hearing parents and hearing siblings	10 to 14 years	The Battle Self-Esteem Inventory Family Systems Test (FAST)
Cambra and Silvestre (2003)	Comparison of self-concept between students with special needs and students without special needs in integrated school setting	29 special needs students 68 students without special needs	10 to 14 years	Self-Concept Scale (linguistically adapted for deaf students)

Study	Objective	Participants	Age	Instrument
Polat (2003)	Examination the psychosocial adjustment of deaf students in Turkey	1.097 deaf students	not reported	Meadow/Kendall Social and Emotional Adjustment Inventory (SEAI)
Abdi et al. (2004)	The measurement of emotional status of children undergoing cochlear implantation (CI)	38 deaf children undergoing CI 41 deaf children not having CI	7 to 14 years	Drawings interpetation
Sahli and Belgin (2006)	Comparison of self-esteem level of adolescents with CI and normal hearing	30 adolescents with CI 60 hearing adolescents	12 to 19 years	Rosenberg Self-Esteem Scale
Silvestre et al. (2006)	Examination the influence of controversional skills on self-concept of deaf students	56 deaf students	6 to 18 years	The Self-Development Questionnaire (Spanish Adaptation of SDQ-I Marsh) TST-Who Am I? Conversation situation

Kluwin (1999) examined the effect of co-teaching or team teaching on the social integration of deaf or hard of hearing students. The sample consisted of elementary (4 to 8 grade) deaf or hard of hearing students who had several years experience of co-teaching and of a comparison group with hearing students with the same level. The researcher used the Childhood Loneliness Scale (Asher, Hymel & Renshaw, 1984), My Class Inventory (Fisher & Barry, 1985) and the Piers-Harris Children's Self-Concept Scale (Franklin, 1981), in order to measure social dissatisfaction, loneliness, happiness, school status, popularity and other psychosocial issues. He found no differences between deaf or hard of hearing peers and hearing peers on any of the measures.

Van Gurp (2001) examined the effects of school settings on the self-esteem of 90 deaf students using the modified version of the Self-Description Questionnaire developed by Marsh (1986) and a sign language video presentation of the items. She compared self-esteem in three groups of high-school students: (1) those who were in a separate institution for deaf students; (2) those who were in a new facility for both deaf and hearing students, but who had previously been in a separate school for deaf students; and (3) those who were in resource programs that included special classes and opportunities for integration in regular classes. All the students had severe to profound hearing loss. The results showed that the significant differences were between the two similar settings, the resource and the congregated setting. The resource setting group had a significantly more positive self-concept on the mathematics ($M = 3,4$, $SD = 8,51$) and general school ($M = 28,96$, $SD = 5,93$) subscales ($F(4,61) = 1,81$, $p < .05$) than the segregated and the congregated group and the segregated group had a higher self-esteem on the physical appearance ($M = 32,15$, $SD = 4,62$), the peer relations ($M = 31,44$, $SD = 4, 96$), and the self-worth ($M = 34,00$, $SD = 4,22$) subscales than the resource and the congregated group.

Polat (2003) investigated the effect of the students' background and school factors on the psychological development of deaf children. The subjects of this study were 1,097 deaf students who were in elementary, secondary and high schools from four school types (residential, day, special class, mainstream). The Turkish adaptation of the Meadow/Kendall Social and Emotional Adjustment Inventory ([SEAI], Meadow, 1983) was used to measure social adjustment, self-image and emotional adjustment of the

deaf children. He found that the residential school setting had a positive effect on the social adjustment and the self-image of the students, compared to the other three school types. Additionally, it was found that higher degree and later onset of hearing loss, as well as the presence of additional deficits had negative effects on children's emotional and social adjustment and on their self-image. However, the use of hearing aids and total communication at school and at home had a positive effect on their psychosocial adjustment.

Cambra and Silvestre (2003) examined the relationship between social integration of students with special needs and their self-concept in comparison with their peers who did not have special needs. In this study, 97 students participated from a mainstream school in Catalonia, which is particularly interested in integration of students with hearing impairment. Of these, 29 students had various special educational needs (visual, cognitive, relational, learning, motor problems, and hearing impairment). The instrument which was used to measure the self-concept of the students was the Self-Concept Scale which was linguistically adapted for the children with hearing impairment. This study showed that there was a significant difference on self-concept between students with special needs and students without special needs ($t = 2,59$, $p = 0,013$). Students with special needs had a lower self-concept ($M = 14,90$, $SD = 4,19$) than the students without special needs ($M = 17,25$, $SD = 3,87$). Nevertheless, their self-concept was not negative.

Silvestre et al. (2006) conducted a different study. They examined the important role of conversational skills on the self-concept of deaf students in an inclusive school setting. The participants were 56 deaf students, aged 6 to 18 years. All students were born in a hearing family environment, some of them were profoundly deaf and others had moderate to severe hearing difficulties. All of them were using hearing aids and all the students were attending integrated schools. The conversational skills were measured through a recorded interview between the participants and the researcher. The Spanish adaptation of the Self-Description Questionnaire ([SDQ;I], Elexpuru,1992) was used to measure social, academic and personal dimensions of the self-concept and the 'TST-Who Am I?' (Kuhn & McPartland, 1954) to measure self-concept of the sample. This study showed no significant differences between groups with regard to self-concept dimensions (academic, social, personal). Although, self-concept strongly correlated with the conversational skills level of deaf children, for example low global ($r = -.412$, $p = .036$) and social self-esteem scores ($r = -.524$, $p = .006$) correlated with difficulties in responses during the conversation. Silvestre et al., (2006) underlined the importance of cooperative and leisure activities with deaf and hearing children in order to improve their conversational and communicative skills.

Medical intervention

The cochlear implants are powerful hearing aids which help deaf children to perceive and produce spoken language to a varying extent according to their abilities. Deaf children who have a cochlear implant often continue to use sign language, because they are afraid to speak and afraid to be left without a peer group (Fjord, 2000). There are few studies which examined the effect of the implantation on their self-esteem.
Abdi et al. (2004) measured the emotional status of deaf children undergoing a cochlear implant. The participants were 38 prelingually deaf children, aged 7 to 14 years, and 41 deaf children who did not have cochlear implants, as control group. Self-esteem was measured by interpreting children's drawings. Both groups made their pictures at the start of the study, only the cochlear implanted (CI) group drew their pictures before the implantation and 1, 3, 6 and 12-months after the implantation. The results of this study showed that scores for low self-esteem (including measurement variables) decreased from 42.9% in the third month of the study to 21.4% after one year for deaf children with cochlear implants.

Sahli and Belgin (2006) compared the levels of self-esteem of adolescents with cochlear implants (before and after the implantation) and children who have normal hearing. In this study participated 30 adolescents with sensory neural hearing loss and cochlear implantations and 60 adolescents with normal hearing conditions. The Rosenberg Self-Esteem (Rosenberg, 1963) Scale was used to measure the levels of self-esteem in both groups. According to the scoring system of the scale, a high score represents a low self-esteem. The results showed that there was a significant difference ($p < 0,05$) between self-esteem values of adolescents before the cochlear implantation ($M = 4,18$, $SD = 0,86$) and the hearing adolescents ($M = 1,82$, $SD = 1,37$). There was no significant difference ($p < 0,05$) between the self-esteem scores of adolescents after the implantation ($M = 2,10$, $SD = 0,76$) and those of the hearing adolescents ($M = 1,82$,$SD = 1,37$). Examining different variables that influence the self-esteem of both group, it was found that the self-esteem in both was higher for the participants who had brothers/sisters, preschool education, high levels of income, parents with higher levels of education and mother who were working.

School intervention

Evidence for the benefits of intervention programs in mainstream school setting comes from studies by Greenberg and Kusche (1998) and Suarez (2000).

Greenberg and Kusche (1998) examined the effect of an intervention program on the social, cognitive and behavioral status of deaf students. The Promoting Alternative Thinking Strategies (PATHS) (Kusche & Greenberg, 1994) curriculum attended 57 severely and profoundly hearing impaired children with a degree of hearing loss > 60 db and deafness which was diagnosed prior to 3 years of age. All children had hearing parents and were aged from 5,5 to 12 years. The teachers were trained to provide PATHS lessons during the school year. There was a pretest before the intervention program and a posttest at the end of the program and at the end of the second and third year. The Meadow/ Kendall Social-Emotional Assessment Inventory for Deaf students ([MKSEAI], Meadow, 1983) was used to assess the self-image of the students. They used also eight more instruments in order to measure cognitive, academic, and reading skills, social and emotional understanding, and behavior. The parents also participated in this study and were asked to report behavior problems in their children. This study showed that the intervention program had a positive impact on the self-image of younger children ($F(1,53) = 5,1$, $p < .05$).

Suarez (2000) examined the effect of an intervention program on the social development of deaf children in a mainstream setting. The participants were 36 deaf and hearing children who formed two groups. The first group consisted of the deaf students who participated in an interpersonal problem-solving training program. Both groups participated in a social skills training program. The author used three types of measures to evaluate aspects of social development, before and after the intervention program. The Spanish version of the Meadow/ Kendall Social-Emotional Inventory for Deaf Students (MKSEAI; Meadow, 1983) was used to measure the self-image of the students. The intervention program had a positive effect on social adjustment ($F(1,2) = 23.33$, $p = .004$), emotional adjustment ($F(1,2) = 10.92$, $p = .004$) and self-image ($F(1,2) = 6.38$, $p = .022$) of the deaf students.

Physical self-esteem

There are two studies in which physical self-esteem was a subscale of the self-concept measurement, but there is no literature available on the physical self-esteem of deaf children and

adolescents (Fung, et al., 1997; Van Gurp, 2001). The effect of the children's school setting on their physical self-esteem is the only factor that has been examined by the researchers (Table 2). All studies used the Self-Description Questionnaire ([SDQ-1], Marsh,1986).

Table 2a
Physical Self-Esteem (Fung, et al., 1997)

SDQ-1 scales	Hearing Impaired Students		Hearing Students	
	Male (n = 19)	Female (n = 26)	Male (n = 150)	Female (n = 150)
Physical appearance	22,7	22	20	19,6
Physical ability	26,3	22	24,7	21,6

Table 2b
Physical Self-Esteem (Van Gurp, 2001)

SDQ-1 scales	Segregated		Congregated		Resource	
	Means	Standard deviations	Means	Standard Deaviations	Means	Standard Deviations
Physical appearance	32,15	4,62	29,18	5,04	30,23	5,85
Physical ability	31,7	6,21	29,14	7,54	32,04	7,2

Fung et al. (1997) showed that there were significant differences on physical appearance ($F(1,344) = 15,43$, $p < .01$) and physical ability ($F(1,344) = 21,37$, $p < .01$) scales between hearing and hearing impaired students. The hearing impaired students who were integrated into a normal classroom had higher scores on the physical appearance aspect ($M = 22.7$, males; $M = 22.0$, females) and physical ability aspect ($M = 26.3$, males; $M = 22.0$, females) than the hearing students ($M = 20.0$, males; $M = 19.6$, females; and $M = 24.7$, males; $M = 21.6$, females). Statistically significant differences were found on the physical appearance aspect for group ($F(1,344) = 15,43$, $p < .01$) and on the physical ability aspect for gender ($F(1,344) = 21,37$. $p < .01$). Reversely, Van Gurp (2001) found that the deaf students who were attending a segregated setting had higher scores on the aspect of physical appearance ($M = 32.15$, $SD = 4,62$) compared to children attending a resource setting ($M = 30.23$, $SD = 5,85$) and a congregated setting ($M = 29.18$, $SD = 5,04$). Students who were attending a resource setting had higher scores on the aspect of physical ability ($M = 32,04$, $SD = 7,20$) compared to children attending a segregated ($M = 31,70$, $SD = 6,21$) or a congregated setting ($M = 29,14$, $SD = 7,54$).

Discussion

The objective of this study was to examine the self-esteem in deaf children and adolescents with particular interest in physical self-esteem.

Regarding the family factors, three studies showed that deaf children with deaf parents had a higher self-esteem than deaf children with hearing parents (Hilburn, et al., 1997; Woolf & Smith, 2001; Polat, 2003). One study showed no difference on self-esteem between deaf children with hearing and deaf parents (Van Gurp, 2001). One study showed that deaf children who had hearing parents, who used total communication had higher self-esteem than deaf children who had hearing parents who did not know how to communicate with sign language (Desselle & Pearmutter, 1997).

The results regarding school placement and the role of self-esteem in the study population were inconsistent. One study showed that deaf children in residential school settings had higher self-esteem than children in special classes, day classes, or mainstream settings (Polat, 2003). Another study showed that deaf students attending resource and segregated settings had higher self-esteem than children in congregated or itinerant settings (Van Gurp, 2001). Three studies compared the self-esteem of deaf and hearing students. One study showed that the deaf students had higher self-esteem than the hearing students (Fung, et al., 1997). One study did not report differences between the two groups (Kluwin, 1999) and another study found that students with special needs, including deaf students, had lower self-esteem than hearing students without special needs (Cambra & Silvestre, 2003). Besides, one study showed that deaf children who had better conversational skills had higher self-esteem that their deaf peers who did not have good conversational skills level (Silvestre, et al., 2006).

Regarding school interventions, two studies indicated that school intervention programs had a positive impact on deaf students' self-esteem (Greenberg & Kushe, 1998; Suarez, 2000). According to medical interventions, one study showed that deaf children had higher self-esteem after the cochlear implantation (Abdi, et al., 2004). Another study showed that there was no difference in self-esteem between hearing children and children with cochlear implants (Sahli & Belgin, 2006). Many methodological factors make that it is difficult to draw firm conclusion out of these the studies. Three major issues are (1) the different objectives of the studies; (2) different study samples (age, degree of hearing loss, number of participants, different description of the sample; and (3) different instrumental approaches.

There was a wide range of objectives. Five studies examined the self-esteem in deaf children and adolescents and were looking for family influences (Hilburn, et al., 1997; Desselle & Pearlmutter, 1997; Van Gurp, 1997; Woolfe & Smith, 2001; Polat, 2003). Five studies reported on the effects of school placement (Fung, et al., 1997; Kluwin, 1999; Van Gurp, 2001; Cambra & Silvestre, 2001; Polat, 2003).

Two studies investigated the effect of an intervention program on students' self-esteem (Greenberg & Kusche, 1998; Suarez, 2000). One study examined the correlation between conversational skills and self-esteem (Silvestre, et al., 2006), and two studies examined the effects of cochlear implantation on students' self-esteem (Abdi, et al., 2004; Sahli & Belgin, 2006).

Only four studies compared the self-esteem of deaf and hearing children (Hilburn & Kusche, 1997; Kluwin, 1999; Suarez, 2000; Sahli & Belgin, 2006) and one compared self-esteem of students with special needs, including deaf children, and children without special needs (Cambra & Silvestre, 2003).

Another reason which makes it difficult to draw conclusions was the diversity (age, number of participants, hearing loss) of the participants. The size of study samples ranged from 18 deaf children to 90 deaf children with an exception of one study consisting of 1,097 deaf students (Polat, 2003). The age of participants ranged from 5.5 years to 19 years. Only two studies included a study population with the same age (Woolfe & Smith, 2001; Cambra & Silvestre, 2003). Despite this similarity of ages, both studies had different objectives and different samples. Only five studies mentioned the degree of hearing loss of deaf children. The degree dif-

fered across studies (Abdi, et al., 2004; Desselle & Pearmutter, 1997; Fung & Watkins, 1997; Greenberg & Kusche, 1998; Silvestre, et al., 2006; Van Gurp, 2001). For example, Desselle included in her study prelingually deaf children with severe to profound deafness. Abdi et al. (2004) mentioned only that the study sample consisted of prelingually deaf children. Van Gurp (2001) reported that the sample had children with mild to moderate and severe to profound deafness, while Fung and Watkins (1997) reported that their study sample consisted of children with moderate to severe deafness. In the study of Silvestre et al (2006), moderately to severely deaf as well as profoundly deaf children were recruited.

A third issue is the diversity of the instruments. The researchers used three different types of instruments to measure self-esteem in deaf children and adolescents. Two studies used instruments which were created for hearing populations without any modification for deaf students (Kluwin, 1999 [Piers-Harris Children's Self-Concept Scale]; Abdi, et al., 2004 [Rosenberg Self-Esteem Scale]). Five studies used instruments which were modified for deaf students (Dessell & Pearlmutter, 1997 [Modified Self-Esteem Inventory]; Hilburn, et al., 1997 [Culture- Free Self-Esteem Inventories-2 for children]; Van Gurp, 2001 [modified version of Self-Desciption Questionnaire; Cambra & Silvestre, 2003 [Self-Concept Scale]). Some of the questionnaires were translated by an interpreter with linguistic modification on the items in order to be more understandable. Van Gurp's study was the only study which used also sign language video presentation of the items. Three studies used instruments which were developed for deaf and hard of hearing students ([Meadow/Kendall Assessment Inventory for Deaf students, Meadow, 1983], Greenberg & Kusche, 1998; Suarez, 2000; Polat, 2003).

Another important reason for the inconsistent and incomplete results is the use in some studies of instruments based on uni-dimensional theory. For example Kluwin (1999) used the Piers–Harris Children's Self-Concept Scale (Franklin, 1981) and Sahli and Belgin (2006) used the Rosenberg Self-Esteem Scale (Rosenberg, 1963). Using these instruments makes it very difficult to explore specific domains of self-concept and the factors which affect them. Only two studies used the Self-Description Questionnaire-1 (SDQ-1)(Van Gurp, 2001; Fung & Watkins, 1997) which appears to be suitable in measuring the self-concept of deaf children (Van Gurp, 1996). This instrument is based on a multi-dimensional theory of self-esteem and it provides information about specific domains of self-esteem, including physical self-esteem.

Conclusion

Studies suggest that total communication methods and medical as well as school interventions programs seem to have a positive influence on the self-esteem of deaf children and adolescents. The methodological limitations of these studies as well as the inconsistent findings regarding the effects of school placement on their self-esteem, do not allow us to make general conclusions. There is also a lack of studies regarding the role of the physical domain of self-esteem on deaf children and the effect of exercise on this domain. Despite the methodological limitations, the reviewed studies provide some information that enable us to understand some of the factors which influence the self-esteem of deaf children and adolescents. Physical educators can collect useful information from the studies' outcomes in order to be aware of the complexity of self-esteem in deaf students and to create appropriate programs which are beneficial for the deaf students. Future research should focus on the measure of physical self-esteem in deaf children and adolescents, in particular on the role of exercise. The use of suitable devices that have been created for deaf children and of appropriate modification on the existing ones when the study population includes a hearing population is also needed. Finally, attention should be devoted to as many factors as possible affecting children's self-esteem.

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