

## Research Paper

## Investigating the Effect of Physical Activities on Social Skills in Athletes and Non-athletes Deaf and Hard of Hearing Students

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**ABSTRACT**

**Background:** Hearing loss and deafness can significantly impact the socialization process, potentially leading to developmental delays, communication challenges, and difficulties in forming social relationships.

**Objectives:** This study compares social skills among deaf students who are athletes and non-athletes. In addition, it investigates the effect of physical activities on social skills in deaf and hard-of-hearing students.

**Methods:** This cross-sectional study included all deaf and hard-of-hearing students between the ages of 12 and 17 years. The students were categorized into two groups based on their participation in sports activities, namely athletes and non-athletes. The researchers used Matson's social skills questionnaire to assess the students' social skills and their various dimensions.

**Results:** The Mean±SD age of student-athletes and non-athletes was 15.83±1.97 and 17.08±2.12 years, respectively. The findings indicated a significant difference between the mean of appropriate social skills, antisocial behaviors, aggressiveness, impulsive behaviors, feelings of superiority, high self-confidence, and peer relationships between deaf and hard-of-hearing students who are athletes and non-athletes.

**Conclusions:** Sports can serve as a valuable avenue for deaf and hard-of-hearing children to foster understanding and interaction among themselves. Engaging in sports activities may enhance their social skills.

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## Introduction

According to the [World Health Organization \(WHO\)](#) report, by the year 2050, nearly 2.5 billion people worldwide are projected to have some level of hearing impairment, and at least 700 million individuals will require hearing rehabilitation services [1]. The prevalence of hearing loss in children is estimated to be between 2% to 4%. Alarmingly, nearly one-third of children with hearing impairment also have at least one additional condition, which further exacerbates the child's difficulties and hinders their ability to effectively communicate with society [2]. This combination of factors can lead to the child experiencing rejection and isolation [3]. Hearing is regarded as a fundamental requirement for learning spoken language, as it is the primary means by which auditory sounds enter the brain [4]. The loss of hearing results in the inability to perceive auditory stimuli, preventing the brain from processing these sounds into comprehensible messages [5]. Consequently, this hampers the ability to acquire, learn, and produce language sounds necessary for effective communication with others. Spoken language is the most prevalent, accessible, and rapid form of human interaction, so the inability to engage with it can lead to significant challenges in communication and social interactions [6].

Deaf children experience behavioral and emotional problems at approximately twice the rate of their hearing peers [7]. Research shows that the physical and mental health of deaf teenagers is adversely affected by their hearing impairment, restricted access to services, and communication barriers [8]. These challenges can significantly impact their quality of life, academic performance, and emotional and social development. As a result, they may experience feelings of loneliness, isolation, and despair, which can also create difficulties for their families [9, 10].

Additionally, hearing loss impacts the cognitive and emotional functioning of deaf teenagers. The complexity and persistence of this issue, along with the related communication challenges, can disrupt family dynamics [11].

Deficiencies in social, individual, and interpersonal skills lead teenagers to encounter numerous challenges, resulting in difficulties in their relationships with others. These issues can contribute to behavioral disorders and adversely affect personal development and adaptation to their environment. Such shortcomings in self-efficacy skills may signal potential precursors to psychological disorders and behavioral issues [12]. Deafness impacts

the socialization process, and its absence can result in developmental delays, communication challenges, and difficulties in social relationships. It is considered one of the most significant sensory disabilities, causing stress for parents and families who are concerned about their child's development and social interactions [13]. Deaf teenagers face more challenges than their hearing peers due to experiences of rejection, neglect, and harassment, which significantly impact their emotional, social, and behavioral development [14].

In the field of behavioral, social, and communication issues among deaf teenagers, maladaptive behaviors, such as attention deficit hyperactivity disorder, aggression, stubbornness, conduct disorders, and low self-esteem, are particularly evident, especially in social situations [15].

Possessing effective social skills significantly influences a child's development, enhancing their relationships with peers and family, supporting emotional regulation, and contributing to academic success [16].

More specifically, children with hearing loss may struggle to learn crucial social behaviors because they have difficulty understanding certain verbal cues, such as social rules or the concept of taking turns. As a result, many of these children face challenges in establishing and maintaining relationships with their hearing peers [17].

Additionally, they encounter more difficulties in dating and are more prone to social rejection compared to their hearing peers. On the other hand, engaging in physical activity aids in the enhancement of cognitive abilities and motor skills in individuals [18]. A study by Singh examined the effects of yoga on deaf children, the results indicated that deaf individuals could demonstrate gradual improvements due to the communication and movement training provided through yoga. After participating in just a few sessions of the yoga exercise program, the people around the deaf children were surprised by their enhanced levels of mental balance, emotional stability, and concentration [19]. Regrettably, there is a scarcity of research examining the benefits of physical activity for individuals who are deaf or hard of hearing.

Physical activity plays a crucial role in the development of children and adolescents with hearing impairments. Engaging regularly in physical activities offers various physical, psychological, and social benefits for these young individuals [20].

Engaging in physical activity can promote physiological and physical well-being, including improvements in cardiovascular and musculoskeletal health, maintenance of a healthy weight, enhancement of self-esteem, and reduction of anxiety and stress [21]. Moreover, engaging in physical activity is linked to improved social integration among children and adolescents, fostering friendships and enhancing social skills. These advantages are especially vital for children and adolescents with disabilities. The WHO advises that children and adolescents, regardless of disabilities, should participate in at least 60 min of moderate to vigorous physical activity each day [22].

Physical activity serves as a crucial means for physical, mental, and social development, as participation in sports activities fosters both spatial and social connections among individuals. Consequently, physical activity can offer psychological and physiological benefits. Currently, improving social skills in children with special needs is considered a goal in society. Hearing impairments can expose these children to isolation. Accordingly, this study examines the impact of physical activities on the social skills of deaf and hard-of-hearing students.

## Methods

This study utilized a cross-sectional design. It focused on all deaf and hard-of-hearing students in Hamadan City, Iran, aged 12 to 17 years, during the period from May 2023 to March 2024. The participants were selected using a census approach. A total of 50 students were initially included, but two were excluded because they were completely deaf.

Students were categorized into two groups, namely athletes and non-athletes, depending on their participation in sports activities. The athlete group consisted of 24 students who engaged in at least 4 h of physical activity per week across various sports disciplines for six months. To ensure comparability between the two groups regarding the degree of deafness and hearing loss, relevant data were obtained from the participants' medical records. The study included both male and female students aged 12 to 17 who were profoundly hearing-impaired or deaf.

The exclusion criteria for this study included a history of musculoskeletal or chronic diseases, as well as any disorders or conditions unrelated to hearing loss, deafness, or complete deafness [23]. The research was approved after obtaining an ethics code from Hamadan University of Medical Sciences.

The Iranian version of Matson's 1983 questionnaire, consisting of 56 questions, was utilized to gather data [24]. This instrument assesses social skills from various aspects, including appropriate social skills, antisocial behaviors, aggression, impulsivity, superiority, self-confidence, and peer relationships. The Cronbach  $\alpha$  coefficient for this questionnaire in measuring social skills is 0.86, indicating a high level of reliability and internal consistency [24].

The collected data were summarized using descriptive statistical methods, including prevalence, relative frequency, Mean $\pm$ SD. The normality of the continuous variables was evaluated using the Shapiro–Wilk test. To compare social skills and their dimensions between deaf and hard-of-hearing students who are athletes and those who are non-athletes, independent t-tests and Mann-Whitney tests were employed. Also, categorical variables were compared using the chi-square test or the Fisher exact test. Data analysis was conducted using the SPSS software, version 24 at a significance level of 0.05.

## Results

In this study, 48 deaf and hard-of-hearing students were considered, 24 of them were athletes and 24 were non-athletes. The Mean $\pm$ SD age of student-athletes and non-athletes was 15.83 $\pm$ 1.97 and 17.08 $\pm$ 2.12 years, respectively. The characteristics of students are given in Table 1. The majority of the student athletes were male (70.8%) and studying in high school (95.8%). The results showed no significant difference between the athletes and non-athlete groups in sex ( $P=0.079$ ), education ( $P=0.999$ ), and hearing status ( $P=0.416$ ).

Different dimensions of social skills, including appropriate social skills, antisocial behaviors, aggression and impulsivity, superiority and self-confidence, and peer relationships, for deaf and hard-of-hearing students who are athletes and non-athletes are shown in Table 2. There was a significant difference between all dimensions of social skills in deaf and hard-of-hearing students who are athletes and non-athletes ( $P<0.001$ ).

The mean appropriate social skills, superiority, self-confidence, and relationship with peers were higher in the group of athletic students compared to non-athletic students. The Mean $\pm$ SD of appropriate social skills, superiority, and self-confidence, and relationship with peers of student-athletes were 76.95 $\pm$ 4.80, 24.42 $\pm$ 1.99, and 27.70 $\pm$ 4.60, respectively. Also, the mean antisocial behaviors, aggression, and impulsivity were lower in the group of athletic students compared to non-athletic students. The Mean $\pm$ SD antisocial behaviors, aggression, and impulsivity of student-athletes were 19.41 $\pm$ 4.06 and 19.83 $\pm$ 4.32, respectively.

**Table 1.** The characteristics of deaf and hard-of-hearing students

Variables	No. (%)		P
	Athletes	Non-athletes	
Sex	Male	17(70.8)	0.079
	Female	7(29.2)	
Education	Primary school	1(4.2)	0.999
	High school	23(95.8)	
Hearing status	Hearing aid	19(79.2)	0.416
	Cochlear implantation	5(20.8)	

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**Table 2.** Different dimensions of social skills of deaf and hard-of-hearing students

Dimensions of Social Skills	Mean±SD		P
	Athletes	Non-athletes	
Appropriate social skills	76.95±4.8	62.62±8.21	<0.001
Antisocial behaviors	19.41±4.06	23.54±3.33	<0.001
Aggression and impulsivity	19.83±4.32	27.08±4.03	<0.001
Superiority and self-confidence	24.42±1.99	18.04±3.83	<0.001
Relationship with peers	27.7±4.6	22.45±2.32	<0.001

SD: Standard deviation.

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## Discussion

This study investigated the impact of physical activities on the social skills of deaf and hard-of-hearing students. The social skills assessed in the questionnaire encompassed dimensions such as appropriate social skills, antisocial behaviors, aggression and impulsive behaviors, superiority, self-confidence, and relationships with peers.

The results of this study revealed a significant association between the mean of appropriate social skills, antisocial behaviors, aggression, and impulsive behaviors, superiority, high self-confidence, and relationships with peers among deaf and hard-of-hearing students ( $P < 0.001$ ). Specifically, in the dimension of social skills, the mean of appropriate social skills was higher in the group of athletic students compared to non-athletic students.

In line with the findings of this study, the research conducted by Qablan et al. demonstrated the positive impact of an educational program centered on recreational games in enhancing social interaction skills among deaf children aged 8 to 10 years [25]. Some evidence

suggests that hearing impairment adversely affects the psychological well-being of hearing-impaired teenagers, making them more susceptible to mental health issues compared to their hearing peers [7]. Sports play a crucial role in physical, mental, and social development. Engaging in sports activities not only fosters physical fitness but also brings individuals together, enhancing their social skills and connections [26].

Learning social skills is a significant challenge for children with hearing impairments. Individuals who are deaf often experience issues, such as introversion, social isolation, low self-esteem, self-centeredness, underdeveloped social maturity, and restricted interactions with others. Among the various difficulties associated with hearing loss, social challenges are the most prominent [17]. Limited research has highlighted the crucial role of play in fostering and enhancing social connections for deaf individuals. This includes recognizing play as a therapeutic tool and addressing the psychological needs of deaf people to mitigate feelings of disappointment. Additionally, this study found that non-athletic students exhibited a higher average of

antisocial behaviors compared to their athletic peers [7]. Individuals with hearing impairments often exhibit social immaturity compared to their peers. The challenges they face in adapting socially can lead to the development of emotional issues such as anxiety, shyness, selfishness, quick temper, and difficulties in integration [27].

Deaf sports serve as a social institution that allows deaf individuals to exercise their right to make choices. This is achieved through organizing, competing, and socializing with other deaf people who participate in physical activities and these results can justify the role of physical activities in the development of social skills [28].

Athletic deaf students exhibited lower levels of aggression and impulsive behaviors compared to their non-athletic counterparts. Deaf individuals are often prone to loneliness, uncooperativeness, aggression, and social anxiety. Research has indicated that deaf people have a higher prevalence of psychiatric disorders, particularly related to social skills, when compared to their hearing peers [14]. Physical activities tailored for individuals with hearing loss play a crucial role in enhancing their social lives at the international, national, and local levels. Additionally, given the positive impact of physical activities, they can be effective in decreasing aggression and impulsive behaviors [29].

In terms of average self-confidence, non-athletic students scored lower than their athletic peers. This suggests that physical activity is a vital component of the educational experience at all levels. Children with disabilities who do not engage in exercise tend to have significantly low self-esteem, a dislike for group activities, and may become antisocial.

Children who engage in physical activities tend to feel better and integrate more easily into groups. A previously passive child who becomes active in physical activities, competitions, and activities can enhance their self-esteem and foster improved relationships. This is particularly crucial for deaf children, who may face communication challenges due to limited speech development. A study conducted by Oyong et al. in 2020 found a significant correlation between suitable field events and the social skills of students with hearing impairments [30]. Additionally, appropriate track events were linked to the social capacities of these students, as well as a statistically significant relationship between suitable recreational sports and social skills [31]. The results are in line with the results of this research. The deaf

community has recognized that physical activities serve as a means to overcome the barriers that separate them from the hearing community.

Additionally, the average quality of peer relationships was lower among non-athletic students compared to athletic students. Deaf individuals often struggle with underdeveloped social skills, and deaf children require social interaction with their hearing peers to enhance and reinforce their social competencies [15]. In the research conducted by Jaradat et al., the effectiveness of a physical activity program designed to enhance social skills was evaluated using a scale specifically created for deaf individuals. The findings indicated that the physical activities program significantly improves the social skills of deaf participants [29]. Engaging in physical activities and competitions allows deaf children to connect, share their experiences, cultivate healthy habits, and enhance their social skills. Additionally, play therapy is an effective approach for fostering the social skills of deaf individuals.

Akinoğlu and Kocahan (2019) argues that suitable sports for individuals with hearing loss can be seen as a means to eliminate barriers to participation, enabling them to engage fully in physical activities without restrictions or discrimination [32]. These activities should accommodate their auditory sensory needs across various sports [28]. Understanding the behavioral traits, abilities, and challenges faced by individuals with hearing impairments is crucial for preventing behavioral issues and enhancing their social skills. This, in turn, can improve their personal, academic, and social lives while reducing misunderstandings about their behavior and minimizing social exclusion. Based on these findings, it is recommended that school administrators consistently organize appropriate sports activities to eliminate barriers created by disabilities. Additionally, utilizing media to promote acceptance and raise government awareness on this issue is essential.

## Conclusion

Engaging in physical activities can help profoundly hearing-impaired or deaf children develop their social skills and enhance interactions within the deaf community. Sports play a vital role in fostering connections among deaf individuals. To prevent behavioral issues, it is essential to improve social skills, which can enhance their personal, academic, and social experiences. This improvement also helps clarify misunderstandings about their behaviors, thereby decreasing the likelihood of social exclusion.

### Study limitations

The limitations of this study include the unwillingness of interview participants and the lack of a hearing loss specialist to conduct a training session to examine and compare the two groups of athletes and non-athletes.

### Ethical Considerations

#### Compliance with ethical guidelines

This study was approved by the Research Ethics Committee of [Hamadan University of Medical Sciences](#), Hamadan, Iran (Code: IR.UMSHA.REC.1402.056. Written informed consent was obtained from each participant before their involvement in the study. Initially, a briefing session was conducted for the participants and their parents to explain the study's procedures. Parents signed a consent form for their child's participation, and all participants were assured that their information would remain completely confidential.

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#### Authors contributions

Conceptualization and supervision: Fatemeh Eghbalian and Homa Naderifar; Methodology: Roya Najafi Vosough; Data collection: Amir Bahariani, and Homa Naderifar; Data analysis: Roya Najafi Vosough; Investigation, funding acquisition and resources, and writing: All authors.

#### Conflicts of interest

The authors declared no conflict of interest.

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