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The Relationship between Sports Participation with Social Skills in Children with Autism: Mediating Role of Emotion Regulation

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ABSTRACT: Purpose: It has been shown that sport participation has numerous benefits for children with autism. However, the role of sport participation on improving the social skills among children with autism has been received less attention in the literature. Thus, the aim of this study was to investigate the relationship between sport participation with social skills among children with autism. In addition, we included the emotion regulation as a mediator in the research model. **Methods**: The method used in this study was a structural equation modelling. The participants included 68 children with autism age 10 to 12 years old (mean 10.92±0.68 years old) who attended in special schools. Standard Questionnaires were used for assessing sport participation, social skills, and emotion regulation. To analyze data, we used Pearson correlation test and structural equation modeling. **Results**: The results showed that sport participation had significant effects on social skills (T=5.271) and emotion regulation (T=4.874). In addition, emotion regulation had significant effects on social skills (T=4.201). Finally, emotion regulation has significantly mediated the relationship between sport participation and social skills ($p<0.001$). Results of evaluating goodness of fit showed that our model has a good fit (GOF=0.94). **Conclusions**: Participation in sport activities is very important for children with autism. Therefore, it is necessary to adopt appropriate strategies to improve the sport activities among this population.

Keywords: Sport participation, social skills, emotion regulation, autism.

INTRODUCTION

Autism is a type of developmental disorder characterized by deficits in communication and social interactions. People with autism disorder are not able to perform social skills and roles, and the symptoms of this disorder appear before the age of three (Birchwood et al. 2012; Goulardins et al. 2017). Children with autism disorder have problems in verbal and non-verbal communication, social interactions and have stereotyped and repetitive behaviors (American Psychiatric Association, 2000). Impairment in social skills is the most well-known and persistent characteristic of autism. Research findings show that many autistic children do not show any emotional or social interaction (Aqdassi et al. 2021; Gkotzia et al. 2017; Ketcheson et al. 2018; Lourenco et al. 2020; Mohd Nordin et al. 2021). Accordingly, defects in social skills and interactions not only hinder the growth of autistic children, but also cause them to be rejected by friends, peers, and adults, and to isolate them.

Disturbance in multiple non-verbal behaviors, inability to communicate with peers in a manner appropriate to the level of development, failure to share others' interests automatically, and lack of social interaction of autistic people are identified as symptoms of social disorder (Aqdassi et al. 2021; Gkotzia et al. 2017; Ketcheson et al. 2018; Lourenco et al. 2020; Mohd Nordin et al. 2021). One of the most important goals of the education of autistic children is to create social adaptation, establish useful and effective communication with others, and accept social responsibility and self-help skills. Researchers have proposed various factors and techniques for improving social skills among children with autism. The most prominent factors and techniques are included video models, social stories, law cards, visual interventions, applied behavior analysis and social skills exercises, music therapy and exposure method (Carlson, 2005; Delano& Snell, 2006; Kuoch, 2003). However, there are some other factors which may influence positively the social skills among children with autism. One of the factors which has rarely received attention in the literature in participation in sport.

Several studies have shown that participating regularly in sport has numerous benefits such as improvement in brain health, helping in weight management, reduction of the risk of disease, strengthening bones and muscles, improving quality of life, and improving ability to do everyday activities (Abdoshahi, Gholami, Naeimikia, 2022; Basterfield et al. 2021; Dana & Christodoulides, 2019; Dana et al. 2021; Hashemi Motlagh, BaniAsadi, Chaharbaghi, & Moradi, 2022; Gholami & Rostami, 2021; Ghorbani et al. 2020, 2021; Lahart et al. 2019; Mohammad Gholinejad, Hojjati, & Ghorbani, 2019; Mohammadi, Nafei, Baniasadi, & Chaharbaghi, 2022; Naeimikia, Izanloo, Gholami, & Ahar, 2018; Naeimikia & Gholami, 2018, 2020; Schwartz et al. 2019; Tremblay et al. 2011; Wafa et al. 2016; Yaali, Naeimi Kia, Gholami, 2018; Zhang et al. 2021). However, the role of sport participation in children with autism has rarely been investigated. Some studies have shown that different types of movement activities, including cycling, weight lifting, skating, swimming, and water aerobics can reduce stereotyped behaviors and violent behaviors, as well as improve executive functions such as active memory and metacognition, weight loss and fitness, and improve academic performance among children with autism (Chu et al. 2020; Haegele, Zhu, Kirk, 2018; Ketcheson, Hauck, Ulrich, 2018; Nguyen, Guinot, Bricout, 2021; Pan et al. 2016; Stanish et al. 2017). However, the role of sport participation on improving the social skills among children with autism has been received less attention in the literature. Thus, the aim of this study was to investigate the relationship between sport participation with social skills among children with autism. In addition, we included the emotion regulation as a mediator in the research model.

METHODS

Participants

The method used in this study was a structural equation modelling. The participants included 68 children with autism age 10 to 12 years old (mean 10.92±0.68 years old) who attended in special schools. All participants have voluntarily attended in the study. The parents of participants gave informed consents for participation of their children in this study. Protocol of this study was in accordance with ethical guidelines of declaration of Helsinki.

Measures

Sport participation: We measured sport participation using Physical Activity Questionnaire for Older Children (PAQ-C). The PAQ-C is a self-administered, 7-day recall instrument. It assesses general levels of PA throughout the elementary school year for students approximately 8 to 14 years of age. The PAQ-C can be administered in a classroom setting and provides a summary physical activity score derived from nine items, each scored on a 5-point scale (Crocker et al. 1997). In this study, we measured its validity with a Cronbach's alpha coefficient of 0.90.

Social skills: To measure social skills, Matson's social skills questionnaire (Matson et al., 1983) was used, which is used to measure the social skills of people aged 4 to 18 years. This scale includes 56 statements that measure the following factors: appropriate social skills, antisocial behaviors, aggressiveness and impulsive behaviors, superiority, high self-confidence, and relationship with peers. The answers given to this scale are graded based on a 5-point Likert scale with a range from 1 (never) to 5 (always). We measured the reliability of this questionnaire with a Cronbach's alpha coefficient of 0.88.

Emotion regulation: To measure emotion regulation, the Emotion Regulation Skills Questionnaire (Berking et al. 2008) was used, which includes 27 questions that are scored using a 5-point Likert scale and evaluates the successful application of emotion regulation skills. The evaluation items include: paying attention to emotions, clarity, understanding emotions, physical perception of emotions, self-advocacy, moderation of emotions, acceptance, emotional resilience and preparation for confrontation. We measured the reliability of this questionnaire with a Cronbach's alpha coefficient of 0.89.

Data analysis

Mean and standard deviation were used for data description. Normality of data was assessed using Kolmogorov-Smirnov test. The associations between research variables were analyzed using Pearson correlation test. Finally, structural equation modelling was used to measure structural associations between research variables. SPSS software version 26 and SmartPLS were used to analyze the data. P-value was set at $P < 0.05$.

RESULTS

Descriptive data and bidirectional relationships

Table 1 shows descriptive data including mean and standard deviation as well as bidirectional associations between research variables. First of all, the results of Kolmogorov-Smirnov tests showed that our data were normally distributed (all $P>0.05$). In addition, results of Pearson correlation tests showed significant associations between sport participation with social skills and emotion regulation (both $p=<0.001$). In addition, emotion regulation was significantly associated with social skills ($p=<0.001$).

Table 1. Descriptive data and bidirectional relationships

	Mean ± SD	1	2	3
1. Sport participation	1.93 ± 1.08	-		
2. Emotion regulation	48.39 ± 12.84	r=0.538 p<0.001	-	
3. Social skills	49.55 ± 17.22	r=0.627 p<0.001	r=0.473 p<0.001	-

Path analysis

Table 2 and Figure 1 show the results of structural equation modeling. The results showed that sport participation had significant effects on social skills (T=5.271) and emotion regulation (T=4.874). In addition, emotion regulation had significant effects on social skills (T=4.201). Finally, emotion regulation has significantly mediated the relationship between sport participation and social skills ($p<0.001$). Results of evaluating goodness of fit showed that our model has a good fit (GOF=0.94).

Table 2. Results of path analysis

	Path	β	T-value
1	Sport participation => social skills	0.502	5.271
2	Sport participation => emotion regulation	0.471	4.874
3	Emotion regulation => social skills	0.418	4.201
		Z	p
4	Sport participation => emotion regulation => social skills	3.207	<0.001

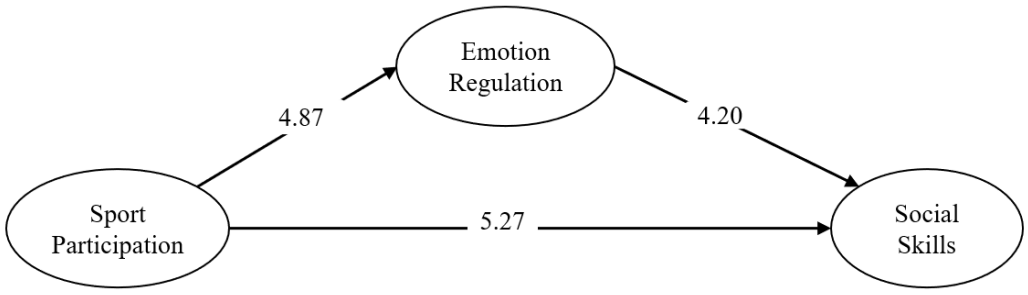

Figure 1. Research model in the form of T values

DISCUSSION

It has been shown that sport participation has numerous benefits for children with autism. However, the role of sport participation on improving the social skills among children with autism has been received less attention in the literature. Thus, the aim of this study was to investigate the relationship between sport participation with social skills among children with autism. In addition, we included the emotion regulation as a mediator in

the research model. First of all, our results showed that the participation in this study had very low levels of sport activities. These results confirm those of previous findings (Chu et al. 2020; Haegele, Zhu, Kirk, 2018; Ketcheson, Hauck, Ulrich, 2018; Nguyen, Guinot, Bricout, 2021; Pan et al. 2016; Stanish et al. 2017), indicating that children with autism engage in less sport activities than typically developing children. The mechanism underlying less sport activities in children with autism is not well understood, nevertheless, it may be related to social interaction impairment, motor skill difficulties, and physical barriers in individuals with autism (Rostami Haji Abadi et al. 2021). Therefore, it is necessary to adopt appropriate strategies to improve the sport activities among children with autism.

In addition, the results of this study showed that higher participation in sport activities could be associated with better social skills. This study confirms the results of previous studies that sport participation has positive benefits for children with autism (Chu et al. 2020; Haegele, Zhu, Kirk, 2018; Ketcheson, Hauck, Ulrich, 2018; Nguyen, Guinot, Bricout, 2021; Pan et al. 2016; Stanish et al. 2017). Humans are social creatures and show social tendencies from the first day of birth, but not all children are able to acquire social skills due to their mental conditions. Autistic children are among the children who are less able to present social behaviors in social situations and are always delayed in acquiring social skills or are not able to perform social behaviors at all (Bellini & Hopf, 2007; Chung, Reavis, Mosconi, Drewry, Matthews, & Tassé, 2007; Demir, 2014; Kroeger, Schultz, & Newsom, 2007; White, keoing, & Scahill, 2002). It should be noted that participating in movement and physical activities provides an important opportunity to increase communication and social interactions. Hence, it can be assumed that if children with autism participate more in sport activities, they would have more opportunities for social interactions and this leads to better social skills among children with autism.

As well, the results of this study showed that sport participation is significantly associated with emotion regulation and subsequently emotion regulation can significantly mediate the relationship between sport participation and social skills among children with autism. Regarding these findings is can be stated that individuals benefit from more self-awareness due to participating in sports and experiencing different competitive conditions, and have a deep understanding of their emotions and are able to evaluate and control themselves. It has been shown that sport participation improves people's mood in two direct ways, one is the release of endorphins and the other is the reduction of cortisol levels (a hormone that is released in the blood due to nervous tension). This feature enables individuals to regulate their emotions better and deal with daily stress more easily (Amstadter, 2008; Bargh & Williams, 2007; Gross, 2001). Sports as a valuable tool can help people to overcome physical, psychological and social pressures. Therefore, the level of sport participation has a positive relationship with emotion regulation. Accordingly, it can be suggested that children with autism should participate in regular sport activities in an attempt to increase their level of social skills.

CONCLUSION

As the results of this study showed, sport participation can be considered as an important factor for improving social skills among children with autism. In this relationship, emotion regulation can act positively as a mediator. Finally, our sample had, on average, low levels of sport activities. Therefore, it is necessary to adopt appropriate strategies to improve the sport activities among children with autism.

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