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RESEARCH ARTICLE

The Evaluation of Developments in Children with Autism within the Framework of Hemsball Training: From the Trainer's and Parents' Perspective

Meltem Işık AFACAN[1*]

[1]Aydin Adnan Menderes University, Faculty of Sports Science, Aydın / Turkiye
*Corresponding author: isik.meltem@adu.edu.tr

Abstract
This study was designed to answer questions about why hemsball, an activity that allows children with autism to be easily involved and allows for individualized adaptations, can be an alternative activity for children with autism. The aim of this study is to examine the observations of parents and trainers for the evaluation of developments in children with autism with in the frame work of hemsball training. This study adopted a qualitative research model and was designed as a case study.The study group in the research consists of 8 parents and one trainer, who were selected by easily accessible case sampling method and participated in the research voluntarily. Semi-structured interviews were conducted with the parents and the trainer to achieve the aims of the research. In the first part of the form given to the parents, there is personal in formation and general information about the participation of their child with autism in hemsball training, and in the second form, there are interview forms consisting of 3 semi-structured questions for the parent and the trainer. After the interviews, the data were coded with the maticanalysis method. Content analysis technique was used in the analysis of the data obtained in the research. The changes that parents and hemsball trainer saw in children with autism after the hemsball training started were collected under 6 themes: motor, behavioral, academic, language and communication, sociological and psychological. And as a result, it was revealed that children with autism showed positive development in these six themes.

Keywords
Hemsball, Autism, Training, Skill Development, Sportive Skill Development

INTRODUCTION

Autism is classified as a neurodevelopmental disorder in which genetic and environmental factors play a role. Neurodevelopmental disorders are a heterogeneous group of conditions characterized by disorders or abnormalities, such as delays in motor skills, in various areas of development [Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5)]. In autism, attitudes such as lack of social communication, repetitive behaviors, limited interests, and attachment to familiar events or situations are observed (APA, 2013). From another perspective, autism is also defined as a syndrome in which repetitive behaviors and behaviors characterized by excesses can be changed with the regulation of the physical and social environment and early, intensive and continuous education (Green, 2001; Öztürk et al., 2023).

The prevalence of motor disorders in autism is frequently reported in the literature (Esposito et al. 2009; Fournier et al. 2010). The fact that children with autism have delays in locomotor skills such as kicking and catching a ball, balancing and jumping, and object control skills is seen as a factor that may prevent participation in physical activities (Crucitti et al. 2019; Lee and Vargo, 2017). At the same time, it is stated that

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[1]**ORCID:** 0000-0002-1372-9322

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motor deficits as well as deficits in social and communicative skills seen in children with autism are also barriers to participation in after-school physical activities (Obrusnikova and Miccinello, 2012). Therefore, instead of asking or waiting for a child with autism to enter a crowded environment with active, noisy and unpredictable characteristics, it would be of greater benefit for children with autism to increase the frequency of individual training, provide direct instruction, and then gradually include them in group activities (Bremer and Lloyd, 2016; Ketcheson et al. 2017). From past to present, the effects of physical activities on children with autism have been evaluated in many studies in terms of physical, motor, intellectual, behavioral and emotional aspects and their role in reducing inappropriate behaviors has been revealed (Nazemzadegan et al. 2016; Healy et al. 2018; Ruggeri et al. 2020; Jachyra et al. 2021).

Since the development of motor function is related to a child's capacity in linguistic, cognitive and social development (Iverson, 2010; Karasik et al. 2011; Bedford et al. 2016), the type and duration of activities that support motor development may vary in children with autism compared to their typically developing peers. For these reasons, the continuity of exercise in children with autism is as important as the type of exercise. Studies have shown that acute physical exercise can at least temporarily improve cognitive functions in children with autism (Ludyga et al. 2019; Benzing et al. 2018; Chen et al. 2016; Tan et al. 2016), but long-term physical exercise interventions have shown positive effects on the brain-based skills needed to successfully execute goal-directed behaviors among school-aged children diagnosed with autism (Tan et al. 2016; Phung and Goldberg, 2019; Bahrami et al. 2015). Moreover, Bremer and Lloyd (2016) suggest that the intervention duration (>18 weeks) should be increased to better understand the effects of motor skills interventions on social skills.

Behavioral therapies are widely preferred in autism, but the economic burden of these therapies on families' budgets makes it necessary to investigate alternative therapeutic strategies that are effective and physical (Tan et al. 2016). However, parents' efforts to find activities and a suitable environment for their children with autism often require a lot of time, energy and resources (Obrusnikovaand Cavalier, 2011).

In this respect, hemsball, which has an adaptive game integrity, should be seen as an alternative activity that can be set up and played in any indoor or outdoor area, and has high accessibility.

Hemsball has been studied in the areas of psychomotor and physical development and physiological effects of both normally developing children and children with special needs. For example, it was examined whether there was a change in attention and coordination (Işık and Kılıç, 2021b), balance and coordination (Işık and Zorba, 2020), fine motor precision and integration (Işık and Kılıç, 2021a), physical measurements (height, weight, flexibility, chest width and heart rate, etc. (Todorova et al. 2014) in children with intellectual disabilities, and jumping and balance (Sever et al. 2016) skills/measurements in children with normal development compared to the control group. The findings of the study revealed that hemsball was effective by creating a change in the physical characteristics and motor skills of both normally developing and children with disabilities compared. However, no studies have been found that demonstrate the intellectual, social, emotional or cooperative contributions or language developments in children.

This article aims to analyze the observations of parents and trainers about the effects of hemsball on children with autism. The themes obtained from parent and trainer views will be discussed respectively. It is thought that the hemsball activity discussed in this article can benefit all physical trainers, sports experts and program providers serving children with autism.

Hemsball

Hemsball, which was introduced as an idea by Murat Altınay in 2011 and was accepted by the Ministry of Youth and Sports in 2013 after being finalized through research and development studies, is the official sports branch of the Republic of Turkey, (ihfed.org. 2023). The aim of the game is to bounce a ball into a hoop on a target board so as to make it land on the opponents field and to prevent the opponent from achieving the same goal. (Gönülateş 2017; Işık and Kılıç, 2021). The name of this sports branch, hemsball, is the result of the combination of the initials (hand, energy, move, stability and ball) of the performance put forward during the game. The materials required for the game are a ball, a hoop, a target board, a foot plate and strips to mark the

game area. As can be seen in Figure 1 below, the materials required for the game can be increased according to the needs of the individual or the group, and suitable conditions can be provided for skill acquisition. Figure 2 shows the of the hemsball pitchand equipment. Figure 3 shows the measurements of the hemsball ball.

Figure 1. Sample studies related to hemsball trainings

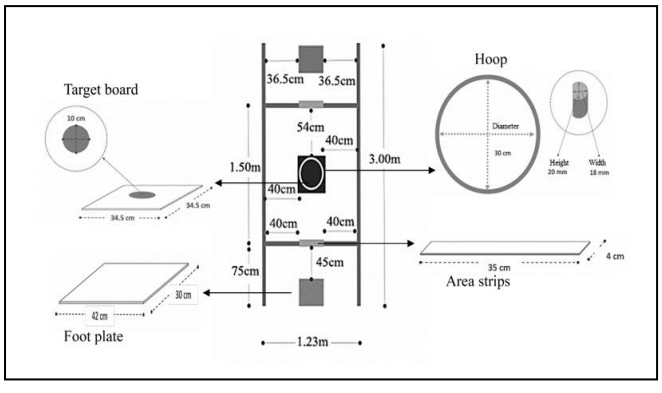

Figure2. Hemsball pitch and equipments

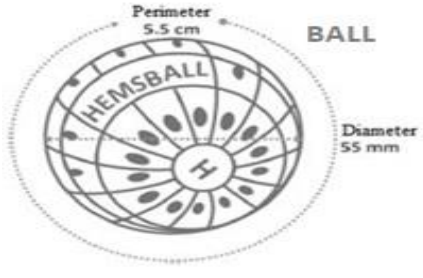

Figure3. The measurements of the hemsball ball

MATERIALS AND METHODS

Research Model

This study adopted a qualitative research model and was designed as a case study. Case studies focus on one or more individuals, events or situations and the variables that affect or are affected by this situation (Yıldırım and Şimşek, 2011). In this study, the case study design is thought to be suitable for the purpose of the research, as the evaluation of the development of children with autism who have been continuing their hemsball training for a while from the perspective of their parents and educators will be examined.

Population

The families of children with autism who participated in hemsball training for at least one and at most five years at Aydın Youth and Sports Training Center and the trainer who gave these trainings were invited to participate in the study. Participation in the study was voluntary. Eight parents who agreed to participate in the study from the families who received hemsball training and a trainer who provided the hemsball training were included.

It was determined that the parents were between the ages of 40 and 50, 5 of them were mothers and 3 of them were fathers. In terms of educational level, the number of parents who were university graduates was higher. Only one of the parents was retired and the others were working.

It was determined that the children with autism who participated in the study were between the ages of 10 and 18. 1 participant was female, 7 were male. 2 participants had second disabled. 6 children with autism participated in inclusive education and all participants received after-school support education.

This study was conducted in accordance with the principles stated in the Declaration of Helsinki, the necessary ethical permission was obtained, and Informed Consent was obtained from the parents and educator who were invited to the study and agreed to participate.

Data Collection Tools

A Semi-structured interview technique was used to obtain the views of parents and trainers. The first part of the form given to the parents included personal information and general information about the participation of their child with autism in hemsball training, while the second form included interview forms consisting of 3 semi-structured questions for the parent and the trainer. During the semi-structured interview process, the interview questions directed to the parents and the trainer were determined in line with the relevant researches (Hebert et al. 2022;

Thomas 2021) and the opinions of researchers working with parents of children with autism as practitioners. In the interview with the parents of children diagnosed with autism, open-ended questions were asked about their experiences after starting the hemsball training (How interested is your child in participating in hemsball training?

Have there been any noticeable changes in your child after starting hemsball training? If there have been changes, in which area have they been most noticeable? In the interview with the Hemsball trainer, open-ended questions were asked about his/her experiences after starting the training (How was the child's willingness to participate from the beginning of the Hemsball trainings until today? What kind of difficulties did you encounter with the child with autism during the Hemsball training?, If there have been noticeable changes in the child with autism after starting the Hemsball training, what are these? The interviews were conducted one-on-one and lasted 30 to 40 minutes. Participants were informed about the purpose of the study and the interview questions. Interviews were held with each participant on different days. The interviews took place over a two-week period.

Data Analysis

After the interviews, the data were coded by thematic analysis method. Content analysis technique was used to analyze the data obtained in the study. "Content Analysis is a systematic, repeatable technique in which some words of a text are summarized by smaller content categories with certain rules-based encodings asit is defined" (Büyüköztürk et al. 2016). In order to categorize the participants' views on the effects of the hemsball training on their children with autism, common concepts were identified from the topics mentioned by the participants and coding was done. Then, themes were created from the coded data and the concepts were organized according to these themes. The themes were grouped and the final version of the content analysis was obtained. To calculate the reliability of the study, the reliability formula suggested by Miles and Huberman (1994) (Reliability = Consensus/ (Agreement + Disagreement) × 100) was used. As a result of the anal-ysis, the reliability rate was found to be 90%. In addition, as a measure of reliability, the data obtained were quoted directly without comment.

RESULTS

In this part of the study, the demographic information of the parents and their children diagnosed with autism, the answer themes, frequencies and example answers generated in line with the answers they gave to the open-ended questions directed to the parents and the hemsball trainer, and the findings and interpretations related to these findings are presented. During the analysis process, parents were coded as P1, P2, P3, ……, P8. The children with autism evaluated by the trainer are coded as A1, A2, A3....., A8.
Educational information for children diagnosed with autism is presented in Table 1.

Table 1. Demographic information of children diagnosed with autism

Educational information for children with autism		*f*
Education type	Inclusive education	6
	Tutoring school	2
Doesout-of-school support receive education?	Yes	8
	No	0
Has he/she participated in a sports event before?	Yes	5
	No	3
How did you meet hemsball?	Autism association	2
	YSC Courses	2
	Friend recommendation	4
How long has he/she been studying hemsball?	1 year	2
	2 year	1
	3 year	4
	5 year	1
How many hours per week does he/she train hemsball?	2 hours	8
Have you met other parents through hemsball?	Yes	8
	No	0

Findings Related to Parents' Views on Hemsball

In the interview with the parents of children with autism, open-ended questions were asked about their experiences after starting the hemsball training (How interested is your child in participating in the hemsball training? Have there been any noticeable changes in your child after starting the hemsball training? If there have been changes, in which area have they been most noticeable?) The themes, frequencies and example answers extracted from the views obtained in line with the answers given by the parents to the question "How interested is the child with autism in participating in hemsball training?" are presented in Table 2.

Table 2. Participation interest of children with autism in hemsball trainings

Themes	Frequency	Example answers
Willing	4 Parents	Has been very enthusiastic since the day he/she met Hemsball, looks forward to the training days, he/she can't wait to go to the training.
Trainer attention	3 Parents	Is happy during the trainings because of the attention and love shown by our trainer. We love our trainer very much.
Incentive	1 Parent	Participates in trainings with rewards. Interest in Hemsball is changing day by day.

Based on the responses of the parents to the first question, three different themes were identified. Four parents stated that their children were eager to participate in hemsball, three parents stated that the trainer's relevant approach affected participation, and one parent stated that their child participated with the rewarding method.The answers given by the parents to the open-ended questions about the experiences gained after the start hemsball training were divided into 6 themes. These themes are presented in Table 3.

Table 3. Thematic distribution of the areas of development of their children after the start of hemsball training according to parents

1.Motor development	Parents
Reduction of balance problems	P1, P3, P4
Increased hand-eye coordination	P1, P2, P4, P5, P6
Fine motor skill development	P2, P4, P5, P6
Grasping the ball and throwing it to the target point	P2, P4, P6
Prolonged attention (focus) time	P3, P4, P5, P6
2. Behavioral development	
Learning the waiting behavior	P2, P3, P6
Obey the rules	P1, P2, P3, P4, P5, P6
Ability to stay calm	P8
3.Cognitive development	
Counting	P2,P4,P5
Learning the concepts of right-left	P1,P2,P4
4. Language and communication development	
Listening	P1,P2,P3,P4,P5,P6
Answering questions	P1,P2,P3,P4,P5,P6
Request to speak	P1,P2,P3,P4,P5,P6
5.Sociological development	
Making friends	P3,P4
Ability to play games in different environments	P3,P4,P6
6.Psychological development	
Being happy	P1,P2,P3,P4,P5,P6
Increased motivation	P1,P2,P3,P4,P5,P6
Self-confidence development	P7

In the interview with the hemsball trainer who has been working with children diagnosed with autism for 7 years, three open-ended questions were asked about the experiences the trainer had after starting the training. (How was the child's willingness to participate from the beginning of the hemsball trainings until today? What kind of difficulties did you encounter with the child with autism during the hemsball training?, If there have been significant changes in the child with autism after starting the hemsball training, what are these? The answers given by the trainer for each child regarding these experiences are presented below. The answers given by the trainer participating in the research to the question of the child's willingness to participate from the beginning of the hemsball training until today are given below.

For Participant 1: "He has been attending hemsball training for about 3 years, two days a week for one hour. In this process, he has not been absent except for when he was ill. At the moment, we can keep the duration of the exercises longer than when we first started. He always comes willingly."

For Participant 2: "He has been attending hemsball training for about 3 years, two days a week for one hour. He mostly participated in the trainings. When we first started, we had a lot of trouble responding to commands and paying attention, we could do the exercises for very short periods of time, but now we can do our exercises for longer."

For Participant 3: "The participant, whom I have been working with for one year, 2 days a week for one hour, initially had a focus time of no more than 15 minutes. At the end of one year, he could participate with the same enthusiasm from the beginning to the end of the training. He is very enthusiastic about participation and continuity."

For Participant 4: "In the first months of our training, which has been going on for 18 months, the participant was both hesitant and his attention span was quite short, but over time, he got used to both me and the training and his focus time increased. He participated except for public holidays and illness."

For Participant 5: "He has been attending my hemsball training 2 days a week for one hour for 3 years. While at first, he participated with a reward, I can say that he gradually became more routine and enthusiastic. When I say let's start, we start working in an order. He is one of my regular participants."

For Participant 6: "We have been working for about 1 year, 2 days a week for one hour. She has maintained continuity since the first day and participates very willingly. She makes a lot of effort to do the activities without any mistakes."

For Participant 7: "At first, he was obliged to participate. It has been a year since we started, and now he participates more willingly."

For Participant 8: "In the first days of hemsball training, he was easily distracted. He participated regularly every week. After the first six months, he participated more willingly and enjoyably from the beginning to the end of the one-hour training."

The themes, frequencies and example answers extracted from the opinions obtained in line with the answers given by the trainer participating in the study to the question "What difficulties did you encounter with the child with autism during the hemsball training?" are given in Table 4.

Table 4. Thematic distribution of the difficulties encountered with the child with autism during the training according to the hemsball trainer

Trainer's response themes for participants	Participants	Trainer Opinions
Communication	For A1, A2	Has difficulty making eye contact and is not taking commands
Motor	For A1, A2, A4	Has loss of balance, has difficulty using hand and fingers while grasping or trying to hold the ball
Behavioral	For A4, A5, A8	Has trouble focusing, gets bored quickly and leaves the training area
Psychological	For A3, A6, A8	When he/she can't do the shown movement, he gets angry, sad and unhappy
Sociological	For A5, A7	Has difficulty participating in group activities

Five different themes (communication, motor, behavioral, psychological, psychological and sociological) emerged from the responses of the trainer to the question of "what difficulties did you encounter with the child with autism during the hemsball training?". The trainer who participated in the study asked, "Would you say that there have been noticeable changes after you started hemsball training? If yes, what are these changes?", the themes, frequencies and example answers are given in Table 5.

Table 5. Thematic distribution of the significant changes in children with autism after the hemsball training started according to the trainer

The themes of the trainer's response for the participants	Participants	Trainer Opinions
Communi-cation	For A1, A2, A3, A4, A5, A6, A7, A8	Can hold short conversations, shows less echolalia, can give short answers to questions, can express needs and feelings, increased eye contact, can use greetings and goodbyes
Motor	For A1, A2, A3, A4, A5, A6, A7, A8	Can balance on the step-board, can hold the ball with one hand, can use both hands, hand-eye coordination has increased, can reach for and catch the ball that comes towards him/her or that goes in a different direction, and focus has increased.
Behavioural	For A2, A4, A5, A6, A8	Performs sequential exercises without receiving commands, imitates the movement shown, develops the ability to wait for a turn and act in accordance with commands, throws the ball to the desired target, puts the dislocated hoop in its correct place, helps in the preparation and removement of hemsball materials.
Psychological	For A5	Overcame his fear of touching the hemsball.
Sociological	For A1, A2, A3, A4, A6, A7, A8	Adapts to group work, is willing to participate in group work with her peers, and his/her communication with his/her peers has increased.
Cognitive	For A1, A5, A7	Has learned the concept of directions, can count the sequence of movements by tens, can answer questions about the basic rules of hemsball correctly.

DISCUSSION

This is the first study to systematically investigate the perceptions of parents and trainers regarding the factors affecting the development of children with autism who have participated in hemsball training for at least one and up to five years. Parents with different demographic characteristics generally had positive views about the benefits of hemsball for their children with autism. These views were grouped into 6 themes: motor, behavioral, cognitive, language and communication, sociological and psychological development.

The first of the themes, motor development, was reported by the trainer that the children experienced loss of balance, difficulty in grasping the ball and using their fingers in the beginning stages of the studies. Both trainer and parents stated that balance and hand-eye coordination increased, fine motor skills improved, and attention (focusing) durations were prolonged by grasping the ball and throwing it to the target point with hemsball training. There are various studies in the literature in which different physical education interventions have a positive effect on the motor skill acquisition of children with autism (Ruggeri et al. 2020; Ketcheson et al. 2017). In addition, the importance of intervening in motor skills is seen in order for children with autism to have the necessary skills for physical and recreational activities and not to lag behind their peers in motor competence (Guest et al. 2017; Thomas et al. 2021; Pan 2014). A meta-analysis of the effects of physical activity interventions on young people with autism found that physical activity interventions had a moderate or large effect on a variety of outcomes, including improving manipulative and locomotor skills, and skill-related fitness (Healy et al. 2018). Visual aids commonly used in activity programs designed for children with autism support the motor skill

learning of children with autism (Winnick 2011). This especially enriches the game skill learning of hemsball, which has equipments such as a hoop, a ball, a target board and foot plates.

The second theme is behavioral development; The trainer reported problems focusing of children with autism in the early stages of the training, getting bored easily, and leaving the training area. As a result of the interviews, parents stated that they observed improvement in their children's ability to learn waiting behavior, obey the rules, and stay calm through hemsball training. Similar behavioral improvements were noted by the coach, while improvement in imitation and cooperation was also reported. All cultural systems such as law, religion and morality are living techniques that teach how individuals should behave in society, and they are called rules of behavior. These systems bind people living in society together and force them to obey the rules (Topçuoğlu 1984). The effort to transform the environment into a positive learning environment to minimize inappropriate behaviors in children with autism is known as an important positive behavior support for physical activity (Winnick 2005). In many scientific studies, it has been determined that there is a decrease in behavioral problems in children with autism through physical exercise (Liu et al. 2016; Ferreira et al. 2019; Tse 2020). Emphasizing the importance of exercise in children with autism, researchers have stated that after the emergence of maladaptive behaviors in children, parents and educators can use physical activities to reduce stereotyped behaviors as an alternative before starting to use medication (Liu et al. 2016). Physical education and physical activities are widely accepted, especially to reduce stereotypic behaviors in children with autism.

The third of the themes is academic development; The trainer reported that the child with autism learned the concept of direction, could count the order of moves with decimal places, and could correctly answer questions about the basic rules of hemsball. Parents rated their children's academic progress in a similar way. The concept of academic development is a concept that covers all developmental behaviors other than psychomotor skills and affective development (Arslan 2019). Students need institutional communication due to factors such as ideas, practices and research topics which are outside their field of knowledge but are effective in academic development (Sezgin 2017). In this context, we can state that sports, an important social institution, can also have a positive impact on academic development. In the literature review, it can be seen that the issue of adaptation to the academic environment and academic development in children with autism is among the limited studies. A few of the limited studies were as following: for example, Oriel et al. (2011) on the effect of exercise on academic development found that aerobic exercise before class activities can improve the academic responses of young children with autism. In another study, it was emphasized that a physical activity as simple as light jogging can be effective in increasing academic achievement for students with autism (Nicholson et al. 2011).

The fourth theme was language and communication development; The trainer stated that children with autism have difficulty in making eye contact and taking commands. With the hemsball training, it was reported that there were positive changes in children with autism, such as decreasing echolalia, giving short answers to questions, expressing their needs and feelings, increasing eye contact, and using greeting and farewell words. Likewise, parents made statements that their children's desire to listen, answer questions and talk has increased. One of the main limitations of children with autism is language and communication (Eigsti et al. 2011; Campisi et al. 2018) and almost half of these children fail to develop appropriate verbal language skills (Vandereycken et al. 2016). On the other hand, there are studies that support the findings of this study and show that physical activities positively affect language and communication development. For example, Zhao and Chen (2018) concluded that a specially structured physical activity program positively affected the communication skills, social interaction, rapid response and frequency of expression of children with autism.

The fifth theme was sociological development; the trainer stated that the children with autism have difficulty in participating in group activities when they are just starting their hemsball training. The trainer clarified that the children in the course of time adapted to group activities, were willing to participate in group activities with their peers, and increased their communication with their peers. Parents also expressed that their children with autism, who

continue their hemsball training, have made friends and their ability to play games in different environments has improved. Since the social environment is important for children with autism, a child with autism living in a positive environment has more advantages than a child with autism living in a negative environment. In this context, the environment where various sports opportunities are offered is a positive environment for the child with autism (Afacan 2020). Pan (2009) emphasized that social participation, which is thought to be a determinant for physical activity in children with autism, is partially related to physical activity. Parents who said that their children with autism were excluded in group activities stated that their children spent more time in front of the screen on weekends due to such social barriers (Must et al. 2015). Blagrave and Colombo-Dougovito (2019) show that physical activity can provide tremendous opportunities to build better connections in the community and improve quality of life, but families and their children with autism may not have the same opportunities to access physical activities. Also, in their study on parental perceptions of factors affecting participation in after-school physical activities, Obrusnikova and Miccinello (2012) reflected that gyms were too noisy and bright for the children with autism and that an adaptive physical education program could be more effective. Huang et al. (2020), according to the results of their meta-analysis study on the intervention effects of physical activities in children and adolescents with autism, stated that physical activity had a positive effect on social interaction and communication ability, motor, social and communication skills of children with autism, but had no significant effect on stereotyped behaviors. Past research on children with autism has shown that motor skills interventions have positive effects on social skills for children with autism, including reductions in maladaptive behaviors and improvements in functional engagement with peers (Colombo-Dougovitoand Block, 2019; Bremer and Lloyd, 2016; Ketcheson et al. 2017).

The sixth of the themes is psychological development; The trainer stated that children with autism who have just started to hemsball training show negative emotions such as fear of the hemsball ball, getting angry when they cannot do the movement shown, and being unhappy and sad. The trainer noted that as the trainings progressed, negative emotions decreased and the fear of touching the hemsball ball disappeared. Parents, on the other hand, stated that they observed that their children with autism were happy, their motivation increased and their sense of self-confidence improved with hemsball training. Some studies have reported that physical activity is associated with mental health and can improve psychological health (McPhail 2006; Lord and Patterson, 2008).

According to the research findings, the researcher revealed that hemsball is effective in motor, behavioral, academic, language and communication, sociological and psychological skills in children with autism by examining the views of parents and trainers. Considering the findings, it can be said that hemsball, which can easily include children with autism and allow individualized plans and adaptations, can benefit all sports experts, physical trainers and program providers who provide education to children with autism. In addition, longitudinal studies are also needed to reveal the effects of exercise interventions in more than one field.

In future studies, longitudinal studies can be conducted to reveal the effects of hemsball interventions in more than one area on children with autism.In addition, hemsball studies in which a child with autism is included in the same training as a parent or peer can also be included.

Acknowledment

I would like to thank Firdevs Türkeli, the hemsball trainer who has been providing hemsball training to children with autism for a long time and who contributed greatly to the emergence of this study, and to the parents who participated in the study.

Conflict of interest

No conflict of interest is declared by the author. In addition, no financial support was received.

Ethics Committee

In terms of compliance with research ethics, this study was conducted in accordance with Aydin Adnan Menderes University Social and Humanities Research Ethics dated 02.05.2022 and numbered 31906847/050.04.04.04-08-91. It has been reviewed and approved by the Board.

Author Contributions

Planned by the author: Study design, data collection, statistical analysis, data ınterpretation, manuscript preparation, literature search. author have read and agreed to the published version of the manuscript.

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