Research Article

The selected rehabilitation exercise program effect on the social development of autistic children - a single-subject study

Seyedeh Maedeh Basamtabar¹, Keyvan Molanorouzi^{*2}, Elahe Arabameri³, Ali Kashi⁴

1- Ph.D. candidate in Motor Behavior, Department of Physical Education and Sport Sciences, Science and Research Branch, Islamic Azad University, Tehran, Iran

2- Department of motor behavior and sport psychology, Science and Research Branch, Islamic Azad University, Tehran, Iran.

3-Associate professor, Faculty of Sports and Health, University of Tehran, Tehran, Iran.

4- Associate Professor of Behavioral Sciences in sport, Sport Sciences Research Institute, Tehran, Iran.

Abstract

Received: 3 January 2025 Revised: 15 January 2025 Accepted: 29 January 2025

Keywords:

autism, targeted exercise program, social growth.

Background: Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by being one of the most prevalent developmental disorders, marked by difficulties in motor skills, social interactions, repetitive behaviors, and movements. With the rising prevalence of autism, the challenges and impact of this condition on children, their families, and the broader community underscore the necessity for an extensive rehabilitation training program designed to enhance the social development skills of autistic children from early childhood through elementary school years. Hence, the objective of this study is to explore the impact of a targeted rehabilitation training program on the social development of autistic children.

Materials and Methods: For this research and case study, we chose two autistic children, from a rehabilitation center in Tehran. This selection was made through the A-B-A method, considering their HFA and IQ scores (60-90). The participants were a 12-year-old boy with an IQ score of 67 and an 11-year-old girl with an IQ score of 60. Following their parents' approval, they agreed to take part in the study.

Results: The results of the T-test showed the significant effect of eight weeks of functional and Extra functional exercises on dorsi Flexion, Plantar Flexion and ground reaction force. ($P \le 0/001$).

Result: The research indicated that the targeted rehabilitation activities were successful in enhancing the social abilities of children with autism. In male and female subjects, the mean scores of the Vineland test increased in the post-intervention phase. They demonstrated improvement across all subtests related to general self-help, self-help in eating, self-help in dressing, self-leadership or self-direction, movement and mobility, as well as communication and sociability.

Conclusion: The results indicate that a 12-week program of targeted rehabilitation activities, incorporating play and rhythmic exercises, enhances a child's ability to engage with peers, improve coordination, increase involvement, and boost self-assurance and social abilities in children with autism.

*Corresponding author: Keyvan Molanorouzi

Address: Department of motor behavior and sport psychology, Science and Research Branch, Islamic Azad University, Tehran,Iran

Email: Keivannorozy@gmail.com

ID K M : 0000-0003-1374-460X



1. Introduction

Autism spectrum disorder is an intricate disorder of brain development marked by problems in social interaction, movement, and repetitive actions (4). It stands as one of the most prevalent pervasive developmental disorders, known for its complexity and the lack of understanding surrounding it (1).

Since 2009, this condition has seen the quickest rise in prevalence, experiencing an average yearly growth of 10.9% (9). A key challenge for a child with autism is a shortfall in social skills. Issues include a reduced ability to maintain eye to eye contact, minimal interest or attraction to human faces, difficulties in initiating physical touch, and challenges in engaging in cooperative play, among others (19).

Developing the ability to interact socially enhances an individual's social maturity and skill level. In children with autism spectrum disorder, inadequate social skills lead to difficulties in forming friendships and often result in neglecting others (8). Such inappropriate social conduct can lead to challenges in social integration. Hence, it's crucial to explore methods for intervention and support. Engaging in organized movement activities and exercise programs will be instrumental in this process. Isaacs (2002) states that physical activity and social acceptance are considered the most important elements at every phase from early years to old age (6). Effective treatments for the core symptoms of autism spectrum disorder have not yet been developed. First-line evidencetreatments are represented based by behavioral therapies (such as the Treatment and Education of Children with Autism and Children with Associated Communication Disorders or Applied Behavior Analysis) (21).

The application of drugs (like Risperidone or Aripiprazole) is typically restricted to managing the behavioral aspects of the condition, including irritability or aggression. Regrettably, despite the notable impact on these challenging behaviors. the drug treatment for the fundamental symptoms has often yielded uncertain outcomes and is occasionally hindered by serious adverse side-effects (5). Families of children with autism are often concerned about potential medication side effects and are constantly seeking more clinical treatments. As a result, in recent years, interest in complementary and alternative medicine has increased, not only in autism spectrum disorder, but also in several pathological conditions (11). In a study conducted by Sarabi and colleagues (2018), it was demonstrated that engaging in parallel training enhance can social, communication, and motor abilities, while also diminishing repetitive behaviors among children with autism (15). Moradi and her team's findings (2021) indicated that children diagnosed with autism and who also have visual impairments tend to struggle with understanding social cues, empathy, recognizing facial expressions, making decisions. communicating, engaging and in social activities. However, these challenges can be overcome by participating in a consistent training regimen, which leads to improvements both cognitive and social abilities. in Undoubtedly, selected and targeted programs for children with autism reduce inappropriate behaviors and increase their physical fitness, social and emotional relationships, and the child enjoys these activities (19). Since the teachings and advice through stories, puppet shows (theater), images, videos, etc. become well understood and meaningful for the child, the likelihood of their application and generalization by the child in similar fields increases (20).

This study adopted a quantitative, applied research approach, specifically utilizing the case report method. The target population for this investigation consisted of 40 autistic children, aged between 8 and 12 years, engaged in a rehabilitation center located in the northwest Tehran. From this pool, two participants were selected: a girl aged 11, with an IQ of 60, and a boy, aged 12, with an IQ of 67. The selection criteria were based on the Autism Diagnostic Observation Schedule (HFA) and IQ scores, which ranged from 60 to 90. Prior to the study, a specialized consent form for participation in the assessments was completed by the parents, along with personal characteristics а questionnaire. To enhance the precision and efficacy of the targeted training program, a single-subject methodology was employed, utilizing the A-B-A design. This educational and rehabilitation approach, known as A-B-A, addresses all facets of a child's developmental needs, encompassing sensory-motor, cognitive, social, self-help, and speech skills. Within this

2. Materials and Methods

This study adopted a quantitative, applied research approach, specifically utilizing the case report method. The target population for this investigation consisted of 40 autistic children, aged between 8 and 12 years, engaged in a rehabilitation center located in the northwest Tehran. From this pool, two participants were selected: a girl aged 11, with an IQ of 60, and a boy, aged 12, with an IQ of 67. The selection criteria were based on the Autism Diagnostic Observation Schedule (HFA) and IQ scores, which ranged from 60 to 90. Prior to the study, a specialized consent form for participation in the assessments was completed by the parents, personal characteristics along with а questionnaire.

To enhance the precision and efficacy of the targeted training program, a single-subject methodology was employed, utilizing the A-B-A design. This educational and rehabilitation approach, known as A-B-A, addresses all facets of a child's developmental needs, encompassing sensory-motor, cognitive, social, self-help, and speech skills. Within this framework, a single subject, such as an individual or a group, is the focus of study at any given time. The outcomes of the therapeutic or educational interventions are then assessed in relation to these specific subjects (13).

The inclusion criteria for participation in the study and the selection of subjects were established on the basis of several criteria. These criteria included being between the ages of 8 and 12, having a diagnosis of Autism Spectrum Disorder (ASD) according to the DSM-IV-IR criteria and validated through ADI-R diagnostic assessments, and obtaining a confirmation from a psychiatrist. Additionally, participants were required to demonstrate verbal comprehension to the level of recognizing imperative verbs and significant body parts. Furthermore, the absence of motor disabilities was a prerequisite for eligibility. Initially, a pre-test was administered to assess the variables related to the targeted rehabilitation training program-i-e- social skillsover twelve weeks, encompassing a total of 36 sessions, with three sessions held per week, each lasting 60 minutes. The first segment of these sessions was allocated to type 1 activities, which included warm-up exercises, gross motor skills, and perceptual-motor-heading tasks, each allocated 10 minutes for rest. Subsequently, type 2 activities were introduced, which encompassed fine motor skills, social-emotional skills, and cognitive abilities, each session allocated 30 minutes.

Following a period of 18 weeks, the test was repeated, and finally, a post-test was conducted to evaluate the outcomes of the rehabilitation training program. This post-test was complemented with the Vineland test and the Social Interaction and Communication Questionnaire (GARS), which were employed to measure the impact of the targeted training program on the enhancement of social skills.

The Vineland Test represents a developmental assessment tool designed to evaluate an individual's capacity to fulfill their practical requirements and assume responsibility. This comprehensive scale encompasses a wide age range, extending from birth to over 25 years, with its efficacy demonstrating a peak at younger ages, particularly within populations with intellectual disabilities. The scale comprises a total of 17 items. It is structured into eight distinct categories: general self-help, self-help in eating, self-help in dressing, self-control, employment, language communication, mobility, and socialization.

The Vineland Scale underwent standardization procedures 620 involving participants, encompassing both genders. The resulting coefficient, with a reproducibility rate of 0.92, was subsequently reported.

The Gars-2 Test (GARS), a diagnostic tool for individuals with autism, was conceptualized by Gilliam in 1994. This assessment was subsequently validated and underwent evaluation in 2011 at the Isfahan Autism Center by Ahmadi and associates. The assessment was calibrated against norms specific to the Iranian community, , and its psychometric characteristics were scrutinized through the analysis of 100 participants,

comprising 81 boys and 19 girls, spanning the ages of 3 to 18 years (2).

The Gars-2 assessment tool is composed of three distinct subscales, each comprising a total of 14 items. In the context of this study, the second subscale, which pertains to communication (characterized by the description of both verbal and nonverbal behaviors), was selected for analysis. Specifically, this subscale included questions 15 to 28. Concurrently, the third subscale, focusing on social interaction, was chosen, encompassing questions 29 to 42. To ascertain the internal consistency and reliability of the Gars-2 scales, the Cronbach's alpha coefficient was employed. The results indicate that the alpha coefficient for the communication subscale is 0.86, while for the social interaction subscale, it stands at 0.94(2).

Considering the distinct physical and mental conditions of the participants, they are permitted to take rest periods during the various stages of the test instructions so as to mitigate the additional pressure that might otherwise be exerted on them to complete the test Furthermore, verbal encouragement and gifts are employed to enhance motivation throughout the duration of the test. The training program is structured as follows: (Warm-up activities of the first category, encompassing cognitive-motor exercises, static and dynamic balance, movement skills, manipulation, lateral superiority, body recognition, spatial and temporal perception, hearing, shape and orientation perception, strength, power, agility, flexibility, coordination, and stereotyped behaviors, concluding with a 30-minute cool-down period). The second type of activities include: fine motor skills and tactile development, social-emotional skills. problem-solving and cognitive skills, reasoning, creativity, attention, and spatial visualization (30 minutes).

Towards the conclusion of the session, Jacobs' Breathing Exercises were executed with the aim of facilitating both mental and muscular relaxation, as well as the reduction of stress and anxiety. This exercise program was designed the objective of comprehensively with identifying the various weaknesses and disorders prevalent among autistic children. For each identified disorder, specific exercises were formulated, accompanied by detailed instructions on the execution of each movement. These instructions, along with relevant images, are included in the 60-page research paper. However, due to space constraints, only a selection of the exercise program has been outlined in this document.

Sessions	Static and	Movement and	Spatial and temporal	Perceptual-	Strength, power,
	dynamic balance	manipulation	perception, hearing,	motor skills	agility, flexibility
		Lateral	shape perception, and	Coordination	
		superiority and	orientation	and stereotyped	
		body		behaviors	
		recognition			
١	Walking in the	Rolling a ball	Passing over and under	All-hand	Vertical jump and
	Footsteps of the	on the ground	obstacles	walking (knees	hitting the ball
	Alphabet	(Galaho, Test	(Galaho, Ozmon	not on the	(Sheikh et al., 2019)
	(Ahmadi, Be	2011)	2011)	ground)	
	Pajouh 2016)			(Abbasi et al.	
				2018)	
٢	Jumping pairs	Running	Stepping inside the	Winding a	Sun Salutation Yoga
	within a square	through circles	ladder	thread around a	Poses
	(Kashi et al.	(Emami et al.	(Werner-Reini,	spool while	(Beck 2015)
	2018)	2018)	translators, Sazmand,	walking	
			Tabatabaeinia 2014)	(Abbasi,	
				Ebrahimpour	
				2017)	

Table 1 - Warm-up + Type 1 activities (30 minutes) + Cool-down // Gross motor skills Perceptual-motor exercises

<u>Research</u>	<u>article</u>	<u>Journal of Sp</u>	<u>ports Physiology and </u>	<u>Athletic Conditi</u>	<u>ioning. 2025; 5 (15)</u> : 1
٣	Hopping around	Catching the	Drawing shapes on the	Making	Running through
	obstacles	ball and	board by indicating	Bubbles and	obstacles and
	(Galaho, Ezmon	moving the ball	their direction	Chasing Them	moving sandbags
	2011)	with the other	(Sheikh et al., 2019)	(Baghandeh et	(Sheikh et al., 2019)
		hand		al. 2015)(
		Kayhani,			
		Kowsari 2013)			
۴	Stork Movement	Dribbling the	Running and kicking,	Plastic Ring	Hitting a Medicine
	(with eyes open	ball through	to a ball thrown by the	Game	Ball
	and closed)	the cones and	tester	(Werner-Reni,	(Kashi et al. 2018)
	(Matrin, Dirjitkar	shooting	(Galahou, Azmoon	Translators,	
	2018)	(dominant	2011)	Sazmand,	
		foot)		Tabatabaeinia	
		(Moradi et al.		2014)	
		2017)			
۵	Moving in a	-Opening and	Running and standing	Jumping and	Sun Salutation Yoga
	straight line	closing the	with whistle signal	Clapping	Exercises
	backwards and	lock	(Kashi et al. 2018)	(Abbasi,	(Beck 2015)
	sideways	-Passing a hat		Ebrahimpour	
	(Najafabadi et al.,	(Pir Ali et al.		2017)	
	2018)	2020)			
۶	Jump with	Throwing the	Chasing a Pendulum	Badminton	Tug of war
	rotation	ball towards	Ball with the Eye	service (Isaac	(Moradi et al. 2015)
	(Abbasi et al.	the basketball	(Werner-Reini,	2005)	
	2018)	hoop (with	Translators, Sazmand,		
		eyes open and	Tabatabai Nia 2014)		
		closed)			
		(Kashi et al.			
		2013)			
٧	Yoga movement	Hitting the ball	The subject and the	Catching the	Passing the ball,
	(tree)	with a golf club	tester strike each other	ball between	dribbling and
	(Beck et al. 2015)	(dominant	with two sticks	the legs and	passing the ball
		hand)	(Sheikh et al. 2019)	jumping with	(Payne & Isaacs
		(Galaho,		the feet closed	2002, translated by
		Azmoon 2011)		Abbasi et al.	Khalaji and Khajou
				2018(1382)

A Jumping over the ine (paired and single leg) Passing the ball (ground and shapes on paper and basket on paper and play-Doh, respectively (Moradi et al. 2015) Cossing and (Kathleen M. Sun Saluration Yoga (Beck 2015) (Moradi et al. 2015) (Kathleen M. (Sheikh et al. 2019) (Beck 2015) * Hopping in plastic rings Naming of body parts by (Payne and Isaas 2002, translated Pointing in different incertions by the tester (Kashi et al. 2018) Hand rings Multi-circuit movements * Hopping plastic rings the tester (Kashi et al. 2018) Noving by the subject Hand rings Multi-circuit movements * Yoga pose(Angel (Hadavi et al. 2017) Zigzag running (Kashi et al. 2018) Playing with grometric shapes Jumping to both sides of the clapping at the same time (Becigi and Pirzadi 2017) Sun Salutation Yoga (Beck 2015) * Yoga pose(Angel (Kashi et al. 2018) Zigzag running (Becigi and Pirzadi 2017) Jumping to both sides of the clapping at the same time (Becigi and Pirzadi 2017) Sun Salutation Yoga (Beck 2015) * Yoga pose(Chapel (Kashi et al. 2017) Throwing balls of (Cashi et al. 2018) Gym Ball Pirzadi 2017) -Dumbbell shoulder press * Mini- toes-heels (Kashi et al. 2015) Throwing balls of (Calaho & Cashi et al. 2016) Gym Bal	<u>Research</u>	article	Journal of Sp	orts Physiology and	<u>Athletic Conditi</u>	oning. 2025; 5 (15): 11
line (paired and single leg)(ground and air)shapes on paper and Play-Doh, respectively simultaneously imultaneously (Moradi et al. 2015)(Kathleen M. (Kathleen M. 2009)(Sheikh et al. 2019)Catching thrown ball (Abbasi et al. 2018)(Beck 2015)1Hopping in plastic ringsNaming of body parts by body parts by directions by the tester (Mathaji and by Khalaji and moving by the subjectPointing in different directions by the tester (Nikbakh12020) direction (Kashi et al. 2018)Multi-circuit movements (Hashemi, Hamayat Talab 2015)1Yoga pose(Angel pose) (Hadavi et al. 2017)Zigzar runing (Kashi et al. 2018)Playing with direction (Kashi et al. 2018)Jumping to both safes of the same time (Rigi and pose) (Rashi et al. 2017)Single of the same time (Kashi et al. 2018)Sin Salutation Yoga (Beck 2015)1Yoga pose(Angel (Kashi et al. 2017)Zigzar runing (Kashi et al. 2018)Playing with (Sif 2014)Jumping to both same time (Rigi and Pirzadi 2017)Sin Salutation Yoga (Beck 2015)1Walking on toes-heels (Kathleen M. Aramaizode, Aslankhari 200Mini- (Bachade)Throwing balls of (Glahade et al.2017)Orawing and different sizes in al.2016)Orawing al (Quasemi et al.2012)1Walking on (Galaho & (Galaho & (Calaho & (Calaho & (Arabi et al. (Aslankhari 200)Starting and stopping (Gane (Aliai et al. 2016)Drawing al (Carbi et al. (Carbi et al. (Carbi et al. (Carbi et al. (Carbi et al. (Carbi et al. 	٨	Jumping over the	Passing the ball	Drawing and making	Crossing an	Sun Salutation Yoga
single leg) air) Play-Doh, respectively simultaneously (Beck 2015) (Moradi et al. 2015) (Kathleen M. Haywood (Sheikh et al. 2019) catching a thrown ball (Abbasi et al. 2018) Multi-circuit • Hopping in plastic rings Naming of body parts by Pointing in different directions by the tester Hand rings Multi-circuit • Hopping in plastic rings Naming of body parts by Pointing in different Hand rings Multi-circuit • Hopping in plastic rings Naming of body parts by Pointing in different Hand rings Multi-circuit • moving in the same - - Talab 2015) • moving in the same - - - • Voga posc(Angel (Radwi et al. 2018) Zigzag running gemetric shapes Sides of the same time Poses - (Hadwi et al. 2017) (Kashi et al. 2018) Cistacles (Sif 2014) rope and Pirzad12017) Obstacles (Beck 2015) • - - - - - - 10 Walking on Mini- Throwing balls of Gifferent sizes in Fose-heels Gashatet al. 2015) - </th <th></th> <th>line (paired and</th> <th>(ground and</th> <th>shapes on paper and</th> <th>obstacle and</th> <th>Poses</th>		line (paired and	(ground and	shapes on paper and	obstacle and	Poses
(Moradi et al. 2015) (Kathleen M. 2009) (Sheikh et al. 2019) catching a thrown ball (Abbasi et al. 2018) Mepping in plastic rings (Payne and Isaacs (Payne and Isaacs) Naming of body parts by divections by the tester, (Payne and Isaacs) Pointing in dilTerent directions by the tester, and the subject moving in the same direction (Kashi et al. 2018) Haud inos (Nikbakh2020) Multi-circuit movements (Hashemi, Hamayat Talab 2015) Merica (Payne and Isaacs) the tester, touching and moving by the subject 2002, translated 2018) Haud inos direction (Kashi et al. 2018) Multi-circuit moving in the same direction (Kashi et al. 2018) Numping to both sides of the same time (Beigi and Prizadi 2017) Making on tocs-hecls Mini- diribing and diribing and different directions Jumping to both sides of the same time (Beigi and Prizadi 2017) Sum Salutation Yoga (Babadi et al. 2018) Making on tocs-hecls Mini- basketball Throwing balls of different directions Gym Ball Prizadi 2016) -Dumbbell shoulder press Makiken M dribbing and different directions (Babadi et al. 2016) -Dumbbell shoulder press Makanalananopoi Asiankhani 2009) Starting and stopping al. 2015) Drawing a different directions Yoga poses(tree, butterfly, cat) Makanalananopoi Animal disternt -Starting and stopping distert al. 2015) Drawing a dimulaneously Yoga poses(tree,		single leg)	air)	Play-Doh, respectively	simultaneously	(Beck 2015)
2015) Haywood thrown ball (Abbasi et al. 2018) 4 Hopping in Naming of body parts by (Payne and Isaacs) Pointing in different directions by the tester, and the subject Hand rings Multi-circuit 10 (Payne and Isaacs) touching and moving in the same Image: Circuit Abbasi et al. 2018) Multi-circuit 2002, translated touching and moving in the same Image: Circuit Abbasi et al. 2018) Talab 2015) 5 Khajou 1382) subject 2018) Jumping to bodh Sun Salutation Yoga 9080 through geometric shapes sides of the same (Begi and Pirzad) 2017) Poses Poses (Hadavi et al. 2017) (Kashi et al. 2018) 2018) Jumping to bodh sides of the same (Begi and Pirzad) 2017) Poses 11 Walking on toes-heels basketball different sizes in (Kathleen M. difbbing and different sizes in (Kathleen M. dibbing and Astacle (Valini et al. 2016) 2016) -Dumbbell shoutder press 13 Walking on Animal Astankhari 2015) -Starting and stopping at the tire with whiste if al. 2016) -Dumbbell leg squat ifferent directions -Dumbbell leg squat ifferent directions 14 Walking on Animal Abstacle		(Moradi et al.	(Kathleen M.	(Sheikh et al. 2019)	catching a	
1 Hopping in plastic rings Naming of body parts by directions by the tester (Payne and Isaacs (Payne and Isaacs by Khalaji and by Khalaji and by Khalaji and moving by the khajou 1382) Pointing in different directions by the tester and the subject (Kashi et al. 2018) Hand rings (Nikbakh2020) Multi-circuit movements (Hashemi, Hamayat Talab 2015) V Yoga pose(Angel (Kashi et al. 2018) 2018) Jumping to both sides of the same time (Hadavi et al. 2018) Sun Salutation Yoga (Beck 2015) V Yoga pose(Angel (Hadavi et al. 2017) Zigzag running (Kashi et al. 2018) Playing geometric shapes Jumping to both sides of the same time (Beigi and Pirzaci 2017) Sun Salutation Yoga (Beck 2015) V Yoga pose(Angel (Hadavi et al. 2018) Throwing balls of different sizes in toes-heels Gym absketball Gym absketball Jumbbell shoulder press V Walking on toes-heels Mini- toes-heels Throwing balls of al. 2015) Gym absketball Gym absketball Gifferent directions (Babai et al. 2016) -Dumbbell shoulder press Translators, obstacle Iobakude time al. 2015) Iomaer al. 2015) Iomaer al. 2015) Iomaer al. 2015) V Standing on floated Car tire (Galaho & Initation Animal -Starting and stopping iranslators, Sarzmand, (Alisi et al., Viranslators, Sarzmand, (Alisi et al., Viranslators, Sarzmand, (Alisi et al., Viranslators, Sarzmand,		2015)	Haywood		thrown ball	
Image: second			2009)		(Abbasi et al.	
Numing Numing Pointing in different plastic rings Naming Pointing in different directions by the tester and the subject Hand rings (Nikbakhl2020) Multi-circuit movements 2002, translated by Khalaji and Khajou 1382) touching and moving by the subject and the subject (Nikbakhl2020) (Hashemi, Hamayat 1 Yoga pose(Angel (Hadavi et al. 2017) Zigzag running through pose) Playing utrough geometric shapes Jumping to both sides of the same time (Beigi and Pirzadi 2017) Sun Salutation Yoga Poses 1 Walking on Kathleen M. Translators, Namazizadeh, Aslankhani 2009) Mini- dirboling and different sizes in al. 2015) Jumping to both saketball Sun Salutation Yoga Poses 1 Walking on (Kathleen M. Translators, Namazizadeh, Aslankhani 2009) Mini- different sizes in al. 2015) Jumping to both sides of different directions Sun Salutation Yoga Poses 1 Standing on floated Car tire (Galaho & Dimato Mini- different al. 2015) Throwing balls of different directions Grawing a circle Poumbbell leg squat -Langes 1 Standing on floated Car tire (Galaho & Dimato Animal (Alisi et al., (Alisi et					2018)	
plastic ringsbody parts by the tester, 2002, translatedbody parts by the tester, and the subject(Nikbakh12020) (Hashemi, Hamayat Talab 2015)2002, translatedtouching and moving by the direction (Kashi et al. Khajou 1322)moving by the direction (Kashi et al. 2018)Talab 2015)W Yoga pose(Ange)Zigzag running UroughPlaying geometric shapesJumping to both sides of the geometric shapesSun Salutation Yoga (Beck 2015)WYoga pose(Ange)Zigzag running UroughPlaying geometric shapesJumping to both sides of the geometric shapesSun Salutation Yoga (Beck 2015)2017)(Kashi et al. 2017)(Kashi et al. 2018)(Sif 2014)Sun Salutation Yoga (Beck 2015)MWalking on toes-heelsMini- basketballThrowing balls of different sizes in altiferent sizes in (Kathleen M. Translators, obstacleGym (Valinia et al. 2016)Jumbell shoulder ExercisesMStanding on (Galaho & (Galaho & (Cashi et al. 2007)Starting and stopping signalDrawing a toreYoga poses(tree, butterfly, cal) signalMStanding on (Galaho & (Galaho & (Cashi et al. (Alisi et al., (Alisi et al., (Arabia et al., (A	٩	Hopping in	Naming of	Pointing in different	Hand rings	Multi-circuit
(Payne and Isaacs 2002, translated by Khalaji and Khajou 1382)the tester, touching and moving by the subjectand the subject moving in the same direction (Kashi et al. 2018)(Hashemi, Hamayat Talab 2015)Marker Pose2018)2018)Impring to both sides of the pose)Sun Salutation Yoga sides of the pose)Marker (Hadavi et al. 2017)Zigzag ranning (Kashi et al. 2018)Playing geometric shapesJumping to both sides of the poseSun Salutation Yoga (Beck 2015)2017)(Kashi et al. 2018)(Sif 2014)Drawing at the same time (Beigi and Dirzadi 2017)MWalking on toes-heelsMini- basketballThrowing balls of different sizzes in different sizzes in (Kathleen M. Translators, Aslankhani 2009)Orsing (Baghandeh et al. 2015)CymBall ExercisesMStanding on (Kathleen M. dribbling and different directions al. 2015)Animal signalStarting and stopping signalDrawing a simultancously (Galaho & (Galaho & (Galaho & (Gialaho & (Gialaho & (Gialaho & (Gialaho & (Gialaho & (Alisi et al. (Gialaho & (Alisi et al. (Alisi et al. (Alisi et al. (Alisi et al. (Gialaho & (Alisi et al. (Alisi et al. (Alisi et al. (Alisi et al. (Alisi et al. (Cimer-Reini, (Siavoshi 2015)Drawing a (Werner-Reini, (2019)Voga poses(tree,		plastic rings	body parts by	directions by the tester	(Nikbakht2020)	movements
2002, translated by Khalaji and Khajou 1382)touching and moving by the direction (Kashi et al. 2018)moving in the same direction (Kashi et al. 2018)Talab 2015)N- Pose)Zigzag running (Kashi et al. 2018)Playing with geometric shapesJumping to both sides of the rope and clapping at the same time (Beck 2015)Sun Salutation Yoga (Beck 2015)N- (Hadavi et al. 2017)Obstacles(Sif 2014)Jumping to both sides of the rope and (Beck 2015)Sun Salutation Yoga (Beck 2015)N (Hadavi et al. 2017)Mini- basketballThrowing balls of different sizes in different sizes in (Katheen M. Translators, ObstacleGrum Ball (Calinb and different directions different directions (Valinia et al. 2016)Orumobell shoulder pressN (Ratheen M. (Kathean M. dibbling and floated Car tire (Galaho & (Cossing Aslankhani 2009)Mini- dighandeh et al. 2015)Throwing balls of (Valinia et al. 2016)Grum Ball (Calabi & (Calabi & (Calabi & (Calabi & (Calabi & (Calaba & (Clinbing inside the (Calaba & (Calaba & (Calaba & (Calaba & (Calaba & (Calaba & (Canoo 2011((Canoo 2011((Canoo 2011((Calab & (Calaba & (Calaba & (Calaba & (Calaba & (Calaba & (Clinbing inside the (Calaba & (Clinbing inside the <th></th> <th>(Payne and Isaacs</th> <th>the tester,</th> <th>and the subject</th> <th></th> <th>(Hashemi, Hamayat</th>		(Payne and Isaacs	the tester,	and the subject		(Hashemi, Hamayat
by Khalaji and moving by the direction (Kashi et al. 2018) Lange Khajou 1382) subject 2018) Lange V Yoga pose(Angel Zigzag running through Playing with geometric shapes Jumping to both 		2002, translated	touching and	moving in the same		Talab 2015)
Khajou 1382) subject (Kashi et al. 2018) 2018) Iumping Loboth (Kashi et al. 2018) Jumping to both geometric shapes Sun Salutation Yoga Poses (Hadavi et al. 2017) obstacles (Sif 2014) rope and clapping at the same time Beck 2015) 2017) (Kashi et al. 2018) 2018) Iumping to both geometric shapes Beck 2015) 10 (Kashi et al. 2017) 2018) Iumping balls Clapping at the same time 2018) 1 Throwing balls of toes-heels Gym Ball -Dumbbell shoulder N Walking on toes-heels different sizes in basketball Gifferent directions (Babadi et al. 2016) -Dumbbell shoulder Namazizadeh, Aslankhani 2009 (Baghandeh et al. 2015) Starting and stopping Drawing a the tire with whistle Yoga poses(tree, butterfly, cat) M Standing on floated Car tire (Galabo & Imitation Movement the tire with whistle circle butterfly, cat) Ozmoon 20116 Game -Climbing inside the (Alisi et al., translated by (Werner-Reini, Zaivashi 2014) 2019) (Beck et al. 2015) Variabaei Nia 2014) Siavashi 2015) translators, Sazmand, Tabatabaei Nia 2014) Zuity Lunges		by Khalaji and	moving by the	direction (Kashi et al.		
N Yoga pose(Angel pose)Zigzag running through obstaclesPlaying geometric shapesJumping to both sides of the clapping at the same timeSun Salutation Yoga Poses(Hadavi et al. 2017)obstacles (Kashi et al. 2017)(Kashi et al. 2018)(Sif 2014)rope and (Beigi and Pirzadi 2017)M Walking on toes-heelsMini- basketballThrowing balls of different sizes in different sizes in (Kathleen M. Aslankhani 2009)Gym (Baghandeh et al. 2015)-Dumbbell shoulder pressMStanding on toes-heelsMinial obstacle(Valinia et al. 2016)2016)-Lunges (Qasemi et al. 2012)MStanding on (Kathleen M. (Kathleen M. Translators, (Gaghandeh et al. 2015)Starting and stopping signalDrawing er circleYoga poses(tree, butterfly, cat)MStanding on (Galaho & (Galaho & (Aisi et al., (Kaisi et al., (Kemer-Reini, (Kaisi et al., (Kemer-Reini, (Kaisi et al., (Kaisi et al., (Kaisi et al., (Kaisi et al., (Kemer-Reini, (Kemer-Reini, (Kaisi et al., (Kaisi et al., (Kaisi et al., (Kemer-Reini, (Kemer-Reini, (Kaisi et al., (Kaisi et al., (Kaisi et al., (Kemer-Reini, (Kaisi et al., (Kaisi et al., (Kaisi et al., (Kemer-Reini, (Kaisi et al., (Kemer-Reini, (Kaisi et al., 		Khajou 1382)	subject	2018)		
Voga pose(Angel pose)Zigzag running through obstaclesPlaying geometric shapesJumping to both sides of the clapping at the same time (Beigi and Pirzadi 2017)Sun Salutation Yoga PosesVWalking on toes-heelsMini- basketballThrowing balls of different sizes in altiferent sizes in toes-heelsGymBall toes-heels-Dumbbell shoulder pressVStanding on floated Car tire (Galaho & InitationMinial tire-Throwing and tire with whistle signalDrawingA toes-loe toes-heelsOstacle tiferent sizes in tiferent directionsBabadi et al. (Calinia et al. 2016)-Dumbbell shoulder pressVStanding on floated Car tire (Galaho & (Galaho & (Alisi et al., translated by (Alisi et al., translators, Sazmand, tireDrawing tireYoga poses(tree, butterfly, cat)VStanding on floated Car tire (Galaho & (Alisi et al., translated by (Alisi et al., translators, Sazmand, tireDrawing translators, simultaneouslyYoga poses(tree, butterfly, cat) simultaneouslyVStanding on (Alisi et al., tire-Climbing inside the (Marbie tal. (Arabi et al. 2019)Yoga poses(tree, butterfly, cat)VStanding on (Alisi et al., translatod by Siavoshi 2015)-Climbing inside the tire(Arabi et al. (Arabi et al. 2019)Yoga poses(tree, butterfly, cat)VStanding on (Alisi et al., translatod by Siavoshi 2015)(Werner-Reini, Tabatabaei Nia 2014)Z019)			(Kashi et al.			
Yoga pose(Angel pose)Zigzag running through (Hadavi et al. 2017)Zigzag running through (Kashi et al. 2018)Playing geometric shapesJumping to both sides of the rope and clapping at the same time (Beigi and Pirzadi 2017)Sun Salutation Yoga PosesNWalking on toes-heelsMini- basketballThrowing balls of different sizes in attifferent sizes in (Kathleen M. Translators, Namazizadeh, crossingMini- clapping at different directionsGym (Babadi et al. 2016)Ball -Dumbbell shoulder pressYStanding on Ifoated Car tire (Galaho & C Dzmoon 2011(Siavoshi 2015)Animal (Alisi et al., translators, Sazmand, (Alisi et al., translated by (Werner-Reini, Siavoshi 2015)Drawing a (Arabi et al. 2019)Yoga poses(tree, butterfly, cat) (Beck et al. 2015)			2018)			
pose)throughgeometric shapessides of the ropePoses(Hadavi et al. 2017)obstacles(Sif 2014)ropeand clapping at the same time(Beck 2015)2017)(Kashi et al. 2018)2018)(Beigi and Pirzaci 2017)(Beigi and Pirzaci 2017)NWalking on toes-heelsMini- basketballThrowing balls of different sizes in different directionsGymBall (Babadi et al. 2016)-Dumbbell shoulder pressNMamazizadeh, ronssingcrossing(Valinia et al. 2016)2016)-Lunges (Qasemi et al. 2012)NStanding on floated Car tire (Galaho & ImitationAnimal-Starting and stopping signalDrawing a simultaneouslyYoga poses(tree, butterfly, cat)NStanding on (Galaho & (Alisi et al., translated by (Casemi et al., (Alisi et al., translated by (Alisi et al., translated byClimbing inside the tireDrawing a (Arabi et al. (Arabi et al.Yoga poses(tree, butterfly, cat)NStanding on (Galaho & (Alisi et al., translated by (Siavoshi 2015)-Climbing inside the tireSimultaneously (Arabi et al.(Beck et al. 2015)NSiavoshi 2015 (Siavoshi 2015)(Werner-Reini, translators, Sazmand, translated bi (Alasi et al., translater bia 2014)2019)Intervet	١٠	Yoga pose(Angel	Zigzag running	Playing with	Jumping to both	Sun Salutation Yoga
(Hadavi et al. 2017) obstacles (Kashi et al. 2018) (Sif 2014) rope and clapping at the same time (Beck 2015) 1 2018) (Rashi et al. 2018) 2018) (Beigi and Pirzai 2017) 1 Walking on toes-heels Mini- Throwing balls of different sizes in different sizes in toes-heels Gym Ball obstacle -Dumbbell shoulder press Namazizadeh, Aslankhani 2009 obstacle (Valinia et al. 2016) 2016) -Lunges (Qasemi et al. 2012) N Standing on floated Car tire (Galaho & Imitation -Starting and stopping signal Drawing a signal Yoga poses(tree, butterfly, cat) Ozmon 2011(Game Game -Climbing inside the tire (Arabi et al. (Arabi et al. 2019) Voga poses(tree, butterfly, cat) Siavoshi 2015) Siavoshi 2015) (Werner-Reini, Tanslators, Sazmand, Tanslators, Sazmand, Tanslator, Sazmand, 2019)		pose)	through	geometric shapes	sides of the	Poses
2017)(Kashi et al. 2018)clapping at the same time2018)2018)(Beigi and Pirzadi 2017)NWalking on toes-heelsMini- basketballThrowing balls of different sizes in (Kathleen M. Translators, ObstacleGymBall (Babadi et al. 2016)-Dumbbell shoulder pressNamazizadeh, Aslankhani 2009)crossing (Baghandeh et al. 2015)(Valinia et al. 2016)2016)-Lunges (Qasemi et al. 2012)NStanding on floated Car tire (Galaho & (Galaho & (Alisi et al., (Alisi et al., 		(Hadavi et al.	obstacles	(Sif 2014)	rope and	(Beck 2015)
2018)2018)same time (Beigi and Pirzadi 2017)NWalking on toes-heelsMini- basketballThrowing balls of different sizes in different directionsGymBall Exercises-Dumbbell shoulder press(Kathleen M. (Kathleen M. Translators, Namazizadeh, Aslankhani 2009)different directions (Valinia et al. 2016)(Babadi et al. 2016)-Dumbbell leg squat -Lunges (Qasemi et al. 2012)MStanding on floated Car time (Galaho & Ozmoon 2011(Animal-Starting and stopping signalDrawing a simultaneously (Mermer-Reini, (Arabi et al. 2019)Yoga poses(tree, butterfly, cat) (Beck et al. 2015)MGame (Alisi et al., timaslated by Siavoshi 2015)Commer-Climbing inside the translators, Sazmand, Tabatabaei Nia 2014)With both hands (Arabi et al.		2017)	(Kashi et al.		clapping at the	
Marking on Mini- Throwing balls of Gym Ball -Dumbbell shoulder N Walking on Mini- Throwing balls of Gym Ball -Dumbbell shoulder itoes-heels basketball different sizes in Exercises press (Kathleen M. dribbling and different directions (Babadi et al. -Dumbbell leg squat Translators, obstacle (Valinia et al. 2016) 2016) -Lunges Namazizadeh, crossing crossing ulter in with with site -Lunges Aslankhani 2009 (Baghandeh et al. 2015) yroga poses(tree, butterfly, cat) floated Car trie Movement the tire with whistle circle butterfly, cat) (Galaho & Imitation signal simultaneously (Beck et al. 2015) Ozmoon 2011(Game -Climbing inside the with both hands (Arabi et al. (Alisi et al., tire (Arabi et al. 2019) Siavoshi 2015) translators, Sazmand, Siavoshi 2015) Siavoshi 2015) translatos Na 2014) U U U			2018)		same time	
NWalking on toes-heelsMini- basketballThrowing balls of different sizes in different sizes in (Kathleen M. Translators, Namazizadeh, al 2015)Throwing balls of different directions (Valinia et al. 2016)Gym Ball (Babadi et al. 2016)Jumbbell shoulder pressNMini- toes-heelsdifferent directions obstacle(Babadi et al. 2016)-Dumbbell leg squat -LungesTranslators, Aslankhani 2009)obstacle (Baghandeh et al. 2015)(Valinia et al. 2016)2016)-Lunges (Qasemi et al. 2012)NStanding on floated Car tire (Galaho & Ozmoon 2011(Siavoshi 2015)-Starting and stopping signalDrawing a simultaneously (Beck et al. 2015)Yoga poses(tree, butterfly, cat)NStanding on floated Car tire (Galaho & imitation-Climbing inside the (Karbi et al. (Alisi et al., tirewith both hands (Arabi et al.(Alisi et al., Siavoshi 2015)translators, Sazmand, Tabatabaei Nia 2014)2019)Interton (Arabi et al.					(Beigi and	
M Walking on toes-heels Mini- basketball Throwing balls of different sizes in different sizes in Gym Ball -Dumbbell shoulder press (Kathleen M. Translators, Namazizadeh, Aslankhani 2009) dribbling and obstacle different directions (Babadi et al. 2016) -Dumbbell leg squat Mamazizadeh, Aslankhani 2009) (Baghandeh et al. 2015) (Valinia et al. 2016) 2016) -Lunges M Standing on floated Car tire Animal -Starting and stopping Drawing a Yoga poses(tree, butterfly, cat) Ozmoon 2011(Game -Climbing inside the (Alisi et al., translators, Sazmand, Tabatabaei Nia 2014) Z019) (Beck et al. 2015)					Pirzadi 2017)	
toes-heelsbasketballdifferent sizes in different directionsExercisespress(Kathleen M.dribbling anddifferent directions(Babadi et alDumbbell leg squatTranslators,obstacle(Valinia et al. 2016)2016)-LungesNamazizadeh,crossingImage(Qasemi et al. 2012)(Qasemi et al. 2012)Aslankhani 2009(Baghandeh et al. 2015)ImageImageImageMStanding onAnimal-Starting and stoppingDrawing a simultaneouslyYoga poses(tree, butterfly, cat)M(Galaho & (Galaho & (Alisi et al., (Alisi et al., Siavoshi 2015)ImageImageImageImage(Alisi et al., (Alisi et al., Siavoshi 2015)(Werner-Reinin, Tabatabaei Nia 2014)2019)Image	11	Walking on	Mini-	Throwing balls of	Gym Ball	-Dumbbell shoulder
(Kathleen M.dribbling anddifferent directions(Babadi et alDumbbell leg squatTranslators,obstacle(Valinia et al. 2016)2016)-LungesNamazizadeh,crossingII(Qasemi et al. 2012)Aslankhani 2009)(Baghandeh etIIIal. 2015)IIIIYStanding onAnimal-Starting and stoppingDrawing aYoga poses(tree,floated Car tireMovementthe tire with whistlecirclebutterfly, cat)(Galaho &Imitationsignalsimultaneously(Beck et al. 2015)Ozmoon 2011(Game-Climbing inside thewith both handsI(Alisi et al.,tire(Arabi et al.2019)ISiavoshi 2015)translators, Sazmand,2019IIJTabatabaei Nia 2014)IIII		toes-heels	basketball	different sizes in	Exercises	press
Translators, Namazizadeh, Aslankhani 2009)obstacle crossing (Baghandeh et al. 2015)(Valinia et al. 2016)2016)-Lunges (Qasemi et al. 2012)MStanding on Alizated Car tire(Baghandeh et al. 2015)-Starting and stopping the tire with whistle signalDrawing a circleYoga poses(tree, butterfly, cat)MStanding on (Galaho & Imitation-Starting and stopping signalDrawing a simultaneouslyYoga poses(tree, butterfly, cat)Ozmoon 2011(Siavoshi 2015)Game 		(Kathleen M.	dribbling and	different directions	(Babadi et al.	-Dumbbell leg squat
Namazizadeh, Aslankhani 2009)crossing (Baghandeh et al. 2015)(Qasemi et al. 2012)NStanding on floated Car tireAnimal-Starting and stopping the tire with whistle signalDrawing a circleYoga poses(tree, butterfly, cat)(Galaho & (Galaho & ImitationImitationsignalsimultaneously with both hands(Beck et al. 2015)Ozmoon 2011(ImitationGame (Alisi et al., tire-Climbing inside the (Merner-Reini, 2019)with both hands(Alisi et al., Siavoshi 2015)translators, Sazmand, Tabatabaei Nia 2014)2019)Imitation		Translators,	obstacle	(Valinia et al. 2016)	2016)	-Lunges
Aslankhani 2009)(Baghandeh et al. 2015)Image: Construct of the second		Namazizadeh,	crossing			(Qasemi et al. 2012)
Ifal. 2015)Image: starting and stopping of floated Car tireAnimal-Starting and stopping of the tire with whistleDrawing aYoga poses(tree, butterfly, cat)If floated Car tireMovementthe tire with whistlecirclebutterfly, cat)(Galaho &Imitationsignalsimultaneously(Beck et al. 2015)Ozmoon 2011(Game-Climbing inside thewith both hands(Alisi et al.,tire(Arabi et al.translated by(Werner-Reini,2019)Siavoshi 2015)translators, Sazmand,LTabatabaei Nia 2014)LL		Aslankhani 2009)	(Baghandeh et			
Y*Standing on floated Car tire (Galaho & Ozmoon 2011(Animal Movement-Starting and stopping the tire with whistle signalDrawing circleYoga butterfly, cat)Ozmoon 2011((Alisi et al., translated by Siavoshi 2015)Game tire-Climbing inside the (Merner-Reini, Tabatabaei Nia 2014)With both hands (Arabi et al.(Beck et al. 2015)			al. 2015)			
floated Car tireMovementthe tire with whistlecirclebutterfly, cat)(Galaho &Imitationsignalsimultaneously(Beck et al. 2015)Ozmoon 2011(Game-Climbing inside thewith both hands(Alisi et al.,tire(Arabi et al.translated by(Werner-Reini,2019)Siavoshi 2015)translators, Sazmand,ImitationTabatabaei Nia 2014)ImitationImitation	١٢	Standing on	Animal	-Starting and stopping	Drawing a	Yoga poses(tree,
(Galaho &Imitationsignalsimultaneously(Beck et al. 2015)Ozmoon 2011(Game-Climbing inside thewith both hands(Alisi et al.,tire(Arabi et al.translated by(Werner-Reini,2019)Siavoshi 2015)translators, Sazmand,Imit an		floated Car tire	Movement	the tire with whistle	circle	butterfly, cat)
Ozmoon 2011(Game-Climbing inside thewith both hands(Alisi et al.,tire(Arabi et al.)translated by(Werner-Reini,2019)Siavoshi 2015)translators, Sazmand,Image: Climbing inside		(Galaho &	Imitation	signal	simultaneously	(Beck et al. 2015)
(Alisi et al.,tire(Arabi et al.)translated by(Werner-Reini,2019)Siavoshi 2015)translators, Sazmand,1Tabatabaei Nia 2014)11		Ozmoon 2011(Game	-Climbing inside the	with both hands	
translated by(Werner-Reini, Siavoshi 2015)2019)Siavoshi 2015)translators, Sazmand, Tabatabaei Nia 2014)–			(Alisi et al.,	tire	(Arabi et al.	
Siavoshi 2015) translators, Sazmand, Tabatabaei Nia 2014)			translated by	(Werner-Reini,	2019)	
Tabatabaei Nia 2014)			Siavoshi 2015)	translators, Sazmand,		
				Tabatabaei Nia 2014)		

Table 2- Type 2 Activities (30 minutes)

Fine motor skills Social-emotional skills Cognitive skills

Sessions	Movement	Lateral	Spatial and temporal	Perceptual-	Strength, power,
	and	dominance and	perception, hearing,	motor skills	agility, flexibility
	manipulation	body	shape perception, and	Coordination	
		recognition	orientation	and stereotyped	
		Static and		behaviors	
		dynamic			
		balance			
1	Walking in the	Rolling a ball	Passing over and under	All-hand	Vertical jump and
	Footsteps of	on the ground	obstacles	walking (knees	hitting the ball
	the Alphabet	(Galaho,	(Galaho, Azmoon	not on the	(Sheikh et al., 2019)
	(Ahmadi, Be	Azmoon 2011)	2011)	ground)	
	Pajouh 2016)			(Abbasi et al.	
				2018)	
2	Jumping pairs	Running	Stepping inside the	Winding a	Sun Salutation Yoga
	within a square	through circles	ladder	thread around a	Poses
	(Kashi et al.	(Emami et al.	(Werner-Reini,	spool while	(Beck 2015)
	2018)	2018)	translators, Sazmand,	walking	
			Tabatabaeinia 2014)	(Abbasi,	
				Ebrahimpour	
				2017)	
3	Hopping	Catching the	Drawing shapes on the	Making	Running through
	through the	ball and	board by indicating	Bubbles and	obstacles and
	obstacles	moving the ball	their direction	Chasing Them	moving sandbags
	(Galaho,	with the other	(Sheikh et al., 2019)	(Baghandeh et	(Sheikh et al., 2019)
	Azmoon	hand		al. 2015)(
	2011)	Kayhani,			
		Kaushari			
		2013)			
4	Stork	Dribbling the	Running and kicking,	Plastic Ring	Hitting a Medicine
	Movement	ball through	to a ball thrown by the	Game	Ball
	(with eyes	the cones and	tester	(Werner-Reni,	(Kashi et al. 2018)
	open and	shooting	(Galahou, Test 2011)	Translators,	
	closed)			Sazmand,	

Research	article	Journal of	<u>f Sports Physiology ar</u>	<u>nd Athletic Conc</u>	<u>litioning. 2025; 5 (</u>
	(Matrin,	(dominant		Tabatabaeinia	
	Dirjitkar	foot)		2014)	
	2018)	(Moradi et al.			
		2017)			
5	Moving in a	-Opening and	Running and standing	Jumping and	Sun Salutation Yoga
	straight line	closing the	with whistle signal	Clapping	poses
	backwards and	lock	(Kashi et al. 2018)	Abbasi,	(Beck 2015)
	sideways	-Passing a hat		Ebrahimpour	
	(Najafabadi et	(Pir Ali et al.		2017)	
	al., 2018)	2020)			
6	Jump with	Throwing a	Chasing a Pendulum	Badminton	Tug of war
	rotation	ball towards a	Ball with the Eye	service (Isaac	(Moradi et al. 2015)
	(Abbasi et al.	basketball	(Werner-Reini,	2005)	
	2018)	hoop (with	Translators, Sazmand,		
		eyes open and	Tabatabai Nia 2014)		
		closed) (Kashi			
		et al. 2013)(
7	Voga	Hitting the ball	The subject and the	Catching the	Passing the ball
/	Novoment	with a golf club	tastar strike each other	ball batwaan	dribbling and
	(Trac)	(dominant	with two sticks	the lass and	nessing the hell
	(Tree)	(dominant	(Shailh at al. 2010)	ine legs and	(Deems and Leases
	(Beck et al.	nand)	(Sneikn et al. 2019)	jumping with	(Payne and Isaacs
	2015)	(Galano,		the feet closed	2002, translated by
		Azmoon 2011)		Abbasi et al.	Khalaji and Khajou
				2018(1382)
8	Jumping over	Passing the	Drawing and making	Crossing an	Yoga pose (Tree)
	the line (paired	Ball (Ground	shapes on paper and	obstacle and	(Beck et al. 2015)
	and single leg)	and Air)	Play-Doh, respectively	simultaneously	
	(Moradi et al.	(Kathleen M.	(Sheikh et al. (2019)	catching a	
	2015)	Haywood		thrown ball	
		(2009)		(Abbasi et al.	
				(2018)	
9	Lying in	Naming of	Pointing in different	Hand rings	Multi-circuit
	plastic rings	body parts by	directions by the tester	(Nikbakht1399)	movements
	(Payne and	the tester,	and the subject		(Hashemi, Hamayat
	Isaacs 2002,	touching and	moving in the same		Talab (2015)
	translated by	moving by the	direction (Kashi et al.		
	Khalaji and	subject	2018)		
	Khajou (1382)				
	1	1			1

10 Yoga Zigzag running pose(Angel) Playing with geometric shapes Jumping to both sides of the clapping at the same time (Beck 2015)(Clapping at the 2017)(Sun Salutation Yoga Poses 10 Yoga Zigzag running geometric shapes (Sif 2014)((Sif 2014)(rope and Poses 2017)((Kashi et al. 2017)(Clapping at the same time (Beigi and Pirzadi 2017)((Beck 2015)((Beck 2015))(11 Walking on toes-heels Mini- basketball Throwing balls of different sizes in different directions Gym Ball -Dumbbell shoulder press 11 Walking on toes-heels Mini- basketball Throwing balls of different directions Gym Ball -Dumbbell shoulder press 12 Standing on a floated car (Galaho & Azmoon Animal -Starting and stopping signal Drawing a simultaneously Yoga poses (tree, butterfly, cat) 12 Standing on a floated car (Galaho & Azmoon Animal -Starting and stopping signal Drawing a simultaneously Yoga poses (tree, butterfly, cat) 12 Standing on a floated car (Galaho & Azmoon Animal -Starting and stopping signal Drawing a simultaneously Yog	<u>Research</u>	<u>article</u>	Journal of	<u>f Sports Physiology ar</u>	<u>nd Athletic Cona</u>	<u>litioning. 2025; 5 (1</u>
10Yoga pose(Angel) (Hadavi et al. 2017)(Zigzag running through obstacles (Sif 2014)(Jumping to both sides of the rope and clapping at the same time (Beigi and Pirzadi 2017)(Sun Salutation Yoga Poses (Beck 2015)((Beck 2015)((Beck 2015)) (Beck 2015)(11Walking on toes-heelsMini- basketball different sizes in different directions (Valinia et al. 2016)Gym (Babai et al. 2017)(Jumbbell shoulder press11Walking on toes-heelsMini- basketball different directions (Valinia et al. 2016)Gym (Babadi et al. 2016)(Jumbbell shoulder press12Standing on a floated car (Galaho & Azmoon (Galaho & Azmoon (Alisi et al., 2011))-Starting and stopping the tire with whistle signalDrawing a simultaneously with both hands (Arabi et al. 2019)Yoga poses (tree, butterfly, cat)12Standing on a floated car (Galaho & Azmoon (Alisi et al., 2011)-Starting and stopping translators, publisher, ranslators, publisher, ranslators, publisher, ranslators, publisher, ranslators, in translators, in translators, 			(Kashi et al.			
10Yoga pose(Angel) (Hadavi et al. 2017)(Zigzag running through obstacles (Kashi et al. 2018)Playing geometric shapes (Sif 2014)(Jumping to both sides of the rope and clapping at the same time (Beigi and Pirzadi 2017)(Sun Salutation Yoga Poses (Beck 2015)(11Walking on toes-heels (Kathleen M. (Kathleen M. Translators, obstacleMini- tobstacleThrowing balls of different sizes in (Valinia et al. 2016)Gym Exercises-Dumbbell shoulder press12Standing on a floated car (Galaho & Azmoon (Alisi et al., 2011)-Starting and stopping isignalDrawing a simultaneously (Werner-Reini, 2019)Yoga poses (tree, butterfly, cat)12Standing on a floated car basket ball (Galaho & Azmoon (Alisi et al., 2011)-Starting and stopping translators, publisher, rabatbaei Nia 2014)Drawing a simultaneously (Werner-Reini, 2019)Yoga poses (tree, butterfly, cat)			2018)			
pose(Angel) (Hadavi et al. 2017)(through obstacles (Kashi et al. 2018)geometric shapes (Sif 2014)(Capping at the same time (Beigi and Pirzadi 2017)(sides of the (Beck 2015)(Capping at the same time (Beigi and Pirzadi 2017)(Poses (Beck 2015)(Capping at the same time (Beigi and Pirzadi 2017)(11Walking on toes-heelsMini- basketballThrowing balls of different sizes in (Kathleen M. dribbling and ObstacleGym Capping at the same time (Babadi et al. 2016)(-Dumbbell shoulder press12Standing on a floated car (Galaho & Azmoon (Alisi et al., 2011)-Starting and stopping the tire with whistle signalDrawing a simultaneously with both hands (Arabi et al. 2019)Yoga poses (tree, butterfly, cat) (Beck et al. 2015)12Standing on a floated car (Galaho & Azmoon (Alisi et al., 2011)-Starting and stopping translators, publisher, car tireDrawing a (Arabi et al. (Arabi et al. 2019)Yoga poses (tree, butterfly, cat) (Beck et al. 2015)13Standing on a floated car (Alisi et al., Siavshi 2015)-Climbing inside the (Werner-Reini, Tabatabaei Nia 2014)Drawing a (Arabi et al. 2019)Yoga poses (tree, butterfly, cat) (Beck et al. 2015)	10	Yoga	Zigzag running	Playing with	Jumping to both	Sun Salutation Yoga
(Hadavi et al. 2017)(obstacles (Kashi et al. 2018)(Sif 2014)((Clapping at the same time (Beigi and Pirzadi 2017)(rope (Beigi and Pirzadi 2017)((Beck 2015)((Clapping at the same time (Beigi and Pirzadi 2017)(11Walking on toes-heelsMini- basketballThrowing balls of different sizes in (Kathleen M. Translators, obstacleGym Ball (Valinia et al. 2016)-Dumbbell shoulder press12Standing on a (Baghandeh et 2009)(Animal al. 2015)-Starting and stopping the tire with whistle signalDrawing circleYoga poses (tree, butterfly, cat)12Standing on a (Galaho & Azmoon (Alisi et al., 2011)Animal tanslators, publisher, ignalDrawing circleYoga poses (tree, butterfly, cat)12Standing on a (Galaho & Azmoon (Alisi et al., 2011)Animal translators, publisher, ignalDrawing circleYoga poses (tree, butterfly, cat)12Standing on a (Alisi et al., 2011)Animal translators, publisher, ignalDrawing simultaneouslyYoga poses (tree, butterfly, cat)12Standing on a (Alisi et al., 2011)Animal translators, publisher, ignalSimultaneously(Beck et al. 2015)13Galaho & (Alisi et al., 2011)Galaho By ignalGym ignalSimultaneously(Beck et al. 2015)14Journel (Journel (Alisi et al., 2011)Translators, publisher, ignalJournel ignalJournel ignalJournel ignal		pose(Angel)	through	geometric shapes	sides of the	Poses
2017)((Kashi et al. 2018) clapping at the same time same time 11 Walking on toes-heels Mini- Throwing balls of different sizes in (Kathleen M. Gym Ball -Dumbbell shoulder press 11 Walking on toes-heels Mini- Throwing balls of different sizes in (Kathleen M. Gym Ball -Dumbbell shoulder press 11 Manazizadeh, 2009)(obstacle (Valinia et al. 2016) (Babadi et al. 2016)(-Dumbbell leg squat 12 Standing on a floated car Animal -Starting and stopping signal Drawing a simultaneously Yoga poses (tree, butterfly, cat) 12 Standing on a floated car Movement the tire with whistle signal circle butterfly, cat) 12 Standing on a floated car Animal -Starting and stopping signal Drawing a simultaneously Yoga poses (tree, butterfly, cat) 12 Galaho & Game -Climbing inside the Azmoon (Alisi et al., 2011) car tire (Arabi et al. 2019) (Beck et al. 2015) 12 Siavoshi 2015) translators, publisher, 7 2019) Translators Poter second 2011		(Hadavi et al.	obstacles	(Sif 2014)(rope and	(Beck 2015)(
11 Walking on Mini- Throwing balls of Gym Ball -Dumbbell shoulder 11 Walking on Mini- Throwing balls of Gym Ball -Dumbbell shoulder 11 Walking on Mini- Throwing balls of Gym Ball -Dumbbell shoulder 11 Walking on different sizes in Exercises press 14 Kathleen M. dribbling and different directions (Babadi et al. -Dumbbell leg squat 15 Namazizadeh, crossing (Valinia et al. 2016) 2016) -Lunges 12 Standing on a Animal -Starting and stopping Drawing a Yoga poses (tree, 10ated car Movement the tire with whistle circle butterfly, cat) 12 Standing on a Game -Climbing inside the with both hands 12 Makine Galaho & Game -Climbing inside the with both hands 12 Standing on a Animal car tire (Arabi et al. 13 Galaho & Game -Climbing inside the idrabi et al.		2017)((Kashi et al.		clapping at the	
11 Walking on Mini- Throwing balls of Gym Ball -Dumbbell shoulder 11 Walking on Mini- Throwing balls of Gym Ball -Dumbbell shoulder toes-heels basketball different sizes in Exercises press (Kathleen M. dribbling and different directions (Babadi et al. -Dumbbell leg squat Translators, obstacle (Valinia et al. 2016) 2016)(-Lunges Namazizadeh, crossing (Rashandeh et 2009)(al. 2015) (Qasemi et al. 2012) 12 Standing on a Animal -Starting and stopping Drawing a Yoga poses (tree, butterfly, cat) 12 Standing on a Animal -Starting and stopping Drawing a Yoga poses (tree, butterfly, cat) 12 Standing on a Animal -Starting and stopping Drawing a Yoga poses (tree, butterfly, cat) 14 Initiation signal simultaneously (Beck et al. 2015) (Galaho & Game -Climbing inside the Azmoon with both hands Image (Arabi et al. 2011) translated b			2018)		same time	
Image: space s					(Beigi and	
11Walking on toes-heelsMini- basketballThrowing balls of different sizes in different sizes in (Kathleen M. Translators, obstacle Namazizadeh, 2009)(Throwing balls of different directions (Valinia et al. 2016)Gym Exercises (Babadi et al. 2016)(-Dumbbell shoulder press12Standing on a floated car (Galaho & Azmoon (Alisi et al., 2011)Animal the tire with whistle signal-Starting and stopping signalDrawing a circleYoga poses (tree, butterfly, cat)12Standing on a floated car (Galaho & Azmoon (Alisi et al., 2011)-Climbing inside the translators, publisher, Tabatabaei Nia 2014)Uwerner-Reini, (Arabi et al.2019)					Pirzadi 2017)(
toes-heelsbasketballdifferent sizes in different directionsExercisespress(Kathleen M.dribbling and dibbling anddifferent directions(Babadi et al. 2016)(-Dumbbell leg squat -LungesTranslators,obstacle(Valinia et al. 2016)2016)(-LungesNamazizadeh,crossingImageImage(Qasemi et al. 2012)Aslankhani(Baghandeh et 2009)(ImageImageImage2009)(al. 2015)ImageImageImage12Standing on a floated carAnimal-Starting and stopping signalDrawing a simultaneouslyYoga poses (tree, butterfly, cat)14(Galaho & AzmoonGame-Climbing inside the signalwith both hands (Arabi et al. 2011)Image15Siavoshi 2015)translators, publisher, Tabatabaei Nia 2014)2019)Image	11	Walking on	Mini-	Throwing balls of	Gym Ball	-Dumbbell shoulder
(Kathleen M.dribbling and obstacledifferent directions (Valinia et al. 2016)(Babadi et al. 2016)((Dasemi et al. 2012)Namazizadeh, Aslankhanicrossing (Baghandeh et 2009)(Image al. 2015)Image (Qasemi et al. 2012)12Standing on a floated car (Galaho & AzmoonAnimal (Movement-Starting and stopping isignalDrawing a simultaneouslyYoga poses (tree, butterfly, cat)12Standing on a floated carMovement (Mitationthe tire with whistle isignalcirclebutterfly, cat)13Galaho & (Galaho & (Galaho & AzmoonGame (Alisi et al., Siavoshi 2015)car tire (Merner-Reini, Tabatabaei Nia 2014)Yoga poses		toes-heels	basketball	different sizes in	Exercises	press
Translators, Namazizadeh, Aslankhaniobstacle crossing (Baghandeh et 2009)((Valinia et al. 2016) (Baghandeh et 2009)(-Lunges (Qasemi et al. 2012)12Standing on a floated car (Galaho & Azmoon (Alisi et al., 2011)-Starting and stopping the tire with whistle signalDrawing a circleYoga poses (tree, butterfly, cat)12Standing on a floated carAnimal-Starting and stopping signalDrawing a circleYoga poses (tree, butterfly, cat)12Standing on a floated carMovementthe tire with whistle signalCirclebutterfly, cat)13(Galaho & AzmoonGame-Climbing inside the car tirewith both hands (Arabi et al.(Beck et al. 2015)14Journal (Alisi et al., Siavoshi 2015)(Werner-Reini, Tabatabaei Nia 2014)2019)Image the second sec		(Kathleen M.	dribbling and	different directions	(Babadi et al.	-Dumbbell leg squat
Namazizadeh, Aslankhanicrossing (Baghandeh et 2009)((Baghandeh et al. 2015)(Qasemi et al. 2012)12Standing on a floated carAnimal-Starting and stopping signalDrawing a circleYoga poses (tree, butterfly, cat)12Standing on a floated carMovement imitation-Starting and stopping signalDrawing a simultaneouslyYoga poses (tree, butterfly, cat)12Galaho & GameGame-Climbing inside the circlesimultaneously (Beck et al. 2015)(Beck et al. 2015)13Galaho & Azmoon(Alisi et al., Siavoshi 2015)car tire(Arabi et al. 2019)(Beck et al. 2015)14Siavoshi 2015)translators, publisher, Tabatabaei Nia 2014)2011ImitationSiavoshi 2014)		Translators,	obstacle	(Valinia et al. 2016)	2016)(-Lunges
Aslankhani 2009)((Baghandeh et al. 2015)ImageImageImage12Standing on a floated carAnimal-Starting and stopping the tire with whistle signalDrawing a circleYoga poses (tree, butterfly, cat)12Standing on a floated carMovement Imitationthe tire with whistle signalDrawing a circleYoga poses (tree, butterfly, cat)13(Galaho & (Galaho & AzmoonGame-Climbing inside the car tirewith both hands (Arabi et al.(Beck et al. 2015)1411car tire(Arabi et al.2019)15Siavoshi 2015)translators, publisher, Tabatabaei Nia 2014)ImageImage		Namazizadeh,	crossing			(Qasemi et al. 2012)
2009)(al. 2015)ImageImageImageImage12Standing on aAnimal-Starting and stoppingDrawing aYoga poses (tree, butterfly, cat)floated carMovementthe tire with whistlecirclebutterfly, cat)tubeImitationsignalsimultaneously(Beck et al. 2015)(Galaho &Game-Climbing inside thewith both handsAzmoon(Alisi et al.,car tire(Arabi et al.2011)translated by(Werner-Reini,2019)Siavoshi 2015)translators, publisher, Tabatabaei Nia 2014)Imitation		Aslankhani	(Baghandeh et			
12Standing on aAnimal-Starting and stoppingDrawingaYoga poses (tree, butterfly, cat)floated carMovementthe tire with whistlecirclebutterfly, cat)tubeImitationsignalsimultaneously(Beck et al. 2015)(Galaho &Game-Climbing inside thewith both handsAzmoon(Alisi et al.,car tire(Arabi et al.2011)translated by(Werner-Reini,2019)Siavoshi 2015)translators, publisher,Tabatabaei Nia 2014)Imitation		2009)(al. 2015)			
floated carMovementthe tire with whistlecirclebutterfly, cat)tubeImitationsignalsimultaneously(Beck et al. 2015)(Galaho &Game-Climbing inside thewith both handsAzmoon(Alisi et al.,car tire(Arabi et al.2011)translated by(Werner-Reini,2019)Siavoshi 2015)translators, publisher,LTabatabaei Nia 2014)LL	12	Standing on a	Animal	-Starting and stopping	Drawing a	Yoga poses (tree,
tubeImitationsignalsimultaneously(Beck et al. 2015)(Galaho &Game-Climbing inside thewith both handsAzmoon(Alisi et al.,car tire(Arabi et al.2011)translated by(Werner-Reini,2019)Siavoshi 2015)translators, publisher,2019Tabatabaei Nia 2014)ImitationImitation		floated car	Movement	the tire with whistle	circle	butterfly, cat)
(Galaho &Game-Climbing inside thewith both handsAzmoon(Alisi et al.,car tire(Arabi et al.2011)translated by(Werner-Reini,2019)Siavoshi 2015)translators, publisher,Tabatabaei Nia 2014)		tube	Imitation	signal	simultaneously	(Beck et al. 2015)
Azmoon(Alisi et al., translated bycar tire(Arabi et al.2011)translated by(Werner-Reini, translators, publisher, Tabatabaei Nia 2014)2019)		(Galaho &	Game	-Climbing inside the	with both hands	
2011)translated by(Werner-Reini, 2019)2019)Siavoshi 2015)translators, publisher, Tabatabaei Nia 2014)1		Azmoon	(Alisi et al.,	car tire	(Arabi et al.	
Siavoshi 2015) translators, publisher, Tabatabaei Nia 2014)		2011)	translated by	(Werner-Reini,	2019)	
Tabatabaei Nia 2014)			Siavoshi 2015)	translators, publisher,		
				Tabatabaei Nia 2014)		

3. Results

The present study is a single-subject study using an A-B-A design. In this design, the target behavior is measured repeatedly under the condition and intervention, and after recording data in the intervention condition, the second baseline condition begins. Adding a second baseline condition increases the control for confounding variables and increases the internal validity of the design. Researchers working in the field of single-case designs pay as much attention to issues of internal and external validity as researchers working in group experiments. (23) Table 3 shows the descriptive statistics related to the research subjects. 1 girl and 1 boy participated in this study.

Table 3- Descriptive statistics related to age, height, and weight

	Age	Height (m)	(kg) weight	Intelligence
Boy	12	152	55	67
Girl	11	150	48	60

Implementing the targeted exercise program had a significant effect on improving the social development of autistic children.

Boy's Vineland Test

Table 4-The boy's Mean Vineland Test scores

Questionnaire Question	Pre intervention	intervention	Post intervention
General Self-Help	2	3	4
Self-Help in Eating	2	3	4
Self-Help in Dressing	6	7	9
Self-leadership		1	2
Career issues	2	3	5
Movement and movement	1	2	3
Communication (voice imitation, noise, laughter)	1	2	3
Social	1	2	3
Total	15	23	33



• Figure 1 - Mean Wayland Test scores for boys

• Pre-intervention phase: The lower numerical values represent the baseline condition of the subject prior to any intervention.

• Intervention phase: There was a notable increase in grades across most variables, suggesting a positive impact of the interventions.

• Post- intervention phase: Grades in all variables have shown a consistent upward trend, indicating the enduring stability of the positive outcomes associated with the exercise program.

Boy's Vineland Test

Table 5-The Girl's mean Test Scores

Questionnaire Question	Pre-invention	Intervention	Post-intervention
General self -help	1	2	3
Self -help in eating	1	2	3
Self -help in wearing	2	3	5
Self -guidance	0	1	2
Job issues and businesses	1	1	2
Moving and moving movement, commuting	1	1	2
Communication (voice imitation, noise, laughter)	0	1	2
Sociability	0	1	1
Total	5	12	20

Figure 2-Mean Girl Test Scores



These results show that the impact of the intervention has been very positive and significant.

The boy's social interaction test

Table 6-Mean Social Interaction Test Scores

Questionnaire	Pre0intervention	Intervention	Post-intervention
Boy's Social Interaction Questionnaire	12	10	8



Figure 3-Average Social Interaction Test Scores

• Pre- intervention phase: The initial scores at this stage have the highest value.

• Intervention phase: It is observed that during this stage, there is a noticeable decline in scores, which suggests a positive impact of the implemented interventions.

• Post- intervention phase: Subsequent to the intervention phase, there is a sustained decline in grades, further substantiating the efficacy of the training program.

Research article

The girl's social interaction test

Tables 6-The Girl's mean Social Interaction Test Scores

Questionnaire	Pre-intervention	Intervention	Post-intervention
The Girl's Social Interaction Questionnaire	14	12	10



Figure 4-Average Girl's Social Interaction Test Scores

The findings indicated that the targeted rehabilitation training program exerted a positive influence on the social interaction of the girl.

The girl's communication test

Table 8-	The	Girl's	Communication	Test	Scores
----------	-----	--------	---------------	------	--------

1	
т	•

The girl's communication questionnaire	Pre-intervention		Intervention			Post-intervention			
	1	2	3	4	5	6	7	8	9
Score	21	20	20	18	18	17	16	15	15



Figure 6- The Girl communication test scores based on the trend line (top) and the mid line (bottom)

The training program has demonstrated a significant positive influence on enhancing the girl's performance in the communication questionnaire. Scores have consistently decreased throughout both intervention phases and post-intervention, reflecting an improvement in the subject's status.

4. Discussion

The findings of the study indicate that the rehabilitation exercise targeted program significantly influenced the enhancement of social skills among participants, encompassing both male and female subjects. Individuals with autism spectrum disorder (ASD) present considerable challenges to social development. Consequently, they may struggle with communication and exhibit difficulties in engaging in social behaviors, including friendship and recognizing others' emotions through facial expressions or body language. Such individuals often face challenges in forming interpersonal relationships and may find it challenging to communicate effectively with others (22).

Conclusion

The findings of the present study align closely with those observed in previous studies, including those conducted by Uness et al. (2020), Hire and Sava et al. (2020), Namedet and Kobenn (2020), Baharani et al. (2019), and Moradi et al. (2013). The Baharani et al. research results (2019) further corroborate the notion that interventions involving game therapy and rhythmic movements significantly enhance social interactions among children capable of engaging in autistic play and rhythmic exercises. These activities serve as a foundation for facilitating interactions between children and group members, thereby improving social participation and the development of social skills in children. Given that the participants are assessed and perceive that errors in the game could result in missed opportunities, such as educational and academic pursuits, it is advisable to adopt a more reflective approach in response. This strategy is likely to enhance their success rates. Consequently, it elevates their self-esteem and, in the long run, fortifies their social competencies (16).

In his study, Hambick (2017) elucidated the influence of training programs and participation in games on social development. Phenille and Burger (2018), along with Herbart et al. (2017), posited in their research that practical behavior analysis techniques are deemed the most effective approach for children with autism. Consequently, the application of Applied Behavior Analysis (ABA) methodologies has been shown to reduce inappropriate behaviors while enhancing performance and social interactions (12).

Treatment of Autism that ABA is the Sole Intervention for Comprehensive and Sustainable Social and Communication Skill Enhancement in Children with Autism" (12). This study's findings indicate that Applied Behavior Analysis (ABA) stands as the sole intervention that yields comprehensive and sustainable improvements in the social and communication skills of children with autism. The research revealed that the targeted exercise program significantly enhanced the social development of the participating children. To elucidate the impact of a rehabilitation exercise program on the social development of the children, the following explanation can be provided. Children with highfunctioning autism often experience feelings of inferiority, accompanied by social fear and anxiety, primarily due to challenges in social interactions and deficiencies in social skills. This can lead to a sense of worthlessness, defeat, and failure, as well as difficulties in adapting to environments. various Typically, these challenges manifest in a range of forms, such as isolation, heightened sensitivity, aggression, depression, and anxiety (14).

One of the elements that fortifies social bonds among children is the physical and physiological transformations they undergo. These changes enable children to showcase their capabilities to the perspectives of various groups, coaches, and even spectators, thereby fostering communication within society. Rhythmic games and exercises serve as the foundation for facilitating interactions among children with their peers, promoting coordination and participation within group settings, and enhancing social skills in young individuals. Subjects, perceiving themselves as being evaluated, are less likely to fear making mistakes, as they believe these errors will not result in the loss of opportunities such as education and learning. Consequently, this mindset encourages more thoughtful responses, leading to greater success. This, in turn, boosts their confidence levels. Moreover, these activities contribute to the improvement of social skills in autistic children (16).

Acknowledgements

The authors would like to thanks all individuals who participated in this research.

Funding

This study did not have any funds.

Compliance with ethical standards

Conflict of interest None declared.

Ethical approval the study was approved by the ethics committee of Kermanshah. University of medical sciencs. (IR.KUMS.REC.1403.509). written informed consent has been obtained from the patients to participate in the study and paper.

Informed consent Informed consent was obtained from all participants.

Author contributions

Conceptualization: S.M.B, K.M, E.A, A.K; Methodology: S.M.B, K.M, E.A, A.K; Software: S.M.B, K.M, E.A, A.K; Validation: S.M.B, K.M, E.A, A.K; Formal analysis: A.D., S.M.; S.M.B, K.M, E.A, A.K; Investigation: S.M.B, K.M, E.A, A.K. Resources: S.M.B. K.M. E.A. A.K. Data curation: A.D., S.M.; S.M.B, K.M, E.A, A.K; Writing - original draft: A.D., S.M.; S.M.B, K.M, E.A, A.K; Writing - review & editing: S.M.B, K.M, E.A, A.K; Visualization S.M.B, K.M, E.A, A.K; Supervision: A.D., S.M.; S.M.B, K.M, E.A, A.K; S.M.B, K.M, E.A, Project administration: S.M.B, K.M, E.A, A.K; A.K: Funding acquisition: S.M.B, K.M, E.A, A.K;

References

1. Aarabi, M. A., Abdi, K., Khanjani, M. Saeid Using of Rehabilitation Services, The Main Concern of Autism Spectrum Disorder: What Can Be Done?. *Journal of Rehabilitation Sciences & Research*, 2020; 7(4): 189-190. doi: 10.30476/jrsr.2020.89004.1121.

2. Ahmadi A, Beh Pagouh A. The effectiveness of sensorymotor, sacial interactive skills and formal behaviors in children with autism spectrum disorders. Journal of behavioral science research, 2017. 14 (2).1.

3. Asgharzadeh N. The effect of eight weeks of ball games on the communication skills of children with autism. Master's thesis in physical education of Azad University of research Sciences; 2018.

4. Association Ap. Diagnostic statistical manual of disorders (DSM-50): American Psychiatric pub; 2014.

5. Boon-Yasidhi V, Jearnarongrit P, Tulayapichitchock P, Tarugsa J. Adverse effects of risperidone in children with autism spectrum disorders in a naturalistic clinical setting at siriraj hospital, Thailand. Psychiatry J. 2014;2014:136158. doi: 10.1155/2014/136158. Epub 2014 Feb 3. PMID: 24790986; PMCID: PMC3979146.

6. Grigory Payne, V. Larry D. Khalji, H. khagawi, D. translators. Human motor development, a Life Long approach. Arak university publications, 2006.

7. I Hambrick, Marion E., 2017. "Sport communication research: A social network analysis," Sport Management Review, Elsevier, vol. 20(2), pages 170-183.

8. Hosseinzadeh K, Gamari S, Askari A, Abdizadad K. The effect of games in teaching social skills of autistic children. www.irijournals.com.2022,322-332.

9. Li, HJ., Chen, CY., Tsai, CH. *et al.* Utilization and medical costs of outpatient rehabilitation among children with autism spectrum conditions in Taiwan. *BMC Health Serv Res* **19**, 354 (2019). https://doi.org/10.1186/s12913-019-4193-z

10. Liao, Y., Dillenburger, K., He, W., Xu, Y., & Cai, H. (2020). A Systematic Review of Applied Behavior Analytic Interventions for Children with Autism in Mainland China. *Review Journal of Autism and Developmental Disorders*, 7(4), 333–351. https://doi.org/10.1007/S40489-020-00196-W

11. Miller, A.R., Vernon, T.W., Wu, V.L., & Russo, K. (2014). Social Skill Group Interventions for Adolescents with Autism Spectrum Disorders: a Systematic Review. *Review Journal of Autism and Developmental Disorders*, *1*, 254-265.

12. noferesti A, Hassanabadi H R. (2019). Data analysis in single case experimental design studies. *Rooyesh*. 7(12), 291-306.

URL: <u>http://frooyesh.ir/article-1-1567-en.html</u>.

13. Pashazadeh Azari Z, Hosseini SA, Rassafiani M, Samadi SA, Hoseinzadeh S, Dunn W. Contextual Intervention Adapted for Autism Spectrum Disorder: An RCT of a Parenting Program with Parents of Children Diagnosed with Autism Spectrum Disorder (ASD). Iran J Child Neurol. 2019 Fall;13(4):19-35. PMID: 31645864; PMCID: PMC6789080.

14. Pourmohamadreza Tajrishi B, Rajabi-Shamami M, Haghgoo H. The Pivotal Response Training (PRT) in Children with Autism Disorder. J Except Educ 2013; 8 (121) :56-61/URL: <u>http://exceptionaleducation.ir/article-1-230-en.html</u>.

15. Ershad Sarabi R, Hashemi Razini H, Abdollahi M H. Comparing Parental Stress, Parenting Styles, and Social Problem Solving in Mothers of Children with Autism Spectrum Disorder, ADHD, and Typically Developing Children . J Child Ment Health 2018; 4 (4) :165-179 URL: <u>http://childmentalhealth.ir/article-1-280-en.html</u>.

16. Soleimany Adriany S, Sadeghi Hosnije AH, Zerehpoush A, Rabie M, Abedi A, Esmaeeli S. Effectiveness of rhythmic games on social skills of children with attention deficit hyperactive disorder. J Gorgan Univ Med Sci 2016; 18 (2) :91-96-URL: <u>http://goums.ac.ir/journal/article-1-2767-en.html</u>.

17. Stevenson, B. S., & Correa, V. I. (2019). Applied behavior analysis, students with autism, and the requirement to provide a free appropriate public education. *Journal of Disability Policy Studies, 29*, 206-215. (Original DOI: https://doi.org/10.1177/1044207318799644)

18. Syriopoulou-Delli CK, Gkiolnta E. Review of assistive technology in the training of children with autism spectrum disorders. Int J Dev Disabil. 2020 Jan 20;68(2):73-85. doi: 10.1080/20473869.2019.1706333. PMID: 35309695; PMCID: PMC8928843.

19.Tabatabai S, Shabazi M, Bagherzade F. The relationship between motor development and Social development in children 6 to 20 years in Mashhad. Sports of Motor Development and Learning Journal; 2017. 2 (8).

20. Taziki T, Hasanzadeh S, Afrour Gh, Chobari Bonab B. Ghasem zadeh S. The effectiveness of intervention using pets and pets on the cognitive, social, and behavior of children in autism spectrum.

21. Tonge BJ, Bull K, Brereton A, Wilson R. A review of evidence-based early intervention for behavioural problems in children with autism spectrum disorder: the core components of effective programs, child-focused interventions and comprehensive treatment models. Curr Opin Psychiatry. 2014 Mar;27(2):158-65. doi: 10.1097/YCO.00000000000043. PMID: 24452070.

22. Varogiz, T. Teaching and using signs of social communication for minors with autism spectrum disorders and similar problems. Translated Sajjadian M, Shahrivar. Z. Tehran. Arjmand. 2017.

23. Takhti M, Riyahi Malayeri S, Behdari R. Comparison of two methods of concurrent training and ginger intake on visfatin and metabolic syndrome in overweight women. Razi Journal of Medical Sciences. 2020;27(9):98-111.

24. Vakilizade N, Malekpour M, Faramarzi A. Investigating the effect of joint attention training on the degree of social initiation responding of children with autism spectrum disorder : single-subject research. The journal of paramedical science and rehabilitation. 2016, 6(3): 68-79.