



## Research Paper

# Comparing the Effectiveness of Parent-mediated Intervention With Social Media-based and Face-to-face Rehabilitation Approaches on Autism Children's Social Interaction and Challenging Behaviors: A None-randomized Quasi-experimental Study



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### Conflict of interest

The authors declared no conflict of interest.

## ABSTRACT

**Background and Objectives:** Children with autism spectrum disorders (ASDs) often require various specialized services and access to various specialists in the fields of medicine, rehabilitation, and education due to the multifaceted problems caused by these disorders. Also, parents of children with ASDs face many challenges which expose them to high levels of stress, anxiety, and depression, as well as the quality of life (QoL) of these parents is often affected. As a result, it is necessary for children with ASDs and their parents, especially their mothers to access various services. The present study was conducted to investigate and compare the effectiveness of the parent-mediated intervention method with social media-based and face-to-face rehabilitation approaches for mothers of children with ASDs.

**Methods:** The research sample included 30 mothers of 3-6-year-old children with ASDs who were randomly assigned to two groups of social media-based education and face-to-face education. Both groups received two training sessions every week for four weeks. The intervention for the first group was based on social media and using video calls, video, and educational texts, and for the second group, it was face-to-face.

**Results:** The results showed that training was effective in improving social interaction and challenging behaviors in children and led to the improvement in depression symptoms, QoL, and sense of well-being in mothers; however the difference in the scores obtained from the two groups of social media-based education and face-to-face education is not significantly different from each other ( $P > 0.05$ )

**Conclusion:** According to the results of the research, it seems that the effect of the group interaction was significant in the time. Treatment as well as accessibility, choose one of the above two methods that are more economical for the individual according to the conditions, which requires further studies.

**Keywords:** Autism spectrum disorders (ASDs), Mothers, Rehabilitation approach, Parent-mediated intervention, Social media



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↑ *What is “already known” in this topic:*

*The occurrence of autism spectrum disorders in a child due to the challenging conditions often leads to issues such as stress, anxiety and depression in parents and makes their daily life difficult.*

→ *What this article adds:*

*Face-to-face, social network-based treatment methods for children with autism spectrum disorders are equally effective for maternal stress, anxiety, and depression.*

## Introduction

Autism is a multifactorial developmental disorder, and genetic factors combined with environmental factors are involved in its development. According to the definition of the American Psychiatric Association (APA), it is defined as deficits in communication and social interaction, as well as unusual, repetitive, and limited behaviors. Autism is a disorder whose symptoms begin from infancy and are identified in the first three years of life. This developmental disorder includes autistic disorder, Asperger syndrome, childhood disintegrative disorder, Rett syndrome, and pervasive developmental disorder not otherwise specified. Also, another type of classification divides autism spectrum disorders (ASD) into three categories based on severity, first level (mild), second level (moderate), and third level (severe) [1]. Its main indicator is the defect in communication and social interactions, the occurrence of stereotyped behaviors, and limited behavioral-motor treasury. Autism affects people's understanding of the world and their interactions with others [2]. Epidemiological studies showed that the prevalence of ASD has increased in the last 50 years [1-4]. The prevalence of ASD is estimated to be 1 in 160 children. This estimate represents the average prevalence of ASDs worldwide; however, specific epidemiological studies for different countries may show different statistics. So far, no comprehensive study has been conducted on the prevalence of this disorder in Iran. However, epidemiologic studies in Iran have reported a prevalence of 1 in 150 children. ASD has become one of the most widespread developmental disorders [4].

Considering the types of ASDs and the different abilities and disabilities of each one, the range of services required for ASD is very wide. Types of common treatments for ASDs include special medicine regimes, behavioral-social (rehabilitation interventions), and family-oriented treat-

ments [4]. The occurrence of ASD in a child of a family due to the challenging conditions often leads to issues, such as stress, anxiety, and depression in parents and makes their daily life difficult. On the other hand, parents are the closest and vital caregivers of children with these disorders and are the interface between the home and the outside environment. They can continue the role of coach and therapist at home, which is why the use of family-oriented methods has become very common today [5, 6].

Family-centered interventions are recognized as parent-mediated interventions (PMI). During PMI, parents or other caregivers of children receive training from expert professionals, thereby enhancing children's learning by increasing the opportunity to practice the life skills taught to them, which is necessary to generalize the learned skills. A number of these methods target and evaluate several parent-specific personality traits, such as stress and well-being and categorize both components during the implementation of PMI on children's functional characteristics [7]. Increasing parents' awareness and skills can have a crucial impact on their children's progress and provide learning opportunities for children with ASD in the environment outside the treatment center [8]. These interventions, in addition to the impact on children's progress, lead to the improvement of parents' psychological reactions and increase the sense of self-sufficiency and well-being in parents [9].

Studies showed that parents can implement therapeutic strategies well and at an acceptable level by receiving special training. Because PMI relies on parents spending significant time with children, it can have a significant impact on the active participation of parents and children in the treatment process [7-10]. Also, these methods are cost-beneficial in terms of time and cost. Therefore, these strategies that target the basic deficits of children with ASDs, such as challenging behaviors, functional life skills, academic skills, and psychiatric comorbidities, are increasingly being developed and used [11].

Today, with the expansion of social media and the creation of a platform, it is possible to provide a part of family-oriented education in this way. Nowadays, with the spread of the Coronavirus and the emphasis on maintaining social distance and the use of remote rehabilitation, it is possible to offer such treatments to parents and children with ASD. It seems that using this method and tools of social media for PMI training can save both cost and time compared to the physical presence method. The preference of therapists is to use more effective methods in terms of treatment and effectiveness, along with paying attention to the time and costs of different treatment methods [12, 13].

Since the PMI method has been introduced in literature as an effective method in the field of rehabilitation of children with ASD with an impact on parents and children, this research was conducted to evaluate the effectiveness of the parent-mediated interventions method with two social media and face-to-face rehabilitation approaches for mothers with ASD to investigate the social interaction and challenging behaviors of children with ASD [13].

## Materials and Methods

The current research is an applied research and a quasi-experimental study with two groups of social media-based training and face-to-face training in the form of pre-test and post-test studies.

The statistical population included 30 mothers of 3 to 6-year-old children with ASD and their children. This sample was selected from the people who were referred to the Occupational Therapy and Speech Therapy Center of the Koodak Center located in Tehran City, Iran. The sample size was selected based on previous studies conducted in Iran, considering the primary outcome of social interaction extracted from the Gilliam questionnaire and with the help of G\*Power software, version 3.0.10 and test power of 80% and an  $\alpha$  level of 5% in each group considering the dropout of 15% of people.

In this study, the conventional sampling method was used. After initial evaluations and checking the inclusion and exclusion criteria, 30 mothers were selected along with their children, and pre-intervention evaluations were equally performed for all participants (mothers and children). Then, the participants were divided into two groups using the stratified non-randomized block method by the researcher. Each group included 15 mothers (children with ASD). Sampling started in the fall of 2021 and ended in the spring of 2022. After grouping, interventions started in June 2022 and will be completed after four weeks in July 2022.

## Procedure

The present study was a quasi-experimental study of single-blind strain to compare two therapeutic approaches from the set of PMI. Primary information was collected through interviews and the use of the Gilliam-Gars questionnaire to measure the level of autism and children's communication and behavioral characteristics, and the Beck questionnaires to measure the severity of depression and general sense of well-being to measure the sense of well-being of mothers. After collecting the initial information, the subjects were divided into two non-random groups of 15. A) Intervention group and B) Comparison group) using the minimization method of children's autism level index and mothers' depression level. The evaluation was performed by a person who was blinded to the grouping of the subjects. Then the intervention was started by the researcher, who was not present in the evaluation phase for the two treatment groups. The duration of the interventions in both groups was eight sessions in four weeks and was carried out in the spring of 2022.

The method of intervention for group A was as follows: Fifteen mothers in eight sessions (four weeks) of general education about the full introduction of ASDs, training of two techniques applicable at home (pivotal response training [PRT]) and (applied behavior analysis [ABA]), and available services in the day. The main treatment sessions were received in the form of a package, including two videos and two texts through the active group on social networks, and the messages should have a blue tick indicating that the message has been opened, and the mother would send feedback on receiving the training to the researcher. After studying the mentioned cases on Thursday in social media and the question and answer session, the mothers raised their questions at an agreed time for an hour and a half and received the answer in the form of an audio file from the researcher. The questions were sent specifically to the therapist's user account the night before the session and had to be related to the educational materials shared that week, and each mother was required to raise a problem or question.

The procedure for the intervention in group B was as follows: The type of information provided in the intervention was the same as in group A, but the type of information transfer was different. Mothers of group B received their package as face to face after completing the routine occupational therapy session, and the summary, question, and answer session was held on the day agreed with the parents for two hours in the form of video communication in social media.

After completing the training course, the participants (mothers and children with ASD) in the research entered the post-test phase, and once again the mothers participating in the research in the fields of depression, sense of well-being, and Quality of life (QoL) and children also in the areas of interaction. Social and challenging behaviors were evaluated using standard research tools. The scores obtained from two groups were analyzed using SPSS software, version 26. A significance level of 0.05 was considered.

#### Assessment tools

The assessment tools used in this research were:

#### Gilliam-Gars autism rating scale (2<sup>nd</sup> version)

The Gilliam-Gars autism rating scale (GARS) test is a checklist that helps diagnose autistic people. This test was normalized in 1994 and represents issues of autism in a sample group of 1 094 people from 46 states from Colombia, Puerto Rico, and Canada. The GARS was prepared based on the definitions of the American Autism Association (ASA, 1994), the APA, and based on diagnostic and statistical manual of mental disorders, fourth edition (DSM-IV) [14].

GARS is suitable for 3-22-year-olds and can be completed by parents and professionals at school or home.

GARS contains four subscales and each subscale contains 14 items. Each item is scored based on the number of times it occurs, which is detailed in the appendix. The first subscale is stereotyped (repetitive/restrictive) behaviors, which include 1 to 14 items. This subtest describes cases of stereotyped behaviors, movement disorders, and eccentric behaviors. The second subscale, which is communication, includes items 15 to 28. These items describe verbal and non-verbal behaviors that are signs of autism. Social interactions is the third subscale that includes items 29 to 42. Items in this subscale assess subjects' ability to adequately describe events to people. The fourth subtest is developmental disorders, which includes items 43 to 56. This subscale asks key questions about people's childhood development [14].

#### Beck depression inventory (BDI) (6<sup>th</sup> edition)

Beck depression inventory (BDI) showed a change in the mental health specialists' view of depression, from a psychoanalytical approach to an approach directed by thoughts or cognitive distortions. These descriptions and observations were collected in the form of 21 symptoms

and attitudes and graded based on the severity of depression on a four-point scale from 0 to 3. [15]

#### General well-being questionnaire (GWQ)

The general wellbeing questionnaire (GWQ) provides a summary but broad-ranging index of internal feelings of well-being or psychological distress used in social research contexts. The scale that reflects negative and positive emotions is evaluated in 6 dimensions, including positive well-being, self-control, vitality, anxiety, depression, and general health [16].

#### QoL questionnaire

The 36-question QoL questionnaire is the most famous and widely used tool to measure the QoL.

The world health organization's 26-question QoL questionnaire (WHOQoL-BREF) is a 26-question questionnaire that measures a person's overall QoL. This questionnaire has 4 subscales and a total score. These subscales are physical health, mental health, social relationships, health of the surrounding environment, and an overall score. First, a raw score is obtained for each subscale, which must be converted to a standard score between 0 and 100 through a formula. A higher score indicates a higher QoL [17].

## Results

In this study, 36 mothers of children with ASDs and their children participated, 30 of them remained in the study with 6 cases dropping out. Of these, 15 people were included in the online training group and 15 people were included in the face-to-face training group. The mean age of mothers participating in the research was 31.9 years and the mean age of children was 49.8 months. To investigate and compare the effectiveness of two methods of training based on social media and face-to-face rehabilitation approaches training, the statistical tests of central statistics and dispersion (Mean±SD) of research data, the Shapiro-Wilk test to check normal distribution was used in research data and mixed analysis of variance (ANOVA) test (time×group) was used to examine the main effect of time and the main effect of group and their interactive effect. Therefore the following results were obtained from examining and comparing the data from the two groups.

**Table 1.** Summary of the analysis of variance results of the interactive effect of the group in time in the research variables

Variable	Statistics	QoL	Depression	General Wellbeing	Stereotype Behaviors	Social Interaction
Interactive effect	F	0.190	0.26	0.015	0.001	0.003
group×time	P	0.666	0.873	0.902	0.999	0.954

**Table 2.** Between-group comparisons of the variables related to mothers participating in the research before and after interventions

Variables	Group	Mean		P	
		Before Intervention	After Intervention	Before Intervention	After Intervention
QoL	Social media	67.13	72.66	0.349	2.128
	Face-to-face	71.13	77.80		
Beck depressing	Social media	17.06	16.26	0.4	0.787
	Face-to-face	16.66	15.73		
Well-being	Social media	45.33	48.13	0.666	0.555
	Face-to-face	46.66	49.66		

### Examining the interactive effect of group and time on research variables

According to the results of [Table 1](#), using the mixed model of analysis of variance (ANOVA) test, the interaction effect of group×time in the research variables was not significant. Therefore, in the following, the main effect of within-group and between-group comparisons will be discussed.

Considering that the level of significance in this research is 0.05 and according to the probability values obtained from the statistical analysis of the variables related to the mothers participating in the research, the educational interventions used in the present research led to the improvement of the mothers' conditions in the variables of QoL, Beck depression and feeling of well-

being; however, all these variables have shown the same trend towards the intervention and the effect of group interaction was significant in time. ([Table 2](#) and [3](#)).

### Discussion

Parents of children with ASD, especially mothers, face many challenges that expose them to high levels of depression and other negative psychological consequences. Parents' participation in educational programs improves their ability to deal with the problems of a child with ASD. Also, the mothers' greater awareness regarding their child's therapeutic interventions and the better implementation of those interventions and therapeutic exercises in the natural environment and context of life will cause the child to improve and progress faster. In this regard, the easier it is for parents and children to access

**Table 3.** Within-group comparison of the variables related to the children participating in the research before and after the interventions

Variables	Group	Mean		P	
		Before Intervention	After Intervention	Before Intervention	After Intervention
Stereotype behavior	Social media	16.93	15.8	0.843	0.837
	Face-to-face	16.26	15.13		
Social interaction	Social media	17.4	15.4	0.545	0.496
	Face-to-face	19.7	17.66		

educational and rehabilitation services, the more the possibility of using the services and improving the psychological condition of parents increases. The primary goal of this research was to investigate the impact of PMI on the social interaction of children with ASD in two groups of education with social media and face-to-face education. The data obtained from the present study showed that PMI is effective in improving social interaction and stereotyped behaviors in children with ASD, and the interventions led to decreased score of the GARS in the social interaction and stereotyped behaviors sections. According to the GARS questionnaire, the second version, a lower score in the social interaction and stereotype behaviors section indicates a better condition of the child in these cases. According to the information in the above table, the intervention has been effective in reducing and improving the symptoms of deficits in social interaction and stereotype behaviors, but the numbers of the probability values related to these two variables showed that both groups have shown the same trend compared to the interventions, and a significant difference is observed based on which one method is not more effective than the other. However, no significant difference is observed in the effectiveness of these interventions the between two groups ( $P>0.05$ ) and the two groups have shown the same trend towards the interventions. Previous research indicated the effectiveness of remote rehabilitation and educational treatment. Research conducted in 2011 entitled family-oriented occupational therapy and remote rehabilitation for children with ASD indicated that along with face-to-face sessions, educational videos were also used to improve sensory integration disorders and, as a result, improve social interaction and stereotype behaviors in children with ASD. In this study, families received online rehabilitation services for six weeks in addition to face-to-face meetings. The purpose of this research was to help parents to better implement therapeutic strategies for sensory integration in the natural environment of life. The result of the research showed that remote rehabilitation sessions can be a suitable supplement for face-to-face sessions for better implementation of treatment solutions at home because it provides an opportunity to review treatment solutions, question and answer, and better understanding the clinical reasoning of each solution, as well as PMI. It can lead to the improvement of sensory integration in children through parent education.

In the current research, in addition to measuring the status of stereotype behaviors and social interaction before and after the intervention, the rate of change in QoL, depression, and general sense of well-being in mothers was examined as secondary outcomes [18].

Also, about treatment based on virtual space and its impact on the skills of children with ASD in 2020, a research was conducted titled remote rehabilitation to improve the stereotype behaviors of children with ASD with multiple disorders as a systematic review study. The objectives of the study were to examine the effectiveness of remote rehabilitation, to describe the tools used in the treatment process, to examine the level of satisfaction of users (families and professionals), and to summarize the results of previous research. Virtual integrated systems, game-based systems, and video-based systems were used in these studies. The results of the research showed that the users of this type of treatment have a high level of satisfaction with remote rehabilitation because in this condition, parents have easier access to services and can maintain their relationship with health and treatment specialists. This treatment is effective in improving stereotype behaviors [19].

In the examples mentioned above, the effectiveness of remote rehabilitation as a complementary method or an independent method has been investigated, which showed that remote rehabilitation was both a complementary treatment method and an independent treatment method in improving social interaction and stereotyped behaviors. In this research, the effectiveness of PMI was investigated and compared with two treatment methods based on social media and face-to-face therapy, and the results showed that both methods are effective in improving the social interaction and stereotype behaviors of children with ASD, and no significant difference was observed between the two treatment methods.

Examining the change in the QoL, depression, and feeling of general well-being were considered as the secondary goals of this research. The results of the research showed that both treatment methods based on social media and face-to-face were effective in improving the desired variables for mothers, and the score of QoL and sense of well-being increased after the intervention for both groups. The score obtained from the BDI decreased for both groups after the intervention, which indicated the positive impact of the interventions for both groups, but the effect of group interaction was significant in time, which showed no significant difference between the two treatment methods.

In 2020, research was conducted under the title of investigating the effect of parent-centered education on the self-sufficiency of parents of children with ASD in Albania. Also, in 2021, research was conducted under the title of a multi-faceted remote rehabilitation approach to support social interaction in families with ASD in Italy. In this research, experts designed a program called SUPER

to make it easy for families with members with ASD to access during the COVID-19 pandemic. In this program, practical information related to ASD was shared with families. This research showed social media-based rehabilitation was effective in parents' knowledge about autism and interventions for autism spectrum disorder.

Another study was conducted in 2022 to investigate the impact of remote health education on reducing parental stress and increasing parenting strength and skills for parents of children with ASD. All three of these studies showed the effectiveness of parent-centered interventions, both social media and face-to-face on parents' mental health [20-22].

The present study also showed that both social media-based and face-to-face treatment methods are effective in improving the condition of variables related to mothers; however, no significant difference is observed between the mean scores of the two groups after the intervention, and the two groups have shown the same trend compared to the interventions.

## Conclusion

Considering the results of the research, it is possible to look at social media-based and face-to-face treatment from the perspective of rehabilitation management. If no significant difference is observed between the two treatment methods, it may be possible to use social media-based treatment for better management of time, cost, physical and mental erosion in parents, and easy access to services and specialists, which can be the subject of future research.

## Ethical Considerations

### Compliance with ethical guidelines

This study was approved by the Ethics Committee of the [Iran University of Medical Sciences](#) (Code: IR.IUMS.REC.1400.325).

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## Authors' contributions

Conceptualization and supervision: Ghazaleh Gholabi and Reza Salehi; Methodology: Mohammad Kamali, Hossein Mobaraki and Reza Salehi; Investigation and writing–review, editing: All authors. Writing–original draft: Ghazaleh Gholabi.

## Conflict of interest

The authors declared no conflict of interest.

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## مقاله پژوهشی



# مقایسه اثربخشی روش مداخله واسطه‌گری والد با رویکردهای توانبخشی مبتنی بر فضای مجازی و حضوری برای مادران کودکان مبتلا به اختلالات طیف اتیسم بر تعامل اجتماعی و رفتارهای چالش‌برانگیز کودکان

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## چکیده

**مقدمه** والدین کودکان مبتلا به اختلالات طیف اتیسم با چالش‌های بسیاری روبه‌رو هستند که زندگی آنان را دستخوش تغییرات منفی می‌کند. پژوهش حاضر یک مطالعه مداخله‌ای شبه‌آزمایشی یک سویه کور است که با هدف بررسی و مقایسه اثربخشی روش مداخله واسطه‌گری والد با رویکردهای توانبخشی مبتنی بر فضای مجازی و حضوری برای مادران کودکان مبتلا به اختلالات طیف اتیسم انجام شد.

**مواد و روش‌ها** نمونه مورد پژوهش ۳۰ مادر کودک ۳ تا ۶ ساله مبتلا به اختلالات طیف اتیسم هستند که به روش غیرتصادفی بلوک‌بندی شده طبقه‌ای براساس مطالعات قبلی صورت‌گرفته در داخل کشور ایران و با کمک نرم‌افزار جی‌پاور، توان آزمون ۸۰ درصد و سطح آلفای ۵ درصد در دو گروه آموزش مبتنی بر فضای مجازی و آموزش حضوری قرار گرفتند و ارزیابی‌های قبل و بعد از مداخله با ابزارهای پرسش‌نامه‌های گیلیام-گازز نسخه دوم، کیفیت زندگی، افسردگی بک و احساس بهزیستی عمومی سنجیده شدند. هر دو گروه به مدت ۴ هفته هر هفته طی ۲ جلسه آموزش‌ها را دریافت کردند. آموزش‌ها برای گروه اول مبتنی بر فضای مجازی و با استفاده از تماس تصویری، ویدئو و متن‌های آموزشی و برای گروه دوم به صورت حضوری ارائه شد.

**یافته‌ها** براساس آزمون‌های آماری شامل آماره‌های مرکزی (میانگین) و پراکندگی (انحراف معیار) داده‌های تحقیق، آزمون شاپیرو ویلک برای بررسی توزیع نرمال در داده‌های تحقیق، آزمون تحلیل واریانس آمیخته (دو زمان، دو گروه) برای بررسی اثر اصلی زمان و اثر اصلی گروه و اثر تعاملی آن‌ها، نتایج نشان دادند آموزش‌ها در بهبود تعامل اجتماعی و رفتارهای چالش‌برانگیز در کودکان مؤثر هستند و همچنین منجر به بهبود علائم افسردگی، کیفیت زندگی و احساس بهزیستی در مادران شده است، اما تفاوت نمرات حاصل از دو گروه آموزش مبتنی بر فضای مجازی و آموزش حضوری با یکدیگر تفاوت معناداری ندارد ( $P > 0.05$ ).

**نتیجه‌گیری** باتوجه‌به این نتایج به نظر می‌رسد اثر تعامل گروه در زمان معنادار نبوده است و هر دو گروه حاضر در پژوهش، روند یکسانی نسبت به مداخلات نشان داده‌اند و ممکن است بتوان با در نظر داشتن شاخصه‌هایی مانند هزینه و زمان صرف‌شده برای درمان و همچنین قابلیت دسترسی، یکی از دو روش یادشده را که (از نظر شرایط) برای فرد به صرفه‌تر می‌باشد، برگزید که نیازمند پژوهش‌های بیشتر است.

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## کلیدواژه‌ها:

اختلالات طیف اتیسم، مادران، رویکرد توانبخشی، مداخله واسطه‌گری والد، فضای مجازی



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