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THE EFFECTS OF EARLY INTERVENTION PROGRAMS ON THE SOCIAL COMMUNICATION SKILLS OF YOUNG CHILDREN WITH AUTISM SPECTRUM DISORDER (ASD): A SYSTEMATIC REVIEW

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Autism spectrum disorder is a developmental disorder characterized by two main symptoms; social communication deficient, and behavior issues. However, individuals with ASD might demonstrate language and cognitive impairment but they were not considered as key features of ASD (American Psychiatric Association, 2013). In the last 20 years, the number of individuals with ASD has increased dramatically (Rayan & Ahmad, 2018). Many Statistical studies demonstrated that the prevalence rate of ASD was 1 in 1000 children and this rate increased in 2014 to 1 in 88 children. The increasing rate of ASD can be as a result of social awareness or the development of assessment criteria (Crawford, 2016).

Lack of social communication skills was considered as a fundamental and common issue of individuals with ASD. Therefore, they demonstrate difficulties in verbal and non-verbal social communication skills includes lack of joint attention skills, initiating or maintain the conversation, abnormal facial expression, turn-taking, and language impairment (Thomeer, McDonald, Rodgers, & Lopata, 2017). In addition, they have difficulties to respond or use gestures, difficulty in requesting skills, lack of making eye- contact, and difficulty in engaging vocally or visually with others during social interaction. Consequently, they have difficulties to maintain a relationship with others (Mundy & Crowson, 1997), and difficulties in developing friendship and playing skills (Ulke-kurkcuoglu, 2015). Overall, Social communication difficulties in ASD can impact students with ASD academic and social development and isolate them from their environments (Yeo & Teng, 2015).

The American Academy of Pediatrics revealed that all children with ASD can be identified and screened at two years of age, which provided strong evidence supporting the early intervention for ASD (Charman, 2014). Therefore, many early intervention programs appeared targeting mean deficient areas in ASD e.g., early intensive behavior analytic treatment which yielded positive outcomes in domains of social communication, behavior, cognitive, and language skills (Howard, Sparkman, Cohen, Green, & Stanislaw, 2005).

The National Research Council report (NRC) (2001) indicated that many studies conducted early intervention programs using different approaches to disclosure the effectiveness of early intervention for young children with ASD. They found three types of programs were used; Behavioral-based program e.g. (Early Intensive Behavior Intervention and Pivotal Response Treatment) and developmental approach such as (Early Start Denver Model), and Eclectic methods like Division TEACCH. The results of these studies demonstrated that early intervention for young children with ASD could significantly promote their social communication, motor, and play skills (Volkmar & Reichow, 2014). Therefore, the early intervention programs have promising outcomes on the development of social communication, behavior and language skills of individuals with ASD (Divan, Hamdani, Vajartkar, Minhas, Taylor, Aldred, & Patel, 2015).

METHODS

This article is a systematic literature review to identify the scientific studies that were published between 2009 and 2019 in international journals. In order to conduct the review, the researcher used digital format database research: Scopus, PubMed, and Eric journal, using the search terms “Autism spectrum disorders”, AND “social skills”, OR “communication skills”, AND “children”, AND “early intervention”. The results of the search demonstrated 140 publications. All obtained publications in Scopus, PubMed, and Eric were analyzed, 128 studies were excluded: 24 studies were about the parents, 14 randomized control trial, 15 without training program, 15 about other disabilities, 2 about the adults, 22 reviews, 19 about diagnosis and assessment

of ASD, 8 about others skills, 3 unrelated studies, 3 studies with no access, 1 about professionals, 1 follow-up study, and 1 meta-analysis.

The studies' inclusion and exclusion criteria are described in Table1.

The data of the systematic review was analyzed according to the PRISMA criteria (Moher, Liberati, Tetzlaff, Altman, & Grp, 2009). The obtained information was classified and analyzed according to the authors, year of publication, country, study aim, sample, and, methodology, results.

RESULTS

A total of 479 young children with ASD participated in the studies. The studies the in the USA (50%), Italy (17%), Portugal (8.3%), Canada (8.3%), China (8.3%), and Israel (8.3%).

Several instruments were utilized to measure the improvement of social communication skills and decrease the severity of Autism, such as: The Autism Diagnostic Observation Schedule (ADOS) (15%), the Vineland Adaptive Behavior Scale (11%), The Autism Diagnosis Interview-Revised (ADl-R) (7%), the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) (5%), The Psychoeducational Profile, 3rd .ed. (PEP-3) (5%), The Bruininks- Oseretsky Test of Motor Proficiency, 2nd .ed. (BOT™-2) (2%), The Attention Network Test (ANT) (2%), The Wechsler Intelligence Scale for Children-Fourth Edition (2%), the Wechsler Preschool and Primary Scale of Intelligence, 3rd (2%), the Kaufman Test of Educational Achievement-Second Edition (2%), the Asperger Syndrome Diagnostic Scale (2%), the Stanford Binet-Fifth Edition (2%), the Gilliam Autism Rating Scale-Second Edition (2%), the Adaptive Behavior Assessment System-Second Edition (2%), the Autism Social Skills Profile (ASSP) (3%), the Diagnostic and Statistical Manual of Mental Disorders (4th ed) (3%), the Mullen Scales of Early Learning (MSEL) (7%), the Griffiths Mental Development Scales (GMDS) (3%), the Clinical Global Impressions Scale (CGI) (2%), the Social Responsiveness Scale, second edition (SRS-2) (3%), the Differential Ability Scales-II (DAS-II) (2%), the Clinical Evaluation of Language Fundamentals-Preschool- 2 (CELF-P-2) (2%), the Revised Version of the

Strange Stories Test (2%), the Theory of Mind Inventory scale (2%), the Autism Spectrum Quotient: Child Version (2%), the Assessment Scale of Children with ASD (2%), the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) (2%), the Early Social-Communication Scales (ESCS) (2%), the teacher-child play interactions (TCX) (2%), the Structured Play Assessment (SPA) (2%), the MacArthur Communication Developmental Inventories (CDI) (2%), the Questions About Behavior Change (QABF) questionnaires (2%), the Child Behavior Checklist (CBCL) (2%), the Early Communicative Index (ECI) (2%), and the Individual Growth and Development Indicator (IGDI) (2%).

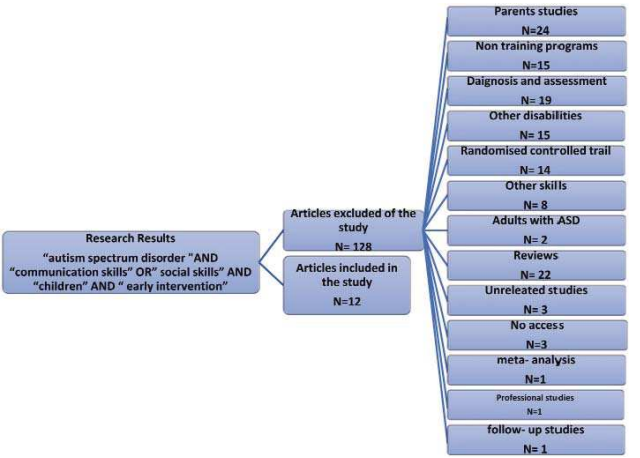

Figure 1. Flowchart shows inclusion and exclusion criteria in research

Table 1

Inclusion and exclusion criteria of the research "social skills early intervention programs for young children with ASD"

Inclusion criteria	**Exclusion criteria**
The Use of Training program	Non-training program
Targeting social communication skills	Other skills
Young children with ASD	Adults with ASD
Provided by professionals and teachers	Provided by parents.
Last 10 years between 2009 and 2019	Before 2009
Provided in schools or community services centers	Randomized control trial or follow up studies
	Incomplete studies/ without accessibility
	Studies about parents or professionals

So & colleagues 2018 conducted a study to examine the effects of robot-based training in improving the gestures skills for 15 young children with ASD, aged four and six years. The training included a social robot that produces 14 gestures and five stories. The result of the study demonstrated that the experimental group who received the intervention produced more accurate gestures and maintained the skills after two weeks of the training sessions over the waitlist group (So, Wong, Lam, Cheng, Yang, Huang, & Lee, 2016).

Radley & colleagues 2015 examined the effects of The Superhero Social Skills program based on video modeling and self-monitoring to improve the accuracy of using conversation, nonverbal, requesting, and responding skills for two participants with ASD; one with Asperger's syndrome and the other with intellectual disability. The results of the study showed that both participants showed an increased level of the learned skills and improvement of skills accuracy, and generalized the skills after the program implementation (Radley, Ford, McHugh, Dadakhodjaeva, O'Handley, Battaglia, & Lum, 2015). Similarly, Radley & colleagues 2017 evaluated the impact of the Superhero social skills in improving the social skills accuracy and function of two participants with ASD, aged 4.5 years and 4.3 years, attending preschool in the northeast of the USA. The results of the study demonstrated that both participants achieved improvement in the accuracy of the social skill and maintained the accuracy after one and half month of the intervention implementation (Radley, McHugh, Taber, Battaglia, & Ford, 2017).

Vivanti & colleagues 2014 evaluated the impact of the Early Start Denver Model on social, cognitive, and behavior skills of children with ASD, aged 18 to 60 months. the intervention program was conducted at care community services, lasted for 12 months, 15 to 25 hours weekly. The participants of the study were compared with a control group (30 participants) with ASD. The result of the study demonstrated that both groups showed improvement in the targeted skills. However, the ESDM group presented a higher level in the targeted skills compared to the control group (Vivanti et al., 2014). Likewise, Colombi & colleagues., 2018 conducted a study to examine the impact of the ESDM Intervention on social, cognitive, behavior skills for a sample of 22 children with ASD, aged 18 to 48 months. The ESDM group received three sessions, 2 hours each for 6 months, and the control group which consisted of 70 participants were receiving usual treatment 5.2 hours weekly for 6 months. The result of the study showed that both groups achieved

improvement in social and cognitive skills, however, the ESDM group gained higher improvement in social, cognitive, and adaptive skills after 3 to 6 months of the ESDM implementation compared with the control group (Colombi, Narzisi, Ruta, Cigala, Gagliano, Pioggia, & Muratori, 2018).

Ventola & colleagues 2014 evaluated the effects of Pivotal Response Treatment (PRT) on adaptive and social skills of ten children with ASD, aged 4.5 to 6.11 years, attending the pre-school setting. The results of the study indicated that all the participants achieved over the implementation of the intervention a moderate to high improvements in the adaptive, and social communication skills domains (Ventola, Friedman, Anderson, Wolf, Oosting, Foss-Feig, & Pelphrey, 2014).

Waugh & Peskin, 2015 conducted a study to evaluate the effects of social skills and Theory of Mind (S.S.T.o.M) intervention in improving the social communication skills of high functioning children with ASD. The study included 49 participants of young children with HFASD, aged 6 to 13 years. In order to examine the impact of the S.S.ToM intervention, the researchers divided the participants into three groups; 19 participants in the S.S.T.o.M group, and two control groups; 11 participants in Children Friendship Training group CFT, and 19 in delayed treatment control group DTC. The S.S.T.o.M intervention program lasted for 3 months based on comic stories through visual supports and gameplay. The result of the study showed that all the participants in CFT and S.S.T.o.M groups demonstrated improvements in social motivation and social communication skills compared to the DTC group who didn't show any improvements in the post-test (Waugh & Peskin, 2015).

Reis, Pereira and Almeida, 2018 examined the impact of the DIR / Floortime intervention model (The Developmental, Individual difference, Relationship-based Model) in developing the social communication skills of children with ASD, aged 3 to 6 years. The study included one experimental group of 25 participants and based on pre and post-test design. The DIR/ Floortime intervention program based on playing activities where the caregivers or parents play with the children on the floor to encourage them to communicate. The results of the study demonstrated improvement in social skills and sensory progress after the program implementation (Reis, Pereira, & Almeida, 2018).

Zachor & Ben Itzchak, 2010 examined the impact of tow intervention approaches; the ABA and the Eclectic on cognitive, social, communication,

and adaptive skills of 78 children with ASD, aged 15 to 35 months, attending pre-schools and receiving a community-based intervention. Besides, the study compared between the two intervention approaches in reducing the severity of ASD. The sample was divided into two groups; the ABA intervention group consisted of 45 participants, and the Eclectic group included 33 participants. The results of the study demonstrated that both intervention groups achieved improvements in cognitive, social, communication and adaptive skills. Moreover, the study demonstrated that there was no significant difference between both intervention groups on the post-test (Zachor & Ben Itzchak, 2010).

Chang, Shire, Shih, Gelfand and Kasari, 2016 conducted a study to evaluate the effects of JASPER intervention on social communication skills of 66 children with ASD, 38 participants of the intervention group and 28 participants waitlist group, aged 3 to 5 years, attending six preschools. The programs targeted independent and symbolic play, communication, motor skills, using behavioral and developmental strategies e.g, modeling, imitating, language and play activities. The results of the study showed that all participants in the intervention group showed significant improvement over the waitlist group in domains of gestures and language joint attention and joint engagement, and teachers showed high fidelity in implementing of JASPER strategy (Chang, Shire, Shih, Gelfand, & Kasari, 2016).

Fava & colleagues 2011 compared the effects of two intervention approaches; the EIBI and the Eclectic in reducing the severity of Autism. The study included 12 children who were receiving EIBI, aged 2.2 to 6.9 years and 10 participants who were receiving Eclectic intervention, aged 2.4 to 5.6 years. The results of the study demonstrated a decrease in autism severity for the EIBI group over the Eclectic group in domains of language, developmental skills. However, both intervention groups scored similar changes in the adaptive behavior domain (Fava, Strauss, Valeri, D'Elia, Arima, & Vicari, 2011).

Barber, Saffo, Gilpin, Craft, & Goldstein, 2016 evaluated the effects of peer Mediated Intervention based on stay, play, talk strategies on social communications skill of three students with ASD, aged 3 to 4 years, attending the clinical setting. Each child with ASD was paired with each one of the developed children. The intervention lasted for 1.5 months to two months, a 20 minutes session a week. The results of the study showed

that all participants in both developed and ASD increased their level of social interactions, however, the participants did not maintain the improvement after two months of the intervention (Barber, Saffo, Gilpin, Craft, & Goldstein, 2016).

DISCUSSION

Most of the early intervention studies were based on behavioral or cognitive principles to evaluate and compare the effects of different forms of techniques on social communication skills of young children with ASD, in addition, these studies demonstrated the effectiveness of early intervention programs in improving the social communication, language, behavior, and cognitive skills of children with ASD.

Seven studies utilized training programs based on behavioral strategies, two of them compared the intervention based on behavioral strategies as Early Intensive Behavioral Intervention (EIBI) approach with the Eclectic intervention approach. The results demonstrated that (EIB) group achieved better outcomes in social, communication, and language skills and decreased level of autism severity over Eclectic group, however, both groups achieved significant improvement in adaptive behavior domain (Fava et al., 2011), and Applied Behavioral Analysis (ABA) approach with Eclectic intervention approach which uses strategies based on multiple theories. The results of the study showed that there was no significant difference between both intervention groups on the post-test, and both intervention groups achieved improvements in cognitive, social, communication and adaptive skills (Zachor & Ben Itzchak, 2010).

Both behavioral and developmental strategies were utilized together in three of these studies as Early Start Denver Model (ESDM) to improve social, cognitive, and behavioral skills for preschool children with ASD (Colombi et al., 2018; Vivanti et al., 2014), both studies showed that both groups demonstrated improvements in the targeted skills but ESDM groups achieved higher gains compared to control groups. Further, Joint Attention Symbolic Play Engagement and Regulation (JASPER) model were used to improve the social communication skills, and the study

demonstrated significant improvement over the waitlist group in domains of gestures and language joint attention and joint engagement (Chang et al., 2016).

Social learning theory strategies were used in three studies, two of them utilized Superheroes social skills program based on video modeling, social stories, and Self-monitoring cards to improve social skills accuracy, both studies demonstrated that all participants with ASD showed an increased level of social skills accuracy and maintained the accuracy after one and half month of the intervention (Radley et al., 2015, 2017), and only one study used " stay, play, and talk" approach to improve social communication skills and the study showed that both participants of children with ASD and their typically developed peers increased their level of social interactions, however, the participants did not maintain the improvement after two months of the intervention (Barber et al., 2016).

Only one study was conducted to evaluate the effect of social skills theory of mind (S.S.T.o.M) intervention to improve the social communication skills of high functioning children with ASD. The study indicated that all children with HFASD in (S.S.T.o.M) group demonstrated significant improvements compared to two control groups: the Children Friendship Training group (CFT), and the delayed treatment control group (DTC) (Waugh & Peskin, 2015).

There was one study used the developmental theory principles solely to examine the impact of the DIR / Floortime intervention model (The Developmental, Individual difference, Relationship-based Model) in developing the social communication skills of children with ASD. The study demonstrated improvement in social skills and sensory progress after the implementation of the intervention program (Reis et al., 2018).

Robot-based training was utilized in one study to improve the gestures skills of preschool children with ASD by comparing the effects of this technique with two control groups: waitlist group and typically developed group. the study showed that the experimental group who received the intervention produced more accurate gestures and maintained the skills after two weeks of the training sessions compared to the waitlist group (Wing Chee So et al., 2018).

The inclusion and exclusion criteria that were used in the present study restricts the obtained results which can neglect several studies that can provide us with more information to understand the investigated topic.

There were limitations in the analyzed studies: some studies limited to one category of ASD or use small sample size (Barber et al., 2016; Radley et al., 2015, 2017; Ventola et al., 2014; Vivanti et al., 2014; Waugh & Peskin, 2015; Chang et al., 2016). Besides, some studies did not have a control group (Barber et al., 2016; Radley et al., 2015, 2017; Reis et al., 2018; Ventola et al., 2014; Fava et al., 2011; Colombi et al., 2018), or not randomly assigned (Zachor & Ben Itzchak, 2010; Waugh & Peskin, 2015). In addition, participants in some study were receiving other intervention or services besides the implementation of the intervention program (Reis et al., 2018), or the external factor e.g. preferred toys rather than peers interaction influence (Barber et al., 2016), which might impact the obtained results of the studies. Furthermore, the limitations of assessment of generalization of the learned skills in other environments e.g. home (Radley et al., 2015, 2017), or lack of long term follow up data which affect the generalizability and maintenance of the learned skills (Radley et al., 2015; Ventola et al., 2014; So et al., 2018; Chang et al., 2016). unavailability of measures for the study sample (Fava et al., 2011), or the cost and the time of using some measures to confirm the results (Waugh & Peskin, 2015). Finally, the implementation of some programs occurred in a clinic setting instead of the natural setting as home or school (Barber et al., 2016).

The present systematic review showed that early intervention programs for children with ASD were effective in improving social communication skills and other deficient areas in ASD. Furthermore, the study highlighted the issues that should be addressed in future studies. Therefore, there is a need for more early intervention programs to address the social communication deficit and other deficits area in ASD as well as more studies and accurate assessment tools to evaluate the effects of early intervention programs for children with ASD.

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