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Learners with Autism Spectrum Disorder: What Socio- Communication Difficulties Entail and the Recommended Research Based Intervention Strategies

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Abstract: **In the last three decades, there has been an unprecedented rate of increase in the prevalence of Autism Spectrum Disorder (ASD). According to the Center for Disease Control and Prevention, 1 in every 59 children in USA has ASD.**

ASD is a dyad of disabilities with a major hall mark feature being socio-communication difficulties. The feature significantly affects interaction and lowers the quality of life of individuals with ASD. To address its implication, a multidisciplinary team approach is critical especially in this era of inclusive education. The main aim of this paper is to assemble and consolidate relevant literature on what Socio-communication difficulties entail as well as the appropriate research-based intervention strategies. This creates a one '*stop shop'* source of reference for multidisciplinary team members who may not be experts in the field of Autism Speech Disorder. To achieve this, Google Scholar search engine was used to search for Articles and research findings from peer reviewed journals on the deficit and appropriate intervention strategies. Only articles that clearly addressed characteristics and intervention strategies were considered. The main electronic data sources used include Jstor, Eric digest and EBSCO. This study is a therefore a product of an extensive in-depth qualitative desk top research.

Challenges in socio-communication abilities are significantly associated with poor theory of mind as well as comorbidity in learners with ASD. The article summarizes the categories of comorbidity first, socio-communication difficulties and finally scans through contemporary research-based intervention strategies.

Key terms**: Autism Spectrum Disorder, Socio-Communication deficits, Intervention strategies, Applied Behaviour Analyses, Discrete Trial, PECS, Pivotal Response Training.**

I. INTRODUCTION

Autism spectrum disorder which manifests itself in early childhood is a condition characterized by aberrant socio-communication skills, restrictive repetitive behaviors, interests, and activities (Brasic, 2020). It is a deep rooted compounded neurodevelopmental disorder (Azhagiri et al., 2021). It was described by Blenner et al., (2021) as an umbrella term used to refer to a class of neurodevelopmental disorders characterized by deficits in social reciprocity, impaired communication and restricted patterns of behavior or interests. Leo Kanner is the father of Autism. He described it for the first time in 1943. He noted children who had many challenges in social communication. They could not keep eye contact, respond to questions, and also had a tendency towards obsessive conversation. Social communication deficit has always been a dominant feature and a hall mark in ASD (Denworth ,2018).

While ASD represent a dyad of disabilities involving deficits in social - communication and challenging behavior, majority of the individuals also exhibit sensory processing disorders and other comorbidities that significantly lower the quality of their life (Wairungu, 2020). Epidemiological studies have also indicated that learners with ASD have a high propensity of developing emotional and behavior problems inclusive of anxiety, depression, hyperactivity, inattention, aggressive behavior and depression (Tsai et al., 2020). The traits of ASD are commonly detectable during early childhood but last the entire life (Azhagiri,et al., 2021). It is basically a lifelong disorder beginning in early childhood but with its pathological outcomes evident in adulthood (Romero, et al., 2016).

While it is not very clear what causes ASD, its *Etiopathogenesis* is thought to be multifactorial with researchers pointing at a complex interaction between genetics and environmental factors (Parmeggian et al., 2019). The disorder is highly (polymorphic) heterogeneous and one of the most prevalent neuro-developmental disorder in the world today (Rylaarsdam & Guemez-Gamboa, 2019). Further, it is currently considered the fastest growing developmental disability in America (Frasier-Robinson & Graham, 2015). Since the 1990s, there has been unprecedented escalation of the number of children with the disorder. According to the American Center for disease Control and prevention (CDC), 1 in every 59 children has ASD (Alpert, 2021). Research further indicates that the disorder predominantly affects more boys than girls in the ratio of 4.5: 1 (Singh et al., 2014). It is opined that the disparity could be explained due to females with ASD showing less repetitive behaviors compared to males, and differing symptom presentations. It is also believed that criteria for diagnoses is made mostly with boys in mind

(Simmons, 2020). It is estimated that more than five million people have ASD in America (Hayman et al., 2020).

With time, changes have been done on criteria for diagnoses of ASD (Baird & Norbury, 2014). In the year 2013, there was the introduction of Diagnostic and Statistical Manual of Mental Disorders *(*DSM–5). It introduced the term *spectrum* which was not there in DSM-4. Before 2013, there were separate diagnoses now consolidated to form the current *spectrum* (ASD). It included Autistic disorder, Asperger's disorder and Pervasive developmental disorder – not otherwise specified (PDD-NOS). With DSM-5 there was also the introduction of a separate diagnosis known as *social communication disorder* (SCD). This is for individuals who have no features such as repetitive disorders and restricted interest but have social communication deficits.

The reason for using the term *spectrum* is because ASD symptoms affect people differently (Wairungu, 2020). Some individuals require around the clock support for example, while others may live a relatively normal life including being able to keep a job and raise a family (Frasier-Robinson & Graham, 2015). Most adults with Autism however find it challenging to get a job in their adulthood. Even when they do get one, they earn very low wages and work very few hours (Gorenstein et al., 2020) as part time and not full-time employees. Precisely, implications of ASD affect the quality of life of individuals in a varied manner. The lifelong ASD implication results to one being a serious burden to family and the community (Xu & Strathearn, 2018). Individuals with the disorder require support in diverse areas including health, education, and daily living. Its *medio-economic* burden is enormous with no validated pharmacological treatment targeting the core features of ASD available (Singh et al., 2015). In (2015) for example, the total cost of direct and indirect care of individuals with ASD was 268 billion dollars (in USA) (Hayman et al., 2015).

Diagnoses of ASD can be done as early as 18 months of age with standardized screening age being between 18 and 24 months (Hyman et al., 2020). Majority of the cases are confirmed by the third birthday (Blenner et al., 2021) in many developed countries. While ASD is a grand mental health challenge globally and calling for prioritized attention, most of the literature (known) is mainly from developed world. Not much information from developing world is documented (Patra & Kar, 2021). While this is the case, it is important to note that ASD cuts across all races, ethnicity, and economic classes. No known propensity exists towards any race, ethnicity or economic class.

As noted earlier, ASD is a dyad of disabilities. One main challenge that makes individuals with ASD to remain dependent throughout their lives is their social communication skill deficits. The deficit is highly polymorphic. This could be explained by comorbidity which is quite rampant in ASD. Researchers opine that apart from the primary ASD features comorbidity of disabilities contributes significantly to the socio communication difficulties. Many individuals with ASD commonly have other secondary conditions such as (among others), depression, anxiety, and AD/HD (Steensel et al., 2013).

II. CO-MOBIDITY IN AUTISM SPECTRUM DISORDER

While core features of ASD impair functioning in ASD, comorbidity (co-occurring conditions) can be a significant source of further impairment (Collins, 2019). Comorbidity is associated with more severe symptoms in ASD. This can be explained by the cumulative effect of the more than one condition in the same individual (Romero et al., 2016; Morozov, 2018). The following are the most common comorbidities.

Epilepsy: Autism is associated with Epilepsy in early childhood (Gabis et al., 2006). Between 25% and 45% individuals with ASD have epilepsy compared to 2% to 3% in typical population. It is a major concern by families and caretakers. The risk for females is significantly higher (Hung, 2016). Historical review indicates that the association of the two has been recognized for a long time. The basis of the association is not very well understood (Hung, 2016). Evidence indicates that individuals who have both ASD and severe cognitive disabilities are at a higher risk of epilepsy (Gabis et al., 2006).

Intellectual disability: Approximately 44% of individuals diagnosed with ASD have average intelligence, 24% have borderline intelligence while 32% are comorbid with intellectual disabilities (Zajic et al., 2018). Communication deficits and cognitive ranges in individuals across the spectrum make diagnoses difficult. Personal interview is made difficult due to the cor-mobidity (Simonoff et al., 2008).

Sensori Motor issues: A significant number of learners exhibit deficient *sensori motor behavior*. While this varies across the spectrum and with individuals, the condition is a predictor of worse functional challenges (Unruh et al., 2021).

Psychiatric disorders: Psychiatric comorbidity is quite common and frequently multiple in children with ASD **(**Simonoff et al., 2008). As noted earlier, ASD is a highly heterogeneous with many associated psychiatric and medical co-morbidities (Frye, 2018). Up to 70% of children with ASD may be affected by other psychiatric disorders (Gordon - Lipkin et al., 2018). Common psychiatric disorders include, anxiety disorders, depressive disorders, bipolar, mood disorders, schizophrenia spectrum, suicidal behavior disorders, attention-deficit/hyperactivity disorder, disruptive, impulse-control and conduct disorders.

Psychiatrist disorder is either externalized or internalized. Internalized one includes emotions and behaviors directed inwards. Examples include mood disorders and anxiety disorders. Externalized disorders have emotions and behaviors directed outwards. These include conduct disorder, AD/HD, and opposition defiant Disorder (Steensel et al., 2013). Psychiatric disorders could mask symptoms of ASD leading to a misdiagnosis. On the same note, IQ, and communication

disorders could lead to challenges of ASD individuals expressing themselves while diagnoses of psychiatric disorders is taking place (Muratori et al., 2019).

AD/HD: More than half of individuals diagnosed with ASD have comorbid AD/HD. Further, more than 50% of individuals diagnosed with AD/HD have traits of ASD. AD/HD Symptoms could easily overshadow the key features of ASD leading to a misdiagnosis or delayed diagnoses (Clarke et al., 2018). It is suspected that both AD/HD and ASD could be influenced by the same genes. Research indicates that learners who exhibit challenges in motor coordination and AD/HD are likely to also have ASD (Reierson & Teod, 2008). Research further indicates that comorbidity of AD/HD and ASD is higher in boys than Girls. It is also more likely in white than other races (May, 2020). While Co-occurrence of AD/HD is common in children with ASD, research indicates that Children with both ASD and AD/HD highly risk having anxiety and mood disorders.

Depression*:* Many learners with ASD experience adverse life affect that increase stress that could lead to depression. It is important that educationist differentiate between the primary ASD condition and the secondary comorbid condition and address them distinctly (Collins, 2019).

Anxiety: Individual with anxiety will often exhibit tension, fear, worry and hyperactivity. Usually, learners with a combination of ASD and AD/HD exhibit high levels of anxiety (Gadow, 2009). Further, anxiety is more prevalent with increasing age (Gordon-Lipkin et al., 2018). Approximately 30% of adults with ASD meet diagnosis of anxiety disorders. On the same note Comorbid anxiety in ASD is highly associated with suicidal or self-injurious behaviors (Kuzminskaite et al., 2020).

Others: Other Comorbid disorders include sleep, elopement, feeding, gastrointestinal tract symptoms, seizure, and obesity (Heyman et al., 2020).

III. SPECIFIC SOCIAL –COMMUNICATION SKILL DEFICITS IN INDIVIDUALS WITH AUTISM SPECTRUM DISORDER.

Historical review indicates that social skill deficit has been the key defining feature of ASD since its conception (Fre, 2015). Social skills are customs, rules and abilities guiding how people interact with others given context. On the other hand, communication entails passing of information from one party to the other. The two are highly related and individuals with ASD struggle with both (Wairungu,2020). Historically, the two deficits were considered separately but the latest Diagnostic and Statistical Manual of Mental Disorder (DSM-5) (unlike DSM-4) address the two together as social - communication deficits. The logic of doing this is clear. In both verbal and nonverbal communication, social reciprocity is central. Technically, there can never be communication without intent of social reciprocity (Loukusa et al., 2018). Communication must be done in an appropriate manner. It varies with situations and context. Individuals with ASD have challenges knowing how to change behavior as contexts change. Research indicates that the learners may have intentions to behave appropriately but the capability is not intrinsic in them. In neuro-typical people, communication disorders may include problems with language, but not with social interaction. Experts use the phrase 'social - communication' to emphasize that fact (Denworth, 2018).

Latest research highlights the key social- communication deficits in ASD as difficulties in social interaction, social cognition, and pragmatics (Simmons, 2020). They are broadly explained below.

Eye contact: One of the hall marks of ASD is atypical eye gaze (Madipakkam et al., 2017). Individuals with ASD have challenges keeping with eye contact when conversing or interacting with others (Yeo & Teng, 2015). They have an unconscious tendency to avoid eye contact. This is one of key diagnostic features of ASD. Typically, in the first few months of life, infants focus on the faces of their caregivers. Children with ASD however tend to focus less on the eyes (Tammy, 2008). On the same note, research further indicates that persons with ASD pay less attention to the area of the eyes even in the static pictures of a human face than persons with typical development (Yoshikawa et al., 2019). Individuals with ASD do not look at the conversation partner directly regardless of whether they are being talked to or they are the ones talking (Azhagiri et al., 2021). This has serious social implication because reciprocity lacks.

Poor nonverbal conversation skills: Individuals with ASD have challenges using body language to supplement their speech. While verbal communication is the common means to deliver communication in social contexts, nonverbal signals play an essential role in paving the way for social interactions (Madipakkam et al., 2017). Example, pointing is important to direct attention during conversation. This has significant social implication. Further, as mentioned earlier, individuals with ASD do not give eye contact which makes them seem uninterested and rude in the eyes of the communication partner. Absence of meaningful gestures or other nonverbal skills to enhance their oral language skills, make individuals with ASD frustrated as they attempt to communicate. Secondarily, this could read to challenging (aggression) behaviors as they express frustrations (Wairungu, 2020).

Joint attention: Joint attention which is a keystone in social skill development refers to the ability to share focus on an object or an area of interest with another person (Sareh & Adel, 2016). It refers to the triadic coordination between two people and the object of interest. Its deficiency is one of the key and early indicators of ASD (Charman, 2003). Normally, the skills involve pointing, showing, and coordinating looks between objects and people. Joint attention skills relate to (positive or negative) outcome out of natural course or early intervention program (Charman, 2003). When language is developing in children, it follows the track of joint attention. Typical children commonly point at an object or an area to

call or direct the attention of parent or care giver. Further, infants and parents flexibly use verbal and nonverbal behaviors to establish frequent episodes of joint attention. The skills help coordinate looks between objects, people, and develop attention states that involve mutually sustained joint engagement (Kasari et al., 2010). Its absence in individuals with ASD significantly affects social communication and their general quality of life.

Speech Challenges: Many individuals with ASD have pedantic or odd speech (Yeo & Teng, 2015), that significantly affect their social communication abilities. This is in both those who can fluently speak as well as those who just utter a few words. The concerns are highlighted below.

Pragmatics: There is a variedly wide range of verbal language abilities in learners with ASD. However, one striking feature about their language profile is a universal impairment in pragmatic language (Parsons et al., 2017). Pragmatics refers to appropriate use of language in diverse social contexts (Denworth, 2018). Some individuals with ASD talk but despite structural language being apparently intact, difficulties with pragmatic language persist. They struggle with appropriate social use of language (Volden, 2008). During a conversation, one is expected for example to give turns and remain focused in the topic of discussion. One should also ask appropriate questions and with decorum (Denworth, 2018). Further, one should be polite, be aware of others communication needs, manage turns and topics, and effectively use language to achieve social goals (Simmons & Volkmar, 2014). This is not automatic in individuals with ASD. There is a total mismatch between language use and context in learners with ASD (Volden, 2008). This is partially because of poor theory of mind where learners with ASD have challenges appreciating that other people have their own views, beliefs, perceptions, and feelings (Wairungu, 2020).

Prosody: Prosody can generally be described as rhythm of speech (Denworth et al., 2018). These are the aspects of speech that accompany words and sentences creating tone of voice (Paul et al., 2005). Being able to talk does not necessarily mean that one is able to effectively communicate. Many individuals with ASD have challenges in prosody. Technically, they have challenges with supra-segmental aspects of speech production (Paul et al., 2005). Prosody has multiple functions. It conveys pragmatic information and communicates emotion (Denworth, 2018). In typical situations, it is important to vary pitch, tempo, rhythm and tone in a conversation. As noted earlier, this is quite a challenge in individuals with ASD (Rudy, 2020). Since spoken language involves more than just pronouncing words, individuals with ASD have challenges communicating effectively even those who are verbal. Problems with prosody can vary. Some individuals speak in monotone for example while others exaggerate pitch.

Pedantic Speech: Individuals with ASD have pedantic or odd speeches. Pedantic speech can be defined as an overly formal speaking style. In real life situations vary and they are not always formal. Children with ASD however, commonly use stock phrases to begin a conversation. This significantly interferes with communication (Mang'ombe & Wairungu 2021).

Rigidity in Language: Individuals with ASD are known to have a rigid way of speaking. Often, children with ASD who can speak will say things that have no meaning or that do not relate to the conversations they are having with others. They may also give recursive examples during conversations (Azhagiri et al., 2021). Typically, learners with ASD are biased towards their areas of restricted interest (Mang'ombe & Wairungu, 2021). Example, a child might introduce the topic of dinosaurs in a conversation about a kin who is sick and in hospital. This happens because the child is un-proportionately interested in dinosaurs. This unfortunately is out of context and significantly interferes with communication.

Echolalia: Echolalia is a verbal disorder involving meaningless repetition of words said by others. It is both pathological and non-intentional (Marconi & Galluci, 2012). The phenomenon is pervasive in verbal children with ASD. Although traditionally thought to play non communication function, research indicates that echoes could play a communication function (Sterponi & Shankey 2013). Echolalia is categorized into two. It could be *delayed* or *immediate*. In the immediate echolalia, a child may repeat words she has just heard. In the delayed one, a child repeats words heard at an earlier time. Echolalia contributes to communication breakdown during conversation. It may also increase chances of stigmatization in children with ASD (Neely et al., 2015), especially in an inclusive education setting. It can significantly be disruptive and could make classroom management (or a therapy session) difficult.

Uneven language development: Typical children start developing language right the day they are born. This is enhanced through interaction with caretaker and significant other people. This is unfortunately a challenge with children who have ASD because they are reserved (Wairungu, 2020). They do not meaningfully interact with others. Children with ASD may develop speech and language skills, but not to a normal level of ability (Mang'ombe & Wairungu, 2021). The development progress is usually uneven. In some situations, a child may develop vocabulary fast but only in areas of interest. Others may be able to read at a very early age but with no comprehension. They may also not respond to speech of others making themselves to be mistaken for being rude.

IV. RESEARCH BASED INTERVENTION STRATEGIES

As noted earlier, social communication challenges have been a hall mark of ASD since it was ever recorded. Social communication is also known as pragmatics and refers to the way people use language within social contexts. It is quite critical to ensure that learners with ASD socialize and communicate effectively. This is especially so in this era of

inclusion. In this section, appropriate research based intervention strategies are discussed. They include discrete trial, functional communication training, naturalistic language training, joint action routines and video modelling.

Discrete trial training

This is a lengthy 1:1 teaching strategy based on applied behavior analyses principles (Leaf et al., 2016). The strategy is both intensive and individualized. It varies with the needs and nature of the learner (Readon, 2012). It involves breaking skills into subskills with correct responses being accompanied by positive reinforcement. It has been commonly and effectively used as an early intervention in learners with ASD (Booth & Keenan, 2018). Usually, repeated practice skills are conducted accompanied with prompting where necessary. This is done for several hours per day until a skill is mastered. It is implemented in a fixed way in which the therapist is governed by a strict set of rules (Leaf et al., 2016). DTT has five parts, initial instruction, prompt or cue for student to give a response, an appropriate consequence and finally a pause or wait time (in between consecutive attempts) of a few seconds. For best results DTT should be combined with other interventions to enable children initiate, maintain, generalize, and acquire skills faster (Readon, 2012).

Naturalistic Language Strategies

Naturalistic language strategies are child centered strategies that take place during naturally occurring routine or activities.

It includes Environment arrangement and interaction techniques. Like DTT above, the strategy is anchored on applied behavior analysis principles. The main aim is to encourage specific target behaviors based on learners' interests by building more complex skills that are naturally reinforcing and appropriate to the context of interaction (Davis, 2017). The strategy helps learners become more social and as well improve communication. In this strategy, skills are more easily generalized because it is set in a more natural environment. It maximizes the interaction between children with ASD, parents and significant others. This further improves language development, communication, and social skills (Akamoglu & Dinnebeil).

Social narratives

Social narratives are interventions describing social situations, highlighting relevant cues and giving appropriate contextual response. While dealing with ASD learners, narratives are written in a highly visual language. This is because many learners with ASD have challenges comprehending long wordy statements. They connect important details of a social setting. Narratives are also known as social stories and are highly individualized. The strategy is frequently used to address deficits in the theory of mind (Saad, 2016). This is because individuals with ASD have challenges understanding other people's thoughts, beliefs feelings or emotions (Wairungu, 2020). Evidence indicates that *out of sit behaviors*, *conversational skills* and *on-task behavior* have been addressed successfully using the strategy among many other social communication difficulties (Saad, 2016).

Peer Mediated Instruction and Intervention PMII

This strategy teaches peers to interact and support students with ASD in acquiring new social skills in natural environment. Research indicates that the strategy increases opportunities to practice appropriate social and communication skills in a natural interaction with others (Neitzel, 2008). It can take a variety of approaches inclusive of class wide intervention, peer modelling intervention, peer tutoring intervention and social skill training.

Picture Exchange Communication Systems

PECs is a popular communication training program for young children with ASD (Flippin et al., 2016). It is an augmentative communication system commonly used as an intervention in children with ASD (Charlop-Christy et al., 2002). It teaches a child to be an initiator of communication. The strategy is based on ABA and the works of BF skinner. It was first developed in Delaware (USA) by Andy Bondy and Lon Frost in 1985 (Mang'ombe & Wairungu, 2021). Initially, it was used with pre scholars in Delaware Autism Center. Today it is applied in many parts of the world and in diverse situation with positive results.

Pivotal Response Training

In the current world of ASD, there is a growing support for naturalistic developmental behavioral support (NDBS) (Gengoux et al., 2019). One such approach is Pivotal Response Training. PRT is a research-based intervention strategy anchored in the principle of ABA. It adopts more naturalistic approach compared to other strategies like Discrete Trial Teaching (Lei & Ventola, 2017). It was developed by Robert Koegel and Lynn Koegel in 1987 (Hobbs, 2021). It is said to be naturalistic because it is child centered. Many of the learning opportunities are determined by the interests of the child (McClelland, 2016).

Voice Output Communication Aids

Voice output communication aids (VOCAs) refers to a Critical form of communication within the field of augmentative and alternative communication (AAC) (Judge & Townend, 2013). These are portable electronic devices that provide computer generated or digitized speech output (Mang'ombe & Wairungu, 2021). They are mostly handheld and produce prerecorded words or phrases.

Video Modelling

This is a common mode of teaching that makes use of video recording and display equipment to provide a visual model of the targeted behavior or skill (Mang'ombe & Wairungu, 2021). The child with ASD watches an individual demonstrating a certain skill and learns through the demonstration. There are four approaches inclusive of basic video modelling, point of view video modelling, video self-

modeling and video prompting. It was first used to intervene for an autistic child in 1982 by Steinborn & Knapp. It is currently a popular strategy throughout the world.

Functional Communication Training

Functional communication training is one of the most common and effective intervention strategies for learners with severe behavior problems (Tiger et al., 2008). Children are taught appropriate ways of communicating in place of the undesired forms of expressing oneself. This is because every exhibited challenging behavior is functional (Wairungu, 2020). It is important to help the child communicate appropriately achieving the same goal (Mang'ombe & Wairungu, 2021). The strategy is used in combination with other therapies. Precisely, learners are taught meaningful and functional communication in a natural way. Meaningful forms of communication include gestures, sign language, use of pictures etc. As teaching takes place differential reinforcement is concurrently done.

Joint Action Routines

Popularly known as JAR, the strategy was developed to support language development, communication skills and encourage participation in individuals with communication skills challenges. It relies on consistency and reliability of familiar routines that provide cues for learner to acquire new responses or use acceptable responses at the appropriate time. Learners with ASD like structure and routines (Mang'ombe & Wairungu, 2021). Routines are repeated often making them become more meaningful to the child with ASD. As the child gains a sense of control, he or she engages in the targeted cognitive task or activity. During a joint activity routine, the adult and the child are focused on the same item or activity together at the same time. Once the child masters the routine, he/she knows what exactly they need to do when. They relax, are less anxious, participate and communicate. Apart from improving socio-communication abilities the strategy reduces challenging behaviors significantly (Wairungu, 2020).

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