Development, Validation and Efficacy of an E-Module on Autism Spectrum Disorder for Preschool Teachers in India

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June- 2026

CERTIFICATE

This is to certify that this dissertation entitled **"Development, Validation and Efficacy of an E-Module on Autism Spectrum Disorder for Preschool Teachers in India"** is a bonafide work submitted as part of the fulfillment of the degree of Master of Science (Speech-Language Pathology) of the student with Registration Number P01II24S123021**.** This has been carried out under the guidance of the faculty of this institute and has not been submitted earlier to any other university for the award of any other Diploma or Degree.

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CERTIFICATE

This is to certify that this dissertation entitled **"Development, Validation and Efficacy of an E-module on Autism Spectrum Disorder for Preschool Teachers in India"** has been prepared under my supervision and guidance. It is also being certified that this dissertation has not been submitted earlier to any other university for the award of any other Diploma or Degree.

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DECLARATION

This is to certify that this dissertation entitled **"Development, Validation and Efficacy of an E-Module on Autism Spectrum Disorder for Preschool Teachers in India"** is the result of my own study under the guidance of Dr. Jayashree C. Shanbal, Professor of Language-Pathology, Head-Department of Speech-Language Pathology, All India Institute of Speech and Hearing, Mysuru and has not been submitted earlier to any other university for the award of any other Diploma or Degree.

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List of Frequently Used Abbreviations

ASD: Autism Spectrum Disorder

CVR: Content Validity Ratio

Mdn: Median

IQR: Inter Quartile Range

CVI: Content Validity Index

APA: American Psychiatric Association

SLP: Speech Language Pathologist

CDC: Centres for Disease Control and Prevention

MMR: Measles, Mumps, and Rubella

NIDCD: National Institute on Deafness and Other Communication Disorders

NIMHANS: National Institute of Mental Health and Neurosciences

NCERT: National Council of Educational Research and Training

PECS: Picture Exchange Communication System

TEACCH: Treatment and Education of Autistic and Communication Handicapped Children

MCHAT-R: Modified Checklist for Autism in Toddlers, Revised

IEP: Individualized Education Plan

PwD: Persons with Disabilities

NEP: National Education Policy

ABSTRACT

ASD is a major neurodevelopmental concern, with global estimates indicating that 1 in 100 children have ASD (WHO, 2022), while Indian studies report a prevalence of 1% to 1.5% among children aged 2 to 9 years (Arora et al., 2018). Despite the importance of early intervention, inadequate awareness and a lack of any sensitization training has been reported among professionals, including teachers (Alobaid & Almogbel, 2020, John & Shetty, 2022). Therefore, the present study aimed to develop and evaluate the effectiveness of an E-module on ASD for sensitizing preschool teachers in India. The study utilized a descriptive, single group pre-test and post-test design. The E-module and questionnaire were developed through an in-depth literature review, followed by quantitative and qualitative content validation by a team of 10 multidisciplinary professionals and five preschool teachers. The findings showed universal agreement across all domains of E-module and questionnaire. Qualitative suggestions were incorporated to improve the quality of the final E-module and questionnaire. A pilot study (N=5) suggested no further protocol changes. For the final study, 55 preschool teachers from Mysore were recruited. The pre-test was administered, followed by delivery of the E-module and post-test. Descriptive statistics showed improved median post-test scores, both overall and section-wise, compared with the pre-test scores. The Wilcoxon Signed Rank test further revealed a statistically significant improvement indicating improved awareness about ASD screening, referral pathways, classroom modifications, government schemes and misconceptions about ASD. This study concludes that the E-module developed for Preschool teachers was relevant, comprehensive and culturally appropriate.

Keywords: Autism Spectrum Disorder, E-module, Preschool Teachers, ASD Awareness, Early Identification, Teacher Sensitization, Screening, Inclusive Classroom Practices.

CHAPTER I

INTRODUCTION

As quoted by popular American autistic activist and writer Jim Sinclair, “Autism is not a disease, it’s a different way of being human”. Autism Spectrum Disorder (ASD) is a condition which is characterised as a group of lifelong neurodevelopmental conditions whose main core features are deficits in the area of social communication domains and also restrictive and repetitive behaviours (American Psychiatric Association, 2022). Global estimates indicate that roughly 1 in 100 children are diagnosed with ASD (World Health Organization, 2022). According to data from the Centre for Disease Control and Prevention (CDC), the estimated prevalence of ASD among 8-year-old children in 2020 was approximately 1 in 36 children, or 2.76% (Maenner et al., 2023). Estimates of the prevalence of ASD in India indicate an increase, with studies indicating that around 1% to 1.5% of the children's population is estimated to report clinically with ASD (Arora et al., 2018). Despite increased awareness, many children are undiagnosed or diagnosed too late to benefit from early intervention, demonstrating the need for systematic awareness campaigns, early identification and structured interventions in the Indian context (Chakrabarti, 2023; Chattopadhyay, 2024).

One of the earliest and most noticeable signs of ASD is often a delay or impairment in communication development (Hyman et al., 2020). This impairment will affect a child's ability to learn and express language and to use communication in a functional and meaningful way in social interactions. One may see a variety of language markers, such as a child who begins talking much later than peers or who does not talk at all. Other risk factors can include delayed name call response, no or limited babbling or pointing or gestures, echolalia, etc (Hyman et al., 2020; Tager-

Flusberg et al., 2005).

At the global level, the WHO has been calling for the integration of ASD awareness into community and school-based systems through teacher sensitization and training. In response to this global call, the Government of India has established policies, the pioneer being the National Trust Act (1999) by the Ministry of Social Justice and Empowerment. Several schemes like Samagra Shiksha Abhiyan, Niramaya health insurance scheme, Disha Early Intervention and School Readiness Scheme, etc. It was intended to assist with lifelong care and provide education and jobs for persons with disabilities. The National Disability Policy (2006) emphasized the continued themes of equality, accessibility and empowerment for persons with disabilities. With the Rights of Persons with Disabilities (RPwD) Act (2016) the government committed to creating specific legislation to recognize autism as a category of disability. The RPwD Act (2016) mandates specific provisions for inclusive education, reservations for individuals with disabilities in higher education and employment, and accessibility programs. The National Mental Health Policy (2015) by the Ministry of Health and Family Welfare, recognized the need for early identification, timely care, and community-based rehabilitation for children with developmental disorders. While these policies can be viewed as a comprehensive framework, the implementation of these policies into the early education system is inconsistent at best.

The revised scope of practice in speech-language pathology given by American Speech and Hearing Association (ASHA, 2016), expands the role of Speech Language Pathologists (SLPs) beyond assessment and treatment by emphasizing professional responsibilities such as advocacy and outreach, highlighting their role in creating awareness, supporting early identification,

educating communities, and strengthening access to services. SLPs have a crucial role in creating awareness about ASD and facilitating early identification among parents, preschool teachers, and community-level workers (Santhanam et al., 2025). Since communication difficulties are often among the earliest and most noticeable concerns in children with ASD, SLPs are well-positioned to recognize early red flags such as delayed speech and language development, poor response to name, limited use of gestures, reduced joint attention, poor eye contact, echolalia, difficulties in social reciprocity, and atypical play or interaction patterns (Hyman et al.,2020; Binns et al., 2022). Their experience in communication, language development and social interaction is useful to identify children who may require further developmental assessment and early intervention.

The role of SLPs extends to awareness generation, caregiver counselling, teacher training, advocacy and interprofessional collaboration (Hyman et al.,2020). SLPs can help Preschool teachers understand that they are not expected to diagnose ASD, but they can play an important role in observing red flags, documenting classroom behaviours, communicating the behaviours to the parents and referring children to right professionals. Through educational programs and training modules, SLPs can empower Preschool workers with accurate, practical and culturally relevant knowledge about ASD (Hyman et al., 2020). This empowerment can help reduce myths and misconceptions, promote timely referral, and minimize delays in diagnosis and intervention. Therefore, SLP-led awareness initiatives are essential in strengthening early identification systems and improving access to early support services for children with ASD.

Need for the Study

The importance of this study lies in addressing the barriers that hinder early identification and support for children with ASD in India. Families often face delays in diagnosis and intervention, not only because of stigma and limited awareness in the community, but also due to gaps in teacher preparedness during the preschool years, i.e., the period when symptoms typically become evident. In this era of rapid technological enhancement Preschool teachers' knowledge through an educational E-Module, can play an important role in bridging this gap and facilitating early identification and early intervention.

Myths and stigma associated with ASD also remain important barriers to early identification and timely intervention (Liao, Lei & Li, 2019). In many Indian families and communities (Estrin et al., 2023) ASD related behaviours may be misunderstood as poor discipline, poor parenting or the result of misbeliefs regarding supernatural or social causes. Such misconceptions can delay parental acceptance, reduce help-seeking behaviour, and affect the child's participation in preschool and community settings. Patra and Patro (2019), in their study on affiliate stigma among parents of children with autism in eastern India, reported that parents experienced high levels of stigma, strain, burden, and discrimination while caring for their child with ASD. They further highlighted that parents may internalize stigma, which can increase psychological distress and negatively influence care-seeking and caregiving practices. Therefore, Preschool teachers need accurate and sensitive knowledge about ASD so that they can challenge myths, reduce stigma, communicate concerns appropriately to parents, and support early referral and intervention.

Preschool teachers, play a pivotal role in early identification. The age range to which they cater is typically between 3 to 6 years, a critical developmental period

during which the signs of ASD begin to manifest more evidently. A study conducted in the Qassim region of Saudi Arabia reported that 74.4% of Preschool teachers demonstrated poor levels of awareness of ASD (Alobaid & Almogbel, 2020) and only 25.6% of Preschool teachers possessed adequate knowledge about ASD. A systematic review of 25 global studies done between 2015-2020 found that teachers' knowledge of ASD was typically not very comprehensive, that prior training or direct experience with autistic students was a strong predictor of knowledge and attitudes (Gómez-Marí et al., 2021). Studies in nearby low and middle-income settings have reported the same misunderstanding and knowledge gaps in education down to the roots.

A community-based study from Laos reported that ASD awareness was low and that there was still stigma among teachers that continued to delay early identification and inclusion (Low et al., 2021). Research from specific areas also confirmed this trend, wherein both school- and community-based research from South (Nepal) and Southeast Asia (Laos) identified a low level of baseline knowledge in teachers, but significant improvement post-educational intervention (Bhurtel et al., 2024; Low, Wong, & Lee, 2021). Essentially, they reported both a dilemma (unprepared teachers) and an opportunity (teacher training mirroring measurable gains). Another research from Yemen reported parallel findings, i.e., a lack of awareness among Preschool teachers regarding ASD, exposing the wider challenge of equipping educators to support children with autism while engaging in early learning (Taresh et al., 2019).

The results of the studies done in the Indian context are in consonance with the findings of global studies. Kumar et al.(2023) conducted a two-group(parents and Preschool teachers) pre-test-post-test study on a total of 60 participants. The findings

revealed improved knowledge among both groups and it was found that the post-test scores of the teachers were higher than those of the parents, but it was the opposite as to that in the pretest scores. Another study done by Shetty and Rai (2014) on primary school teachers reported that though 95.7% of the teachers were aware of ASD, only 21% had adequate knowledge of ASD and that the experienced teachers demonstrated higher awareness than novice teachers. Yet another study done by Daniel et al. (2013) evaluated the effect of a self-instructional educational module on the knowledge of primary school teachers of four different schools in Delhi regarding early symptoms of childhood psychiatric disorders (particularly Attention Deficit Hyperactivity Disorder (ADHD) and ASD). The findings of this pre-test and post-test suggested a significant increase in the post-test scores indicating improved knowledge of primary school teachers regarding early symptoms of childhood psychiatric disorders after exposure to the self-instructional educational module. The results of this study align with a similar study done by Jain and Menaria (2019), who also concluded that a self-instructional module was significantly effective in enhancing the knowledge of the Preschool teachers regarding ASD.

The legislative and policy frameworks in India, such as the RPwD (2016) and national guidelines, support early identification and inclusive education, however, these frameworks are not fully operationalized in preschool settings across the country. These gaps arise due to several barriers including limited in-service training for Preschool teachers, recommendations to access under-resourced/needy contexts, adaptable learning resources, and challenging underdeveloped referral pathways neglecting needful/diagnostic and intervention services. Altogether, the issues discussed here contributed to late diagnosis and missed the critical windows of opportunity for early intervention, which are known to influence long-term outcomes

for children with ASD.

Given the proven ability of short, structured educational interventions (Daneil & Sagar, 2013; Jain & Menaria, 2019), and particularly the increasing viability of online training in Indian schools, an E-Module for Preschool teachers offers a scalable solution. However, although previous Indian studies have demonstrated the usefulness of self-instructional modules and awareness-based educational programs in improving teachers' knowledge of ASD, there is limited evidence on the development of a holistic, ASD-specific E-module designed particularly for Preschool teachers. Most existing resources tend to focus on general awareness, primary school teachers, parents, or broader childhood developmental concerns, rather than addressing the specific needs of Preschool educators who work with children during the critical early years of development.

Also, although earlier Indian studies have reported improvement in teacher knowledge following educational modules, many of these have focused on primary school teachers, broader developmental or psychiatric conditions, or general awareness (Daneil & Sagar, 2013; Jain & Menaria, 2019). There is comparatively limited work targeting Preschool teachers, despite their crucial role during the 3 to 6 year developmental period. Therefore, there is a need for a structured Indian E-module that comprehensively covers early signs of ASD, common myths and misconceptions, referral pathways, classroom support strategies, communication difficulties, sensory concerns, and behavioural characteristics. Such a module can help preschool teachers move beyond basic awareness toward practical understanding and readiness for early identification and timely referral, therefore supporting early intervention within the Indian preschool context. An E-Module could facilitate and create awareness of early signs, help in timely referrals, and this

module can be shared across webs therefore benefiting Preschool teachers at large.

Aim of the study

The aim of the study is to develop, validate and evaluate the efficacy of an E-Module on ASD, for Preschool teachers in India.

Objectives of the study

The objectives of this study are as follows:

i. To develop a structured, scalable and validated digital resource E-module to create awareness on ASD among Preschool teachers in the Indian context.
ii. To study the efficacy of the E-Module on ASD among Preschool teachers in terms of their awareness, knowledge, and attitudes.

Null Hypothesis

The following null hypothesis is proposed for the present study:

H01: There is no significant difference in the scores of pre- and post-test among the Preschool teachers even after undergoing the administration of the E-Module.

CHAPTER II

REVIEW OF LITERATURE

Understanding Autism Spectrum Disorder (ASD) is essential for early identification, timely referral, and appropriate support, especially during the preschool years when developmental differences become more evident. The following section provides an overview of ASD, including its core characteristics and related developmental features. The literature is reviewed below under following headings:

2.1 Overview of ASD

2.2 Role of Multidisciplinary Action

2.3 Importance of Early Identification

2.4 Current level of awareness about ASD amongst different professionals

2.5 Policy Frameworks for ASD

2.6 Myths and Misconceptions associated with ASD

2.7 Available Preschool Teacher Training and Education Programs on ASD

2.8 Digital Educational Modules on ASD for Teachers

2.1 Overview of ASD

ASD is a neurodevelopmental disorder characterized by deficits in social communication and social interaction and the presence of restricted, repetitive behaviours. The social communication deficits show in various ways and can include impairments in joint attention and social reciprocity as well as challenges using verbal and nonverbal communication behaviours for social interaction. The Restricted, Repetitive Behaviours (RRBs) interests, or activities are manifested by stereotyped, repetitive speech, motor movement, or use of objects; inflexible adherence to routines; restricted interests; and hyper- and/or hyposensitivity to sensory input. (American Psychiatric Association (APA), 2022).

The symptoms of ASD usually emerge during early childhood and can significantly affect language development, learning, adaptive functioning and social participation. Children with ASD may demonstrate difficulties in maintaining eye contact, understanding social cues, engaging in reciprocal communication and developing peer relationships. Repetitive behaviours, insistence on routines, restricted interests and atypical sensory responses are also commonly observed. Since early childhood represents a critical period for brain development and language acquisition, timely identification and intervention are considered essential for improving developmental outcomes and quality of life.

Autism phenotyping refers to the systematic description of the observable characteristics of individuals with ASD. Autism is described as a spectrum because individuals with ASD show wide variability in their social communication abilities, behavioural patterns, sensory responses, language development, cognitive profiles, and levels of support needs. Since ASD is highly heterogenous and referred to as 'spectrum' of disorder, phenotyping helps explain why children with the same diagnosis may present very differently in terms of severity, strengths and support needs (Ousley & Cermak, 2014; Masi et al., 2017). A sub-category called the broader Autism phenotype refers to milder ASD-like traits observed in some family members or in the general population, such as subtle pragmatic deficits, social withdrawal, rigid personality traits, or preference for routines, etc., without meeting full diagnostic criteria for ASD (Sucksmith et al., 2011). Researchers have described possible Autism subgroups based on language age, intellectual functioning, regression, sensory issues, and other co-morbidities. Tager-Flusberg and Joseph (2003) discussed neurocognitive phenotypes based on language and cognitive differences. Accurate phenotyping helps in early identification, guide referral, improve intervention quality rather than relying on the treatment approach of 'one size

fits all' (Beversdorf, 2016). The heterogeneity observed in ASD phenotypes has also influenced how ASD has been understood, classified and diagnosed over the last fours decades, leading to significant shifts in its diagnostic criteria across successive frameworks of Diagnostic and Statistical Manual of Mental Disorders(DSM) and International Classification of Diseases (ICD).Table 2.1 summarizes a shift in the diagnostic criteria of ASD in the last 4 decades as per the DSM and ICD.

Table 2.1

Shift in the diagnostic criteria of ASD as per DSM and ICF frameworks.

Diagnostic framework	Diagnostic label	Key diagnostic features	Major shifts	Implication for ASD diagnosis
Early clinical descriptions: Kanner, 1943	Early Infantile Autism	Difficulties in social relatedness, communication differences, insistence on sameness, and unusual behaviours.	Autism was described as a distinct condition rather than only as childhood schizophrenia.	Formed the basis for later recognition of autism as a separate clinical entity.
DSM-III	Infantile Autism	Childhood-onset disorder marked by social, communication, and behavioural disturbances.	Autism was formally placed under pervasive developmental disorders.	Established specific diagnostic criteria for autism as a developmental disorder.
DSM-IV	Pervasive Developmental Disorders (PDDs), including Autistic Disorder, Asperger's Disorder, PDD-NOS, Childhood Disintegrative Disorder, and Rett's Disorder.	Multiple subtypes were diagnosed based on differences in social interaction, communication, restricted behaviours, language delay, and cognitive profile.	Autism-related conditions were divided into separate diagnostic categories.	Led to diagnostic overlap, difficulty in subtype differentiation, and reduced reliability across settings.

Diagnostic framework	Diagnostic label	Key diagnostic features	Major shifts	Implication for ASD diagnosis
ICD-10	Pervasive Developmental Disorders, including Childhood Autism, Atypical Autism, Rett Syndrome, Asperger Syndrome, Other Childhood Disintegrative Disorder, and PDD-Unspecified.	Used separate PDD subtypes. Childhood autism required impairments in social interaction, communication, and restricted/repetitive behaviours, usually before 3 years.	Continued a categorical subtype-based understanding of autism.	Helped classify different presentations but had limited usefulness due to symptom overlap and variability.
DSM-5	Autism Spectrum Disorder	Combined previous PDD categories into one diagnosis with two core domains: social communication/social interaction deficits and restricted, repetitive behaviours.	Shifted from rigid subtypes to a dimensional spectrum approach.	Improved diagnostic consistency and emphasized severity, heterogeneity, and support needs.
DSM-5-TR	Autism Spectrum Disorder	Retained DSM-5 criteria with clearer wording, updated	Maintained the spectrum approach with improved clarity and inclusivity.	Supported more consistent and clinically applicable

Diagnostic framework	Diagnostic label	Key diagnostic features	Major shifts	Implication for ASD diagnosis
		terminology, and refined descriptions.		diagnosis across diverse individuals.

Researchers have extensively explored the etiology of ASD to better understand its underlying mechanisms and improve early identification. Recent studies have focussed on identifying biomarkers that may support earlier screening and diagnosis, therefore facilitating timely access to intervention and support services (Interagency Autism Coordinating Committee (IACC), 2023).Current evidence suggests that ASD from a complex interaction of genetic, neurobiological and environmental factors rather than a single causative agent.

Genetic factors considered as one of the predominant contributors to the development of ASD. Numerous studies indicate that ASD has significant hereditary component with genetic variations and mutations playing a major role in atypical neurodevelopment. Researchers have suggested that ASD may be associated with genetic differences linked to the X chromosome, which partly explains the higher prevalence of ASD among males compared to females (Chakrabarti & Fombonne, 2005). The twin studies also support the strong genetic basis of autism, demonstrating increased recurrence rates among siblings and close relatives. For instance, younger siblings of children diagnosed with autism are at a greater risk of also receiving an ASD diagnosis compared to the general population (Ozonoff et al., 2011). Advances in molecular genetics have further identified several candidate genes associated with synaptic functioning, neuronal connectivity, and brain development, suggesting that multiple genes rather than a single gene contribute to ASD susceptibility.

Neurobiological research has shown that genetic differences may influence early brain development, leading to alterations in brain structure, neural connectivity, and information processing. These atypical developmental processes can affect cognition, sensory processing, attention, social interaction, and communication abilities in individuals with ASD. According to D. Williams (2012), genetic variations may can

significantly influence differences in both brain structure and neurological functioning, which in turn influence behavioural patterns commonly associated with ASD. Neuroimaging studies have identified abnormalities in different brain areas especially involved in social cognition, emotional processing, language, and executive functioning. These include the frontal cortex, temporal lobe, amygdala, and cerebellum. In addition, studies have demonstrated atypical neural responses to social stimuli such as eye gaze and facial expressions among infants later diagnosed with ASD (Elsabbagh et al., 2012). These findings suggest that differences in neural processing may emerge very early in development and contribute to the characteristic social communication difficulties observed in ASD.

Factors related to environment have also been explored as potential contributors to ASD, specifically those which occur during prenatal and early infancy development. Studies were focused on findings out the possible role of maternal health , exposure to certain medications or toxins during pregnancy, nutritional factors, maternal age and complications during pregnancy or birth which can increase likelihood of ASD. However, findings of these studies revealed that no single environmental exposure has been established as a direct cause of ASD. Current evidence suggests that environmental factors can pair up with underlying genetic susceptibility, therefore affecting neurodevelopmental outcomes. The Interagency Autism Coordinating Committee (IACC, 2023) highlights the need for further research in this area to better understand specific environmental causes and possible genetic interactions involved in ASD etiology. The findings of such research studies may contribute to improved prevention strategies, earlier identification, and the development of more targeted intervention approaches in the future.

Extensive research conducted over several decades has consistently shown that childhood vaccines, including measles, mumps and rubella (MMR) vaccines, don't cause ASD. In 1998, Andrew Wakefield and colleagues published a paper in the journal 'The Lancet'. Wakefield's hypothesis was that the measles, mumps and rubella (MMR) vaccine caused a series of events that include intestinal inflammation, entrance into the bloodstream of proteins harmful to the brain, and consequent development of autism. In support of his hypothesis, Dr. Wakefield described 12 children with developmental delay, eight had autism. All of these children had intestinal complaints and developed autism within one month of receiving MMR (Philadelphia, n.d.). However, this paper was later found retracted by The Lancet due to serious ethical and methodological flaws (Rao & Andrade, 2011). Large cohort studies revealed results that disproved this claim. Hvidd et al. (2019), in a nationwide Danish cohort study of more than 6,50,000 children found no increased risk of ASD among children receiving MMR vaccine. DeStefano et al., (2004) reported that the age at which children received their first MMR vaccine was not associated with ASD risk. A meta-analysis by Taylor, Swerdfeger and Eslick (2014) which combined evidence from multiple cohort and case-control studies found similar findings of no link between vaccines, MMR, Mercury, Thiomersal and ASD. Overall, the available evidence strongly supports that ASD is neurodevelopmental disorder influenced by genetic and early developmental factors and not by vaccination.

2.1.1 Epidemiology of ASD: Global and Indian data

The prevalence of ASD has increased considerably over the past few decades, reflecting improvements in awareness, screening practices, diagnostic criteria and access to services. Incidence refers to the number of newly identified cases within a specified period, whereas prevalence refers to the total number of individuals living with ASD during a given time frame. Recent epidemiological reports indicate that ASD is one of the

most commonly identified neurodevelopmental disorders in childhood. ASD has become a major public health and developmental concern, with the World Health Organization (2022) estimating that nearly 1 in 100 children are diagnosed with ASD. According to data from the CDC, the estimated prevalence of ASD among 8-year-old children in 2020 was approximately 1 in 36 children, or 2.76% (Maenner et al., 2023). Similarly, the National Survey of Children's Health reported a parent-reported prevalence of 3.1% among children aged 3–17 years (Wang et al., 2023). Educational statistics further indicate that approximately 1.2% of children aged 5–21 years received special education services under the ASD category as part of the Individuals with Disabilities Education Improvement Act (U.S. Department of Education, 2023).

Epidemiological findings consistently demonstrate higher prevalence rates among males compared to females. Maenner et al. (2023) reported ASD prevalence rates of 4.3% in boys and 1.14% in girls, with an overall male-to-female ratio of approximately 3.8:1. Studies have also reported significantly higher rates of ASD among gender-diverse individuals, with a total prevalence of 11% (Kallitsounaki & Williams, 2023). Variations in prevalence have additionally been noted across racial and ethnic groups, with higher prevalence reported among Hispanic, non-Hispanic Black, and Asian/Pacific Islander children compared to non-Hispanic White children (Maenner et al., 2023). Furthermore, ASD frequently co-occurs with several genetic and neurodevelopmental syndromes, including Cohen syndrome, Cornelia de Lange syndrome, fragile X syndrome, tuberous sclerosis complex, Down syndrome and Williams syndrome (Richards et al., 2015).

Globally, prevalence rates vary across regions, possibly due to differences in diagnostic awareness, healthcare access, cultural perceptions and surveillance systems (Olusanya et al., 2023). Overall, the increasing prevalence of ASD highlights the growing

need for early identification, multidisciplinary intervention, inclusive educational practices and accessible support services across the lifespan.

In India, prevalence estimates also indicate a rising trend. Arora et al.,(2018) conducted a large population-based study across five geographically diverse regions of India to estimate the burden of neurodevelopmental disorders among children aged 2 to 9 years. Using community-based screening and standardized diagnostic assessments, the study reported that approximately 1% to 1.5% of Indian children may clinically present with ASD. The findings of this study revealed significant disparities in access to developmental screening, diagnostic services and rehabilitation facilities across regions and socio-economic groups. The study emphasized that many children with ASD remain undiagnosed or receive diagnosis at a later stage, therefore missing opportunities for early intervention during critical developmental periods. Both studies collectively underscore the growing prevalence of programs, multidisciplinary intervention services and strengthened healthcare infrastructure to support children with ASD and their families.

A systematic review conducted by Chauhan et al.,(2019) examined the prevalence of ASD among Indian children by synthesizing findings from multiple epidemiological studies conducted across different regions of the country. This review aimed to provide a consolidated estimate of ASD prevalence in India while also identifying methodological variations and challenges associated with ASD identification. The authors analyzed studies involving diverse populations, screening methods, and diagnostic criteria, and reported considerable variability in prevalence estimates across studies. Despite these differences, the review indicated an increasing trend in ASD prevalence among Indian children, suggesting that autism is an emerging developmental and public health concern in India. Factors such as limited awareness, inadequate screening practices, shortage of trained professionals and social stigma often contribute to delays in diagnosis and

referral. These concerns highlight the urgent need for systematic awareness programs, early identification initiatives and structured intervention approaches within the Indian context to ensure timely support and improved developmental outcomes for children with ASD.

The findings of above study are in consonance with the studies done by Raina et al.,(2015), Rudra et al.,(2017) and Arun and Chauhan (2021). The results suggested that variations in ASD prevalence across India may be influenced by differences in diagnostic methods, awareness, healthcare accessibility, sociocultural factors, and availability of trained professionals. The authors emphasized that under-identification and delayed diagnosis remain major concerns, especially in rural and resource-limited settings, and stressed the need for standardized screening procedures, culturally appropriate assessment tools, and improved early identification and intervention services for children with ASD.

Early identification facilitates the early detection of developmental delays and disabilities in children. By identifying these differences in early childhood, families and professionals can provide timely, appropriate rehabilitation support to improve long-term outcomes. Early identification of ASD is crucial because it enables timely interventions during a child's critical development window, when the brain exhibits peak neuroplasticity, causing the emergence of skills. This leads to significant improvement in communication, social interaction and behaviour, therefore helping children by reducing the severity and facilitating mainstream classroom integration.

2.1.2 Core Signs of ASD

ASD is commonly identified based on a pattern of developmental differences observed across social, communication, behavioral and sensory domains. Core signs of

ASD include persistent differences in social communication and interaction, along with restricted, repetitive patterns of behaviour, interests, activities, and sensory responses.

Communication difficulties: Communication difficulties in children with ASD are highly heterogeneous; some children remain minimally verbal, some develop functional spoken language with delays, while others may have age-appropriate structural language but continue to experience difficulties in social use of language, conversation, reciprocity, and nonverbal communication (Tager-Flusberg et al., 2005). Longitudinal studies have shown that language development in ASD follows varied trajectories and is influenced by factors such as early joint attention, nonverbal cognitive ability, age of first words and phrases, and access to early intervention (Kover et al., 2016; Lord et al., 2006). Therefore, language difficulty in ASD should not be viewed only as speech delay, but as a broader difficulty in understanding, expressing, initiating, responding, and using communication flexibly across social contexts.

Children with ASD commonly show difficulties in early social communication, including reduced response to name, limited eye gaze, poor use of gestures, reduced pointing to share interest, limited joint attention, and difficulty coordinating gaze, more gesture usage, facial expression, and vocalization (National Institute on Deafness and other Communication Disorders (NIDCD), 2020). Joint attention is especially important because it supports later language, symbolic play, and social learning. Mundy et al., (1990) found that early gestural joint attention predicted later language development in children with autism, while Wetherby et al, (2004) identified deficits in gestures, gaze shifts, shared affect, and symbolic behaviours as important early indicators of ASD. These findings suggest that communication difficulties in ASD involve not only learning words, but also understanding the social purpose of communication.

Communication challenges in ASD are closely linked with sensory regulation and behaviour. Hyper or hypo-responsiveness to sound, light, touch, movement, smell, or texture can interfere with attention, listening, comprehension, and classroom participation. When children are unable to express discomfort, fear, confusion, or sensory overload, these may appear as crying, avoidance, aggression, withdrawal, or repetitive behaviours. Similarly, restricted and repetitive behaviours such as echolalia, repetitive questioning, insistence on sameness, and restricted interests may affect communication flexibility. However, these behaviours may also serve communicative or regulatory functions. For instance, echolalia may be used to request, protest, self-regulate, process language, or maintain interaction rather than being meaningless repetition (Prizant & Duchan, 1981).

In India, children with ASD are often first brought for consultation due to delayed speech, poor response to name, limited eye contact, reduced social interaction, or unusual behaviours. However, these concerns may be misinterpreted as isolated speech delay, shyness, stubbornness, or poor parenting, which can delay referral and diagnosis. Chattopadhyay (2024) highlighted that autism screening in India faces several gaps, including lack of awareness, shortage of trained professionals, limited access to screening tools, and delayed identification. Similarly, Chakrabarti (2023) emphasized the need for a coordinated national autism programme in India to address gaps in early identification, clinical services, research, and intervention planning. These studies support the need to view communication difficulties in ASD not merely as speech delay, but as part of a broader social-communication and developmental profile

Receptive and Expressive Language Delay: Receptive language refers to the ability to understand spoken language, gestures, facial expressions, instructions, questions, and social cues, whereas expressive language refers to the ability to communicate wants,

needs, thoughts, emotions, and ideas through speech, gestures, signs, pictures, AAC, or other symbolic means (Moyle & Long, 2021). Children with ASD may show delays in both receptive and expressive language, but the pattern is not always uniform (Seol et al., 2014,). This means that a child may repeat words, label objects, or use memorized phrases but still struggle to understand questions, emotions, intentions or classroom directions.Receptive language forms the foundation for competent expressive language including literacy skills. Information from language assessments is also used to create therapy goals and monitor progress on these goals (Muller & Brady, 2016; Moyle & Long, 2021).

Expressive language difficulties in ASD may appear as delayed onset of first words, limited vocabulary, reduced spontaneous communication, poor sentence formulation, pronoun reversal, limited use of verbs, difficulty asking questions, reduced narrative ability, and difficulty explaining events in sequence (Bal et al., 2021). Some children may demonstrate need-based communication to communicate certain objects but may rarely use language for commenting, sharing experiences, asking for help, greeting, protesting appropriately, or expressing feelings. This reflects a core difficulty in social-pragmatic communication, where the child may know some words but may not use them flexibly across social contexts.

Language delay in ASD also affects learning in preschool and school environments. A child who does not understand classroom instructions may appear inattentive, stubborn, or behaviourally difficult, when the actual difficulty may be comprehension(Thurm et al., 2015; Tager-Flusberg, 2016). Similarly, a child who cannot express discomfort, confusion, pain, hunger, fear, or sensory overload may show crying, aggression, running away, or refusal). Gesture use, joint attention, imitation, and social reciprocity are often related to the pace of early language development, and weaknesses

in these areas can make speech delay more pronounced (Tager-Flusberg&Kasari, 2013; Zwaigenbaum et al., 2015). Therefore, receptive and expressive language assessment should include not only formal language testing but also observation across natural environments such as home, classroom, playground, and therapy settings. Intervention should focus on functional communication, comprehension of daily routines, vocabulary expansion, sentence building, question-answering, narrative skills, and social use of language. Visual supports, gesture cues, modelling, simplified language, repetition, and augmentative and alternative communication (AAC) can significantly support children who struggle with spoken language (Hyman et al., 2020; Robertson & Baron-Cohen, 2017).

Indian evidence suggests that receptive and expressive language delay is a major reason for referral in ASD. Children may show delayed first words, limited vocabulary, poor sentence formation, reduced spontaneous communication, poor response to verbal instructions, and difficulty understanding questions or social language. Chakrabarti (2024) noted that speech-language concerns were among the earliest and most frequent parental concerns, while Daley (2004) showed that symptom recognition and help-seeking in India are strongly shaped by how families interpret early developmental signs. Raina et al. (2017), in a population-based study of rural, urban, and tribal children aged 1–10 years, also highlighted the public-health relevance of identifying ASD across diverse Indian communities, where language delay may be one of the most visible signs leading to referral. Another communication feature commonly associated with receptive and expressive language difficulties in ASD is echolalia, which may serve different communicative or self-regulatory functions.

Echolalia refers to the repetition of words, phrases, or sentences previously heard from another person, television, mobile videos, rhymes, advertisements, classroom

instructions, or conversations (Xie, Pascual & Oakley, 2023). It may be immediate, where the child repeats something just heard, or delayed, where the child repeats a phrase after minutes, hours, days, or even months. Earlier, echolalia was often viewed as meaningless or non-functional repetition. However, later research has shown that echolalia in children with ASD may serve several communicative and self-regulatory functions (Prizant & Duchan, 1981). Echolalia may also be used for requesting, protesting, turn-taking, emotional expression, self-calming, processing language, or maintaining interaction.

Regarding its types, immediate echolalia may involve: turn-taking, declarative utterances, yes/no answers, and requests (Prizant & Duchan, 1981; Sterponi et al., 2014). Delayed echolalia may include: turn-taking, information-providing, labelling, calling, protesting, requesting, completing, affirming, directing, and maintaining social interaction (Prizant, 1983; Prizant & Rydell, 1984; Pascual et al., 2017). In children with ASD, echolalia may reflect both a strength and a challenge. It shows that the child is attending to speech and has some ability to store and reproduce language. At the same time, the child may not yet be able to generate original language. It is important that parents, teachers, and therapists do not simply stop echolalia without understanding its function. Instead, echolalia can be shaped into meaningful communication.

Childhood Apraxia of Speech (CAS): It is a motor speech disorder in which the planning and programming of speech movements is affected. A child with CAS may know what they want to say but may have difficulty producing words clearly (Child Apraxia Treatment, 2024). CAS may present with inconsistent speech sound errors, difficulty sequencing syllables, vowel distortions, disrupted transitions, groping movements, and abnormal prosody (Martins et al., 2021). Some children with ASD may show motor speech features suggestive of CAS; however, Shriberg et al. (2011) cautioned that CAS should not be assumed in all minimally verbal autistic children, while Tierney

et al. (2015) reported overlap between autism and apraxia in clinically referred samples, emphasizing the need for careful differential diagnosis.

CAS can reduce speech intelligibility, limit expressive output, increase frustration, and lead to reliance on gestures, echolalia, or behaviour. Therefore, SLPs should assess speech production, oral-motor imitation, syllable sequencing, prosody, error consistency, and response to cueing, while differentiating CAS from phonological disorder, dysarthria, limited language, or social communication differences (Martins et al., 2021). Intervention should combine motor-based speech therapy with functional communication support through frequent practice, multisensory cueing, imitation, shaping of syllables and words, rhythm-prosody work, and functional word practice (Dahlwai et al., 2021). AAC should be introduced when speech is limited or unclear, and parents and teachers should be encouraged to accept all forms of communication within a neurodiversity-affirming approach (Moore, Boyle, & Namahshivayan, 2024).

Deficits in Social Communication: Children with ASD may experience difficulties in initiating and maintaining social interactions, responding to social cues, sharing interests, taking turns, understanding others' emotions, and participating in group-based activities (Hyman et al., 2020). These challenges may not always reflect a lack of interest in social engagement; rather, they may arise from differences in social communication, sensory processing, flexibility, attention, and understanding of social expectations (Lord et al.,2006). As a result, children with ASD may appear withdrawn, prefer solitary play, have difficulty joining peer groups, or engage in repetitive and restricted patterns of interaction. Such difficulties can affect their inclusion in preschool and school settings, peer relationships, classroom learning, and overall quality of life.

Social skills in children with ASD include a wide range of abilities such as eye contact, joint attention, imitation, turn-taking, sharing, greeting, requesting help,

understanding personal space, following classroom routines, and using appropriate verbal and non-verbal communication (Tager-Flusberg&Kasari, 2013; Zwaigenbaum et al., 2015). These skills are essential for successful participation in daily social and educational contexts. However, many children with ASD require structured support to acquire and generalize these skills across settings. Preschool teachers play an important role in promoting social participation by creating predictable routines, encouraging peer-mediated interaction, using visual supports, modelling appropriate social behaviour, and providing opportunities for cooperative play (Hemdi, 2023). Early identification and intervention can help improve social communication, reduce barriers to participation, and support the child's inclusion in natural environments (Zwaigenbaum et al., 2019; Chattopadhyay, 2024). Therefore, strengthening social participation and social skills should be viewed as an important component of ASD intervention, as it not only enhances communication and peer engagement but also supports emotional well-being, independence, and long-term adaptive functioning.

Overall, social participation and social skills are central to the holistic development of children with ASD, as they influence communication, learning, emotional regulation, peer relationships, and independence (Lord et al., 2006). Although children with ASD may experience challenges in social interaction, these difficulties can be reduced through early identification, structured intervention, inclusive classroom practices, and consistent support from caregivers and professionals (Hyman et al., 2020; Onu, 2026). Creating accepting, predictable, and responsive environments enables children with ASD to participate more meaningfully in everyday routines and social experiences (Hemdi, 2023). Therefore, promoting social participation should be considered an essential goal in preschool education and early intervention, as it supports not only the child's present

functioning but also their long-term inclusion, confidence, and quality of life (Hemdi, 2023).

Restricted and Repetitive Behaviours (RRBs): RRBs are a core feature of ASD and include repetitive motor movements, lining up objects, hand flapping, spinning, insistence on sameness, rigid routines, restricted interests, repetitive speech, and distress during transitions or changes (American Psychiatric Association, 2022). RRBs may vary from mild preferences to behaviours that significantly interfere with learning and social participation (Ravizza et al., 2017). Research has also shown links between sensory processing and repetitive behaviours in ASD, suggesting that some repetitive behaviours may help children regulate sensory input or manage uncertainty (Boyd et al., 2012; Fetta et al., 2021). For instance, hand flapping may occur during excitement, spinning may provide vestibular input, and repeated questioning may help the child cope with anxiety about upcoming events. Communication intervention should therefore include predictable routines, visual schedules, transition warnings, social stories, and functional alternatives. Support for RRBs should focus on increasing flexibility, communication, and participation. Visual schedules, first-then boards, choice-making, planned transitions, and structured routines can reduce distress (Brown & Mirenda, 2006). Teachers can allow short, scheduled opportunities for preferred interests while also gently expanding the child's range of activities and topics. This balanced approach respects the child's interests while promoting adaptive communication and social participation.

In the Indian context, these behaviours may be misunderstood as stubbornness or poor discipline rather than a developmental characteristic of autism (Chakrabarti, 2023; Chattopadhyay, 2024). In practice, rigidity and repetitive behaviour can affect schooling, family routines, and peer relationships because even minor changes may lead to major distress or loss of engagement (Chattopadhyay, 2024; Srivastava et al., 2023). Ray-

Subramanian and Ellis Weismer (2012) studied 115 children with ASD at ages 2 and 3 to examine whether language and nonverbal cognitive skills predicted restricted and repetitive behaviours (RRBs). They found that poorer receptive and expressive language at age 3 was associated with higher RRBs. Improvements in language from age 2 to 3 predicted a reduction in RRBs, suggesting that early language development may help reduce repetitive behaviours in young children with ASD. Recognising rigidity and transition difficulty as part of the autism profile supports earlier identification**.**

Sensory Issues in ASD: Sensory processing difficulties are common in children with ASD and are now included within the diagnostic criteria under restricted and repetitive patterns of behaviour as hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment (American Psychiatric Association, 2022). Sensory issues may occur across auditory, visual, tactile, vestibular, proprioceptive, gustatory, and olfactory systems. Leekam et al. (2007) reported that sensory abnormalities were highly prevalent in individuals with autism and often occurred across multiple sensory domains. These sensory differences can directly affect communication, attention, learning, behaviour, and social participation. Three main sensory patterns have been described in ASD: hypo-responsiveness, hyper-responsiveness, and sensory seeking; some authors have added a fourth pattern: enhanced perception (Posar & Visconti, 2018).

Hypersensitivity refers to over-responsiveness to sensory input. A child with auditory hypersensitivity may cover ears, cry, or run away when exposed to loud sounds such as school bells, mixer-grinders, traffic, clapping, or crowded classrooms (Eric et al., 2014; Baranek et al., 2013). Tactile hypersensitivity may cause distress during grooming, dressing, haircuts, toothbrushing, or physical touch. Visual hypersensitivity may make bright lights, colourful classrooms, or fast-moving visual stimuli overwhelming. Such sensory overload can reduce the child's ability to listen, understand language, participate

in group activities, or respond to communication attempts. For example, a teacher may think that a child is not following instructions, when the child is actually overwhelmed by noise and unable to process spoken language.

Hyposensitivity refers to under-responsiveness to sensory input. A child may not respond when called, may seem unaware of pain, may seek strong pressure, may spin, jump, crash into objects, or place objects in the mouth (Eric et al., 2014; Baranek et al., 2013). Such children may require more intense sensory input to remain alert and regulated. Sensory seeking behaviours may interfere with sitting tolerance, attention, and classroom communication. A child who constantly moves, touches objects, or makes sounds may be trying to regulate the sensory system rather than intentionally misbehaving. Sensory processing differences may also affect feeding, sleep, play, peer interaction, and participation in school routines.

Sensory issues and communication difficulties often interact. When a child cannot express “too loud”, “too bright,’ “I don’t like this texture,” or “I need movement,” behaviour becomes the mode of communication. Therefore, sensory support should be integrated with communication support. Children can be taught functional phrases or AAC symbols or use assistive technologies to indicate “break,” “too loud,” “help,” “stop,” “more pressure,” “I need headphones,” or “I need movement” (Superior &Sevilla, 2022). Environmental modifications such as reducing background noise, providing visual schedules, allowing movement breaks, using calm corners, offering sensory tools, and preparing the child before transitions can improve communication readiness. Collaboration between speech-language pathologists, occupational therapists, parents, and teachers is essential because sensory regulation often forms the foundation for successful language learning.

2.2 Role of Multidisciplinary Action

Rehabilitation of children with ASD requires a multidisciplinary approach because ASD affects multiple developmental domains, including communication, social interaction, behaviour, sensory processing, cognition, learning, play, and adaptive functioning. No single professional can address all the needs of a child with ASD. Therefore, effective intervention usually involves speech-language pathologists, occupational therapists, special educators, clinical psychologists, parents, and teachers working together with shared goals. A coordinated team approach helps ensure that intervention is individualized, functional, and carried over across home, school, therapy, and community settings(Chakrabarti, 2023; Srivastava et al., 2023).

The speech-language pathologist (SLP) assesses receptive language, expressive language, pragmatic communication, speech sound production, joint attention, play, social interaction, and the need for AAC. In intervention, the SLP works on functional communication, requesting, commenting, answering questions, turn-taking, topic maintenance, comprehension, and social communication. For minimally verbal children, AAC such as picture communication, communication boards, or speech-generating devices may be introduced, as Kasari et al. (2014) found that speech-generating devices improved spontaneous communication in minimally verbal children with ASD.

The Occupational Therapist (OT) supports children with ASD in sensory processing, motor coordination, self-care, play, attention, and participation in daily routines. Since many children show hyper- or hypo-sensitivity to sound, touch, light, movement, texture, or smell, these sensory issues may affect sitting tolerance, learning, feeding, dressing, classroom participation, and behaviour. OTs help children regulate sensory responses, improve fine motor and daily living skills, and participate more

effectively at home and school. Schaaf et al. (2014) reported that occupational therapy using a sensory integration approach improved functional goals in children with ASD.

The special educator focuses on educational planning, school readiness, pre-academic and academic skills, individualized education plans, structured teaching, visual schedules, task analysis, and functional learning. Evidence-based strategies such as visual supports, prompting, reinforcement, modelling, social narratives, and structured instruction are useful for improving learning and independence in children with ASD (Wong et al., 2015). The clinical psychologist supports assessment and management of behaviour, cognition, emotional regulation, adaptive functioning, anxiety, social skills, and family counselling. Behavioural and developmental interventions have been shown to improve cognitive and adaptive outcomes in young children with ASD (Dawson et al., 2010). The Medico Social Service Officer (MSSO or MSO) help helps families understand the diagnosis-related social and financial needs, provides casework and counselling, guides them regarding disability certification, UDID card, National Trust schemes, educational concessions, travel concessions, assistive devices, and welfare benefits(Dev & Jeryda, 2022).

Parents and teachers are key members of the rehabilitation team because they help generalize therapy goals into daily life. Parents support communication and behaviour through responsive interaction, modeling, visual supports, reinforcement, predictable routines, and daily communication opportunities. Parent-mediated interventions have shown benefits in improving parent-child interaction and social communication, including in South Asian settings (Green et al., 2010; Rahman et al., 2016). Teachers support classroom participation through clear instructions, visual schedules, structured routines, sensory accommodations, peer support, social stories, and positive behaviour

support. They also play an important role in early identification and carryover of therapy goals into natural school situations (Chang & Locke, 2016).

In conclusion, multidisciplinary action is essential for children with ASD because their needs are diverse and interconnected. The SLP supports communication, the OT supports sensory and functional participation, the special educator supports learning, the clinical psychologist supports behaviour and emotional regulation, parents support generalization at home, and teachers support inclusion in school. When all team members collaborate and follow common goals, children with ASD receive more consistent, meaningful, and functional rehabilitation across all environments.

2.2.1 Role of Speech Language Pathologist

SLPs play a significant key role in describing and defining the communication and social interaction skills so often impaired in children with ASD. They also offer insight into differential diagnosis, helping to determine when there is more than just a communication problem(American Speech-Language-Hearing Association (ASHA), 2006;). The SLP assesses receptive language, expressive language, speech production, joint attention, play, imitation, pragmatic skills, and functional communication. Intervention is planned according to the child's profile and focuses on increasing meaningful communication, such as requesting, commenting, protesting, responding, and initiating interaction(Masi et al., 2017; Hyman et al., 2020). In addition, a speech-language pathologist can help nonverbal children and adults find and use the most appropriate means of alternative communication. For one person, this may involve learning how to use gestures. Another person might do best with a communication system that includes using pictures or visual supports.

For children with limited speech, the SLP targets early communication skills such as eye contact, joint attention, imitation, turn-taking, gestures, simple words, and comprehension of routine instructions. For verbal children, therapy may focus on vocabulary, sentence formation, answering questions, narration, topic maintenance, conversational repair, and social use of language(Masi et al., 2017; Hyman et al., 2020). Since children with ASD may be verbal but still struggle with social communication, intervention must also address pragmatic skills such as maintaining interaction, understanding emotions, adapting language to context, and using appropriate conversational rules (Tager-Flusberg et al., 2005).

The SLP also introduces augmentative and alternative communication (AAC) when speech is limited or unclear. AAC may include gestures, signs, picture exchange, communication boards, visual supports, or speech-generating devices.(Hyman et al., 2020). AAC helps children communicate immediately and can reduce frustration without preventing speech development. Kasari et al. (2014) found that the use of speech-generating devices improved spontaneous communication in minimally verbal children with ASD, while Brignell et al. (2018) reported that AAC and communication-based interventions can support spoken and nonverbal communication.

Another important role of the SLP is to train parents, teachers, and caregivers so that communication goals are practised in daily routines. Strategies such as modelling, expansion, waiting, choice-making, visual schedules, simplified language, and responsive interaction help generalize communication across home, school, and community settings (Masi et al., 2017; Hyman et al., 2020). Parent-implemented interventions embedded in everyday routines have been shown to improve social communication outcomes in young children with ASD (Wetherby & Woods, 2006; Wetherby et al., 2014).

Good coordination with parents is equally important in obtaining good results from speech-language therapy. A tailor-made IEP, structured home-training, parental counselling and consistency are key approaches in achieving progress. In this way, the SLP supports both the child's communication and the family's ability to use practical communication strategies every day (ASHA, 2006).

2.2.2 Role of Occupational Therapist

Occupational therapy is a client-centred healthcare profession that promotes participation, independence, and functional performance in meaningful daily occupations such as self-care, play, education, social participation, work and leisure.Occupational therapists work as consultants and experts in health information technology, human-cantered design, addressing the health of communities, education (e.g.,schools, higher education), health promotion programs, driving and community mobility, and many others (American Occupational Therapy Association (AOTA), n.d.).

The role of an occupational therapist is to assess how physical, sensory, cognitive, emotional, developmental, or environmental challenges affect a person's daily functioning and to provide individualized intervention, adaptations, assistive strategies, and environmental modifications to help the person achieve maximum independence and participation (The Association of Occupational Therapists of Ireland (AOTI), n.d.).Occupational therapy improves sensory skills, relationship-building skills, body and object usage abilities, language skills, and social and self-care skills(Dahlhauser &Frolek, 2010; Jaicks, 2024).

OT provides sensory integration-based activities and environmental adaptations to help the child remain regulated and participate meaningfully in daily routines. The OT may also develop a sensory diet, which is a planned set of sensory activities given

throughout the day to improve arousal, attention, and self-regulation. Research supports that occupational therapy using sensory integration approaches can improve functional goals and participation in children with ASD (Schaaf et al., 2014; Case-Smith et al., 2015).

The OT collaborates closely with speech-language pathologists, special educators, psychologists, teachersbecause sensory regulation directly affects communication, learning, and behaviour (Auerbach, 2002). With the SLP, the OT helps ensure that the child is regulated enough to attend, imitate, understand language, and communicate. With the special educator and teacher, the OT suggests classroom strategies such as visual schedules, structured seating, reduced sensory distractions, pencil-grip support, adapted writing tools, transition routines, and movement breaks. With the psychologist, the OT helps differentiate whether a behaviour is sensory-based, anxiety-related, communication-related, or learned behaviour, so that intervention is appropriate and not purely disciplinary. The OT works closely with parents and trains them to recognize sensory triggers, understand the child's sensory needs, use calming or alerting activities, adapt home routines, support feeding, dressing, bathing, grooming, sleep and transitions, and create predictable sensory-friendly environments(Case-Smith &Arbesman, 2008; Dahlhauser &Frolek, 2010). Thus, the OT's role is not only to provide direct sensory intervention but also to build a consistent support system across home, school, and therapy settings so that the child can achieve better regulation, independence, participation, and quality of life.

2.2.3 Role of Clinical Psychologist

Clinical psychologists can play an important role diagnosing ASD and helping people cope with and manage the challenges associated with the disorder (APA, 2024;

Hyman et al., 2019).They perform diagnostic assessments by using standardized tools and provide behaviour intervention and parental counselling (Small, 2012). Clinical psychologists or psychiatrists are involved in ASD intervention when there is occurrence of severe behaviour problems, temper tantrums or ADHD symptoms. In the Indian context, clinical practice guidelines emphasize that ASD assessment should be multidisciplinary and should include evaluation of developmental level, adaptive functioning, behavioural concerns, comorbidities, and family needs (Subramanyam et al., 2019). National Institute of Mental Health and Neuro Sciences (NIMHANS), Bengaluru, through its child and adolescent mental health services and training initiatives,highlights the importance of structured psychosocial assessment, case formulation, and multidisciplinary referral in neurodevelopmental conditions like ASD.

In intervention, the clinical psychologist helps identify the function of difficult behaviours such as tantrums, aggression, self-injury, rigidity, non-compliance, repetitive behaviours, sleep-related issues, and difficulty with transitions (Gulati, Sapra &Chakrabarty, 2014). Rather than treating these behaviours as intentional misbehaviour, the psychologist analyses whether they are linked to communication difficulties, sensory overload, anxiety, frustration, poor routine understanding, or environmental triggers. Based on this, behaviour management plans may include functional behaviour assessment, positive behaviour support, reinforcement strategies, visual routines, emotional regulation training, social skills training, and parent counselling. Evidence from developmental-behavioural intervention research shows that early, structured intervention can improve cognitive, adaptive, and social-communication outcomes in young children with ASD (Dawson et al., 2010; Gulati, Sapra & Chakrabarty, 2014).

Clinical psychologists are also important in identifying and managing co-occurring emotional and behavioural difficulties in ASD, such as anxiety, ADHD

symptoms, irritability, sleep problems, mood concerns, and emotional dysregulation. These difficulties may be hard to identify when the child has limited language and cannot clearly express fear, sadness, confusion, or distress. Therefore, psychologists use observation, caregiver interviews, rating scales, and school reports to understand the child's emotional profile and daily functioning. In the Indian context, tertiary centre studies such as Kommu et al. (2017) have highlighted the complex clinical and developmental profiles of 200 children with ASD presenting to child and adolescent psychiatry services, supporting the need for detailed psychological assessment and individualized intervention planning.

Another key role of the clinical psychologist is family support. Parents of children with ASD often experience stress related to diagnosis, behaviour management, schooling, therapy decisions, stigma, and future planning. Clinical psychologists help families understand the child's strengths and needs, set realistic goals, learn behaviour-management strategies, and maintain consistency across home and school. They also collaborate with speech-language pathologists, occupational therapists, special educators, psychiatrists, and teachers to ensure that behavioural, emotional, communication, sensory, and educational goals are integrated. Thus, the clinical psychologist acts as an important team member who supports diagnosis, behavioural intervention, emotional regulation, parent training, and multidisciplinary rehabilitation of children with ASD (NIDCD, 2020).

2.2.4 Role of Special Educator

A special educator plays a crucial role in the intervention and educational support of children with ASD, as many children experience difficulties in learning, behaviour, communication, social interaction, attention, and classroom participation (NASET, 2026).

The special educator identifies the child's strengths, learning style, academic level, behavioural needs, and functional skills, and helps develop an Individualized Education Plan (IEP). An IEP acts as a structured educational roadmap that includes specific goals, teaching strategies, classroom adaptations, and regular progress reviews to support the child's academic, social, emotional and behavioural development (Gulati, Sapra & Chakrabarty, 2014).

In intervention, the special educator uses structured and individualized teaching methods to help the child learn effectively. Strategies may include visual schedules, task analysis, reinforcement, prompting, repetition, social stories, structured routines, and modified curriculum (National Council of Educational Research and Training (NCERT), 2019; Odom et al., 2021). Approaches such as Training and Education of Autistic and Related Communication Handicapped Children (TEACCH), help children understand routines through visual structure, while Picture Exchange Communication System (PECS) supports communication in children with limited verbal skills (Gulati, Sapra &Chakrabarty, 2014). Play-based and behavioural approaches such as Floor time and Lovaas-based techniques may also be used depending on the child's needs (Gulati, Sapra & Chakrabarty, 2014). These methods help improve attention, concept learning, communication, social skills, independence, and classroom readiness.

The special educator also works closely with parents, teachers, therapists, and the school system to ensure that learning goals are carried over across settings. Parents provide information about the child's preferences, strengths, triggers, and daily routines, while schools support inclusion through peer interaction, buddy systems, sensory-friendly classrooms, and classroom accommodations. Overall, special educators help children with ASD achieve their maximum learning potential by creating structured, meaningful, and supportive educational environments that promote independence, social participation,

emotional growth, and functional learning (National Association of Special Education Teachers (NASET), 2026).

2.2.5 Role of Parents

Parents play a central role in the ASD journey because they are usually the first to notice early developmental concerns such as delayed speech, poor response to name call, limited eye contact, reduced play skills, sensory issues, or repetitive behaviours (Hayman et al., 2019). They are also key decision-makers in seeking assessment, diagnosis, therapy, schooling, and long-term support. Research has shown that parent involvement is essential because children with ASD require consistent support across daily routines, not only during therapy sessions. Parent-mediated interventions have been found to improve parent-child interaction and child social communication outcomes, highlighting the importance of training parents as active partners in intervention (Green et al., 2010; Oono, Honey & Conachie, 2013).

In intervention, parents help generalize therapy goals into natural home and community settings. They can support communication by using responsive interaction, modelling, waiting, turn-taking, visual supports, choice-making, reinforcement, and daily routine-based teaching.Wetherby et al. (2014) found that parent-implemented social communication intervention improved outcomes in toddlers with ASD, while Rahman et al. (2016) showed that parent-mediated intervention was feasible and acceptable in South Asian settings, including India and Pakistan.

Parents also act as advocates for the child in educational, medical, and community settings. They coordinate with speech-language pathologists, occupational therapists, special educators, psychologists, psychiatrists, teachers, and government agencies to ensure that the child receives appropriate support(Green et al., 2010; Oono, Honey &

Conachie, 2013). At the same time, families may experience stress, stigma, financial burden, and emotional challenges. Therefore, professionals must support parents through counselling, psychoeducation, skill training, and realistic goal-setting. Overall, parents are not passive recipients of services but active co-therapists, advocates, and lifelong support partners in the rehabilitation and inclusion of children with ASD (Hyman et al., 2019).

2.2.6 Role of Medico-Social Service Officer

A Medical Social Officer or Medical Social Service Officer (MSO or MSSO) acts as a key link between the patient, family, hospital team, and community resources (Dev & Jeryda, 2022). In the context of children with ASD, the MSO helps families understand the diagnosis-related social and financial needs, provides casework and counselling, guides them regarding disability certification, UDID card, National Trust schemes, educational concessions, travel concessions, assistive devices, and welfare benefits. Acharya (2018) described hospital social service officers in India as professionals involved in psychosocial assessment, counselling, financial/resource mobilization, discharge planning, rehabilitation, and liaison with government and non-government agencies. All India Institute of Medical Sciences (AIIMS). (n.d.), also describes MSSOs as part of multidisciplinary hospital care, supporting patients through counselling, financial assistance, rehabilitation referral and coordination with welfare agencies.

MSOs also educate and counsel families to reduce stress, improve coping, and help them participate in treatment and rehabilitation decisions. They assist families in completing paperwork for health insurance, financial aid, transport support, and community-based services, and they coordinate referrals to schools, therapy centres, NGOs, and government departments (Dev & Jeryda, 2022). However, Acharya (2018)

noted that in many Indian hospital settings, medical social work services are often accessed mainly by economically disadvantaged patients and may remain limited to material assistance such as medicines or funds, with less emphasis on psychological and rehabilitative support.

2.2.7 Role of Teachers in Early Identification

After parents, preschool teachers play a pivotal role in the early identification of ASD as they observe children in natural classroom and peer-group settings where early social-communication differences become more evident (Taresh et al., 2023). They are well placed to identify red flags such as poor socialization, limited eye contact, reduced response to name, delayed speech and language, lack of pretend play, difficulty following instructions, sensory sensitivities, and restricted and repetitive behaviours (RRBs). Empowering preschool teachers with knowledge of ASD can help reduce delays in early identification by enabling them to recognize these signs, guide parents toward screening and assessment, and avoid misinterpreting behaviours as stubbornness, disobedience, or poor discipline.

Within the ASD framework, empowerment involves strengthening teachers' knowledge, confidence, and practical skills to support children through visual schedules, structured routines, simplified instructions, peer interaction opportunities, sensory-friendly adaptations, and positive behaviour support. Kuhlthau et al. (2014) emphasized empowerment as an important factor in improving child and family outcomes. Thus, preschool teachers act as an important bridge between home, school, and professional services by supporting early referral, inclusive classroom participation, and timely intervention for children with Fact-finding's of the studies conducted by Low et al. (2020) and Alobaid and Almogbel (2020) in Laos and Saudi

Arabia, respectively, suggested that many preschool teachers possess very limited knowledge about ASD, therefore emphasizing a significant need for educational programs to sensitize their awareness and competence. A similar trend has been observed in the Indian context as well (Rai et al., 2018; Elumai et al., 2019; Dhyanithi et al., 2023), highlighting the universal need for teacher empowerment on the concepts of early identification, early intervention, mainstreaming and inclusive education.

Despite results of several studies indicating limited knowledge of preschool teachers about ASD, few studies have also reported that after exposure to educational or training programs can significantly improve their ability to identify the early signs of ASD (Bhurtel et al., 2024; Low, Wong, & Lee, 2021, Daniel et al., 2013).

Communication support for children with ASD should be naturalistic, consistent, functional, and family-centred. Teachers are especially important because children spend a major part of their day in educational settings. Teachers can support children with ASD by using clear, short, and concrete instructions; pairing verbal instructions with visual cues; checking comprehension; giving extra processing time; preparing the child for transitions; and creating predictable classroom routines. A child with ASD may not understand long instructions. They can be broken into steps with visual support. Teachers can also use first-then boards, visual timetables, classroom rules with pictures, peer buddy systems, and structured play activities.

Teachers should also promote social communication. Many children with ASD do not automatically learn social rules by observation. They may need explicit teaching of greeting, turn-taking, waiting, requesting help, joining play, topic maintenance, personal space, and classroom conversation rules. Social stories, role play, video modelling, peer-mediated intervention, and structured group activities can be useful. Teachers should

avoid punishing communication differences such as reduced eye contact, echolalia, or sensory-related behaviours without understanding their function. Instead, they should collaborate with speech-language pathologists, special educators, occupational therapists, and parents to develop individualized communication goals.

Community workers such as Anganwadi workers, preschool teachers, primary school teachers, special educators, community health workers, and rehabilitation workers can support early identification and referral. They are often the first professionals to observe children in group settings and can notice red flags such as no babbling, no pointing, poor response to name, lack of joint attention, delayed speech, loss of words, limited pretend play, unusual sensory responses, repetitive play, and poor peer interaction. Their role is not to diagnose ASD but to identify concerns, guide families toward developmental screening, encourage early intervention, and reduce stigma. In the Indian context, Anganwadi workers and preschool teachers can play a particularly important role by educating parents, encouraging responsive communication at home, and referring children to paediatricians, speech-language pathologists, psychologists, or developmental specialists when needed. Effective communication support requires collaboration. Parents know the child's preferences and daily routines; teachers understand classroom demands; therapists provide assessment and intervention planning; and community workers help with awareness, referral, and follow-up. When communication partners understand the child's sensory needs, language level, interests, and behaviour patterns, they can reduce frustration and increase participation, learning, independence, and social connection.

2.3 Importance of Early Identification

Early identification of ASD plays a crucial role in improving developmental outcomes and enhancing the overall quality of life of the child and family. Over the past few decades, increasing research evidence has strongly emphasized that children who receive intervention during the early years demonstrate significantly better outcomes in communication, cognition, adaptive functioning, social interaction and academic performance compared to those identified later.

2.3.1 Concept of Neuroplasticity and Critical Period

The importance of early identification and intervention in ASD is strongly associated with the concept of 'Neuroplasticity', which refers to the brain's ability to reorganize its structure, functions, and neural connections in response to environmental experiences, learning and stimulation. During early childhood, the developing brain demonstrates a significantly high degree of plasticity, making this period particularly favourable for learning language, social communication, cognition and adaptive behaviours. Neurodevelopment during infancy and early childhood involves rapid neuronal sprouting, where large numbers of neural connections and synapses are formed in response to sensory and environmental experiences. Children with ASD exhibit abnormal neuroplasticity, which impacts information processing, sensory processing, and social cognition, leading to the manifestation of corresponding symptoms (Chen et al., 2024).

Synaptic pruning is another crucial neurodevelopmental process in which the brain removes weak or unused neural connections while strengthening frequently used pathways, following the principle of "use it or lose it." During early childhood, the brain rapidly forms numerous synaptic connections through neuronal sprouting, after which

unnecessary connections are gradually eliminated to improve the efficiency and organization of neural networks. This process continues through adolescence and plays an important role in learning, memory, sensory processing, emotional regulation, and cognitive functioning. Specialized immune-related cells called microglia help identify and remove weaker synapses, therefore refining brain circuitry and supporting adaptive functioning. Research suggests that atypical synaptic pruning may contribute to neurodevelopmental conditions such as ASD, where insufficient or delayed pruning may result in excessive or inefficient neural connectivity, affecting social communication, behaviour, and information processing (Pardo & Eberhart, 2007). Since synaptic pruning and brain plasticity are most active during early developmental years, timely identification and intervention are considered essential for strengthening functional neural pathways and improving long-term developmental outcomes in children with ASD.

In children with ASD, research suggests atypical patterns of neuronal connectivity, altered synaptic pruning, and excessive or inefficient neural connections, which may contribute to difficulties in social interaction, communication, sensory processing, and behavioural regulation (Pardo & Eberhart, 2007) . Early therapeutic intervention during this stage can therefore facilitate more adaptive neural organization, strengthen functional neural pathways, and reduce maladaptive developmental patterns by utilizing the heightened neuroplastic potential of the developing brain.

Tsang et al. (2019) reported that early detection and intervention programs significantly improve functional outcomes in children with ASD because intervention provided during periods of increased neuroplasticity produces greater developmental gains. The importance of early intervention is further understood through the concepts of critical and sensitive periods of development. A critical period refers to a biologically determined developmental window during which the brain is optimally prepared to

acquire specific skills such as language, social communication, and emotional regulation. A sensitive period, although similar, refers to a phase during which learning occurs more efficiently but may still continue beyond the period with relatively reduced effectiveness. According to Freidman and Rusou (2015), the sensitive period for language and communication development generally extends from birth to approximately six years of age. During this period, children acquire language naturally through social interaction, environmental stimulation, and communicative exposure. If adequate linguistic and social experiences are absent during these early years, communication development may be significantly compromised.

Liang et al. (2023) reported that children deprived of sufficient language stimulation during this developmental window demonstrated delays in speech and language acquisition. In the Indian context, limited awareness regarding early signs of ASD, social stigma, inadequate screening practices and poor accessibility to specialized services result in delayed diagnosis and intervention. Such delays may reduce the effectiveness of intervention because opportunities to utilize the brain's maximal neuroplastic potential during the critical developmental years may be missed. Therefore, increasing awareness regarding early signs of ASD and promoting timely referral and intervention are essential for optimizing developmental outcomes and improving long-term communication, social and adaptive functioning in children with ASD.

In children with ASD, delays in speech and language, social interaction and play behaviours are often observable during the first few years of life. Common early signs include poor eye contact, limited response to name call, delayed babbling, lack of joint attention, repetitive behaviours and difficulties in social communication. Despite the presence of these signs many children remain undiagnosed until later childhood due to lack of awareness among caregivers, social stigma, inadequate screening practices and

limited access to professional services. Delayed diagnosis often leads to missed opportunities for intervention during the critical developmental years. Therefore, promoting awareness regarding the early signs of ASD among parents, teachers, paediatricians and healthcare professionals is essential for facilitating prompt referral and diagnosis.

Early identification not only benefits the child but also supports the family system. Receiving an early diagnosis enables parents to better understand their child's behaviours and developmental needs. It allows families to access intervention services, educational planning, counselling and support systems at an earlier stage. Parents can also be trained in strategies to facilitate communication, social interaction and behaviour management within naturalistic settings such as the home environment. Family-centred intervention approaches have shown that empowering caregivers contributes significantly to improved developmental outcomes in children with ASD.

2.3.2 Effectiveness of Early Intervention

Several research studies have demonstrated the effectiveness of early intervention following early identification. A study conducted by Antibor, Gurcova and Stoian (2026) examined the impact of early intervention on the development of communication skills in children with ASD. The study presented impact of early intervention on the communication outcomes of 30 children. The early intervention focused on improving both verbal and non-verbal communication abilities. The findings of the study revealed significant improvements in the children's communication skills following early intervention. The findings therefore confirming the effectiveness of early intervention on overall communication outcomes. A comprehensive review conducted by Onu (2026) examined the impact of early intervention on developmental outcomes in children with

ASD. The review synthesized findings from multiple empirical studies and highlighted the critical importance of intervention during the early postnatal years, a period characterized by heightened brain plasticity and rapid skill development. The study evaluated several evidence-based intervention approaches, including Naturalistic Developmental Behavioural Interventions (NDBIs), Early Intensive Behavioural Intervention (EIBI) and parent-mediated interventions. The findings consistently indicated that intensive, family-centred and high-quality early intervention significantly improves cognitive abilities, language skills, adaptive behaviour and social functioning in children with ASD. However, outcomes varied depending on factors such as intervention intensity, child characteristics and family involvement. The authors concluded that individualized, accessible and comprehensive early intervention programs are essential for improving long-term developmental outcomes and quality of life in individuals with ASD.

Sridevi and Arya (2014) conducted a case study on a 37-month-old child diagnosed with mild to moderate ASD. The child was recruited in a six-month intervention program focused on improving on communication and social interaction. After six months of intervention, significant improvements were observed in social behaviours and communication. The study highlighted that intervention during the early developmental years can facilitate meaningful behavioural and communicative changes even within a short duration. Such findings emphasize the notion that early identification allows clinicians to capitalize on the child's developmental potential during the critical period.

Furthermore, early intervention may reduce the long-term economic and social burden associated with ASD. Children who receive timely support are more likely to develop functional communication skills, achieve greater independence and require less

intensive support services later in life. Early intervention can improve school readiness, facilitate inclusion in mainstream educational settings and enhance participation in daily activities. From a societal perspective, early identification and management may decrease future healthcare costs and improve productivity and quality of life outcomes for both individuals with ASD and their families.

Screening programs play an important role in sensitizing about the importance of early identification. Standardized screening tools administered during routine paediatric visits can help identify children at risk for ASD before the age of two years. Early screening allows professionals to initiate early intervention services without unnecessary delays therefore, improving the outcomes of the therapy. Despite increasing awareness, several challenges continue to be a barrier for early identification, particularly in low-resource countries. Limited availability of trained professionals, lack of standardized screening protocols, myths and stigma often delay diagnosis and intervention. In the Indian context, many parents seek professional help only after speech and behavioural concerns become evident. Therefore, there is an urgent need for developing awareness programs and accessible intervention services to ensure timely identification and support for children with ASD.

In conclusion, early identification of ASD is of paramount importance because it enables intervention during a period of heightened neuroplasticity and optimal developmental readiness. Research consistently demonstrates that early intervention leads to improved outcomes in language, cognition, social interaction, adaptive functioning and overall quality of life. Timely diagnosis also empowers families, enhances educational planning and reduces long-term functional challenges. Therefore, increasing awareness regarding the early signs of ASD, strengthening screening programs and ensuring access

to early intervention services are essential steps toward improving developmental outcomes for children with ASD and supporting their successful participation in society.

2.3.3 Importance of Screening a Child for ASD

The primary aim of screening is to identify early signs that may indicate the need for a detailed assessment. During screening, paediatricians may observe the child's social interaction, communication, play behaviours and responses to environmental stimuli along with parent-child interaction. Common early red flags associated with ASD included delays in expression and the diversity in gestural usage, reduced response to name call, limited social interaction, insisting on sameness, etc. Early diagnosis does not provide a formal diagnosis but helps identify children who may require comprehensive developmental evaluation by specialists. The American Academy of Pediatrics (AAP) suggests that ASD screenings should be part of standard 18 and 24-month child checkups, whereas the National Centre on Birth Defects and Developmental Disabilities (NCBDD) recommends that all children be screened at 9, 18 and 24 or 30 months.

2.3.4 Tools for Screening children for ASD

Several standardized screening tools are commonly used in clinical practice. According to the report by Juneja and Sairam (2018), the internationally developed ASD screening tool that are standardized and validated for use in in India include Modified Checklist for Autism in Toddlers (M-CHAT; Robins et al., 2009), Autism Spectrum Quotient (ASQ; Baron-Cohen et al., 2001), Social Communication Questionnaire (SCQ; Rutter et al., 2003a, 2003b), Social Responsiveness Scale (SRS; Constantino, 2013), Autism Behavior Checklist (ABC; Krug et al., 1980), and Social Communication Disorder Checklist (SCDC; Skuse et al., 1997).

The Modified Checklist for Autism in Toddlers, Revised (M-CHAT-R) (Robins et al.,(2001) is one of the most widely used parent-report screening tools for toddlers aged 16–30 months. It is a screening checklist of 20 questions which focuses on social interaction, communication, attention and behaviour. This checklist is intended for toddlers between 16 to 24 months of age. The tool helps in early detection of children who may be at risk for ASD and require further evaluation. M-CHAT-R is a quick, inexpensive and commonly used in routine ASD screening. The previous version, MCHAT has been translated into several Indian languages like Bengali, Tamil, Hindi, Marathi, Telegu and Punjabi (Divya et al., 2020; Rudra et al., 2014).

The SCQ is a parent-report screening tool used to identify children who may be at a risk for ASD. It is derived from Autism Diagnostic Interview Review (ADI-R) and is intended for children above 4 years of age with a mental age greater than 2 years. The tool contains 40 items related to language development, reciprocal social interaction and communication throughout child's developmental history (SCQ Lifetime) and behaviours observed in the past 3 months (SCQ Current). This tool had a sensitivity of 80% and a specificity of 25.7% (Staton et al., 2022).

The ASQ is a screening questionnaire designed to measure the degree of autistic traits present. It is commonly used for adolescents and adults with average or above average intellectual abilities. The tool consists of items assessing social skill, communication, im0agination, attention switching and attention to detail. Individuals respond to statements describing behaviours and preferences and higher score indicate greater autistic traits.

The SRS is a standardized rating scale used to measure the severity of social impairment associated with ASD. The shorter version of the questionnaire has 16 items and is a brief, unidimensional scale. The SRS has been criticized for lacking specificity at

least among children and for exhibiting inflated scores due to its characteristics not specific to an ASD diagnosis, such as problem behaviours and low IQ (Kaat & Farmer, 2018).

The ABC checklist was developed to screen for ASD in individuals between 3 to 35 years of age. The scale which was developed in 1980 is yet unrevised. This scale consists of 57 item and 5 scales. These scales are sensory, relating, body and object use, language and social and self-help (Davenport,2011). Other tools include the which screen for ASD are the Screening Tool for Autism in Toddlers and Young Children (STAT), which evaluates play, communicationand imitation skills. The STAT is an empirically based, interactive measure developed to screen for ASD in children between 24 and 36 months. It is designed for use by community service providers like teachers, day-care workers, special educator or a speech therapist who work with young children in assessment or intervention settings and who have experience with ASD. The STAT consists of 12 items and takes about 20 minutes to administer. Activities assess key social communication behaviours including imitation, play, requesting and direct attention and the Parents' Evaluation of Developmental Status (PEDS), which identifies concerns related to language, motor, and adaptive development. If screening results suggest the presence of autistic features, children are typically referred for detailed multidisciplinary evaluation and diagnostic assessment. Early screening and referral are considered essential because they facilitate timely intervention during critical periods of neurodevelopment, therefore improving long-term communication, social, and adaptive outcomes.

2.3.5 Diagnostic Tools for Assessment of ASD

Assessment of ASD generally involves a combination of clinical observation, caregiver interview, developmental history and standardized tools assessing social communication, interaction, restricted and repetitive behaviours, sensory responses, play, and adaptive functioning. Among Indian tools, the Indian Scale for Assessment of Autism (ISAA) was developed by the National Institute for the Mentally Handicapped (NIEPID), India and is used for assessing autism and certifying disability. It contains 40 items rated on a 5-point scale, across six domains: social relationship and reciprocity, emotional responsiveness, speech-language and communication, behaviour patterns, sensory aspects and cognitive component. It is administered through observation, caregiver interview, and interaction with the child or person, and usually takes around 20 to 30 minutes. The study done by Chakraborty et al (2015) supported ISAA as a useful tool for grading autism severity in the Indian clinical context, especially for structured assessment and disability certification.

The Childhood Autism Rating Scale (CARS), developed by Schopler et al., (1980), (1988) as part of the TEACCH program at the University of North Carolina. It includes 15 items, each rated from 1 to 4, covering areas such as relating to people, imitation, emotional response, body use, object use, adaptation to change, sensory responses, fear or nervousness, verbal and nonverbal communication, activity level, intellectual response, and general impressions. Total scores are used to classify the child as non-autistic, mildly to moderately autistic, or severely autistic. The revised version, CARS-2, was later published by Schopler et al., (2010) to improve use across different age and functioning levels.

The Autism Diagnostic Observation Schedule (ADOS) was developed by Lord et al., (2000) as a semi-structured, standardized observational assessment of autism. It assesses communication, reciprocal social interaction, play, imagination, restricted

interests, and repetitive behaviours. The original ADOS had four modules, selected according to the individual's expressive language level, from nonverbal children to verbally fluent individuals. The updated ADOS-2 by Lord et al. (2012) includes revised algorithms and a Toddler Module, making it useful across a wider developmental range. ADOS is often considered a gold-standard observational tool, but it requires trained administration and is typically used along with developmental history and clinical judgement.

The Ministry of Social Justice and Empowerment (Department of Empowerment of Disabilities) released the INCLEN Tool for the assessment of ASD on April 25, 2016, to be uniformly followed for the assessment of autism in India. It was developed through expert consensus for the Indian context and is based on DSM-IV-TR criteria. The tool has two sections, with Section A containing 29 symptoms/items and Section B containing 12 questions. It assesses core ASD features such as social interaction deficits, communication difficulties, restricted/repetitive behaviours, and associated developmental concerns. It is a simple and effective tool that can also be used regularly by SLPs and other professionals for the diagnosis of Indian children with ASD (Asokan, Sreenath & Nagarajarao, 2016).

2.4 Current level of awareness about ASD amongst different professionals

Awareness regarding ASD among professionals plays a crucial role in facilitating early identification, timely referral and appropriate intervention for children with ASD. However, studies have reported varying levels of awareness, knowledge and attitudes toward ASD among different professional groups including teachers, healthcare professionals and allied health practitioners. A study conducted by Suhuram, Leong and Wong (2021) assessed awareness regarding ASD among 181 paediatricians and

healthcare professionals of Singapore using an online survey. The findings revealed significant gaps in ASD awareness and early identification skills, despite most participants regularly working with preschool children. Only 43.7% felt confident in identifying early signs of ASD, while merely 27.1% had received prior ASD training. Additionally, only 8.3% correctly identified all early warning signs and many professionals continued to have the misconception of 'outgrowing ASD' instead of making immediate referrals. The study emphasized the need for continued professional training and awareness programs to improve early identification and intervention practices for ASD.

The findings of this study are in consonance with few other similar studies conducted across the globe. A study by Atun-Einy and Ben-Sasson (2018) assessed ASD-related knowledge and self-efficacy among 234 pediatric allied healthcare professionals, including physical therapists, occupational therapists and speech-language pathologists, using a validated questionnaire. The findings showed adequate knowledge regarding core features of ASD; however, gaps were observed in understanding comorbidities, interventions and early ASD markers. Professionals with prior ASD experience demonstrated significantly higher knowledge and self-efficacy scores. The study highlighted the need for improved professional training on ASD.

Another study conducted by Corsano, Cinotti and Laura Guidotti (2019) reviewed knowledge and experiences related to ASD among 93 paediatric nurses in Italy using questionnaires and open-ended responses. The findings revealed that nurses possessed basic knowledge regarding ASD, although gaps were observed in areas such as comorbidity and onset of the disorder. Nurses with greater paediatric or ASD-related experience demonstrated higher knowledge scores. The study also reported difficulties

among nurses in managing interactions with children with ASD and highlighted their need for additional training and strategies to improve communication and care practices.

Yet another study conducted by Nurmukhanbetova et al., (2026) conducted a cross-sectional study among 638 medical professionals in Almaty, including general practitioners, paediatricians, neurologists and psychiatrists, examined awareness of ASD using a structured questionnaire. The findings revealed that psychiatrists recognized ASD-related social, behavioural, and sensory symptoms better than neurologists, while experienced paediatricians demonstrated greater awareness than general practitioners. Overall, the study revealed limited ASD awareness among physicians, particularly general practitioners, and emphasized the need for targeted training to improve early recognition, diagnosis, and referral of children with ASD.

A study by Ellias and Shah (2019) assessed knowledge regarding ASD among 201 final-year medical students from seven medical colleges in Mumbai using the Knowledge about Childhood Autism among Healthcare Workers (KCAHW) questionnaire. The findings revealed overall poor knowledge regarding ASD, with notable gaps in understanding repetitive behaviours and the association between ASD and epilepsy. The study emphasized the importance of improving autism-related education among medical students to facilitate accurate and early identification of ASD.

Another Indian study done by Kashyap et al., (2024) involving 602 Indian paediatric dentists and postgraduates assessed their awareness and perception regarding the diagnosis and management of children with ASD. Although most participants had fair knowledge of the characteristic features of ASD, only 37.3% were aware the correct referral pathways and intervention methods, indicating gaps in broader clinical awareness and thus highlighting the need for additional training to improve diagnostic understanding and individualized dental management for children with ASD.

2.4.1 Awareness and Knowledge of Preschool Teachers about ASD in Global and Indian Context

In a study done by Kara and Demirtas (2020) involving 226 preschool teachers of Turkey, the results reported significant lack of awareness and knowledge about core ASD symptoms. Similar findings were reported by Alobaid and Almogbel (2022), Yahya and Mohamed (2024), Lamichhane and Bagale (2024). Some existing studies on preschool teachers' awareness and knowledge of ASD consistently reports moderate levels of understanding but, with considerable gaps in recognizing early signs, etiology and interventions. A review done Alwadei et al (2020) compiled global studies showing that while teachers often identify behavioural symptoms like social withdrawal and excessive temper tantrums, they lack the required in depth knowledge of ASD, leading to delayed referrals. Factors like prior training and prior experience of teaching children with ASD have shown positive corelations. Al Saree and Al Shurman (2019) explored the level of teachers' knowledge of ASD among 115 teachers who taught students with ASD in Jordan. The findings revealed that the teachers had an average knowledge of ASD.

The findings of a study done by Ponnala et al.,(2025) revealed that attitudes towards inclusion were found to be mixed; many preschool teachers (72%) were aware of the basic concept of ASD and its core symptoms but misconceptions were present in 30% of the participants. Higher awareness levels were significantly associated with higher educations and longer experience, but formal training was rarely undertaken by any of the participants. These results highlight that although policy-level efforts towards inclusive education are present and increasing every year, there still is a substantial need for training and empowerment programs to enhance preschool teacher's knowledge, attitudes and competence to effectively support children with ASD in inclusive classroom setups.

Research evidence from Indian studies indicates that although awareness regarding ASD has increased among preschool teachers, significant gaps continue to exist in their practical understanding, confidence and attitudes toward inclusion. Findings of an Indian study conducted by John and Shetty (2022) revealed that, preschool teachers in Kerala reported have adequate information regarding ASD; however, their attitudes toward children with ASD were found to be mixed in nature. While some teachers showed willingness towards inclusive education others demonstrated negative attitudes like uncertainty and apprehension regarding the management of children with ASD within classroom settings. These findings suggest that having theoretical knowledge alone does not necessarily provide confidence or competence in handling children with ASD effectively.

Studies highlighted that many preschool teachers lacked sufficient practical exposure, specialized training and structured guidance regarding ASD management (Shetty & Rai, 2014; Ponnala, Suresh & Karthick, 2025). Teachers often reported difficulties in understanding the managing communication deficits and behavioural problems, and addressing sensory sensitivities within classroom environments. Inadequate training contributed to conducting inclusive classes for children with ASD. Such challenges can negatively affect both teacher confidence and the overall quality of educational support provided to these children.

One significant consequence of insufficient teacher knowledge regarding ASD is delayed identification. Preschool teachers are frontline professionals who can identify early developmental red flags because they regularly observe children's social participation, communication skills, play behaviour, and peer interaction. However, when teachers lack sufficient knowledge about the red flags of ASD, there are high chances that the concern can be overlooked or misinterpreted as behavioural problems, shyness or

stubbornness. As a result, referrals for further assessment may be delayed, leading to delay in diagnosis and intervention.

Delayed identification can have serious consequences, as early childhood is a critical period for language acquisition and social development. During these years, the brain exhibits high neuroplasticity, making intervention more effective and meaningful. If ignored, it may result in missed opportunities for early intervention, therefore affecting long-term developmental outcomes. Teachers who are adequately trained to recognize red flags can contribute significantly to earlier referrals and improved intervention outcomes. In addition to this, a limited understanding of ASD among preschool teachers can also hinder effective classroom support and inclusive educational experiences. Children with ASD often require simple, clear instructions, visual supports, predictable routines, sensory accommodations, behavioral strategies, and structured social opportunities to participate successfully in classroom activities. Teachers with insufficient knowledge of these strategies may struggle to create supportive learning environments, leading to reduced classroom participation and increased behavioral difficulties.

2.4.2 Barriers in Preschool Teachers' Awareness and Adoption of Inclusive Teaching Practices for Children with ASD

Vincent and Ralston (2020) emphasized that inadequate teacher preparedness negatively impacts inclusive education practices for children with developmental disorders. Similarly, Gomez-Mari et al. (2021) reported that limited knowledge among teachers regarding ASD can negatively impact classroom engagement, peer interaction and social participation among children with ASD. Children with ASD may become socially isolated, excluded from group activities, or misunderstood by both teachers and

peers. Such experiences can adversely affect their self-esteem, emotional well-being, academic development and social competence.

The attitudes of preschool teachers toward inclusion also play a critical role in shaping inclusive educational experience for children with ASD. Positive teacher attitudes promote acceptance, empathy, collaboration and inclusive participation, whereas negative attitudes, stigma or misconceptions may contribute to reduced opportunities for meaningful engagement. Teachers who lack confidence in managing children with ASD may experience increased stress, frustration and burnout, further affecting classroom dynamics and educational quality. Therefore, empowerment initiatives should not only focus on improving knowledge but also aim to foster positive attitudes, empathy and confidence among preschool teachers. Another concern is that many preschool teacher training programs provide limited exposure to neurodevelopmental disorders such as ASD and are more focussed on holistic communication disorders. As a result, teachers often enter professional practice without adequate understanding of early warning signs, behavioural management techniques or inclusive educational strategies specifically for ASD. In countries like India, where awareness regarding developmental disabilities is still evolving, this gap becomes even more pronounced. Furthermore, variations in access to specialized resources and professional support across urban and rural settings may further limit teachers' preparedness to address the needs of children with ASD effectively.

Teacher empowerment programs refer to structured educational initiatives aimed at improving teachers' knowledge, skills, attitude sand confidence in identifying and supporting children with developmental disorders. Such programs can include training workshops, e-learning modules, classroom demonstrations, video-based learning, case discussions, interactive activities and collaborative sessions with professionals such as

speech-language pathologists, psychologists, occupational therapists and special educators.

Yet another challenge is that, despite the availability of evidence-based intervention approaches for children with ASD, many educational and early childhood settings in India continue to depend on conventional teaching methods such as rote learning, verbal instruction, copying, repetition, and whole-class teaching. These methods may not adequately address the needs of children with ASD, who often require structured routines, visual supports, individualized teaching, sensory accommodations, functional communication systems, and behaviour-based learning strategies. In government-supported early childhood systems such as The Integrated Child Development Scheme (ICDS), Anganwadi centres play an important role in preschool education, nutrition, and early childhood care; however, limited training in neurodevelopmental disorders may restrict the ability of Anganwadi workers and preschool teachers to identify ASD red flags and provide appropriate classroom support. Chattopadhyay (2024) highlighted major gaps in ASD screening in India, including lack of awareness, shortage of trained professionals, and poor access to screening systems, while Chakrabarti (2023) emphasized the need for a national autism programme to strengthen early identification, service delivery, and intervention planning.

Although intervention resources such as Augmentative and Alternative Communication (AAC), visual schedules, Picture Exchange Communication System (PECS), Applied Behaviour Analysis (ABA)-based strategies, Treatment and Education of Autistic and related Communication Handicapped Children (TEACCH), social stories, sensory supports, and parent-training modules are available, they are not always used consistently in regular preschool or community settings. This may be due to lack of awareness, limited professional training, inadequate resources, large classroom sizes,

stigma, and the continued belief that all children can be taught using the same methods. Evidence suggests that children with ASD benefit from structured, individualized, and communication-focused approaches(Wong et al., 2015). Similarly, AAC-based intervention can support communication in minimally verbal children; Kasari et al. (2014) found that speech-generating devices improved spontaneous communication, while Srinivasan et al. (2022) showed that the indigenously developed Jellow Communicator supported requesting skills in Indian children with ASD.

The gap, therefore, is not only the absence of intervention models but the limited translation of these models into everyday teaching and community practice. Preschool teachers and Anganwadi workers often observe early signs such as speech delay, poor peer interaction, lack of pretend play, echolalia, sensory distress, and restricted or repetitive behaviours, but may not have sufficient training to interpret these as possible indicators of ASD. Teacher empowerment is therefore critical, as trained preschool teachers can support early identification, guide parents toward assessment, and use simple classroom strategies such as visual timetables, first-then boards, structured routines, peer-buddy systems, sensory breaks, and simplified instructions. Parent-mediated and community-based approaches have also shown promise in low-resource settings; Rahman et al. (2016) demonstrated that parent-mediated intervention was feasible and acceptable in South Asian contexts. Thus, strengthening training modules for teachers, Anganwadi workers, parents, and community workers is essential to move from conventional teaching toward inclusive, evidence-based, and child-centred intervention for children with ASD.

Vygotsky's sociocultural theory (Vygotsky, 1978), provides a strong theoretical basis for the need to train preschool teachers in evidence-based and individualized teaching strategies for children with ASD. According to Vygotsky, children learn best

through social interaction and guided support within the Zone of Proximal Development (ZPD), which refers to the gap between what a child can do independently and what the child can achieve with appropriate adult or peer support. In this context, scaffolding involves providing support such as prompts, modelling, visual cues, repetition, simplified instructions, and structured routines, which are gradually faded off as the child becomes more independent. This is especially relevant for children with ASD, who often require systematic support in communication, play, social interaction, behaviour regulation and classroom participation.

The continued use of conventional teaching methods in preschool settings may limit such scaffolding. Children with ASD may not benefit adequately from the usual general classroom instructions, rote teaching, unplanned or unstructured activities, as they often require visual supports, AAC, PECS, TEACCH-based structured teaching, task analysis, and reinforcement-based strategies. From a Vygotskian perspective, these strategies act as scaffolds that help the child move from supported participation to more independent functioning. Therefore, when preschool teachers lack training in ASD-specific strategies, the child's ZPD may not be effectively addressed, resulting in reduced opportunities for language development, social communication and adaptive learning.

2.4.3 Need for Empowerment Programs

Validated empowerment programs are important because they ensure that the information provided is evidence-based, culturally appropriate and educationally relevant. Standardized training programs can help preschool teachers understand the core characteristics of ASD, recognize early signs, be aware about the referral pathways, implement classroom accommodations and facilitate social communication skills within

naturalistic educational settings. These programs can enhance teachers' competence and reduce anxiety related to handling children with ASD in the class.

Moreover, empowering preschool teachers can pave a way for multidisciplinary collaboration. Teachers who are knowledgeable about ASD are more likely to communicate effectively with parents and healthcare professionals regarding developmental concerns. Early communication between teachers and parents can facilitate timely referrals and encourage families to seek professional intervention services. Teachers can contribute valuable observational information regarding the child's classroom behaviour, social interaction and communication patterns, therefore supporting comprehensive assessment and intervention planning.

Empowerment programs may additionally help reduce stigma and misconceptions surrounding ASD. In many communities, developmental disorders continue to be misunderstood, leading to social discrimination and delayed help-seeking behaviours. Teachers who possess accurate information regarding ASD can serve as important agents of awareness within schools and communities. By promoting acceptance and inclusion, they can foster supportive educational environments that respect neurodiversity and encourage equal participation for all children. The integration of technology in the learning methods have further improved the accessibility and effectiveness of teacher empowerment programs. E-modules, online training platforms, mobile applications, webinars and virtual workshops can provide flexible and cost-effective opportunities for teachers to access training resources. Such approaches are particularly beneficial in regions difficult to access. Interactive digital modules support self-paced learning and repeated review of content, therefore improving knowledge retention.

2.5 Policy Frameworks for ASD

2.5.1 *Policy Frameworks for ASD Across the Globe*

Globally, policies for Autism Spectrum Disorder (ASD) have increasingly shifted from a purely medical model to a rights-based, inclusive, and life-span support model. The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) provides the broad international framework for disability rights, including the rights to non-discrimination, accessibility, inclusive education, rehabilitation, employment, and community participation. Article 24 of the UNCRPD specifically recognizes the right of persons with disabilities to inclusive education, while Article 25 emphasizes equal access to health services. These provisions are important for individuals with ASD because they support early identification, inclusive schooling, reasonable accommodation, community participation, and protection from discrimination (United Nations, 2006). The need for such global policies is supported by prevalence and service-access research, as Zeidan et al. (2022) reported a median global ASD prevalence of approximately 1%, while McConkey (2022) highlighted that most individuals with autism live in low- and middle-income countries where timely diagnosis and appropriate services remain limited.

The World Health Organization (WHO) has also played a major role in shaping global ASD policy. It has worked to strengthen awareness, surveillance, diagnosis, early intervention, family support, education, employment, and community-based services for individuals with ASD and other developmental disorders (World Health Organization, 2014). WHO further developed the Caregiver Skills Training (CST) programme for families of children with developmental delays or disabilities, including autism, especially for low-resource settings. The CST programme trains caregivers to use daily routines and play-based interaction to improve children's communication, engagement, adaptive behaviour, and participation. Salomone et al. (2019) described the development

of the WHO-CST programme as a scalable, culturally adaptable model, while studies on CST implementation have shown that parent-mediated, non-specialist-supported interventions can be feasible and acceptable across different countries and service contexts.

Several countries have also developed national-level autism-specific laws, strategies, and service guidelines. In the United States, the Individuals with Disabilities Education Act (IDEA) ensures early intervention services for infants and toddlers through Part C and special education services for children and youth through Part B. It supports individualized planning through the Individualized Family Service Plan (IFSP) and Individualized Education Program (IEP), which are highly relevant for children with ASD who require speech-language therapy, occupational therapy, behavioural support, classroom accommodations, and assistive technology. The Autism CARES Act further supports autism research, surveillance, professional training, and service development in the United States. In the United Kingdom, the Autism Act, 2009 was the first autism-specific legislation in England and required the government to develop an adult autism strategy and statutory guidance for local authorities and health services. The National Institute for Health and Care Excellence (NICE) also provides clinical guidelines for autism diagnosis, support, and management in children and young people, emphasizing multidisciplinary assessment, family-centred support, and evidence-based intervention (NICE, 2013; NICE, 2021).

Overall, global ASD policies emphasize early screening, timely diagnosis, inclusive education, caregiver empowerment, community-based services, reasonable accommodations, and life-span support. However, the implementation of these policies remains uneven across countries. Findings of several studies have revealed that individuals with autism and their families continue to experience gaps in diagnosis, health

care, mental health support, education, employment, transition services, and social support. Similarly, Lord et al. (2022), through 'The Lancet Commission' on autism, emphasized the need for personalized, stepped-care models, greater investment in evidence-based supports, and stronger systems for individuals across different levels of ability and support needs. Globally, inclusive education has been promoted through frameworks such as the Salamanca Statement (UNESCO, 1994) and the United Nations Convention on the Rights of Persons with Disabilities (2006). Thus, while global frameworks such as the UNCRPD, WHO resolutions, IDEA, Autism CARES, NICE guidelines, etc provide important policy direction outcomes depend on how well these policies are translated into accessible, affordable, culturally appropriate and family-centred services.

2.5.2 Policy Framework for ASD in India

Within India's policy framework, the National Education Policy (NEP), 2020, aims to address and end the discrimination towards Children with Special Needs (CWSN) by providing an inclusive space for learning. However, further actions and refinements are needed to ensure proper implementation (Gajendrabhai, Joshi & Saini, 2021). India's ASD related support framework combines legal rights, disability certification, welfare schemes, guardianship provisions, and service supports that are especially important for families navigating long-term care needs (The Rights of Persons with Disabilities Act, (RPwD, 2016; The National Trust, 1999). The Rights of Persons with Disabilities Act, 2016 is the principal law governing disability rights in India and is the legal foundation for many autism-related entitlements and protections (RPwD Act, 2016). The Act includes ASD among the specified disabilities, which places ASD within a rights-based legal framework rather than a purely medical one (RPwD Act, 2016). It also sets out

general rights and entitlements relating to equality, non-discrimination, accessibility, and participation in society (RPwD Act, 2016).

A major significance of the Act is that it supports access to disability certificate and its benefits (RPwD Act, 2016; Department of Empowerment of Persons with Disabilities, n.d.). In addition, the Act works alongside other disability institutions and schemes, including the National Trust and the Rehabilitation Council of India, to create a broader support system for persons with autism (The Rehabilitation Council of India Act, 1992; The National Trust, 1999).The Rights of Persons with Disabilities Act, 2016 is the main legal basis for recognising disability rights in India, while the National Trust Act, 1999 establishes a statutory body to support persons with ASD and other communication disorder. Together, these measures link ASD to a rights-based system rather than treating it only as a clinical condition.

2.5.3 Disability Certificate and its Importance

Disability certification opens the gate to many public benefits and scheme for persons with disability, so it is a key step for families seeking support (Department of Empowerment of Persons with Disabilities [DEPwD], n.d.; The RPwD Act, 2016). The Unique Disability ID (UDID) card is a government-issued identity card for persons with disabilities in India. It is an initiative of the Department of Empowerment of Persons with Disabilities (DEPwD), Ministry of Social Justice and Empowerment, Government of India. Any Indian citizen with a recognized disability under the Rights of Persons with Disabilities Act, 2016, including autism, intellectual disability, cerebral palsy, locomotor disability, visual impairment, hearing impairment, speech and language disability, and multiple disabilities, can apply for it. The UDID card creates a single national disability identity and helps persons with disabilities access government schemes, scholarships,

pensions, railway concessions, education benefits, employment reservations, assistive devices, and other welfare services more easily.

The application can be made online through the UDID portal by registering as a person with disability, filling in personal and disability-related details, uploading required documents such as photograph, identity proof, address proof, and available medical/disability documents, and submitting the application. After submission, the person is assessed by the concerned medical authority or medical board, following which the disability certificate and UDID card are generated if eligible. The portal also allows applicants to track application status, renew certificates, apply for replacement cards, and download or print the disability certificate or UDID card.

2.5.4 Government Schemes and Benefits for Children with ASD

The National Trust for the Welfare of Persons with Disabilities (PwD) provides several schemes for the welfare, support, education, health care and rehabilitation of PwDs. These schemes are especially relevant for individuals with Autism Spectrum Disorder and their families, as they aim to reduce financial burden, improve access to services, promote inclusion, and provide long-term care support. An overview of some important schemes is given below.

The Niramaya Health Insurance Scheme provides affordable health coverage to PwDs, including individuals with ASD. The major benefits of this scheme is that no pre-insurance medical test is required, making it easier for PwDs to access insurance. The scheme provides coverage up to Rs.1 lakh on reimbursement basis. Treatment can be taken from any hospital, which gives families flexibility in choosing health care services. The scheme covers OPD treatment, medicines, diagnostic tests, regular medical check-ups, dental preventive care, corrective surgeries, hospitalization, non-surgical

interventions, therapies to reduce the impact of disability, management of disability-related complications, alternative medicine and transportation costs. Thus, the Niramaya Health Insurance Scheme is highly beneficial for families who require continuous medical and therapeutic support for the person with disability.

Samagra Shiksha is an integrated Government of India scheme covering school education from preschool to Class 12, aligned with the Right to Education Act (RTE) Act, 2009 and NEP 2020. It aims to provide free, equitable, inclusive, and quality education while addressing children's diverse backgrounds, multilingual needs, academic abilities, and learning styles. The scheme, focuses on early childhood care and education, foundational literacy and numeracy, inclusive and activity-based pedagogy, improved learning outcomes, teacher training, safe learning environments, and vocational education. It covers about 1.16 million schools, 156 million students, and 5.7 million teachers, beginning with Anganwadi or preschool education. Its emphasis on play-based, experiential, multidisciplinary, and inclusive learning makes it especially relevant for supporting children with disabilities and developmental conditions such as ASD.

The Disha Early Intervention and School Readiness Scheme is for children with disabilities in the age range of 0 to 10 years. The main aim of this scheme is to provide early intervention services and prepare children for school readiness. Under this scheme, support is provided through day care centres where children can receive therapy, training and developmental support. These centres generally include services by professionals such as special educators, early interventionists, physiotherapists, occupational therapists, and counsellors. The scheme benefits children by improving their communication, motor, cognitive, social, and adaptive skills at an early age. It also supports families by guiding them on how to manage the child's developmental needs at home and in daily routines.

The Gyan Prabha Educational Support Scheme aims to encourage persons with Autism, Cerebral Palsy, Mental Retardation and multiple disabilities to pursue educational and vocational training leading to employment or self-employment. The scheme provides financial support for different types of courses, including professional courses, graduation and post-graduation courses, and vocational courses. The support amount may help cover expenses such as course fees, transportation, books, and other out-of-pocket educational costs. This scheme is beneficial because it promotes higher education, skill development, independence, and employability among persons with disabilities. By supporting both academic and vocational pathways, The Gyan Prabha scheme helps individuals with disabilities become more self-reliant and socially included.

The Gharaunda Scheme is to provide lifelong housing and care services for adults with Autism, Cerebral Palsy, Mental Retardation, and multiple disabilities. It aims to ensure that persons with disabilities have access to a safe, secure and supportive living environment, especially when family members are unable to provide continuous care. The scheme provides group home facilities with acceptable living standards, basic medical care, assistance in daily living, and support from trained caregivers. It also includes vocational and pre-vocational activities, which help adults with disabilities remain engaged, develop functional skills, and improve their independence.

The Sambhav Aids and Assistive Devices Scheme aims to improve access to assistive devices, aids, software, and other supportive technologies for persons with disabilities. Under this scheme, resource centres are established where various devices and assistive technologies are collected, displayed, and demonstrated. The scheme is beneficial because assistive devices can improve communication, mobility, learning, independence, and participation in daily life. For individuals with ASD, such resources

may include communication aids, visual supports, educational software, adaptive devices, and other tools that enhance functional abilities.

The Badhte Kadam Scheme aims at community awareness, sensitization, social integration and mainstreaming of PwDs. The purpose of this scheme is to increase public awareness about disabilities covered under the National Trust and to spread information about available schemes, rights, services, and preventive strategies. It also encourages innovative projects that promote inclusion and community participation. This scheme benefits persons with disabilities and their families by reducing stigma, improving awareness, encouraging early identification, and helping communities understand the needs and abilities of persons with disabilities.

Overall, these schemes of the National Trust provide important support across different stages of life, beginning from early intervention and education to health care, assistive devices, caregiver training, awareness, and lifelong residential care. They are especially helpful for persons with autism and their families, as they address not only medical and therapeutic needs but also educational, social, vocational, and long-term support requirements.

2.6 Myths and Misconceptions associated with ASD

Myths surrounding ASD continue to influence how parents, teachers and other community workers understand early developmental differences in children. Common myths about autism can delay identification, reinforce stigma, and distort parental decision-making, so correcting them is essential for early detection and support (John et al., 2018; Bölte et al., 2019). One such myth is that ASD is caused by poor parenting. This myth potentially increases parental guilt and delays professional help-seeking.

Another prevalent myth is that ASD is caused by vaccines. Large cohort studies and meta-analyses have consistently shown that vaccines, including the MMR vaccines for rubella, don't cause ASD (Hviid et al., 2019; Taylor, Swerdfeger& Eslick, 2014). This myth is harmful because it creates vaccine hesitancy and shifts attention away from early developmental monitoring. Another persistent myth is that ASD is caused by poor parenting, lack of affection, etc. Current evidence explains ASD as a complex neurodevelopmental condition arising from interactions between genetic and environmental influences that affect early brain development (Chaste & Leboyer, 2012; Hodges et al., 2020). Genetic studies have shown that ASD is highly heterogeneous and may involve inherited as well as genetic variations (Rylaarsdam & Guemez-Gamboa, 2019).

A further myth is that all autistic people have intellectual disability or, conversely, that all autistic people are "savant-like" and gifted in an exceptional way (Bölte et al., 2019; "Autistic Spectrum Disorder," 2007). In reality, autism occurs across a wide range of intellectual and adaptive functioning, and strengths in one area may coexist with difficulties in another (Lord et al., 2020; Happé & Frith, 2020). Similarly, the belief that autistic people do not want relationships or lack emotion is inaccurate; many autistic individuals value social connection but experience difficulty with social communication, reciprocity, and interpreting social cues (Bölte et al., 2019; Lai et al., 2014).

Myths and misconceptions about ASD are not just misunderstandings; they create stigma, family stress, and access to services resulting in delayed identification and intervention (Bölte et al., 2019; Cleary et al., 2023). Public education is therefore necessary to debunk these myths and misconceptions with evidence-based understanding (Chakrabarti, 2023; Chattopadhyay, 2024). In the Indian context, correcting myths is especially important because early identification depends on whether families and

frontline professionals recognise ASD as a developmental condition that requires early intervention (Chakrabarti, 2023; Hyman et al., 2020).

2.7 Available teacher training and education programs on ASD

Many teachers lack sufficient awareness and specialized training regarding ASD. Inadequate knowledge can affect their ability to recognize early red flags and facilitate meaningful classroom participation for children with ASD. Professional training addresses these limitations by empowering teachers with recent theoretical understanding and practical intervention strategies than the conventional ones. Effective training programs should integrate both theoretical and practical aspects to ensure that teachers are not only aware of the characteristics of ASD but are also able to apply suitable strategies within real classroom situations.

Theoretical knowledge about concepts of ASD provides teachers with an understanding of the core characteristics and red flags of ASD. Whereas, practical training focuses on the possible classroom modifications through use of visual supports, sensory breaks, structured reinforcement schedule and inclusive teaching practices. The integration of these components helps in enhancing confidence and competence of teachers in supporting children with ASD. Findings of several studies have indicated that structured teacher training programs helps in improving knowledge of teachers regarding ASD. Soni, Mohanand Samuel (2021) investigated the effectiveness of a planned teaching program on knowledge regarding ASD among preschool teachers in schools of Udaipur. The study assessed teachers' knowledge pre- and post-participation in an educational program focused on improving awareness of ASD. The findings revealed a significant improvement in post-test knowledge scores among teachers following exposure to the planned teaching program.

The study highlighted that structured educational training modules can effectively enhance teachers' awareness regarding ASD. Teachers demonstrated enhanced knowledge of ASD characteristics, communication difficulties, behaviours and management approaches after participating in the program. Such findings indicate that structured and planned teaching programs can improve teachers' competence in identifying the red flags and supporting children with ASD within classroom settings. Enhanced awareness among teachers can contribute to earlier identification and referral for required detailed assessments and intervention services, therefore improving long-term developmental outcomes for children with ASD.

Jain & Menaria (2019) have also done another study which was based on the efficacy of a Self Instructional Modular Training for the Preschool Teachers in selected settings of Bangalore on ASD. The goal of the study was to facilitate teachers' understanding of ASD, such as knowledge of characteristics, early signs, classroom management strategies. The study results indicated that the post-intervention knowledge scores of preschool teachers showed a significant increase after reading the self-instructional module. The intervention resulted in teachers having greater awareness of early warning signs and classroom support strategies for teaching children with ASD and understanding of ASD symptoms. The flexibility and accessibility are one of the most important benefits of self-instructional modules. Teachers have the flexibility to handle the content in their own learning speed and can 're-visit' ideas as and when needed. These instructional approaches are particularly beneficial in educational contexts where hands-on professional learning may be constrained by time, cost or logistics. Self-learning approaches also enable the dissemination of information to a greater number of teachers in a standardised format, which is very useful in resource poor areas.

Daniel, Gupta and Sagar (2013) further provided evidence about the effectiveness of an educational module, which was self-instructional, regarding knowledge of primary school teachers about early symptoms of ASD. A total of 35 teachers of selected schools in Delhi were selected and assessed before and after the educational module was presented to them for a period of 15 days. The educational material focused on improving awareness regarding the early symptoms of ASD, communication deficits, behavioural characteristics and referral procedures.

The results showed that there was a significant increase in the scores of the knowledge of the teachers after the intervention. Furthermore, teachers exhibited greater accuracy in identifying children with ASD post-learning the educational module. This is especially crucial since early identification is one of the most important factors that effect the success of intervention with a child diagnosed with ASD. Teachers with sufficient awareness about developmental warning signs are more likely to make early referrals for assessment and intervention.

The study found that SIE modules are an effective way of enhancing teachers' self-instructional awareness and early identification skills. These results demonstrate the need for the teachers working in preschool and primary school to be provided with the educational resources that are accessible and evidence-based. The knowledge and understanding of teachers are important contributors to the delays in diagnosis and intervention, which remains a very high concern in many developing countries.

These Indian studies were discovered to be congruent with the study carried out by Leblanc, Richardsonand Burns (2009), which was an international study. The researchers in this study looked at the effect of a training program focused on teaching strategies for children with ASD on new teachers placed in inclusive classrooms. This

study specifically focused on whether or not professional development activities could enhance teachers' knowledge about ASD and evidence-based education practices. The literature suggests that even brief (but well-planned and organized) training to teachers was very effective in improving teachers' awareness of ASD. Teachers indicated a feeling of increased confidence in implementing inclusive educational practices, managing classroom issues and supporting children with ASD in mainstream classroom settings. Further, lessons in their ability to teach children with ASD in regular classrooms, were less stressful and anxiety provoking as a result of the training. The results of this study are very important, particularly for many teachers who feel uneasy and unconfident working with children with ASD because of lack of training and knowledge of effective strategies. Practical training programs build teachers' problem-solving skills, enhance the ability to manage the classroom, and promote teachers' positive attitudes towards inclusion. Greater confidence of teachers could also lead to more supportive and accepting classroom environments for children with ASD.

Ongoing professional development is also essential since there is continuous evolution of knowledge about ASD and evidence-based practices of intervention. Ongoing training enables teachers to remain updated regarding new educational approaches, communication strategies, sensory accommodations, assistive technologies and inclusive classroom practices. Training programs can consist of workshops, seminars, on-line courses, demonstrations, classroom simulations, or case discussions and interdisciplinary collaboration with others, including speech language pathologists, psychologists, occupational therapists and special educators. In addition, on-going teacher training is reinforced of inclusive education. The inclusive classroom is a place where teachers must attend to the individual needs of students with various learning needs and encourage equal participation and acceptance. When teachers are trained in ASD specific

strategies, they are more likely to adjust teaching practices, to utilize visual schedules, to make sensory accommodations, to provide individualized instruction and facilitate peer interaction. These practices promote children with ASD to be more involved in learning, more involved in class, more socially included, more emotionally happy. Teacher training also helps families of children with ASD. Educators with sufficient knowledge of ASD are able to exchange more with parents about developmental issues, behavioral observations and educational needs. Educator and family partnerships are essential for consistency between home and school and to a child's developmental success.

E-learning and digital education is the method that uses electronic technologies and digital platforms in the teaching and learning process. Compared with the traditional teaching method, e-learning has some benefits includes anytime and anywhere learning, cost reduction, flexible learning and easy evaluation (Yusuf, 2013). E-learning enhances teaching and learning activities, improves resource access and boosts the learners' performance (Malik & Rana (2020).

Electronic modules or E-modules are designed digital learning resources that offer a structured and self-directed learning for a particular topic. They include multimedia presentations, videos, animations, online assessments and quizzes, case examples that facilitate active participation in learning. The interactive, self-paced nature of e-modules is one of its great advantages, and learners can continue to learn at their own pace and convenience. Several studies have reported positive learner response and significant outcomes (Holisoh, Nurhalimah & Hamda, 2023; Maggala, Nyanasuryanadi & Suherman, 2024).

In the context of teacher education and professional training, e-modules offer several advantages. They improve accessibility by enabling teachers from diverse geographical locations to access educational resources without the need for physical

attendance. E-modules are also flexible and cost-effective, as they reduce travel costs, printing and infrastructure related expenses associated with traditional training programs and workshops. Additionally, digital modules ensure standardized delivery of content, therefore providing uniform information and training experiences to all learners. E-modules significantly increase self-efficacy, motivation and learning outcomes in online learning (Delita, Berutu & Nofrion, 2022). These advantages make e-modules an effective educational approach for enhancing teacher knowledge and professional competencies.

E-learning has become a relevant mode of education, especially in situations where the conventional face-to-face training is limited by barriers like shortage of trained professionals, low teacher to student ratio, geographical barriers, accessibility issues, time barriers or financial constraints. In such situations, e-learning provides a flexible alternative therefore allowing learners to access structured content at their own pace and revisit materials or resources. This is useful in training related programs where repeated exposure, visual aids and self-paced learning can support better understanding. Research evidence suggest that well-designed online learning formats can be effective. In fact e-learning can be more effective particularly active learning and structured feedback in is included (Means et al., 2010; Bernard et al., 2014).

However, the effectiveness of e-learning depends largely on how the content is designed and delivered. Merely converting offline material in digital format may not ensure meaningful learning. Therefore, e-learning modules need to be interactive, visually engaging, easy to navigate and pedagogically structured. When digital content includes short explanations, examples, visuals, quizzes, feedback and opportunities for reflection, it becomes more learner-friendly and reduces the passive nature of online learning. One important strategy that has strengthened e-learning is the use of gamification.

2.7.2 Efficacy of E-learning and Gamification on Learning

Gamification refers to the use of game-like elements such as points, badges, levels, challenges, progress bars, rewards, feedback and interactive tasks within a non-game learning environment. These elements help transform learning from a one-way instructional process into a more participatory experience. In practical terms gamification encourages learners to stay involved, complete tasks, monitor their progress and experience a sense of achievement. Sailer and Homner (2020), in a meta-analysis, found that gamification had positive effects on cognitive, motivational and behavioural learning outcomes. Studies have also suggested that gamified learning can improve not only what learners know, but also how actively and consistently they engage with the learning process.

Gamification is particularly useful in addressing one of the major concerns of e-learning: reduced engagement. In traditional classroom settings, teachers can observe learners' responses, clarify doubts immediately, and modify teaching based on learner behaviour. In online learning, this direct monitoring is often limited. Gamified components can partially compensate for this gap by providing immediate feedback, maintaining interest, and encouraging learners to continue progressing through the module. Antonaci, Klemke and Specht (2019), in their systematic review of gamification in online learning environments, reported that gamification can positively influence learner performance, motivation, engagement, collaboration, and attitude toward learning. These findings indicate that when game elements are meaningfully integrated, they can make online learning more interactive and less monotonous.

Overall, E-learning can be considered an effective approach when it is carefully planned, learner-cantered, and supported by interactive design. Despite challenges such as reduced direct interaction, digital barriers, and learner motivation issues, e-learning offers

flexibility, wider reach, standardization of content and opportunities for repeated learning. Gamification further enhances its effectiveness by improving engagement, motivation, participation and learning outcomes. Therefore, in training programmes where there is a low professional-to-learner ratio or limited access to expert-led sessions, a well-designed gamified e-learning module can serve as a practical and evidence-based method for improving knowledge and skill acquisition.

2.7.3 Use of E-learning by teachers

E-learning is considered a potential strategy and effectively teaches preschool teachers to use simultaneous prompting to teach discrete skills to children with ASD (Tunc-Paftali & Tekin-Iftar, 2020).Several attempts have been made to develop e-modules and digital educational programs on various communication disorders to improve awareness, knowledge and professional competency amongst preschool teachers. Online teacher professional development is particularly useful because it allows teachers to learn flexibly, revisit content, access expert guidance, and participate in training despite barriers such as time limitations, geographical distance, shortage of trainers, and high teacher–student ratios. Dede et al. (2008) highlighted that online teacher professional development can support teacher learning through scalable, technology-mediated models, while also emphasizing the need for well-structured content, interaction, and research-based design.

Similarly, Dash et al. (2012) reported that online professional development in mathematics improved teachers' pedagogical content knowledge and had positive effects on instructional practice. In early childhood education, More recently, Copur-Gencturk et al. (2024) demonstrated through a randomized controlled trial that an interactive, personalized computer-based professional development programme improved teacher

outcomes and student performance, further supporting the value of structured and responsive online learning systems.

These types of training approaches have also focused on enhancing teachers' understanding of disorders such as ASD, Learning Disabilities (LD), speech and language delays, etc through accessible and self-paced learning methods. Findings from studies indicate that e-learning programs can effectively strengthen teacher preparedness and support inclusive educational practices. Doughlas, McNaughton and Light (2013) examined the effectiveness of an online training program designed to help paraeducators support the communication skills of young children with complex communication needs, including children with ASD and developmental delay. The study involved three paraeducators working in early childhood settings who received training through interactive opportunities for practice and discussion-based support. Following the intervention, paraeducators demonstrated increased use of appropriate communication opportunities during play interactions, while the children also showed improvement in the frequency of communication acts. The results of this study highlight that online training can effectively enhance the communication support skills of paraeducators and improve interaction outcomes for young children with developmental disabilities.

2.8 Digital educational modules on ASD for teachers

A study conducted by Low et al (2021) evaluated the effectiveness of an e-module titled 'The story of Khamdy' in preparing Malaysian pre-service teachers to teach students with ASD in inclusive settings. The module was delivered through online platforms such as Facebook and Open Learning and used a pictorial narrative approach with over 200 illustrations to explain concepts related to ASD. The topics covered were early identification, intervention, inclusive practices, social communication strategies,

bullying prevention and transition to adulthood. This study involved 91 pre-service teachers. The findings revealed significant improvement in ASD related knowledge and a reduction in ASD related stigma after completion of the module. The authors concluded that pictorial narrative-based e-modules are an effective and accessible approach for enhancing teacher preparedness, awareness, and inclusive educational practices related to ASD.

Another study carried out by Rakap, Jones and Emery (2015) evaluated the effectiveness of project Autism Competencies for Endorsement (ACE), a web-based professional development program designed for teachers of children with ASD. The program aimed to enhance teachers' competencies, knowledge and instructional skills related to supporting children with ASD through online training modules and evidence-based teaching strategies. The findings indicated that participation in the web-based program significantly improved teachers' understanding and professional skills and participants reported confidence in applying the learned strategies withing classroom settings.

The online training program developed by Hamad, Serna and Fleming (2010) explored whether web-based instruction could effectively teach behavioural intervention principles in ASD to family and service providers (day care workers, preschool teachers). The curriculum focussed on early intervention strategies based on Applied Behaviour Analysis (ABA). It was designed to make training about ASD more accessible to the caregivers. Results showed a clear increase in participants' knowledge after completing the modules, along with favourable feedback regarding the usability and convenience of the online learning. The results also suggested that online curriculum can serve as an effective medium for dissemination of ASD intervention knowledge and strategies for inclusive education on a wider scale.

Hemdi (2023) conducted a qualitative study to identify the gaps between academic preparation and practical implementation among trainee teachers of children with ASD. The study involved six trainee teachers enrolled in special education programs and data was collected using semi-structured interviews and discussions to find out participants' perceptions regarding preparedness to work with children with ASD. The findings revealed that although the trainees had acquired theoretical knowledge about ASD during their coursework, many experienced difficulties in applying the complex intervention strategies, classroom management techniques and individualized teaching approached in inclusive education settings. Participants also reported limited practical exposure, applied skill development to bridge the gap between the theoretical learning and classroom practice.

This review highlights the importance of early identification and intervention in ASD, particularly during the critical developmental years. Preschool teachers play a significant role in recognizing early signs of ASD. However, studies from both Indian and global contexts consistently report limited awareness, knowledge and preparedness among teachers regarding ASD and inclusive education practices. Such gaps may contribute to delayed identification, inadequate classroom support and reduced inclusive participation of children with ASD.

In the Indian context, another gap is that existing materials often lack ASD specific depth in relation to early developmental concerns. Many available resources provide broad information about different disability, child development, but they don't comprehensively address ASD-related features such as early communication delays, reduced social reciprocity, limited eye contact, poor response to name, restricted or repetitive behaviours, sensory differences, play-related concerns, and behavioural indicators. As preschool teachers spend considerable time observing children in natural

classroom and peer-interaction contexts, they can play an important role in noticing these early signs and guiding families toward timely screening, diagnosis, and intervention. Further, the accessibility and applicability of available resources remain uneven across settings. Even when digital resources, training materials or awareness programmes are available, their effectiveness may vary depending on language, format, teacher preparedness, internet access, school support and contextual relevance. This creates a gap between the presence of information and its actual use for early identification and early referral. In the preschool period, such gaps are particularly significant because delays in recognizing ASD-related concerns can postpone access to speech-language therapy, occupational therapy, behavioural intervention, parent counselling, and other early intervention services.

The present study addresses a relevant need by developing an E-Module on ASD specifically for preschool teachers, with an emphasis on strengthening their knowledge for early identification and early intervention. The E-Module aims to provide structured, autism-specific, contextually appropriate, and teacher-friendly information in one place. The literature review indicates that structured educational interventions, self-instructional modules and professional development programs can effectively improve teachers' knowledge, attitudes and competency related to ASD. Recent studies further support the effectiveness of E-learning and digital educational modules in enhancing teacher preparedness through flexible, accessible and cost-effective training approaches.

2.8.1 Need for the Current Study

If teachers improve in their ability to identify early developmental issues and concerning behaviors, the screening process will be quicker, more efficient, and more effective. Since preschool teachers work with children in an environment, they have

many opportunities to observe a child's communication, play, social interaction, attention, behaviour, learning style and peer relationships. They are the front-line observers and can help to identify the behavior of a child by observing that same child repeatedly during different activities such as circle time, playtime, group work, lunchtime, and story time. Teachers can be made competent to identify patterns that indicate that a child has, or may be at risk of having, a developmental delay in the area of concern. Trained teachers will be able to provide valuable insights as first-level assessors within the early identification process, as the majority of developmental warning signs will be first observed in classroom settings. Examples of these warning signs include a child's lack of responsiveness to his or her name being called, lack of eye contact, preference for solitary play, limited pretend play, difficulty following simple directions, limited number of words that the child uses as compared to other children, displaying behaviors that are repetitive as well as having atypical responses to sensory stimuli.

In many cases, parents may not immediately recognise these signs as areas of concern, either because they are unaware of typical developmental milestones or because the child’s behaviour is considered a part of individual variation. A teacher who is trained to understand developmental milestones and warning signs can identify such concerns earlier and document them more objectively. Once teachers are equipped with knowledge about early red flags, screening becomes faster because they can recognise which children require closer observation or referral. They may not diagnose the child, but they can use simple checklists, classroom-based observation records, or developmental screening tools to note areas of concern. This helps in reducing unnecessary delays in the referral pathway. In resource-limited settings, where access to developmental paediatricians, psychologists, speech-language pathologists, or occupational therapists may be limited, teacher-led identification can serve as an important bridge between the child, family, and

professional services. Thus, teachers can support the process of early detection without replacing the role of specialists.

When teachers have a good understanding of their students, they become more confident in communicating the problems with parents. Rather than using labels or giving specific diagnosis, the teacher might more clearly describe the exact problems by giving right examples and refer the child to the right professional. Specific examples can help a parent understand the concerns and might also help in reducing stigma associated with those concerns. This process is crucial when considering early intervention since children have better outcomes if support is provided early. Delayed identification may result in child missing out on his critical period of development. Being able to screen early and communicate the red flags to the parent in the right way helps ensure timely access to professional help once the teacher observes the first signs of difficulty.

Thus, strengthening preschool teachers' competence in ASD-related knowledge and classroom-based strategies can significantly support early identification and timely intervention. When teachers are trained to recognize early red flags such as poor social interaction, delayed speech and language, limited eye contact, lack of pretend play, sensory difficulties, and restricted or repetitive behaviours, screening can become quicker and more systematic. Competent teachers can communicate these concerns sensitively to parents, guide them toward appropriate professional assessment, and reduce delays caused by lack of awareness or misinterpretation of symptoms. Therefore, empowering preschool teachers acts as an important bridge between early classroom observation, parental awareness, referral for diagnosis, and initiation of intervention services for children with ASD.

This study is expected to positively impact early intervention timelines by strengthening preschool teachers' knowledge and competence in identifying early red

flags of ASD. Since preschool teachers observe children in natural classroom and peer-interaction settings, they are in a unique position to notice concerns such as delayed speech and language, poor response to name, limited eye contact, reduced social interaction, sensory difficulties, lack of pretend play, and restricted or repetitive behaviors. When teachers are trained through a structured E-Module, these signs can be recognized earlier and communicated sensitively to parents, therefore encouraging timely referral for screening, diagnosis, and intervention.

By reducing dependence on parental concern or late clinical referral, the E-Module may help shorten the gap between early identification and early intervention. Early identification allows children to access the required intervention and classroom accommodations during the critical early developmental period. Thus, the study has the potential to improve early intervention timelines by empowering preschool teachers as frontline observers, strengthening referral pathways, and promoting earlier access to support services for children with ASD.

CHAPTER III

METHOD

The primary aim of the study was to sensitize preschool teachers on ASD and to develop, validate, and check the efficacy of an E-Module on ASD. The objectives of the present study were to develop a structured, scalable, and validated digital E-module to create awareness regarding ASD among preschool teachers in the Indian context, and to evaluate the efficacy of the E-module in improving preschool teachers' awareness, knowledge, and attitudes toward children with ASD.

3.1 Research Design for the Study

The study utilized a descriptive research method with a single-group pre-test and post-test research design. A control group was not included in the present study as the primary objective was to conduct a preliminary evaluation of the effectiveness, feasibility, and acceptability of the E-module among preschool teachers. The study focused on determining changes in awareness, knowledge, and attitudes following exposure to the intervention within the same group of participants.

3.2 Participants of the Study

The data was collected from 55 teachers working across various preschool setups, Montessori and school setups of Mysuru, Karnataka, India.

3.2.1 Inclusion Criteria for Experts

The following were the inclusion criteria for selection of experts in this study:

i. All eleven professionals, including seven SLPs, one special educator, two clinical psychologists and one occupational therapist possessed at least a graduate degree and a valid RCI registration/licensure within their professional field.

ii. Professionals having at least one year of post-qualification clinical or academic experience in working with children diagnosed with ASD were included in the study. This criterion ensured that the participants possessed adequate professional exposure and expertise related to ASD.

iii. Professionals currently practicing in clinical, academic, research, or rehabilitation capacity in India were included.

iv. Professionals possessing knowledge of the sociocultural aspects surrounding ASD in India were included.

v. Professionals were also required to provide informed consent and commit sufficient time to the validation process.

The following were the inclusion criteria for selection of participants in the present study:

3.2.2 Inclusion Criteria for Participants:

i. The participants were preschool teachers working with children aged 3 to 6 years to the best of their ability.

ii. English was the medium of instruction of the setups from where the participants were recruited.

iii. At least one year of experience working with the preschool/early childhood education standards.

iv. The participants proficient in both verbal and written English were considered.

v. An educational level of 12^{th} grade was required (preferably someone who completed training in early childhood general education, like D.Ed.(Diploma in Education), Diploma in Montessori Teacher Training (DMTT) or Bachelors of Education (B.Ed).

vi. Those who were willing to provide informed consent to participate in the study were included in this study.

3.3. Procedure

The study was carried out in four phases.

Phase 1:Development of the E-module and Questionnaire

Phase 2: Content Validation of the E-module and the Questionnaire

Phase 3: Pilot Study

Phase 4: Final Study and Statistical Analysis

3.3.1 Phase 1 Development of the E-Module and the Questionnaire

*3.3.1.1 Step 1: D*evelopment of E-Module for Preschool Teachers

The development of the module focused on the creation of visually engaging learning content in simple and crisp terms. Illustrative content for the E-module was generated using Microsoft Copilot (Microsoft, 2025) and Google Gemini Nano Banana 2 (Google, 2025), which provide simple and relatable graphics for the E-module domains. The AI-generated images were used only for educational and illustrative purposes to enhance conceptual clarity and learner engagement. The generated graphics were slightly modified to improve the cultural appropriateness. Paint 10.2104.17.0©2021 Microsoft version. The E-module was edited using the VN video editor app (Ubiquiti Labs, 2026). Care was taken to ensure that the images did not reproduce copyrighted material, identifiable individuals, institutional logos, or protected content. The use of these images was in accordance with the copyright, licensing, and usage rights applicable to AI-generated content. They were further reviewed to ensure alignment with institutional ethics and publication standards. The entire module was divided into the following six domains:

Domain 1: The Domain 1 (as in Appendix I) was titled 'Causes and Characteristics of ASD'. The topics covered under this domain include the definition of ASD in simple terms, the concept of 'Spectrum', core features of ASD, co-occurring conditions, the impact of ASD on the quality of life of the child and his family, etc.

Domain 2: The Domain 2 (as in Appendix I) was titled 'Screening children for ASD'. Topics under this domain included developmental milestones, early warning signs of ASD, differentiating ASD signs from typical variations, presence of Restrictive and Repetitive Behaviors (RRBs) or Sensory Issues, role of preschool teachers in early identification, observation strategies, importance of early identification, referral pathways, etc.

Domain 3: The Domain 3 (as in Appendix I), titled 'Awareness on Multidisciplinary Action' addressed points related to the role of different allied health professionals in rehabilitating a child with ASD, neurodiversity, and inclusive education principles, i.e, the ways in which children with ASD can be included in the mainstream settings.

Domain 4: The Domain 4 (as in Appendix I) was titled 'Classroom Modifications for Children with ASD'. This domain highlighted a few in-classroom modifications (such as visual scheduling, sensory breaks, and reinforcements) that teachers can implement to accommodate children with ASD.

Domain 5: The Domain 5 (as in Appendix I) titled 'Awareness of Government Schemes and Benefits' covered about the government acts, schemes, policies (Revised Persons with Disability Act (RPWD), Niramaya Health Insurance Scheme and Samagra Siksha Abhiyan Act) along with awareness about Disability certificate or the Unique Disability ID (UDID) card, the concessions, reservations and benefits given by the government for ASD children and their families.

Domain 6: The Domain 6 (as in Appendix I) titled ‘Myths and Facts associated with ASD’. The last domain focussed on debunking myths associated with ASD and a quick glance at the actual facts.

To facilitate easy understanding of the major domains, a story featuring ‘Aarav’ and his family was included in the e-module. This story presents the concepts in a simple, relatable way, making them easier for participants to understand. Each of these domains was followed by its short summary, highlighting the important points about ASD covered in the respective domains.

The contents within each of these sections were developed based on an in-depth review of the literature on these topics. The script for each module was drafted in a detailed and layman's language. The sentences were kept short, uniform terms were used throughout the E-module consistent coherence was maintained to facilitate easy understanding. The total duration of the module was 37 minutes (as in Appendix I).

3.3.1.2 Step 2: Development of the pre-test and post-test Questionnaire

The pre- and post-test data were collected using a structured, self-administered questionnaire developed through a rigorous literature review to meet the study's objectives. The developed questionnaire followed a closed-ended format and included 34 multiple-choice questions (MCQs; as in Appendix II).

These 34 MCQs have been placed under these six sections:

Section 1: This section, titled ‘Awareness of Causes and Characteristics of ASD’, assessed the understanding of the causes and the signs and symptoms of ASD. Five MCQs like: ‘What are the three main signs of ASD in children?’, ‘What is the most common cause of ASD ?’, etc, were included. Participants were asked to choose one of the four provided options.

Section 2: The section 2 titled 'Screening Children for ASD' covered five MCQs questions encompassing topics like 'Poor eye-contact in ASD is related to?', 'Restricted Repetitive Behaviours will include', etc were included under this section.

Section 3: The Section 3 titled 'Awareness of Multidisciplinary Action' consisted of eight MCQs which focus on assessing the knowledge of preschool teachers on how the different professionals contribute to the care of a child with ASD. Apart from this, questions on Neurodiversity and Inclusion were also covered under this section. Questions like: 'Which professional helps in reducing the sensory issues of a child with ASD?', 'Where will you advise the parents of children with ASD to apply for the UDID card?', 'If a child is neurodivergent, it means?', etc, were included under this domain.

Section 4: This section, titled 'Classroom Modifications for Children with ASD', focused on assessing preschool teachers' awareness and competence to modify their classrooms and make them inclusive for children with ASD. It consists of five MCQs. Questions from this section include: 'Visual schedules help by?', 'Teachers can support the sensory needs by?', etc.

Section 5: This section, titled 'Awareness on Government Schemes and Benefits', included five MCQs on different government acts, schemes, and benefits for children with ASD. It included questions like 'Niramaya scheme covers expenses related to:', 'The disability certificate is useful when applying for', etc.

Section 6: This section, titled 'Myths and Misconceptions about ASD', focussed on determining whether preschool teachers can distinguish between facts and myths that exist about ASD. It included 6 questions in total. Items 25 and 26 are True or False type, and the remaining four questions are MCQs. Questions from this domain are

'Can Autism Spectrum Disorder be completely cured? (True or False)', 'The belief that Autism Spectrum Disorder is caused by vaccines is:', etc.

3.3.2 Phase 2: Content Validation of the E-Module and the Questionnaire

The developed E-module and the Questionnaire were subjected to content validation to check they were relevant, accurate, comprehensive, culturally appropriate, and suitable for empowering preschool teachers with knowledge and awareness regarding ASD.

The content validation stage was carried out in two sub-steps:

Step 1: Content Validation of the E-module by the experts

Step 2: Content Validation of the Questionnaire by the experts

3.3.2.1 Step 1: Content Validation of the E-module by the experts

The E-module was first given to 10 experts (seven SLPs, one special educator, one occupational therapist, and two clinical psychologists) for validation. The developed material was then given to five preschool teachers for validation. To facilitate ease of rating, a Google Form explaining the study and the rating parameters was circulated. This digital format enabled experts and preschool teachers to submit their ratings and open-ended feedback conveniently, therefore facilitating this step of content validation. Table 3.1 summarizes the professional designations and years of experience of the 15 content validators involved in validating the E-module and questionnaire. These experts represented multidisciplinary backgrounds including speech-language pathology, clinical psychology, occupational therapy, special education and general childhood education, with professional experience ranging from 1 to 24 years.

Table 3.1

Designation and experience of the validators

Validator	Years of Experience	Designation
1	01	Speech-Language Pathologist
2	01	Junior Research Fellow (SLP)
3	04	Speech-Language Pathologist
4	02	Speech-Language Pathologist
5	01	Speech-Language Pathologist
6	04	Speech-Language Pathologist
7	17	Special Educator
8	10	Occupational Therapist
9	06	Clinical Psychologist
10	04	Clinical Psychologist
11	24	Preschool Teacher
12	18	Preschool Teacher
13	21	Preschool Teacher
14	20	Preschool Teacher
15	20	Preschool Teacher

The validators were asked to rate each domain of the E-module, through these eight parameters:

i. Relevance - How relevant is this domain for preschool teachers working with children with ASD?

ii. Clarity - How clear and well-organized is the content presented in this domain?

iii. Simplicity - How easy is the content to understand for preschool teachers, considering language and complexity?

iv. Comprehensiveness - How adequately does this domain cover the intended concepts without unnecessary repetition?

v. Cultural Appropriateness - How appropriate and sensitive is the content for the Indian cultural and educational context?

vi. Picture Quality - How clear, relevant, and visually appropriate are the pictures/images used in this domain?

vii. Sound Quality - How clear and understandable is the audio narration or sound used in this domain?

viii. Participant Engagement - How well does this domain keep the learner interested and engaged throughout the content?

Each of these parameters was rated on a 3-point Likert scale according to the provided dimensions. The ratings were: '1' as 'Essential', '2' as 'Useful but not essential', and '3' as 'Not Necessary'. Qualitative feedback and suggestions for each domain of the E-Module were also taken. For any parameter under any domain receiving lower ratings (scores of 2 or 3), experts and preschool teachers were required to specify the duration of the segments that required refinement.

3.3.2.2 Step 2: Content Validation of the Questionnaire by the experts

The questionnaire was also given to the same 15 experts through Google Form and the experts were asked to rate on the same 3-point rating scale (where '1' is 'Essential', '2' is 'Useful, but not essential', and '3' is 'Not Essential'). The parameters used to rate each section of the questionnaire were:

i. Relevance - How relevant is this domain for preschool teachers working with children with ASD?

ii. Clarity - How clear and well-organized is the content presented in this domain?

iii. Simplicity - How easy is the content to understand for preschool teachers, considering language and complexity?

iv. Comprehensiveness - How adequately does this domain cover the intended concepts without unnecessary repetition?

For any parameter in any section receiving a lower rating (scores of 2 or 3), experts and preschool teachers were required to specify the question number that needed refinement. The entire content validation process was facilitated by a customized Google Form designed exclusively for the systematic collection of expert evaluations and feedback. Lawshe's Content Validity Index (CVI) was used to facilitate the content validation process. The CVR was obtained using the following formula:

$$CVR = \frac{n_e - n_{ne}}{N}$$

Where n_e is the number of validators in agreement and n_{ne}, is the number of validators in disagreement and N is the total number of experts in agreement and disagreement. The average rating for each parameter was calculated to obtain the CVI. Critical threshold value for 15 content validators was 0.49. No parameters of each domain of the E-module and questionnaire received CVI below the critical thresholds.

3.3.3 Phase 3:Pilot Study

To assess the feasibility of the developed E-module and the study procedures, and to identify any potential issues during the main field testing, a pilot study was conducted with five preschool teachers before the final administration. These five preschool teachers were included using the same inclusionary criteria as the main study. The entire study was carried out in online mode through the Google Meet app (Google Meet, Version 2026.01, Google Play Store, 2026). First, the pre-test was administered, followed by exposure to the E-module, and then the post-test was conducted. Based on the pilot study results and the suggestions provided by the content validators, the E-module and questionnaire were revised. No significant changes were made in the study protocol. After revision, the E-module was proofread to check for typographical errors, readability, and cultural fit. After proofreading, the final version of the E-module was ready for the main study.

3.3.4 Phase 4: Final Delivery of the E-Module and Statistical Analysis

The study design and purpose were explained to each preschool teacher, and informed consent was obtained prior to their inclusion in the study. While administering the questionnaire to the preschool teachers, clarifications were provided as needed to improve comprehension. Participants were given adequate time to answer independently, and they were strictly instructed not to confer with others while answering the questionnaire. Doubt sessions were encouraged after the module was completed. After the E-Module was delivered, the preschool teachers were asked to complete the same questionnaire as the post-test. The pre-test, E-Module, and the post-test were administered to each preschool teacher individually through Google Meet. To avoid fatigue, the participants were given breaks of 10

minutes after the pre-test and the delivery of E-module.

3.3.4.1 Step 1: Scoring, Tabulation and Interpretation

Scoring was carried out for both the pre and post-test responses. The questionnaire results were recorded as one '1' for each correct response and zero '0' for each incorrect response or no response among four multiple-choice. The total score for the questionnaire was 34. The scoring was distributed across six domains based on the relative importance and number of items included in each domain. Section 1(Awareness of Causes and Characteristics of ASD) and Section 2(Knowledge on Screening a Child for ASD) were assigned subtotal scores of five points each for the five questions in each section. The eight questions in section 3 (Awareness of Multidisciplinary Action) carried the highest subtotal score of eight points. Further, Section 5 (Awareness on Government Schemes and Benefits)was assigned a subtotal score of six points for the six questions asked under this section, while Section 6 (Myths and Misconceptions about ASD) was allotted five points, the section 4 (Classroom modifications for children with ASD) was added after revision and carried a score of five points for the five questions. Thus, the subtotal scores across all six domains together constituted the overall score of 34 points.

The specific responses of each section of the questionnaire from both the pre-test and post-test of each participant were then tabulated. Statistical analysis was carried out using SPSS- Statistical Package for Social Sciences (IBM SPSS Statistics, Version 26.0, IBM Corp., 2019) to compare pre-test and post-test scores to assess the efficacy of the developed E-module. Higher post-test scores than the pre-test scores indicate higher efficacy of this developed E-module.

CHAPTER IV

RESULTS

The primary aim of the present study was to develop, validate, and evaluate the efficacy of an E-Module on ASD for preschool teachers in India. The first objective of the present study was to develop a structured, scalable, and validated digital resource E-module to create awareness on ASD amongst preschool teachers in the Indian context. The second objective of the study was to study the efficacy of the E-module on ASD among preschool teachers in terms of any improvement in their awareness, knowledge, and attitudes.

Through a thorough review of the existing literature and available digital modules, a structured E-module was developed. This E-module consists of six domains: Domain 1- Causes and characteristics of ASD, Domain 2- Screening a child for ASD, Domain 3- Awareness on multidisciplinary action, Domain 4- Classroom modifications for children with ASD, Domain 5-Awareness of Government schemes and benefits, Domain 6- Myths and facts associated with ASD. The developed E-module and the pre- and post-test questionnaire were validated by a total of 15 experts, out of which six were SLPs, two clinical psychologists, one occupational therapist, one special educator, and five preschool teachers, using a self-rated 3-point Likert Scale. The domains of the E-module were evaluated based on the parameters of relevance, simplicity, clarity, comprehensiveness, audio quality, video quality, and participant engagement. The pre- and post-questionnaires were assessed using the parameters of relevance, clarity, simplicity, and comprehensiveness.

The E-module and questionnaire were refined based on the experts' feedback. The final E-module comprised six domains, totalling 37 minutes. The final questionnaire had 34 questions distributed across 6 sections. The study recruited 55 preschool teachers through convenience sampling from government and private schools and preschool setups of Mysore city. The selected participants were those having a minimum proficiency of 12th grade English in both verbal and written modalities. The participants were first administered the developed and validated pre-test questionnaire, followed by exposure to the developed and validated E-module and at the end, the post-test questionnaire was also administered.

The results of this study are explained under the following sections:

4.1 Development and Validation of the E-module

4.1.1 Content validity of E-module domain-wise by experts

4.1.2 Revisions made based on reviews by experts

4.2 Development and Validation of the Questionnaire

4.2.1 Content validity of questionnaire section-wise by experts

4.2.2 Revisions made based on reviews by experts

4.3 Testing the Efficacy of the developed E-module

4.3.1 Descriptive statistics of overall knowledge

4.3.2 Section-wise pre and post-test analysis of E-module efficacy

4.3.3 Comparison of total pre and post-test scores

4.1 Development and Validation of the E-module

As part of Objective 1, a detailed review of research literature, existing resources was done to identify key areas of ASD that can be included in the E-module. The literature review included research evidence on core signs of ASD, epidemiology of

ASD, need, importance, and effectiveness of early intervention, myths associated with ASD, levels of awareness about ASD among preschool teachers, and policy frameworks on rights of persons with disabilities. Existing modules were also examined to avoid duplication and to identify content gaps. Based on this literature review, six key areas were finalized for the E-module: (1) Causes and characteristics of ASD, (2) Screening children for ASD, (3) Multidisciplinary action, (4) Classroom modifications for children with ASD, (5) Available government schemes and benefits, (6) Myths and facts associated with ASD. After the E-module was developed, it was given to the experts for content validation. The entire process of content validation was carried out using a content validation questionnaire that was circulated using a Google Form to 15 experts. This Google Form contained 3-point Likert Scale in order to rate the content of the E-module and questionnaire across parameters like relevance, clarity, simplicity, comprehensiveness, etc.

4.1.1 Content validity of E-module domain-wise by experts

The quantitative content validity of the E-module was assessed by experts using Lawshe's Content Validity Ratio (CVR) method (Lawshe, 1975). Here, the six domains of the E-module were evaluated based on the parameters of relevance, simplicity, clarity, comprehensiveness, audio quality, video quality, and participant engagement. The experts were required to rate each parameter on a 3-point scale where '1' meant 'essential', '2' meant 'useful but not essential', and '3' meant 'not necessary'. The ratings from the content validators were therefore used to calculate the CVR. The CVR was obtained using the following formula:

$$CVR = \frac{n_e - n_{ne}}{N}$$

Where $n_e$is the number of validators in agreement and n_{ne}, is the number of validators in disagreement, N is the total number of validators in agreement and disagreement. The domain-wise quantitative content validity results are as follows:

Table 4.1 shows CVR values for content validation domain-wise by experts for the parameters of relevance, simplicity, clarity, comprehensiveness, audio quality, video quality and participant engagement.

Table 4.1

CVR values for content validation domain-wise by experts (N=15)

Domain	Parameters	n_e (Essential)	CVR
Domain 1	Relevance	15	1.00
	Clarity	15	1.00
	Simplicity	14	0.86
	Comprehensiveness	13	0.73
	Cultural Appropriateness	15	1.00
	Picture Quality	14	0.86
	Sound Quality	14	0.86
	Participant Engagement	13	0.73
Domain 2	Relevance	15	1.00
	Clarity	15	1.00
	Simplicity	14	0.86
	Comprehensiveness	15	1.00
	Cultural Appropriateness	15	1.00
	Picture Quality	15	1.00
	Sound Quality	15	1.00
	Participant Engagement	13	0.73
Domain 3	Relevance	15	1.00
	Clarity	15	1.00
	Simplicity	15	1.00
	Comprehensiveness	14	0.86
	Cultural Appropriateness	15	1.00
	Picture Quality	14	0.86
	Sound Quality	14	0.86
	Participant Engagement	13	0.86
Domain 4	Relevance	15	1.00
	Clarity	14	0.86
	Simplicity	15	1.00

Domain	Parameters	n_e (Essential)	CVR
	Comprehensiveness	15	1.00
	Cultural Appropriateness	15	1.00
	Picture Quality	15	1.00
	Sound Quality	15	1.00
	Participant Engagement	15	1.00
Domain 5	Relevance	15	1.00
	Clarity	15	1.00
	Simplicity	14	0.86
	Comprehensiveness	15	1.00
	Cultural Appropriateness	15	1.00
	Picture Quality	14	0.86
	Sound Quality	15	1.00
	Participant Engagement	14	0.86
Domain 6	Relevance	15	1.00
	Clarity	14	0.86
	Simplicity	15	1.00
	Comprehensiveness	14	0.86
	Cultural Appropriateness	15	1.00
	Picture Quality	15	1.00
	Sound Quality	15	1.00
	Participant Engagement	15	1.00

Table 4.2 summarizes the open-ended feedback domain-wise and general feedback for all the domains from the experts for the E-module. The feedback indicated that the E-module was considered informative, relevant, and participant-friendly; however, minor revisions were suggested to improve clarity, audio quality, visual representation, content organization, and participant engagement.

Table 4.2

Open-ended feedback domain-wise from experts

Expert	Domain	Open-ended Feedback
Expert 1	General	Improve overall sound quality and increase speaking volume; audio speed at 1.25x was preferred. Clarify the myth related to poor parenting and

Expert	Domain	Open-ended Feedback
		autism. Add labels/bookmarks for government schemes to make tracking easier.
Expert 2	Domain 1	Replace ‘developmental condition’ with ‘neurodevelopmental condition’; add pictures to improve engagement.
	Domain 2	Modify pictures to better depict ASD-related behaviours; add pictures in developmental progress chart; reorganize ‘red flags’ into domains; include a slide on critical period.
Expert 2	Domain 3	Modify image gaze direction for accurate representation.
	Domain 5	Correct typographical error; elaborate the left-side columns for clarity.
	Domain 6	Revise myth statement using the word ‘only’; add subtitles/captions; simplify content validation rating method.
Expert 3	Domain 1	Add images/symbols alongside examples of communication, behavioural, sensory, and social difficulties.
	Domain 2	Organize slide content according to audio sequence; simplify the explanation of certain concepts.
	Domain 3	Add additional symbols/pictures where required.
	Domain 4	Explain sensory breaks using simple examples; improve images used in visual schedules.
Expert 4	Domain 1	Read learner objectives directly without elaboration; frame objectives according to Bloom’s taxonomy.
	Domain 4	Provide examples for sensory breaks; add picture of special seating for children with autism.
	Domain 5	Include an example/image of a UDID card.
	Domain 6	Highlight important points using bold formatting.

Expert	Domain	Open-ended Feedback
Expert 5	Domain 3	Add subtitles during picture-only sections for improved understanding.
	General	Include question-and-answer sections at the end of each module to assess participant understanding.

Domain 1: As shown in Table 4.1, CVR values for Domain 1 (Causes and Characteristics of ASD) ranged from 0.73 to 1.00, therefore exceeding the critical threshold value of 0.49 for 15 experts. The scale-level CVI (Content Validity Index), calculated as the average CVR was 0.93. Overall, the findings showed that all segments of Domain 1 were retained, therefore reflecting strong expert agreement on the relevance, clarity, and quality of Domain 1 of the E-module. Hence, all segments under Domain 1 were retained. The qualitative feedback (as in Table 4.2) for Domain 1 primarily focused on improving participant engagement, clarity, and presentation of content. Three validators suggested modifications specifically for this domain. The suggestions included incorporating additional pictures and symbols while discussing communication difficulties, behavioural challenges, sensory processing difficulties, and socialization deficits to enhance understanding and visual appeal. Minor modifications related to terminologies were also recommended, such as replacing the term 'developmental condition' with 'neurodevelopmental condition.' Suggestions were further provided to improve the framing of learner objectives according to Bloom's taxonomy and to reduce excessive elaboration while presenting the objectives in the narration.

Domain 2: As shown in Table 4.1, CVR values for Domain 2 (Screening Children for ASD) ranged from 0.73 to 1.00. This range exceeds the critical threshold value of 0.49 for 15 experts. The scale-level CVI, calculated as the average CVR was 0.94. Overall, the findings showed that all segments in this domain were retained, indicating strong

universal agreement amongst 15 experts regarding relevancy, clarity, and quality of Domain 2. Hence, all the segments under Domain 2 were retained.

Qualitative feedback (as in Table 4.2) for Domain 2 primarily focused on improving visual representation and content organization. Validators suggested modifying certain images to better depict ASD-related characteristics, simplifying explanations, adding more visuals to developmental charts, and including a slide on the critical period to enhance participant understanding.

Domain 3: The interpretation of the CVR values shown in Table 4.1 indicated that the CVR values for all segments of Domain 3 (Awareness on Multidisciplinary Action) ranged from 0.86 to 1.00, thus exceeding the critical threshold value of 0.49 for 15 experts. The scale-level CVI (average CVI) obtained was 0.93. Overall, the findings showed that all segments in Domain 3 were retained, reflecting universal agreement regarding relevancy, clarity, and quality of Domain 3.

The qualitative comments (as in Table 4.2) for Domain 3 (Awareness on Multidisciplinary Actions) highlighted the need for additional visual supports and clearer contextual representation. Validators suggested adding labels such as ‘SLP’ in relevant images and modifying certain pictures to better depict real-life clinical interactions. Recommendations were also made to include more symbols, pictures, subtitles, and captions, particularly when explaining topics that rely primarily on visuals.

Domain 4: As shown in Table 4.1, CVR values for Domain 4 (Classroom Modifications for Children with ASD) ranged from 0.86 to 1.00. This range exceeds the critical threshold value of 0.49 for 15 experts. The scale-level CVI calculated as the average CVR was 0.98. Overall, the findings showed that all segments in this domain were retained, indicating strong universal agreement amongst 15 experts regarding relevancy, clarity, and quality of Domain 4. Hence, all the items under Domain 4 were retained.

Qualitative feedback (as in Table 4.2) for Domain 4 largely focused on simplifying concepts and enhancing visual quality. Validators recommended explaining concepts such as ‘sensory breaks’ in simple language, with practical examples, to facilitate better understanding among participants. Suggestions were also made to improve the quality of images used in visual schedules and to include pictures depicting special seating arrangements for children with autism. These modifications were suggested to make the content more practical, visually appealing, and participant-friendly.

Domain 5: As shown in Table 4.1, CVR values for Domain 5(Awareness of Government Schemes and Benefits) ranged from 0.86 to 1.00. This range exceeds the critical threshold value of 0.49 for 15 experts. The scale-level CVI calculated as the average CVR was 0.94. Overall, the findings showed that all segments in this domain were retained, indicating strong universal agreement among 15 experts regarding the relevance, clarity, and quality of Domain 5. Hence, all segments under Domain 5 were retained.

The qualitative feedback (as in Table 4.2) obtained for Domain 5 was primarily focused on improving clarity and providing practical illustrations. Experts identified minor typographical errors and recommended elaborating certain tabular information for better comprehension. In addition, suggestions were made to include visual examples of a UDID card to help participants gain a clearer practical understanding of government documentation and support services.

Domain 6: As shown in Table 4.1 CVR values for Domain 6 (Myths and Facts associated with ASD) ranged from 0.86 to 1.00. This range exceeds the critical threshold value of 0.49 for 15 experts. The scale-level CVI calculated as the average CVR was 0.96. Overall, the findings showed that all segments in this domain were retained, indicating strong universal agreement amongst 15 experts regarding relevancy, clarity, and quality of Domain 6. Hence, all segments under Domain 6 were retained.

The qualitative feedback (as in Table 4.2) for Domain 6 emphasized improving clarity, readability, and participant engagement. Validators suggested revising myth-related statements to avoid ambiguity and improve accuracy. Recommendations included highlighting important points in bold and incorporating subtitles or captions throughout the module to enhance accessibility and comprehension. These suggestions aimed to improve the overall presentation and effectiveness of the content. Table 4.3 describes the themes identified from expert open feedback across all domains of the E-module.

Table 4.3

Themes identified from expert open-ended feedback across all domains of the E-module

Themes	Description
Visual enhancement suggestions	Recommendations to include additional pictures and symbols related to communication difficulties, behavioural challenges, sensory processing difficulties, and socialization deficits to improve engagement and understanding.
Terminology and language refinement	Replacing certain terms, such as changing 'developmental condition' to 'neurodevelopmental condition.'
Content presentation improvements	Suggestions to improve clarity, presentation style, and participant engagement within the domain.
Typographical errors	Suggestions to correct spelling errors, such as 'Niramaya' instead of 'Niramay.'

Table 4.3 shows the themes identified from the open-ended feedback provided by experts across all domains of the E-module. The feedback summarized in Table 4.3 primarily focused on improving the visual presentation, refining terminology and language, enhancing clarity and participant engagement, and correcting typographical

errors. Overall, the suggestions reflected the need for minor modifications to improve the comprehensibility, accuracy, and presentation quality of the E-module.

To summarize, the quantitative content validation results indicated strong expert agreement across all six domains of the E-module. The CVR values across domains ranged from 0.73 to 1.00, exceeding the critical threshold of 0.49 for 15 experts. The scale-level CVI values were also high across domains, ranging from 0.93 to 0.98 wherever calculated, reflecting strong agreement regarding the relevance, clarity, simplicity, comprehensiveness, and overall quality of the E-module content. Since all segments met the required validity criteria, no domain was rejected, and all six domains were retained in the final E-module.

The qualitative feedback provided by experts primarily focused on improving the clarity, visual appeal, participant engagement, and practical usefulness of the E-module. Across domains, experts suggested adding more pictures, symbols, captions, subtitles, and contextual examples to enhance comprehension. Minor language and terminology refinements, correction of pronunciation-related issues, revision of ambiguous myth-related statements, and correction of typographical errors were recommended. Overall, the qualitative feedback indicated that the E-module was appropriate and acceptable, with only minor modifications required to improve readability, accessibility, visual quality, and participant-friendly presentation.

4.1.2 Revisions made based on reviews by experts

The revisions were made based on the experts' feedback. The suggestions were categorized into themes, and the necessary modifications were made. Table 4.4 summarizes the themes, along with the suggestions and the actions taken.

Table 4.4

Suggestions and action taken for the identified themes requiring modifications

Themes Identified	Overall Suggestions	Actions Taken
Enhancement of visuals	Add pictures, symbols, labels, subtitles, and improve images.	Relevant visuals, labels, subtitles, and improved images were incorporated.
Improvement of content clarity and organization	Simplify explanations, reorganize content, and reduce excessive narration.	Content was reorganized and explanations were simplified for better clarity.
Terminology and language refinement	Modify terminology, pronunciation, and ambiguous statements.	Necessary language, terminology corrections.
Formatting	Improve formatting and highlight key points.	Bold formatting, subtitles, and structured presentation were incorporated.
Typographical corrections	Correct spelling and technical errors.	All identified errors were corrected.

The expert feedback was categorized into five themes: enhancement of visuals, improvement of content clarity and organization, refinement of terminology and language, formatting, and typographical corrections. Domain-wise revisions incorporated into the E-module are discussed below.

Based on the feedback, Domain 1 (Causes and Characteristics of ASD) was revised by adding relevant pictures, symbols, and refining terminology. The suggestion to restructure objectives according to Bloom’s taxonomy wasn’t incorporated, as the module

is designed for awareness and practical application among preschool teachers; using Bloom's Taxonomy could increase complexity and reduce clarity for the target audience (as in Table 4.4). Domain 2 (Knowledge on Screening a Child for ASD) was revised by modifying images to better represent ASD-related characteristics, simplifying selected explanations, adding visuals to developmental charts, and incorporating a slide on the critical period to improve clarity and understanding (as shown in Table 4.4). Based on the feedback, Domain 3 (Awareness on Multidisciplinary Action) was revised by adding relevant labels, improving contextual representation in images, and incorporating additional symbols, subtitles, and captions to enhance participant comprehension and engagement (as in Table 4.4). According to expert reviews, Domain 4 (Classroom Modifications for Children with ASD) was revised by simplifying explanations with practical examples and improving the quality of the visual schedule (as in Table 4.4). Based on the feedback, Domain 5 (Awareness of Government Schemes and Benefits) was revised by correcting typographical errors, elaborating selected tabular content for better understanding, and incorporating visual examples of the UDID card to improve practical awareness (as in Table 4.4). Based on the feedback, Domain 6 (Myths and Facts associated with ASD) was revised by modifying myth-related statements for improved clarity, highlighting key points in bold, and adding subtitles and captions to enhance readability and participant engagement (as shown in Table 4.4).

Overall, revisions were made across all six domains to improve clarity, organization, visual appeal, readability, and practical relevance. The modifications included adding pictures, symbols, labels, subtitles, and captions; reorganizing content for better understanding; simplifying explanations; improving image quality; correcting typographical errors; adding practical visuals such as the UDID card; and revising

ambiguous myth-related statements. Overall, these changes made the E-module clearer, more comprehensible, and participant-friendly, while suggestions that did not suit the purpose or target audience were excluded with justification.

To summarize the results of this section, i.e., the content validation of the E-module by the experts, showed that Domain 1 had a scale-level CVI of 0.93, Domain 2 had 0.94, Domain 3 had 0.93, Domain 4 had 0.98, Domain 5 had 0.94, and Domain 6 had 0.96. Since every domain exceeded the critical CVR threshold value of 0.49 for 15 experts across all six domains, they were retained. The qualitative suggestions provided by the content validators were considered and appropriate revisions were incorporated across all domains of the E-module. The modifications included adding relevant pictures, symbols, subtitles, captions, and practical illustrations to enhance visual appeal and participant engagement. Content was reorganized and simplified wherever necessary to enhance clarity, reduce excessive narration and facilitate better understanding. terminology, pronunciation and language-related corrections and refinements were implemented to ensure accuracy and consistency of information. Overall, these revisions contributed to improving the relevance, clarity and presentation quality and overall effectiveness of the E-module.

4.2 Development and Validation of the Questionnaire

4.2.1 Content validity of questionnaire section-wise by experts

The procedure for content validation of the pre- and post-test questionnaires (as in Appendix II) was similar to that for the E-module. Lawshe's method (Lawshe, 1975) was again followed to obtain the CVR values for each section of the questionnaire. The quantitative and qualitative content validation for the questionnaire was based on the parameters of Relevance, Clarity, Simplicity, and Comprehensiveness. Table 4.5 shows

CVR values for content validation section-wise by experts for the parameters of relevance, simplicity, clarity and comprehensiveness.

Table 4.5

CVR values for content validation of the questionnaire by the experts

Sections	Parameter	n_e (Essential)	CVR
Section 1	Relevance	15	1.00
	Clarity	15	1.00
	Simplicity	15	1.00
	Comprehensiveness	15	1.00
Section 2	Relevance	15	1.00
	Clarity	15	1.00
	Simplicity	15	1.00
	Comprehensiveness	15	1.00
Section 3	Relevance	14	0.86
	Clarity	14	0.86
	Simplicity	14	0.86
	Comprehensiveness	14	0.86
Section 4	Relevance	15	1.00
	Clarity	15	1.00
	Simplicity	14	0.86
	Comprehensiveness	14	0.86
Section 5	Relevance	15	1.00
	Clarity	14	0.86
	Simplicity	15	1.00
	Comprehensiveness	14	0.86
Section 6	Relevance	15	1.00
	Clarity	15	1.00
	Simplicity	15	1.00
	Comprehensiveness	15	1.00

Table 4.6 shows theme-wise open-feedback provided by the experts. The suggestions were broadly categorised under the themes of: Clarity and simplification of questions, structural modifications and terminology related refinements.

Table 4.6

Themes identified from expert open-ended responses for all 6 sections of the questionnaire

(N=15)

S.No	Themes Identified	Description
1	Clarity and simplification of questions	Suggestions to improve clarity, readability, and comprehension of certain questionnaire items and response options.
2	Structural modifications	Recommendations to modify some questions into simpler true/false or polar-type formats.
3	Terminology related refinements	Suggestions related to improving questions involving professional roles and multidisciplinary management of ASD. Recommendations to improve interpretation of questions assessing early red flags and screening indicators of ASD. Suggestions to improve questions addressing myths and misconceptions associated with ASD.

Section 1: The interpretation of the CVR values shown in Table 4.5 revealed that all parameters received the CVR value of 1.00 for Section 1 (Awareness of Causes and Characteristics of ASD) of the questionnaire. The scale-level content validity index, calculated as the average CVR, was 1.00. Overall, the quantitative and qualitative (as in Table 4.6) findings indicated that all questions from section 1 of the questionnaire were

retained, reflecting universal expert agreement on the relevance, clarity, simplicity, and comprehensiveness of the items included in this section.

Section 2: The interpretation of the CVR values shown in Table 4.5 revealed that all parameters had a CVR of 1.00 for Section 2 (Screening Children for ASD) of the questionnaire. The scale-level CVI, calculated as the average CVR, was 1.00. Overall, the findings indicated that all questions from section 2 of the questionnaire were retained, reflecting universal expert agreement on the relevance, clarity, simplicity, and comprehensiveness of the items included in this section.

The qualitative feedback (as in Table 4.6) for Section 2 mainly focussed on improving the clarity of screening-related questions. Experts suggested revising Question 6, which assessed awareness regarding poor peer interaction in preschool children. The suggestion received for this question was to improve clarity of the response options and avoid ambiguity between normal shyness and social communication difficulties associated with ASD. These modifications were recommended to improve preschool teachers' understanding of early red flags of ASD.

Section 3: The interpretation of the CVR values shown in Table 4.5 revealed that all parameters received the CVR value of 0.86 for Section 3 (Awareness of multidisciplinary action) of the questionnaire. The scale-level content validity index, calculated as the average CVR, was 0.86. Overall, the findings indicated that all questions from section 3 of the questionnaire were retained, reflecting universal expert agreement on the relevance, clarity, simplicity, and comprehensiveness of the items included in this section.
Open-ended feedback (as in Table 4.6) obtained for Section 3 primarily focused on improving the appropriateness and clarity of questions. Experts reviewed Question 12,

which focussed on professionals involved in diagnosing ASD and suggested modifications to refine the response options. Similarly, Question 18, which assessed awareness of the professional who supports learning in school settings for children with ASD, was suggested for revision to improve comprehension.

Section 4: The interpretation of the CVR values shown in Table 4.5 indicated that the CVR values for all segments of Section 4 (Classroom modifications for children with ASD) ranged from 0.86 to 1.00, thus exceeding the critical threshold value of 0.49 for 15 experts. The scale-level content validity index, calculated as the average CVR, was 0.93. Overall, both quantitative and qualitative findings (as in Table 4.6) indicated that all questions from section 4 of the questionnaire were retained, reflecting universal expert agreement on the relevance, clarity, simplicity, and comprehensiveness of the items included in this section. No section-wise suggestions were provided for Section 4.

Section 5: The interpretation of the CVR values shown in Table 4.5 indicated that the CVR values for all segments of Section 5 (Awareness of government schemes and benefits) ranged from 0.86 to 1.00, thus exceeding the critical threshold value of 0.49 for 15 experts. The scale-level content validity index, calculated as the average CVR, was 0.93. Overall, the quantitative and qualitative (as in Table 4.6) findings indicated that all questions in section 5 of the questionnaire were retained, reflecting universal expert agreement on the relevance, clarity, simplicity, and comprehensiveness of the items included in this section. No section-specific open-ended feedback was provided for Section 5.

Section 6: The interpretation of the CVR values shown in Table 4.5 revealed that all parameters received a CVR of 1.00 for Section 6 (Myths and facts associated with ASD) of the questionnaire. The scale-level content validity index, calculated as the average CVR, was 1.00. Overall, the findings indicated that all questions from section 6 of the questionnaire were retained, reflecting universal expert agreement on the relevance, clarity, simplicity, and comprehensiveness of the items included in this section.
The qualitative feedback for Section 6 (as in Table 4.6) focused on simplifying the structure and readability of the questions addressing common myths about ASD. Experts suggested modifying Questions 25 and 26 into simpler true-or-false or polar questions to make them easier to understand. These questions specifically addressed misconceptions regarding whether ASD can be completely cured and whether the use of visual aids or gestures can prevent a child from speaking. Table 4.6 summarizes the open-ended feedback from the experts. The suggested revisions aimed to improve participants' understanding and reduce ambiguity when assessing misconceptions related to ASD.

Overall, the qualitative feedback from the validators significantly refined the questionnaire by improving the clarity, structure, and comprehensibility of the items. The experts' suggestions were reviewed and incorporated where applicable.

4.2.2 Revisions made based on reviews by experts

The experts' qualitative feedback was carefully reviewed to improve the clarity, structure, readability, and appropriateness of the questionnaire items. Based on the suggestions received, necessary modifications were incorporated wherever applicable to enhance participant comprehension and ensure that the questionnaire items accurately

reflected the intended constructs. Table 4.7 presents a summary of revisions to the questionnaire based on qualitative feedback from experts.

Table 4.7

Theme-wise summary of revisions made to the questionnaire based on qualitative feedback from experts

Themes Identified	Description	Actions Taken
Clarity and simplification of questions	Suggestions to improve clarity, readability, and comprehension of certain questionnaire items and response options.	Ambiguous wording and response options were revised to improve clarity and ease of understanding for the participants.
Structural modifications	Recommendations to modify some questions into simpler true/false or polar-type formats.	Questions addressing myths and misconceptions were reformatted into simpler true/false structures to improve readability and response accuracy.
Multidisciplinary awareness refinement	Suggestions related to improving questions involving professional roles and multidisciplinary management of ASD.	Questions related to professional roles were revised to provide clearer differentiation between disciplines and improve conceptual understanding.
Screening-related improvements	Recommendations to improve interpretation of questions assessing early red flags and screening indicators of ASD.	Screening-related questions were modified to better reflect early ASD indicators and reduce ambiguity in interpretation.
Misconception-related refinements	Suggestions to improve questions addressing myths and misconceptions associated with ASD.	Myth-based questions were refined to ensure accurate representation of misconceptions and improve participant comprehension.

Based on the expert's suggestions, as shown in Table 4.7 indicated that in Section 1 (Awareness of causes and characteristics of ASD), question 6, which was related to poor peer interaction in preschool children, was revised to improve the clarity of the

response options and reduce ambiguity between typical shy behavior and social communication difficulties associated with ASD. These revisions were incorporated to improve the understanding of early screening indicators and red flags of ASD among preschool teachers. In Section 3 (Awareness of multidisciplinary action), revisions were made to Questions 12 and 18 based on expert feedback. Question 12, which focused on identifying professionals involved in diagnosing ASD, was reviewed and modified to improve the appropriateness and clarity of the response options. Similarly, Question 18, which assessed awareness regarding professionals supporting learning in school settings for children with ASD, was revised to provide clearer differentiation between the professional roles listed in the options. For Section 6 (Myths and Facts associated with ASD), Questions 25 and 26 were modified to simpler true-or-false formats per the validators' recommendations. These questions addressed misconceptions regarding whether ASD can be completely cured and whether the use of visual aids or gestures can prevent a child from speaking. The revisions were made to improve readability, ease of response, and participant comprehension while assessing myths and misconceptions related to ASD. The revisions made based on expert feedback contributed towards improving the comprehensibility, relevance and overall quality of the questionnaire, therefore strengthening its suitability for use among the target participants.

To summarize the results of this section, the quantitative analysis indicated that the developed pre- and post-test questionnaire demonstrated strong content validity for assessing preschool teachers' awareness and knowledge of ASD. Quantitative content validation using Lawshe's CVR method revealed that all sections of the questionnaire exceeded the critical threshold of 0.49, with all parameters ranging from 0.86 to 1.00 and scale-level CVI values ranging from 0.86 to 1.00. These findings reflected strong

universal expert agreement regarding the relevance, clarity, simplicity, and comprehensiveness of the questionnaire items. The qualitative feedback provided by experts mainly focused on improving clarity, simplifying question structure, refining response options and enhancing the interpretation of questions related to screening, multidisciplinary management and myths associated with ASD. Based on these suggestions, necessary revisions were incorporated, including rewording ambiguous items, modifying certain questions into simpler true or false formats and refining professional-role related questions for better differentiation and comprehension. Overall, the revisions made based on expert feedback improved the comprehensibility, structure and appropriateness of the questionnaire, therefore strengthening its overall quality and suitability for use among preschool teachers.

4.3 Testing the efficacy of the developed E-module

The data obtained after administering the E-module was subjected to statistical analysis. The statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) (IBM SPSS Statistics, Version 26.0, IBM Corp., 2019). Descriptive statistics were computed for evaluating overall knowledge. The data were subjected to Shapiro-Wilk's test for normality, and the results revealed that the data did not follow normal distribution ($p>0.05$). Hence, a nonparametric test was applied to further analyze the scores. The pre- and post-test score analysis was done using the Wilcoxon Signed Ranks Test. The results are shown under the following sections:

4.3.1 Descriptive statistics of overall knowledge

4.3.2 Section-wise pre and post-test analysis of E-module efficacy

4.3.3 Comparison of total pre and post-test scores

4.3.1 Descriptive statistics of overall knowledge

Table 4.8 shows the section-wise mean scores, median, SD and IQR of pre and post-test.

Table 4.8
Mean scores, SD, Median, and IQR scores section-wise of the questionnaire (Total maximum score=34)

	Variables	Mean	SD	Median	IQR	Minimum	Maximum
Pre-test	Section 1	3.40	1.16	3.00	1	1	5
	Section 2	3.29	1.06	3.00	2	1	5
	Section 3	5.24	1.23	5.00	2	2	7
	Section 4	3.64	0.75	4.00	1	2	5
	Section 5	3.73	0.73	4.00	1	3	5
	Section 6	3.80	1.77	4.00	2	2	6
	Total	23.09	3.72	23.00	6	16	31
Post-test	Section 1	4.71	0.49	5.00	1	3	5
	Section 2	4.65	0.55	5.00	1	3	5
	Section 3	6.96	0.88	7.00	2	5	8
	Section 4	4.82	0.38	5.00	0	4	5
	Section 5	4.82	0.38	5.00	0	4	5
	Section 6	5.42	0.71	6.00	1	4	6
	Total	31.29	2.20	31.00	3	25	34

The total pre-test scores (Mdn=23.00, IQR=6.00) showed improvement, with greater total post-test scores (Mdn=31.00, IQR=3.00) after exposure to the E-module (as in Table 4.8). This increase in the median score indicates an improvement in participants' overall knowledge and awareness of ASD after exposure to the E-module. Since the median represents the central value of the group, the increase suggests that the typical participant performed better on the post-test than on the pre-test. The reduction in IQR

further indicates that the scores of the middle 50% of participants became more closely grouped after the intervention. This suggests reduced variability and greater consistency in post-test performance. The pre- and post-test scores for each participant across all six sections of the questionnaire were compared to examine changes in performance following exposure to the E-module. The total scores were analyzed using the Wilcoxon Signed Rank test to determine the extent of improvement in knowledge and understanding of ASD.

The Wilcoxon Signed Rank test results demonstrated a high statistically significant difference between the total pre- and post-test scores ($|Z|=6.461$, $p<0.001$). This finding indicates that participants showed greater improvement in overall awareness and knowledge of ASD following exposure to the E-module. The statistically significant p-value suggests that the observed increase in post-test scores was not due to random variation, therefore supporting the effectiveness of the E-module as a valuable resource for preschool teachers to improve their knowledge of ASD. The negative Z value obtained in the analysis reflects that the post-test scores were generally higher than the pre-test scores among the participants. Since the Wilcoxon Signed Rank test is based on negative ranks, it indicates that for the majority of participants, the post-test scores exceeded their corresponding pre-test scores, therefore demonstrating a consistent pattern of improvement in knowledge of ASD upon completion of the E-module.

Furthermore, the magnitude of the Z value of ($|Z|=6.461$) suggests a big difference between pre- and post-test intervention performance levels. The improvement in total scores across all sections indicates that the E-module effectively enhanced participants' comprehension, information retention, and overall learning outcomes. These findings provide evidence that the instructional content and delivery of the E-module successfully facilitated knowledge acquisition and improved participant performance across the

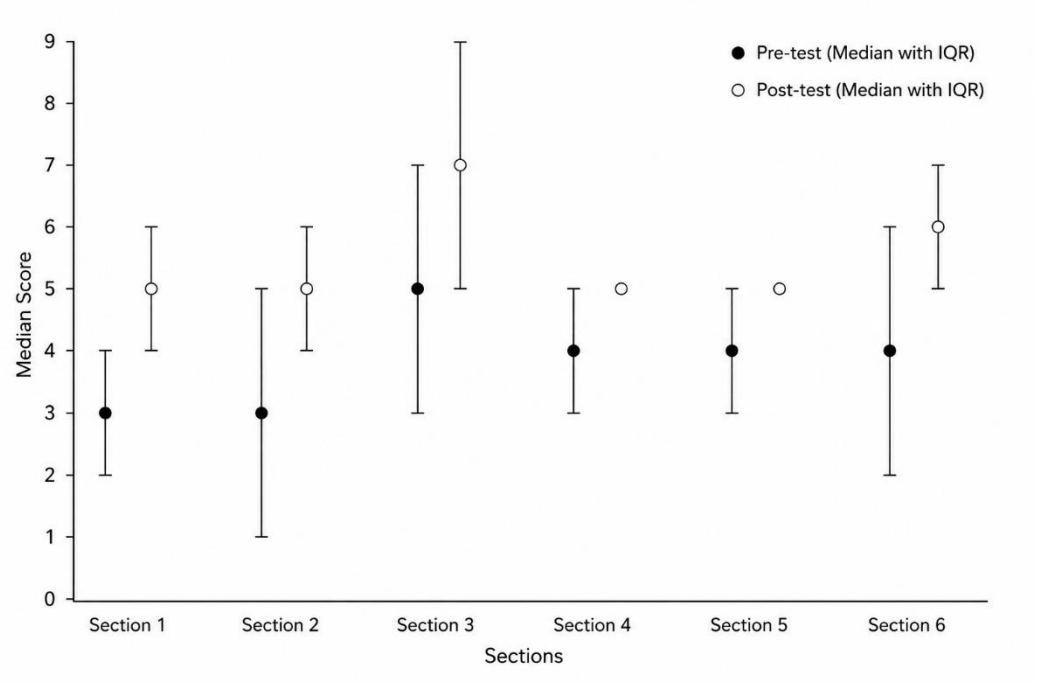
assessed areas. Results revealed that testing the efficacy of the developed E-module, the pre-test and post-test assessment of preschool teachers' awareness and knowledge of ASD showed an overall improvement following exposure to the E-module.

4.3.2 Section-wise pre and post-test analysis of E-module efficacy

The section-wise descriptive statistics shown in Table 4.8 indicate a notable improvement in participants' performance following the exposure to the E-module intervention. Across all sections the post-test scores were higher than the corresponding pre-test scores, indicating an overall improvement in participants' knowledge and awareness of ASD after exposure to the E-module. The pre-test median scores ranged from 3 to 5, whereas the post-test median scores ranged from 5 to 7, showing that participants generally moved from moderate baseline knowledge to higher levels of performance after the intervention (Figure 4.1). The IQR was reduced in post-test scores compared to pre-test scores. This suggests not only improved performance but also greater consistency in understanding among participants after completing the E-module.

Figure 4.1

Pre-test and Post-test comparison of median and IQR Scores on the questionnaire



In Section 1(Awareness of Causes and Characteristics of ASD), it was observed that there was an improvement in the scores from pre-test (Mdn=3.00, IQR=1.00) to post-test (Mdn=5.00, IQR=1.00), it was observed that there was an improvement in the scores from pre-test (Mdn=3.00, IQR=1.00) to post-test (Mdn=5.00, IQR=1.00). This indicates that participants showed clear improvement in their understanding of the basic causes, characteristics, and presentation of ASD. Since the IQR remained the same, it suggests that although the spread of scores among participants was similar, the entire group shifted towards higher scores after the E-module (as in Table 4.8). The Wilcoxon Signed Ranks Test results indicated that on Section 1 (Awareness of Causes and Characteristics of ASD), a statistically significant difference was observed between Pre-test and post-test scores ($|Z|=5.612$, $p<0.001$), indicating improvement in participants' performance following exposure to the E-module (Figure 4.1).

In Section 2 (Screening Children for ASD), it was observed that scores improved from pre-test (Mdn=3.00, IQR=2.00) to post-test (Mdn=5.00, IQR=1.00). This reflects better knowledge of early signs, screening indicators, and identification of children at risk for ASD. The reduction in IQR indicates that participants' responses became more consistent after the intervention, suggesting that the E-module helped reduce differences in baseline understanding (as in Table 4.8). The Wilcoxon Signed Ranks Test results indicated that on Section 2, a statistically significant difference was observed between Pre-test and post-test scores ($|Z|=5.781$, $p<0.001$), indicating improvement in participants' performance following exposure to the E-module (Figure 4.1).

In Section 3 (Awareness of Multidisciplinary Action), it was observed that scores improved from pre-test (Mdn=5.00, IQR=2.00) to post-test (Mdn=7.00, IQR=2). Since this section had a higher maximum score, the increase suggests improved understanding of the role of different professionals and the importance of multidisciplinary support for children with ASD. The unchanged IQR shows that variability remained similar, but the overall level of knowledge shifted upward (as in Table 4.8). The Wilcoxon Signed Ranks Test results indicated that, for Section 3 (Awareness of Multidisciplinary Action), a statistically significant difference was observed between the Pre-test and post-test scores ($|Z|=6.076$, $p<0.001$), indicating improvement in participants' performance following exposure to the E-module (Figure 4.1).

In Section 4 (Classroom modifications for children with ASD), it was observed that scores improved from the pre-test (Mdn=4.00, IQR=1.00) to the post-test (Mdn=5.00, IQR=0.00). This indicates improved awareness regarding available schemes, benefits, and

support systems for children with ASD. The post-test IQR of 0.0 suggests that the middle 50% of participants obtained the same score, reflecting highly consistent performance after the intervention (as in Table 4.8). The Wilcoxon Signed Ranks Test results indicated that on Section 4 (Classroom modifications for children with ASD), a statistically significant difference was observed between Pre-test and post-test scores ($|Z|=5.937$, $p<0.001$), indicating improvement in participants' performance following exposure to the E-module (Figure 4.1).

On Section 5 (Awareness of Government Schemes and Benefits), it was observed that there was an improvement in the scores from pre-test (Mdn=4.00, IQR=1.00) to post-test (Mdn=5.00, IQR=0.00). This suggests that the E-module helped participants clarify common misconceptions related to ASD. The reduction in IQR indicates that participants' post-test responses became highly uniform, suggesting strong consistency in understanding after the module. The Wilcoxon Signed Ranks Test results indicated that on Section 5, a statistically significant difference was observed between Pre-test and post-test scores ($|Z|=5.757$, $p<0.001$) indicating improvement in participants' performance following exposure to the E-module (Figure 4.1).

In Section 6 (Myths and Facts associated with ASD), it was observed that scores improved from pre-test (Mdn=4.00, IQR=2.00) to post-test (Mdn=6.00, IQR=1.00). This reflects improved understanding of classroom-based strategies and modifications that can support children with ASD. The reduction in IQR indicates that participants not only performed better but also became more consistent in their responses (as in Table 4.8). The Wilcoxon Signed Ranks Test results indicated that on Section 6 (Myths and Facts associated with ASD), a statistically significant difference was observed between Pre-test

and post-test scores (|Z|=5.991, p<0.001), indicating improvement in participants' performance following exposure to the E-module (Figure 4.1).

From across all the six sections, it can be observed that the post-test median scores were higher than the corresponding pre-test median scores, indicating improved participant knowledge and awareness following exposure to the E-module ((Figure 4.1). In addition, the IQR values either decreased or remained low in the post-test, suggesting reduced variability and greater consistency in participants' responses. Notably, sections 4 and 5 showed least IQR values in the post-test, indicating highly uniform performance among participants. Overall, the figure visually demonstrates that the E-module was effective in enhancing ASD-related knowledge across all sections while promoting more consistent learning outcomes among participants.

Thus, across all six sections, participants showed improvement from pre-test to post-test after exposure to the E-module. In Section 1 (Awareness of Causes and Characteristics of ASD, the median score increased from Mdn=3.00 , IQR=1.00 to Mdn=5.00, IQR=1.00, and the Wilcoxon Signed Ranks Test showed that this improvement was statistically significant (|Z|=5.612, p<0.001). In Section 2 (Screening Children for ASD), the median score improved from Mdn=3.00 , IQR=2.00 to Mdn=5.00, IQR=1.00, with a statistically significant difference between pre-test and post-test scores (|Z|=5.781, p<0.001). In Section 3 (Awareness of Multidisciplinary Action) scores increased from Mdn=5.00, IQR=2.00 to Mdn=7.00, IQR=2.00, and the improvement was statistically significant (|Z|=6.076, p<0.001). In Section 4 (Classroom Modifications for Children with ASD), the median score improved from Mdn=4.00, IQR=1.00 to Mdn=5.00 , IQR=0.00, and this change was found to be statistically

significant (|Z|=5.937, $p < 0.001$). In Section 5 (Awareness of Government Schemes and Benefits), the median score increased from Mdn=4.00 , IQR = 1.00 to Mdn=5.00 , IQR = 0.00, with a statistically significant improvement (|Z|=5.757, $p<0.001$). In Section 6 (Myths and Facts Associated with ASD) scores improved from Mdn=4.00, IQR=2.00 to Mdn=6.00, IQR=1.00, and the Wilcoxon Signed Rank test result also showed a statistically significant improvement (|Z|=5.991, $p<0.001$) between pre and post-test scores. These findings show improved awareness about ASD among the participants after the exposure to the E-module.

To summarize the overall results of this study indicated that the developed E-module underwent content validation by 15 experts from multidisciplinary backgrounds. Quantitative analysis revealed CVR values ranging from 0.73 to 1.00 across all domains, exceeding the critical value of 0.49, while the scale-level CVI ranged from S-CVI =0.93 to 0.98, indicating excellent content validity. Qualitative feedback primarily focused on improving visuals, terminology, presentation, accessibility, and participant engagement. Based on expert recommendations, appropriate revisions were incorporated, resulting in a validated and refined E-module. The 34-item questionnaire developed for assessing preschool teachers' knowledge of ASD was also subjected to expert validation. The questionnaire demonstrated strong content validity, with domain-wise CVR values ranging from 0.86 to 1.00. Qualitative feedback led to refinements in question wording, response formats, multidisciplinary role-related items, screening-related questions, and myth-based statements, therefore improving the clarity and comprehensibility of the questionnaire.

CHAPTER V

DISCUSSION

Based on findings from several studies, the existing E-modules and field experts, the content areas related to ASD were identified, and an E-module was developed for preschool teachers in India (see Appendix I). The identified key content was presented across six domains: Causes and characteristics of ASD, Screening children for ASD, Role of multidisciplinary action, Classroom modifications for children with ASD, Available government schemes and benefits, and Myths and facts associated with ASD. This E-module aimed to sensitize preschool teachers to ASD, therefore supporting early intervention.

This chapter discusses the findings of this study with respect to the stated objectives, literature review, and its clinical relevance. The discussion for this study is presented under the following sections:

5.1 Development and Validation of the E-module and Questionnaire on ASD for Preschool Teachers.

5.2 Efficacy of the developed E-module on ASD for Preschool Teachers.

5.1 Development and Validation of the E-module and Questionnaire on ASD for Preschool Teachers.

The first objective of this study was to develop and validate an E-module on ASD for preschool teachers. The identified key content areas were explained across six domains of the E-module, namely: Causes and characteristics of ASD, Screening children for ASD, Role of multidisciplinary action, Classroom modifications for children with

ASD, Available government schemes and benefits, and Myths and facts associated with ASD.

The need to develop this E-Module is supported by the existing literature, which showed that ASD is increasingly recognized as a public health and developmental concern. The World Health Organization (2022) reported that nearly 1 in 100 children are diagnosed with ASD. In the Indian context, studies reported that approximately 1% to 1.5% of children aged 2 to 9 years may present with ASD (Arora et al., 2018), while other studies highlighted regional disparities, limited awareness (Rudra et al., 2017; Raina et al., 2015), limited access to diagnostic services, lack of trained professionals (Alobaid & Almogbel, 2022; Ponnala, Suresh, & Karthick, 2025), and social stigma (John & Shetty, 2022) as barriers to early identification. These findings indicated the need for awareness-building resources that reach frontline professionals, including preschool teachers, who may observe developmental concerns before families have access to specialist services.

The use of a digital module in the present study is supported by the literature, which shows that structured and digital learning formats are effective for teacher training. Research evidences reported that planned teaching programs significantly improved post-test knowledge among pre-primary teachers (Soni, Mohan & Samuel, 2021) , while other studies also found that self-instructional modules were flexible, cost-effective, and useful for improving teachers' knowledge and early identification skills (Jain & Menaria, 2019) and Daniel, Gupta & Sagar, 2013). Similarly, findings from few studies have also showed that online learning formats are effective when supported by structured learning components (Means et al., 2010; Bernard et al., 2014). Research also reported the usefulness of e-learning in training preschool teachers in instructional behaviours for children with ASD (Tunc-Paftali & Tekin-Iftar, 2020), while evidence further showed that online professional training can improve classroom communication opportunities

(Douglas, McNaughton & Light, 2013). Further, studies also highlighted that pictorial-narrative digital modules can improve ASD knowledge and reduce stigma(Low, Wong & Lee, 2021), and emphasized that interactive and game-like digital elements can enhance cognitive, motivational, and behavioral learning outcomes (Sailer & Homner, 2020; Antonaci, Klemke & Specht, 2019). Therefore, the E-Module used in the present study served as a structured, accessible, and engaging medium for improving Preschool teachers' knowledge of ASD.

The E-module was developed in a structured, audiovisual format to make the information more engaging and comprehensible for participants. The use of a digital module is supported by studies indicating that e-learning and self-instructional formats can be effective in improving knowledge and professional preparedness. Studies have reported that online learning formats are effective, particularly when they include structured content and active learning elements (Means et al., 2010; Bernard et al., 2014) . Similarly, studies on self-instructional demonstrated that structured educational materials can significantly improve teachers' knowledge and early identification skills modules by Jain & Menaria, 2019; Daniel et al., 2013) . Therefore, the use of an E-Module in the present study was appropriate, as it enabled standardized delivery of ASD-related information in a flexible, teacher-friendly format.

The Domain 1 of the E-module (Causes and Characteristics of ASD) (as in Appendix I) focused on providing an overview of ASD, its core affected areas, and causes, which was particularly important because early red flags may be subtle and misinterpreted as shyness. This domain was included in the E-module because understanding the basic nature and early signs of ASD forms the foundation for early identification. Global estimates indicate that nearly 1 in 100 children are diagnosed with

ASD (World Health Organization, 2022). In the Indian context, population-based evidence suggests that approximately 1% to 1.5% of children aged 2 to 9 years present with ASD, with major disparities in screening and diagnostic access across regions and socioeconomic groups (Arora et al., 2018). Further, Indian studies show that variations in ASD identification are strongly influenced by diagnostic methods, awareness levels, availability of trained professionals, stigma, and healthcare accessibility, especially in settings with limited resources and accessibility (Chauhan et al., 2019; Raina et al., 2015; Rudra et al., 2017; Arun & Chavan, 2021). Therefore, including this domain was necessary to strengthen teachers' basic understanding of the causes and characteristics of ASD, therefore laying a foundation for early intervention.

Domain 2 (Screening Children for ASD) (as in Appendix I) emphasized topics like concept of screening, red flags for ASD, developmental milestones, normal vs ASD-like behaviour, etc. This domain holds a significant importance because Preschool teachers need to distinguish between typical developmental milestones and early red flags suggestive of ASD. Since ASD presents with highly varied communication and behavioural profiles, ranging from minimally verbal children to verbally fluent children with pragmatic difficulties, teachers require basic knowledge of screening indicators rather than relying only on obvious speech delay (Tager-Flusberg et al., 2005; Lord et al., 2006; Boucher, 2012). Studies have shown that deficits in joint attention, gaze shifts, gestures, and shared affect are powerful early indicators of ASD and are associated with later language outcomes (Tager-Flusberg et al., 2005; Wetherby et al., 2004) . Indian evidence also suggests that speech-language delay and poor response to name are among the earliest concerns reported by families, but help-seeking may be delayed due to cultural interpretations of these signs (Daley, 2004; Chakrabarti, 2024). Hence, including

screening-related information in the module helped address a clinically meaningful area relevant to early identification.

Domain 3 (Role on multidisciplinary action) (as in Appendix I) was helpful because children with ASD often present with needs across communication, sensory processing, behaviour, learning, and classroom participation, requiring coordinated support from different professionals rather than isolated intervention. The inclusion of roles of SLPs, OTs, psychologists, special educators, parents, and Preschool teachers was supported by evidence that ASD profiles are heterogeneous and include language difficulties, sensory processing differences, restricted and repetitive behaviors, and require diverse intervention needs (Lord et al., 2006; Leekam et al., 2007; Boyd et al., 2012). Since early, family-centered and multidisciplinary structured intervention approaches have been shown to improve communication, cognitive, behavioural, and adaptive outcomes, teacher awareness of multidisciplinary collaboration becomes essential for timely referral and coordinated support (Pardo & Eberhart, 2007; Chen et al., 2024; Onu, 2026). This domain also helped Preschool teachers understand their own role as part of the intervention team, especially because gaps in teachers' knowledge and uncertainty regarding classroom management have been reported in the Indian context (John & Shetty, 2022; Ponnala et al., 2025).

The Domain 4 (Classroom modifications for children with ASD) (as in Appendix I) on classroom modifications was also necessary because children with ASD may experience challenges in communication, sensory regulation (Posar & Visconti (2018) transitions, routines, social participation and classroom behaviour. Sensory processing differences and restricted repetitive behaviours are commonly reported in ASD and studies have described patterns such as hyper-responsiveness, hypo-responsiveness,

sensory seeking, and enhanced perception (Leekam et al., 2007; Posar & Visconti, 2018). Since teachers directly manage classroom routines, the inclusion of practical strategies such as visual schedules, structured routines, sensory breaks, seating adaptations and simplified instructions made the module more functional and classroom-oriented. Usage of these modifications in classroom will facilitate inclusion of ASD children in mainstream classroom (Vygotsky, 1978).

Domain 5 (Awareness of government schemes and benefits)(as in Appendix I) was included to make the E-Module practically relevant for Preschool teachers. Since Indian families of children with ASD may face delays due to limited awareness, stigma and poor access to services due to various barriers like socio-economic status or geographical locations (Arora et al., 2018; Chauhan et al., 2019), teachers need basic knowledge of support systems. Policies such as the RPwD Act (2016) and schemes like the Niramaya Health insurance scheme and Samagra Shiksha Abhiyan under the National Trust Act (1999) emphasize early support, inclusive education, disability certification and welfare benefits; hence, this module aimed to help teachers guide families toward appropriate services.

Addition of Domain 6 (Myths and Facts associated with ASD) (as in Appendix I) to the E-module was highly necessary because misconceptions about autism can delay identification, referral, acceptance, and appropriate classroom support. Myths such as children ‘outgrowing’ autism, autism being caused by poor parenting, or repetitive behaviors being meaningless can negatively influence how teachers interpret a child’s behavior and communicate concerns to parents. Evidence shows that gaps and misconceptions regarding ASD persist even among healthcare professionals and teachers,

including poor recognition of red flags, uncertainty about comorbidities, and mixed attitudes toward inclusion (Suhumaran et al., 2021; Atun-Einy & Ben-Sasson, 2018; John & Shetty, 2022). Indian evidence also highlights that limited awareness, stigma, and culturally shaped interpretations of early signs contribute to delayed help-seeking and under-identification of ASD (Daley, 2004; Chauhan et al., 2019; Chakrabarti, 2024). Therefore, including a myths-and-facts domain was necessary to correct inaccurate beliefs, reduce stigma, and promote scientifically accurate, neurodevelopmentally informed understanding of ASD among Preschool teachers. The developed E-module (as in Appendix I) was subjected to content validation by 15 content validators. The results of the study based on CVR indicated that that all six domains of the E-module were universally rated as highly relevant, comprehensiveness and culturally appropriate. Results based on S-CVI indicated a strong agreement among the content validators for the content in the E-module.

In addition to quantitative ratings, qualitative feedback was obtained from the content validators to improve the E-module further. The qualitative feedback helped identify areas that required refinement in terms of clarity, language, visual presentation, audio quality, organization of content, and participant engagement. This is important because the effectiveness of educational material depends not only on the accuracy of content but also on how clearly and practically it is presented Studies have showed using a pictorial-narrative digital module, showed that visually supported and narrative-based digital tools can improve ASD-related knowledge and reduce stigma among pre-service teachers (Tager-Flusberg et al., 2005; Wetherby et al., 2004) . Although the quantitative findings showed that all domains were valid and suitable, the qualitative comments provided useful suggestions to make the module more understandable, practical and

teacher-friendly. The modifications included the addition of relevant pictures, symbols, subtitles, captions, and practical illustrations to improve visual appeal and participant engagement. Content was reorganized and simplified wherever necessary to enhance clarity, reduce excessive narration and facilitate better understanding. Terminology, pronunciation and language-related corrections and refinements were implemented to ensure accuracy and consistency of information. Overall, these revisions contributed to improving the relevance, clarity and presentation quality and overall effectiveness of the E-module.

The pre and post-test questionnaire (as in Appendix II) was developed as a structured, domain-wise tool to evaluate the efficacy of the E-module. An in-depth literature review was done to identify the knowledge gaps present in similar studies carried out previously. The questionnaire consisted of six sections which aligned with the E-module domains. Section 1 (Awareness of Causes and Characteristics of ASD) was important as it assessed teachers' foundational understanding of ASD as a neurodevelopmental condition, its causes, spectrum nature, and core characteristics, which is essential given the increasing prevalence and under-identification of ASD in India (Arora et al., 2018; Chauhan et al., 2019). Section 2 focused on screening, red flags, and typical versus ASD-related behaviours, which was necessary because early indicators such as poor response to name, reduced joint attention, limited gestures, and atypical social communication strongly predict later developmental outcomes (Mundy et al., 1990; Wetherby et al., 2004; Daley, 2004). Section 3 assessed awareness of multidisciplinary action, including referral and the roles of professionals, because ASD requires coordinated support across communication, sensory, behavioural, psychological, educational, and family-centred domains (Lord et al., 2006; Leekam et al., 2007; Boyd et

al., 2012). Section 4 examined classroom modifications such as sensory support, visual schedules, extra response time, and inclusive participation, which are important because teachers often report uncertainty in managing children with ASD in classroom settings (John & Shetty, 2022; Ponnala et al., 2025). Section 5 assessed awareness of government schemes and benefits, including UDID, disability certification, Samagra Shiksha, and Niramaya, as teachers can guide parents toward available support systems within the Indian context. Section 6 debunked the myths and misconceptions, which was essential because inaccurate beliefs regarding ASD, vaccines, cure, parenting, visual aids, and gender can contribute to stigma, delayed referral, and inappropriate classroom responses (Suhumaran et al., 2021; Atun-Einy & Ben-Sasson, 2018; Chakrabarti, 2024). Thus, the questionnaire was comprehensive, teacher-friendly, and directly linked to the knowledge areas required for early identification, referral readiness, inclusive classroom support, and family guidance.

The content validation of the pre-test and post-test questionnaire was done because the tool needed to accurately assess the key knowledge areas addressed in the E-Module. This is supported by previous studies which have reported gaps in ASD-related awareness and practical knowledge among Preschool teachers, especially regarding early signs, inclusion, classroom management, and referral pathways (Kara & Demirtas, 2020; Alobaid & Almogbel, 2022; John & Shetty, 2022; Ponnala, Suresh, & Karthick, 2025).

The procedure for content validation of the pre and post-test questionnaire was similar to the process of content validating the E-module. These content validation results reflected strong universal expert agreement regarding the relevance, clarity, simplicity, and comprehensiveness of the questionnaire items. The open-ended feedback obtained

from the validators contributed significantly towards refining the questionnaire by improving the clarity, structure, comprehensibility of the items. The suggestions provided by experts were reviewed and incorporated wherever applicable. Thus, the validation and revision process strengthened the questionnaire as an appropriate tool for assessing the efficacy of the developed E-Module among Preschool teachers.

Overall, the development and validation process showed that the E-module was relevant, clear, comprehensive, culturally appropriate, and suitable for Preschool teachers. Content validation of the E-module and questionnaire showed strong expert agreement on their relevance, clarity, comprehensiveness, cultural appropriateness, and suitability for Preschool teachers. The quantitative analysis indicated that all six domains of the E-module were universally rated as highly relevant, comprehensive, and culturally appropriate. Results based on S-CVI indicated strong agreement among the content validators regarding the content in the E-module. This is supported by previous studies, which have reported gaps in Preschool teachers' knowledge of ASD, practical classroom management, referral pathways, and inclusion-related preparedness (Kara & Demirtas, 2020; Alobaid & Almogbel, 2022; John & Shetty, 2022; Taresh et al., 2023; Ponnala, Suresh, & Karthick, 2025). Therefore, the validation findings indicate that the E-Module content was aligned with the real informational needs of Preschool teachers. These studies support the content validation findings by showing that Preschool teachers require structured, practical, and contextually relevant training materials to improve their knowledge of ASD, early signs, referral pathways, and classroom modifications.

Qualitative feedback from validators helped refine both tools by improving clarity, simplifying content, refining terminology, enhancing visuals, correcting errors,

and improving item structure. Previous studies have consistently reported gaps in teachers' ASD awareness, limited formal training, misconceptions, and uncertainty in classroom management and referral practices (Kara & Demirtas, 2020; Alobaid & Almogbel, 2022; John & Shetty, 2022; Ponnala, Suresh, & Karthick, 2025). Hence, the strong expert agreement obtained in the present study suggests that the developed E-Module and questionnaire appropriately addressed these documented knowledge gaps and were suitable for use with Preschool teachers. Overall, the revisions strengthened the comprehensibility, accessibility, and practical usefulness of the E-module and questionnaire. Therefore, the final E-module can be considered a valid educational resource for enhancing awareness and knowledge of ASD among Preschool teachers in the Indian context. Thus, this sub-section met the first objective of this study, which was to develop a structured, scalable and validated digital resource E-module to create awareness on ASD among Preschool teachers in terms of their awareness, knowledge and attitudes.

5.2 Testing the Efficacy of the Developed E-module

The second objective of the study was to evaluate the efficacy of the developed E-module. The findings showed an improvement in post-test performance across all domains after exposure to the E-module. This indicates that the E-module was effective in improving teachers' overall knowledge of ASD. The comparison of total pre-test and post-test descriptive scores showed an overall improvement in Preschool teachers' ASD-related knowledge after exposure to the E-Module. The total median score increased from pre-test to post-test, indicating that the typical participant performed better after completing the module. The reduction in total IQR further suggests that the post-test scores became more closely grouped, reflecting reduced variability and greater

consistency in knowledge levels across participants. Thus, the E-Module not only improved overall knowledge but also helped bring participants toward a more uniform level of understanding (Soni, Mohan & Samuel, 2021; Jain & Menaria, 2019; Daniel, Gupta & Sagar, 2013), who reported that structured teaching programs and self-instructional modules significantly improved teachers' post-intervention knowledge scores. The Wilcoxon Signed Ranks Test for total pre-test and post-test scores showed a statistically significant improvement, indicating that the overall gain in Preschool teachers' ASD-related knowledge was meaningful and not due to chance. This suggests that the E-Module was effective in improving teachers' knowledge across all targeted domains, including ASD characteristics, screening, multidisciplinary action, classroom modifications, government schemes and myths (Means et al., 2010; Bernard et al., 2014), which reported that structured online learning formats are effective in improving knowledge outcomes. Evidences have also demonstrated that pictorial and narrative-based digital modules can improve ASD -related knowledge among teachers, supporting the effectiveness of the audio-visual E-Module used in the present study (Tager-Flusberg et al., 2005; Wetherby et al., 2004) .

Section-wise findings also supported the effectiveness of the E-module. The median post-test scores and the Wilcoxon Signed Rank scores for each section improved, mirroring the corresponding pre-test scores, indicating a clear improvement in participants' knowledge of ASD across each domain of the E-module. In Section 1 (Awareness of Causes and Characteristics of ASD), the descriptive findings showed an increase in median score from pre-test to post-test, while the IQR remained low. This indicates that participants developed a better understanding of the basic causes, characteristics, and varied presentation of ASD after exposure to the E-Module. Since the

IQR remained the same, the spread of scores was similar, but the overall group performance shifted toward higher scores. This finding is relevant because ASD is highly heterogeneous, and children may differ in social communication, behaviour, sensory responses, language abilities, cognitive profile, and support needs. Findings of studies have emphasized the variability in language and developmental trajectories in ASD (Tager-Flusberg et al., 2005; Kover et al., 2016; Lord et al., 2006). Therefore, improvement in this section suggests that the E-Module helped teachers understand ASD beyond a single or stereotyped presentation. The Wilcoxon Signed Ranks Test for Section 1 showed a statistically significant improvement between pre-test and post-test scores. This indicates that the E-Module was effective in improving teachers' knowledge of the causes, characteristics, and core signs of ASD. The finding is important because previous studies have reported limited or uneven awareness of ASD characteristics among Preschool educators. Various researchers documented gaps in Preschool teachers' basic awareness and practical knowledge of ASD symptoms (Kara & Demirtas, 2020; Alobaid & Almogbel, 2022; John & Shetty, 2022), and Yahya and Mohamed (2024). Hence, the significant improvement in this section suggests that the E-Module addressed an important teacher knowledge gap.

In Section 2, Screening Children for ASD, the descriptive findings showed an increase in median score from pre-test to post-test and a reduction in IQR. This indicates that participants gained better knowledge of early signs, screening indicators, and referral-related concerns. The reduction in IQR suggests that teachers' responses became more consistent after the intervention, indicating that the E-Module helped reduce differences in baseline understanding. This finding is clinically relevant because Preschool teachers observe children in natural classroom contexts where early red flags

such as poor response to name (Chakrabarti, 2024), reduced joint attention, limited gestures, reduced peer interaction, communication delay, repetitive behaviors, and sensory differences may become noticeable (Posa & Visconti, 2018). Research findings have reported that deficits in joint attention, gaze shifts, gestures, and shared affect are important early markers of ASD and are associated with later language outcomes (Tager-Flusberg et al., 2005; Kover et al., 2016; Lord et al., 2006). The Wilcoxon Signed Ranks Test for Section 2 (Screening Children for ASD) showed a statistically significant improvement in post-test scores. This suggests that the E-Module was effective in improving teachers' knowledge about red flags for ASD (Chattopadhyay, 2024) and screening-related knowledge. Indian evidence also supports the importance of this finding, as speech-language delay and poor response to name are commonly reported early concerns, but may be misinterpreted due to limited awareness or cultural explanations (Daley, 2004; Chakrabarti, 2024). Therefore, the significant improvement in this section indicates that the E-Module may help teachers recognize developmental concerns earlier and guide families toward professional assessment.

In Section 3 (Awareness of Multidisciplinary Action), the descriptive findings showed an increase in median score from pre-test to post-test, while the IQR remained stable. This indicates that participants developed a better understanding of the role of different professionals and the importance of multidisciplinary support for children with ASD. The unchanged IQR suggests that although variability remained similar, the group as a whole shifted toward a higher level of knowledge. This improvement is important because it indicates an improvement regarding knowledge that ASD management requires coordinated involvement of Speech-Language Pathologists (Masi et al., 2017; Hyman et al, 2020), Occupational Therapists (Schaaf et al., 2014; Case-Smith et al.,

2015), Clinical Psychologists (Subramanyam et al., 2019), Special Educators (Gulati, Sapra & Chakrabarty, 2014), parents (Green et al., 2010), and teachers (Taresh et al., 2023). Hyman et al. (2020) emphasized that ASD intervention should be coordinated, evidence-based, and family-centred. The Wilcoxon Signed Ranks Test for Section 3 showed a statistically significant improvement, indicating that the E-Module enhanced teachers' understanding of professional roles and referral pathways. This finding suggests that the module helped teachers understand that their role is not to diagnose ASD, but to observe concerns, communicate with parents, and guide families toward appropriate professionals. This is particularly relevant in the Indian Preschool context, where referral pathways may not always be clearly understood by teachers or caregivers (Rai et al., 2018; Elumai et al., 2019; Dhyanithi et al., 2023). Thus, the significant improvement in this domain supports the usefulness of the E-Module in strengthening referral readiness and collaborative understanding.

In Section 4 (Classroom Modifications for Children with ASD), the descriptive findings showed an increase in median score from pre-test to post-test and a reduction in IQR. This indicates that teachers gained better knowledge of classroom-level strategies and that their understanding became more consistent after the E-Module. The reduction in IQR suggests that participants reached a more uniform level of knowledge regarding classroom supports. This finding is important because children with ASD may experience difficulties in classroom routines, transitions, sensory regulation, attention, peer interaction, and communication. Improved knowledge of visual schedules, structured routines, sensory breaks, seating adaptations, and transition supports is meaningful for classroom participation (Mehmood & Parveen, 2025). The Wilcoxon Signed Ranks Test for Section 4 showed a statistically significant improvement, indicating that the E-Module

was effective in improving teachers' knowledge of classroom modifications. This finding is supported by Vygotsky's sociocultural theory, which emphasizes the role of adult-mediated scaffolding in supporting children's learning and participation. In the context of ASD, classroom scaffolds such as visual schedules, task analysis, modified prompting, and structured routines can help children move from dependent to more independent functioning. Hence, the significant improvement in this section suggests that the E-Module helped teachers move beyond awareness toward basic classroom-level support.

In Section 5 (Awareness of Government Schemes and Benefits), the descriptive findings showed an increase in median score from pre-test to post-test and a reduction in IQR. This indicates that participants became more aware of disability-related support systems available for children with ASD and their families. The reduced IQR suggests highly consistent post-test performance, showing that teachers developed a more uniform understanding of schemes and benefits after the E-Module. This finding is important in the Indian context, where families may face delays in accessing services due to limited awareness, stigma, poor referral guidance, and lack of information regarding disability certification, UDID, educational entitlements and welfare schemes. Arora et al., (2018), Rudra et al., (2017) and Chauhan et al., (2019) highlighted that limited awareness, shortage of trained professionals, and disparities in access to screening and diagnostic services contribute to under-identification of ASD in India. The Wilcoxon Signed Ranks Test for Section 5 showed a statistically significant improvement, indicating that the E-Module was effective in improving teachers' awareness of government schemes and benefits. This finding aligns with Indian policy frameworks such as the RPwD Act (2016), National Trust Act (1999), Samagra Shiksha, and NEP (2020), which emphasize early support, inclusive education, disability certification, and rights-based access to

services. Therefore, the significant improvement in this section suggests that the E-Module strengthened teachers' ability to guide families toward appropriate support systems.

In Section 6 (Myths and Facts Associated with ASD), the descriptive findings showed an increase in median score from pre-test to post-test and a reduction in IQR. This indicates that participants developed better understanding of common myths and facts related to ASD. The reduction in IQR suggests that teachers' responses became more consistent after the E-Module, reflecting clearer understanding across the group. This is important because myths such as ASD being caused by poor parenting, children 'outgrowing' ASD, all children with ASD being the same, or children with ASD being unable to improve may delay referral and negatively affect teacher attitudes (Irene Lacruz-Perez et al., 2024). Research evidences have reported that even professionals working with Preschool children may lack confidence in identifying early signs of ASD and may hold misconceptions about autism. (Suhuram, Leong & Wong, 2021; Taresh et al.,2023). The Wilcoxon Signed Ranks Test for Section 6 showed a statistically significant improvement, indicating that the E-Module was effective in reducing misconceptions and improving accurate knowledge about ASD. This finding suggests that the module contributed not only to knowledge enhancement but also to more positive and informed perspectives regarding ASD. Addressing myths is important because accurate teacher understanding can support early referral, reduce stigma, and improve classroom acceptance of children with ASD.

Overall, the increase in total and section-wise median scores indicates that the E-Module improved Preschool teachers' knowledge across all targeted areas. The reduction

or maintenance of low IQR values in total and across the sections, suggests that the module also promoted greater consistency in learning outcomes. The statistically significant Wilcoxon Signed Ranks Test results across total and section-wise scores further confirm that the E-Module was effective in enhancing ASD-related awareness, referral readiness, classroom-based support knowledge, and understanding of government schemes and myths among Preschool teachers. These findings collectively support the usefulness of a structured, culturally relevant, and audio-visual E-Module as an educational resource for strengthening early identification and teacher preparedness in the Indian Preschool context. Thus, this sub-section met the second objective of the study, which was to evaluate the efficacy of the developed E-module on ASD among Preschool teachers. The findings presented above indicate that the proposed null hypothesis H01: "There is no significant difference in the scores of pre- and post-test among the Preschool teachers even after undergoing the administration of the E-Module" is rejected.

The developed E-module has clinical relevance because it translates essential information of ASD into a structured, accessible, and teacher-friendly format for Preschool teachers. In the context of ASD, early identification and timely referral are crucial because early intervention can positively influence communication, social interaction, adaptive behaviour, and overall developmental outcomes. Preschool teachers are often among the first professionals to observe children in naturalistic social and learning environments. Therefore, improving their awareness about the early signs of ASD can support earlier recognition of developmental concerns and help reduce delays in referral and intervention.

The clinical relevance of the E-module is supported by its content validation findings. Since all domains exceeded the critical CVR threshold value of 0.49 for 15 experts, the content was considered relevant, clear, comprehensive, culturally appropriate, and suitable for the intended users. This supports the clinical usefulness of the E-module as a valid educational resource for improving teachers' knowledge of ASD. The E-module is clinically relevant because it addresses areas directly linked to early identification and intervention. The module covers the causes and characteristics of ASD, screening information, multidisciplinary approaches, classroom modifications, government schemes and benefits, and myths and facts about ASD. These areas are important for Preschool teachers because they help them understand not only the red flags of ASD but also the appropriate steps to take when concerns are observed.

As suggested by the AAP (2025), ASD screenings should be part of standard 18 and 24-month child checkups. By improving knowledge of red flags, screening, professional referral, and classroom-based support, the E-module can help teachers facilitate early identification, therefore improving therapy outcomes (Antibor, Gurcova & Stoian, 2025; Onu, 2026). Early intervention is particularly important because the early years represent a period of heightened neuroplasticity. During this period, the developing brain is more responsive to environmental input, learning experiences, and therapeutic support. Therefore, identifying ASD-related concerns during this critical period and initiating timely intervention may help improve developmental outcomes in areas such as communication, social interaction, adaptive behaviour, and classroom participation (Sridevi & Arya, 2014).

Overall, the developed E-module has strong clinical relevance as an awareness and educational tool for Preschool teachers. It emphasizes the need for early intervention during the critical period of development, where structured environmental input can positively influence developmental outcomes in children with ASD (Pardo & Eberhart, 2007; Chen et al., 2024; Freidman & Rusou, 2015; Liang et al., 2023). Studies have also shown that early, family-centered interventions can improve cognitive, language, adaptive, behavioral, and communicative outcomes, including evidence from the Indian context (Antibor, Gurcova & Stoian, 2026; Onu, 2026; Sridevi & Arya, 2014). By improving knowledge of ASD characteristics, screening indicators, referral pathways, early intervention is facilitated. Knowledge of multidisciplinary action (Hyman et al., 2020) and classroom modification (Vygotsky, 1978) further improve communication and overall outcomes. At the same time, debunking myths about ASD helps in reducing stigma and delayed referrals (Irene Lacruz-Perez et al., 2024). The significant improvement in post-test scores across all domains indicates that the E-module was effective in enhancing Preschool teachers' knowledge. Therefore, the E-module can serve as a useful resource for strengthening early recognition, timely referral, and classroom-based support for children with ASD in the Indian Preschool context.

The present E-Module also addresses important practical gaps reported in existing literature. Studies have highlighted the academic-practical mismatch, where educators may know theoretical facts about autism but struggle to apply behavioural and visual modification strategies in real settings (Hemdi, 2023) . Research evidences have also emphasized that a 'one-size-fits-all' approach is insufficient because ASD is highly heterogeneous and children vary in severity, strengths, and support needs (Beversdorf, 2016) . Similarly, findings have also noted that the major gap is not only the lack of

intervention models but also the poor translation of existing tools and strategies into everyday teaching and community practice, due to limited frontline professional upskilling (Chattopadhyay, 2024; Chakrabarti, 2023). Thus, the developed E-Module helped bridge this gap by presenting ASD-related knowledge, red flags, referral pathways, classroom strategies, government schemes, and myths in a practical, teacher-friendly format suitable for preschool settings.

CHAPTER VI

SUMMARY AND CONCLUSION

The primary aim of this study was to sensitize Preschool teachers on ASD and to develop, validate, and check the efficacy of an E-Module on ASD. The objectives of the present study were to develop a structured, scalable, and validated digital E-module to raise awareness of ASD among Preschool teachers in the Indian context and to evaluate the E-module's efficacy in improving Preschool teachers' awareness, knowledge, and attitudes toward children with ASD. The study was carried out in four phases: development of the E-Module and questionnaire through an in-depth review of the literature; content validation of the developed E-Module and the pre- and post-test questionnaire; a pilot study; and the final study. The E-module was developed based on an in-depth review of the literature and using supportive visuals, an engaging storyline, simple language, and short sentences to improve clarity, simplicity, comprehensiveness, and cultural appropriateness. It was ensured that the video and audio quality stay uniform and excellent across all the domains of the E-module.

The E-module was divided into six domains, which were: Domain 1: causes and characteristics of ASD, Domain 2: screening children for ASD, Domain 3: awareness on multidisciplinary action, Domain 4: classroom modifications for children with ASD, Domain 5: awareness of government schemes and benefits, and Domain 6: myths and facts associated with ASD. These concepts were further explained using a storyline of a child named 'Aarav' and his journey from screening to intervention for ASD. The total duration of the E-module was 37 minutes.

A 34-item pre- and post-test questionnaire was also developed to evaluate the efficacy of the developed E-module. The 34 questions were distributed across sic sections. These six sections aligned with the six domains of the E-module. The developed material was then validated by a multidisciplinary team of 15 experts, which included SLPs, occupational therapists, special educators, clinical psychologists, and Preschool teachers. A pilot study with 5 Preschool teachers was conducted. The pre-test was administered, followed by the delivery of the E-module and the post-test. The entire process was conducted online via Google Meet (Google Meet, Version 2026.01, Google Play Store, 2026). It confirmed that the methodology was suitable for field testing.

The quantitative content validation findings for the E-module using Lawshe's CVR method revealed that all domains exceeded the critical threshold of 0.49, with all parameters ranging from 0.73 to 1.00 and scale-level CVI values from 0.93 to 0.98. The content validation results for the questionnaire revealed that all sections of the questionnaire exceeded the critical threshold value of 0.49, with all parameters obtaining CVR values of 0.86 to 1.00 and scale-level CVI values of 0.86 to 1.00. These findings reflected strong universal expert agreement regarding the relevance, clarity, simplicity, and comprehensiveness of the content in the E-module and questionnaire.

The quantitative analysis of content validation for both the E-module and the questionnaire showed that all six domains of the E-module exceeded the critical CVR of 0.49, indicating universal agreement among experts on relevance, clarity, comprehensiveness, and cultural appropriateness. Qualitative feedback from experts focused on improving clarity, simplifying certain terms, enhancing visual representation,

improving audio quality, refining pronunciation, adding labels or contextual cues in visuals, improving organization, and making some sections easier to follow. Based on these suggestions, appropriate revisions were made to the module. Ambiguous terms were clarified, visuals were improved, examples were refined, audio-related concerns were addressed, and sections were reorganized wherever required. Overall, these revisions improved the relevance, clarity, presentation quality, and overall effectiveness of the E-module. Therefore, the first objective of the study was to develop a structured, scalable, and validated digital E-module to raise awareness of ASD among Preschool teachers in the Indian context.

The results of the final study revealed that exposure to the E-module has significantly improved Preschool teachers' knowledge of screening children for ASD and providing accurate referral pathways. Descriptive analysis of total pre- and post-test scores showed consistent improvements following exposure to the E-module. The total pre-test scores (Mdn=23.00, IQR=6.00) showed improvement, with greater total post-test scores (Mdn=31.00, IQR=3.00) after exposure to the E-module. The Wilcoxon Signed Ranks Test demonstrated statistically significant improvements in all six domains. A significant difference was also observed between the total pre-test and post-test scores ($|Z| = 6.461$, $p < 0.001$). These findings indicate that the E-module effectively enhanced Preschool teachers' knowledge and awareness of ASD across all content areas.

Across all six sections, participants showed improvement from pre-test to post-test following exposure to the E-module. In Section 1 (Awareness of Causes and Characteristics of ASD, the median score increased from Mdn=3.00, IQR = 1.00 to

Mdn = 5.00, IQR = 1.00, and the Wilcoxon Signed Ranks Test showed that this improvement was statistically significant ($|Z| = 5.612$, $p < 0.001$). In Section 2 (Screening Children for ASD), the median score improved from Mdn = 3.00, IQR = 2.00 to Mdn = 5.00, IQR = 1.00, with a statistically significant difference between pre-test and post-test scores ($|Z| = 5.781$, $p < 0.001$). In Section 3 (Awareness of Multidisciplinary Action) scores increased from Mdn = 5.00, IQR = 2.00 to Mdn = 7.00, IQR = 2.00, and the improvement was statistically significant ($|Z|=6.076$, $p < 0.001$). In Section 4 (Classroom Modifications for Children with ASD), the median score improved from Mdn=4.00, IQR=1.00 to Mdn = 5.00, IQR= 0.00, and this change was found to be statistically significant ($|Z|=5.937$, $p < 0.001$). In Section 5 (Awareness of Government Schemes and Benefits), the median score increased from Mdn = 4.00, IQR = 1.00 to Mdn=5.00, IQR=0.00, with a statistically significant improvement ($|Z|=5.757$, $p < 0.001$). In Section 6 (Myths and Facts Associated with ASD), scores improved from Mdn=4.00, IQR=2.00 to Mdn=6.00, IQR=1.00, and the Wilcoxon Signed Rank test result also showed a statistically significant improvement ($|Z|=5.991$, $p<0.001$) between pre- and post-test scores.

These findings indicated that the E-module was effective in improving Preschool teachers' awareness and knowledge across all areas related to ASD. Overall, the findings demonstrate that the E-module was a valid, well-accepted, and effective educational resource for improving Preschool teachers' knowledge and awareness of ASD. The significant improvements observed across all domains indicate its potential utility in supporting early identification, referral, and educational management of children with ASD. Therefore, the second objective of the study, which was to evaluate the efficacy of the E-module in improving Preschool teachers' awareness, knowledge, and attitudes

toward children with ASD, was fulfilled. Given these results, which indicated a significant developmental trend across age groups, the null hypothesis *(H01) - "H01: There is no significant difference in the scores of pre- and post-test among the Preschool teachers even after undergoing the administration of the E-Module"* was rejected.

The present study effectively empowered Preschool teachers by significantly improving their knowledge and awareness of ASD following exposure to the E-module. The increase in total median scores from 23.00 in the pre-test to 31.00 in the post-test, along with the statistically significant Wilcoxon Signed Rank test result ($|Z| = 6.461$, $p < 0.001$), indicates that the teachers gained a clearer and more structured understanding of ASD-related concepts. Improvement across all six domains suggests that the E-module strengthened teachers' ability to identify early red flags, understand referral pathways, debunk myths associated with ASD, guide parents about certain government schemes and benefits, and apply basic classroom modifications. In India, where awareness is inadequate and associated stigma persists, this E-module can help sensitize Preschool teachers, therefore bridging the gap between early identification and early intervention. The study empowered teachers as informed early observers and facilitators who can support early identification, guide parents toward professional help, and create more inclusive Preschool environments (Chattopadhyay, 2024; Jain & Menaria, 2019; Daniel et al., 2013).

This study concludes that the E-module developed for Preschool teachers was relevant, comprehensive, and culturally appropriate. The strong content validity and statistically significant pre- and post-test scores indicate that the E-module is

acceptable and efficient in empowering the Preschool teachers. The revisions improved clarity and comprehensibility and improved it utility. These findings are supported by literature, which shows that early multidisciplinary intervention improved communication outcomes in children with ASD (Hyman et al., 2020; Chattopadhyay, 2024; Chaudhary & Chaudhary, 2025). Thus, this E-module can be considered a meaningful tool for sensitizing Preschool teachers about ASD in the Indian context.

Implications of the Study

The results of the present study had important implications for early identification and early intervention of ASD in preschool settings. Since Preschool teachers observe children regularly in natural classroom situations, improving their knowledge through a structured E-module can help them recognize early developmental red flags, understand when referral is needed, and guide parents toward appropriate professional support, especially in the Indian context, where there is inadequate awareness (John & Shetty, 2022; Shetty & Rai, 2014; Ponnala, Suresh & Karthick, 2025). Thus, the study highlights the role of Preschool teachers as important early observers and facilitators in the pathway to early intervention.

The findings also support the use of digital educational modules as accessible, cost-effective, and scalable tools for teacher training. The E-module can be used in Preschool teacher training programs, private and government preschool settings, and awareness initiatives conducted by professionals. It is structured and digitally delivered, and it can help provide standardized ASD-related information to teachers who may not have regular access to formal training. The study further has

implications for classroom practices. It encourages the use of simple classroom strategies such as visual schedules, predictable routines, clear instructions, sensory breaks, peer support, and appropriate seating arrangements. These modifications can help create more inclusive, responsive, and supportive Preschool environments for children with ASD or developmental concerns.

Overall, the study contributes a validated and effective E-module that can strengthen teacher capacity, improve ASD awareness, support timely referral, and promote better collaboration between teachers, parents, and professionals in the Indian context.

Limitations of the Study

This study had certain limitations. Firstly, the sample included only participants from Mysore city. This limits the generalizability of the findings to teachers from other regions, rural areas, different states, or varied linguistic and educational backgrounds. Secondly, due to dissertation timeline constraints, the study could assess only immediate post-test performance after exposure to the E-module. Hence, the long-term retention of knowledge and the module's sustained impact could not be determined. Lastly, the E-module was developed in English, which may limit its accessibility for Preschool teachers who are more comfortable in the regional languages of India.

Future Directions for the Study

Thus, future studies can evaluate the E-module using a larger and more diverse sample of Preschool teachers from different geographical regions of India,

including rural and urban areas, government Preschools, private preschools, and Anganwadi centers. Further research can include follow-up assessments after a few weeks to examine long-term knowledge retention. The E-module can also be translated and adapted into regional languages to improve accessibility for Preschool teachers across India.

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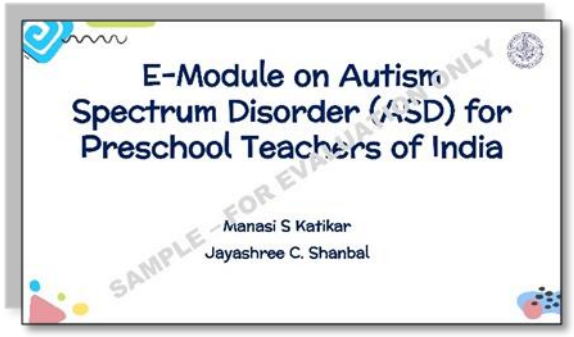
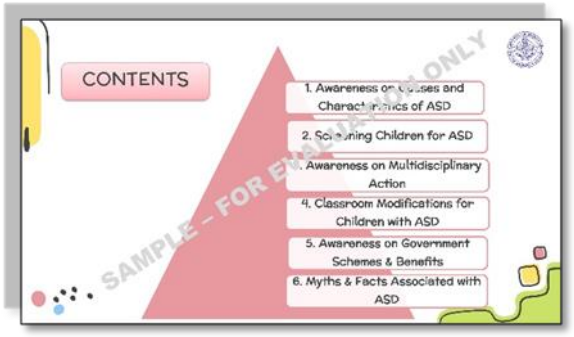
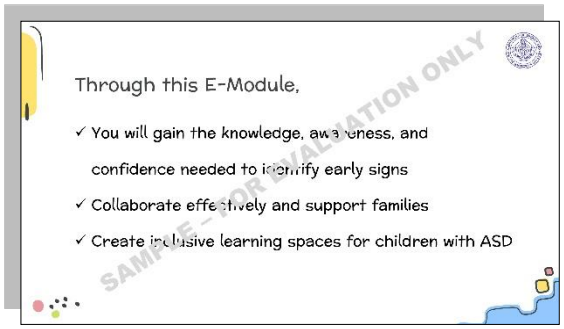
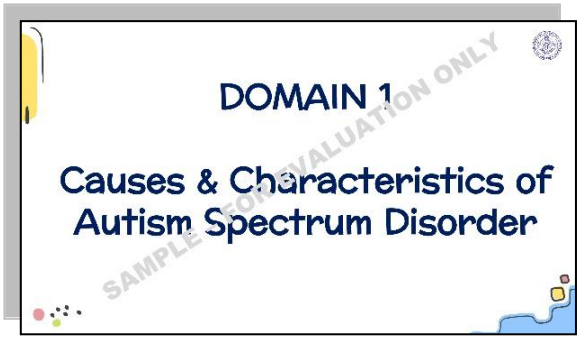
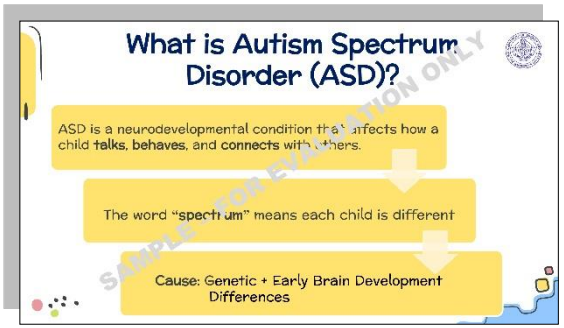
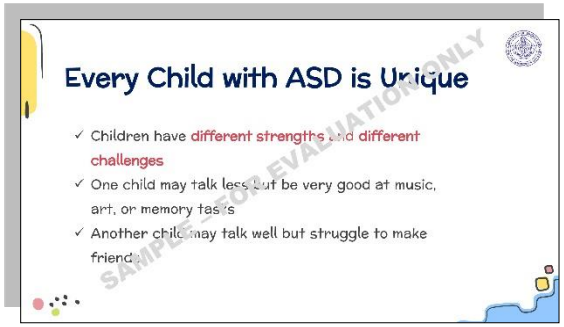
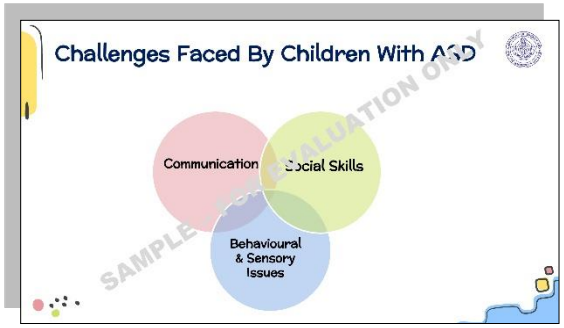
Appendix I

Script for Domain 1 (Causes and Characteristics of ASD) (Link)

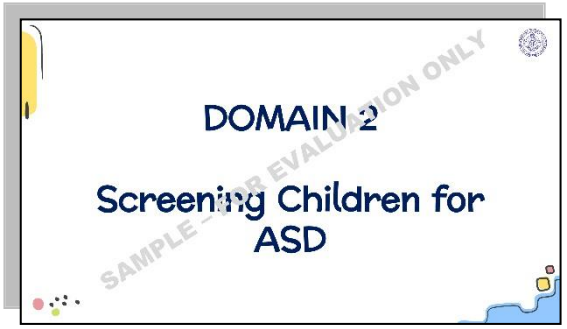
Slide No.	Content of the Slide	Audio Script for the Video
1.		Every child communicates, learns, and interacts with the world in their own unique way. Some children, however, experience differences in social skills, behavior, and sensations that require our understanding, our support and the right help. I welcome you to this E-Module on Autism Spectrum Disorder for Pre-school Teachers of India.

Slide No.	Content of the Slide	Audio Script for the Video
2.		This E-Module is structured into five key domains, each addressing an essential aspect of autism spectrum disorder awareness and treatment within the preschool context. Domain 1 : Will give an introduction to Autism Spectrum Disorder, Domain 2: Will stress the process of screening a child for ASD, Domain 3: will focus on Awareness about different specialists involved in giving treatment for ASD. The 4th Domain will emphasize on Government Schemes and Benefits. The last domain will shed light on Myths and Facts associated with ASD
3.		Through this E-Module, you will develop a comprehensive understanding of Autism Spectrum Disorder, enhance your ability to identify early behavioural and developmental signs, and build the confidence to initiate timely referrals. The module also aims to strengthen your skills in multidisciplinary collaboration, enable you to effectively support and guide families, and empower you to create inclusive, responsive, and supportive learning environments for children with Autism Spectrum Disorder.

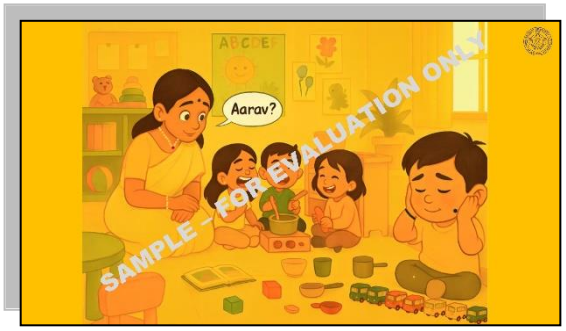
Slide No.	Content of the Slide	Audio Script for the Video
4.		Now let's start with Domain 1 – An overview on Autism Spectrum Disorder, wherein we will learn what exactly is Autism and its characteristics.
5.		Autism Spectrum Disorder, or ASD, is a developmental condition. It mainly affects communication, social interaction, and behaviour. The term *spectrum* reminds us that each child with ASD is unique—no two children show the same signs. Some may have mild difficulties, while others may need more support in daily activities.

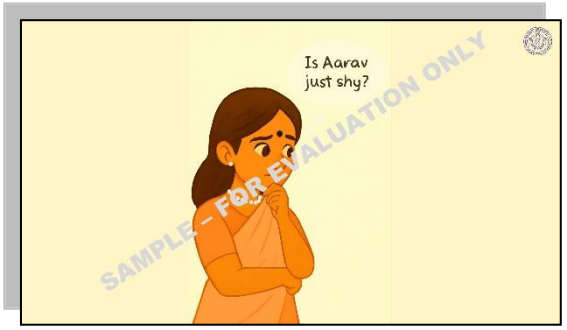
Slide No.	Content of the Slide	Audio Script for the Video
6.		Children with ASD often have their own set of strengths and challenges. For example, some children may not speak much but may show amazing talent in music, drawing, or puzzles. Others may speak clearly but may find social situations—like sharing or making friends—difficult. This wide variation is why we call it a spectrum.
7.		Children with ASD usually face challenges in three key areas. First is communication—some may speak less or find it hard to express their needs. Second is social skills—they may prefer to play alone, avoid eye contact, or struggle with sharing and turn-taking. The third area is behaviour and sensory sensitivities—they might repeat certain actions or feel uncomfortable with loud sounds, certain textures, or bright lights. Understanding these helps teachers provide the right support. In the next parts, we will learn how to identify a child who might have ASD and the next steps that a pre-school teacher can follow in the treatment.

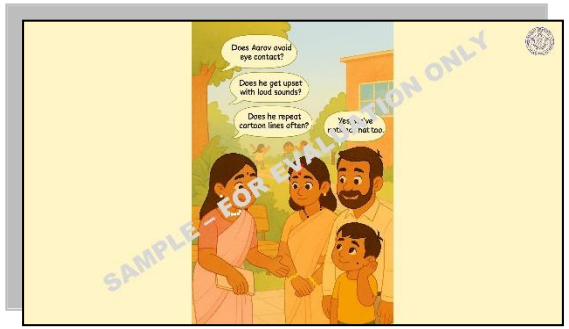
Script for Domain 2 (Screening Children for ASD) (Link)

Slide No.	Content of the Slide	Audio Script for the Video
1.		In the next part, we will learn how to identify a child who might have ASD and the steps a preschool teacher can follow to help the child with treatment.
2.		Let us understand more through a story. This is the story of Aarav, a little boy from Mysuru and these are his parents and his elder sister Ananya.

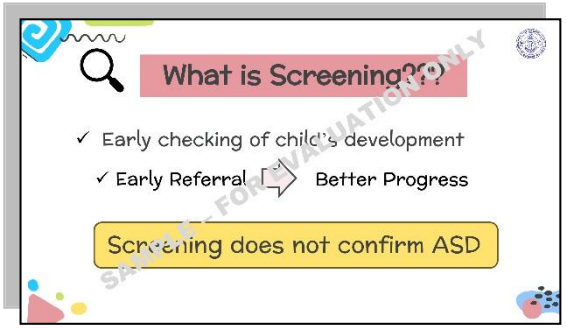
Slide No.	Content of the Slide	Audio Script for the Video
3.		When Aarav was 2 years old, his parents began noticing small differences between him and his elder sister, Ananya. But Aarav was different. When his mother called his name, he often did not respond.
4.		He rarely pointed at things, and instead of speaking words, he would just pull his parents' hands to get what he wanted.

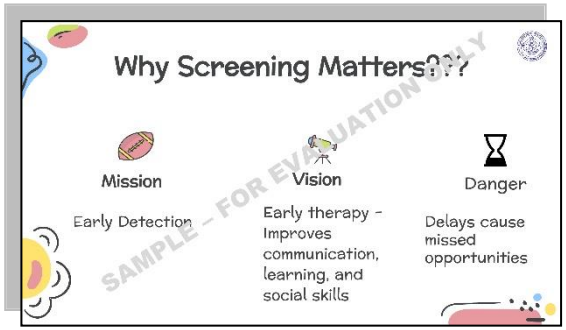
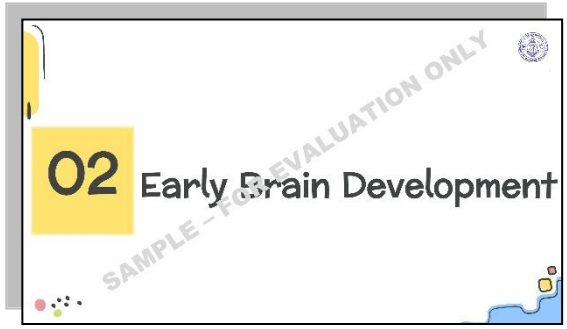
Slide No.	Content of the Slide	Audio Script for the Video
5.		When Aarav was turned 3, his parents admitted him to a pre-school. In his class, the teachers noticed differences.
6.		During group play, the teacher observed closely. Aarav's classmates were pretending to cook in the play kitchen, laughing and sharing roles. But Aarav sat away from them, arranging his toy cars in a straight line.

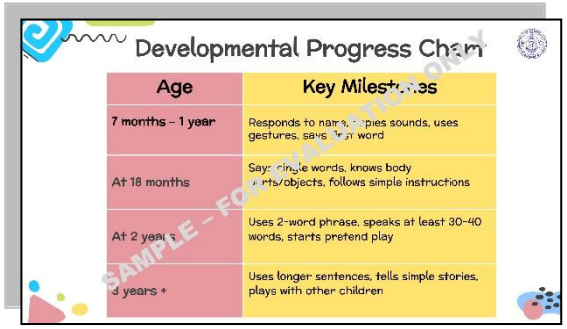
Slide No.	Content of the Slide	Audio Script for the Video
7.		When the class got noisy, Aarav would cover his ears tightly and sometimes cry loudly. He found the sounds of the classroom overwhelming. His teacher also noticed that Aarav often repeated phrases from cartoons he watched at home, like “Let’s go, peppa!”, but he did not use proper words to ask for water or call his friends.
8.		The teacher thought to herself, “This is not just shyness. I need to understand more.”

Slide No.	Content of the Slide	Audio Script for the Video
9.		After school, she gently spoke with Aarav's parents. She asked, "Does Aarav also avoid eye contact at home? Does he get upset with loud sounds? Does he repeat cartoon lines often?". The parents nodded slowly. "Yes, we have seen the same things, but we thought it was just his nature."
10.		The teacher knew these were red flags for autism: delays in communication, difficulties in social interaction, repetitive play, and sensory sensitivities. She explained to the parents that it would be best to consult professionals for guidance.

Slide No.	Content of the Slide	Audio Script for the Video
11.		She suggested visiting a Speech-Language Pathologist (SLP) could help with Aarav's language and communication and guide them toward the other right specialists.Thanks to the teacher's careful observation, Aarav's parents decided to follow through. Within a few weeks, Aarav was formally assessed and began early therapy. His parents also felt more hopeful, realising that with support, Aarav could learn new ways to communicate and engage.
12.		This story shows us how teachers play a key role in spotting the early signs of autism. By noticing differences in communication, play, and behaviour, and by working with families, teachers can open the door to early intervention. And the earlier the support, the brighter the child's future.

Slide No.	Content of the Slide	Audio Script for the Video
13.		Now let's explore some more related concepts.
14.		What is Screening?

Slide No.	Content of the Slide	Audio Script for the Video
15.		Screening means watching a child's behaviour and development to see if anything looks different from what is expected. It does not mean diagnosing autism. It only helps us notice early signs and guide parents to the right professionals.
16.		Early identification helps children get support faster. Any delay is going to cause hindrance is child's bright future

Slide No.	Content of the Slide	Audio Script for the Video
17.		Let's us now find out how brain develops in toddlers. From 7 months to 1 year: A child usually starts responding when you call their name. They copy sounds you make and may say their first word. Socially, they begin to point or wave and show interest in people around them. At around 1.5 years: A child starts using single words like "mama" or "ball" and can understand simple questions such as "Where is the cup?" They can point to body parts (like nose or eyes) and to familiar objects. At 2 years: A child typically begins to use short 2-word phrases, such as "want water," and has a vocabulary of about 30–40 words. In play, they enjoy simple pretend games, such as pretending to cook or feed a doll. At 3 years and above: A child begins to use longer sentences and can tell small stories or describe what happened. Socially, they show excitement about playing with other children and enjoy group play.
18.		Now, let's us know in detail what are the red flags for ASD.

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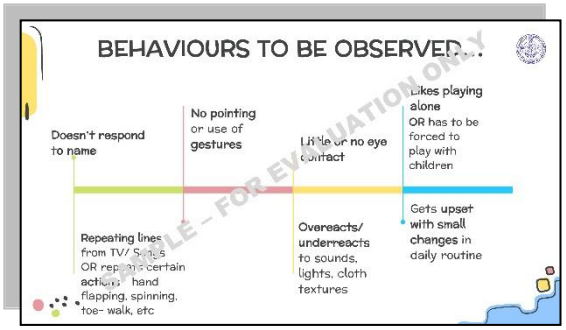
19.		Now, let us understand some early warning signs, or red flags, that may suggest the need for further screening for Autism Spectrum Disorder. In the area of communication, a child may not respond when their name is called, may show delayed speech, or may repeat lines from television or videos. Some children may also have difficulty using gestures, such as pointing, waving, or showing objects to others. In the area of social interaction, the child will be seen making very little eye contact, may prefer playing alone, or may show limited interest in people around them. They may not share toys, show objects, or try to involve others in their play. These signs need to be observed. In terms of behaviour, some children may show repetitive movements such as hand flapping, spinning, or rocking. They may line up toys repeatedly, become upset with small changes, or strongly prefer sameness in their daily routine. Some children may also show sensory differences. For example, they may overreact to sounds, lights, textures, touch, or certain clothes. They may also stare at lights, fans, or spinning objects for a long time. These are some of the red flags needed to be observed and reported if found consistent.

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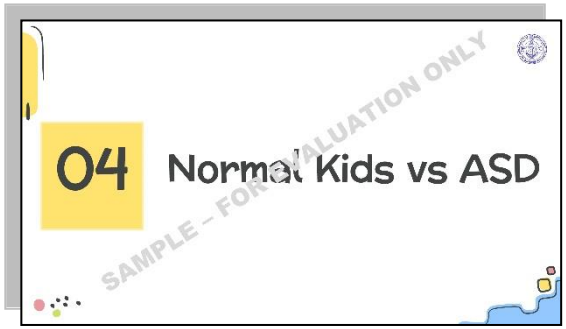
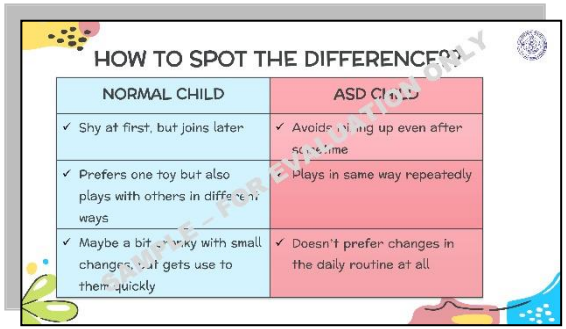
20.		Now, let's us compare ASD vs normal behaviour.
21.		Normal behaviours like shyness or liking one toy usually change with time. In ASD, the behaviours: Stay for long, Happen in many places and Affect social interaction.

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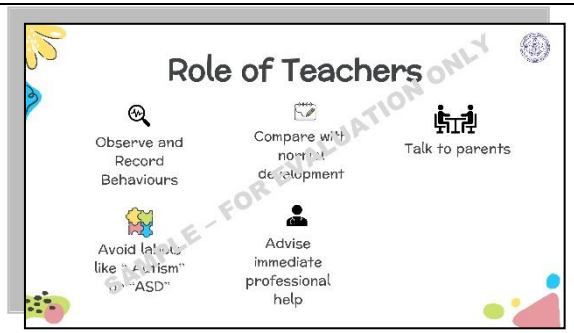
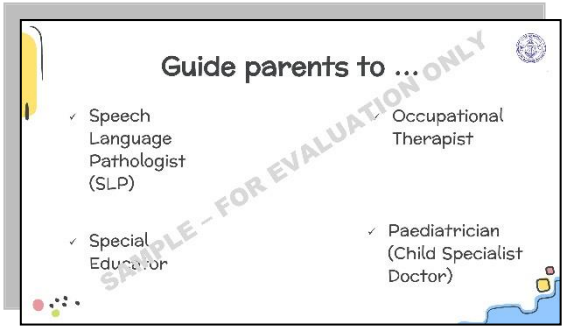
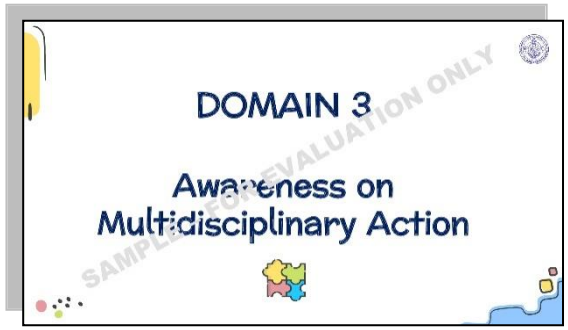
		Teachers should: Observe the child regularly, Compare skills with expected milestones, Talk to parents kindly using behaviour-based examples, Avoid saying "autism," focus on behaviour and guide parents to the right professionals. From 3 to 6 years, the brain develops quickly, children learn to talk fast, and preschool teachers are the ones who spend the most time with them.
21.		Referral Pathways: Teachers can suggest meeting: Speech-Language Therapist, Occupational Therapist, Special Educator and Pediatrician

Script for Domain 3 (Role of Multidisciplinary Action) (Link)

Slide No.	Content of the Slide	Audio Script for the Video
1.		In this next part, we will be learning about different specialists involved in treating a child with ASD.
2.		Let's find out what did Aarav's family do after that day's talk with Ms. Ramya. The very next day, Aarav's parents met a Speech-Language Pathologist (SLP).

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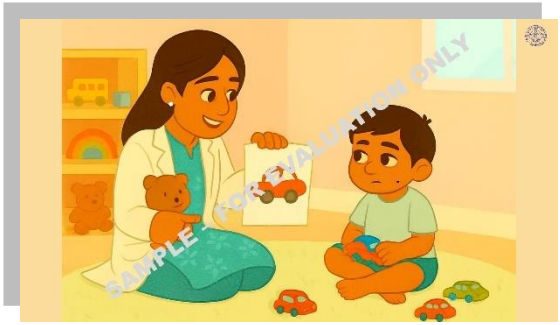
3.		In the first session, the SLP playfully engaged Aarav with cars, teddy bears, bubbles and whistles. He liked playing with cars and bubbles but didn't prefer playing with the teddy.
4.		He was quite scared and closed his ears tightly when the therapist blew the whistle; these behaviours indicated that he was quite sensitive to sounds.

Slide No.	Content of the Slide	Audio Script for the Video
5.		He had a fleeting eye contact and frequently kept looking at the ceiling without paying attention to what the SLP was asking him.
6.		Aarav's parents also revealed that Aarav is quite addicted to phones and would harm-himself if the phone was taken away highlighting the behavioural issues. The foremost guidance that the SLP gave to the parents was to reduce or, if possible, avoid the usage of screens.

Slide No.	Content of the Slide	Audio Script for the Video
7.		After administering a few tests, the SLP told the parents that, although Aarav is a three-year-old, his level of understanding and speaking abilities is comparable to that of a one-year-old. The SLP also diagnosed Aarav as 'Mild ASD'.
8.		The SLP also referred Aarav to the Occupational therapist for his sensory issues, to the Clinical Psychologist for his behavioural issues and to the Special Educator for any guidance that might be useful for the child's school-life. At the end, upon the advice of the SLP, Aarav's parents also visited a medico-social service officer in the government hospital.

Slide No.	Content of the Slide	Audio Script for the Video
9.		The SLP started working on building the vocabulary that Aarav would need in his daily life through use of exciting games and activities, flash cards, natural objects, etc.
10.		There were also instances where the SLP conducted group therapies where other children with similar problems were grouped.

Slide No.	Content of the Slide	Audio Script for the Video
11.		Meanwhile, the OT worked on regulating Aarav's sensory issues, helping him to tolerate loud classroom noises, and worked on improving his sitting tolerance.
12.		The Special Educator guided Aarav's parents regarding play-based learning and importance of group activities. She also explained the idea of inclusion making sure children of all abilities learn together in the same classroom. She assured Aarav's parents that inclusive classrooms help children feel accepted, learn social skills, and build confidence

Slide No.	Content of the Slide	Audio Script for the Video
13.		Within few weeks of consistent therapy, Aarav's parents started noticing improvements in Aarav's speech and level of understanding. They found that he has begun sitting for longer durations and his behaviours have reduced.
14.		Meanwhile, Aarav's preschool teacher, Ms. Ramya also coordinated with Aarav's parents and added similar activities in the class to supplement the therapy goals. For e.g., using visual schedules and allowing sensory breaks for Aarav.

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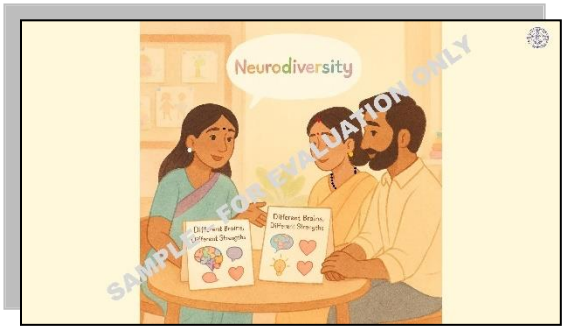
15.		On a fine day, she spoke to Aarav's parents, "Over the past few months, I have seen Aarav grow in so many ways. And I want to share something important with you. Every child's brain works in its own special way — and that is called *neurodiversity*. Children like Aarav are not 'less' or 'behind'. They simply learn, play, and communicate differently. When we understand this, we start seeing their strengths not just their difficulties. Aarav is curious, observant, and very eager to learn in his own style. With the right support, he will continue to shine."
16.		Over the next few months, Aarav began showing progress. His eye-contact improved. He began looking at his teacher more often .

Slide No.	Content of the Slide	Audio Script for the Video
17.		He also started using one -word or pointing to request items and help wherever required.
18.		Before we find out what happened to Aarav and his family let's know about the concept of multidisciplinary approach a little more.

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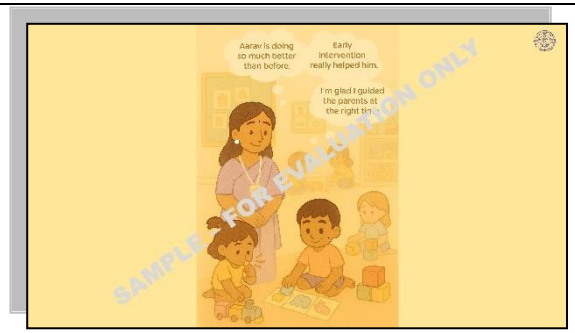
19.		When a teacher notices early signs of ASD, the first step is to guide the parents to meet professionals. ASD needs support in many areas, so one expert is not enough.
20.		What is a Multidisciplinary Approach? A Multidisciplinary Approach means many specialists working together as one team.They help the child in speaking, learning, behaviour, social skills, and daily routines. This gives complete support to the child.

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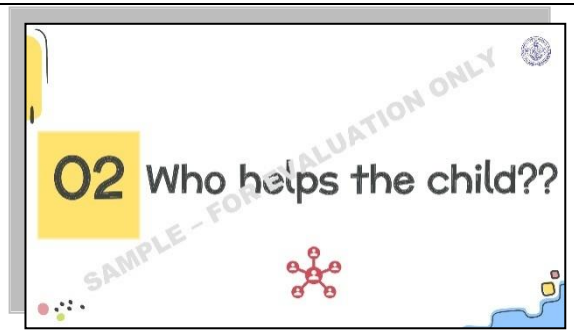
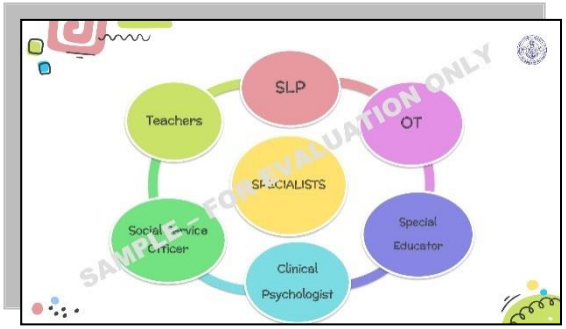
21.		Who Are the Professionals Involved? Many experts collaborate to support the child's growth. Each one has a special role.
22.		The specialists are: Speech Language Pathologist (SLP), Occupational Therapist (OT), Special Educator, Clinical Psychologist, Social Service Officer and Teachers.

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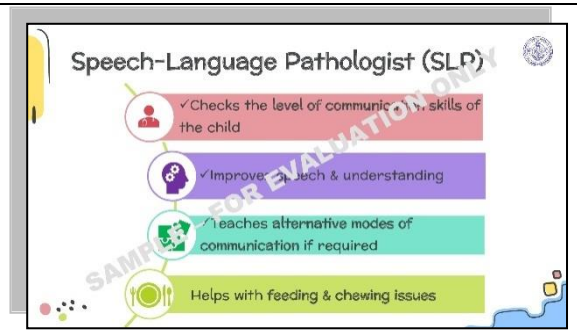
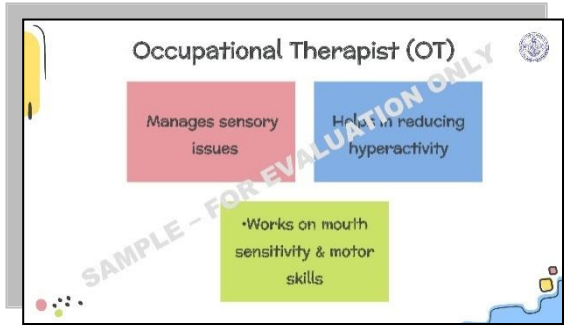
23.		SLPs checks the child's communication and help them develop the skills to talk, understand, and interact effectively. If a child speaks very little or not at all, SLPs teach alternative ways to communicate. They also help with feeding problems like picky eating or difficulty chewing.
24.		OTs work on the child's sensory issues, such as under- or over-sensitivity to clothes, sounds, light or touch. They help reduce behaviours like toe-walking or making loud sounds. They also support SLPs in improving the child's mouth movements.

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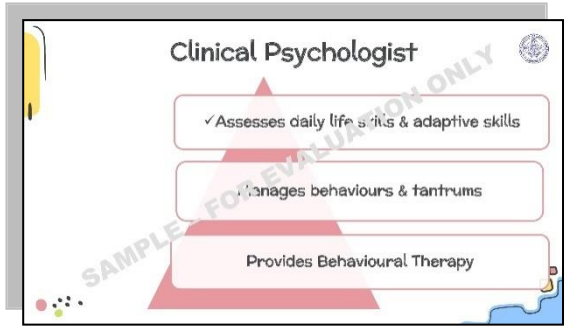
25.		Clinical Psychologists check how the child manages daily activities and routines. They also help reduce behaviour issues like tantrums or self-harm through therapy.
26.		Special Educators support learning and school skills. They use play, visuals, and step-by-step methods to help the child learn better. They also guide teachers on how to support the child in class.

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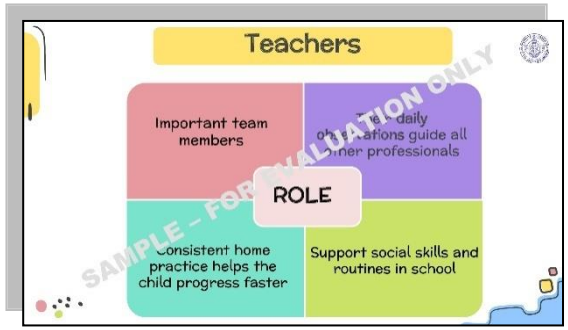
27.		Teachers are the most important team members. They observe the child every day. Their support at home and school helps the child improve faster.
28.		MSSOs guide families about government schemes, rights, and support services. They help parents get benefits from hospitals, schools, and NGOs.

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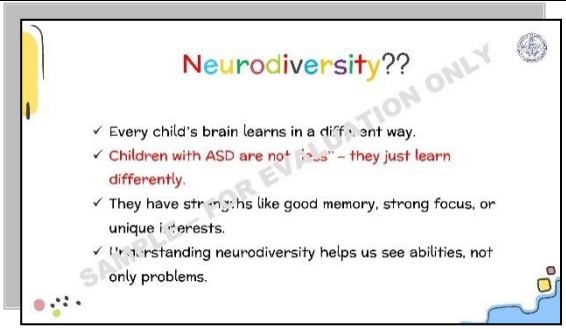
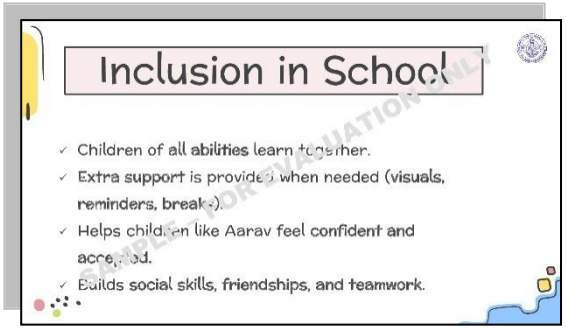
30.		Neurodiversity simply means that all children think, learn, and communicate in their own special way. Aarav processes the world differently, and that is okay. The brain of children with ASD works differently, and they may see details very sharply, remember things well, or think in creative ways. When teachers and parents understand neurodiversity, they stop comparing the child to others and start recognising their strengths. This positive view helps the child feel accepted and supported.
31.		Inclusion means that children with and without difficulties study in the same classroom. They learn together, play together, and support each other. Children like Aarav can also study in a regular school with small adjustments like visual schedules, sensory breaks, or extra help from the special educator. Inclusive classrooms make children feel that they belong. They learn social skills naturally, make friends, and become more confident. Inclusion benefits *all* children, not just those with ASD.

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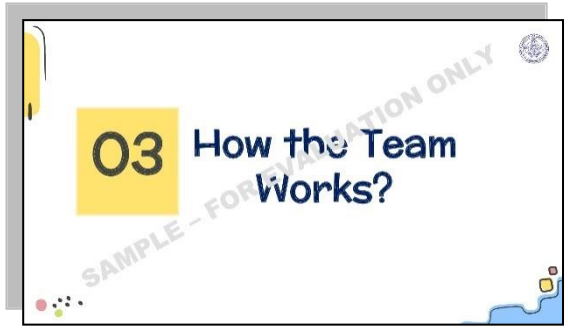
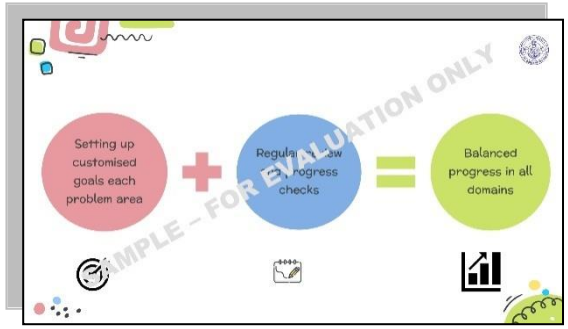
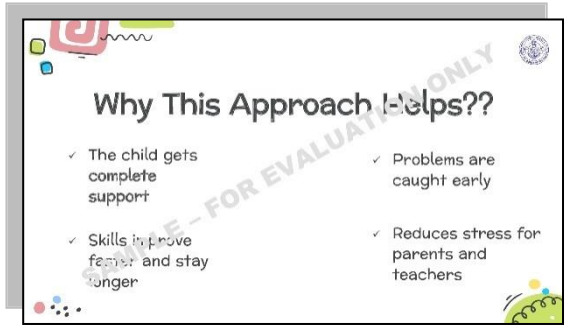
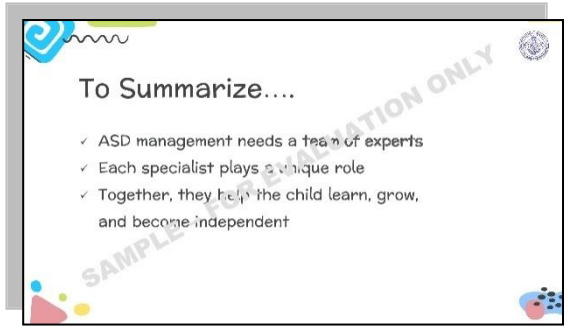
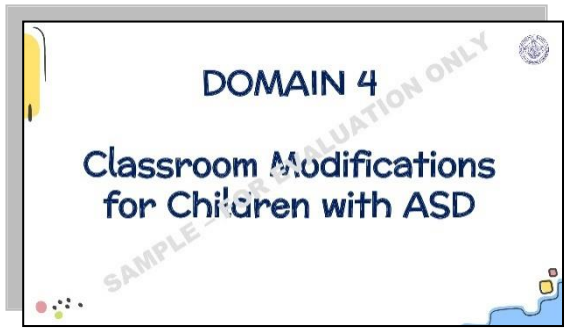
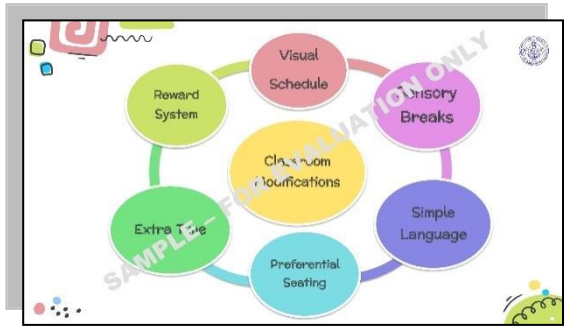
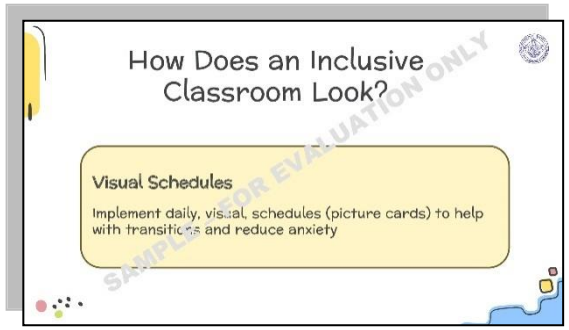
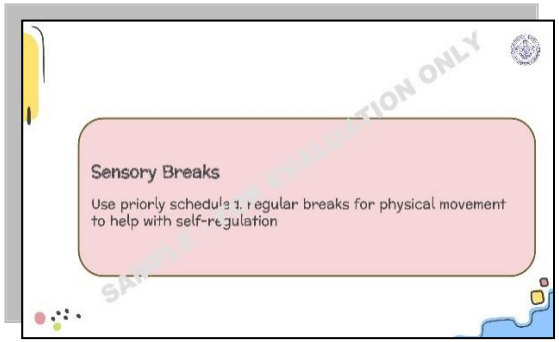
32.		Let’s get familiar with the way a team approach works.
33.		All professionals assess the child, set customised goals based on child’s requirements and track progress regularly and make the necessary changes based on the improvement level of the child. This teamwork helps the child in all areas not just speech.

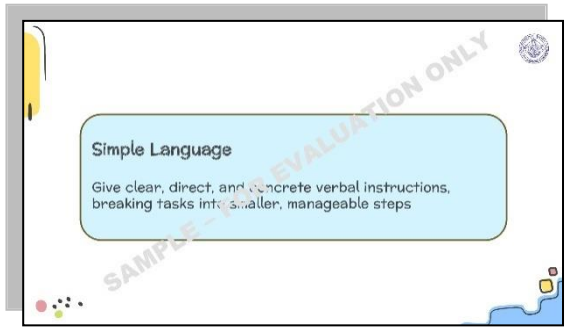
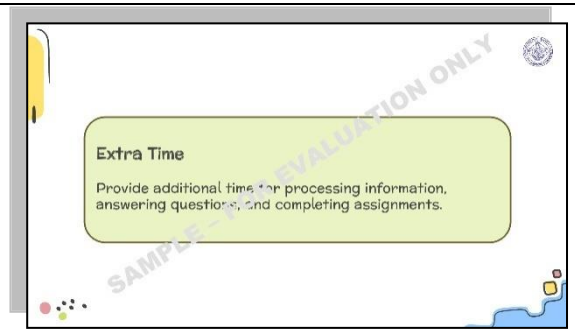
Slide No.	Content of the Slide	Audio Script for the Video
34.		Why This Approach Helps? It gives complete support to the child. Problems are caught early. Skills improve faster. Parents and teachers feel less stressed.
35.		To wrap up this domain, let’s do a quick recap of what we have learnt. Autism management needs a team. Each expert has a special role. When everyone works together, the child learns better, grows better, and becomes more independent.

Script for Domain 4 (Classroom Modifications for Children with ASD) (Link)

Slide No.	Content of the Slide	Audio Script for Video
1.		In this next topic, we will be looking at some classroom modifications suitable for children with ASD. An inclusive classroom begins with small but meaningful modifications that support the learning, communication, and sensory needs of children with ASD. Classroom modifications are small changes that are made to help children with ASD learn better. The second modification is that of including sensory breaks. But what are sensory breaks? The sensory breaks are short, planned pauses during the day that can help children regulate their sensory issues. They support attention, reduce overload, and help children return to learning calmly. The next modification.

Slide No.	Content of the Slide	Audio Script for Video
2.		Using visual schedules, sensory breaks, simple language, extra time, group setting arrangements, and rewards systems make the classroom more supportive and comfortable.
3.		The first modification can be of using visual schedules. These visual schedules use pictures or symbols to show children what activities will happen and in what order, helping them to understand routines and transitions.

Slide No.	Content of the Slide	Audio Script for Video
4.		In Arav's classroom, the teacher uses a visual schedule displayed on the wall with pictures showing the order of daily activities: prayer, rise, group activity, lunch break, dance sessions, etc., step by step. Before starting the day, the teacher shows Arav the visual schedule and explains the activity one by one. By looking at these pictures, Arav understands what is coming next, he feels more secure, and is able to move from one activity to another without distress. This visual schedule helps Aro reduce anxiety, follow his routines, and participate better in the classroom activities.
5.		The second modification is that of including sensory breaks. But what are sensory breaks? The sensory breaks are short, planned pauses during the day that can help children regulate their sensory issues. They support attention, reduce overload, and help children return to learning calmly.

Slide No.	Content of the Slide	Audio Script for Video
6.		Next modification is of using simpler language. Give short and direct instructions to the children. Children with ASD may find long or complex sentences difficult to understand. When teachers use simple words, one instruction at a time, and repeat if needed, they are better able to understand and follow the classroom activities.
7.		The third and an important modification can be providing extra time. Children with ASD may need extra time to process informatioGive short and direct instructions to the children. Children with ASD may find long or complex sentences difficult to understand. When teachers use simple words, one instruction at a time, and repeat if needed, they are better able to understand and follow the classroom activities and respond. Providing additional time reduces pressure and supports successful participation.

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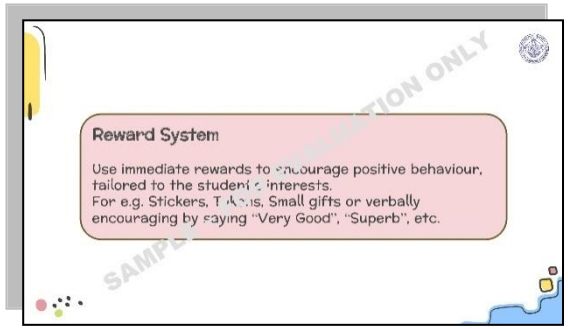
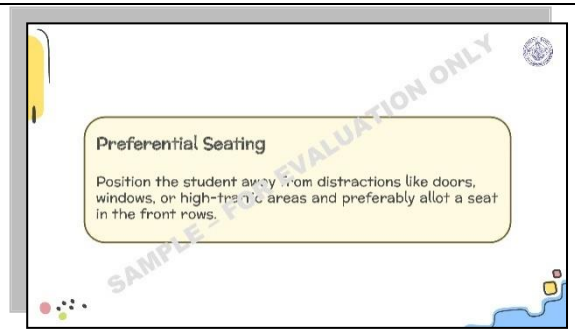
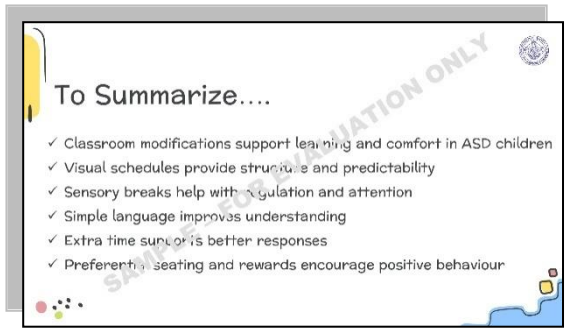
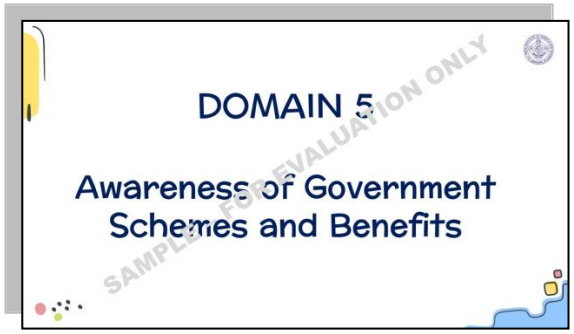
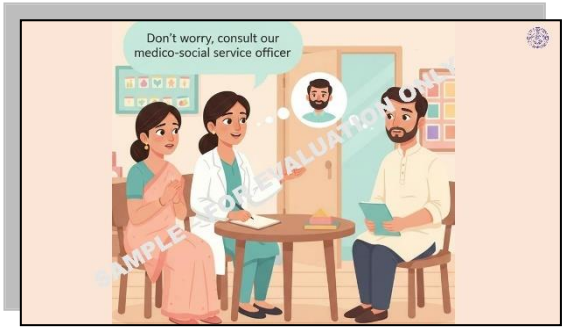
7.		Another modification can be that of including a reward or a reinforcement system. A reward system is basically using praises, tokens, or small gifts to encourage positive behavior. Consistent rewards help children learn desired skills and stay motivated.
8.		The next modification is that of preferential seating. It means placing a child in a seat that helps them stay calm and focused. For children with ASD, it is best to avoid seats near doors, windows, or busy walkways, as these areas can be distracting or noisy. A quiet seat, close to the teacher, helps the child pay attention, follow instructions, and feel more secure in the classroom.

Slide No.	Content of the Slide	Audio Script for Video
9.		To wrap up this domain, classroom modifications are small but important changes that support children with autism spectrum disorder. Using visual schedules, sensory breaks, simple language, extra time, and positive reward helps create a structured, calm, and inclusive classroom for learning.

Script for Domain 5 (Awareness of Government Schemes and Benefits) (Link)

Slide No.	Content of the Slide	Audio Script for Video
1.		Now is the time to know about different government schemes and benefits available for children with ASD.
2.		After meeting the SLP, OT, Clinical Psychologist, and Special Educator, Aarav's parents had a much clearer idea about his therapy needs.

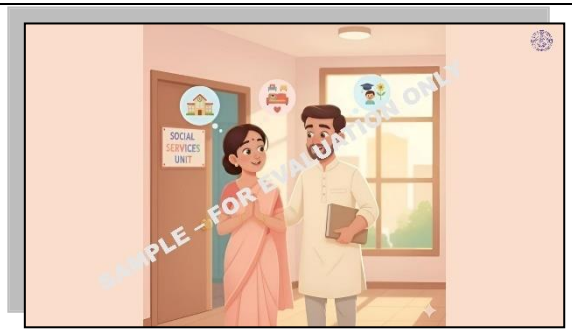
Slide No.	Content of the Slide	Audio Script for Video
3.		But they were still worried about how they would manage everything—transport, fees, follow-ups, therapy costs, and school support. On a fine day, the SLP gently said, "Please visit our Medico-Social Service Officer. He will guide you about the government schemes and benefits that can support Aarav."
4.		The next day, Aarav's parents reached the hospital's Social Services Unit. A small board outside the room read: "Medico-Social Service Officer - Guidance & Support." They looked at each other hopeful, yet nervous and took the next day's appointment. By now, Aarav's parents had also started understanding that autism is not something to 'fix', but something to support. Aarav's way of thinking was simply part of neurodiversity, and the goal was to help him thrive through acceptance and the right support systems.

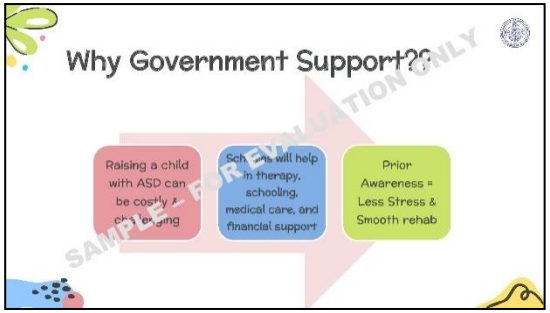
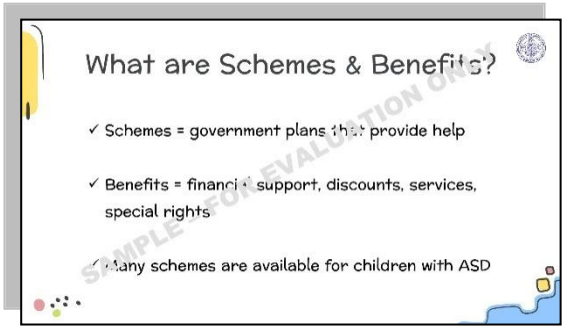
Slide No.	Content of the Slide	Audio Script for Video
5.		On the next day, as they entered the Medico-Social Service Officer – Mr. Manish welcomed them with a warm smile and asked them to sit. "Please don't worry. You have already taken the most important step by starting early intervention. Along with therapy, the government provides many supports to help children like Aarav." Aarav's parents leaned a little forward, listening carefully. This was the first time someone was explaining this part clearly.
6.		Mr. Manish then took out a sample UDID Card (Unique Disability ID Card) and placed it gently on the table. "This is the first step. Once Aarav gets this card: His diagnosis is officially recognised by the government. You don't have to carry big files everywhere everything becomes digital" while you apply for availing the benefits. He showed them a simple pamphlet on UDID with steps to apply both online and offline. Aarav's mother nodded slowly, "We didn't know about this… thank you".

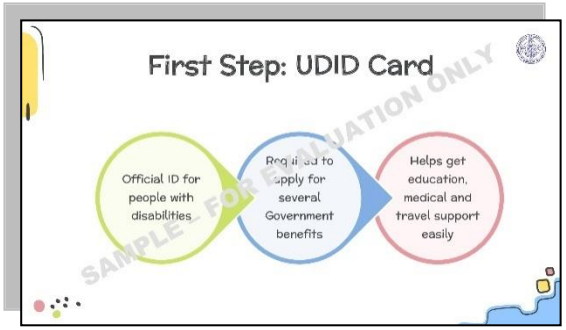
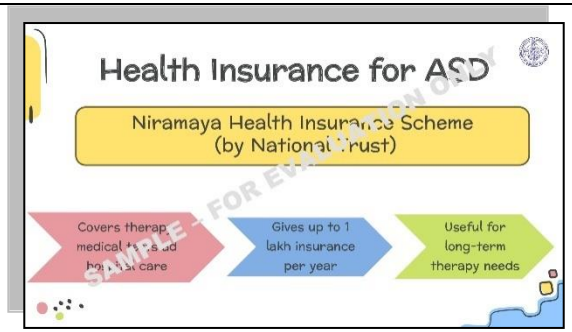
Slide No.	Content of the Slide	Audio Script for Video
7.		The officer then showed a colourful chart with icons for hospital, therapy, and medicines and said, “It was the Niramay Health Insurance Scheme. It helps with therapy expenses, consultations, and medical care. It is one of the most helpful supports for families.” The parents looked visibly relieved.
8.		The officer continued gently. “Aarav will also be eligible for travel concession in trains and state buses. Whenever you travel for therapy or hospital visits, your travel cost becomes very low.” Aarav’s father said quietly, “This will really help us. We travel so often now for his various therapies.”

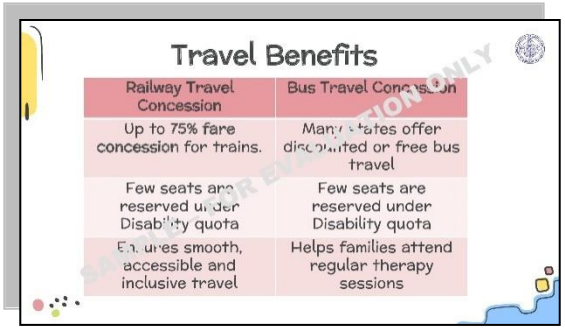
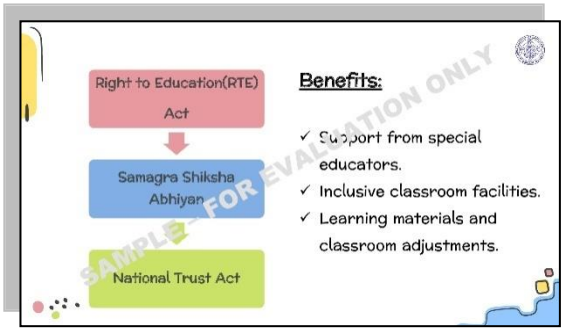
Slide No.	Content of the Slide	Audio Script for Video
10.		Mr. Manish then took out another sheet showing a classroom icon and continued further, “Under *Samagra Shiksha Abhiyan*, schools get support to include children with ASD. Aarav has the right to study in a regular school with the help he needs special educator support, classroom adjustments, and learning materials. He further explained that this is part of inclusive education, where schools welcome all children with or without disabilities and provide support so everyone can learn together.” Aarav’s mother smiled for the first time. “The special educator had told us about the inclusive education, but we weren’t sure if it would be possible. We wanted him to study in a normal school…”. The officer gave a confirming nod. /

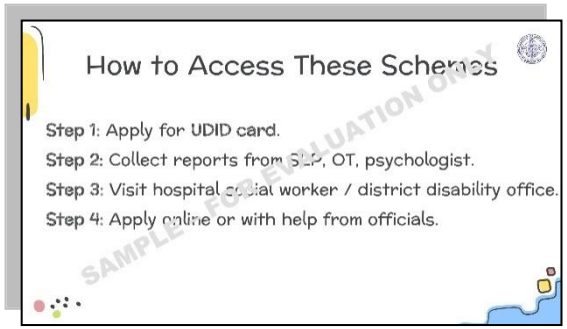
Slide No.	Content of the Slide	Audio Script for Video
11.		The officer further explained the education scholarships: The scholarship includes, support for school fees, books and learning materials. It also includes transport allowance and special education support in normal schools. The MSSO continued: “These scholarships and support schemes ensure that children continue schooling without financial difficulty.”
12.		After explaining all the benefits and steps to apply, the officer looked at the parents kindly. MSSO:“You are not alone. There is plenty of support available.We will help you get every benefit Aarav is eligible for.” Aarav’s mother: “We didn’t know so much help existed. Thank you for explaining everything so clearly.” Aarav’s father: “We feel much more confident now.”

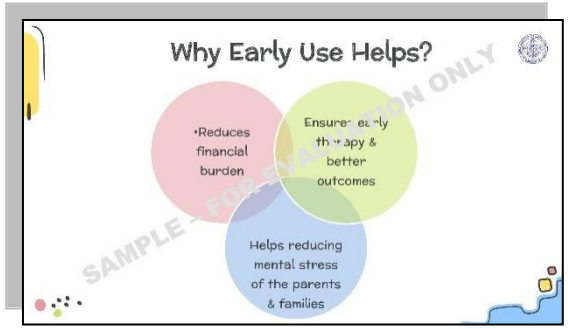
Slide No.	Content of the Slide	Audio Script for Video
13.		Aarav's parents walked out of the Social Services Unit feeling lighter and more hopeful. They now knew that—with therapy, school support, and government schemes—Aarav's future was secure, supported, and full of possibilities.
14.		Let's know why government support matters?

Slide No.	Content of the Slide	Audio Script for Video
15.		Government help reduces the pressure on families. It provides money support, learning support, travel benefits, and health services. This makes education and therapy easier to access.
16.		What Are Schemes & Benefits? Schemes are government plans made to support people. Benefits are the help you get from these schemes (money, discounts, services). For children with ASD, these schemes make therapy, travel, education and health care easier.

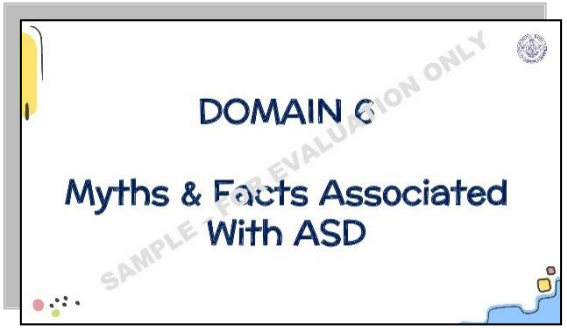
Slide No.	Content of the Slide	Audio Script for Video
17.		First Step: The UDID Card (Unique Disability ID Card) is the most important first step. It is an ID card for people with disabilities. With this card, families can apply for all other government schemes easily. What UDID Card Gives? It give a proof of disability, provides access to government benefits, easy application for school support, travel concessions, and health schemes. It is like a special pass that opens the door to many services.
18.		Niramaya Health Insurance Scheme: This health insurance is specially for children with disabilities, including Autism. It covers therapy, check-ups, and some medical needs and basically it reduces the cost of treatment.

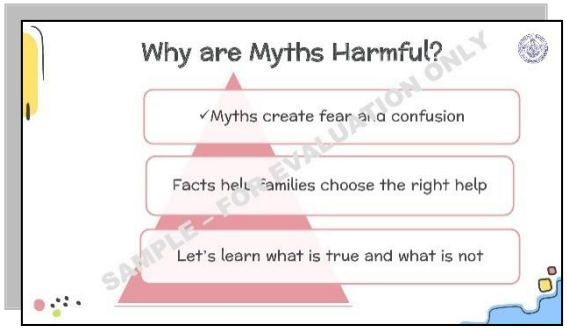
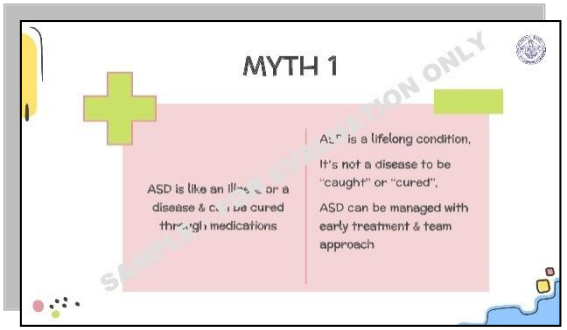
Slide No.	Content of the Slide	Audio Script for Video
19.		Travel Concessions: With a disability certificate or UDID card, children with ASD get: Reduced train/air ticket prices and free travel for one parent in many train categories This helps families travel for therapy or school without high costs.
20.		Moving forward to the education support. The Samagra Shiksha Abhiyan scheme supports children with special needs in school. Benefits include: Support from special educators, classroom accommodations and learning materials. This helps the child learn comfortably in school. The other supports families can access are :Scholarships for children with disabilities, Financial help from NGOs, Therapy services in government hospitals. Families should connect with the hospital Social Service Officer to know all available help.

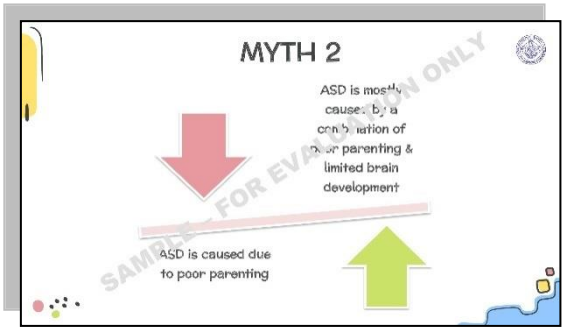
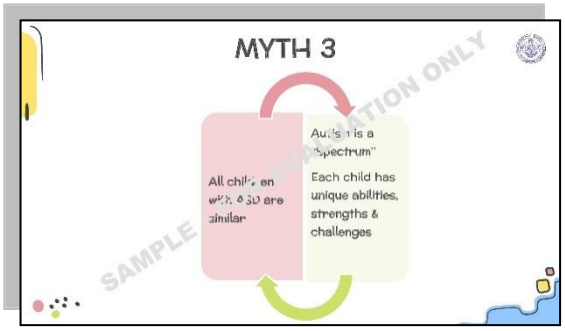
Slide No.	Content of the Slide	Audio Script for Video
21.		How to Access These Schemes? 1. Apply for UDID card 2. Collect reports from SLP, OT, psychologist 3. Visit the Medico-Social Worker or district disability office 4. Submit forms online or with the officer's help These steps make the process simple and clear.
22.		This slide holds the website links for the discussed schemes and benefits provided by the Government of India for children of ASD and their families.

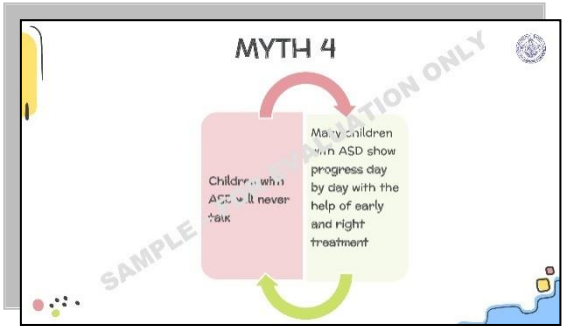
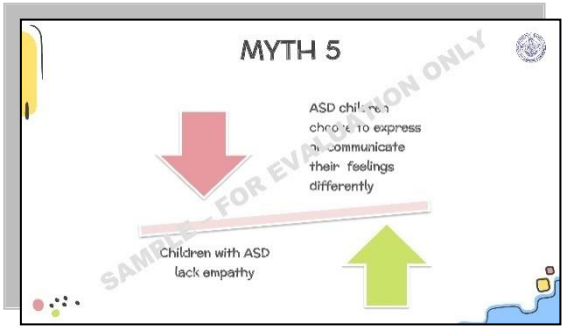
Slide No.	Content of the Slide	Audio Script for Video
23.		Why Early Use Helps? Using these schemes early reduces stress for families. It also gives children the right help at the right time improving learning, behaviour, and daily life. To sum up : Government support can make a big difference. When families know their rights, children get better opportunities.

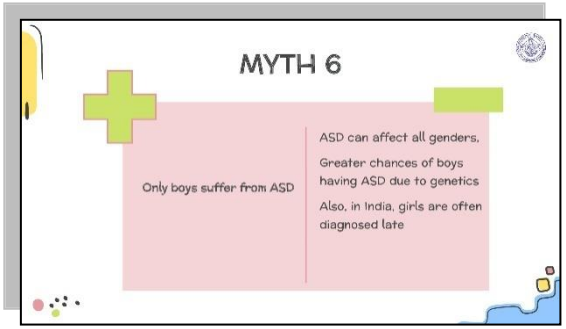
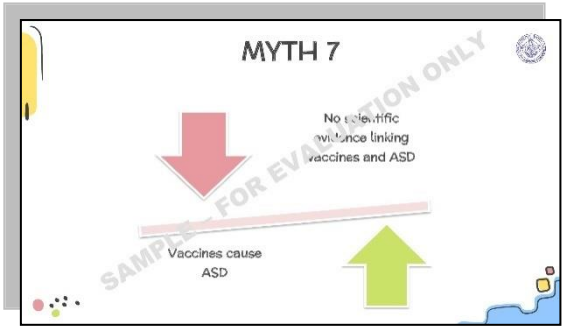
Script for Domain 6 (Myths and Facts associated with ASD) (Link)

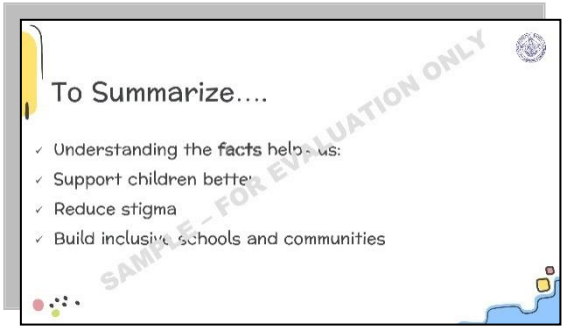
Slide No.	Content of the Slide	Audio Script for the Video
1.		In this final domain, we will explore some common myths and misconceptions about Autism.
2		Knowing the truth helps us support children like Aarav better.

Slide No.	Content of the Slide	Audio Script for the Video
3.		Why Are Myths Harmful? Many people believe things about ASD that are not true. These wrong beliefs can: Create fear or stigma, Delay early help, and Make families feel guilty or confused. So, it is important to learn the facts.
4.		The first myth is that ASD is a disease and can be cured through medications This is not true. ASD is not a disease. It is a developmental difference in how the brain works. There is no "cure" in form of medicines, but children improve a lot with early therapy and support.

Slide No.	Content of the Slide	Audio Script for the Video
5.		The second myth says that ASD is caused by poor parenting. This is completely false. ASD is not caused by parenting style. It happens because of brain development differences, often linked to genetics. Parents are never responsible for causing ASD.
6.		The third myth says that all autistic children are the same. ASD is a spectrum, which means every child is different. Some children talk a lot, some talk less. Some learn quickly, some need extra time. Each child has unique strengths and challenges.

Slide No.	Content of the Slide	Audio Script for the Video
7.		Myth 4- Children with ASD never talk or learn. This is not true. Many children with ASD learn to talk, communicate, read, write, and do well in school. Early intervention helps children reach their best potential.
8.		The next commonly heard myth is, children with ASD don't have feelings. This myth is hurtful and wrong. Children with Autism feel emotions like love, joy, sadness, frustration just like everyone else. They may express it differently, but they do feel and care.

Slide No.	Content of the Slide	Audio Script for the Video
9.		The 6th myth is that only boys have ASD. No, ASD can happen to any gender. It is sometimes easier to notice in boys, but many girls and other genders also have ASD. Girls often mask their behaviours, so they might get diagnosed late
10.		The last myth that we are going to discuss is that Vaccines cause Autism. This is a completely debunked myth. Research from all over the world shows no link between vaccines and Autism. Vaccines are safe and protect children.

Slide No.	Content of the Slide	Audio Script for the Video
11.		To summarize the last domain; Autism is a developmental difference, not a disease. It is not caused by parents. Every child is unique. Children with Autism can learn and grow. Early support makes a big difference. Facts help us reduce stigma and build inclusive classrooms. This brings us to the end of this E-Module. Hope you found it informative.

Appendix II

Pre-test and Post-test Questionnaire

Participant No.:

Date:

Contact No.:

Name:

Age/Sex:

Section I: Causes and Characteristics of ASD

1. Autism Spectrum Disorder (ASD) is best described as a:

A. Mental illness
B. Neurodevelopmental condition
C. Hyperactivity disorder
D. Learning disability

2. What do you think is the cause of Autism Spectrum Disorder?

A. Medication
B. Genetics
C. Vaccines
D. Birth defects

3. The term "Spectrum" in Autism Spectrum Disorder refers to:

A. Age of onset
B. Intellectual level only
C. Severity and variety of symptoms
D. Type of schooling

4. Autism Spectrum Disorder mainly affects:

A. Physical growth
B. Communication, social interaction, and behaviour
C. Vision and hearing
D. Motor strength

5. Which one is not true for Autism Spectrum Disorder?

A. The child has delayed response to name call
B. The child prefers playing alone
C. Medications help in treating ASD
D. The child has behavioural issues

Section II: Screening Children for ASD

6. Poor peer interaction in preschool may indicate:

A. Normal shy behaviour
B. Social communication difficulty
C. High independence
D. Advanced maturity

7. Repetitive spinning of objects is:

A. Symbolic play
B. Sensory-seeking behaviour
C. Cooperative play
D. Typical curiosity

9. Poor eye contact in Autism Spectrum Disorder is mainly related to:

A. Visual impairment
B. Social communication difficulty
C. Laziness
D. Disobedience

10. Lack of response to name by 12 months is a:

A. Typical behaviour
B. Red flag for Autism Spectrum Disorder
C. Hearing issue only
D. Attention-seeking behaviour

Section III: Awareness of Multidisciplinary Action

11. Multidisciplinary approach means:

A. One professional
B. Team collaboration
C. Parent-only care
D. School-only care

12. Who diagnoses Autism Spectrum Disorder?

A. Physiotherapist
B. Speech-Language Pathologist
C. ENT specialist
D. General Physician

13. Referral should be made when:

A. Child misbehaves once
B. Persistent developmental concerns exist
C. Parents request labels
D. Exams approach

14. If a child is called neurodivergent, it means:

A. The child is not smart
B. The child's brain works in a different but valid way
C. The child cannot go to school
D. The child is misbehaving on purpose

15. Referral does not mean:

A. Labelling
B. Seeking support
C. Helping the child
D. Collaboration

16. How can teachers promote inclusivity in school?

A. By educating peers about diversity and encouraging acceptance
B. By isolating the child from group activities
C. By allowing the child to skip school events
D. By limiting interaction with parents and professionals

17. If a child exhibits sensory issues such as avoiding loud noises (traffic, classroom noises) or liking loud noises, consultation should be sought from a:

A. Behavioural Therapist
B. Speech-Language Pathologist
C. Occupational Therapist
D. General Physician

18. Which professional helps in making learning easier for children with Autism Spectrum Disorder in school?

A. Special Educator
B. Teacher
C. Speech-Language Pathologist
D. Neurologist

Section IV: Classroom Modifications for Children with ASD

19. A teacher can help a child with Autism Spectrum Disorder deal with loud or distracting noises by:

A. Giving the child ear plugs
B. Ignoring the child's needs
C. Allotting a seat away from noise
D. None of the above

20. Teachers can support sensory needs by:

A. Creating supportive environments (sensory breaks)
B. Forcing tolerance
C. Avoiding activities
D. Using punishment

21. Inclusive classrooms promote:

A. Segregation
B. Participation of all children
C. Uniform teaching
D. Silence

22. Visual schedules help by:

A. Increasing confusion
B. Providing predictability
C. Reducing independence
D. Limiting communication

23. Giving extra time to a child with Autism Spectrum Disorder for answering questions will lead to:

A. Child getting distracted
B. Child forgetting the question
C. Higher chances of correct response
D. Wastage of time

Section V: Awareness of Government Schemes and Benefits

24. Where can parents apply for a UDID card?

A. In private hospitals
B. In schools
C. Online or at government hospitals
D. At NGO centers

25. The disability certificate is useful when applying for:

A. Insurance plans
B. UDID card, pensions, travel concessions, and reservations in education and jobs
C. School admissions only
D. Private tuitions

26. The main aim of Samagra Shiksha Abhiyan is to:

A. Promote competitive exams
B. Provide inclusive and equitable quality education
C. Train only special educators
D. Support higher education only

27. Government welfare schemes for children with Autism Spectrum Disorder may include:

A. Tax benefits and pensions
B. Only hospital care
C. School punishment exemptions
D. Sports scholarships only

28. Niramaya scheme covers expenses related to:

A. Only emergency surgeries
B. Health care, including OPD services and therapies
C. School fees
D. Travel costs only

Section VI: Myths and Facts Associated with ASD

29. Autism Spectrum Disorder can be completely cured. Is it true or false?

A. True
B. False

30. Use of visual aids or gestures can stop a child from speaking.

A. True
B. False
31. The belief that Autism Spectrum Disorder is caused by vaccines is:

A. Scientifically proven
B. A common misconception
C. Supported by WHO
D. A diagnostic criterion

32. The assumption that Autism Spectrum Disorder affects only boys is:

A. Correct
B. A misconception
C. A diagnostic requirement
D. Always true

33. The belief that children with Autism Spectrum Disorder prefer to be alone is:

A. Completely true
B. A misunderstanding of social communication challenges
C. A diagnostic rule
D. Applicable to all children

34. Which of the following is a common myth about Autism Spectrum Disorder?

A. Autism Spectrum Disorder is a neurodevelopmental condition
B. Autism Spectrum Disorder affects social communication
C. Autism Spectrum Disorder is caused by poor parenting
D. Autism Spectrum Disorder presents differently in each child