NICE | 8th Annual Conference on AUTISM

AUTCON 2024

CONNECTING THE DOTS

March 24, 2024

Vestin Park Hotel
Egmore, Chennai

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FOREWORD

Dear Patrons,

I extend my heartfelt thanks to all the delegates who graced our conference with their presence. Your participation not only enriched the discourse but also added vibrancy to the intellectual atmosphere of the event.

NICE takes great pride in having hosted this groundbreaking multi-city hub conference, the first of its kind, which has undoubtedly been a resounding success. The convergence of minds from diverse backgrounds has fostered invaluable learning experiences, transcending geographical boundaries and enriching our collective knowledge base.

I invite you all to immerse yourselves in the pages of this informative souvenir, which encapsulates the essence of our shared experience and experiential thoughts from expert contributors.

Once again, I extend my sincerest gratitude to each and every one of you for your invaluable contributions and unwavering commitment to advancing knowledge and innovation.

Dr. Subramanian

Director

NICE

NICE | 8th Annual Conference on AUTISM

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EDITORIAL

Dear Readers.

We are delighted to meet you all with the editorial of our prestigious **AUTCON**, 8th annual conference on Autism with a theme of connecting the dots which emphasizes on prenatal events, comorbidities of autism and the mimics.

As it is said "**Efficiency is doing better what is already being done**" our conference is always striving to improve, introduce new and innovative strategies for the audience from diverse sectors involving paediatricians, rehab professionals and people working with children and young adults in the autism spectrum.

This souvenir has excellent articles on providing expert view on advantages and disadvantages in early detection of Autism, significance and added weightage of timely intervention to prevent and decrease neurodisabilty in preterm and high-risk babies in NICU, a prospective viewpoint of using animal assisted intervention in Autism , empowering parents with finer techniques of engaging children based on parents learning style and approach and insight on understanding overlapping features of comorbidities in Autism .

Let us spread the knowledge on upgraded and latest advancement in promoting early childhood development to all and we eagerly look forward to your valuable inputs and continuous support .

Thank you

Dr. Naveena Karthik

Consultant Developmental Pediatrician

Nishta Integrated Neuro Development Centre

8th ANNUAL AUTCON (by NICE), CHENNAI

A report by **Smruthi Sivakumar**
Behavioral Therapist and Special Educator, Nishta Centre

This year saw the 8th edition of AUTCON – an autism focused conference organized by NICE (Nishta Center for Excellence) held at Vestin Park Hotel on 24th March 2024. To expand the spread the knowledge, this year AUTCON stepped up by including multi-city participation – including clinics like Ramana Rehab Center from Trichy, Threysol Solutions from Hosur and Ashay Centre from Ahmedabad. The conference was screened across these cities, with 2- way interactive, cross-city participation from all these centers and their audiences by sharing their experiences and knowledge. This collaborative multicity centered set-up of the conference helped to educate on the localized issues aiding increased awareness on autism care in the Indian context.

The event was inaugurated by the honorable chief guest who graced the occasion – Dr. Lakshmi Velmurugan, President of IAPCCB (Indian Academy of Pediatrics Chennai City Branch).

Mr. Rengarajan, CFO of Kanchi Kamakoti Child's Trust Hospital and Dr. Janani, Managing Director of Kanchi Kamakoti Child's Trust hospital – honored the event with their presence as the guests of honor. The event was inaugurated followed by a talk by Dr. Subramanian, Director of NICE – on what is AUTCON and how it helped connect the dots, by connecting the various stakeholders in autism care.

The first morning session included interesting talks on perinatal factors, maternal health and autism risk in them by Dr. Deepthi Jammi, Obstetrician and Fetal Medicine expert followed by Dr. Gauri Krishna (Pedicatrician and Clinical Genetics expert) sharing her knowledge through a talk on genetic testing and diagnosis in autism. The talks were followed by an enriching discussion and question and answer session throughout the multiple centers. Talks related to epilepsy in autism (by Dr. Subramanian) and early detection and intervention of this epilepsy in autistic population was given by Dr. Ranjith Kumar Manokran, pediatric neurologist and epileptologist.

Following this was a discussion on the multicenter experience and a talk on models of delivery of care in autism in the Indian context given by Dr. Shabina Ahmed, a developmental pediatrician. She talked about the varied models of this care delivery in the Indian diaspora and highlighted the success and factors behind it. Followed by discussions on this, was a talk on AAC in autism by Dr. Krupa Murugesan, a speech language pathologist, emphasizing on the need for our way of communication to be augmented. Continuing with this theme, Dr. Anil Krishnaiah, pediatric intensivist and digital health expert from the UK, talked about using assistive technology in communication in differently abled population. The talk included an

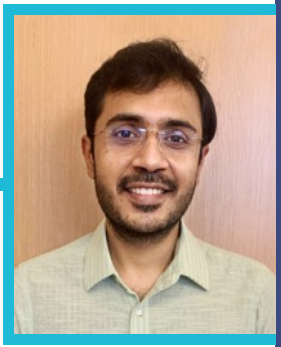
eye-opening anecdote of a young girl with cerebral palsy, who communicated verbally through eye-gazing technology. This provided an encouraging future to look forward to in India, hoping for such technologies to be implemented to aid our population too.

Parallel to these engaging talks were paper presentations and infographic poster presentation – by various budding students and professionals in the field related to autism. Students and professionals from various states shared their interest and new-found knowledge and engaged in an eye-opening discussion with the judges' panel – who gave them valuable feedback to take away along with great encouragement to keep delving more into the field of autism in India and increase its knowledge and research foundation

After breaking for lunch, Dr. Amola B Patel talked about the role of physical activity in autistic population. Following this important talk, a case-based approach – Autism Mimics" was presented by developmental pediatricians Dr. A Somasundaram, Dr. Sudhakar P and developmental and behavioral pediatrics fellow Dr. Rathi Sharmila. This session moderated by Dr. Subramanian was a true opener, throwing light on mimics that seem like autism and how differential diagnoses can impact a child, through case based discussions. A talk on food allergy in autism was given by Dr. Ashutosh Sinha, pediatric intensivist and allergist from Fortis Health New Delhi, explaining the food allergies, habits and gut-brain axis in autistic population. A multicenter discussion on this was concluded by the final talk by Mr. Hariharan, head of mental health at Smrthi Healthcare and Dr. Deepa Sundareshwaran, principal of occupation therapy at MAHER. Their talk included ways to synthesize behavioral techniques in everyday life, delving deep into the strategies and concepts that are needed to implement it.

The event concluded with a prize distribution to the winners of paper and poster presentations and was graced by Dr. Rupa Nagarajan, Dean of Sri Ramachandra University providing her valuable inputs and knowledge to the sessions. This year's AUTCON was an overall success with a full-house in Chennai and enthusiastic participation from the other city hubs to further spread awareness and improve knowledge about autism.

Diagnosis of Autism Spectrum Disorder (ASD) before 2 years



Dr. Venkateswaran

Consultant Psychiatrist, Department of Child and Adolescent Psychiatry
Kanchi Kamakoti Child Trust Hospital

According to the latest CDC reports ASD is a neurodevelopmental disorder that affects 1 in 36 children. It causes significant morbidity in affected children and places a considerable burden on caregivers, leading to parental grief. As per available literature, there is no permanent cure. However, with early identification and initiation of intervention, we can significantly improve the outcome.

Who is at risk?

If we could identify vulnerable children and conduct regular developmental screening, we can detect ASD early. Children who have a family history of ASD, other developmental disorders like ADHD, psychiatric disorders in the family, antenatal complications, perinatal complications, early onset of meningoencephalitis, chronic illness, seizures, and any developmental delays are at risk for ASD. Therefore, pediatricians should have a high index of suspicion.

Early signs of ASD

Early signs usually appear between 1-2 years.

They can have social/communication deficits in the form of poor social reciprocity, poor nonverbal skills, and less age-appropriate play.

Poor social-emotional reciprocity includes

1. Not consistently responding to their names being called, (may respond only when there is a need)
2. Rarely points to or hold up objects to show you things (e.g. sharing interesting toys with the parents)
3. Not consistently smiling back at you or at other familiar members when smiled at.
4. Having difficulty understanding simple, one-step instructions of a 1-2 years old – for example, 'Show me the dog'.

Poor nonverbal gestures include

1. Not consistently using eye contact to get someone's attention – for example, they might not always look at you but then look at a snack to indicate they want it.
2. Not looking back towards you when they see something that excites them.

3. Not consistently using gestures on their own – for example, they might not wave bye-bye or clap without being asked to or they might not nod for "Yes" or shake their head for "No".

Lack of age-appropriate play includes

1. Rarely imitating other people's actions like combing their hair when someone else does.
2. Not sounding like they are having a conversation with you when they babble, or not babbling at all.
3. Poor interactive play with parents and known caregivers.
4. Lack of interaction with other children is not usually taken as a symptom in very young children.

Among criteria 2 symptoms, children less than 2 years can express motor stereotypes like flapping, toe walking, visual stimming, spinning, rocking, and running in circle. Usually, echolalia is not seen in this age group except for children with normal language development. However, they can have random-primitive vocalization. They will have sensory issues including aversion to sounds, picky eating and in getting introduced to various textures as well as walking in various surfaces.

Rigid behaviours and stereotypical interests are observed in some children with normal development as well as those with ASD.

Biological basis of very early intervention

Research indicates that genes and the environment continuously interact to influence the development of the brain, including increased myelination, synaptic growth, neural circuit formation, cell migration, pruning, and metabolic capacity. Different areas of the brain mature at varying rates, reflected in their developmental unfolding of specific behaviours and abilities over time.

Children with ASD, may have a specific deficit in their early interest in and attention to social stimuli, which becomes apparent in the second half of the first year of life. Deficiencies in social attention have been hypothesized to be related to difficulties in forming representations of the reward value of social stimuli, leading to a social motivational deficit.

An early lack of social attention and engagement with others may compromise the process of cortical specialization and the development of neural networks, resulting in neuron abundance, abnormal connectivity, and atypical synaptic synchronization. The interplay between the brain and behaviours leading to a poor neural synchronization in

young children with ASD may be related to the severity of early behavioural symptoms.

Thus, with the above biological basis, identifying children in vulnerable age and improving their social stimulation will lead to very good outcomes.

Screening tools available for children below 2 years

Communication and Symbolic Behaviour Scales (CSBS)

Modified Checklist for Autism in Toddlers (MCHAT)

Autism Diagnosis and Observation Schedule (ADOS) is a gold standard diagnosis available for children as early as one year.

Advantages of early diagnosis

It includes very early initiation of therapy leading to a good clinical outcome. Vulnerable children, when they are placed in a less stimulating environment such as exposure to gadgets and reduced playtime, have an increased chance of manifestation of symptoms. Therefore, adequate or intense stimulation at a very early age can lead to optimal outcome by 3 to 4 years.

Disadvantages

The chance of misdiagnosis is high, as a child will developmental delay can be diagnosed as ASD, leading to parental grief and significant emotional trauma to the family.

However, considering the benefits of early initiation of therapy and impact of long-term outcomes, a high index of clinical suspicion and start of therapy, rather than waiting for proper diagnosis is strongly recommended.

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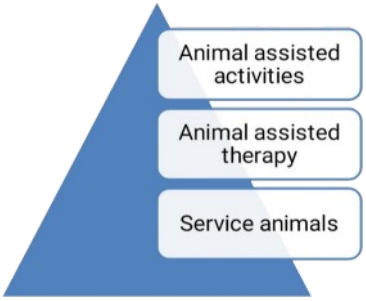
Redefining Treatment Paradigms

OCCUPATIONAL THERAPY INCORPORATING ANIMALS IN CHILDREN WITH AUTISM SPECTRUM DISORDER

Aarthi R.
Occupational Therapist.

Humans have kept domesticated animals for thousands of years, providing companionship. The use of animals in therapy can be traced back to the last century. Freud, the founder of psychoanalysis, was one of the first therapists to introduce his pet dog into therapy sessions. During these sessions, he found that patients were more willing to communicate because of the presence of his pet (VanFleet and Faa-Thompson, 2014).

The American Veterinary Medical Association (AVMA) uses the umbrella term animal-assisted interventions (AAI), for which animals are purposefully used as a part of the therapeutic process. AAI includes animal-assisted activities (AAA), animal-assisted therapy (AAT), and service animal programs (SAP) (Calcaterra et al., 2015).



Occupational therapists use animals in conjunction with standard occupational therapy interventions. The therapist will determine the specific goals that will be achieved in AAT after completing an evaluation on the client (Poleshuck, 1997). AAT is used to assist individuals with physical, social, emotional, or cognitive disabilities. As in the standard occupational therapy process, when utilizing AAT, the OT will have stated client-centered goals, and sessions will be formally documented after each appointment (Goddard & Gilmer, 2015).

Approaches to OT intervention using AAT may include promotion, remediation or restoration, maintenance, and prevention (AOTA, 2014). A reflection on the information above demonstrates how pediatric occupational therapists can conduct AAT as a modality to facilitate the development of skills needed by the child to achieve independent functioning in occupations such as activities of daily living, instrumental activities of daily living, education, work, play, leisure, and social participation (AOTA, 2014). In OT, AAT is considered a purposeful activity; it is selected to support the development of performance patterns to enhance occupational engagement (AOTA, 2014).

Animal-assisted therapy and occupational therapy have similar goals such as improving attention skills, social skills, participation in play, self-esteem, and reducing anxiety, loneliness and isolation (Poleshuck, 1997).

It is important that the animals being used for animal-assisted therapy meet criteria such as the correct aptitude, size, age, breed/species typical behaviors, and the correct level of

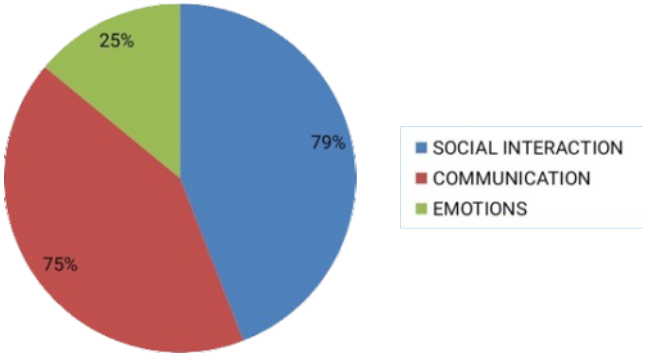
training or skill required for their presence to be beneficial to a client population and their tasks (Poleshuck, 1997).

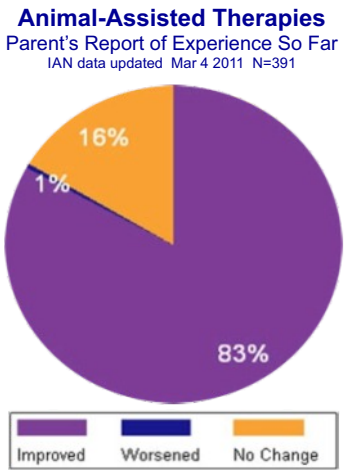
The field of AAT is advancing quickly throughout the world. It is being used in multiple areas and by multidisciplinary professionals globally. A recent article published in 2021 found a dearth of practice and research throughout India, indicating an urgent need to take steps in promoting the growth of the field.

In a pediatric setup, occupational therapists can take advantage of many motivating factors that animal-assisted therapy provides. Children are naturally curious, energized by novel experiences, and long to interact with their environment. Working with therapy animals capitalizes on these motivating factors.

According to a 2021 study published in the Indian Journal of Pediatrics, the estimated prevalence of autism in India is around 1 in 68 children. According to DSM-5 criteria for diagnosis, autism spectrum disorder is characterized by persistent deficits in social communication and social interaction, deficits in developing, maintaining, and understanding relationships, and highly restricted fixated interests that are abnormal in intensity or focus. Disturbances in motivation, especially social motivation, can be detrimental to social development and participation in meaningful occupations across the lifespan. Ayres suggested that this reduced interest and salience of stimuli result in underdeveloped perception and is the reasons why individuals with ASD are not motivated to ***"do things."***

Recent neurobiological evidence suggests that children with autism may perceive greater reward from animal faces as compared to human faces, as indicated by a greater activation in brain regions related to reward and emotional arousal, like the amygdala and putamen (Whyte, Behrmann, Minshew, Garcia, & Scherf, 2015).





Diagnosis of Autism Spectrum Disorder (ASD) before 2 years *(cont'd)*

An article published in the year 2015 reviewed 12 articles based on the use of animal assisted intervention for the children with autism spectrum disorder. They found that the most commonly assessed outcome of AAI was social interaction, language and communication, emotional display and experience. Most of them reported positive outcomes and significant improvements in these areas.

Animals have a natural ability to assist therapists in the healing process; they are good motivators because they are intriguing and fun. They also provide affection and attention, accept unconditionally, are good listeners, and enjoy playing with humans. Children naturally gravitate towards animals out of curiosity and fondness, and thus, caring for and playing with animals turns therapy into something more gratifying.

A few examples of animal-assisted activities are petting or brushing an animal's hair or fur for tactile input, grooming, feeding, and providing water to an animal.

Attention development activities, such as following directions related to animal care or watching animals play for a specific amount of time.

Social skill activities, which may include taking turns petting or playing with an animal, sharing caregiver tasks for an animal with a partner, learning how to treat an animal with kindness and gentleness, observing and interpreting an animal's behavior, and communicating thoughts and feelings about an animal.

Fine motor activities, such as opening a container of treats, retrieving a small treat from a container, breaking treats into pieces, cutting vegetables with plastic knives, picking spinach leaves, etc.

Hence, Occupational therapists incorporating AAI in conjunction with standard OT interventions by taking the necessary precautions and supervision will be beneficial in creating an innovative client-centered approach to achieving goals.

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The shared and overlapping symptoms and features between Autism and ADHD

Dr. Naveena Karthik
Developmental Pediatrician
Nishta Integrated Neurodevelopmental centre

In children Autism Spectrum Disorder, ADHD are two of the most common neurodevelopmental conditions.

Autism is characterised by social communication difficulties, language delay and repetitive and restrictive behaviours, and ADHD is characterised by hyperactivity, inattention, and impulsivity.

This creates the need for screening and early diagnosis of comorbid ADHD in children with ASD and vice versa considering the management of challenges.

There is however limited research and literature that exist with the presentation and severity of overlapping symptoms, particularly inattention and hyperactivity/impulsivity, when a child is diagnosed with one of more of these neurodevelopmental disorders.

The core symptoms of ADHD are part of autism, and autism and ADHD have similar neurophysiological profile.

With the high frequency of ADHD symptoms in autism, children with autism may initially be misdiagnosed with ADHD. Studies found that children with autism had more problems with language and communication, social interaction peer relationships, stereotyped and idiosyncratic language, and imaginative play, relating to people, emotional responsiveness, stereotypies, odd and repetitive object use, eye contact, and verbal and nonverbal communication when compared to ADHD.

Social communication deficits and Adaptive functioning in ASD and ADHD

Social problems are not part of the core diagnostic criteria for ADHD, but it has to be mentioned that children with ADHD experience significant social difficulties.

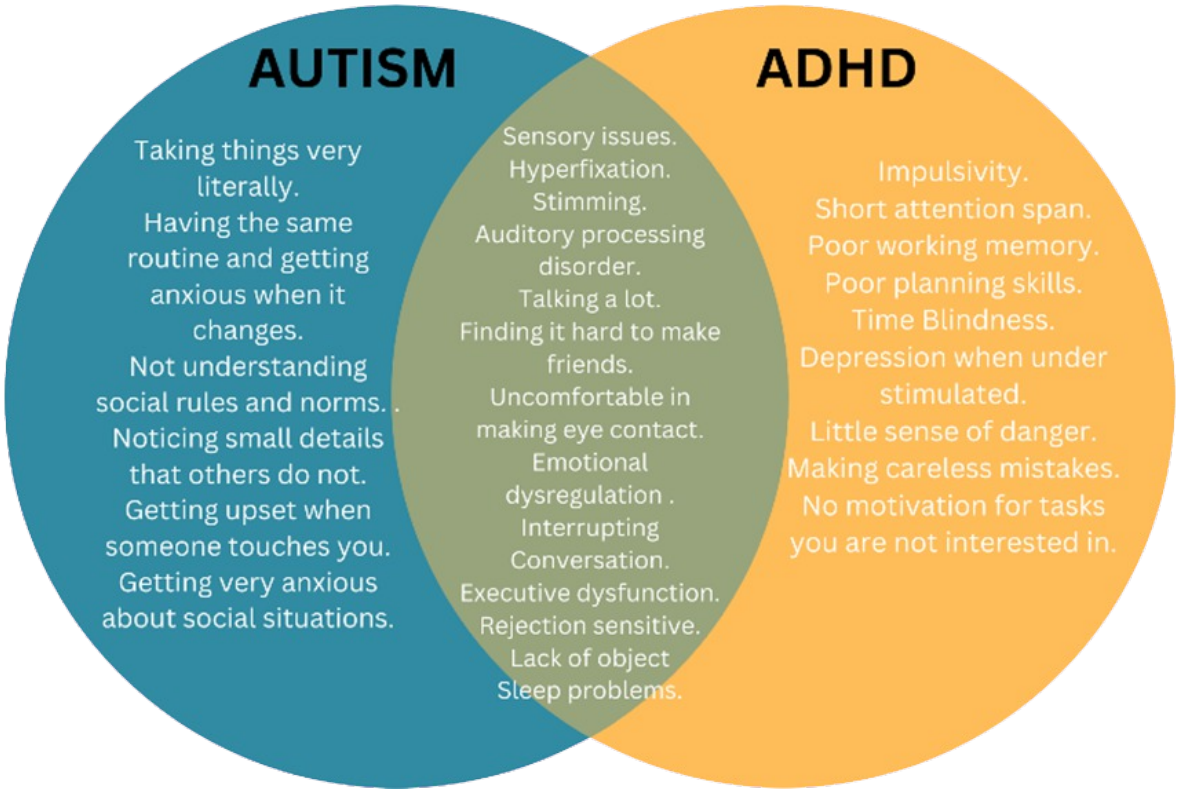
ADHD children are more often rejected by their peers, and have fewer friends. In many cases, these difficulties are viewed as a direct result of the ADHD core symptoms.

Specific play behaviours have been linked with rejection of ADHD children and include being bossy, intrusive, inflexible, controlling, annoying, explosive, argumentative, easily frustrated, inattentive during organized sports/games, and violating the rules of the game.

Social functioning by ADHD subtype varies somewhat according to rater; however, the general consensus is that all ADHD subtypes are at risk for peer rejection.

The shared and overlapping symptoms and features between Autism and ADHD

These distinct clinical particulars suggest attentional symptoms inherent to ASD rather than comorbid ADHD. Attention control concerns the ability to maintain attention on the required task while also responding to external stimuli, feedback, and continual behaviour correction.



Attention in ASD and ADHD

Attentional switching which is the ability to shift attention from one task or object to other in a very flexible way.

The Autism traits reflects with attentional disengagement and sustained attention, whereas the ADHD traits with selective attention and attention inhibition.

These four aspects of attention are widely thought to collectively feed into the broader construct of attention control.

Attention inhibition is a key diagnostic criterion for ADHD. It has been demonstrated in many studies on Autism that sensory over reactivity is associated with over selective, hyperreactive and overfocused attention; perseverative and stereotyped behaviours; and excellent memory skills but they do present with major social deficits.

The shared and overlapping symptoms and features between Autism and ADHD

Executive Function (EF) in Autism and ADHD

The varying ability to distinguish individuals with ASD from those with ADHD on the basis of their performance on different cognitive tasks that assess sustained attention is crucial.

The rapid letter naming task, which is thought to predict surface reading ability and other reading skills, did reveal significant differences between ASD and ADHD children.

Children with ASD can spend more time and focus on the task and performed better than ADHD.

It is usually the lower cognitive levels significantly affect executive function where we can see that Autism and inattention symptoms were differentially associated with EF, whereas hyperactivity symptoms were unrelated to EF.

With co-occurring conditions ASD and ADHD, it is important to understand the common co-morbidity profiles in both, and by understanding differences and similarities in social perception, motor functions and language, cognition, and EF in each disorder and in the co-occurring phenotype.

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Tailoring Parental Training for Autism Spectrum Disorder: A Comprehensive Approach

Ms. Vipula Rajesh Kumar

Consultant Speech and Language Pathologist

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Parental involvement is pivotal in effective intervention for autistic children as they transition from traditional passive roles to active collaborators in their child's journey. However, the success of interventions depends not only on the program content but also on alignment with diverse parental learning styles and preferences. Therefore, exploring the importance of tailoring parental training for autistic children to accommodate varying styles and preferences is crucial, promoting optimal outcomes for both parents and children.

Baker et al. (2021) introduced six education/ learning paradigms which are relevant to parent training: Behaviorism, Cognitivism, Cognitive Constructivism, Social Constructivism, Humanism, and Transformative. Within the behaviorist paradigm, clinicians are responsible for controlling the learning environment to achieve a specific response, representing a teacher-centered approach to teaching (Ertmer & Newby, 2013). Cognitive learning theories are associated with mental and psychological processes to facilitate learning by assigning meaning to events such as information processing, perceptions, reflection, metacognition, and memory. The humanism paradigm suggests that learning is self-directed, and that parents can plan, manage, and assess their own learning to accomplish self-actualization, self-fulfillment, self-motivation values, goals, and independence in their learning. According to constructivism, parents can construct new knowledge through the interaction between their previously learned skills and knowledge, the skills and knowledge gained from social interaction with peers and interventionists and social activities. Knowledge is actively constructed based on the parent's environment, the physical and social world, which makes it relative.

Transformative learning comprises three stages: first, encountering a perplexing issue and reflecting on past perspectives; second, engaging in critical evaluation and self-reflection, necessitating metacognitive thinking; and third, taking action based on self-reflection and prior assumptions, leading to a transformation of meaning, context, and long-standing beliefs (Mukhalalati & Taylor, 2019).

Though these pedagogies may overlap in clinical practice, they differ significantly in philosophical assumptions, each offering nuanced perspectives on education/training purposes, the nature of knowledge, and the roles of teachers (clinicians) and students (parents/caregivers).

Tailoring Parental Training for Autism Spectrum Disorder: A Comprehensive Approach *(cont'd)*

The delivery of parental training in ASD intervention programs should be moderated and matched to parental styles, optimizing effectiveness through personalized approaches. Active parental engagement from the outset is valuable. Parents should be encouraged to express and reflect on their preferred learning methods, to ensure that the intervention is delivered in an optimal manner. Initially, parents may need more direct coaching to support observation and participation in positive interactions with their child. As they progress and gain deeper understanding of effective interaction techniques, parents may adopt a more reflective approach. Combining broad questions and specific probes guides observation and discussion, helping parents identify behaviors supporting their child's communication opportunities and understand underlying reasons for their child's responses.

Just as children have diverse learning styles, clinicians should recognize diverse parental learning styles and accommodate neurodivergent caregivers. The parent learning cycle, central to the parent training program may involve observation and reflection through video feedback discussions, creating and executing home plans, and practicing intervention strategies. While coaching parents or caregivers, employing effective adult teaching strategies, such as guided practice with feedback, modeling and demonstrations, problem-solving, and direct teaching, is useful. These strategies align with adult learner preferences and are grounded in adult learning theory principles (Trivette et al., 2009).

TAKE HOME MESSAGE

Each parent's learning style is unique. Some learn best by reading, others by listening/ discussing or by watching the clinician interact with the child. It is important as a clinician to recognise the parent's optimal learning approach. Customizing parental training for autistic children entails recognizing varied learning styles and preferences, leveraging educational paradigms such as Behaviorism, Cognitivism, Humanism, Constructivism and Transformative learning. By aligning interventions with parental styles, fostering active engagement, and utilizing effective teaching methods, optimal outcomes for both parents and children can be realized.

Tailoring Parental Training for Autism Spectrum Disorder: A Comprehensive Approach *(cont'd)*

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NICU LIVE

CASE STUDIES

Case Study 1

Neonatal birth injury

What Happened?

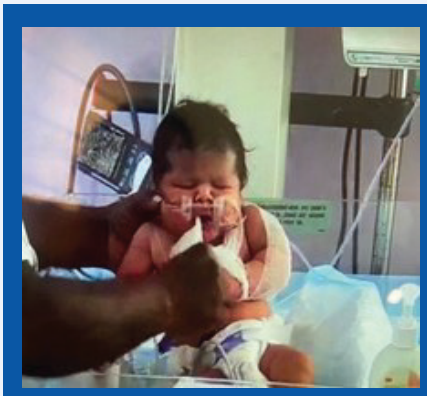
A term neonate born via vaginal delivery with difficult extraction was bought in for evaluation for respiratory distress and floppy left arm. Chest X ray and arm were taken at admission revealed well expanded lung and fracture left humerus. Target saturations achieved by administering saturations via LFNC.

NICU Live intervention

Pediatric orthopedician from Niculive team was consulted. Picture of neonatal arm sling was provided as a guide for local team to support fractured arm and sent to local orthopedician for cast. Paracetamol IV every 6 hours was adviced for pain control. Baby had immobilization cast in place for 1 week. Upon discharge from spoke site, baby followed up with pediatric orthopedics team at Motherhood – where complete evaluation revealed brachial plexus injury of right arm and healing humerus fracture on left arm. Physiotherapy taught to parents for longitudinal well being.

Takeaway

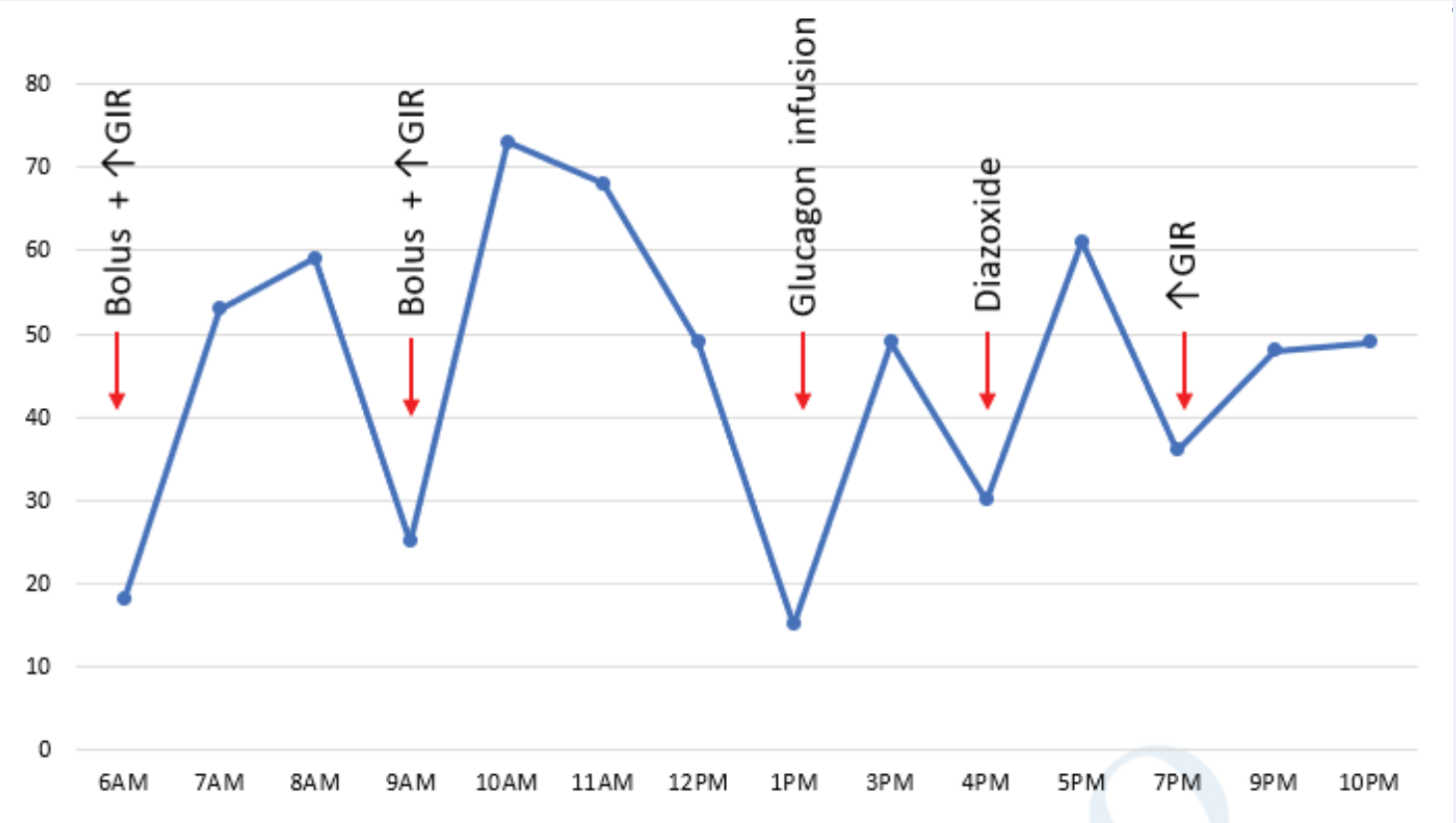
Timely intervention can prevent neurovascular deficit associated with displaced fracture humerus. NICU live accentuated timeline of appropriate management for neonatal birth trauma. Involving parents through early intervention for appropriate physiotherapy can help regain acceptable function of affected limb.



NICU Level: II
Location: Hindupur

Case Study 2

Persistent hypoglycemia in neonatal sepsis



What Happened?

15day old term baby admitted with fever, irritability and altered sensorium. Sepsis screening revealed underlying meningitis and hypoglycemia. CSF cell count suggested possible bacterial meningitis.

NICU Live intervention

Hypoglycemia persisted despite appropriate doses of dextrose 10% boluses and maximal increase in GIR able to give through peripheral IV. Critical labs showed hyperinsulinemia. Glucagon infusion and Diazoxide were started to sustain euglycemia. However, due to persistent hypoglycemia despite maximal measures through peripheral IV line, baby was transferred to higher center for PICC line placement.

Takeaway

Glucose is the only significant substrate for neonatal brain. Having significant hypoglycemia for longer periods leads to permanent neurodevelopmental effects. Immediate action should be taken to attain euglycemia in sick neonates. Nicu Live was able to guide through use of Glucagon infusion and Diazoxide in setting of hyperinsulinemia – an uncommon strategy used at peripheral centers.

Case Study 3

Meconium Aspiration Syndrome

What Happened?

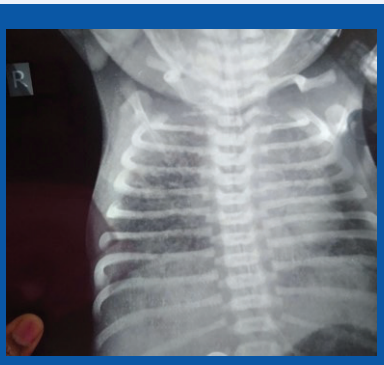
Term newborn, difficult delivery through meconium came in with resp distress at HOL 3, saturations on 80s in room air. Baby was put on LFNC, upgraded to HFNC for increased distress by ground team. X ray showed low lung volumes and meconium aspiration changes.

NICU Live intervention

Based on our recommendations, baby was intubated early in course. Lung recruitment done with appropriate ventilation strategies. X ray done 24 hours later showed good expansion of lungs and decrease in Fio2. With no bed side ECHO facility, PPHN becomes clinical diagnosis – IV Sildenafil started. Hypotension was managed with dobutamine & noradrenaline infusion. Over the next few days pressors weaned off, baby was extubated safely to LFNC and feeds established.

Takeaway

NICU Live led timely intubation and appropriate ventilation strategies (with or without surfactant) recruited alveoli in accelerated fashion. This not only prevents severe PPHN (or need for iNO) in setting of MAS but also helps retain the patient in peripheral centers and avoid unnecessary transports. Indirectly it leads to building trust between caregivers and parents in local community.



NICU Level: II
Location: Hindupur

Case Study 4

Cardiac misdiagnosis

What Happened?

3 day old term neonate with birth asphyxia and history of cyanotic episode was admitted with saturations in mid 80s on LFNC. Baby had disproportionately comfortable breathing and active precordium leading to suspicion of structural heart defect.

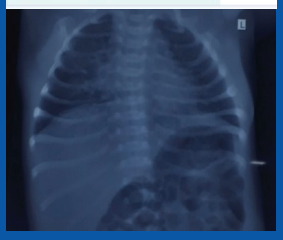
NICU Live intervention

Ground team directed to intubate baby, get ECHO, ABG, Xray. X ray showed bell shaped thoracic cavity, no parenchymal changes to explain hypoxia, intubation and 100% O2 did not make great difference in Spo2 – still in 80s on ventilator. ABG showed PaO2 of 100 mm Hg ruling out PAH at given time. However, Echo was also reported to be normal with no structural defects. Baby was immediately retrieved by Motherhood team, prostaglandin infusion was started on transport. STAT ECHO was performed revealed obstructed TAPVC. Baby was then shifted to cardiac center for corrective surgery.

Takeaway

High index of suspicion and timely intervention is required to delineate cardiac and pulmonary etiology for baby with respiratory distress. Collaborated efforts of NICU Live and ground team accelerated this transport for timely corrective surgery which otherwise could have been fatal.

ABG	02/01,
pH	7.37
PaCO2	25
PaO2	100
Bicarb	18.6
Sodium	152
Potassium	5
Chloride	100
CSO2	96
BE	-3
Ionized Calcium	1.17



NICU Level: II
Location: Ananthpur

Case Study 5

Collapsed lung – care instructions

What Happened?

13 day old term baby with X ray features of bronchiolitis admitted for respiratory distress and saturation in 87-89% on RA, was managed with nebulization and LFNC. 3 days after hospital admission, there was sudden increase in distress and O2 need. Cold light examination for pneumothorax was negative.

NICU Live intervention

X ray adviced revealed right upper lobe atelectasis consistent with physical examination findings from ground team. Bed side nurse was taught to do effective chest physiotherapy using neonatal mask, shown favorable positioning of baby to open the collapsed lung. 24 hours later repeat X ray taken showed re-recruited alveoli from RUL. Baby was weaned to room air in next 36 hours and discharged home.

Takeaway

Maneuvers like chest physiotherapy and positioning of neonate to open airways are simple yet effective ways to optimize ventilation. Early recognition and implementation of such measures in appropriate time frame can prevent hypoxic respiratory failure.

NICU Level: II
Location: Ananthpur

Case Study 6

Antibiotic stewardship

What Happened?

Rampant irrational use of higher grade antibiotics is not uncommon in remote centers across India. This is mainly due to non availability of blood culture services and antibiogram to guide antibiotic usage. Hospital XXX prior to NICU Live would use combination vancomycin, linezolid, netilmicin in addition to meropenem and piptaz at various stages to combat rising CRP and thrombocytopenia. Some would respond, many would get multiple platelet transfusions prior getting transferred for persistent thrombocytopenia.

NICU Live intervention

Blood cultures were sent for every admission requiring antibiotics. Few culture positive sepsis gave an insight into kind of bugs that are prevalent in population being served. Sensitivity panel guided the antibiotic upgradation for clinically unresponsive culture negative sepsis patients for rest of the unit. In this process we have identified E coli and MDR Klebsiella as common agents for sepsis at XXX hospital responsive to meropenem 3 colistin. Those not responding to above combination are recommended to be transferred out for possibility of XDR Klebsiella requiring Aztreonam and Avibactum.

Takeaway

Recognition of prevalent bacteria and their antibiogram in various geographical areas helps in starting/upgrading to appropriate antibiotics. This will reduce number of sepsis related platelet transfusions, unnecessary exposure to other high grade antibiotics and emergence of MDR variants. Unit level protocols can be made to rationalize antibiotic usage

NICU Level: II
Location: Ananthpur

Case Study 7

Persistent Pulmonary Hypertension of Newborn

What Happened?

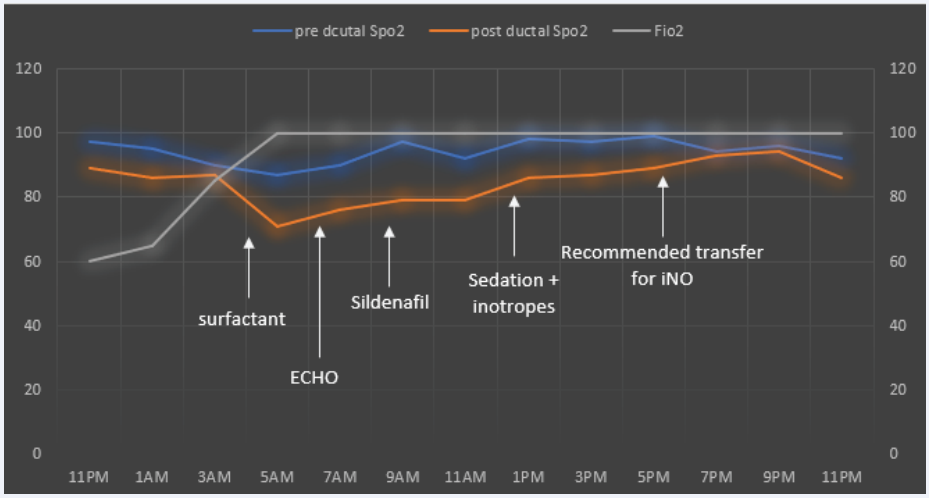
Term baby with meconium aspiration syndrome, ventilated with 50-60% fio2 status post surfactant dose x 1. By hour of life 12, saturations slowly dropped to low 90s, CXR continued to show underventilated lungs with features of meconium aspiration. Baby had desaturation episode to mid 80s requiring grading up of O2 from 60% to 100%

NICU Live intervention

Suggested to give second dose of surfactant, monitor pre and post ductal saturations and get ECHO. Post 2nd dose of surfactant, pre ductal saturation optimized, but ductal difference of saturations persisted. ECHO confirmed the findings. Oral Sildenafil started, followed by umbilical venous line, sedation and inotropes. Ductal difference in saturations closed however, remained on 100% O2. It was then recommended to transfer to higher center for iNO therapy.

Takeaway

It is extremely important to escalate care in a timely fashion in neonates with PAH in setting of MAS. Early referral prior reaching cascade of hypoxia and worsening pulmonary pressures will benefit both referral center and receiving unit.



Case Study 8

Where is the diaphragm?

What Happened?

A 12-day old term neonate was admitted to NICU at XXX with history of respiratory distress, difficult to wean Fio2, requiring 50-70% and above x ray features. Baby was started on adrenaline and milrinone infusion for mild PPHN features on ECHO. Baby was admitted 2 days later to NicuLive.

NICU Live intervention

During the assessment by NicuLive team, baby had an episode of pulmonary hemorrhage. Milrinone infusion was immediately stopped since all ABG until then had PaO2>150.

Surfactant dose was given with good recovery. Given the anatomy of structures on X ray presented above, strong suspicion for congenital diaphragmatic hernia vs eventration of diaphragm was made. Immediate chest USG was done to find liver in right chest with very thin rim of fibrous tissue without defects of continuity. Thus, a diagnosis of complete diaphragmatic eventration was made. Surgical consult was taken and transferred to surgical center for probable need for plication.

Takeaway

Congenital complete eventration is a rare entity and requires high index of suspicion. Once diagnosed, appropriate management - medical Vs surgical requires a multidisciplinary approach. NicuLive was able to communicate between specialties in best interest of the baby.

NICU Level: II
Location: Patna

Case Study 9

Thrombosis in neonates

What Happened?

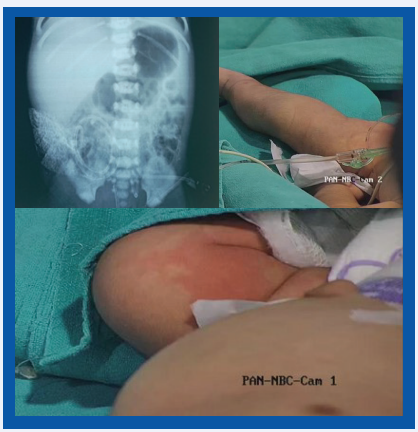
Term neonate admitted to NicuLive at 40 hours of life with meconium aspiration and severe PPHN. Intubated on admission, blood screened for sepsis, started on antibiotics and started on inotropes.

NICU Live intervention

Initial X ray showed features of meconium aspiration, was given surfactant, started on milrinone + noradrenaline via peripheral IV for emergency purposes, advised to secure umbilical venous line. By 60 hours of life, left lower limb pulses were weak, with poor perfusion and decreased activity and tone. Immediate chest and abdomen x ray was taken to confirm position of venous line and catheter was found to be malpositioned in umbilical artery ending at L4-L5 level coinciding with branching of common iliac artery. Doppler confirmed thrombus of left femoral artery. Catheter was removed and heparin drip started, and circulation was gradually restored in following 6-8hours.

Takeaway

It is not an uncommon practice to rely ONLY on visual caliber differences for identification of umbilical artery and vein to place lines, without getting X ray to confirm line positions. Malpositioned umbilical lines are most common cause for neonatal thrombosis and microthrombi leading to limb ischemia. Therefore, it is prudent to do x ray after placing lines to confirm good position. NicuLive intervention in index baby salvaged the left lower limb from prolonged ischemia which might have led to irreversible debilitating consequences affecting quality of life.



Case Study 10

Nursing challenges in rapidly deteriorating neonate

What Happened?

A full-term neonate experienced sudden apnea while on a ventilator, which was accompanied by a significant decrease in oxygen saturation levels, reaching as low as 75%. Additionally, the baby displayed bradycardia with a heart rate dropping to 60 beats per minute and see-saw breathing pattern.

NICU Live intervention

The Motherhood eNICU nursing team promptly contacted the ground team to perform suctioning to clear any potential airway obstructions and increased the FiO2 percentage to enhance oxygenation.

DOPE pathway followed to rule out major causes of sudden deterioration of the neonate. Additionally, the team communicated the situation to the ground team consultant, providing relevant information. It was found that ET tube had thick secretions upon suctioning, eventually baby was re intubated with a fresh tube – demonstrating complete block of old ETT.

Takeaway

Following these interventions, the medical team assessed the baby for bilateral air entry, ensuring adequate ventilation and oxygenation. They also verified the proper positioning of the endotracheal tube to maintain an open airway and facilitate effective respiratory support.

See saw breathing pattern is typically seen if ET tube is blocked or displaced. Following algorithms – DOPE pathway in this case not only saves time in addressing emergent issue in deteriorating newborn, it also alerts the ground team to be ready to perform timely emergent procedures. Algorithms as above empowers the nurses to safely and confidently escalate care to stabilize a rapidly deteriorating newborn.

Case Study 11

Neonatal pleural effusion

What Happened?

Term baby was admitted with respiratory distress requiring intubation. CXR revealed homogenous whiteout lungs bilaterally. First dose of surfactant was given following which Fio2 requirement gradually reduced. Repeat X ray showed no changes in homogenous opacity of bilateral lung fields. Baby was admitted to NicuLive at this stage.

NICU Live intervention

Lung ultrasound was advised on urgent basis to evaluate for pleural effusion. Baby was found to have large effusion bilaterally. Pleural tap was done followed by ICD placement.

Further x rays showed well expanded lungs and bay was successfully extubated 48 hours later. No accumulation of fluid in any other body spaces. Baby remained on IV antibiotics, TPN and was hemodynamically stable.

Pleural fluid analysis favored transudative process. After initial stabilization, feeds were gradually introduced with caution. In next 12 hours, pleural fluid from ICD tuned milky white – chyle. Enteral nutrition stopped, repeat pleural fluid analysis confirmed chylous effusion bilaterally. Octreotide infusion was started and graded up to achieve response. Chylous output gradually started reducing one week after starting octreotide. Surgical review done and planned to do chemical pleurodesis if there was no response to octreotide.

Takeaway

Congenital neonatal chylous pleural effusions are relatively rare and requires clinical expertise and patience to diagnose and treat. NicuLive intervention aided in correct timely diagnosis of above case.

NICU Level: II
Location: Hisar

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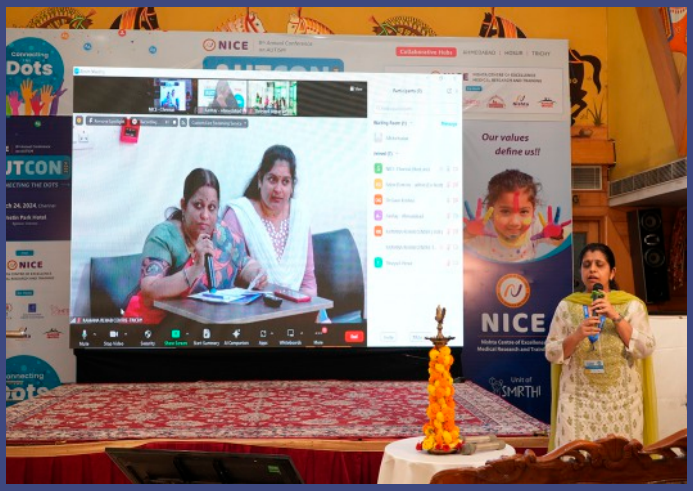

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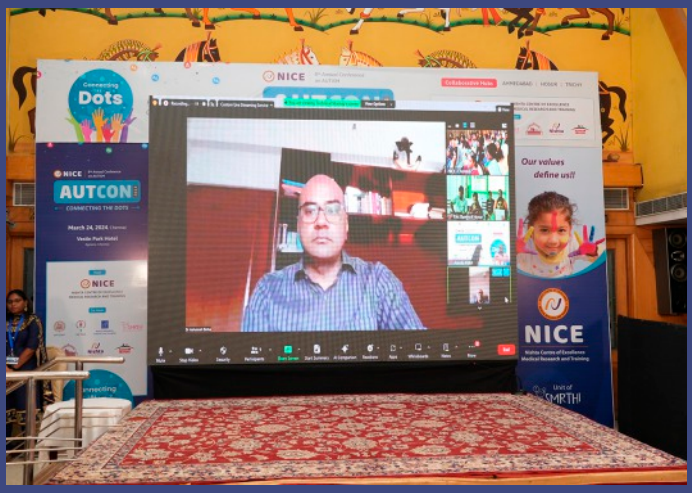
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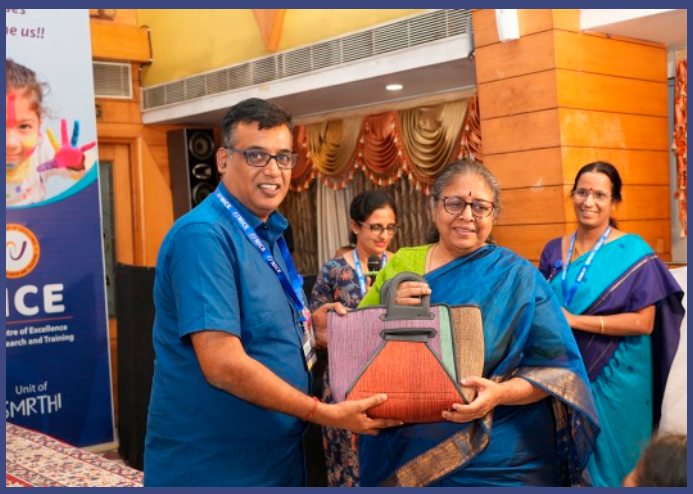
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