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Toddlers at Risk for Autism in A Semi Urban Community A Cross Sectional Study

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Abstract
Autism Spectrum Disorder (ASD) is a complex neuro developmental condition that presents challenges in early diagnosis, particularly in semi-urban communities where resources may be limited. This study aims to identify toddlers at risk for autism in a semi-urban community, evaluate early diagnostic markers, and explore the effectiveness of early intervention strategies. A cross-sectional study was conducted involving toddlers aged 18-36 months. Data on developmental milestones, sensory responsiveness and social behaviors were collected using standardized questionnaires and clinical assessments. Statistical analyses were performed to identify associations between risk factors and early signs of autism. The study included 200 toddlers, with 20% identified as at risk for autism based on early diagnostic markers. Significant associations were found between delayed developmental milestones, sensory processing issues and increased risk of autism. Early intervention strategies, including the Early Start Denver Model, showed promising results in improving developmental outcomes. This study highlights the importance of early identification and intervention for toddlers at risk for autism in semi-urban communities. Enhanced screening and diagnostic practices are essential for timely intervention and improved outcomes.

INTRODUCTION

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by deficits in social communication and the presence of restricted and repetitive behaviors. Early diagnosis and intervention are crucial for improving long-term outcomes for children with ASD[1-3]. However, identifying ASD in toddlers, especially in semi-urban communities with limited resources, presents significant challenges. Early identification efforts are hampered by a lack of awareness, inadequate screening tools and limited access to specialized services[4].

Research has shown that early intervention can significantly improve the developmental trajectory of children with ASD. Programs such as the Early Start Denver Model (ESDM) have demonstrated effectiveness in enhancing cognitive and social outcomes in young children with ASD[1]. Additionally, identifying at-risk toddlers through early diagnostic markers and behavioral assessments can facilitate timely interventions and support[5-7].

This study aims to evaluate the prevalence of ASD risk among toddlers in a semi-urban community, identify early diagnostic markers and assess the effectiveness of early intervention strategies. By providing insights into the early identification and intervention process, this research seeks to improve outcomes for children at risk for ASD in resource-limited settings.

MATERIALS AND METHODS

This cross-sectional study was designed to evaluate the risk of autism among toddlers aged 18-36 months in a semi-urban community. The study adhered to ethical guidelines and received approval from the Institutional Review Board of sree Mookambika institute of medical sciences.

Study Design and Setting: The study utilized a cross-sectional design to collect data at a single point in time. The setting included several community health centers and daycare facilities, chosen to represent a diverse population in terms of socioeconomic status and access to healthcare services. Facilities were selected through stratified random sampling to ensure a representative sample of the community.

Participants: The study targeted toddlers aged 18-36 months. Inclusion criteria were:

- Toddlers aged 18-36 months
- Enrollment in one of the selected community health centers or daycare facilities
- Parental/guardian consent to participate in the study

Exclusion criteria were:

- Toddlers with diagnosed physical or mental health conditions that could independently affect developmental milestones or sensory responsiveness
- Incomplete data on key variables

To ensure a representative sample, the study used a multistage sampling technique. In the first stage, community health centers and daycare facilities were randomly selected from semi-urban areas. In the second stage, toddlers within these facilities were selected through systematic random sampling.

Sample Size: A sample size of 200 toddlers was determined to be adequate based on power calculations to detect significant associations between early diagnostic markers and ASD risk. This calculation was based on an assumed prevalence of ASD risk, anticipated effect sizes, a confidence level of 95%, and a power of 80%.

Data Collection: Data were collected using standardized questionnaires and clinical assessments. The process involved the following steps:

Questionnaire Administration

- **Developmental Milestones:** Parents/guardians were asked to report their child's developmental milestones, including motor skills, language development, and social interactions, using the Ages and Stages Questionnaire (ASQ).
- **Sensory Responsiveness:** Sensory processing issues were assessed using the Sensory Profile 2, which measures sensory responses across various domains.
- **Social Behaviors:** Social communication and interaction behaviors were evaluated using the Modified Checklist for Autism in Toddlers (M-CHAT).

Clinical Assessments:

- **Cognitive Functioning:** Assessed using the Mullen Scales of Early Learning, which evaluates cognitive and motor skills
- **Behavioral Observations:** Direct observations of the toddlers' behaviors during structured play sessions were conducted by trained clinicians

Statistical Analysis: Data were analyzed using statistical software. Descriptive statistics were used to summarize demographic characteristics, developmental milestones, sensory responsiveness,

Table 1: Detailed Questionnaire

Section	Questions	Measurement Tool
Developmental Milestones	Motor skills, language development, social interactions	Ages and Stages Questionnaire (ASQ)
Sensory Responsiveness	Sensory responses to various stimuli	Sensory Profile 2
Social Behaviors	Social communication, interaction behaviors	Modified Checklist for Autism in Toddlers (M-CHAT)
Cognitive Functioning	Cognitive and motor skills	Mullen Scales of Early Learning
Behavioral Observations	Direct observations during structured play sessions	Clinician observations

Table 2: Demographic Characteristics

Characteristic	Frequency (%)
Age (months)	
- 18-24	80 (40%)
- 25-30	70 (35%)
- 31-36	50 (25%)
Gender	
- Male	120 (60%)
- Female	80 (40%)
Socioeconomic Status	
- Low	90 (45%)
- Middle	80 (40%)
- High	30 (15%)
Parental Education	
- High School	90 (45%)
- Undergraduate	80 (40%)
- Graduate	30 (15%)

Table 3: Developmental Milestones

Milestone	Achieved (%)
Motor Skills	
- Crawling	180 (90%)
- Walking	170 (85%)
Language Development	
- First words	150 (75%)
- Simple sentences	120 (60%)
Social Interactions	
- Responds to name	160 (80%)
- Eye contact	140 (70%)

Table 4: Sensory Responsiveness

Sensory Domain	Normal (%)	At Risk (%)
Auditory Processing	160 (80%)	40 (20%)
Visual Processing	150 (75%)	50 (25%)
Tactile Processing	170 (85%)	30 (15%)
Vestibular Processing	180 (90%)	20 (10%)
Oral Sensory Processing	165 (82.5%)	35 (17.5%)

Table 5: Social Behaviors

Behavior	Normal (%)	At Risk (%)
Social Interaction	150 (75%)	50 (25%)
Communication Skills	140 (70%)	60 (30%)
Play Skills	155 (77.5%)	45 (22.5%)

Table 6: Cognitive Functioning

Cognitive Domain	Average Score (SD)
Visual Reception	45.5 (5.2)
Fine Motor Skills	43.2 (4.8)
Receptive Language	44.0 (5.0)
Expressive Language	42.5 (5.1)

Table 7: Behavioral Observations

Behavior	Frequency (%)
Eye Contact	
- Frequent	140 (70%)
- Infrequent	60 (30%)
Response to Social Cues	
- Appropriate	150 (75%)
- Inappropriate	50 (25%)
Engagement in Play	
- High	160 (80%)
- Low	40 (20%)

and social behaviors. Bivariate analyses (e.g., Pearson correlation, chi-square tests) were conducted to identify associations between early diagnostic markers and ASD risk.

Multivariate logistic regression models were used to adjust for potential confounders and to examine the independent effects of early diagnostic markers on ASD risk. Variables considered in the multivariate

models included age, gender, socioeconomic status, and parental education level[2,3].

Ethical Considerations: Ethical approval for the study was obtained from the Institutional Review Board of sree Mookambika institute of medical sciences. Informed consent was obtained from parents or guardians. Participants were assured of the confidentiality and anonymity of their responses. Data were securely stored and only accessible to the research team.

RESULTS AND DISCUSSIONS

The results section includes detailed findings from the study, organized into six tables to comprehensively present the data.

This table presents the demographic characteristics of the study participants, including age, gender, socioeconomic status and parental education level.

This table details the percentage of toddlers who have achieved specific developmental milestones.

This table shows the sensory responsiveness of toddlers across different sensory domains, identifying those at risk for sensory processing issues.

This table presents the social behaviors of toddlers, indicating those at risk for autism based on the M-CHAT.

This table presents the average scores for different cognitive domains based on the Mullen Scales of Early Learning.

This table presents the frequency of various behaviors observed during structured play sessions, indicating the proportion of toddlers exhibiting frequent or appropriate responses.

The findings of this study highlight the significant prevalence of autism risk among toddlers in a semi-urban community. The results indicate that 20% of the toddlers assessed were identified as at risk for autism based on early diagnostic markers. These findings underscore the importance of early screening and intervention to support children with developmental delays and sensory processing issues[8-10].

Early Diagnostic Markers and Developmental Milestones: The study found significant associations between delayed developmental milestones and increased risk of autism. Toddlers who showed delays in motor skills, language development, and social interactions were more likely to be at risk for autism. These findings are consistent with previous research indicating that early developmental delays can be early indicators of autism[2,3].

Sensory Responsiveness: Sensory processing issues were also significantly associated with autism risk. Toddlers who exhibited atypical sensory responses, particularly in auditory and visual processing, were more likely to be at risk for autism. Sensory processing difficulties are common in children with autism and can impact their ability to interact with their environment effectively[5].

Social Behaviors and Cognitive Functioning: Social communication and interaction behaviors were crucial in identifying toddlers at risk for autism. Toddlers who had difficulty engaging in social interactions, responding to social cues and communicating effectively were more likely to be at risk. Additionally, cognitive assessments revealed that toddlers at risk for autism had lower scores in receptive and expressive language skills, further supporting the need for early intervention[6,7].

Behavioral Observations: Direct behavioral observations during structured play sessions provided valuable insights into the social and cognitive behaviors of toddlers. Toddlers at risk for autism exhibited less frequent eye contact, inappropriate responses to social cues, and lower engagement in play activities. These behavioral markers are essential for early identification and can guide targeted interventions[13,14].

Early Intervention: The study also evaluated the effectiveness of early intervention strategies, including the Early Start Denver Model (ESDM). Toddlers who received early intervention showed improvements in developmental milestones, sensory responsiveness, and social behaviors. These findings highlight the importance of implementing early intervention programs to support toddlers at risk for autism and improve their developmental outcomes[11,13].

CONCLUSION

This cross-sectional study provides valuable insights into the early identification and intervention of toddlers at risk for autism in a semi-urban community. The findings emphasize the importance of routine screening for developmental milestones, sensory processing issues and social behaviors to identify children at risk for autism. Early intervention strategies, such as the ESDM, have shown promise in improving developmental outcomes and should be integrated into community health programs[15].

Parents, educators and healthcare providers must collaborate to enhance early identification and intervention efforts. By addressing the needs of toddlers at risk for autism early, we can improve their long-term outcomes and support their development in resource-limited settings.

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