



Exploration of Respondent and Child Characteristics on the Outcomes of Screening Tools

Sarah E. O'Kelley¹, Kristi Carter Guest¹, Michelle Patriquin², M. Kate McCalla³, Sarah E. Leger¹, and Peter Waselkov¹

1- UAB Department of Psychology and Civitan International Research Center, UCEDD/LEND; 2- U. of Houston, Dept. of Psychology, Sleep and Anxiety Center for Kids, Houston, TX; 3- Kennedy Krieger Institute/Johns Hopkins School of Medicine

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ABSTRACT

One result of increased awareness of early warning signs for ASD is increased demand for evaluation to rule out this diagnosis among young children. With increased demand and limited resources, clinicians are challenged to identify children in need of intervention early and efficiently. Screening tools are helpful in this effort, but there is not yet consensus on which measures are promise for use in primary care settings to identify toddlers at risk for ASD but have not been investigated as closely among children who are referred for evaluation (i.e., those children considered at-risk). Our previous research with these tools in a tertiary care setting has revealed elevated scores for most children with limited specificity regarding ASD diagnosis, suggesting that these tools are not as helpful in screening out children who do not require extensive ASD evaluation. The current study explored if contribute to screening measure outcomes, revealing an important impact of respondent education and language skills of

BACKGROUND

Research has demonstrated that early intervention with young children with Autism Spectrum Disorders (ASD) is highly effective social interactions). However, ASD-specific intervention is often delayed due to a lack of diagnosis

In an effort to facilitate earlier diagnosis, researchers and clinicians have developed screening measures to identify children who are at risk for an ASD, although there is not yet consensus on which measures are most effective.

The Modified Checklist for Autism in Toddlers (M-CHAT) and the Communication and Symbolic Behavior Scales Developmental Profile-Infant/Toddler Checklist (CSBS-ITC) have been identified as effective screening tools in the general population, such as primary care settings, to identify young children at risk for ASD (Pandey et al., 2008; Wetherby et al., 2008). Based on our previous research with these tools in an interdisciplinary clinic be elevated for most children and the screeners demonstrate difficulty in distinguishing ASDs from other DDs at the screening level. Thus, the current study explores if factors related to the parent or child could contribute to screening measure outcomes as has been examined recently in a primary care sample by

OBJECTIVES

To explore how characteristics of the child and/or the caregiver setting. Analyses focused on children who either received a diagnosis of ASD or for whom ASD was ruled out to investigate screening data. This study examined child gestational age, birth weight, age at referral/intake, and language skills in addition to respondent age and education level

Caregiver-Completed Screeners for ASD in Young Children

	Modified Checklist for Autism in Toddlers	Communication and Symbolic Behavio Scales Infant/Toddler Checklist
Typical Age Range	16 to 30 months	6 to 24 months
# Items/ Time to Complete	23 items/ 10 minutes	24 items/ 5-10 minutes
Content	Early signs of autism (poor eye contact, failure to respond to name, etc.)	Language predictors (emotion, eye gaz gestures, sounds, use of words, understanding of words, object use, etc
Positive Predictive Value in previous studies	11 - 61% in low-risk samples 60% in Early Intervention 74 to 79% in high-risk samples (Kleinman et al., 2008; Pandey et al., 2008;	70 - 79% for 15 to 24 months (Wetherby et al., 2008)

METHODS

under who were referred to the UAB Civitan-Sparks Clinics, caregivers completed the M-CHAT and CSBS-ITC in addition to the general intake form requesting information about development, family history, medical history, and referral question (i.e., ASD, developmental delay, speech delay, etc.). For this sample, most screeners were completed by the child's biological mother. Scores on screeners were used by clinic staff to inform interdisciplinary scheduled for an ASD-specific evaluation, which consists of an Autism Diagnostic Observation Schedule (ADOS) and Autism interdisciplinary assessments Audiology Speech/Language Pathology).

Data for 68 children evaluated through the UAB Civitan-Sparks Clinics were included in these retrospective analyses. Final diagnoses were concluded by members of the interdisciplinary team. Diagnostic outcomes included either ASD (n = 25) or other non-ASD developmental and/or behavioral disorders (n = 43; e.g., Mixed Developmental Delays, Language Disorder, ADHD, Adjustment Disorder, Disruptive Behavior Disorder).

Child Characteristics

	ASD Group	Non-ASD Group
		(77% Male)
	Mean (SD)	Mean (SD)
Age at Screening	33.00 (13.00) months	38.10 (12.00) months
	42.44 (13.08) months	48.37 (14.23) months
Gestational Age	37.22 (2.34) weeks	37.57 (3.33) weeks
Birth Weight	113.10 (21.74) ounces	102.03 (25.19) ounces
Receptive Language Standard Score*	58.48 (10.69)	75.27 (14.93)
Expressive Language Standard Score*	61.68 (10.74)	74.58 (14.00)
Insurance Type*	68% Medicaid	93% Medicaid
		56% White
		39% Black
		3% Hispanic
*		·/

Respondent Characteristics

Respondent Level of Education



- · Respondent level of education was significantly different between
- · Mean age of respondent at intake did not differ between groups

ASD Group Respondent Age: 32.52 years (SD = 7.58) Non-ASD Group Respondent Age: 29.29 years (SD = 5.85)

RESULTS

Overall M-CHAT Scores by Diagnostic Group

	ASD	No ASD		
Total Score* Mean (SD)	7.84 (4.45)	5.88 (3.58)		
Critical Score * Mean (SD)	2.72 (1.70)	1.07 (1.22)		

Overall CSBS-ITC Raw Scores by Diagnostic Group

	ASD	No ASD
Total Score* Mean (SD)		37.0 (11.3)
Social Composite Mean (SD)		17.13 (5.50)
Speech Composite* Mean (SD)	7.05 (3.04)	9.41 (4.46)
Symbolic Composite* Mean (SD)	9.62 (2.60)	11.83 (4.36)
* n < .05	Noto: Scoror indication	concorn includo

Although children with an outcome diagnosis of ASD scored more poorly on both screening tools, group means across measures suggested "concern" for both diagnostic groups. However, the ASD group obtained scores on the CSB-71C that indicated developmental delay at the 12-month-old level while the non-ASD group obtained scores in the range of concern for a

Correlations

- Respondent education was correlated with M-CHAT Total score and CSBS-ITC Social, Symbolic, and Total scores, with lower levels of respondent education associated with poorer scores on screening measures (r = .47 to .62, p <.05). The correlation between respondent education and the CSBS-ITC Speech domain score approached significance (r = .44, p = .06)
- **Respondent education** was also positively correlated with **Expressive Language** score of the child with ASD (r = .46, p= .03).
- Respondent age was not correlated with screener scores.
- · Child birth weight was positively correlated with **Expressive Language** score (r = .40, p = .05).
- None of the screener scores were correlated with gestational age or age of child at intake.

Non-ASD Group

- Language scores were correlated with all M-CHAT and **CSBS-ITC** scores such that better language skills indicated better screener performance (r = .37 to .59, p < .05).
- Child age at screening was correlated with all CSBS-ITC scores such that older children had acquired more of the screened skills at intake (r = .51 to .62, p < .01).
- No significant correlations between respondent education, age, or perinatal measures (i.e., gestational age or birth weight) and screener scores were observed.

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CONCLUSIONS

skilled at diagnosing ASD (resulting in very long wait lists and prolonged time to diagnosis and related intervention), it is essential that clinics utilize effective means to identify children in need (and those not in need) of ASD-specific evaluation as quickly and efficiently as possible. The current analyses offer some insight into possible factors impacting screening outcome and relation to diagnostic outcome. Results from a tertiary care clinic setting indicated that children referred for ASD evaluation are identified as at risk with the CSBS-ITC and M-CHAT but suggest that different factors may impact the positive predictive value of these measures.

- Within the ASD group, respondent level of education was an important factor related to screener outcome such that lower levels of education were associated with elevated scores on screening tools. This relation was not observed in the group of children with a non-ASD diagnosis. Overall, this finding is consistent with Scarpa et al. (2013), who reported that lower maternal education was an important factor in M-CHAT scores reflective of ASD risk.
- Language skills of children in the ASD group were positively correlated with respondent education but language skills were not related to screening results for children with subsequent ASD diagnoses. Within the non-ASD group, measured language skills were positively related to screening results but the impact of respondent education was not observed. The non-ASD group likely includes children with a wider range of developmental and behavioral difficulties than the ASD group, and may resemble the more typical developmental pattern of language acquisition and understanding within this group that result in less pronounced social and communication difficulties than the children with an ASD diagnosis.
- · Perinatal characteristics of gestational age and birth weight CSBS-ITC for the children with or without ASD.

Notably, our sample was similar to that of Scarpa et al. (2013) but was less racially diverse. Families are referred to our clinic from throughout Alabama and surrounding states and this data does represent a similar primarily rural area with limited access to screening, evaluation, and intervention resources.

Current data suggests that the development of future screening respondent education. Further, level of language of the child function differently in ASD than in other DD groups, which is consistent with the unique language profile of young children with ASD.

FUTURE DIRECTIONS

ongoing at our site, and with the larger sample it will be language skills at a more sophisticated level to explore these relations more specifically. Further, analyses with the larger sample will include specific measures of ASD, such as the ADOS and ADI-R scores, to evaluate how screener outcomes are related to diagnostic outcome and level of ASD symptoms in this high-risk referred sample. Finally, it will be important to evaluate how the recently released \dot{M} -CHAT -R, including the Follow-Up Interview, functions in this tertiary care setting.