

Validation of the modified checklist for Autism in toddlers, revised with follow-up (M-CHAT-R/F)

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OBJECTIVE

This study validates the Modified Checklist for Autism in Toddlers, Revised with Follow-up (M-CHAT-R/F), a screening tool for low-risk toddlers, and demonstrates improved utility compared with the original M-CHAT.

METHODS

Toddlers (N = 16,071) were screened during 18- and 24-month well-child care visits in metropolitan Atlanta and Connecticut. Parents of toddlers at risk on M-CHAT-R completed follow-up; those who continued to show risk were evaluated.

RESULTS

The reliability and validity of the M-CHAT-R/F were demonstrated, and optimal scoring was determined by using receiver operating characteristic curves. Children whose total score was ≥ 3 initially and ≥ 2 after follow-up had a 47.5% risk of being diagnosed with autism spectrum disorder (ASD; confidence interval [95% CI]: 0.41-0.54) and a 94.6% risk of any developmental delay or concern (95% CI: 0.92-0.98). Total score was more effective than alternative scores. An algorithm based on 3 risk levels is recommended to maximize clinical utility and to reduce age of diagnosis and onset of early intervention. The M-CHAT-R detects ASD at a higher rate compared with the M-CHAT while also reducing the number of children needing the follow-up. Children in the current study were diagnosed 2 years younger than the national median age of diagnosis.

CONCLUSIONS

The M-CHAT-R/F detects many cases of ASD in toddlers; physicians using the 2-stage screener can be confident that most screen-positive cases warrant evaluation and referral for early intervention. Widespread implementation of universal screening can lower the age of ASD diagnosis by 2 years compared with recent surveillance findings, increasing time available for early intervention.

Pediatrics. 2014 Jan;133(1):37-45. doi: 10.1542/peds.2013-1813. Epub 2013 Dec 23. (Original) PMID: 24366990

For Immediate Release: Monday, December 23, 2013

Revised autism screening tool offers more precise assessment

Testing during routine checkups indicates earlier diagnosis possible

An updated screening tool that physicians administer to parents to help determine if a very young child has autism has been shown to be much more accurate than earlier versions at identifying children who could benefit from further evaluation, according to researchers supported by the National Institutes of Health.

The Modified Checklist for Autism in Toddlers — Revised, with Follow-Up (M-CHAT-R/F) — is a free, two-step screening tool used to detect children likely to have autism. It is intended for use at regular well-child checkups for children 16 to 30 months old. With the M-CHAT-R/F, health care providers can classify a child's risk of having autism as low, medium or high, on the basis of parents' answers to 20 questions.

"This checklist can more accurately identify children likely to have autism so they can get the treatment and support they need," said Alice Kau, Ph.D., of the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), the NIH institute that funded the study. "Given that the typical autism diagnosis occurs at age 4, it also offers the possibility of detecting autism much earlier — during regular doctor's visits when a child is 18 months or 2 years old. And earlier intervention has been shown to improve outcomes for children with autism."

A score in the high-risk range warrants a referral for further evaluation for possible autism. For a child determined to be at medium risk, M-CHAT R/F includes a follow-up questionnaire used soon after the original evaluation to obtain additional information needed to more definitively classify the child as either high risk or low risk.

Based on the M-CHAT-R/F classifications, the researchers found that a smaller proportion of children received a medium- or high-risk assessment (7 percent) than with earlier versions of the checklist (9 percent). However, more total cases of autism were detected with the revised checklist than with earlier versions (67 cases per 10,000 screened vs 45 cases per 10,000 screened).

Of the more than 16,000 children evaluated with the screening tool, 93 percent of the children screened were considered low-risk, 6 percent were in the medium-risk range and 1 percent were considered high-risk.

Of all the children who determined by the test to be at risk after the M-CHAT-R/F follow-up, 95 percent were eventually found to have some form of developmental delay, including more than 47 percent with autism spectrum disorder.

First author Diana L. Robins, Ph.D., of Georgia State University (GSU), in Atlanta, conducted the research with GSU colleague Karís Casagrande, and Marianne Barton, Ph.D., Chi-Ming Chen, Ph.D., Thyde Dumont-Mathieu, M.D., M.P.H., and Deborah Fein, Ph.D., all of the University of Connecticut in Storrs. Dr. Fein was the study's senior author.

The findings appear in *Pediatrics*.

The researchers updated an earlier version of the autism screening tool, adding examples, rephrasing some questions and dropping others that previously did not elicit strong responses. Using the revised tool, the researchers worked with health care providers to screen more than 15,000 toddlers considered at low risk for autism.

“Earlier tools cast a wider net, but these refinements will allow health care providers to focus energy where it is needed most and will reduce the number of families who go through additional testing but which ultimately do not need treatment interventions,” said Dr. Fein.

The free [autism screening tool](#) is available online in more than 45 languages.

This study was supported by NIH grant number R01HD039961.

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