Screening for autism in pre-school children in primary care: systematic review of English language tools

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CRD summary
This review found that the Checklist for Autism in Toddlers (CHAT) was unlikely to offer sufficient sensitivity to be useful for population screening; the modified CHAT appears more promising but further research was required. These conclusions should be interpreted with caution given the likelihood that relevant studies have been missed, the failure to appropriately consider study quality, and the poor quality and small number of included studies.

Authors' objectives
To determine the accuracy of brief screening tools for autism in pre-school children.

Searching
MEDLINE, CINAHL, EMBASE and PsycINFO were searched from inception to January 2005. The full search strategy, which included a diagnostic filter, was provided. The HTA databases and National Screening Committee website were also searched. The reference lists of relevant studies were screened for additional relevant studies.

Study selection
Studies that compared English language screening or diagnostic tools with a reference standard based on the American Psychiatric Association's DSM-III/IV criteria or International Classification of Diseases (ICD 10) criteria for diagnosing autism or autistic spectrum disorder, and that were conducted in children aged younger than four years at screening with no prior diagnosis of developmental delay, were eligible for inclusion. The screening tools had to be appropriate for use in a general primary care setting (ability to score the tool in a brief consultation without extensive prior training). Studies that assessed only Asperger's Syndrome were excluded, as were studies that assessed global development delay.

The included studies were diagnostic cohort studies that assessed the Checklist for Autism in Toddlers (CHAT; parent and professional report) and modified CHAT (M-CHAT; parent report only) screening tools. These tools require minimal training and take approximately 15 minutes to complete. Screening was performed by general practitioners, health professionals or parents. The reference standards used by the included studies were DSM-III, DSM-IV and ICD-10 criteria. Diagnosis was made after between 1 and 5.5 years' follow-up. The included children were aged from 17 to 24 months. The outcomes reported in the review were the sensitivity, specificity, and positive and negative predictive values.

One reviewer selected studies for inclusion and a second reviewer checked the decision.

Assessment of study quality
The authors did not state that they assessed validity. However, they did describe the time lapse between the application of the screening tool and the reference standard, and blinding at screening and diagnosis.

Data extraction
Data on the sensitivity, specificity, and positive and negative predictive values were extracted or calculated from the extracted data. If 95% confidence intervals were not reported for sensitivity and specificity, these were then calculated using exact methods for single proportions. Data on the reproducibility of the tests were also extracted, where reported.

One author extracted the data from the included studies and a second reviewer checked the data extraction.

Methods of synthesis
A narrative synthesis was presented.

Results of the review
Three studies (17,619 children) were included. 

All studies were unblinded during the application of the reference standard.

One small study reported a sensitivity and specificity of 100% for the diagnosis of autistic spectrum disorder using the CHAT tool. However, this study had a very short duration of follow-up and only those children thought to be suffering from developmental delay received the reference standard. A second study reported a sensitivity of 11 to 38% and a specificity of 98 to 100% for the CHAT tool. This study reported separate data for childhood autism and autistic spectrum disorder, for medium- and high-risk thresholds, and for an initial screen of all children and a subsequent screen of children identified as high risk based on the initial screen. Only a subset of patients received the reference standard. The third study assessed the M-CHAT and reported a specificity of 98% based on the whole sample; the sensitivity was not reported. A subset of children were followed up at age 3.5 years: the data suggested a sensitivity of 100% and a specificity of 98%. The spectrum of children included in this study was not representative of children in the general population.

Authors' conclusions
The sensitivity of CHAT was unlikely to be sufficient to be useful for population screening, although its high specificity suggests that it may be useful in secondary screening. The M-CHAT may be more sensitive, but further data were required to confirm this.

CRD commentary
The review addressed a focused question supported by clearly defined inclusion criteria. The literature search was reasonable but included a diagnostic filter, and only limited attempts were made to locate unpublished studies. It is therefore likely that relevant studies were missed. Some steps were taken to minimise bias in the study selection and data extraction processes. A formal quality assessment was not conducted, although some methodological limitations were discussed in relation to the included studies. The lack of such an assessment is a considerable limitation of this review given the apparent poor quality of the included studies. Appropriate study details were summarised in the tables and discussed in the text. The narrative synthesis was appropriate given the small number of included studies and differences between these studies. The authors’ conclusions are unlikely to be reliable due to the likelihood that relevant studies have been missed, the failure to appropriately consider study quality, and the poor quality and small number of included studies.

Implications of the review for practice and research
Practice: The authors stated that the CHAT performs poorly as a screening instrument.

Research: The authors stated that parent report tools, in particular the M-CHAT, are worthy of further research.

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