

Simple Screening Test Allows Early Detection of Autism

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Aug. 5, 2004 —The Checklist for Autism in Toddlers (CHAT-23), a simple two-part screening test, aids in the early detection of autism in Chinese children aged 18 to 24 months, according to the results of a cohort study described in the August issue of *Pediatrics*.

"There is a recent trend of a worldwide increase in the incidence of autistic spectrum disorder. Early identification and intervention have proved to be beneficial," write Virginia Wong, FRCP, FHKAM, FHKC, from the University of Hong Kong, and colleagues. "The original version of CHAT was a simple screening tool for identification of autistic children at 18 months of age in the United Kingdom. Children with an absence of joint attention (including protodeclarative pointing and gaze monitoring) and pretend play at 18 months were at high risk of autism."

The first section of this instrument is a self-administered parent questionnaire addressing rough and tumble play, social interest, motor development, social play, pretend play, protoimperative pointing (pointing to ask for something), protodeclarative pointing (pointing the index finger to indicate interest in an object), functional play, and showing. The second section consists of five items recorded after observation by general practitioners or health visitors: eye contact, ability to follow a point (gaze monitoring), pretend (pretend play), produce a point (protodeclarative pointing), and make a tower of blocks.

In this cross-sectional cohort study, 212 Chinese children with mental ages of 18 to 24 months were tested with the CHAT-23, a new checklist translated into Chinese. Of the 212 children, 125 were not autistic, and the remaining group had autistic disorder (n = 53) or pervasive developmental disorder (n = 33).

Based on discriminant function analysis, there were seven key questions that could best discriminate autism from nonautism, addressing areas of joint attention, pretend play, social relatedness, and social referencing. On the parental questionnaire, failing any two of seven key questions yielded a sensitivity of 0.931 and specificity of 0.768. Failing any six of all 23 questions produced a sensitivity of 0.839 and specificity of 0.848. The seven key questions included on the parental questionnaire were: does your child imitate you; does your child ever pretend to talk on the telephone, take care of dolls, or other pretend behaviors; does your child ever use his/her index finger to point or to indicate interest in something; does your child look at your face to check your reaction when faced with something unfamiliar; does your child ever bring an object to you to show it to you; if you point at a toy across the room, does your child look at it; and does your child take an interest in other children?

On the observational portion of CHAT-23, failing any two of four items produced a sensitivity of 0.736, specificity of 0.912, and a positive predictive value of 0.853. These items were making eye contact, looking to see what the examiner was pointing at, pretending to pour out or drink tea, and pointing with the index finger at a light.

Study limitations include increased chance of identifying autism because 41% of the cohort was autistic, and higher age of autistic subjects compared with nonautistic subjects.

"We found that integrating the screening questions of the M-CHAT [Modified-CHAT] (from the United States) and observational section B of the original CHAT (from the United Kingdom) yielded high sensitivity and specificity in discriminating autism at 18 to 24 months of age for our Chinese cohort," the authors write. "We recommend identifying the possible positive cases with part A (parental questionnaire) and then proceeding to part B (observation) with trained assessors.... Whether this approach is feasible in the United States depends on the local medical system and screening procedures."

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Clinical Context

Although autism may manifest itself in certain behaviors when children are younger than 24 months, predicting children who will go on to develop this disorder is not easy. Baron-Cohen and colleagues demonstrated in the February 1996 issue of the *British Journal of Psychiatry* that the absence of three key items at age 18 months: protodeclarative pointing (pointing the index finger to indicate interest in an object), gaze response (the child looks at an object the interviewer describes), and pretend play (the child acts out pretend activities), reliably predicted 83.3% cases of autism among all children screened. Follow-up of these children with autism demonstrated that the diagnosis remained valid at 3.5 years of age.

CHAT first espoused by Baron-Cohen and his fellow group of researchers has been since modified to improve both positive predictive value and efficiency. The current research incorporates two versions of the CHAT in an attempt to create an autism screening algorithm for young children.

Study Highlights

- This cross-sectional study was performed on children with autism, developmental delay, and normal development recruited from clinics in Hong Kong. Children were between the chronologic ages of 13 to 86 months and tested to have mental ages between 18 to 24 months. The authors used mental age as their main criteria for study entry because they could not find a sufficient number of children

between 18 to 24 months chronologic age diagnosed with autism. The diagnosis of autism in this cohort was confirmed using criteria from the *Diagnostic and Statistical Manual of Mental Disorders, 4th edition*.

- Children with other active medical conditions or receiving antiepileptic medications were excluded from participation.
- The authors created combined several elements of the original CHAT test as well as the M-CHAT and administered these examinations to study participants. 23 questions from the M-CHAT were included, along with section B of the original CHAT. Answers to the questionnaire completed in part A of the new CHAT-23 were modified so parents could rate the frequency of behaviors. Part B of the new CHAT examination was performed under the supervision of trained researchers examining children's behavior. Part A took approximately 10 minutes for parents to complete, while part B allowed for less than 5 minutes of direct observation time. Interobserver reliability for part B of the examination was good.
- 87 children with autism or pervasive developmental disorders and a mean chronologic age of 51.3 months were included, along with 67 children with developmental delay (mean age, 33.5 months) and 58 children with normal development (mean age, 23.9 months).
- Only 2 questions of the 23 questions of part A of the examination, one regarding whether the child enjoyed being swung or bounced and another focused on the ability to walk, were found not to discriminate between autism and nonautism.
- Seven questions from part A were found to have the best discriminating value between children with autism and the other groups. These questions regarded (in descending order of value): imitative behaviors, pretend play, protodeclarative pointing, whether the child checks the parents reaction before reacting on his/her own when faced with a new situation, whether the child brings objects to show parents, gaze response, and whether the child takes an interest in other children. The best balance of sensitivity and specificity for screening for autism was found when children failed 2 of these 7 questions (sensitivity 93.1%, specificity 76.8%).
- Using the criteria of failing any 6 of the 23 total questions on part A of the examination, the sensitivity of screening for autism decreased to 83.9%, but specificity improved to 84.8%.
- All of the 4 items (making eye contact, gaze response, pretend play, and protodeclarative pointing) used in part B of the examination were discriminatory for autism vs. nonautism. Failing any 2 of these 4 items correlated with a sensitivity of 73.6% and a specificity of 91.2%.
- Based on these data, the authors recommend a two-part screening process for young children with autism. The questionnaire from part A of their examination (using either failing 2 of the 7 key questions or 6 of the 23 total number of questions as a "positive" screen) would serve as the initial screening tool. Children with a positive screen could then be evaluated with the more specific observational component of the examination.