Title: Psychometric Properties of Short Version of Qualitative Checklist for Autism in Toddlers (Q-Chat) in a Sample of Iranian Toddlers: Brief Report

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To appear in: Avicenna Journal of Neuropsychophysiology Journal

Received date: 2019/08/25
Revised date: 2019/09/14
Accepted date: 2019/09/15

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Please cite this article as:
DOI: http://dx.doi.org/10.32598/ajnpp.4.3.305
Abstract

Background: Early screening is necessary for early intervention for people with autism. Parents report questionnaires are effective tools for screening of autism. Short form of Quantitative Checklist for Autism in Toddlers (Q-CHAT-10) is new scale for screening autism in toddlers. The aim of this study was to evaluate the psychometric properties of the Persian version of the short form of Quantitative Checklist for Autism in Toddlers (Q-CHAT-10).

Method: we secondarily analyzed data which were obtained from our study on full version of Q-CHAT. We only selected data regards 10 items which consisted short version of Q-CHAT.

Results: The typically developing group consisted of 50 children with the mean age of 29.62 months, and the ASD group included 50 children with the mean age of 27.14 months. The mean of the total score for the typically developing group was 2.1 and it was 6.46 for the ASD group, that were significantly different (t (98) =-11.52, p=0.000). The Cronbach’s alpha coefficient of the checklist was 0.78, and test-retest reliability was calculated as 0.951 (p<0.001). The estimated area under the curve (AUC) was 0.935.

Conclusion: The Persian translation of Q-CHAT-10 has good reliability and predictive validity and can be used as a screening tool to screening autism.

Keywords: Autism Spectrum Disorder, Q-CHAT, Short version,
Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disorder has been characterized with social communication problems and restricted patterns of behaviors (1). The prevalence of autism has been raised in recent years and reported as about 1% in Diagnostic and statistical manual of mental disorders (DSM-5) (2). Early screening in toddlers for early intervention is highly recommended to decrease negative effects of autism; because of this fact that in the early course of development, interaction between the plasticity of the brain and quality and intensity of interventions can lead to better outcome in the future (3).

Using short parent report questionnaires as a first step to screen who are at risk of autism is very common; this kind of scales are reliable and don’t need to specialist and large amount of time to administer (4).

Checklist for Autism in Toddlers (CHAT) and Modified Checklist for Autism in Toddlers (M-CHAT) are among screening tools which have been used successfully in different setting and countries to screen toddlers who are at risk of autism (5). Due to the changes in approach to autism as categorical diagnosis to dimensional diagnosis, new version of this tools has been developed by their developers which is called qualitative Checklist for Autism in Toddlers (Q-CHAT) (6). It is consisted of 25 items that answered by caregivers of toddlers between 18 to 24 months in a 5 point Likert scales. Recently, It is increasingly used and psychometric properties of it is evaluated in different languages and countries (7).

Since, shorter questionnaires are more feasible, its short version was developed. Short version of Q-CHAT consists of 10 items of its full version which better discriminate between toddlers with autism and typically developing toddlers (8).
Previously, we have investigated psychometric properties of Persian translation of Q-CHAT among Iranian toddlers(9). Because shortness of appropriate and quick dimensional screening tools in Persian language, in present study we aimed to investigate psychometric properties of short version of Persian translation of Q-CHAT using data obtained from our previous study(9).

Materials & Methods
We secondarily analyzed data which are obtained from our study on full version of Q-CHAT(9). The original study was approved by ethical committee of Iran University of Medical Sciences. As explained in the report of full version, at first step, we prepared Persian version of Q-CHAT; items were translated to the Persian and then we checked accuracy of translation using back translation method. After that, we asked a few families to read and feedback us regards understandability of items. When the final version of questionnaire was prepared, we selected appropriate sample and conducted checklist.

Based on number of items of questionnaire and pervious study we considered a sample of 100 toddlers of our study. Our sample included 50 typically developing toddlers and 50 toddlers with autism who had selected conveniently. Typically developing group selected from a hospital nursery and based on their parent reports and they had no history of developmental delay. To confirm that they don’t have any developmental delay, they were evaluated by one of the authors. Autistic group were selected among clients of a psychiatric hospital and an autism center in Tehran, capital city of Iran. At first children who were suspected to be autism due to their developmental delay were evaluated by a child psychiatrist based on diagnostic criteria of DSM-IV-TR and who were diagnosed as autism refer to second child psychiatrist to confirm their diagnosis. Children who were diagnosed by both psychiatrist, were selected as ASD group. Children who had severe physical disability or were deaf or blind were excluded from the study. We described the aim of
the study and its procedure for parents and taking oral consonant form from them. After selecting appropriate sample, the checklist was filled out by mothers of selected children.

Data analysis

Data were entered in SPSS-19 and then descriptive indexes (frequency, mean and standard deviation) and inferential statically tests (independent t-test, Kolmogorov-Smirnov test, Cronbach’s alpha, Pearson’s r, and the receiver operating characteristic (ROC) curve) were computed to addressing aim of the study.

Results

Our sample consist of 50 toddlers with autism (ASD) and 50 typically developing (TD) toddlers. The mean age of ASD group was 27.14 months (sd: 7.68) and TD group was 29.62 months (sd: 9.43) and there weren’t significant differences between these groups (t (98) =-1.441, p=0.153). In ASD group, there were 38 males (76%) and 12 females (24%) and in TD group there were 37 males (74%) and 13 females (26%).

The Cronbach’s alpha coefficient was 78% and test-retest reliability was calculated as 0.951 (p<0.01).

The mean of total score of Q-CHAT-10 in ASD group was 6.46 (sd:2.29) and TD group was 2.1 (1.37); the mean score of ASD group was significantly higher than TD group (t (98) =-11.52, p<0.001).

The area under curve (AUC) was calculated as an index of the overall predictive validity as 0.935 which indicate the ability of short version of Persian translation of Q-CHAT to discriminate between ASD and TD toddlers (figure 1).
Figure 1: Area Under Curve (AUC)

The sensitivity and specificity of different total scores of Q-CHAT-10 are presented in table 1.

<table>
<thead>
<tr>
<th>Total Scores</th>
<th>sensitivity</th>
<th>specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00</td>
<td>0.14</td>
</tr>
<tr>
<td>2</td>
<td>0.98</td>
<td>0.38</td>
</tr>
<tr>
<td>3</td>
<td>0.94</td>
<td>0.58</td>
</tr>
<tr>
<td>4</td>
<td>0.88</td>
<td>0.82</td>
</tr>
<tr>
<td>5</td>
<td>0.78</td>
<td>0.99</td>
</tr>
</tbody>
</table>
Discussion and Implications:

Our findings show that short version of Q-CHAT (Q-CHAT-10) can be used as a reliable tool to screen toddlers who are at risk of autism. As it is expected, the mean scores of ASD group was significantly more than TD group ($t(98)=-11.52, p<0.001$); as there weren’t significant differences between two groups based on mean age and sex ratio, the observed differences in total scores can be reliable.

The mean and sd of total score in ASD group ($M=6.46, SD=2.29$) is similar to Allison et al.’s study ($M=6.9, SD=2.7$), but in TD group ($M=2.1, SD=1.37$) is slightly more than their findings ($M=1.03, SD=1.32$) which can be explained by differences between age ranges of TD groups in these two studies; the age ranges in Allison et al.’s study was 15 to 47 months which is higher than our study.

The Cronbach’s alpha coefficient was 78% and test-retest reliability was calculated as 0.951 ($p<0.01$) which indicate reliability of scores.

The most important component of a good screening tool is its ability to discriminate who are at risk from typically group. Estimating Area Under Curve (AUC) can be an index of this ability. Based on the expert opinion, in an ideal situation, in which a tool can discriminate all of the affected people from non-affected, the AUC will be equal to 1; it means that as AUC is nearer to
1, the screening tools is more useful(10). The AUC in present study is equal to 0.935 which indicate the ability of short version of Persian translation of Q-CHAT in discriminating toddlers with ASD from TD groups. This index in Allison et al.’s study was 0.965 which is almost similar to our finding.

It is recommended that optimal cut off score in a screening tool to identify affected peoples should have sensitivity between 70% to 80% and specificity near to 80%(11). In Allison et al.’s study, recommended cut point is 3. Based on our findings, cut point 3 has a good sensitivity (93%), but poor specificity (54%). Instead, at cut point 4, both sensitivity and specificity are at acceptable level (88% and 82%, respectively).

Conclusion

In sum, our finding shows that short version of Persian translation of Q-CHAT (Q-CHAT-10) can be used as a reliable screening tool among Iranian toddlers. The cut point of 4 can be used as an optimal point for screening purposes.

Acknowledgement

This study has used data obtained from previous study which was financially by Iran University of Medical Sciences through a grant from Mental Health Research Center (MHRC).

Conflict of interest:

All authors reveal that they have no conflict of interest.
References: