



Review Article

Challenges in the Use of M-chat as Screening Tool for Early Detection of Autism in Primary Care Centers, Riyadh, Saudi Arabia

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Citation: Al Khadhrawi NH, Altassan F, Al-Baik MZ, Kofi M (2022) Challenges in the Use of M-chat as Screening Tool for Early Detection of Autism in Primary Care Centers, Riyadh, Saudi Arabia. J Family Med Prim Care Open Acc 6: 177. DOI: 10.29011/2688-7460.100077

Received Date: 28 March, 2022; **Accepted Date:** 04 April, 2022; **Published Date:** 08 April, 2022

Abstract

Introduction: M-chat is a screening tool for autism among children. This study describes use of M-chat and challenges on its application in our local community primary health care centers. This study aimed to test applicability and challenges in use of M-Chat screening method to identify possible autistic children. **Study Design:** cross sectional descriptive. **Methods:** 2542 children were screened using the M-Chat tool for early detection of ASD. **Results:** 222/2542 children were proved that they need further assessment since they were suspected to be ASD. 2542 children were screened for ASD, 222 children were diagnosed as possible ASD, 103/222 were females and 119/222 were males' children. Only one child scored a score of 2, 115 children scored a score of 3, 40 children scored 4, 19 children scored 5, 13 children scored 6, and 8 children scored 7, while 13 children scored 8 to 15. **Conclusion:** The M-Chat was able to detect 222 out of 2452 to be possible ASD, these are important findings, since early detection and intervention have a great impact in the improvement and outcomes of the ASD children.

Keywords: Autism; M-Chat; Screening

Introduction and Review of Literature

Autistic Spectrum Disorder (ASD) refers to a neurodevelopmental condition associated with verbal and nonverbal communication, social interactions, and behavioral complications that is becoming increasingly common in many parts of the globe. Identifying individuals on the spectrum has remained a lengthy process for the past few decades due to the fact that some individuals diagnosed with ASD exhibit exceptional skills in areas such as mathematics, arts, and music among others. To improve the accuracy and reliability of autism diagnoses, many scholars have developed pre-diagnosis screening methods to help identify autistic behaviors at an early stage, speed up the clinical diagnosis referral process, and improve the understanding of ASD for the different stakeholders involved, such as parents, caregivers, teachers, and family members. However, the functionality and reliability of those screening tools vary according to different research studies and some have remained questionable. This study evaluates the Use of one of the screening tools for autism, known as M-Chat.

Autism Spectrum Disorder (ASD), is a pervasive developmental disorder that hinders an individual's skills in socialization, creates repetitive behaviors, and impacts expressive or verbal communication with disruptions ranging from moderate to severe [1]. Can be easily to be identified in children at two to three years of age. According to Towle P, et al. [2], one out of every 68 children have autism. Consequently, various screening methods have been developed to provide the necessary interventions [3].

Diagnosing Autism is a challenging task since there are currently multiple clinical techniques available, with most typically involving long-term observation and evaluation by licensed HCWs [4-6]. Conventionally to diagnose ASD require medical professionals to conduct a clinical assessment of the patient's developmental age based on a specific domain (e.g., behavior excesses, communication, self-care, social skills). This approach is referred to as clinical judgment [7]. To recently, most clinicians used the Diagnostic and Statistical Manual fourth edition (DSM-IV) as the underlying criteria for diagnosing autistic behaviors [8]. The DSM-IV classifies autism under the category of common Pervasive Development Disorders (PDDs).

The most popular clinical methods to assess individuals with ASD include Autism Diagnostic Interview-Revised (ADI-R), Autism Diagnostic Observation Schedule (ADOS), Childhood Autism Rating Scale (CARS), Joseph Picture self-concept scale, and the social responsiveness scale [9-12]. These are clinical methods used for formal ASD diagnosis and treatment planning [13]. The techniques, like ADI-R and ADOS, have been clinically proven to be effective instruments in differentiating autism from other related developmental disorders, and having adequate validity and sensitivity [14]. Unfortunately, because time consuming, having long questionnaires and scoring methods, and requiring licensed HCWs to administer them [15-18].

Apart from clinical diagnostic methods, there are self-administered screening instruments developed by different neuroscientists and psychologists in the autism and healthcare arena. The tools, such as Autism Spectrum Quotient (AQ), Childhood Asperger Syndrome Test (CAST), and the Modified Checklist for Autism in Toddlers (M-CHAT), which are discussed in later sections, often consist of large sets of items for discriminating the autistic behaviors from all other types of PDDs [19-21]. Most of these tools have been developed based on Clinical Judgment methods, and have been able to present more accessible ways for users to undergo an ASD screening. Nevertheless, screening tools are not considered diagnosis methods for ASD since many of them lack the presence of a licensed clinician as well as the necessary clinical environment. In addition, the majority of these screening tools do not fully align with the new criteria for ASD developed under the DSM-5. Therefore, the need for revised methods that adhere to the standards of the DSM-5 have arisen.

There have been many studies in applied behavioral sciences that have investigated the efficiency and effectiveness in clinical environments of ASD diagnosis techniques [22-25]. However, limited studies have been carried out to identify the performance of ASD screening methods and to evaluate their merits and issues [2,26-28]. For instance, [26], reviewed common screening methods related to autism and only compared their performance with regard to specificity and sensitivity. A small number of details about the screening methods were provided, and important aspects such as DSM-5 fulfilment, the methods' popularity, and their target audience were omitted. Zwaigenbaum L, et al. [27] reviewed early screening methods for toddlers without covering other important aspects relating to adolescents, children, and adults. They indicated that early identification of ASD traits in toddlers, 18-24 months of age, is consistent with the recommendations of the American Academy of Pediatrics. Another similar review of ASD tools for infants was conducted by Towle P, et al. [2], and showed that a two-level screening can help improve the reliability of the process. Stewart LA, et al. [28] conducted a systematic review of common diagnosis methods of ASD in low and middle-income countries. They revealed that because of the limited clinical resources in low-income countries, screening methods are more effective in discovering autistic traits. However, clinical diagnosis methods seem more widely utilized in middle and high-income countries.

The Q-CHAT, one of the oldest methods of screening for autism, was developed by Baron-Cohen S, et al. [29], as an efficient quantitative checklist to be administered by medical professionals coinciding with a report submitted by the child's parents based on observations of the child's behavior. The earliest version of Q-CHAT was used to detect autism in toddlers aged between 18 and 24 months only. A screening study carried out to test the validity of Q-CHAT, based on 16,235 toddlers, revealed that the sensitivity of Q-CHAT's initial version was as low as 38%. The M-CHAT, a modified version, was thus introduced by Robins DL, et al. [19] to enhance the sensitivity of the original CHAT method. A similar screening study was conducted for M-CHAT, and it was discovered that it had higher sensitivity and specificity on the referred sample population despite those of the M-CHAT method on the over-all population remained in question. However, both the CHAT and M-CHAT consisted of over 20 Likert Scale-type questions that needed to be completed in order to assist healthcare specialists in differentiating actual cases from the controls for further referrals.

Methods

This study aimed to test applicability and challenges in use of M-Chat screening method to identify possible autistic children.

Study Design: cross sectional descriptive

Study Duration: 6 months

Study Setting: primary health care centers, well baby clinics, Alwezarat PHC

Sampling Technique

Target Population/Sample Size: all children attending the Well baby clinic will be included in a duration of one month. 1300 children are expected to be included as, it is the average of well-baby clinic attendees every month.

Inclusion Criteria: all children at age 18 months - 36 months old are eligible.

Exclusion Criteria: children out of this age group were excluded

Data Collection/Data Source: use of M-chat format

Statistical Analysis

Statistical analyses will be performed using SPSS, version 18.0. Descriptive statistics will be computed for patients with different parameters, health status, virtual clinic usage and perception, of virtual care and virtual clinics versus regular clinics, As well as chi-square test will be used to determine the correlation between usage of patient for virtual compared to regular clinics and other studied variables. P value of <0.05 will be considered statistically significant and 95% confidence intervals will be calculated

Ethical Considerations

1. The participant has the right to refuse participation without

any harmful sign and has the right to stop filling questionnaire any time and withdraw from study.

2. The participant must be informed that filling the questionnaire consider as consent form, by ticking on yes, I agree button on the first page of questionnaire.
3. The participant will be explained what the research about.
4. All information will be confidentially and used only for this research anonymity.
5. The participant has the right to contact a researcher.
6. The participant must be informed that his consent or refusal will not affect access to health services.

MSD-IRB Approval is taken prior to start the study. Additional to the approval from PSMCM also taken prior to start the study.

IRB APPROVAL: On the recommendation of the board of review in the ethical aspects of the proposal, Institutional Review Board (IRB) HP-01-R079 approved and grant permission to conduct research protocol has been documented under:

IRB Approval No Date: 1508; 14 April 2021

Results

2542 children were screened for ASD, 222 children were diagnosed as possible ASD, 103/222 were females and 119/222 were males' children. Only one child scored a score of 2, 115 children scored a score of 3, 40 children scored 4, 19 children scored 5, 13 children scored 6, 8 children scored 7, while 13 children scored 8 to 15.

Conclusion

The M-Chat was able to detect 222 out of 2452 to be possible ASD, this are important since early detection and intervention greatly impact the improvement and outcome of the ASD children.

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Citation: Al Khadhrawi NH, Altassan F, Al-Baik MZ, Kofi M (2022) Challenges in the Use of M-chat as Screening Tool for Early Detection of Autism in Primary Care Centers, Riyadh, Saudi Arabia. *J Family Med Prim Care Open Acc* 6: 177. DOI: 10.29011/2688-7460.100077

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Modified Checklist for Autism in Toddlers, Revised with Follow-Up

(M-CHAT-R/F)TM

Acknowledgement: We thank Joaquin Fuentes, M.D. for his work in developing the flow chart format used in this document.

For more information, please see www.mchatscreen.com
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Permissions for Use of the M-CHAT-R/F™

The Modified Checklist for Autism in Toddlers, Revised with Follow-Up (M-CHAT-R/F; Robins, Fein, & Barton, 2009) is a 2-stage parent-report screening tool to assess risk for Autism Spectrum Disorder (ASD). The M-CHAT-R/F is available for free download for clinical, research, and educational purposes. Download of the M-CHAT-R/F and related material is authorized from www.mchatscreen.com.

The M-CHAT-R/F is a copyrighted instrument, and use of the M-CHAT-R/F must follow these guidelines:

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Instructions for Use

The M-CHAT-R can be administered and scored as part of a well-child care visit, and also can be used by specialists or other professionals to assess risk for ASD. The primary goal of the M-CHAT-R is to maximize sensitivity, meaning to detect as many cases of ASD as possible. Therefore, there is a high false positive rate, meaning that not all children who score at risk will be diagnosed with ASD. To address this, we have developed the Follow-Up questions (M-CHAT-R/F). Users should be aware that even with the Follow-Up, a significant number of the children who screen positive on the M-CHAT-R will not be diagnosed with ASD; however, these children are at high risk for other developmental disorders or delays, and therefore, evaluation is warranted for any child who screens positive. The M-CHAT-R can be scored in less than two minutes. Scoring instructions can be downloaded from <http://www.mchatscreen.com>. Associated documents will be available for download as well.

Scoring Algorithm

For all items except 2, 5, and 12, the response "NO" indicates ASD risk; for items 2, 5, and 12, "YES" indicates ASD risk. The following algorithm maximizes psychometric properties of the M-CHAT-R:

- LOW-RISK:** Total Score is 0-2; if child is younger than 24 months, screen again after second birthday. No further action required unless surveillance indicates risk for ASD.
- MEDIUM-RISK:** Total Score is 3-7; Administer the Follow-Up (second stage of M-CHAT-R/F) to get additional information about at-risk responses. If M-CHAT-R/F score remains at 2 or higher, the child has screened positive. Action required: refer child for diagnostic evaluation and eligibility evaluation for early intervention. If score on Follow-Up is 0-1, child has screened negative. No further action required unless surveillance indicates risk for ASD. Child should be rescreened at future well-child visits.
- HIGH-RISK:** Total Score is 8-20; It is acceptable to bypass the Follow-Up and refer immediately for diagnostic evaluation and eligibility evaluation for early intervention.



www.m-chat.org

Child's name _____ Date _____
 Age _____ Relationship to child _____

M-CHAT-R™ (Modified Checklist for Autism in Toddlers Revised)

Please answer these questions about your child. Keep in mind how your child usually behaves. If you have seen your child do the behavior a few times, but he or she does not usually do it, then please answer no. Please circle **yes** or **no** for every question. Thank you very much.

1. If you point at something across the room, does your child look at it? (FOR EXAMPLE, if you point at a toy or an animal, does your child look at the toy or animal?)	Yes	No
2. Have you ever wondered if your child might be deaf?	Yes	No
3. Does your child play pretend or make-believe? (FOR EXAMPLE, pretend to drink from an empty cup, pretend to talk on a phone, or pretend to feed a doll or stuffed animal?)	Yes	No
4. Does your child like climbing on things? (FOR EXAMPLE, furniture, playground equipment, or stairs)	Yes	No
5. Does your child make <u>unusual</u> finger movements near his or her eyes? (FOR EXAMPLE, does your child wiggle his or her fingers close to his or her eyes?)	Yes	No
6. Does your child point with one finger to ask for something or to get help? (FOR EXAMPLE, pointing to a snack or toy that is out of reach)	Yes	No
7. Does your child point with one finger to show you something interesting? (FOR EXAMPLE, pointing to an airplane in the sky or a big truck in the road)	Yes	No
8. Is your child interested in other children? (FOR EXAMPLE, does your child watch other children, smile at them, or go to them?)	Yes	No
9. Does your child show you things by bringing them to you or holding them up for you to see – not to get help, but just to share? (FOR EXAMPLE, showing you a flower, a stuffed animal, or a toy truck)	Yes	No
10. Does your child respond when you call his or her name? (FOR EXAMPLE, does he or she look up, talk or babble, or stop what he or she is doing when you call his or her name?)	Yes	No
11. When you smile at your child, does he or she smile back at you?	Yes	No
12. Does your child get upset by everyday noises? (FOR EXAMPLE, does your child scream or cry to noise such as a vacuum cleaner or loud music?)	Yes	No
13. Does your child walk?	Yes	No
14. Does your child look you in the eye when you are talking to him or her, playing with him or her, or dressing him or her?	Yes	No
15. Does your child try to copy what you do? (FOR EXAMPLE, wave bye-bye, clap, or make a funny noise when you do)	Yes	No
16. If you turn your head to look at something, does your child look around to see what you are looking at?	Yes	No
17. Does your child try to get you to watch him or her? (FOR EXAMPLE, does your child look at you for praise, or say "look" or "watch me"?)	Yes	No
18. Does your child understand when you tell him or her to do something? (FOR EXAMPLE, if you don't point, can your child understand "put the book on the chair" or "bring me the blanket"?)	Yes	No
19. If something new happens, does your child look at your face to see how you feel about it? (FOR EXAMPLE, if he or she hears a strange or funny noise, or sees a new toy, will he or she look at your face?)	Yes	No
20. Does your child like movement activities? (FOR EXAMPLE, being swung or bounced on your knee)	Yes	No

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Appendix 1: The M-CHAT format.