Saudi mothers’ perception of their children with attention-deficit hyperactivity disorder in Dammam, Al-Qatif, and Al-Khobar cities, Saudi Arabia

Zainab J. Al-Mohsin, Heba A. Al-Saffar, Shaher Z. Al-Shehri, Marwa M. Shafey

Abstract:

BACKGROUND: Mothers’ perceptions about attention-deficit hyperactivity disorder (ADHD) are central to the management of the disorder. The aim of the study was to assess the knowledge, experiences, and attitudes of mothers with ADHD children toward ADHD and identify their common sources of information and service barriers from the perspectives of these mothers in the Dammam, Al-Khobar, and Al-Qatif areas.

MATERIALS AND METHODS: This cross-sectional study comprised mothers of 132 children with ADHD who attended private and government sector special education schools and day-care centers in the Al-Khobar, Dammam, and Al-Qatif cities of Saudi Arabia. All the mothers completed self-administered structured questionnaires.

RESULTS: About 47% mothers of children with ADHD had poor knowledge of ADHD, 74.2% had a positive attitude toward the condition, and 51.5% had a neutral perception of their children. Most of the children received combined therapy, with 69.5% exhibiting improved behavior. The most common concern of mothers was fear of the side effects of medication (39.4%). The mothers were the first family members to seek advice; the most common reason for first visit to clinic were poor social skills (45.5%), and attention hyperactive aggressive behavior (45.5%). The most common reason for the delay in diagnosis was failure to recognize the child’s aberrant behavior (67.4%), whereas the most common source of information was internet (63.6%).

CONCLUSION: It is important for clinicians to address the mothers’ perceptions of ADHD as part of the treatment for ADHD to improve the children’s quality of life. It is also important to develop educational materials and awareness campaigns that target mothers and facilitate good communication between the services through the social media.

Keywords:
Attention-deficit hyperactivity disorder, attention-deficit hyperactivity disorder attitude, attention-deficit hyperactivity disorder knowledge, service, treatment

Introduction

Attention-deficit hyperactivity disorder (ADHD) is one of the most common childhood neurodevelopmental conditions, characterized by a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development. [1] The ADHD worldwide-pooled prevalence in 2007 was 5.3% in the population below the age of 18 years. In the eastern region of Saudi Arabia, the prevalence was 3.5% in girls aged 6–15 years in 2012 [2] and 16.4% in
boys aged 6–13 years in 2008. ADHD is often comorbid with other psychiatric disorders and can persist into adulthood. Untreated ADHD can cause an emotional, social, academic, and economic burden on children, families, and the community.

A literature review of ADHD in Saudi Arabia on the prevalence and the awareness of teachers and the general population suggested that no study in Saudi Arabia had evaluated the perceptions of mothers of children with ADHD. This lack of data spurred our decision to conduct this study.

Materials and Methods

This cross-sectional study was conducted from November 2018 to January 2019 in private and government sector special education schools and day-care centers in Al-Khobar, Dammam, and Qatif cities of Saudi Arabia. All Saudi mothers with children aged <9 years with confirmed diagnosis of ADHD, who agreed to participate in the study, were included. The entire population was recruited from Saudi mothers of children attending special education schools and day-care centers in the private and government sectors in Al-Khobar, Dammam, and Al-Qatif. The study population comprised a total of 132 eligible mothers, with a response rate of 73%. Ethical approval was obtained from the Ethical Committee of the Ministry of Education, and informed written consent was obtained from all participants.

The questionnaire included an introduction on the purpose of the study, a statement of appreciation to the mothers for their participation, and the name of the investigator. It elicited data on:

a. Sociodemographic characteristics: mothers (age and level of education), children (current age, age at diagnosis, gender, birth order, type of ADHD, and comorbid disease), and family income

b. The type of therapy, the impact of the therapy on the child, and the concerns of the mother regarding treatment through questions with yes/no answers

c. Source of the mother’s information: How and where they sought advice on treatment, the reason for the first visit to the clinic, the reason for the delay in seeking medical help, and their family history of ADHD

d. Knowledge regarding ADHD (seven questions with yes/no answers and “I don’t know”). The knowledge score was calculated as percentages of correct answers. Knowledge was categorized as poor = <50% correct answers, fair = 50%–75%, and good = a score of 75% and above

e. The attitude of mothers toward ADHD, consisting of 12 statements, each scored on a 3-point Likert scale ranging from 1 to 3. Individual scores ranged from 5 to 15 (attitude toward the child) and from 7 to 21 (attitude of mothers toward the ADHD condition). Attitude raw scores, percent scores, and mean percent scores for each area and overall attitude were calculated. Attitude was categorized as follows: mothers scoring less 50% had a negative attitude, from 50% to 80% were neutral, and >80% were positive

f. Services available in Saudi Arabia were evaluated by 14 statements with yes/no answers.

After data collection, the raw data were coded and scored using the Statistical Package for the Social Sciences (SPSS), version. 21 Released 2012 (Armonk, New York). Descriptive statistics such as frequency, distribution, mean, and standard deviation were computed to describe different characteristics.

Results

Table 1 shows the sociodemographic characteristics of the sample comprising 132 mothers of ADHD children.

| Characteristics                             | N (%) |
|---------------------------------------------|-------|
| **Child’s age (years)**                     |       |
| <5                                          | 16 (12.1) |
| 5-9                                         | 87 (65.9) |
| ≥9                                          | 29 (22.0) |
| **Mother’s age (years)**                    |       |
| <30                                         | 20 (15.2) |
| 30-40                                       | 87 (65.9) |
| ≥40                                         | 25 (18.9) |
| **Child’s gender**                          |       |
| Boy                                         | 93 (70.5) |
| Girl                                        | 39 (29.5) |
| **Mother’s education**                      |       |
| Illiterate/primary                          | 8 (6.0) |
| Intermediate/secondary                      | 62 (47.0) |
| University/                                | 62 (47.0) |
| **Comorbid disease (n=87)**                 |       |
| Autism                                     | 40 (30.3) |
| Anxiety                                    | 2 (1.5) |
| Learning disability                        | 19 (14.4) |
| Speech disorder                            | 14 (10.2) |
| Other                                      | 12 (9.5) |
| **Family income (Saudi Riyals)**            |       |
| <5000                                      | 29 (22.0) |
| 5000-10,000                                | 61 (46.2) |
| >10,000                                    | 42 (31.8) |
| **ADHD type**                              |       |
| Hyperactive                                | 28 (21.2) |
| Inattentive                                | 25 (18.9) |
| Combined                                   | 61 (46.2) |
| Unknown to mothers                         | 18 (13.6) |
| **Family history**                         |       |
| Yes                                        | 23 (17.4) |
| No                                         | 109 (82.6) |

ADHD=Attention-deficit hyperactivity disorder
Table 2: Mothers’ responses to various statements regarding knowledge about ADHD (n=132)

| Knowledge statements                                                                 | N (%)     |
|--------------------------------------------------------------------------------------|-----------|
| ADHD is a neurodevelopmental disease characterized by a persistent pattern of inattention and/or hyperactivity-impulsivity | 94 (71.2) |
| ADHD continues till adolescence                                                      | 64 (48.5) |
| ADHD affects boys more than girls                                                   | 71 (53.8) |
| ADHD can be caused by genetics, injury during pregnancy, premature birth, or brain injury | 66 (50.0) |
| ADHD is diagnosed by a specialist based on history, examination, and specific criteria | 111 (84.1) |
| Treatment of ADHD depends on child age and severity and it could be both behavioral or pharmacological | 113 (85.6) |
| Methylphenidate (Ritalin) is a medication used in ADHD                               | 34 (25.8) |
| Methylphenidate (Concerta) is a medication used in ADHD                              | 29 (22.0) |
| Atomoxetine (Strattera) is a medication used in ADHD                                 | 19 (14.4) |
| ADHD=Attention-deficit hyperactivity disorder                                        |           |

Table 3: Mothers’ responses to type of treatment, for children with effects of therapy, and concern about therapy on attention-deficit hyperactivity disorder

| Therapy                                                                 | N (%)     |
|------------------------------------------------------------------------|-----------|
| Children on treatment (n=132)                                           |           |
| Yes                                                                    | 82 (62.1) |
| No                                                                     | 50 (37.9) |
| Children on ADHD therapy (n=82) (yes answer)                           |           |
| Behavioral                                                             | 39 (47.6) |
| Pharmacological                                                         | 15 (18.3) |
| Combined                                                                | 28 (34.1) |
| Effect of treatment (n=82) (yes answer)                                |           |
| Positive performance in school                                         | 39 (47.6) |
| Increase self-steam                                                     | 12 (14.6) |
| Better behavior                                                        | 57 (69.5) |
| The negative effect of the child                                       | 4 (4.9)   |
| Better social relationship                                             | 22 (26.8) |
| No change                                                              | 12 (15.9) |
| Concern about therapy (n=132) (yes answer)                             |           |
| Not convince                                                           | 14 (10.6) |
| Quick treatment                                                        | 12 (9.1)  |
| A side effect of medication                                             | 52 (39.4) |
| Long treatment time                                                     | 41 (31.1) |
| High cost                                                              | 18 (13.6) |
| No need to treatment                                                   | 27 (20.5) |
| ADHD=Attention-deficit hyperactivity disorder                           |           |

The mean age at diagnosis of the ADHD children was 4 ± 1.65 years, ranging from 1 to 9 years. Child order was firstborn, 47 (35.6%), followed by fourth or later, 44 (33.3%); second, 24 (18.2%); and third, 17 (12.9%).

Regarding the mother’s knowledge of ADHD, the mean percent knowledge score was 9.82 ± 4.41, ranging from 0 to 18. Mothers with excellent knowledge made up 21.2%, those with fair knowledge 31.8%, and those with poor knowledge 47.0%. The distribution of the population by responses to knowledge statements is shown in Table 2.

Table 3 depicts the type of treatment used, effects of therapy, and concerns about therapy in ADHD children according to mothers.

Regarding the attitude of the mothers toward ADHD, 74.2% had a positive attitude, 24.2% were neutral, and 1.5% were negative. Mothers with a positive attitude toward their ADHD children made up 14.4% of the respondents, those who were neutral made up 51.5%, and those with negative attitudes made up 34.1%.

Table 5 presents the statements used in the study to elicit the opinion of mothers toward ADHD and their feelings toward their children together with their responses.

Table 6 presents the various reasons the mothers gave as being barriers to taking advantage of the services.

Discussion

ADHD is a common childhood neurodevelopmental disorder that affects the quality of life of many children. It is, however, a treatable condition with a very good response, especially with the use of the appropriate medications. However, parents’ insights into the illness and the acceptance of treatment are crucial to achieving good results. Studying mothers’ perceptions is, therefore, of paramount importance.

It is essential to understand the social context of the disorder. Two-thirds of the children in our study were aged 5–9 years, with a mean age at diagnosis of ADHD of 4 ± 1.65 years, which is similar to the findings of previous Saudi studies, indicating that ADHD occurs mostly earlier, at the ages of 7–9 years. Males are at a greater risk of ADHD, as explained in literature, due to greater genetic susceptibility in males and the underdiagnosis of ADHD in females. This is in agreement with our study in which there was a predominance of male children. The greatest number were firstborn children, followed by fourth or later, similar to the results of another Saudi study that observed that the highest
percentage of children with ADHD risk were firstborns, followed by last-borns\(^\text{[13]}\) in the course of determining that the likelihood of ADHD in first, middle, or later-born children, as well as single children, are nearly equal.\(^\text{[14]}\) Genetic transmission plays a major role in the development of ADHD, as suggested by a positive family history of ADHD. However, the study did not discuss the causes of ADHD.\(^\text{[15]}\) In our study, the combined type of ADHD was the highest, with two-thirds showing comorbidities. This is similar to the assertions in the literature that the combined type was the most common with greater comorbidity\(^\text{[16]}\) [Table 1].

The highest percentage of mothers were aged between 30 and 40 years, whereas a previous study found that ADHD was associated with young mothers aged 20 years or younger at the time of the child’s birth.\(^\text{[17,18]}\) The difference in mothers’ ages in our study may be related to the question in the survey that asked for their current age, not their age at the birth of their children. The high education level of mothers in this study may reflect the fact that the net enrollment rate of the Saudi female population is higher at the university stage than the male population.\(^\text{[19]}\) One Saudi study showed that ADHD was not limited by the education level of parents,\(^\text{[20]}\) just as a UAE study showed no relation between the mother’s level of education and ADHD.\(^\text{[21]}\) In contrast, some studies have revealed that ADHD was more common in children with less-educated mothers.\(^\text{[9,22]}\) These differences in study results indicate that further research is needed [Table 1].

Parents’ perception referred to their knowledge and beliefs about the disease and how the disorder affected their lives since their decision to seek help and select treatment interventions can be affected by their knowledge and beliefs.\(^\text{[23]}\) The knowledge of the mothers in our study was high with regard to the definition, method of diagnosis, and type of treatment, although

### Table 4: The source of information, first advice to seek help, the reason for the visit to the clinic, and reason for delaying treatment (n=132)

| Statements (yes answer) | N (%) |
|-------------------------|-------|
| Source of information   |       |
| Internet                | 84 (63.6) |
| Physician               | 71 (53.8) |
| Family                  | 20 (15.2) |
| Book                    | 19 (14.4) |
| TV                      | 13 (9.8) |
| Social seminar          | 12 (9.1) |
| First advice to seek medical help |       |
| Mothers                 | 48 (36.4) |
| Family members          | 33 (25.0) |
| Psychology              | 30 (22.7) |
| School                  | 25 (18.9) |
| Pediatric               | 25 (18.9) |
| Psychiatric             | 16 (12.1) |
| Friends                 | 11 (8.3) |
| Family doctor           | 6 (4.5) |
| Reasons for the first visit to the clinic |       |
| Poor social skills      | 60 (45.5) |
| Attention hyperactive aggressive behavior | 60 (45.5) |
| Advice from school, friends, or family | 44 (33.3) |
| Poor scholastic achievement | 20 (15.2) |
| Reasons for the delay in seeking medical advice |       |
| Unrecognized the behavior of the child | 89 (67.4) |
| Didn’t know where to go | 45 (34.1) |
| Child neglect due to family disintegration | 10 (7.6) |
| Think about mental disorder | 7 (5.3) |

### Table 5: Opinion of mothers of children with ADHD about ADHD and feeling of mothers toward their children (n=132)

| Opinion                                                                 | Answer    | N (%)   |
|------------------------------------------------------------------------|-----------|---------|
| I think the disease results from envy                                   | Agree     | 18 (13.6) |
| I think the disease caused by a type of diet of high sugar and artificial food | Agree     | 51 (38.6) |
| I think the disease is due to the spoiling of the parent                | Agree     | 13 (9.8) |
| I think treatment can be by herbal medication only                      | Agree     | 7 (5.3) |
| I think there is no treatment for the disease at all                    | Agree     | 21 (15.9) |
| Mean score                                                             |           | 12.37±1.85 |
| Mean percentage of score                                               |           | 82.47±12.33 |
| Median                                                                 |           | 86.7    |
| I feel embarrassed and disappointed with my ADHD child                  | Agree     | 50 (37.9) |
| I feel too overprotective on my child                                   | Agree     | 62 (47.0) |
| I feel discrimination from the community                                | Agree     | 84 (63.6) |
| I feel constantly worried about my child’s future                       | Agree     | 103 (78.0) |
| I feel the disease can cause psychological stress                       | Agree     | 105 (79.5) |
| I feel the disease is a financial burden on family (as the cost of private service and medication) | Agree     | 61 (46.2) |
| I feel my child has a difficult relationship with his siblings          | Agree     | 54 (40.9) |
| Mean score                                                             |           | 12.19±3.57 |
| Mean percentage of score                                               |           | 58.08±17.01 |
| Median                                                                 |           | 57.1    |

ADHD=Attention-deficit hyperactivity disorder
The attitudes of the mothers toward their children were neutral [Table 5]. As a previous qualitative study showed the mothers have child with ADHD disease experience varies feelings such as (frustration, exhaustion, depression, guilt, hope, and anger) and worry about child performance in school, ability to succeed in school or work in the future and acceptance in society. We found that families felt socially isolated, had lost internal and external family relationships, and carried a heavier emotional burden, as they felt rejected by a society which was usually judgmental about parents of a child with ADHD. Parents’ work or jobs also suffered because of having to spend more time and energy with the child. Moreover, parents felt that they did not spend enough time with the affected child and his/her siblings. They were aware of the problematic relationship between the child and his or her siblings. All of these increased the feelings of guilt and impacted the well-being of the whole family. Mothers try to cope with this stress in different ways, including trying to redirect the excessive energy of the child, punishment (which could reach child abuse if severe), social help, and accepting and loving their children regardless of such difficulties, sustained by their spiritual strength. Further quantitative studies in the future are needed to clarify mothers’ challenges.[24,29]

One qualitative study conducted in the USA found that 77% of mothers felt stigmatized and 40% felt social rejection because of their children’s condition,[30] and in another USA study, 26% of the families reported financial problems because of their children’s ADHD.[31] Ultimately, the disease affects the child, family, and community differently, so there is a need to develop a strategy to address the family’s needs and reduce their stress.

The high percentage of children on medication goes with the guideline that recommends starting medication at an early age along with behavioral therapy,[19] and the finding that mothers discerned a positive effect in their children after receiving treatment agrees with previous studies[32,33] [Table 3]. However, the present study did not discuss the factor of satisfaction with medication or its extent. These remain issues for further research. The mothers in our study were concerned about the side effects of the medications for the treatment of ADHD. This was similar to a Saudi study which showed a high level of concern over such issues as side effects of medications and starting them at an early age.[28] Another Saudi study reported that most of the parents believed that all psychotropic medications were addictive.[34] A low percentage of mothers reported the high cost of medication as an issue. This may be because medication is free in Saudi governmental hospitals. The issue they had was with the limit to the prescriptions given in psychiatric clinics and the unavailability of some medicines on occasion. In contrast, a study in the USA

### Table 6: Barriers to using the health-care service (n=132)

| Barriers related to health-care service | N (%) |
|----------------------------------------|-------|
| I think there is a long waiting time to get service | 86 (65.2) |
| I think communication with service providers was poor | 81 (61.4) |
| I face refusal to get service from service providers | 20 (15.2) |
| I think service providers are too far | 57 (43.2) |
| I think the service delivery system is weak | 67 (50.8) |
| I think the service delivery system is deficient | 72 (54.5) |
| Barriers related to nonhuman resources and finance | |
| I think services are dispensed | 71 (53.8) |
| I am afraid of the negative impact on my child | 76 (57.6) |
| I feared for the privacy of my child | 46 (34.8) |
| I had a bad experience with service | 33 (25.0) |

ADHD=Attention-deficit hyperactivity disorder

Positive attitude score of mothers toward ADHD [Table 5] may reflect the high level of the mothers’ education, though we note that the mothers expressed the belief that ADHD could be caused by a high-sugar diet, a common misconception not supported by scientific evidence on the relationship between sugar and increased hyperactivity.[25] This finding is similar to that of Bussing et al. in which most of the African-American parents believed that the cause of ADHD was high sugar consumption, which meant that not much benefit would be expected from treatment.[26] Mothers disagreed that the disease was the result of envy, which may be a positive reflection of Islamic religion on our culture. Furthermore, in our study, 70.5% did not agree that it was due to bad parenting, unlike the finding by Davis et al. in which parents believed that the disorder was caused by poor parenting or lack of discipline, a position that can delay treatment.[27]

This depended on severity and age; it was neutral regarding the etiology and the fact that ADHD affected boys more than girls and low as regards the names of specific medications. Only one previous study has been conducted in SA to evaluate parental knowledge pre- and posteducational program. This showed improvements in parental knowledge exemplified in the rise of the proportion of respondents with good knowledge from 16.7% to 46.7%.[10] Other studies have shown that parents had relatively good knowledge of the symptoms of the disorder. However, they lacked knowledge of the diagnosis, treatment, and prognosis.[24] This difference in results may have been affected by race, social, and cultural issues, the characteristics of participants, and the scoring system used in a given study.
found that 36% of parents expressed the belief that the child would recover on their own without any treatment. The low percentage of parents with such beliefs in our study may be related to the large proportion of children with comorbidities, for which the majority were on medication.

The source of mothers’ information was largely the Internet [Table 4], similar to the finding of Bussing et al. in which parents indicated a preference for information from the Internet,[39] and of another study in which parents turned to social media to try several scientifically unproven interventions.[96] As the Internet is a preferred source of knowledge of mothers, there is a need to develop a scientific website and in the social media that target mothers and the community on how to select information.

Parents play a major role by recognizing behavioral problems in their children early prompting them to seek medical help Mourad in his study (2004) which found that mothers made up the highest percentage of parents accompanying their children with ADHD to hospitals and traditionally mothers spent more time and took greater responsibility in caring for their children with ADHD.[10] These results are similar to ours, in that the mothers in our study were the first to seek clinical help [Table 4]. This study found different reasons for the delay in seeking medical advice: the majority failed to recognize the unusual behavior of the child and considered it natural. In a study of Florida elementary school students, about 88% of the children were recognized as showing signs of ADHD, but only 23% received treatment. Other study showed the most common reasons were a lack of knowledge of where to go for help, and that parents did not see a need for professional treatment, as abnormal child behavior may seem “normal” or may represent an absence of understanding of the course and nature of ADHD.[37]

Saudi Arabia provides a variety of comprehensive specialized services as support for patients with ADHD and their families. This includes the raising of awareness and dissemination of information about ADHD. The government through such organizations as the Ishraq Association (the Saudi ADHD Society) also provides education and training programs related to ADHD for families, educators, and health-care practitioners. In our study, as regards barriers to service [Table 6] as was found in the CAPPA survey, the time between the detection of symptoms and the first visit to the doctor ranged from 7 to 42 months, which may indicate that the time needed for parents to adjust to the idea of seeing a physician to obtain an official diagnosis for their children was difficult. This time ranged from 3 to 18.3 months with multiple doctor visits in the course of the diagnosis, with a mean of 2.5.[38]

In a Japanese study, however, the time lapse between the first raising of parental concern and the first visit to the doctors was about 2.6 years. A major reason for this was difficulty in deciding what services were most suitable and the long distances from home to the service, with a mean transit time of around 1 hour.[39] Furthermore, similar to a longitudinal study in the UK, it was found that 54% of parents reported poor communication with professionals. Ten percent of the parents also expressed worries about the cost of travel or time off work, and 20% worried about privacy, as their children might be left with a record that might adversely affect their future prospects.[40] The mothers in our study reported that they felt that no one could help them. This was also found in a qualitative study that indicated that mothers felt a lack of family and community support, with no specialized centers for ADHD, and a lack of experts in the field.[41]

**Limitations**

As the sample size of the study was small, we expect that a larger sample size would yield more precise results. The service barrier in our study self-reported by mothers was not confirmed by medical records.

**Conclusion**

In general, the results of this study highlight the importance of mothers’ perceptions about ADHD and the fact that clinicians should be aware of and assess the knowledge, beliefs, and concerns of mothers and correct any misconceptions as part of the treatment of ADHD in order to improve treatment, compliance, and satisfaction.

There is a need to develop scientific social networks to provide scientific information to parents to enable them to make the best decisions for their children and establish a family-centered approach by improving communication between health centers, family physicians, pediatric practitioners, and school services with child psychiatric services. This would facilitate earlier referral and treatment and involve the community in developing educational programs directed by scientific specialists, as well as group therapy, to educate parents about medication, help decrease the stress on mothers, and improve their quality of life.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**References**

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Arlington, VA: American
2. Jenahi E, Khalil MS, Bella H. Prevalence of attention deficit hyperactivity disorder in Saudi Arabia. Ann Saudi Med 2012;32:462-8.

3. Al Hamed JH, Taha AZ, Sabra AA, Bella H. Attention deficit hyperactivity disorder (ADHD) among male primary school children in Dammam, Saudi Arabia: Prevalence and associated factors. J Egypt Public Health Assoc 2008;83:165-82.

4. Biederman J, Newcorn J, Sprich S. Comorbidity of attention deficit hyperactivity disorder with conduct, depressive, anxiety, and other disorders. Am J Psychiatry 1991;148:564-77.

5. Bararesi WJ, Colligan RC, Weaver AL, Voigt RG, Killian JM, Katusic SK. Mortality, ADHD, and psychosocial adversity in adults with childhood ADHD: A prospective study. Pediatrics 2013;131:637-44.

6. Harpin VA. The effect of ADHD on the life of an individual, their family, and community from preschool to adult life. Arch Dis Child 2005;90 Suppl 1:i2-7.

7. Hamed AM, Kauer AJ, Stevens HE. Why the diagnosis of attention deficit hyperactivity disorder matters. Front Psychiatry 2015;6:168.

8. Al-Ghamdy YS, Qureshi NA. Attention deficit hyperactivity disorder. Epidemiologic, pathophysiologic, diagnostic and treatment perspectives. Saudi Med J 2001;22:666-73.

9. Albatti TH, Alhedyan Z, Alnaeem N, Almuhareb A, Abdalulkarim J, Albadia R, et al. Prevalence of attention deficit hyperactivity disorder among primary school-children in Riyadh, Saudi Arabia; 2015-2016. Int J Pediatr Adolesc Med 2017;4:91-4.

10. Zaki R. Enhancement the awareness of family care givers caring their children with attention deficit hyperactivity disorder of the general administration of intellectual education centers in the city of Abha. J Am Sci 2013;9:46-53.

11. Spencer TJ. ADHD and comorbidity in childhood. J Clin Psychiatry 2006;67 Suppl 8:27-31.

12. St Sauver JL, Bararesi WJ, Katusic SK, Colligan RC, Weaver AL, Jacobsen SJ. Early life risk factors for attention-deficit/hyperactivity disorder. A population-based cohort study. Mayo Clin Proc 2004;79:1124-31.

13. Taleb HA, Farheen A. Descriptive study of attention deficit hyperactivity disorder in Sabia city, Saudi Arabia. Int J Cur Res Rev 2013;05:36-41.

14. Berger I, Felsenthal-Berger N. Attention-deficit hyperactivity disorder (ADHD) and birth order. J Child Neurol 2009;24:692-6.

15. Faraone SV, Larsson H. Genetics of attention deficit hyperactivity disorder. Mol Psychiatry 2019;24:562-75.

16. Wilens TE, Spencer TJ. Understanding attention-deficit/hyperactivity disorder from childhood to adulthood. Postgrad Med 2010;122:97-109.

17. Hvolgaard Mikkelsen S, Olsen J, Bech BH, Obel C. Parental age and attention-deficit/hyperactivity disorder (ADHD). Int J Epidemiol 2017;46:409-20.

18. Chudal R, Joelsson P, Gyllenberg D, Lehti V, Leivonen S, Al-Haj O. A screening tool for attention deficit hyperactivity disorder in primary care. Acta Paediatr 2013;102:806-9.

19. General Authority for Statistics. General Authority for Statistics Demographic Survey; General Authority for Statistics: Riyadh, Saudi Arabia 2016; pp. 1-209.

20. Hassan AM, Al-Haidar F, Al-Alim F, Al-Hag O. A screening tool for attention deficit hyperactivity disorder in children in Saudi Arabia. Ann Saudi Med 2009;29:294-8.

21. Eapen V, Mabrouk A, Zoubeidi T, Sabri S, Yousef S, Al-Ketbi J, et al. Epidemiological study of attention deficit hyperactivity disorder among school children in the united arab emirates. Hamdan Medical Journal 2009;2:119-27.

22. Al-Ghannami SS, Al-Adawi S, Ghebremeskel K, Cramer MT, Hussein IS, Min Y, et al. Attention deficit hyperactivity disorder and parental factors in school children aged Nine to ten years in Muscat, Oman. Oman Med J 2018;33:193-9.

23. Corkum P, Bessey M, McConnell M, Dorbeck A. Barriers to evidence-based treatment for children with attention-deficit/hyperactivity disorder. Atten Defic Hyperact Disord 2015;7:49-74.

24. Dodangi N, Vameghi R, Habibi N. Evaluation of knowledge and attitude of parents of attention deficit/hyperactivity disorder children towards attention deficit/hyperactivity disorder in clinical samples. Iran J Psychiatry 2017;12:42-8.

25. Wolraich ML, Wilson DB, White JW. The effect of sugar on behavior or cognition in children. A meta-analysis. JAMA 1995;274:1617-21.

26. Bussing RG, Millstl, GarvabCW. Cultural parental health beliefs, knowledge, and information sources related to attention-deficit/hyperactivity disorder. J Fam Issues 2007;28:291-318.

27. Davis CC, Claudius M, Palinkas LA, Wong JB, Leslie IK. Putting families in the center: Family perspectives on decision making and ADHD and implications for ADHD care. J Atten Disord 2012;16:679-84.

28. Laugesen B, Lauritsen MB, Jørgensen R, Sørensen EE, Rasmussen P, Gronkjer M. Living with a child with attention deficit hyperactivity disorder: A systematic review. Int J Evid Based Healthc 2016;14:150-65.

29. Mofokeng M, van der Wath AE. Challenges experienced by parents living with a child with attention deficit hyperactivity disorder. J Child Adolesc Ment Health 2017;29:137-45.

30. DosReis S, Barkdalse CL, Sherman A, Maloney K, Charach A. Stigmatizing experiences of parents of children with a new diagnosis of ADHD. Psychiatr Serv 2010;61:811-6.

31. Ronis SD, Baldwin CD, Blumkin A, Kuhlthau K, Sizlagy PG. Patient-centered medical home and family burden in attention-deficit-hyperactivity disorder. J Dev Behav Pediatr 2015;36:417-29.

32. Alqahtani MM. How do parents view psychological assessment and intervention for their children with ADHD in Saudi Arabia? Asia Pac J Clin Psychol 2016;8:41-52.

33. Bussing R, Zima BT, Meyer JM, White K, Garvan CW. ADHD knowledge, perceptions, and information sources: Perspectives from a community sample of adolescents and their parents. J Adolesc Health 2012;51:593-600.

34. Alqahtani MM. The impact of parents' medication beliefs on adhd management. India J Pharm Sci Res 2010;5:144-50.

35. Al-Haidar FA. Parental attitudes toward the prescription of psychotropic medications for their children. J Family Community Med 2008;15:35-42.

36. Bussing R, Zima BT, Mason DM, Meyer JM, White K, Garvan CW. ADHD knowledge, perceptions, and information sources: Perspectives from a community sample of adolescents and their parents. J Adolesc Health 2012;51:593-600.

37. Alqahtani MM. The impact of parents' medication beliefs on adhd management. India J Pharm Sci Res 2010;5:144-50.

38. Bussing R, Zima BT, Gary FA, Garvan CW. Barriers to detection, help-seeking, and service use for children with ADHD symptoms. J Behav Health Serv Res 2003;30:176-89.

39. Fridman M, Banaschewski T, Sikirica V, Quintero J, Chen KS. Barriers to detection, help-seeking, and service use for children with ADHD symptoms. J Behav Health Serv Res 2003;30:176-89.

40. Sayal K, Mills J, White K, Merrell C, Tynmms P. Predictors of and barriers to service use for children at risk of ADHD. J Behav Health Serv Res 2003;30:176-89.