



Research Article

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Awareness about Autism Spectrum Disorder (ASD) among Parents of Typically Developing Children

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Abstract

Autism spectrum disorder (ASD) is a neurodevelopmental disorder common among children. Special attention is frequently given to the early detection of ASD for early treatment implementation, which improves these children's outcomes. Enhanced public awareness is necessary to prevent delays in the provision of such services by aiding the early identification of cases. There is a lack of studies that determine ASD awareness among parents of typically developing children (TDC). Therefore, the aim of this study was to comprehend the extent of ASD awareness and knowledge among Saudi parents of TDC. A cross-sectional descriptive survey using a questionnaire was distributed to survey 232 Saudi parents' (98 female, 134 male) ASD awareness and knowledge. Overall, this study's results showed that ASD awareness among Saudi parents is good, as the study participants were knowledgeable about its aetiology, signs and symptoms. However, there are still misconceptions and lacking of knowledge that need to be addressed. Interestingly, the fathers were found to be more knowledgeable about general ASD information and aetiology than the mothers. The findings showed that around 49.1% of Saudi parents do not know if vaccinations cause ASD, which indicates lacking awareness in this regard. Despite the efforts of different sectors to raise ASD awareness in the KSA, more work needs to be done to address misconceptions among parents. This is necessary to aiding the early detection and identification of ASD, which will expedite services' provision for better outcomes for children with ASD.

Keywords: Autism, Autism spectrum disorder, Parents, ASD awareness

1. Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disorder featuring difficulties in social communication, restricted interests and repetitive behaviours (American Psychiatric Association, 2013). These difficulties are categorized according to severity at three levels in accordance with the support requirements for each individual. Autism is diagnosed based on behavioural observations and caregiver reports, as there are no visible biological indicators or medical tests to confirm diagnosis. According to the American Psychiatric Association (2013), ASD affects around 1% of the world population, and is sometimes comorbid with other psychiatric conditions, such as depression, anxiety, attention deficit hyperactivity disorder (ADHD) and emotional and behavioural problems.

Special attention is often given to the early detection of ASD for early treatment implementation, which improves the outcomes of children with this disorder. Enhanced public awareness is necessary

to prevent delays in the provision of such services by aiding the early identification of cases. It is not clear how knowledgeable the general public around the world is about ASD, even though it has gained a large amount of media attention (Tipton & Blacher, 2014). Many campaigns around the world have been launched to increase ASD awareness (Dillenburger et al., 2013). These campaigns are important because the more informed the public is about the disorder, the more tolerant they will be towards children with ASD.

2. Literature Review

Many studies have attempted to identify the level of ASD awareness among different groups of people, such as healthcare professionals, teachers and parents, in different countries by comparing their ASD knowledge and awareness according to variables like gender, education level and profession. For instance, Dillenburger et al. (2013) investigated data from a North Ireland survey that evaluated autism awareness among children and youth in the country. Their results indicated that teenagers (80%) have higher autism awareness than young children (50%). They also reported that even though autism campaigns have been successful in increasing public awareness, there should be more focus on ASD interventions and services. Tipton and Blacher (2014), meanwhile, distributed a survey to university students and staff in the United States to assess their ASD awareness and knowledge. Their sample showed suitable knowledge, with more correct answers from parents and families of children with ASD (Tipton & Blacher, 2014). Rahbar et al. (2011) similarly assessed general physicians' ASD knowledge and attitudes in Karachi, with the results disclosing their lack of correct information about ASD's aetiology, causes and symptoms; however, the physicians who had graduated in the last five years displayed higher ASD knowledge. Shamsudin and Rahman (2014) detected the level of ASD knowledge and awareness among people in Malaysia. Their results showed that even though most participants recognized the term ASD, most did not comprehend its correct features and causes. Heys et al. (2017) qualitatively investigated both parents' and professionals' understanding of ASD in Nepal using focus groups and semi-structured interviews with parents of both typically developing children (TDC) and children with ASD, healthcare professionals and teachers. The results revealed that specialists and parents of TDC had less precise information about ASD than the rest of the sample (Heys et al., 2017). Another study collected cross-sectional data to evaluate schoolteachers' ASD awareness in Oman (Al-Sharbaty et al., 2015). The results indicated a lack of knowledge and awareness about ASD among school teachers (Al-Sharbaty et al., 2015).

Most of these studies disclosed a low level of ASD awareness among different groups of people in the community. Still, there remains a lack of studies that assess ASD awareness and knowledge specifically among parents of TDC. Even though Heys et al. (2017) instigated ASD awareness among parents of TDC, they did not focus on that particular group, as their sample included teachers and healthcare professionals as well. It is not always adequate to consider ASD knowledge level of parents of TDC similar to that of professionals.

ASD knowledge and awareness in the Kingdom of Saudi Arabia (KSA) is especially understudied in the literature (Alnmary et al., 2017). Although there are some ASD studies from this country, only a few have inspected the aetiology and signs of autism, and none have explored ASD knowledge and awareness among parents of TDC. For instance, Alsehemi et al. (2017) examined Saudi public ASD awareness and noted a low level of knowledge reported by 41% of participants; they ultimately suggested the need for more ASD awareness campaigns. Females felt more knowledgeable about autism than males in that study as well, with males even thinking that autism is identical to mental retardation (Alsehemi et al., 2017). In contrast, Alharbi (2018), which assessed ASD knowledge among families of children with autism and healthcare providers, found that knowledge was higher among higher educated participants but identified no differences between males and females. Another study assessing the Saudi public's ASD awareness demonstrated their adequate general ASD knowledge, even though many participants did not think that ASD is a genetic disorder (Almana et al., 2017). Similar to Alsehemi et al. (2017) findings, SUKKAR (2020) discovered a statistically significant difference in the

ASD awareness between male and female participants in the KSA, with favour to females. SUKKAR (2020) also found that the highest ASD awareness level was among highly educated participants and PhD holders, a finding similar to (Alharbi, 2018). Haimour and Obaidat (2013) further investigated teachers' knowledge about ASD in the KSA and identified a lack of appropriate knowledge, which highlights the importance of professional development.

It is evident from these studies' results that ASD public awareness among different groups of the Saudi population is still limited among the majority of society members. Their lacking ASD awareness and correct information could result in the spread of misconceptions about ASD, generate negative attitudes towards people with ASD and delay the early detection of new cases, which can in turn delay the provision of early interventions (Zuckerman et al., 2014). Of note, Hassan (2019) emphasized that ASD research is limited in the Arab region, even though many scholars have attempted more research in recent years.

Therefore, this study's purpose was to comprehend the extent of ASD awareness and knowledge among Saudi parents of TDC via a cross-sectional descriptive survey. This research is of significant importance to the special education field because it fills a literature gap in identifying the level of ASD awareness among parents of TDC in Saudi society. To the author's knowledge, this issue has never been investigated in another study concerning the same population group. This study is also important in raising awareness about ASD to assist the disorder's early identification and therefore the early provision of treatment and interventions, all of which that will lead to better outcomes for children with ASD and their families (Yoo, 2016).

This study attempted to uncover the level of knowledge about ASD, its aetiology, symptoms and signs, and also any differences in this knowledge based on the parents' gender and education level. Accordingly, this study aimed to answer the following research questions:

1. What level of ASD knowledge and awareness do parents of TDC in the KSA have?
2. Are there any significant differences in the parents' knowledge about ASD based on gender and education level?

3. Methods

This cross-sectional descriptive study was conducted among Saudi parents of TDC following a convenience sampling method. The data was collected in three waves, from December 2018 to December 2019, utilizing a questionnaire to assess the parents' ASD awareness and knowledge. An electronic link to the survey through Google Docs, email and WhatsApp was sent to friends and people in the Saudi community who are parents of TDC at the age of 12 or less. The parents were allowed to participate even if they had a child with a disability as long as they were also parents of TDC. The questionnaire took less than 15 minutes to complete and covered the parents' knowledge about ASD's aetiology, symptoms and signs, as well as their sociodemographic items. The questionnaire used was designed and utilized by Al Sharbati et al. (2015), which assessed ASD awareness in Oman. Their bilingual instrument showed a high validity and reliability, and its construct validity using Spearman correlations displayed a highly significant correlation ($r = 0.80$, $p < 0.01$; (Al-Sharbati et al., 2015). The questionnaire's inter-rater reliability showed 90% agreements as well in questions from all domains (signs and symptoms, causes and aetiology) and a test-retest reliability of 87% ($\kappa = 0.82$; (Al-Sharbati et al., 2015). The questionnaire showed a high internal consistency when used with this study's sample at a Cronbach's alpha of 0.86, demonstrating its acceptable reliability.

The data was gathered in Excel sheets and statistical analysis was performed with the Statistical Package for the Social Sciences (SPSS) version 22 (IBM Corp, 2013). Statistical significance was set to a p-value of < 0.05 . The analysis included two main categories: the first was a frequency and cross tabulation analysis for all the parents' responses, and the second was a mean different test to determine if the respondents' demographic characteristics played a role in their ASD awareness. Chi-square analyses were then used to evaluate the statistical significance of differences among proportions of categorical data. Three more statistical tests – Phi and Cramer's V, Lambda and uncertainty coefficient

– followed to test the nominal by nominal association between the questionnaire’s gender and awareness variables.

Ethical approval was obtained from the Ethics Research Committee at the School of Medicine, King Abdulaziz University. The participants were not asked to provide their names to ensure privacy, and their written consent to participate was obtained at the beginning of the questionnaire.

4. Results

Data was collected from a sample of 232 Saudi parents (98 (42.2%) females, 134 (57.8%) males). Table 1 displays the participants’ sociodemographic characteristics. The sample distribution by age included 50% of the sample in the age group 41–50 years old; 31.5% in the age group 31–40 years; 14.2% older than 50 years old; and 4.3% 30 years old or younger. The majority of the sample (95.3%) were married, compared to 3% who were divorced. The distribution by education level showed that 59.9% of the parents in the sample had a university degree; 33.2% had completed a high studies degree; 5.6% had a secondary school degree; and 1.3% had an intermediate degree or less. The results indicated that 66.8% of the sample had not encountered a child with autism before, compared to 33.2% of the sample did. Moreover, 90.1% of the sample had heard about autism before, while 9.9% had not. The most common ways that the parents had heard about autism was through a friend (48.3%), from the internet (15%) and from this study (11.2%). The results also revealed that 68.1% of the sample did not know autism’s prevalence rate in KSA, though 11.2% thought it was highly prevalent and 1.8% stated that it was from 0.1% to 92%. Approximately 15% of the parents identified having a child with a disability, and 7.2% as having a child with autism.

Table 1. Sociodemographic characteristics of the sample by gender

	Total (N = 232)	Gender				P-Value
		Female (N = 98)		Male (N = 134)		
		Count	%	Count	%	
Age						0.000
≤ 30	10	8	80.0%	2	20.0%	
31–40 years	73	41	56.2%	32	43.8%	
41–50 years	116	42	36.2%	74	63.8%	
> 50 years	33	7	21.2%	26	78.8%	
Marital status						0.649
Widowed	1	1	100.0%	0	0.0%	
Other	3	3	100.0%	0	0.0%	
Married	221	89	40.3%	132	59.7%	
Divorced	7	5	71.4%	2	28.6%	
Education level						0.000
Secondary school	13	7	53.8%	6	46.2%	
University degree	139	75	54.0%	64	46.0%	
High studies	77	14	18.2%	63	81.8%	
Intermediate degree or less	3	2	66.7%	1	33.3%	
Occupation						0.000
Free-lance work	7	7	100.0%	0	0.0%	
Unemployed	27	27	100.0%	0	0.0%	
Retired	24	15	62.5%	9	37.5%	
Private sector	10	5	50.0%	5	50.0%	
Government employee (military)	7	0	0.0%	7	100.0%	
Government employee (civil)	157	44	28.0%	113	72.0%	

Have you ever encountered a child with autism?						0.329
No	155	62	40.0%	93	60.0%	
Yes	77	36	46.8%	41	53.2%	
Have you heard about autism?						0.752
No	23	9	39.1%	14	60.9%	
Yes	209	89	42.6%	120	57.4%	
If yes, was it through one or more of the following:						0.103
Friends	112	54	48.2%	58	51.8%	
Internet	36	16	44.4%	20	55.6%	
TV	16	5	31.3%	11	68.8%	
My studies	26	7	26.9%	19	73.1%	
Newspapers	6	2	33.3%	4	66.7%	
Other source	36	14	38.9%	22	61.1%	
What is the prevalence rate of autism?						0.476
Not prevalent	1	0	0.0%	1	100.0%	
Don't know	158	64	40.5%	94	59.5%	
Moderately prevalent	7	3	42.9%	4	57.1%	
Slightly prevalent	14	3	21.4%	11	78.6%	
Highly prevalent	26	16	61.5%	10	38.5%	
Almost 200,000	1	0	0.0%	1	100.0%	
From 0.1% to 92%	25	12	48.0%	13	52.0%	
Do you have a child with special needs?						0.034
No	196	77	39.3%	119	60.7%	
Yes	36	21	58.3%	15	41.7%	
If yes, what is the category to which your child belongs (e.g. visual disability)						0.053
Sotos syndrome	1	1	100.0%	0	0.0%	
Mental retardation	4	3	75.0%	1	25.0%	
Intellectual disability	3	0	0.0%	3	100.0%	
Visual disability	1	0	0.0%	1	100.0%	
Autism	17	8	47.1%	9	52.9%	
Motion disability	1	1	100.0%	0	0.0%	
Hearing disability	1	0	0.0%	1	100.0%	
Learning disability	1	1	100.0%	0	0.0%	
Hyperactivity	3	3	100.0%	0	0.0%	
Multiple disabilities and Down syndrome with autism	1	1	100.0%	0	0.0%	
Down syndrome	2	2	100.0%	0	0.0%	
Not applicable (don't have a child with special needs)	196	77	39.3%	119	60.7%	

Table 2 shows the markers of the parents' general ASD knowledge. More than half of the parents (62.1%) reported that they can identify a child with autism. Only a few parents (31.9%) thought that autism affects males more than females, though around half of them (50.4%) had no answer. About 39.2% agreed with the statement that autism continues for life, compared to 28.9% who disagreed. Less than half (45.7%) of the parents reported that the majority of children with autism do not suffer from mental retardation. In addition, 77.2% thought that autism appears in the early years of life. Of the sample, 51.3% did not know whether autism is curable or not. The majority of parents showed high ASD awareness, with 87.9% reporting that children with autism need special education and 79.7% agreeing that early diagnosis can improve children with autism. About half of the sample had some misconceptions about ASD, however: 56.5% thought that the majority of children with autism are geniuses; 54.3% did not know if autism is preventable; 50.4% did not know if autism affects children from high-income families more frequently; and 52.6% had no answer to the question of if autism more commonly affects children from highly educated families.

As displayed in Table 2, in terms of gender, the majority of the respondents who agreed with almost all the general knowledge statements about ASD were males. While these results nevertheless showed an insignificant relationship between gender and parents' awareness of most general ASD

knowledge, some statements featured a significant relationship between gender and knowledge, such as “Children with autism suffer from social stigma”, “The majority of children with autism are geniuses (have distinguished skills)”, “There is curative treatment for autism” and “Autism continues for life”.

Regarding the parents’ education level and general ASD knowledge, the results indicated that the majority of parents who agreed with all the general ASD awareness statements had a university degree or higher. The results from the significance tests for the association between education level and general ASD awareness also demonstrated an insignificant relationship between these two variables for almost all the awareness statements. However, the results also featured a significant relationship between education level and two of the general ASD awareness statements: “Autism appears in the early years of life” and “There is curative treatment for autism”. This information is displayed in Table 5 (Appendix A).

Table 2. Markers of parents’ general ASD knowledge

	Total N = 232	Gender				P-Value
		Female (N = 98)		Male (N = 134)		
		Count	N %	Count	N %	
I can easily identify a child with autism						0.828
No answer	31	12	38.7%	19	61.3%	
Agree & strongly agree	144	63	43.8%	81	56.3%	
Disagree & strongly disagree	57	23	40.4%	34	59.6%	
Autism affects males more than females						0.977
No answer	117	49	41.9%	68	58.1%	
Agree & strongly agree	74	32	43.2%	42	56.8%	
Disagree & strongly disagree	41	17	41.5%	24	58.5%	
Autism continues for life						0.066
No answer	74	26	35.1%	48	64.9%	
Agree & strongly agree	91	36	39.6%	55	60.4%	
Disagree & strongly disagree	67	36	53.7%	31	46.3%	
The majority of children with autism suffer from mental retardation						0.593
No answer	44	16	36.4%	28	63.6%	
Agree & strongly agree	82	34	41.5%	48	58.5%	
Disagree & strongly disagree	106	48	45.3%	58	54.7%	
Autism appears in the early years of life						0.279
No answer	33	10	30.3%	23	69.7%	
Agree & strongly agree	179	78	43.6%	101	56.4%	
Disagree & strongly disagree	20	10	50.0%	10	50.0%	
Children with autism need special education						0.682
No answer	10	3	30.0%	7	70.0%	
Agree & strongly agree	204	88	43.1%	116	56.9%	
Disagree & strongly disagree	18	7	38.9%	11	61.1%	
There is curative treatment for autism						0.041
No answer	119	43	36.1%	76	63.9%	
Agree & strongly agree	59	33	55.9%	26	44.1%	
Disagree & strongly disagree	54	22	40.7%	32	59.3%	
Early diagnosis can very much improve children with autism						0.497
No answer	36	12	33.3%	24	66.7%	
Agree & strongly agree	185	81	43.8%	104	56.2%	
Disagree & strongly disagree	11	5	45.5%	6	54.5%	
The majority of children with autism are geniuses (have distinguished skills)						0.000
No answer	70	19	27.1%	51	72.9%	
Agree & strongly agree	131	70	53.4%	61	46.6%	
Disagree & strongly disagree	31	9	29.0%	22	71.0%	

Children with autism suffer from social stigma						0.017
No answer	56	21	37.5%	35	62.5%	
Agree & strongly agree	134	51	38.1%	83	61.9%	
Disagree & strongly disagree	42	26	61.9%	16	38.1%	
An autism diagnosis will create a negative attitude towards the child						0.436
No answer	48	19	39.6%	29	60.4%	
Agree & strongly agree	98	38	38.8%	60	61.2%	
Disagree & strongly disagree	86	41	47.7%	45	52.3%	
Autism can be prevented completely						0.689
No answer	126	50	39.7%	76	60.3%	
Agree & strongly agree	46	21	45.7%	25	54.3%	
Disagree & strongly disagree	60	27	45.0%	33	55.0%	
Autism more commonly affects children from high-income families						0.616
No answer	117	47	40.2%	70	59.8%	
Agree & strongly agree	31	12	38.7%	19	61.3%	
Disagree & strongly disagree	84	39	46.4%	45	53.6%	
Autism more commonly affects children from highly educated families						0.852
No answer	122	53	43.4%	69	56.6%	
Agree & strongly agree	20	9	45.0%	11	55.0%	
Disagree & strongly disagree	90	36	40.0%	54	60.0%	
The available services for children with autism are adequate						0.642
No answer	53	24	45.3%	29	54.7%	
Agree & strongly agree	21	7	33.3%	14	66.7%	
Disagree & strongly disagree	158	67	42.4%	91	57.6%	

Table 3 displays the markers of parents' knowledge about ASD's aetiology, symptoms and signs. A great proportion of the sample displayed good knowledge about ASD causes: around 45.7% disagreed that autism can develop as a result of child maltreatment; 45.7% agreed that genetics play an important role in autism's development; and 60.8% felt that ASD's cause is still unknown. Still, a fair proportion of the sample demonstrated misconceptions and a lack of information about some ASD causes, where around 50.9% of the parents had no answer to if certain types of food can cause ASD and 49.1% did not know if vaccinations cause ASD.

In terms of gender differences, as displayed in Table 3, the significance tests between gender and statements about the different causes of autism showed a significant relationship between gender and awareness about some of the statements concerning causes of autism, such as "Certain types of food can lead to autism" and "The cause of autism is not yet known for sure". Additional results showed an insignificant relation between gender and statements concerning awareness about other causes of autism, such as "Autism can develop due to parental maltreatment/negligence early in life" and "Genetics play an important role in autism development".

Regarding education level, the results indicated that the majority of the parents who agreed with all the causes of autism statements had a university degree or higher. The significance tests for the association between education level and awareness about autism's causes yielded an insignificant relationship between these variables. This information is displayed in Table 6 (Appendix A).

Table 3. Markers of teachers' knowledge about autism's aetiology, symptoms and signs

	Total (N = 232)	Gender				P-Value
		Female (N = 98)		Male (N = 134)		
		Count	N %	Count	N %	
Autism can develop due to parental maltreatment/negligence early in life						0.361
No answer	60	22	36.7%	38	63.3%	
Agree & strongly agree	66	26	39.4%	40	60.6%	
Disagree & strongly disagree	106	50	47.2%	56	52.8%	

Certain types of food can lead to autism						0.003
No answer	118	43	36.4%	75	63.6%	
Agree & strongly agree	43	28	65.1%	15	34.9%	
Disagree & strongly disagree	71	27	38.0%	44	62.0%	
Genetics play an important role in autism development						0.114
No answer	92	45	48.9%	47	51.1%	
Agree & strongly agree	106	37	34.9%	69	65.1%	
Disagree & strongly disagree	34	16	47.1%	18	52.9%	
Vaccinations can cause autism						0.095
No answer	114	40	35.1%	74	64.9%	
Agree & strongly agree	45	22	48.9%	23	51.1%	
Disagree & strongly disagree	73	36	49.3%	37	50.7%	
The cause of autism is not yet known for sure						0.000
No answer	71	16	22.5%	55	77.5%	
Agree & strongly agree	141	72	51.1%	69	48.9%	
Disagree & strongly disagree	20	10	50.0%	10	50.0%	

Table 4 shows the indicators of the parents' knowledge about autism's aetiology. A great proportion of parents exhibited good such knowledge: around 39.2% thought that children with autism do not show certain emotions; more than half (70.3%) felt that children with ASD do not maintain eye contact; 68.5% reported that children with ASD do not like the presence of others; 60.3% answered that children with ASD have no or limited speech; 72.4% felt that children with autism show frequent hand movements; and 54.7% reported that children with ASD show very limited adaptation to change. However, some parents displayed limited awareness about ASD aetiology, as about 62.5% of the parents thought that children with ASD can communicate with others easily, and almost half (48.7%) had no answer to whether children with ASD may lose acquired language.

The relationship between autism aetiology knowledge and gender identified that the majority of parents who agreed with all the statements concerning awareness about autism's aetiology were males. The results for the significance tests between gender and autism aetiology knowledge featured a significant relationship between gender and some statements that assess awareness about autism aetiology, such as "Children with autism do not show certain emotions", "Children with autism do not look in others' eyes (maintain gaze)", "Adapting to environmental changes is very much limited in children with autism", "Children with autism do not like to change eating, clothing and playing patterns", and Children with autism show frequent hand and likely body movements".

In terms of education level, the results indicated that the majority of the parents who agreed with all the autism aetiology awareness statements had a university degree or higher. The significance test for the association between education level and ASD aetiology awareness showed an insignificant relationship between these variables, save in the statement "Children with autism are over talkative", which demonstrated a significant relationship between education level and autism aetiology awareness. This information is displayed in Table 7 (Appendix A).

Table 4. Indicators of parents' knowledge about autism's aetiology

	Total (N = 232)	Gender				P-Value
		Female (N = 98)		Male (N = 134)		
		Count	N %	Count	N %	
Children with autism do not show certain emotions						0.037
No answer	44	11	25.0%	33	75.0%	
Agree & strongly agree	91	42	46.2%	49	53.8%	
Disagree & strongly disagree	97	45	46.4%	52	53.6%	

Children with autism do not look in others' eyes (maintain gaze)						0.001
No answer	43	8	18.6%	35	81.4%	
Agree & strongly agree	163	81	49.7%	82	50.3%	
Disagree & strongly disagree	26	9	34.6%	17	65.4%	
Children with autism do not enjoy the presence of others						0.350
No answer	43	14	32.6%	29	67.4%	
Agree & strongly agree	159	70	44.0%	89	56.0%	
Disagree & strongly disagree	30	14	46.7%	16	53.3%	
Children with autism can communicate with others through body movements or symbols						0.867
No answer	57	24	42.1%	33	57.9%	
Agree & strongly agree	145	60	41.4%	85	58.6%	
Disagree & strongly disagree	30	14	46.7%	16	53.3%	
There is no or limited speech development in children with autism						0.602
No answer	61	23	37.7%	38	62.3%	
Agree & strongly agree	140	60	42.9%	80	57.1%	
Disagree & strongly disagree	31	15	48.4%	16	51.6%	
Child with autism are overtalkative						0.576
No answer	65	31	47.7%	34	52.3%	
Agree & strongly agree	32	13	40.6%	19	59.4%	
Disagree & strongly disagree	135	54	40.0%	81	60.0%	
Children with autism may lose acquired speech						0.900
No answer	113	49	43.4%	64	56.6%	
Agree & strongly agree	70	28	40.0%	42	60.0%	
Disagree & strongly disagree	49	21	42.9%	28	57.1%	
Children with autism show frequent hand and likely body movements						0.599
No answer	50	18	36.0%	32	64.0%	
Agree & strongly agree	168	74	44.0%	94	56.0%	
Disagree & strongly disagree	14	6	42.9%	8	57.1%	
Adapting to environmental changes is very much limited in children with autism						0.040
No answer	81	26	32.1%	55	67.9%	
Agree & strongly agree	127	63	49.6%	64	50.4%	
Disagree & strongly disagree	24	9	37.5%	15	62.5%	
Children with autism do not like to change eating, clothing and playing patterns						0.019
No answer	88	27	30.7%	61	69.3%	
Agree & strongly agree	126	63	50.0%	63	50.0%	
Disagree & strongly disagree	18	8	44.4%	10	55.6%	

5. Discussion

The first aim of this study was to explore the understanding of parents of TDC concerning general information about ASD, its causes and its symptoms, as ASD is characterized by specific signs and symptoms that differ across cases. The study's second aim was to investigate the differences in parental understanding and awareness about ASD based on sociodemographic factors (gender and education level). This study also contributes to the current literature on Saudi public ASD knowledge and awareness, as it highlights the ASD awareness of Saudi parents of TDC, including ASD's aetiology, signs and symptoms. Overall, this study's results indicated that Saudi parents' ASD awareness is strong and the participants of this study are knowledgeable about the disorder's aetiology, signs and symptoms. However, there are still some misconceptions and lacking knowledge in certain areas that need to be addressed.

This study suggests that parents of TDC display good knowledge and awareness about ASD, a finding that is consistent with (Dillenburger et al., 2013), which suggested that a good level of awareness might be due to increased international efforts to improve ASD knowledge. Meanwhile, this study's main findings contradict those of Alsehem et al. (2017), which told that public ASD awareness is inadequate. This could be due to Alsehem et al. (2017) collecting information from different categories of the public, while this study collected data only from parents, who are supposed to be more

knowledgeable about children in general. Similarly, Al-Sharbati et al. (2015) noted that the knowledge about children with ASD is weak among Omani teachers, though this also contradicts with one of this study's findings. This might be because Al-Sharbati et al. (2015) was published a few years ago, and ASD awareness has increased internationally since then.

Interestingly, this study found that Saudi fathers are more knowledgeable about general ASD information and aetiology than mothers. This is a unique finding in the literature that could not be explained based on this study's collected data. However, this warrants investigations in future research. It might be that Saudi mothers, as the primary caregivers in most families, are busy caring for the children, while fathers have time to research ASD. In contrast, most previous studies have found women to be more knowledgeable about autism (Alsehemi et al., 2017; Dillenburger et al., 2013; SUKKAR, 2020; Tipton & Blacher, 2014). According to SUKKAR (2020) explanation, this might result from females' maternal instincts driving them to know more about children through seminars and conferences, which could enhance their level of ASD awareness. Still, it should be noted that the participating women in these extant studies were not all mothers, as some samples included women of different ages and marital statuses; the participating women in this study were all mothers of children younger than 12.

In accordance with other studies in the literature, this study found that participants with higher academic qualifications are more knowledgeable about ASD than participants with lower degrees (Alharbi, 2018; Dillenburger et al., 2013; Haimour & Obaidat, 2013; SUKKAR, 2020; Tipton & Blacher, 2014). This could be due to their enthusiasm to learn encouraging them to educate themselves about different disorders.

Vaccinations are one of the most controversial causes of ASD discussed among parents, despite the latest studies indicating no association between ASD and vaccines (Hviid et al., 2019). This study's findings showed that around 49.1% of the parents do not know if vaccinations cause ASD, which highlights a lack of awareness in this area. This finding is in agreement with Alharbi (2018), which found that some participants believe that there is a relationship between ASD and vaccinations. Moreover, Alsehemi et al. (2017) unveiled a misconception in which respondents thought that vaccines are a factor in ASD's increasing prevalence. This indicates that there is still more work to be done to inform and educate the public to correct this misconception.

The results of this study revealed that the majority of participants have heard about ASD (90%). This finding is in accordance with those from other studies, as 94.3% of the participants in Almana et al. (2017) had heard about ASD, and Dillenburger et al. (2013) found that 82% of the public had heard of ASD. Another of this study's findings was the lack of information among some Saudi parents about the role of genetics in ASD development, as around 39.7% did not know if genetics play a role, and around 14.7% disagreed about the association between genetics and ASD. More recent research has examined the association between genetics and ASD (Ramaswami & Geschwind, 2018). Almana et al. (2017) also found that 47.7% of the public does not agree that ASD is genetic. One of the outcomes of this study that represents a misconception among parents was that the majority of participants did not know whether ASD is curable, though some reported that it is curable. This is in agreement with Alharbi (2018), which noted that some participants believed that autism is curable. However, Almana et al. (2017) wrote that almost half of their participants did not think that children with ASD would surpass the disorder. This may result from this current study targeting parents, and parents might be more optimistic when it comes to finding solutions for children's problems (Shah et al., 2016).

Another common ASD misconception among the public is that children with ASD are geniuses with unique abilities (Dillenburger et al., 2013). Unfortunately, the majority of parents in this study do believe that children with ASD have outstanding abilities, while it is well-documented in the literature that only an estimated 3% of children with ASD show unique abilities (Charman et al., 2011). More than half of the parents in this study thought that the majority of children with ASD have mental disabilities; in truth, mental disabilities can be comorbid with ASD, but not in all or even most cases (Aspromonte et al., 2019). This might be the result of the intermingling between ASD and mental disabilities and some of the common features between them, making it confusing for parents to differentiate between them.

Even though the majority of parents in this study displayed good ASD awareness and knowledge, as evident from its results, there are still areas in which they lack sufficient information. The study also highlighted some misconceptions among Saudi parents about ASD aetiology. Despite the efforts of different sectors to raise ASD awareness in the KSA, more work needs to be done to address these misconceptions among parents. This is essential to aiding the early detection and identification of ASD, which will only help the early provision of services and education for children with ASD to better their future outcomes. It is advisable that parents seek information about ASD from reliable and scientific sources to guarantee correct information, and academics and people working the media should make efforts to guide parents to these sources.

6. Limitations

There are some limitations to this study. First, the study sample was relatively small, though the participants were of different ages and almost of equal gender distribution. Future studies with larger samples may prove more informative in this regard. The second limitation is that the parents subjectively reported their expressed awareness markers. It is thus tricky to predict whether the parents' answers represent their actual behaviour. As such, future studies should incorporate results from multiple informants to enhance reliability.

7. Recommendations for Future Research

- The lack of contact in parents of TDC with children with ASD could result in negative views and misconceptions about these children. Therefore, more contact between these groups may change these parents' perceptions. Future studies can investigate whether there are any differences in ASD knowledge and awareness between parents who have contact with children with ASD versus those who do not.
- It might be an interesting topic for future research to explore the rationale behind Saudi fathers displaying more knowledge and awareness about ASD compared to mothers.
- As many Saudi parents believe that ASD is curable, it is advisable for future studies to assess parental beliefs about possible treatments for ASD to help them correct any misinformation they have (if any), and to increase their awareness about reliable and science-based ASD interventions.

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Appendix A: This is a supplementary material)

Table 5. General ASD information knowledge by parents' education level.

		Education level								P-Value
		Secondary school		University degree		High studies		Intermediate degree or less		
		N	%	N	%	N	%	N	%	
I can easily identify a child with autism	No answer	2	6.5%	17	54.8%	12	38.7%	0	0.0%	0.47
	Agree & strongly agree	11	7.6%	85	59.0%	46	31.9%	2	1.4%	
	Disagree & strongly disagree	0	0.0%	37	64.9%	19	33.3%	1	1.8%	
Autism affects males more than females	No answer	8	6.8%	64	54.7%	43	36.8%	2	1.7%	0.44
	Agree & strongly agree	5	6.8%	46	62.2%	22	29.7%	1	1.4%	
	Disagree & strongly disagree	0	0.0%	29	70.7%	12	29.3%	0	0.0%	
Autism continues for life	No answer	5	6.8%	45	60.8%	23	31.1%	1	1.4%	0.86
	Agree & strongly agree	4	4.4%	52	57.1%	33	36.3%	2	2.2%	
	Disagree & strongly disagree	4	6.0%	42	62.7%	21	31.3%	0	0.0%	

The majority of children with autism suffer from mental retardation	No answer	2	4.5%	23	52.3%	17	38.6%	2	4.5%	0.31
	Agree & strongly agree	4	4.9%	48	58.5%	29	35.4%	1	1.2%	
	Disagree & strongly disagree	7	6.6%	68	64.2%	31	29.2%	0	0.0%	
Autism appears in the early years of life	No answer	2	6.1%	24	72.7%	7	21.2%	0	0.0%	0.02
	Agree & strongly agree	7	3.9%	102	57.0%	67	37.4%	3	1.7%	
	Disagree & strongly disagree	4	20.0%	13	65.0%	3	15.0%	0	0.0%	
Children with autism need special education	No answer	1	10.0%	4	40.0%	5	50.0%	0	0.0%	0.55
	Agree & strongly agree	12	5.9%	121	59.3%	68	33.3%	3	1.5%	
	Disagree & strongly disagree	0	0.0%	14	77.8%	4	22.2%	0	0.0%	
There is curative treatment for autism	No answer	5	4.2%	73	61.3%	41	34.5%	0	0.0%	0.02
	Agree & strongly agree	8	13.6%	33	55.9%	16	27.1%	2	3.4%	
	Disagree & strongly disagree	0	0.0%	33	61.1%	20	37.0%	1	1.9%	
Early diagnosis can very much improve children with autism	No answer	2	5.6%	20	55.6%	13	36.1%	1	2.8%	0.88
	Agree & strongly agree	11	5.9%	113	61.1%	59	31.9%	2	1.1%	
	Disagree & strongly disagree	0	0.0%	6	54.5%	5	45.5%	0	0.0%	
The majority of children with autism are geniuses (have distinguished skills)	No answer	3	4.3%	41	58.6%	26	37.1%	0	0.0%	0.38
	Agree & strongly agree	10	7.6%	79	60.3%	39	29.8%	3	2.3%	
	Disagree & strongly disagree	0	0.0%	19	61.3%	12	38.7%	0	0.0%	
Children with autism suffer from social stigma	No answer	4	7.1%	34	60.7%	18	32.1%	0	0.0%	0.79
	Agree & strongly agree	8	6.0%	77	57.5%	47	35.1%	2	1.5%	
	Disagree & strongly disagree	1	2.4%	28	66.7%	12	28.6%	1	2.4%	
An autism diagnosis will create a negative attitude towards the child	No answer	3	6.3%	30	62.5%	15	31.3%	0	0.0%	0.62
	Agree & strongly agree	8	8.2%	55	56.1%	33	33.7%	2	2.0%	
	Disagree & strongly disagree	2	2.3%	54	62.8%	29	33.7%	1	1.2%	
Autism can be prevented completely	No answer	7	5.6%	81	64.3%	38	30.2%	0	0.0%	0.11
	Agree & strongly agree	5	10.9%	22	47.8%	18	39.1%	1	2.2%	
	Disagree & strongly disagree	1	1.7%	36	60.0%	21	35.0%	2	3.3%	
Autism more commonly affects children from high-income families	No answer	6	5.1%	66	56.4%	44	37.6%	1	0.9%	0.69
	Agree & strongly agree	1	3.2%	21	67.7%	8	25.8%	1	3.2%	
	Disagree & strongly disagree	6	7.1%	52	61.9%	25	29.8%	1	1.2%	
Autism more commonly affects children from highly educated families	No answer	9	7.4%	69	56.6%	43	35.2%	1	0.8%	0.54
	Agree & strongly agree	1	5.0%	13	65.0%	5	25.0%	1	5.0%	
	Disagree & strongly disagree	3	3.3%	57	63.3%	29	32.2%	1	1.1%	
The available services for children with autism are adequate	No answer	3	5.7%	32	60.4%	17	32.1%	1	1.9%	0.73
	Agree & strongly agree	2	9.5%	11	52.4%	7	33.3%	1	4.8%	
	Disagree & strongly disagree	8	5.1%	96	60.8%	53	33.5%	1	0.6%	

Table 6. Autism aetiology knowledge by parents' education level

		Education level								P-Value
		Secondary school		University degree		High studies		Intermediate degree or less		
		N	%	N	%	N	%	N	%	
Autism can develop due to parental maltreatment/negligence early in life	No answer	2	3.3%	38	63.3%	19	31.7%	1	1.7%	0.97
	Agree & strongly agree	4	6.1%	38	57.6%	23	34.8%	1	1.5%	
	Disagree & strongly disagree	7	6.6%	63	59.4%	35	33.0%	1	0.9%	
Certain types of food can lead to autism	No answer	4	3.4%	75	63.6%	38	32.2%	1	0.8%	0.44
	Agree & strongly agree	5	11.6%	25	58.1%	12	27.9%	1	2.3%	
	Disagree & strongly disagree	4	5.6%	39	54.9%	27	38.0%	1	1.4%	
Genetics play an important role in autism's development	No answer	3	3.3%	62	67.4%	25	27.2%	2	2.2%	0.39
	Agree & strongly agree	7	6.6%	60	56.6%	38	35.8%	1	0.9%	
	Disagree & strongly disagree	3	8.8%	17	50.0%	14	41.2%	0	0.0%	
Vaccinations can cause autism	No answer	5	4.4%	69	60.5%	39	34.2%	1	0.9%	0.78
	Agree & strongly agree	2	4.4%	30	66.7%	12	26.7%	1	2.2%	
	Disagree & strongly disagree	6	8.2%	40	54.8%	26	35.6%	1	1.4%	
The cause of autism is not yet known for sure	No answer	3	4.2%	42	59.2%	26	36.6%	0	0.0%	0.35
	Agree & strongly agree	10	7.1%	81	57.4%	47	33.3%	3	2.1%	
	Disagree & strongly disagree	0	0.0%	16	80.0%	4	20.0%	0	0.0%	

Table 7. Autism aetiology knowledge by parents' education level

		Education level								P-Value
		Secondary school		University degree		High studies		Intermediate degree or less		
		N	%	N	%	N	%	N	%	
Children with autism do not show specific emotions	No answer	2	4.5%	30	68.2%	12	27.3%	0	0.0%	0.82
	Agree & strongly agree	5	5.5%	51	56.0%	34	37.4%	1	1.1%	
	Disagree & strongly disagree	6	6.2%	58	59.8%	31	32.0%	2	2.1%	
Children with autism do not look in others' eyes (maintain gaze)	No answer	1	2.3%	29	67.4%	12	27.9%	1	2.3%	0.81
	Agree & strongly agree	10	6.1%	96	58.9%	55	33.7%	2	1.2%	
	Disagree & strongly disagree	2	7.7%	14	53.8%	10	38.5%	0	0.0%	
Children with autism do not enjoy the presence of others	No answer	2	4.7%	28	65.1%	12	27.9%	1	2.3%	0.60
	Agree & strongly agree	11	6.9%	94	59.1%	52	32.7%	2	1.3%	
	Disagree & strongly disagree	0	0.0%	17	56.7%	13	43.3%	0	0.0%	
Children with autism can communicate with others through body movements or symbols	No answer	2	3.5%	40	70.2%	14	24.6%	1	1.8%	0.52
	Agree & strongly agree	9	6.2%	83	57.2%	52	35.9%	1	0.7%	
	Disagree & strongly disagree	2	6.7%	16	53.3%	11	36.7%	1	3.3%	
There is no or limited speech development in children with autism	No answer	2	3.3%	39	63.9%	18	29.5%	2	3.3%	0.44
	Agree & strongly agree	8	5.7%	80	57.1%	51	36.4%	1	0.7%	
	Disagree & strongly disagree	3	9.7%	20	64.5%	8	25.8%	0	0.0%	
Children with autism are overtalkative	No answer	3	4.6%	46	70.8%	15	23.1%	1	1.5%	0.00
	Agree & strongly agree	4	12.5%	18	56.3%	8	25.0%	2	6.3%	
	Disagree & strongly disagree	6	4.4%	75	55.6%	54	40.0%	0	0.0%	
Children with autism may lose acquired speech	No answer	4	3.5%	73	64.6%	35	31.0%	1	0.9%	0.10
	Agree & strongly agree	2	2.9%	40	57.1%	27	38.6%	1	1.4%	
	Disagree & strongly disagree	7	14.3%	26	53.1%	15	30.6%	1	2.0%	
Children with autism show frequent hand and likely body movements	No answer	2	4.0%	30	60.0%	17	34.0%	1	2.0%	0.91
	Agree & strongly agree	11	6.5%	99	58.9%	56	33.3%	2	1.2%	
	Disagree & strongly disagree	0	0.0%	10	71.4%	4	28.6%	0	0.0%	
Adapting to environmental changes is very much limited in children with autism	No answer	4	4.9%	53	65.4%	23	28.4%	1	1.2%	0.51
	Agree & strongly agree	9	7.1%	72	56.7%	45	35.4%	1	0.8%	
	Disagree & strongly disagree	0	0.0%	14	58.3%	9	37.5%	1	4.2%	
Children with autism do not like to change eating, clothing and playing patterns	No answer	3	3.4%	54	61.4%	31	35.2%	0	0.0%	0.32
	Agree & strongly agree	10	7.9%	74	58.7%	40	31.7%	2	1.6%	
	Disagree & strongly disagree	0	0.0%	11	61.1%	6	33.3%	1	5.6%	