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Research Article

**THE PREVALENCE OF VACCINE HESITANCY AND
SKIPPING MMR VACCINE DUE TO AN AUTISM THOUGHTS
IN SAUDI ARABIA****Manal M. Mohamed, PhD¹, Nejoood M. Aljaed², MBBS , Malak E. Aloufi², MBBS ,
Suzan A. Jafri², MBBS ,Rawan A. Aloufi², MBBS, Rahaf G. Altwairqi², MBBS**¹Assistant Professor, Pediatric Department, Faculty of Medicine, Taif University, Saudi Arabia.,²Interns at Ministry of Health Hospitals at Taif city, Saudi Arabia.**Abstract****Objective:** to assess the prevalence of vaccine hesitancy (VH) and MMR vaccine autism thoughts in Taif province.**Methods:** A cross-sectional study was done on 208 parents who attended a PHC center in Taif city. A questionnaire was used to collect data about VH in and MMR vaccine autism thoughts.**Results:** Of the oarticipants 29.3% had VH in general, 37% were worried about the safety of MMR vaccine, and 39.9% had autism thoughts related to MMR vaccine. VH was significantly higher among female parents, those with high education. Hesitant parents showed a significant higher MMR autism thoughts, and higher thoughts that the risk of MMR vaccine overweight the benefit.**Conclusions:** parents had positive and negative aspects related to vaccination. The study calls for health education campaigns implemented through primary health units to correct the false information and concerns about vaccinations, especially the false relationship between the MMR vaccine and autism.**Key words:** prevalence, vaccine, hesitancy MMR, autism, Saudi.**Corresponding author:****Manal M. Mohamed,**PhD, Assistant professor, pediatric department,
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INTRODUCTION:

Vaccine hesitancy (VH) was defined as refusal of vaccination or delay in its intake despite the availability of the vaccine. [1] The World Health Organization (WHO) describes (VH) as the “delay in acceptance or refusal of vaccination despite availability of vaccination services. It is a complex process that varies across time, place and vaccines. [2]

Vaccine hesitant may refuse some vaccines but agree to receive others. they may delay vaccines or accept vaccines according to the recommended schedule but be unsure in doing so. [3]

MMR vaccine stands for measles, mumps and rubella, in National Immunization Schedule, its actually given at age of 12 months, 18 months and in first class primary school age. Two doses of MMR vaccine are 97% effective against measles and 88% effective against mumps. One dose of MMR vaccine is 93% effective against measles, 78% effective against mumps, and 97% effective against rubella. [4]

An old study was published in England in 1998 that firstly referenced to the close proximity of receipt of MMR and autism, a matter that drove to the development of the hypothesis that there might be a relation between the MMR vaccine and autism. [5] Finally the WHO released that there is no relation between the MMR vaccine and the autism but in the other hand some of the parents are still hesitant and worried about the vaccine safety. [6]

Recently a lot of researches and studies about the attitudes of the parents, their decision about the MMR vaccine were published. And this actually can lead to raising of the numbers of the children’s whom not vaccinated, and this can make those children vulnerable of potential long-term impairment and weaknesses also it can lead to disasters from measles, mumps, rubella. [7]

A study on MMR (VH) in USA, reported that 5% drop in the vaccine coverage, and this can triple the number of measles cases in children nationally every year. [8]

To the authors' knowledge, studies regarding (VH) done in Saudi Arabia are scarce. One of the studies was a recent study that assessed (VH) in Riyadh city in 2018. The study was done on a random sample of parents attending our outpatient department (OPD). This study reported that a percent of 15% of (VH) was found among the studied sample. In addition, 34% of parents reported significant delay in giving vaccines to a child or

more. However, only 2.5% of them delayed vaccines intentionally because of doubts about vaccines importance. [9]

Another one was done in in the same city and year, on three groups (parents, adult patients, and healthcare workers at King Abdulaziz Medical City, a tertiary care hospital in Riyadh, Saudi Arabia. Of the 300 study participants, 17% expressed (VH). [10]

Only one study was done in taif city in 2013 to assess the Parents' Knowledge and Attitudes on Childhood Immunization. The study revealed that although parents had good knowledge on some aspects related childhood immunization, gaps was found regarding the importance of administration of multiple doses of the same vaccine to child immunity, impact of administration of multiple vaccines at the same time on child immunity. In addition, parents had positive attitudes on some aspects related childhood immunization expect in some aspects related to vaccination side effects and the probability of occurrence of diseases against which the child was vaccinated. [11]

Literature search of published studies showed that no study was done to assess prevalence of (VH) and skipping MMR vaccine due to an autism thoughts in Taif province. The aim of this study was to assess vaccine hesitancy among a sample of parents who attended a PHC unit in Taif city, and assess the prevalence of parents skipping MMR vaccine due to autism thoughts.

METHODS:

Study design and time frame: A cross sectional study was carried out on a sample of parents who attended a primary healthcare center in the time from (June-July 2018).

Study area/setting: The study was carried out in Taif city, which lies in Mecca Province of Saudi Arabia, and it has a population of 1,200,000 people.

Sampling methodology: From all PHC units in Taif city, one unit was selected by simple random sampling methodology, where all parents who attended the unit during the study period (two-months from June-July 2018) were asked to share in the study. after exclusion of the non respondents, 208 parents agreed to share in the study representing a interviewed.

Study instrument: A pre-designed self-administered questionnaire that gathered information about age, educational level of parents, number of children, age and gender of the youngest child was used. Items related to vaccination hesitancy in general and

hesitancy towards MMR vaccine and knowledge about its relationship to autism were added. All items of the questionnaire were derived from a previous study done in Saudi Arabia and Iraq.^{9,12}

Ethical Considerations: Official approvals were obtained from the directorate of health of taif city, and from the director of the PHC UNIT. The participants were briefed about the nature of the study, and verbal consents were obtained before sharing in the study.

Statistical analysis:

The data were coded, tabulated, and analyzed using the statistical package for the social sciences (SPSS, version 20; IBM Corp., Armonk, New York, USA). Qualitative data were expressed as numbers and percentages, and the Chi-square (χ^2) test was used to test the relationship between variables. A p-value of <0.05 was considered as statistically significant.

RESULTS:

A total of 208 parents agreed to participate in this study. The highest percentage of mothers were aged between 30 to 40 years (43.3%) while most of the fathers were 40 years or older (53.4%). Majority of the mother (77.4%) and father (60.6%) had a college or university level education. Most of the parents had 1 to 3 children. Age of the youngest child at the time of the study was 7 years or more for 65 (31.3) parents. Gender of the youngest child was almost equally distributed with males being 52.9% (Table 1).

(Table 2) shows that (83.7%) of parents reported that their children had taken all vaccines according to the vaccination schedule. Of the participants, 29.3% reported their hesitation from vaccination, (71.2%) reported that their child received too many vaccines and (28.4%) were worried that too many vaccines will affect their children's immunity. About (74%) of parents stated that they believe that people who don't vaccinate their kids put others at risk, (53.4%) thought that doctors are too dismissive of what parents think about vaccine side effects and (46.6%) thought that parents should make health decision for their own children rather than leaving it up to professionals.

(Table 3) shows that a significant difference was found between hesitant and Non-hesitant parents towards vaccination according to their sex, parents' education,, and age and gender of the of youngest child. They percent of hesitant parents was significantly higher among female parents, those with college and university education, among those with an age of the last child of 1-2 years, and among those having a male as the last child.

(Table 4) shows that a significant difference was found between hesitant and non hesitant parents according to some responses towards vaccination. As the non-hesitant group showed a significant higher percent of parents whose last child didn't take vaccine according to his scheduled vaccination. They also showed a higher percent of those who believed that people who don't vaccinate their kids put others at risk.

On the other hand hesitant parents showed a significant higher percent of those who were worried that too many vaccines will affect their child's immunity, and who thought that doctors are too dismissive of what parents think about vaccine side effects. hesitant parents also showed a significant higher percent of those whothought think that parents should make health decision for their own children rather than leaving it up to professionals. In the same time, a non sigfnificant difference was found between hesitants and non-hesitants according to their opinion that their child received too many vaccines.

(Table 5) shows that (37%) of the participants were worried about the safety of MMR vaccine, (39.9%) were worried that MMR vaccine will cause their children to have an autism, (22.1%) saw thought that healthy children don't need to be vaccinated against mumps, measles or rubella, and (29.8%) of them saw that the risk of MMR vaccine overweight the benefit.

On the other hand, (84.4%) of the parents thought that MMR vaccine is important for keeping their children healthy, (76%0 thought that measles is a very serious disease, (87.5%) though that their children are likely to get measles if he/she isn't vaccinated. About (60%) of the participants reported that if they have any concerns about MMR vaccine, it will be taken seriously by their doctor.

(Table 5) shows that 12.5% of parents reported that their youngest child didn't receive the MMR vaccine, or they are n't willing to give him the MMR vaccine. The most common source of information regarding the relationship between MMR vaccine and autism was the social media (62.7%).

(Table 6) shows that a significant difference was found between hesitant and non hesitant parents according thir responses towards MMR vaccine. As hesitant parents showed a significant higher percent of those who were worried that that MMR vaccine will cause your child to have an autism, who thought that healthy children don't need to be vaccinated against mumps, measles or rubella, and who thought that the risk of MMR vaccine overweight the benefit.

Table 1. Baseline characteristics of the respondents (n = 208)

Characteristics	N	%
Sex of parent	67	32.2
○ Male	141	67.8
○ Female		
Mother's age		
○ Less than 20 years	6	2.9
○ 20 to 30 years	40	19.2
○ 30 to 40 years	90	43.3
○ 40 years or more	72	34.6
Father's age		
○ Less than 20 years	2	1.0
○ 20 to 30 years	15	7.2
○ 30 to 40 years	80	38.5
○ 40 years or more	111	53.4
Mother's education		
○ No formal education	3	1.4
○ Elementary school	7	3.4
○ Intermediate school	9	4.3
○ High school	27	13
○ College/ University	162	77.9
Father's education		
○ No formal education	2	1.0
○ Elementary school	6	2.9
○ Intermediate school	15	7.2
○ High school	47	22.6
○ College/ University	138	66.3
Number of children		
○ 1 – 3	113	54.3
○ 4 – 6	84	40.4
○ 7 – 10	11	5.3
Age of youngest child		
○ 0 – 12 months	39	18.8
○ 1 – 2 years	44	21.2
○ 3 – 4 years	38	18.3
○ 5 – 6 years	22	10.6
○ 7 years or more	65	31.3
Gender of the youngest child		
○ Male	110	52.9
○ Female	98	47.1

Table 2. Participants' responses towards vaccination and hesitancy (n = 208)

Question	Response	N	%
Is your last child taking vaccine according to his scheduled vaccination?	Yes	174	83.7
	No	34	16.3
Do you have hesitation from vaccination?	Yes	61	29.3
	No	147	70.7
Do you think that your child received too many vaccines?	Yes	148	71.2
	No	60	28.8
Do you worry that too many vaccines will affect your child's immunity?	Yes	59	28.4
	No	149	71.6
Do you believe that people who don't vaccinate their kids put others at risk?	Yes	163	78.4
	No	45	21.6
Do you think doctors are too dismissive of what parents think about vaccine side effects?	Yes	111	53.4
	No	97	46.6
Do you think that parents should make health decision for their own children rather than leaving it up to professionals?	Yes	97	46.6
	No	111	53.4

Table 3. Relationship between participants VH and their personal characters

Parameter	hesitant parents towards vaccination	Non-hesitant parents towards vaccination	Chi squared test (χ^2)	p-value
	No. (%)	No. (%)		
Sex of parent				
○ Male	9 (13.6)	58 (86.4)	11.44	0.001
○ Female	51 (36.2)	90 (63.8)		
Mother's age				
○ Less than 20 years	0 (0)	6 (100)	4.79	0.188
○ 20 to 30 years	12 (30)	28 (70)		
○ 30 to 40 years	31 (34.4)	59 (65.6)		
○ 40 years or more	17 (23.6)	55 (76.4)		
Father's age				
○ Less than 20 years	0 (0)	2 (100)	1.87	0.59
○ 20 to 30 years	5 (33.3)	10 (66.7)		
○ 30 to 40 years	26 (32.5)	54 (67.5)		
○ 40 years or more	29 (26.1)	82 (73.9)		
Mother's education				
○ No formal education	0 (0)	3 (100)	10.44	0.034
○ Elementary school	0 (0)	7 (100)		
○ Intermediate school	2 (22.2)	7 (77.8)		
○ High school	3 (11.1)	24 (88.9)		
○ College/ University	55 (34)	107 (66)		
Father's education				
○ No formal education	0 (0)	2 (100)	11.7	0.02
○ Elementary school	1 (16.7)	5 (83.3)		
○ Intermediate school	1 (6.7)	14 (93.3)		
○ High school	8 (17)	39 (83)		
○ College/ University	50 (36.2)	88 (63.8)		
Number of children				
○ 1 – 3	31 (27.4)	82 (72.6)	3.05	0.85
○ 4 – 6	26 (31)	58 (69)		
○ 7 – 10	3 (27.3)	8 (72.7)		
Age of youngest child				
○ 0 – 12 months	8 (20.5)	31 (79.5)	9.64	0.047
○ 1 – 2 years	18 (40.9)	26 (59.1)		
○ 3 – 4 years	14 (36.8)	24 (63.2)		
○ 5 – 6 years	8 (36.4)	14 (63.6)		
○ 7 years or more	12 (18.5)	53 (81.5)		
Gender of the youngest child				
○ Male	39 (35.5)	71 (64.5)	4.96	0.026
○ Female	21 (21.4)	77 (78.6)		

Table 4. Relationship between participants VH and their responses towards vaccination

Parameter	Hesitant parents towards vaccination	Non-hesitant parents towards vaccination	Chi squared test (χ^2)	p-value
	No. (%)	No. (%)		
Is your last child taking vaccine according to his scheduled vaccination? <input type="radio"/> Yes <input type="radio"/> No	37 (21.3) 23 (67.6)	137 (78.7) 11 (32.4)	29.81	<0.001
Do you think that your child received too many vaccines? <input type="radio"/> Yes <input type="radio"/> No	45 (30.4) 15 (25)	103 (69.6) 45 (75)	0.608	0.43
Do you worry that too many vaccines will affect your child's immunity? <input type="radio"/> Yes <input type="radio"/> No	32 (54.2) 28 (18.8)	27 (45.8) 121 (81.2)	25.87	<0.001
Do you believe that people who don't vaccinate their kids put others at risk? <input type="radio"/> Yes <input type="radio"/> No	38 (23.3) 22 (48.9)	125 (76.7) 23 (51.1)	11.23	0.001
Do you think doctors are too dismissive of what parents think about vaccine side effects? <input type="radio"/> Yes <input type="radio"/> No	40 (36) 20 (20.6)	41 (64) 77 (79.4)	5.99	0.014
Do you think that parents should make health decision for their own children rather than leaving it up to professionals? <input type="radio"/> Yes <input type="radio"/> No	40 (41.2) 20 (18)	57 (58.8) 91 (82)	13.59	<0.001

Table 5. Participants responses towards MMR vaccine (n = 208)

Question	Response	N	%
Do you worry about the safety of MMR vaccine?	Yes	77	37.0
	No	131	63.0
Do you worry that MMR vaccine will cause your child to have an autism?	Yes	83	39.9
	No	125	60.1
Sources of information about the relationship between MMR vaccine and autism (No: 83)	-Friends	5	6
	-Relatives	26	31.3
	-Media	52	62.7
	-Physician	0	0.0
Do you think healthy children don't need to be vaccinated against mumps, measles or rubella?	Yes	46	22.1
	No	162	77.9
Do you think MMR vaccine is important for keeping your child healthy?	Yes	175	84.1
	No	33	15.9
Does the risk of MMR vaccine overweight the benefit?	Yes	62	29.8
	No	146	70.2
Do you think that measles is a very serious disease?	Yes	158	76.0
	No	50	24.0
Do you think that your child is likely to get measles if he/she isn't vaccinated?	Yes	182	87.5
	No	26	12.5
If you have any concern about MMR vaccine, they are taken seriously by your doctor.	Yes	126	60.6
	No	82	39.4
Did your youngest child receive the MMR vaccine or are you going to give him? (No:26)	Yes	182	87.5
	No	26	12.5
Why your youngest child didn't receive the MMR vaccine	-Fear of side effects	12	46.2
	-Fear of risk of the disease	2	7.7
	-Better with natural immunity	4	15.4
	-Let child mature more	8	30.8

Table 6. Relationship between participants VH and thir responses towards MMR vaccine

Parameter	hesitant parents towards vaccination	Non-hesitant parents towards vaccination	Chi squared test (χ^2)	p-value
	No. (%)	No. (%)		
Do you worry about the safety of MMR vaccine? ○ Yes ○ No	37 (48.1) 23 (17.6)	40 (51.9) 108 (82.4)	21.97	<0.001
Do you worry that MMR vaccine will cause your child to have an autism? ○ Yes ○ No	44 (53) 16 (12.8)	39 (47) 109 (87.2)	39.29	<0.001
Do you think healthy children don't need to be vaccinated against mumps, measles or rubella? ○ Yes ○ No	24 (52.2) 36 (22.2)	22 (47.8) 126 (77.8)	15.65	<0.001
Do you think MMR vaccine are important for keeping your child healthy? ○ Yes ○ No	40 (22.9) 20 (60.6)	135 (77.1) 13 (39.4)	19.27	<0.001
Do the risk of MMR vaccine overweight the benefit? ○ Yes ○ No	32 (51.6) 28 (19.2)	30 (48.4) 118 (80.8)	22.3	<0.001
Do you think that measles is a very serious disease? ○ Yes ○ No	44 (27.8) 16 (32)	114 (72.2) 34 (68)	0.319	0.57
Do you think that your child is likely to get measles if he/she isn't vaccinated? ○ Yes ○ No	45 (24.7) 15 (57.7)	137 (75.5) 11 (42.3)	12.04	0.001
If you have any concern about MMR vaccine, they are taken seriously by your doctor? ○ Yes ○ No	28 (22.2) 32 (39)	98 (77.8) 50 (61)	6.83	0.009

On the other hand, non-hesitant group showed a significant higher percent of parents who were worried about the safety of MMR vaccine, who thought that MMR vaccine are important for keeping their child healthy, and who thought that measles is a very serious disease. The non-hesitant group showed also a significant higher percent of parents who thought that their child is likely to get measles if he/she isn't vaccinated, and who reported that if they have any concerns about MMR vaccine, they are taken seriously by their doctor.

DISCUSSION:

It was reported that the phenomenon of (VH) is globally increasing in the general population. [13,14] The present study showed that (83.7%) of parents reported that their children had taken all vaccines according to the vaccination schedule. This figure is higher than that reported in other Arab countries as Iraq (65.9%), [12] and other Muslim countries as Malaysia where only (75.2%) of children had complete immunisation status. [15]

On the other hand, this figure is very close to a result revealed from a study done in India, where (86%) of the children were found to be fully vaccinated for their age. [16] Hopefully this figure is much higher than that reported in a study done in Taif city in 2013, where (73.9%) reported the full vaccination of their children. [11]

The present study showed that (78.4%) of parents believe that people who don't vaccinate their kids put others at risk. This figure is somewhat lower than that revealed from a study done in Michigan where 90% of parents saw that vaccines are a perfect approach to protect children from disease. [17] This low figure could be explained by lack of information about vaccination. In an overcrowded health center, the health worker doesn't have the time to give health messages about immunization to these hesitant parents. In addition, the brief parents visits make it difficult to request information about vaccine. [18]

Of the 208 participants, (53.4%) thought that doctors are too dismissive of what parents think about vaccine side effects and (46.6%) thought that parents should make health decision for their own children rather than leaving it up to professionals. Studies have shown that physicians are increasingly under pressure to see more patients in less time and find themselves confronted with parents that find misinformation on the internet. Further, they find it more difficult to communicate accurate information to parents and address their concerns. [19]

The present work showed that (71.2%) of parents saw that their children received too many vaccines. This figure is much higher than that reported from studies done in Jordan [20], and California [21], where (26.5% and 62%) of parents had the same opinion respectively. However, a high figure was observed in a Malaysian study, where, (93%) of parents agreed that a child is excessively immunized in the first two years of their life. [22]

In a study done in Taif city in 2013, only (41.6%) of parents saw the importance of administration of

multiple doses of the same vaccine to child immunity. [11]

Of the participants (71.6%) weren't worried that too many vaccines will affect your child's immunity. This figure is much higher than that reported in other studies done in Arab and foreign countries [12,23], which showed that parents see that overloading the immune system, would be side effects of immunization. [24] The same result was also observed in an Italian study where (32%) of parents thought that their child's immune system could be weakened by vaccination. [25]

In the study done in Taif city, only (37.1%) of the participants saw that administration of multiple vaccines at the same time have no negative impacts on child immunity. This result was attributed to the poor knowledge regarding vaccines among parents. [11]

In the present study (15.4%) of parents whose children didn't receive the MMR vaccine, reported that it is better for the child to grow with natural immunity. The same was observed in a study done in Atlanta, where 24% of parents agreed that the body protects itself without vaccines. [18]

The present study found that (63%) of parents weren't worried about the MMR vaccine safety. The nearby figure was reported in a study done in Iraq, where (66.6%) of parents had no concern about vaccine safety. [12] A higher figure was reported in a study done in Jordan, where (90%) of parents had no concern about vaccine safety. [26] However, a lower figure was reported in the studies done in California [21], USA [27], and Canada [23], where (46%, 61% and 68%) of parents were concerned about vaccine safety .

About (84%) of parents in the present study thought that MMR vaccine is important for keeping their children healthy. The same high figure was reported in a study done in Taif city in 2013, where (91%) of parents stated that routine immunization protecting children from communicable diseases and its fatal complications. [11] However, a lower figure was reported in a study done in Iraq. [12]

The present study showed that when asking parents if their young children had received the MMR vaccine or if they are going to give them the vaccine, (12.5%) of parents chose the (no) response. This figure may be more because the figures excluded data from private health clinics and hospitals. For those parents whose children didn't receive the MMR

vaccine, (46%) reported that the reason for not vaccinating their children was the fear of side effects. Nearby results were revealed from the study done in Iraq, where (41%) of parents had the same fears. The fear of the vaccine side effects was the most common cause of VH in previous studies. [28] Hopefully this figure is lower than that revealed from the study done in Taif city in 2013, where (57%) of parents had these fears. [11]

The present work showed that (39.9%) of parents were worried that MMR vaccine will cause the child to have an autism. In agreement with this figure is that observed in an Italian study, where 37.0% of women surveyed were strongly convinced about the association between vaccines and autism. [29]

Another study done in Italy showed that (21%) of parents believe that vaccines can cause autism. [25] In a study done in Malaysia, MMR vaccine was among the top three immunisations that had the highest rate of defaulters (43.4%). [28] The MMR-Autism scare led to a national outbreak of measles in 2013 in the UK and it took years for vaccination rate to recover. [30]

The study done in Taif city in 2013, showed that (34.2%) of parents thought that vaccines could have side effects, and (39.4%) thought about the probability of occurrence of diseases against which the child was vaccinated. [11]

In the present study (29.8%) of parents thought that risk of MMR vaccine outweighs its benefit. This result is in agreement with that observed in a study done in Italy to assess (VH) among pregnant women in 2017. The study showed that 24.4%, of respondents were uncertain about the use of MMR vaccine. The cause of this high figure was attributed to the poor knowledge of vaccinations, inadequate attention from healthcare professionals, recurrent consultation of unreliable sources of information and the misconceptions about the side effects of vaccines. [29]

In Saudi Arabia, a study done in Arar province in 2017 showed that 89.7% of children were fully immunized. [31] In countries with well-established immunization programs, it was argued that the decline in VPD resulting in parents having no direct experience with these illnesses anymore. Thus, fear of risks of vaccine may be more prominent than fear of the diseases vaccines prevent. [32,33] This could explain the wrong thoughts regarding MMR vaccine among the studied participants.

This study showed that the most common source of information about the relationship between MMR vaccine and autism was the media. This result is going with that observed in previous studies which stated that the breakdown of public trust in a vaccine could be explained by media coverage, which permits a faster and larger diffusion of anti-vaccination content, has contributed to the increase of (VH). [34] In addition, studies have found that media made many parents may shift from (VH) to vaccine resistance, and from vaccine resistance to outright opposition. [34]

Only 51% of the websites provided correct information about the fact that no association has even been demonstrated between MMR and Autism. One large study showed that surfing anti-vaccination website for 5 - 10 minutes had a negative influence on risk perceptions regarding vaccinations and on the decision to vaccinate one's child.³ In addition, many scientific studies have demonstrated the negative influence of media controversies on vaccine uptake.

In the present work, (29.3%) of parents reported their hesitation from vaccination. This figure is somewhat in agreement than that reported from a study done. This prevalence of VH is higher than that observed in a Saudi study which reported a percent of 15% of hesitancy towards vaccines in general. [9] It is also higher than a previously mentioned Saudi study, where 17% of the participants expressed influenza (VH). [10] In addition, this prevalence is also higher than that observed in an Italian study which showed a prevalence of (15.6%). [25] However, VH prevalence estimated in this study is lower than that revealed from a study done in France which showed a prevalence of 46% among parents. [35] This variability of prevalence of VH among countries was proved by SAGE Working Group on Vaccine Hesitancy, which reported that (VH) varies not only across vaccines but also across time and place. [36]

In the present study the percent of hesitant parents was significantly higher among female parents, those with college and university education, among those with an age of the last child of 1-2 years, and among those having a male as the last child. This result is going on with other studies which showed that parents with higher level of education did not necessarily comply with the decision to vaccinate their children. These studies also reported the same significant difference according to the relationship between VH and having the age of the last child of 1-2 years. [25,28,37]

The present study showed that the non-hesitant group showed a significant higher percent of parents whose last child didn't take vaccine according to his scheduled vaccination. They also showed a higher percent of those who believed that people who don't vaccinate their kids put others at risk.

On the other hand hesitant parents showed a significant higher percent of those who were worried that too many vaccines will affect their child's immunity, and who thought that doctors are too dismissive of what parents think about vaccine side effects. Hesitant parents also showed a significant higher percent of those who thought that parents should make health decision for their own children rather than leaving it up to professionals. This result is going on with a study done in Italy where vaccine hesitant parents were found to believe that vaccinating children at three months of age is too early, and they were less in favor of combined and coadministered vaccines. And they had a negative attitude towards vaccination. [25,28,37,38] It is also in agreement with other studies, where Hesitant parents had more doubts about the safety of vaccines. [38]

The significant negative attitude of hesitant parents regarding health care providers was also reported in previous studies, where VH parents thought that healthcare professionals give information only about the benefits of vaccination but not about their risks, and the public vaccination service staff don't spend enough time responding to vaccine-related doubts. [25,28,37,38]

In the present study, the hesitant parents showed a significant higher percent of those who were worried that that MMR vaccine will cause your child to have an autism, who thought that healthy children don't need to be vaccinated against mumps, measles or rubella, and who thought that the risk of MMR vaccine outweighs the benefit. In addition non-hesitant group had a significant positive opinion that MMR vaccine is important for keeping their child healthy, that measles is a very serious disease, their child is likely to get measles if he/she isn't vaccinated, and if they have any concerns about MMR vaccine, they are taken seriously by their doctor. This positive attitude of the non-hesitant group was observed in previous studies. [25,35,37]

Limitations. One of the limitations of this study was using self-reported questionnaires for collecting data which were prone to recall bias. Another limitation was being a cross-sectional study which showed the relation between variables without concluding a

cause-effect relationship. Longitudinal studies should be encouraged to determine the causality among variables.

CONCLUSION:

The present study showed that 83.7% of parents reported that their children had taken all vaccines according to the vaccination schedule, 78.4% of them believe that people who don't vaccinate their kids put others at risk, 71.2% saw that their children received too many vaccines, and 29.3% had VH in general. Of the parents 15.4% have children who didn't receive the MMR vaccine, and 39.9% of parents were worried that MMR vaccine will cause the child to have an autism. Vaccination hesitant parents showed a significant higher percent of those who have MMR and autism thoughts, who thought that healthy children don't need to be vaccinated with MMR, and who thought that the risk of MMR vaccine outweighs the benefit. The present study showed that parents had both positive and negative aspects related to vaccination domains. Based on the results of this study calls for health education campaigns implemented through primary health units to correct the false information and concerns about vaccinations, especially the false relationship between the MMR vaccine and autism.

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