Quarantine COVID-19 compliance in families with an allergic and immunological diseased child and its psychological impact in KSA

Aymen A. Atalla (1)
Ghaida T Alrbaiai (2)
Abeer H. Alharthi (2)
Jawaher SH. Alotaibi (2)
Nada E. Algethami (2)
Bushra F. Alshehri (2)

(1) MD, Family Medicine Department, College of Medicine, Taif university, KSA
(2) MBBS, Taif University College of Medicine, Taif university, KSA

Corresponding author:
Dr. Jawaher SH Alotaibi
Taif University College of Medicine,
Taif, Saudi Arabia
Tel.:966558696477
Email: jawaher-41@hotmail.com

Abstract

Background: With the onset of the spread of the Coronavirus around the world, the Saudi Ministry of Health has taken protective measures early to prevent the spread of the disease in the region, and the most effective of these measures is Quarantine and home isolation, which can have an impact on the individual's mental health. The purpose of this study is to assess the compliance of Quarantine in a family with an allergic and immunologically diseased child and its psychological impact on them.

Methods: A cross-sectional study conducted between June-August 2020 was conducted via a self-reported online questionnaire that includes fear of COVID-19 scale for parents, Revised children's anxiety and depression scale to assess Quarantine's psychological effect, fear of getting the infection and also to know the family's attitude towards COVID-19 and public health measures.

Results: This study included 4,436 participants, and the findings revealed that (13.3%) of participants had a child with allergies or immune diseases, (30.2%) had children between 6-10 years of age, the mean fear score was 18.74 ± 6.48 (7- 35) which is nearly moderate; the mean values of the Child Anxiety and Depression Sub- Scale for Parents (RCADS) were 4.81 5.61 and 18.74 ± 6.48, respectively. This study showed a highly statistically significant positive relationship between the mean values for fear of COVID-19 Score scale and mean scores for child anxiety and depression (P = <0.001), and also showed that 73.8% of the families thought that quarantine is a necessary action that should continue until the end of the Pandemic.

Conclusion: The Quarantine impacted psychologically and financially on some parents. Children are also more vulnerable to psychological effects resulting from the commitment of families to Quarantine, so we see that special attention and care is needed to prevent these effects on them, especially children with allergic or immune diseases.

Key words: COVID-19, Quarantine, Saudi, children.

Introduction

The Pandemic of coronavirus disease (COVID-19) is an ongoing pandemic discovered firstly in Wuhan, China, in December 2019, and subsequently declared by WHO as a global concern on March 11, 2020 (1, 2).

This virus has high transmission power because of its long incubation period, which ranges from 2 days to 14 days and its vague symptoms, which mimic acommon cold symptoms and leads to increased transmission between people (3 4).

Up to May 2020, there were 80,185 cases in Saudi Arabia including 441 deaths. Furthermore, 85% of them were adults, 4% old aged, and 11% of them children (5).

Children usually exhibit less severity of the disease (6). Indeed most of them have mild clinical manifestations. Children are exceptional groups due to the immaturity of the immune system (7 8). Therefore, the child who has comorbidities and chronic diseases such as asthma and immunodeficiency should be given special attention since they are considered one of the most common non-communicable chronic diseases. More importantly, it increases the risk of developing more severe COVID-19 (6, 9).

To date, there is no current specific treatment or even vaccine to prevent COVID- 19 (10). As a result, there are many preventive efforts taken by public health officials around the world to contain and reduce the spread of the virus, such as social distancing, isolation and quarantine (11, 12). However, quarantine is often a heavy experience for those who undergo it and their families and, could lead to dramatic effects on the psychological health of children, but it is the most effective and oldest measure to control contagious disease, and it will not work if there is no compliance with it (12, 13).

A study suggests that the majority of people exhibit their agreement toward quarantine as one of the public health actions during the outbreak (14). On the other hand, another study concludes that compliance of people depends on complex behavior related to their perception toward contract or spread the virus, such as their own risk to get the infection, ethical reasons, and social pressure (15).

Regarding psychological issues, recent research showed that fear is a normal response toward new viruses, and it consistently predicts compliance with public health recommendations (16). Furthermore, another study concludes that anxiety, and feeling anger are the most common psychological outcomes on quarantined people (17).

Moreover, a recent survey study showed that people with higher education levels and self-awareness of their health tended to have more psychological distress (18).

However there has been no recent studies in the Kingdom of Saudi Arabia (KSA) about factors that might influence quarantine compliance and its possible psychological effects on children and their parents. Therefore, we aimed in this study to assess quarantine COVID-19 compliance in families who had an allergic and immunological diseased child and its psychological impact, in KSA.

Method

A cross-sectional study aimed to assess Quarantine COVID-19 compliance in families who had an allergic and immunological diseased child and its psychological impact on children and their family was conducted on the general population in Saudi Arabia suring the period between June 2020 – August 2020. Ethical approval was taken from the research ethics committee at Taif University.

The inclusion criteria were all families lived in KSA who had a child between the ages of 0-15 years. The exclusion criteria were any family that refused to answer the questionnaire or who left an incomplete survey, and any participant who had COVID-19 infection either alone or with their family, was excluded. Participants were divided into two groups. Group 1 are those participants who had an allergic child or a child who had an immunological disease, and group 2 was those participants who had not. Eligible participants numbered 4,436 participants; 229 (7.6%) of them had an allergic child and 253 (5.7%) had a child with an immunological disease.

This study focused on collecting information by specifically designed Google form questionnaire from a large random sample of the Saudi population who have children from as many as possible. The questionnaire included multiple choices question, open ended questions, and rating scale questions. The survey included items on the participants' demographics: (sex, number of family members, nationality, education level of parents, region, the income of the family, number of children with an allergy and immunological disease, and age of the diseased child). Items on the parents' perceptions about Coronavirus, Quarantine, child risk of acquiring the infection, their own risk of infection, family attitude toward public health instruction in general and quarantine especially, the source they prefer to get information from, family history of getting coronavirus infection or being isolated compulsorily, were included.

Assessment of parents' fear of COVID-19 was done using fear of COVID-19 Scale (19) and evaluation of the child anxiety and depression was done using the Revised Children's Anxiety and Depression scale (RCADS) (20).

Data were coded, tabulated, and analyzed using (SPSS) version 20 (Armonk, NY: IBM Corp.). Qualitative data were expressed as numbers and percentages, and the Chi- squared test ($\chi2$) was applied to test the relationship between variables.

Quantitative data were expressed as mean and standard deviation (Mean ± SD), where Mann-Whitney and Kruskal Wallis Tests were applied for non-parametric variables. Correlation analysis using Spearman's test was done, and a p-value of <0.05 was considered as statistically significant.

Results

There were a total of 5055 participants. Six hundred and nineteen of them were excluded because they did not meet the inclusion criteria. The 4436 remaining were further reviewed.

Participants were divided into two groups. Group 1, was those participants who had an allergic child or a child that had an immunological disease representing 229 (7.6%), 253 (5.7 %) of the total participants, respectively. And group 2 was those participants who had not.

Table 1 shows that 66.8% of the participants of this study were mothers, 95.4% were of Saudi nationality, 39.7% had an income that ranges from 10000-< 20000 SR, 78.9% had a bachelor's degree of education or higher and most of them (43.8%) were from Mecca region. About a third of the participants (30.2%) had children with age that ranges from 6-10 years; the mean number of family members was 6.22 ± 2.6 members.

Table 2 shows that of the participants who had an allergic child (No.: 299), 72.6%, 23.5%, 3%, and 0.9% had asthma, allergic rhinitis, drug, and food allergy, respectively. Most of the participants (54.3%) saw that Coronavirus is dangerous and could lead to death. 73.8% of the families thought that it is necessary action should continue until the end of the Pandemic, and 76.7% reported that they always wear masks. Only 35.6% of the participants reported that they are more likely to be in danger of infection if their child got infected, and 79.3% preferred to get their information regarding COVID-19 from the official spokesperson of the Ministry of Health (MOH).
The mean values of the child anxiety and depression scale and the mean value of fear of COVID-19 scale for parents were 4.93 ± 4.04, and the mean values of Revised Children's Anxiety and Depression subscale for parent (RCADS) were 4.81 ± 5.61 and 18.74 ± 6.48 respectively (Table 3).

Table 4 shows that a non-significant difference was found between the two groups according to parents' perceptions about Coronavirus and parents' perceptions about Quarantine if they are more likely to be in danger of infection if their child got infected, if they can protect their family from COVID-19 disease, family attitude toward public health instruction in general and Quarantine especially, and preferred source of information (p=> 0.05).

Spearman correlation analysis shows a non-significant positive correlation between the mean values of fear of COVID-19 scale scores and the mean number of family members and the mean number of allergic children (r= 0.01, p=0.44, 1-0.01, p=0.44) respectively.

On the other hand, a highly significant positive correlation was found between the mean values of fear of COVID-19 scale scores and the mean child anxiety and depression scores (r=0.35, p= < 0.001, r=0.25, p=< 0.001) respectively (Table 9).

Table 1. Distribution of the studied participants according to their characteristics (No.: 4436)

Variable	No (%)
Gender	
Male	1471(33.2)
Female	2965 (66.8)
Income	
< 5000 SR	618 (13.9)
5000-<10000 SR	1287(29)
10000-< 20000 SR	1791(39.7)
>20000 SR	770(17.4)
Education	
Bachelor and higher	3498 (78.9)
Secondary	676 (15.2)
Basic	170 (3.8)
Illiterate	92 (2.1)
Nationality	
Saudi	4234 (95.4)
Non-Saudi	202 (4.6)
Age of child ≤ 15 year	
<1	406 (9.2)
1-5	1211 (27.2)
6-10	1341(30.2)
11-14	964 (21.7)
15	514 (11.6)
Number of family members (mean ± SD)	6.23 ± 2.61
Number of allergic children (mean ± SD)	1.8 ± 0.9
Region	
Riyadh region	770 (17.4)
Mecca region	1942 (43.8)
Al-Madinah region	96(2.2)
Qassim region	64 (1.4)
Eastern region	485 (10.9)
Assir region	527 (11.9)
Tabuk region	38 (0.9)
Hail region	15 (0.3)
Northern region	165 (3.7)
Jazan region	216 (4.9)
Nagran region	59 (1.3)
Baha region	27 (0.6)
Jouf region	32(0.7)

Table 2. Distribution of the studied participants according to the type of allergy in their children and their situation from COVID-19 (No.: 4436)

Variable	No. (%)
Type of allergy (No.: 229)	
asthma	166 (72.6)
allergic rhinitis	54 (23.5)
Drug	7 (3)
Food	2 (0.9)
Parents' perceptions about Coronavirus	
I think coronavirus is a simple virus like seasonal influenza.	257 (4.8)
I think Coronavirus is dangerous and could lead to death.	2777 (54.3)
I think coronavirus is a simple virus in the young but dangerous in old age.	949 (17.9)
I have no idea about its virulence, but I am afraid to get the infection.	453 (5.5)
Parents' perceptions about Quarantine	
I think it is an essential action and should continue until the end of the Pandemic.	3274 (73.8)
I think there is no benefit from Quarantine.	132 (3)
I think quarantine time has an effect on psychology	828 (18.7)
I have no idea if it works or not	74 (1.7)
More likely to be in danger of infection if my child got infected:	
Yes	1577(35.6)
No	2859 (64.3)
Family attitude toward public health instruction in general and Quarantine especially	
Always wearing the mask	3426 (76.7)
Always keeping social distance	132(3)
Always washing hands	832 (18.6)
	74 (1.7)
Preferred source of information: I like to hear news from :	
The official spokesperson of the ministry of health.	3516 (79.3)
Official doctor's accounts on twitter.	687 (15.5)
Social media on general (what's app, twitter, Instagram)	80 (1.8)
I think information is not clear and enough yet for me	153 (3.4)

Table 3. Distribution of the mean scores of fear of COVID-19 scale for the participants and the mean scores of anxiety and depression scores of their children

Scale	Mean ± SD
Anxiety scale	4.93 ± 4.04
Depression scale	4.81 ± 5.61
Fear of COVID-19 scale	18.74 ± 6.48

Table 4. Difference between the two studied groups according to their situation from COVID-19 (No.: 4436)

Variable	Group 1	Group 2	χ2	p- value
	No. (%)	No. (%)		
Parents' perceptions about Coronavirus				
I think coronavirus is a simple virus like seasonal influenza.	27 (10.5)	230 (89.5)		
I think Coronavirus is dangerous and could lead to death.	308 (11.1)	2469 (88.9)	0.6	0.89
I think coronavirus is a simple virus in young but dangerous in old age.	97 (10.2)	852 (89.8)		
I have no idea about its virulence, but I am afraid to get the infection.	50 (11)	403 (89)		
Parents' perceptions about Quarantine				
I think it is an essential action and should continue until the end of the pandemic.	352 (10.3)	3050 (89.7)		
I think there is no benefit from Quarantine.	16 (12.1)	116 (87.9)	4.36	0.22
I think quarantine time affects the psychology	106 (12.8)	722 (87.2)		
I have no idea if it works or not	8 (10.8)	66 (89.2)		
More likely to be in danger of infection if my child got infected:				
Yes	177 (11.2)	1400 (88.8)	0.32	0.56
No	305 (10.7)	2554 (89.3)		
I can protect my family from COVID-19 infection				
Yes, by following methods of prevention	359 (11.2)	2855 (88.8)	1.11	0.29
	123 (10.1)	1099 (89.9)		
Family attitude toward public health instruction in general and quarantine especially				
Always wearing the mask	367 (11.2)	2907 (88.8)	3.6	0.3
Always keeping social distance	32 (11.1)	255 (88.9)		
Always washing hands	65 (11.9)	661 (91.1)		
Preferred source of information: I like to hear news from:				
The official spokesperson of the Ministry of Health	382 (10.9)	3134 (89.1)	0.19	0.97
Official doctor's accounts on Twitter.	74 (10.8)	613 (89.2)		
Social media on general (what's app, twitter, Instagram)	8 (10)	72 (90)		
I think information is not clear and enough yet for me.	18 (11.8)	135 988.2)		

Table 5. Distribution of the mean scores of fear of COVID-19 scale for the participants and the mean scores of anxiety and depression scores of their children

Scale	Group 1 Mean ± SD	Group 2 Mean ± SD	Test^	p-value
Anxiety scale	4.98 ± 4.04	4.56 ±4.03	2.31	0.02
Depression scale	4.84 ±5.6	4.58 ±5.68	1.27	0.2
Fear of covid-19 scale	18.57 ± 6.37	18.76 ±6.49	0.73	0.46

Table 6. Relationship between the mean values of fear of COVID-19 score and participants' income and their opinion about conditions related to COVID-19 Quarantine

Variable	Fear of COVID- 19 scores (Mean ± SD)	Test	p-value
Income **< 5000 SR** **5000-<10000 SR** **10000-< 20000** **>20000**	18.89 ±7.14 18.69±6.45 18.65±6.26 18.88 ± 6.46	3*	0.65
Parents perceptions about Coronavirus *I think coronavirus simple virus-like seasonal influenza.* *I think Coronavirus dangerous and could lead to death.* *I think coronavirus simple virus on young but dangerous on old age.* *I have no idea about its virulence, but I amvafraid to get the infection.*	18.67 ± 6.33 16.81 ± 7.04 19.39 ±6.82 17.81 ±7.49	3*	< 0.001
Parents perceptions about Quarantine *I think it is essential action should continue until the end of the Pandemic.* *I think there is no benefit from Quarantine.* *I think quarantine time affects the psychology* *I have no idea if it works or not*	18.78±6.59 18.54±6.07 19.17±6.19 16.08 ± 5.53	3*	< 0.001
More likely to be in danger of infection if my child got infected: *Yes* *No*	18.88 ± 6.6 18.36 ±6.13	2.2**	0.02
Family attitude toward public health instruction in general and Quarantine especially *Always wearing the mask* *Always keeping social distance* *Always washing hands*	18.42±6.96 17.68±6.41 18.82 ±6.39	2*	0.07
Preferred source of information: *I like to hear news from :* *The official spokesperson of the ministry of health.* *Official doctor's accounts on Twitter.* *Social media on general (What's App, Twitter, Instagram)* *I think information not clear and enough yet for me*	18.76±6.54 18.59 ±6.23 20.02 ±6.46 18.14 ±6.61	3*	0.23

N.B.: * Kruskal Wallis test   ** Mann-Whitney test

Table 7. Relationship between the mean values of anxiety scores and participants' income and their opinion about conditions related to covid-19 Quarantine

Variable	Anxiety score (Mean ± SD)	Test	p-value
Income < 5000 SR 5000-<10000 SR 10000-< 20000 >20000	4.95±4.04 4.91±4.04 5.26±4.55 4.47 ±3.82	3	0.25
Parents perceptions about Coronavirus I think coronavirus is a simple virus like seasonal influenza. I think Coronavirus is dangerous and could lead to death. I think coronavirus is a simple virus in young but dangerous in old age. I have no idea about its virulence, but I am afraid to get the infection.	5.22±3.7 4.86 ±3.96 5.11±4.22 4.83 ±4.36	3	0.001
Parents' perceptions about Quarantine I think it is an essential action and should continue until the end of the Pandemic. I think there is no benefit from Quarantine. I think quarantine time affects the psychology I have no idea if it works or not	4.92 ±4 5.04 ±4.16 5.15 ±4.26 3.78 ±3.37	3	0.007
More likely to be in danger of infection if my child got infected: Yes No	5.15±4.17 4.34±3.64	1	< 0.001
Family attitude toward public health instruction in general and Quarantine, Always wearing the mask Always keeping social distance Always washing hands	5.24±4.1 5.33 ±4.23 4.87 ±4.03	2	0.04
Preferred source of information: I like to hear news from : The official spokesperson of the Ministry of Health. Official doctor's accounts on Twitter Social media on general (What's App, Twitter, Instagram) I think information not clear and enough yet for me	4.95 ±4.04 4.91±4.04 5.26 ±4.55 4.47 ±3.82	3	0.61

N.B.: * Kruskal Wallis test   ** Mann-Whitney test

Table 8. Relationship between the mean values of depression scores and participants' income and their opinion about conditions related to covid-19 Quarantine

Variable	Depression score (Mean ± SD)	Test	p-value
Income < 5000 SR 5000-<10000 SR 10000-< 20000 >20000	5.28 ±5.78 4.71±5.55 4.76 ±5.48 4.71 ±5.82	3	0.7
Parents perceptions about Coronavirus I think coronavirus is a simple virus like seasonal influenza. I think Coronavirus is dangerous and could lead to death. I think coronavirus is a simple virus in young but dangerous in old age. I have no idea about its virulence but I am afraid to get infection.	4.63 ±5.5 4.37±5 5.61 ±5.9 4.83 ±6.37	3	< 0.001
Parents' perceptions about Quarantine I think it is an important action and should continue I think there is no benefit from Quarantine. I think quarantine time has effect on psychology I have no idea if it works or not	4.81±5.57 5.06 ±5.51 4.93±6 3.83±4.422	3	0.35
More likely to be in danger of infection if my child got infected: Yes No	4.963 ±5.75 4.42 ±5.2	2.54	0.01
Family attitude toward public health instruction in general and Quarantine especially Always wearing the mask Always keeping social distance Always washing hands	5.51 ±5.6 6.37 ±7.25 4.65 ±5.54	2	< 0.001
Preferred source of information: I like to hear information from : Official spokesperson of ministry of health. Official doctor's accounts on twitter. Social media on general (Whats App, Twitter, Instagram) I think information not clear and enough yet for me	4.84±5.64 4.52 ±5.36 5.78±6.31 4.88 5.42	3	0.32

N.B.: * Kruskal Wallis test   ** Mann-Whitney test

Table 9. Spearman correlation between the mean fear of covid-19 scale scores and mean child anxiety and depression scores

Variable	r	p-value
Number of family members	0.01	0.44
Child anxiety scores	0.35	< 0.001
Child depression scores	0.25	<0.001

Discussion

Recently quarantine compliance and its possible psychological effects on children and their parents have been questioned a lot. Therefore, we aimed in this study to assess Quarantine COVID-19 compliance in families who had an allergic and immunological diseased child and its psychological impact, in KSA.

As long as, identify self-risk and individual health differences determine responses toward quarantine. Our results show that most of the families who had allergic and immunological diseased children thought that quarantine is a necessary action that should continue till the end of the Pandemic by 73.8% and 18% of the remaining saw that Quarantine has a psychological impact. Also, most of them comply with public health preventive measures such as wearing masks, social distancing and Quarantine. Likewise, a study by Li et al. 21 and Wise et al. 22 concluded that feeling at risk promotes self-saving behavior by adherence to public health actions.

Even though, the more surprising result of our research , showed there is no significant difference between the two-family groups in their perception about Coronavirus and their attitude toward Quarantine by p-value > 0.05. It is most likely due to the unpredictable situation at the begging of the pandemic, obligatory closure, and Quarantine in KSA from our view.

Furthermore, there are 79.3% of our population who prefer an official spokesperson from the ministry of health as a favorite source of information, which reflects a high level of trust in Saudi MOH and adherence to their instructions. Likewise, a recently published study by Bodas, M found similar results(23).

Fear of getting the infection, anxiety, and depression are all expected psychological outcomes to the new Pandemic and obligatory Quarantine. By using fear of COVID- 19 scale, we evaluated the amount of fear among the participants. The score ranged from 7 to 35 and, the mean of fear score among our respondents was 18.74 - 6.48 which is nearly moderate. One possible reason for such results among the participants could be the time the study was conducted because at that time obligatory Quarantine was still active, and most of the normal life activities were suspended, and the pandemic was still new. A study that was conducted in 2003 by Cava, M et al. (24) on individuals affected by SARS showed that fear regarding one's health and other people around from getting the infection was among the psychological impact of SARS back then. Likewise, a review article written by Brooks, S. K et al. (25) showed that fear during COVID-19 Quarantine was one of the psychological stressors reported.

Fear is a negative emotion that leads to psychological distress, which may reflect on children's mental health wellbeing, in addition to quarantine stress burden on parents. We found that there is a highly significant positive correlation between parent's fear of COVID-19 scores and the mean child anxiety and depression scores. Similarly to a recently published paper by Spinelli, M et al. (26), which concludes a significant association between parent's stress and children's psychological impact during the COVID-19 Pandemic.

School closure and sudden unpredicted change in life routine could lead to a challenging situation and chronic stress, which in turn may affect mental health and weaken the immune system. So we investigated the psychological impact on a special children group, those who had an allergic and immunological disease and found that the mean values of Revised Children's Anxiety and Depression subscale for parent (RCADS) were 4.56 ±4.03 and 4.58 ± 5.68 respectively. Also a study published by Imran, N et al. (27) showed that anxiety, irritability, anger, and withdrawal all had manifested on children during COVID-19 quarantine.

Moreover, we found a non-significant positive correlation between the mean values of fear of COVID-19 scale scores and the mean number of family members and mean the number of allergic children.

In our results, there is a significant relationship between fear, anxiety, and depression, and parent's perception regarding getting the infection if their child becomes infected. Likewise, a study done in Japan by Shigemura J et al. (28) showed that fear of getting infected increases anxiety. Also some children were concerned about infecting others as a result of infection. Saurabh, K et al. (29). Additionally found there is 54.3% of participants who believe that Coronavirus is dangerous and can lead to death. Since the majority of our population have a bachelor's degree or a higher degree, they have more knowledge of the disease in our hypothesis.

From our view, adverse health effects are likely to be much worse if children are confined to their homes without physical activity for a long time. Parents should observe their children's attitudes and feelings during home quarantine and assist them by initiating a direct conversation related to COVID-19 news to help alleviate their fear and anxiety, as well as performing recreational and educational activities among family members, which will enhance and improve family bonds.

A major limitation is that studies on compliance with quarantine and its psychological impact in children on Saudi Arabia are still not many, and this study could be more accurate if there was an accurate assessment of mental health by physicians rather than an online questionnaire. So our recommendation for further researcher compliance factors of Quarantine and its impact on children should have exceptional attention to minimize long term effects.

Conclusion

In conclusion, compliance to quarantine during COVID-19 pandemic may lead to loss of communication between relatives and friends, causing psychological consequences such as fear response, depression, and anxiety in children and their families. They need care and attention, especially those children who have an allergic and immunological disease.

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