



## Parents' Compliance towards Preventive Measures of COVID-19 for their Children: A Cross-sectional Study

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### ABSTRACT

*Background:* The Saudi Arabia was inveterate its first case of COVID-19 on the March 2<sup>nd</sup>, 2020. In responsible to the situation of spread of COVID-19, ministry of health of Saudi Arabia released many advices to its citizens in order to increase awareness and to avoid the catching the virus through infographics and TV and its official account on the social networking platform Twitter. These precautions and advices include importance of adhering to the preventive precautions for respiratory infections in general. However, it is necessary to assess the compliance of people especially parents about these precautions; no studies had been worked on this.

**Objectives:** To assess Saudi parents' knowledge about protection against COVID-19 corona virus, to assess parent's precautions for their children and their compliance with COVID-19 control measures. **Materials and Methods:** In this cross sectional study, conducted in April-May 2020, in Tertiary University Medical City of 1300 beds. 700 participants were non-randomly assigned in a convenient sample. (38.6%) were males while (61.4%) were females, pre tested questionnaire was used in data collection. **Results:** Findings of the study indicated that Saudi parents' had a sufficient knowledge about protection against COVID-19, that (66%) of the parents had a good level of knowledge. There was no significant relation between gender, marital status, number of children and the level of knowledge, while the only significant relation was between the age and the level of knowledge ( $P=0.043$ ). The result showed that the good level of knowledge is increasing with age. The results revealed a high adherence and compliance of Saudi parents toward Saudi MOH preventive measures of COVID-19 for their children, that the general percentage of parent's adherence and compliance was (90.3%). **Conclusion:** The level of knowledge about protection against COVID-19 was sufficient among Saudi parents in Riyadh city, Saudi Arabia. There was a significant relation between age and the level of knowledge. There was a high adherence and compliance of Saudi parents toward Saudi MOH preventive measures of COVID-19 for their children.

**Keywords:** Saudi parents; MOH; preventive measures; COVID-19; children.

## 1. INTRODUCTION

The corona is not a single virus or new concept. The Corona viruses are surrounded RNA viruses that are dispersed generally among human beings, in mammals, and birds (such as bat). This virus is used to cause neurologic, respiratory, hepatic, and enteric, diseases (Weiss & Leibowitz, 2011). There are six different corona virus kinds are known to cause human disease. There are four viruses such as OC43, NL63, 229E, and HKU1 are widespread and typically reason of common cold indication in immunocompetent persons (Su et al., 2016). The two other damages are known as severe acute respiratory syndrome corona virus (SARS-CoV) and Middle East respiratory syndrome corona virus (MERS-CoV). These two viruses are common in starting. But have been simultaneous to sometimes deadly illness (Cui et al., 2019). SARS-CoV was the fundamental agent of the harsh acute respiratory syndrome. This virus eruption was in 2002 and 2003. The origin of this virus was Guangdong Province of the great China (Zhong et al., 2003). MERS-CoV is caused by the pathogen for rigorous respiratory disease. This virus was come into view in 2012 from the Middle East (Zaki et al., 2012).

Given the high occurrence and extensive allocation of corona viruses, the great genetic assortment and numerous recombination of their genomes, and growing human-animal interface performance, novel corona viruses are likely to emerge periodically in humans because of common cross-species infections and sporadic spill over events (Wong et al., 2015).

In the end of December 2019, frequent local health facilities reported a group of patients with pneumonia of unidentified grounds that were epidemiologically related to seafood and soaked animal general market in Wuhan, Province Hubei China. On 31, December 2019, the Chinese Centre for Disease Control and Prevention (China CDC) transmitted a speedy answer team to accompany Hubei provincial and Wuhan city health authorities. The aim of this team was to conduct an epidemiologic and etiologic investigation. That team identify the new corona virus identified in patients with pneumonia.

According to the report of WHO 2020, in 9 March 2020, on the whole there were 45 States Parties informed the World Health Organization of extra health method they implemented in relation to COVID-19. Further it was said to provide the public health rationale for these measures.

## 2. MATERIALS AND METHODS

This study is cross sectional study carried out among Parents in Riyadh, Saudi Arabia, conducted in April-May 2020, in Tertiary University Medical City of 1300 beds. To assess their adherence toward Saudi MOH preventive measures of COVID-19 for their children. It was conducted in Riyadh region, Saudi Arabia in 2020. The study population was all parents who live in Riyadh region, Saudi Arabia, and agreed to fill the Questionnaire.

Total enumeration method was used for including all parents, male and female agreed to answer the questionnaire in this study. Sample size taken in this study is according to this formula with significance adopted at  $p > 0.05 (=NZ^2P(1-P)/(D^2 + Z^2P(1-P)))$ , the total respondent were 382. Therefore, the invitation to applying the questionnaire was sent to 700 Saudi Arabian parents using the communication of the researchers and their friends besides groups of WhatsApp and Facebook. The distribution of invitation was random and the researchers was try to distribute the questionnaire between all people in different region of the city in order to have general distribution of the questionnaire among Al Riyadh city.

Data was collected by an online pretested questionnaire to assess the adherence of Saudi parents toward Saudi MOH preventive

measures of COVID-19 for their children. The online survey was distributed using social media and WhatsApp application to contact to large possible population. Therefore, invitation to apply the questionnaire was distributed by the help of family and friends.

### Data analysis

Data was coded, entered, and analyzed using the Statistical Package for Social Science (SPSS) version 23. The level of knowledge and convince besides the applying of parents of precaution was calculated using percentage's calculation.

Level of knowledge about protection against COVID-19 was assessed using a scoring system. A value of 1 was provided to right answers, and 0 was used for incorrect/unknown reactions. Mean meaning was used to classify the respondents in two groups. Scores less than the mean value were considered as poor knowledge, while scores equal or greater than the mean value were considered as good knowledge. Furthermore, the relation between demographic character of parents and their level of knowledge was calculated using  $\chi^2$ -test. A statistical significance was determined at  $p = 0.05$ .

### Ethical concern

The ethical approval was obtained from the ethical committee of the Basic Health Research Centre of King Saud University.

## 3. RESULTS

In this study, 700 voluntarily participating Saudi parents were enrolled who were classified based on their socio-demographic information (as summarized in Table 1). It is evident from the given data that 270 (38.6%) participants were males while 430 (61.4%) were females. The age distribution of the sample showed that 340 (48.6%) of the parents were in the age group (25 - 45) years, 318 (45.4%) participants were older than 45 years of age whereas a few (6%) were younger than 25 years of age. All parents were resident in Riyadh city of Saudi Arabia.

Concerning the marital status, most of the participating parents (94.4%) were married, 22 (3.2%) were divorced and 17 (2.4%) were widowed. Segregating on the basis of number of offspring, majority of parents ( $n=260$ , 37.2%) had three or four children, relatively equivalent frequency ( $n=250$ , 35.7%) was observed for parents with 5 or more children while 190 of the participating parents (27.1%) had either one child or two children.

In order to assess the Saudi parents' knowledge about the protective measures against COVID-19 while focusing on first aim of our study, data analysis summarized in Table 2 revealed that 483 (69%) out of 700 parents agreed to the argument that using face mask protects against the virus transmission while 175 (25%) of the parents did not agree with the proposed statement. About the hand washing, 695 (99.3%) of the parents agreed that it protects from virus transmission, 3 (0.4%) did not agreed while 2 (0.3%) did not have any knowledge or opinion about it. Moreover, 684 (97.7%) of the parents agreed that using tissues protects against the virus transmission while 11 (1.6%) did not agree with the given statement and 5 (0.7%) did not know or did not have any opinion.

Additionally, clear majority ( $n=693$ , 99%) of the parents agree with the statement that avoiding contact with infected individuals reduces risk of infection while only a few of the parents (0.4%) did not agree whereas some of the participants (0.6%) did not give any opinion due to lack of knowledge. When asked about their opinion on reduction of infection risk by avoiding touching nose, mouth, and eyes, 678 (96.9%) of the parents agreed, 5 (0.7%) did not agree and 17 (2.4%) did not know about this aspect.

**Table 1:** Socio-demographic characteristics of study participants ( $n=700$ )

Character		Frequency	Percent
Gender	Male	270	38.6%
	Female	430	61.4%
Age (years)	< 25	42	6%
	25 - 45	340	48.6%
	> 45	318	45.4%
Status	Married	661	94.4%
	Divorced	22	3.2%
	Widowed	17	2.4%
Number of children	1 - 2	190	27.1%
	3 - 4	260	37.2%
	5 or more	250	35.7%

**Table 2:** Knowledge of parents about protection against COVID-19

Statement	Agree	Disagree	I don't know
1. Using face mask protects against the virus transmission	483 (69%)	175 (25%)	42 (6%)
2. Hand washing protects against the virus transmission	695 (99.3%)	3 (0.4%)	2 (0.3%)
3. Using tissues protects against the virus transmission	684 (97.7%)	11 (1.6%)	5 (0.7%)
4. Avoiding contact with infected individuals reduces risk of infection	693 (99%)	3 (0.4%)	4 (0.6%)
5. Avoiding touching nose, mouth and eyes reduces risk of infection	678 (96.9%)	5 (0.7%)	17 (2.4%)

The obtained data was also analyzed to cover the second aim of this study which dealt with assessment of the Saudi parents' precautions for their children against COVID-19 and their compliance with Saudi MOH COVID-19 preventive measures (results summarized in Table 3). It was observed that 655 (93.6%) of the study participants monitor their children health regularly while 45 (6.4%) did not show any such precautionary behavior. Also, most of the participating parents (n=666, 95.1%) were observed to guide their children how to wash hands while 34 (4.9%) did not observe any such precautionary measures. Moreover, majority of participating parents (n=660, 94.3%) were found to train their children to cover their mouth and nose with a tissue or their elbow while coughing and sneezing. Furthermore, 669 (95.6%) of the parents were found to involve in creation of safe opportunities for children to play and relax at home while 31 (4.4%) did not intend to do so. Additionally, 530 (75.7%) of the participants were observed to frequently sanitize touchable surfaces in their homes, and 572 (81.7%) of the enrolled parents were observed to make their children wear protective equipment (gloves and mask) when going out. Most of the parents (n=660, 94.3%) reported that their children followed their instructions, and 634 (90.6%) of the parents were observed to guide their children about COVID-19.

About the prevention of COVID-19 transmission, 601 (85.9%) of the parents stated that their kids follow the social distance precautions. Also, it was reported by 635 (90.7%) of the parents that their children follow the new Saudi Ministry of Health preventive measures for COVID-19 and 667 (95.3%) of the parents think that all of these preventive measures are effective to prevent transmission of COVID-19. These results reflected a high adherence and compliance of Saudi parents toward Saudi MOH preventive measures of COVID-19 for their children as the general percentage of parent's adherence was (90.3%).

**Table 3:** Parents' precautions for their children against COVID-19

Statement	Yes (%)	No (%)
1. Are you Monitoring your child's health regularly?	655 (93.6%)	45 (6.4%)
2. Are you guiding your child how to wash hand?	666 (95.1%)	34 (4.9%)
3. Are you directing your child to Cough and sneeze into a tissue or your elbow?	660 (94.3%)	40 (5.7%)
4. Are you Creating safe opportunities for children to play and relax at home?	669 (95.6%)	31 (4.4%)
5. Do you frequently sanitize touchable surfaces in your home?	530 (75.7%)	170 (24.3%)

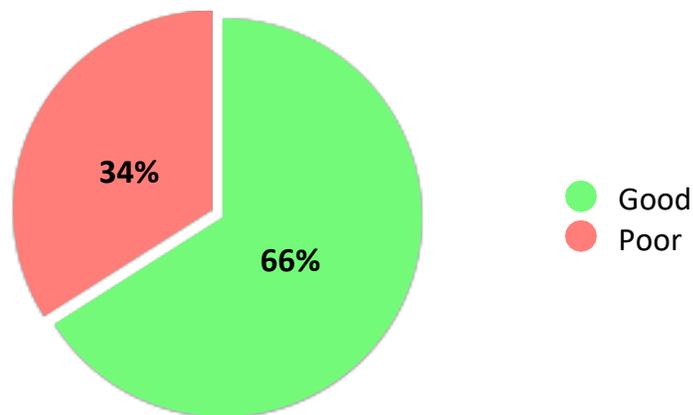
6. Do you and your children wear protective equipment (gloves and mask) when going out?	572 (81.7%)	128 (18.3%)
7. Do your children follow your instructions?	660 (94.3%)	40 (5.7%)
8. Are you providing general guidance about COVID-19?	634 (90.6%)	66 (9.4%)
9. Do your children follow the social distance to prevent COVID-19 transmission?	601 (85.9%)	99 (14.1%)
10. Do your children follow the new Saudi Ministry of Health preventive measures for COVID-19?	635 (90.7%)	65 (9.3%)
11. Do you think all these preventive measures are effective to prevent transmission of COVID-19?	667 (95.3%)	33 (4.7%)
The general percentage	90.3%	9.7%

**Table 4:** The Relationship between demographic characteristics of parents and their level of knowledge

Character	Level of knowledge				P. value
	Good		Poor		
	count	%	count	%	
Gender					
Male	173	64.1%	97	35.9%	0.394
Female	289	67.2%	141	32.8%	
Age (years)					
< 25	23	54.8%	19	45.2%	0.043
25 – 45	215	63.2%	125	36.8%	
> 45	224	70.4%	94	29.6%	
Status					
Married	442	66.9%	219	33.1%	0.134
Divorced	11	50%	11	50%	
Widowed	9	52.9%	8	47.1%	
Number of children					
1 – 2	122	64.2%	68	35.8%	0.755
3 – 4	171	65.8%	89	34.2%	
5 or more	169	67.6%	81	32.4%	

Level of knowledge about protection against COVID-19 was classified based on the responses of the parents. Mean value of responses (4.6) was used to classify the study participants into either with poor knowledge level or with good knowledge level. Scores less than the mean value were considered as poor knowledge, while scores equal or greater than the mean value were considered as good knowledge. There was relatively sufficient knowledge among Saudi parents where most of the parents (66%) were recognized with good level of knowledge (as showed in the Figure 1).

## Level of knowledge



**Figure 1:** Level of knowledge of parents about protection against COVID-19

Chi-square test ( $\chi^2$ -test) was used to determine the significance of differences between level of knowledge and the socio-demographic data of the parents (presented in Table 4). No significant difference was observed between gender, marital status, and number of children in relation to the level of knowledge, as the calculated P values for these parameters were recorded as 0.394, 0.134 and 0.755, respectively. On contrary, there was a significant difference between the age parameter and level of knowledge ( $P=0.043$ ). Our results showed that level of knowledge improves with increasing age as depicted by the highest-level of knowledge observed in parents older than 45 years while lowest level of knowledge was observed in parents younger than 25 years of age.

## 4. DISCUSSION

This study involved convenient sampling and assignment of 700 Saudi parents to assess their knowledge about protection against COVID-19, their adherence and compliance toward Saudi MOH preventive measures of COVID-19 for their children and to analyze if there is a significant relation between demographic data of the parents and their level of knowledge.

In this study the Saudi parents' knowledge about the protection against COVID-19 was assessed. 69% of the parents showed agreement to the use of face mask for protection against the virus transmission as compared to previously reported data in Saudi Arabia by Al-Sulaiman (2018) where it was stated that 50% of the participants were uncomfortable in wearing mask to prevent getting infected by corona virus. Similarly, in case of hand washing, 99.3% of the parents agreed that it protects from virus transmission while a lower fraction of participants (25%) was reported by Al-Sulaiman (2018).

Concerning the risk of infection, avoiding contact with infected individuals reduces risk of infection; in the present study (99%) of the parents agree with this fact which is contrary to the findings of the study that conducted by Al-Sulaiman (2018) who reported that (30%) of the participants agree it is difficult to avoid close contact with sick people.

When the study participants were observed to assess general Saudi parents' behavior in following precautionary measures and their compliance with Saudi MOH COVID-19 preventive measures, covering second aim of the study. It was observed that majority of the parents (94.3%) were instructing their children to cough and sneeze with their face covered by a tissue or their elbow. This was in accordance with previously reported results by Al-Sulaiman (2018) where it was observed that almost 85% of the study participants believed in covering mouth with a tissue when sneezing or coughing being a healthy behavior. In addition, our findings have shown that 95.3% of the study participants considered all of Saudi Ministry of Health preventive measures for COVID-19 as effective steps to prevent virus transmission, concurrent with Al-Sulaiman (2018) reports stating 90% of the participants agreeing to the efficacy of MOH's corona virus recommendation in minimizing the spread of COVID-19.

WHO repeat that measures that limit the association of people during this eruption should be proportionate to the community health danger, little in duration and reviewed regularly as additional information about the virus, the disease epidemiology and clinical characteristics becomes available.

Director-General of WHO reported in his customary media conference on 9 March, 2020. He stated that the danger of a pandemic has turned into very genuine; though, this will be the first deadly disease in history that can be controlled.

The Saudi Arabia was inveterate its first case on the March 2<sup>nd</sup>, 2020. This case has identified in a Saudi national that came from

Iran by means of Bahrain. The Saudi ministry of health explained that the first 3 cases came in to view in male citizen of the Saudi Arabia. These people were in get in touch with a previous case. The entire people are isolated immediately at a health facility in Jeddah. The Saudi ministry of health additionally cited that the fourth and fifth cases are identified for male and female they were Egyptian and recently come from Egypt, further the sixth case was confirmed for a Turkish female occupant approaching from Turkey. These all persons were immediately isolated at a health facility in Makkah. The Ministry of Health revealed that there are 10 other cases, consisting 6 male citizens arrived from Iraq, one male inhabitant arrived from Italy, and one male resident who was in touch with a preceding case. All these cases are isolated at a health facility in Qatif.

The Ministry of Health elaborated that there are 171 total registered numbers the new Corona virus (COVID-19) in the Kingdom. It is significance to reveal that COVID-19 has reached 161 countries in the middle of local and global rigorous efforts to stop and eliminate the virus ("Ministry of Health Reports, 2020). In responsible to the situation of spread of COVID-19, ministry of health of Saudi Arabia released many advices to its citizens in order to increase awareness and to avoid the catching the virus through infographics and TV and its official account on the social networking platform Twitter. These precautions and advices include importance of adhering to the preventive precautions for respiratory infections in general, which include: washing hands with soap and water, covering the mouth and the nose when coughing and sneezing. Besides, advice to travelers heading to areas where the virus (2019-nCoV) appeared, and include: avoiding contact with animals (live or dead), animal products, frequenting animal trading markets, and avoiding contact with people with symptoms Respiratory. And it stressed that if patients thought of having symptoms of a respiratory infection, the necessity of staying at home, avoiding mixing with others, not traveling during sick symptoms, covering the mouth and nose with tissues when coughing or sneezing, and keeping the hands clean by washing them for at least 20 seconds with soap and water, Or with alcohol sterilizers (Ministry of Health (MOH), 2020).

However, it is necessary to assess the compliance of people especially parents about these precautions; no studies had been worked on this. The knowledge of the level of awareness of parents about these precautions and to what extent they applied them in their lives and upon their children are very important in order to develop further tools to improve it as increasing the awareness of the importance of these precautions is very important to control spreading of the virus. Besides, Awareness of an individual's knowledge and being able to predict his or her behavior is crucial when evaluating clinical preparedness for pandemics with a highly pathogenic virus.

The COVID 19 has become a major issue across the world. It is easily transmissible and poses a serious threat to humans around the world. Correct information regarding COVID-19 and strict adherence to control measures will slow down the spread of infection and prevent widespread panic (Alsharif, et al. 2020; El-Malky et al. 2020; Elsheikh et al. 2020). This is yet to be gauged among Saudi parents.

The research is very important for the awareness and prevention. The results of this study may help policymaker's awareness campaigns to insure efficient prevention of COVID-19 spread and to the answer of subsequent question; Are Saudi parents properly informed and trained to keep this from happening (Infection of COVID-19)?

Generally, coronaviruses had not been considered to be extremely pathogenic to individuals until the epidemic of severe acute respiratory syndrome (SARS) in 2002 and 2003 in Chinese province Guangdong. However, it severely affected the respiratory system of the affected person. (Drosten et al., 2003) An additional highly pathogenic coronavirus was the Middle East respiratory syndrome (MERS) coronavirus, which was worse than the previous coronavirus. It broke out from Middle Eastern countries in 2012. A new type of coronavirus was identified in the last month of 2019. This type of coronavirus is more dangerous than the previous ones. COVID-19 is a highly pathogenic coronavirus to humans (Zaki et al., 2012).

This virus has increased global concern because COVID-19 has a great power of transmission as well as a high capability of mobility and fatality. From the last month of 2019 to 14<sup>th</sup> Feb 2020, approximately more than 60000 cases were seen with over 8000 severe patients infected with the COVID-19. It is a very hard pill to swallow that more than 1500 patients died due to this powerful virus. So, it was a challenging time for China. Early reports from China exposed that approximately all of the confirmed patients of the COVID-19 have suffered from pneumonia, and then this pneumonia affected the patient's health severely, leading to death in some cases (11). (Chen et al., 2020) On the other hand, pneumonia is prevalent throughout this time of year when respiratory infections caused by other pathogens infectivity are highly widespread. It has become an extremely hard time for public physical condition as well as health centers and doctors in this epidemic (Gonzalez et al., 2008).

COVID-19 is an advanced coronavirus related to SARS and MERS-Cov. According to Lau, et al., (2013) extensive studies of these two significant coronaviruses (SARS and MERS-CoV) have not only directed to an enhanced understanding of coronavirus natural science, but they have also led to coronavirus detection in bats internationally.

No previous studies had been done to assess the adherence of parents to the precautions to avoid the virus. However, as we discussed the new virus had a relation to SARS virus, we searched for studies conducted to assess the same variables in its

pandemics. Almutairi in 2015 aimed to assess the awareness, attitude and practices of public in Saudi Arabia related to MERS-CoV upon 1147 adults in Riyadh. The study found that the majority of the sample showed high level of awareness and had applied different precautionary measures. Only gender in this study seemed to affect the level of concern however, level of knowledge was a significant factor in predicting both level of concern and applying the precaution. Besides, high concern translated into a higher compliance with precautionary recommendations (Almutairi et al., 2015).

Moreover, in 2004 another study conducted in Qatar by Bener A, Al-Khal A to explore the knowledge, attitude and practice of the population of Qatar towards severe acute respiratory syndrome (SARS) among 1,386 travelers arriving at Doha International Airport and community residents visiting health centers. They showed that almost 80 % of the sample have good knowledge about SARS while 67 % were satisfy about the preventive measured taken by the health authorities, TV and radio programs are the principle source of information to almost half of the sample where educated participates had a greater level of knowledge (Bener & Al-Khal, 2004).

In 2003, Wang and his team conducted a study to assess the knowledge, attitude and practice (KAP) of rural people towards Severe Acute Respiratory Syndrome (SARS) among 118 people in Pinggu County, Beijing China. They found in this study that almost all the sample knew that SARS is an infectious disease especially through salvia and that the most precaution includes opening of window and avoiding the gathering. While most of their knowledge was taken from TV (Wang et al., 2003) Lau et al., conducted a survey in 2003 to investigate patterns of behaviors and attitudes related to SARS prevention in the Hong Kong cross border 839 traveler population. Finding that 40 % of participates were using masks most of the times in public places or washing their hand frequently besides avoiding visiting of crowd places (Lau et al., 2004; Alsulaiman, 2020).

## 5. CONCLUSION

The level of knowledge about protection against COVID-19 was sufficient among Saudi parents in Riyadh city, Saudi Arabia. Moreover, a significant direct relation was observed between age and the level of knowledge about prevention of corona virus transmission. Besides, high adherence and compliance of Saudi parents was noted towards Saudi MOH preventive measures of COVID-19 for their children protection against the viral transmission and disease prognosis.

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**Author Contributions:** Abdulrhman & Firas (Conceptualized and designed the study, Drafted the initial manuscript, Reviewed and revised the manuscript). Abeer & Aleisa (Designed the data collection instruments, Collected data, carried out the initial analyses, Reviewed and revised the manuscript). Mahdi & Khalid (Conceptualized and designed the study, Coordinated and supervised data collection, critically reviewed the manuscript for important intellectual content). All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

**Abbreviations:** TV: Television; MOH: Ministry of health; COVID-19: Corona Virus infectious disease; SARS-COV: Severe acute respiratory disease corona virus; CDC: Center of disease control; WHO: World health organization

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**Conflict of Interest:** The authors declare that there are no conflicts of interests.

**Informed consent:** Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

**Ethical approval:** The study was approved by the Medical Ethics Committee of King Saud University (ethical approval code: 743/o/8992).

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#### Data and materials Availability

All data associated with this study are present in the paper.

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