Original Article

The impact of COVID-19 Pandemic on Routine Childhood Immunization in Baghdad/Al-Karkh

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Abstract

Background: The coronavirus disease 2019 (COVID-19) pandemic is extensively impacting national and international public health. Routine childhood immunization is projected for being adversely affected by COVID-19 mitigation measures. Consequently, vaccine preventable disease outbreak might be a big problem to encounter in the near future. **Objectives:** The aim of the study is to evaluate the prevalence of vaccination delay and explore the barriers leading to that and parents' attitude toward the importance of vaccination timelines. **Materials and Methods:** A cross-sectional study was carried out during the period between of May 1st and of August 1st, 2021. A sample of 400 parents attending vaccination unit with their under 2-year-old children were selected from health-care centers from Al-Karkh directorate. **Results:** The study shows that 266 (66.5%) of the parents were mothers, 134 (33.5%) were fathers, 288 (72%) of them were aged 30 y ears or less, 210 (52.5%) of them were college graduate or higher educational level, 302 (75.5%) of them did not have a health worker in their family, 292 (73%) of them had <3 children. This study revealed that 274 (68.5%) of the parents reported a delay in their children's vaccination timeliness, 198 (49.5%) of which was significant delay of more than 1 month and 76 (19%) was a delay of 2–4 weeks only. 126 (31.5%) reported an on-time vaccination. This study also showed a highly significant association between vaccination delay and history of COVID-19 infection in the family. This study demonstrated that curfew and difficulty in transportation 154 (38.5%) and fear of getting COVID-19 infection 142 (35.5%) were the most encountered barriers for vaccination delay. This study also showed that 51% of the parents had good level of attitude toward the importance of vaccination timeliness for their children. In addition, it showed a significant association between the level of attitude with the age and educational level of the parents and with having a health worker in the family. **Conclusion:** We conclude that 68.5% of sample had vaccination delay since the COVID-19 pandemic has started and good level of attitude toward the importance of vaccination timeliness. This indicates the need for strict recommendation about the importance of routine immunization schedule and need to commit to it even during pandemic situations.

Keywords: Children, COVID-19, immunization

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has impacted all of life's aspects and is a threat to public health and health-care systems worldwide.[1]

COVID-19 pandemic prompting governments to implement many interventions that change the social norms such as curfews, travel bans to prevent further spread of COVID-19, school closure, and extensive screening measures.[2] Despite the importance of these measures but had many negative impacts on mental and physical health especially in children.[3] Furthermore, disruption to health-care services may result in childhood immunization being missed or delayed leading to secondary disease outbreaks of vaccine preventable diseases (VPD) in children or other infectious diseases in general.[4] According to the World Health Organization, the disruption of health-care systems due to the COVID-19 pandemic is exposing at least 80 million children worldwide to the threat of VPD.[5]

The morbidity and mortality caused by VPD is way higher and riskier than the risk of acquiring the COVID-19 disease

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during visits to primary health-care centers (PHC) to receive vaccines.[6]

The study aims to identify the prevalence of delayed immunization and explore the barriers for delayed immunization and evaluate parents' attitude regarding childhood vaccination timeliness during COVID-19.

Materials and Methods

A total of 400 parents attending vaccination unit with their under 2-year-old children in health-care centers of Al-Karkh directorate were selected to participate in this descriptive cross-sectional study on a convenient base, a consent was taken from all the participants to fill in the questionnaire that was prepared to collect the information.

The data collection was carried out during the period between May 1st and August 1st, 2021 from five sectors of Al-Karkh health directorate (Al-Karkh, Al-Amil, Al-Eadl, Al-Ielam, Al-Kadimiya) and 10 family and PHC were chosen conveniently.

Data collection had been done by interview, using questionnaire. The questionnaire was written in English and Arabic and divided into 3 sections:

1st section: Questions regarding sociodemographic characteristics.

2nd section: Questions about vaccination time barriers that faced the parents and subsequently led to preventing them from vaccinating their children on the time scheduled.

3rd section: Questions about their attitude toward vaccination timeliness against VPD in under 2-year-old children during COVID-19 pandemic (3 questions).

The statistical analysis was performed using (Statistical Package for the Social Sciences-version 24). The descriptive statistics were presented using tables and graphs measuring frequencies, percentages. Chi-square test was used to find significance of association between related categorical variables.

$P < 0.05$ was considered as discrimination point for significance. As for the attitude part, the answers were strongly agree-agree-neutral-disagree-strongly disagree and the scoring system of this part was calculated by giving the most suitable answer 4 point then 3, 2 to neutral, then 1 and finally 0 to the less suitable one. After that, the score was calculated by dividing the total possible score by the highest possible score multiplied by 100.

$$\text{Attitude score} = \frac{\textit{Real attitude score}}{\textit{Total possible Attitude score}} \times 100$$

Then the score was divided into 3 levels:

- Poor attitude level: If the parent achieved <50%
- Fair/Accepted attitude level: If 50%–75%
- Good attitude level: If more than 75%.

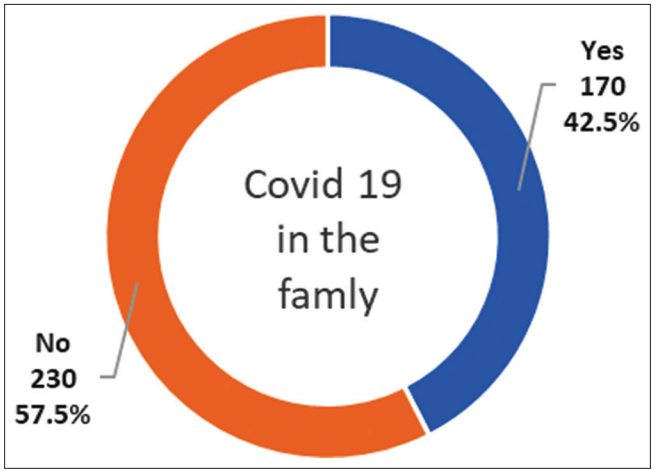

Figure 1: Distribution of studied groups (n = 400) according to presence of history of COVID 19 in the family Baghdad/Al-Karkh, 2021

Results

Table 1 shows the distribution of the study group according to sociodemographic characteristics, mothers were 266 (66.5%) and fathers 134 (33.5%). The highest proportion of the

Table 1: The distribution of the study group (*n*=400) according to sociodemographic characteristics in Baghdad/Al-Karkh, 2021

Sociodemographic variables	*n* (%)
Parents' gender	
Mothers	266 (66.5)
Fathers	134 (33.5)
Parents' age	
≤30	288 (72)
>30	112 (28)
Parents' educational level	
Primary	54 (13.5)
Secondary	136 (34)
College and above	210 (52.5)
Family member health worker	
Yes	98 (24.5)
No	302 (75.5)
Number of children	
<3	292 (73)
≥3	108 (27)

Table 2: Distribution of study groups (*n*=400) according to vaccination time Baghdad/Al-Karkh, 2021

Vaccination time	*n* (%)
Vaccination given on time	126 (31.5)
Vaccination delayed >2-4 weeks	76 (19)
Vaccination delayed >1 month (significant delay)	198 (49.5)

participants age was (≤30) years (72%), college and above was 210 (52.5%), 302 (75.5%) of the families did not have a family member who works in the health sector and 292 (73%) had less than three children.

Concerning

Vaccination time and vaccination delay, unfortunately, the highest proportion of the participants reported delay in their children's vaccination timelines (68.5%) (delay of more than 2–4 weeks (19%) and significant delay of more than 1 month was observed in (49.5%) of the cases) and only 31.5% had their children vaccinated on the time scheduled [Table 2 and Figure 1].

Figure 1 shows the distribution of studied groups according to the presence of COVID-19 infection history in the family, it shows that 42.5% of the participants had a positive history of having an infected family member and 57.5% of them had a negative history of COVID-19 infection in any of their household family members.

Regarding the relation between vaccination delay and COVID-19 infection in family members shows that there is a significant association between the COVID-19 infection in the family with the more than 1-month delay, 51.5% reported positive history of infection and delay more than 1 month, 66.3% reported negative history with no delay of more than 1 month as shown in Table 3.

In the present study, the reasons and barriers leading to delayed immunization show that the curfew and difficulty in transportation was a reason for delay for 38.5% of the participants, and fear of getting the COVID-19 infection was 35.5% as shown in Table 4.

Concerning the distribution of studied groups according to the attitude of parents toward the importance of vaccination timeliness shows that 100% of the parents strongly agreed with vaccinations being essential to keep children healthy, 94.5% of them strongly agreed with vaccinations should be given at the time scheduled as shown in Table 5 and Figure 2.

Figure 2 shows Distribution of studied groups according to the attitude of parents towards the importance of vaccination timeliness, shows that (51%) of the parents had good attitude ,(46%) accepted and(3%) had poor attitude level toward the importance of vaccination timeliness.

Table 3: The relation between vaccination delay and history of COVID-19 infection in family members

Vaccination delay	COVID-19 infection in the family		*P*
	Yes, *n* (%)	No, *n* (%)	
Vaccination given on time or within 2 weeks			
Yes	32 (25.4)	94 (74.6)	0.250
No	138 (50.4)	136 (49.6)	
Vaccination delayed >2-4 weeks			
Yes	36 (47.4)	40 (52.6)	0.340
No	134 (41.4)	190 (58.6)	
Vaccination delayed >1 month (significant delay)			
Yes	102 (51.5)	96 (48.5)	0.0001
No	68 (33.7)	134 (66.3)	

Table 4: Reasons and barriers causing delayed immunization among the studied sample (400) in Baghdad/Al-Karkh, 2021

Barriers	*n* (%)
Fear of getting COVID-19 infection	142 (35.5)
Some vaccination was not available	50 (12.5)
The doctor asked me to postpone	42 (10.5)
Curfew and difficulty in transportation	154 (38.5)
The child was sick	58 (14.5)
Others: Father busy with work	20 (5)

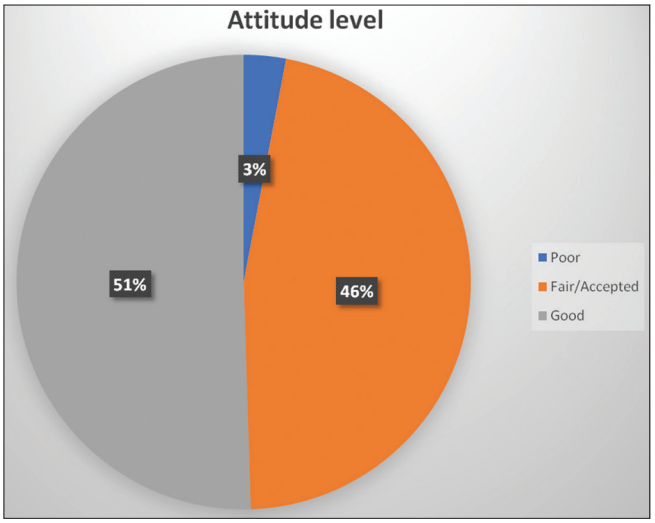

Figure 2: Distribution of the studied groups according to the attitude level of parents toward the importance of vaccination timeliness

Table 5: Distribution of studied groups according to the attitude of parents toward the importance of vaccination timeliness

	Strongly agree, *n* (%)	Agree, *n* (%)	Neutral, *n* (%)	Disagree, *n* (%)	Strongly disagree, *n* (%)
Vaccinations are essential to keep children healthy?	400 (100)	0	0	0	0
Vaccination should be given at the scheduled time?	378 (94.5)	16 (4)	6 (1.5)	0	0
Vaccination delay is not a problem as you can give all vaccines regardless of the due date for your child?	66 (16.5)	68 (17)	92 (23)	28 (7)	146 (36.5)

Table 6: Relation between the attitude level and the sociodemographic characteristics

	Attitude level			*P*
	Poor, *n* (%)	Fair/accepted, *n* (%)	Good, *n* (%)	
Gender				
Father	2 (1.5)	62 (46.3)	70 (52.2)	0.438
Mother	10 (3.8)	124 (46.6)	132 (49.6)	
Age				
≤30	10 (4.4)	118 (51.8)	100 (43.9)	0.004
>30	2 (1.2)	68 (39.5)	102 (59.3)	
Educational level				
Primary	4 (7.4)	40 (74.1)	10 (18.5)	0.001
Secondary	0 (	72 (52.9)	64 (47.1)	
College and above	8 (3.8)	74 (35.2)	128 (61.0)	
Family member health worker				
Yes	0 (	28 (28.6)	70 (71.4)	0.001
No	12 (4.0)	158 (52.3)	132 (43.7)	
Number of children				
<3	8 (2.7)	142 (48.6)	142 (48.6)	0.359
≥3	4 (3.7)	44 (40.7)	60 (55.6)	
History of COVID-19 infection in the family				
Yes	4 (2.4)	70 (41.2)	96 (56.5)	0.116
No	8 (3.5)	116 (50.4)	106 (46.1)	

Regarding the relation between studied variables and attitude level shows that there is significant association ($P < 0.05$) between the level of attitude and the parent's age, (>30) had a proportion of 59.3% good attitude. And educational level of the parents, 74.1% primary school had fair/accepted attitude and 61% college graduates had a good attitude, and 71.4% of the participants had good attitude also had a family member who is a health worker as shown in Table 6.

Discussion

Iraq was among the countries that were early hit by the first wave of COVID-19 pandemic, so maintaining the delivery and uptake of routine childhood immunizations is imperative during the (COVID-19) pandemic to avoid outbreaks of VPD. Emerging evidence indicates that the pandemic has caused disruption to the delivery of immunization programs globally.[7]

This study shows the sociodemographic characteristics of a total sample studied of 400 parents, the participating mothers' percentage was 66.5% and fathers were 33.5%, 72% of the parents aged 30 years or younger, 52.5% had a college or above level of education, 75.5% did not have a health worker in their family, and 73% had less than three children. In comparison with a study done by Alsuhaibani and Alageel in Saudi Arabia (2020),[1] mothers were predominantly higher in number (82.6%) than fathers (17.4%), with 31–40 years being the most common age group (49.8%), most parents obtained a bachelor's degree (78.4%), and 9.9% of the participants worked in the medical field, furthermore, 38.9% reported having one child.

In this study, 68.5% of the parents reported a delay in their children's vaccination timelines. A significant delay of more than 1 month was observed in 49.5% of the cases. However, 31.5% reported that the scheduled vaccine was given on time or within 2 weeks of the due date. This may be attributed to that parents in Iraq were unaware of the Ministry of Health recommendations for vaccination. While in the corresponding study done by Alsuhaibani and Alageel in Saudi Arabia (2020),[1] the 2-week delay was reported by 47.8%, and the more than 1-month significant delay was observed in 23.4%. However, 52.2% reported vaccinating on time or within 2 weeks of the scheduled time.

In the present study, the presence of COVID-19 infection history in the family was a major risk factor for significant vaccination delay (51.5%) [Figure 2]. This disagrees with Alsuhaibani's and Alageel study which shows no relation between the history of COVID-19 infection in the family and vaccination delay. The most common reasons mentioned by the participating parents were (38.5%) curfew and difficulty in transportation. However, fear of getting COVID-19 infection if they visit the PHC centers to receive vaccination was the main reason mentioned in Alsuhaibani's and Alageel study[1] and in Bin Muammar *et al*. study in Saudi Arabia (2021).[8]

Regarding the parents' attitude toward the importance of timeliness of their children's vaccinations, this study showed that 100% of the participating parents strongly agreed with vaccinations are important to keep children healthy, and another 94.5% strongly agreed with vaccination should be given on the scheduled time. When comparing to a study done by Thirumalai Kumar and Kavinprasad in India,[9] 94% agreed with child immunization being important.

In regard of attitude in this study, there was a statement in which vaccination delay is not a problem as you can give all vaccines regardless of the due date for your child? And the highest proportion of parents who strongly disagreed with that was 36.5%, and in a corresponding study by Alsuhaibani and Alageel in Saudi Arabia,[1] the highest proportion of parents (35.6%) agreed with the same statement.

The level of parents' attitude in this study based on these previous statements was good in 51% of the cases, fair/accepted in 46%, and the rest (3%) was poor attitude level toward the importance of vaccination timeliness. Similar results were concluded from Alsuahibani's and Alageel study.[1] Compared to the result observed in a study by a Jovanovic *et al*. in Bosnia and Hercegovina,[10] where the majority of the participants also had positive attitude.

Regarding the relation between the attitude level versus the sociodemographic characteristics of the parents, it was observed that significant association ($P < 0.05$) was found between parents who have college or more level of education, those had the best attitude score (61%) and parents who had a family member working in the medical field also had a good attitude (71.4%) compared to those who did not have a health worker in their family. This agrees with the study done by Alsuhaibani and Alageel in Saudi Arabia.[1] Also agrees with a study by Rammohan *et al*. in Australia,[11] and another study by Torun and Bakırcı *et al*. in Turkey,[12] both of which found that parental education to be significantly associated with a positive attitude toward different types of vaccines.

Conclusions

There is 68.5% delay in routine immunization program schedules. Positive COVID-19 infection in the family is significantly associated with significant vaccination delay of more than 1 month (51.5%) and most commonly encountered reasons and barriers for delayed immunization by the parents were curfew and difficulty in transportation in 38.5% and fear of getting COVID-19 infection in 35.5%. There is good level of attitude toward the importance of vaccination timeliness was found in 51% of the parents. The attitude level score is significantly associated with the educational level of the parent and the presence of a health worker in the family.

Public awareness programs through mass media can play a very important role in increasing individual awareness on the importance of timely delivered routine childhood immunizations to prevent the risk of encountering VPD.

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Conflicts of interest

There are no conflicts of interest.

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