

Effects of the COVID-19 Pandemic on Follow-ups and Immunization: An Example from A District

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ABSTRACT

Aim: We aim to compare the past trajectory of immunization services and different types of follow-ups with their current states during the COVID-19 pandemic.

Methods: This cross-sectional study was conducted in a district of Istanbul in February 2020, and included 138 Family Medicine Units. Services were compared monthly between 2019 and 2020, based on the antenatal, postpartum, infant, child follow-ups, and vaccine doses provided by the units. To examine the impact of the pandemic, the April-December periods of both years were also compared.

Results: It was found that follow-ups and immunizations were continued without any decline despite an increase in delayed vaccines. When the monthly mean number of delayed vaccines were compared, the mean number of delayed vaccines was significantly higher in April-May-June 2020 than in the same months of the previous year.

Conclusion: Performance scores of different services do not differ according to the descriptive characteristics of physicians. Although physicians are successful in services such as follow-ups, delayed vaccines are prevalent among them as well. While services that can be carried out remotely seem to be continued, services that require face-to-face contact are interrupted. Interventions should be done to ensure the sustainability of indispensable services even during extraordinary times.

Keywords: COVID-19, immunization, maternal-child health services, primary health care

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Introduction

Primary health care which is very essential includes minimal care services such as prevention and control of infectious diseases and treatment of common diseases, as well as maternal and child health care. Primary healthcare services should be brought to the closest locations that people can reach and accessibility to these services should be guaranteed (1,2).

Due to the additional demand and workload burden on health systems during epidemics, delivery of and access to health services may be interrupted. This can lead to an increase in both morbidity and mortality rates because of other external causes unrelated to common reasons (3). During the Ebola outbreak, a significant decline was observed in all levels of health services. Especially, institution-based deliveries as part of maternal and child health services are adversely affected (4).

Similarly, the COVID-19 pandemic which creates a huge burden on health systems, has many indirect impacts on health services. Some indirect effects of the pandemic may also arise from governments' restrictions or restructuring of healthcare services (5). In some studies, evaluating the effect of COVID-19 on primary health care services, a significant amount of drop was observed in different types of services including immunization and follow-ups for maternal, infant and children (6-8). According to a modeling study, disruption of health services due to the pandemic will adversely affect women and children more than other groups (9). Therefore, it is stated that the continuity of maternal and child health services is vital to sustain the health status of these vulnerable groups (10).

Childhood immunization programs may also be disrupted during pandemics. Studies show that routine immunization activities in countries in which immunization coverages were already low are more affected, but even countries that have successful immunization schedules may also be adversely influenced (11-13). Even a small failure in immunization coverage can cause a dramatic increase in communicable diseases (14,15). In addition,

individuals who were under-vaccinated in their childhood may have more severe outcomes of diseases at later ages and contribute to the transmission of the diseases in the community (16).

In Türkiye, family physicians working in Family Medicine Units (FMU) provide a great majority of primary care and preventive services for the registered population in their responsibility area. Pregnancy and postpartum follow-ups, infant and child follow-ups and immunizations are carried out by the FMUs (17). Antenatal care coverage was 99.4% and childhood immunization rates were in the range of 96-99% in 2019 (18). Although some revisions were implemented in terms of delivering services during the COVID-19 pandemic, the primary responsibilities of FMUs did not change (19). No study has been published in the literature examining the impact of the pandemic on these services in Türkiye yet.

In this study, we aimed to compare the services of Family Medicine Units in terms of immunization services and different types of follow-ups (antenatal, postpartum, infant and child) during 2019 and 2020 that is before and during the pandemic.

Methods

This cross-sectional study was conducted in February 2021. The population of the study consisted of 180 family medicine units by 01.02.2021 in the analyzed district of Istanbul. A family medicine unit (FMU) is defined as a service unit consisting of a family physician and a family health worker. Independent variables of the study are age, gender, specialty status of the family physicians, unit category, population per unit and working time in the unit. Dependent variables are the performance scores based on the antenatal, postpartum, infant and child follow-ups and vaccine doses provided by the units between January 1, 2019 and December 31, 2020. All data for this study are obtained from the Decision Support System (DSS) of the Ministry of Health.

The monthly service targets that is the number of follow-ups to be executed for each family medicine unit are defined in terms of the number of registered infants, children and pregnant. The performance score

of each variable is computed by using the formula, "the number of follow-ups executed/the number of follow-ups to be executed".

For immunization services, the monthly target population to be vaccinated is determined within the scope of the Ministry of Health National Childhood Immunization Schedule from the population registered in the unit. Unlike the follow-ups, family physicians can delay the time of the vaccine by reporting the reason. The maximum limit of delay for a vaccine dose is 3 months. Since data regarding the delayed vaccines are only available as a number rather than a proportion, the monthly registered infant population of each unit was used to standardize these data in terms of the target population. Although the National Childhood Immunization Schedule covers the 0-13 age period and the monthly target population of immunization could not be obtained from the DSS, the infant population in which 14 (66.6%) of the total 21 vaccine doses were used for the standardization of the number of delayed vaccines in 2019.

To examine the impact of pandemic on the follow-ups and routine services, April-December periods of both years were also compared, because this period involved the implementation of regulations restricting daily life in the whole country after the first case was reported on March 11, 2020 in Türkiye.

The district whose data were analyzed is a large district of Istanbul with a population of 512,502 as of December 2020. Among 180 FMUs in the district, 13 were vacant and 29 were served by physicians discontinuously during the study period. Ultimately, data regarding the 138 FMUs (76.7%) working without interruption were included in the analyses. Data quality was checked in Microsoft Excel 2016. SPSS 24.0 (Chicago, IL) was used for statistical analysis. Descriptive characteristics of the participants are summarized as mean, standard deviation, frequency and percentage. Paired sample t-test is performed for group comparisons. Pearson correlation analysis was conducted to analyze associations among variables. $p < 0.05$ was accepted as the statistical

significance level.

The official permission for the study is obtained from the Ministry of Health COVID-19 Scientific Research Evaluation Commission and the study is approved by the Non-Interventional Clinical Research Ethics Committee of Istanbul Medipol University.

Results

Females were 52.3% of the participants, the mean age was 46.99 ± 8.22 years, and 84.1% of them were general practitioners. Their mean working time in the unit was 2710.30 ± 1180.82 and population per unit was 3447.93 ± 467.90 (Table 1).

Table 1. Descriptive characteristics of the family physicians (n=138)

	n	%
Gender		
Female	73	52.3
Male	65	47.7
Specialization status		
General practitioner	116	84.1
Family physician specialist	22	15.9
Unit category		
A	87	63.0
B	23	16.7
C	5	3.6
D	16	11.6
E	7	5.1

According to Table 2, the mean antenatal follow-up scores in both January-December and April-December periods have slightly increased in the year 2020 (99.44 ± 1.17 and 99.48 ± 1.19 , respectively) and the differences between the same periods of the year 2019 are significant ($p = 0.013$ and $p = 0.005$, respectively).

The mean postpartum follow-up score during January-December 2020 is 78.85 ± 16.48 and it is significantly higher than the same period in 2019 ($p < 0.001$). The mean score of routine immunization in the April-December 2019 period is 97.84 ± 2.34 and this is significantly higher than the mean score of April-December 2020 ($p < 0.001$).

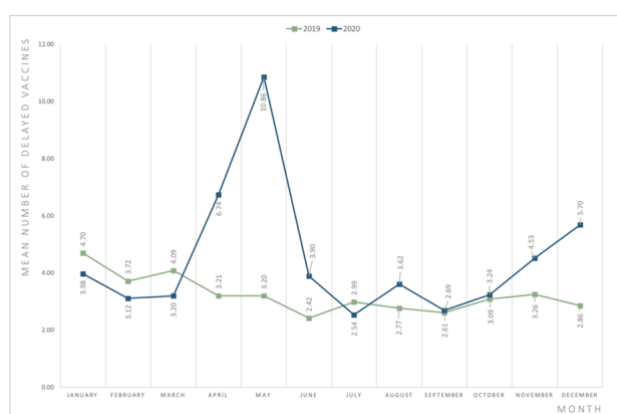
Table 2. Comparison of the follow-up performance scores and the number of visits by 2019 and 2020 (n=138)

	Performance scores				
	January-December		p	April-December	
	2019	2020		2019	2020
	Mean±SD	Mean±SD		Mean±SD	Mean±SD
Antenatal follow-up	99.06±1.49	99.44±1.17	0.013	99.01±1.64	99.48±1.19
Infant follow-up	99.70±0.76	99.62±1.23	0.424	99.62±6.63	99.62±1.32
Child follow-up	99.33±1.27	99.49±0.94	0.054	99.38±1.30	99.50±0.96
Postpartum follow-up*	68.23±20.76	78.85±16.48	<0.001	75.11±20.69	89.65±20.27
Immunization	97.73±2.46	97.71±3.03	0.896	97.84±2.34	97.59±3.27
Number of visits	11.419±376.2	8911±285.8	<0.001	8311±270.7	5839±191.7

*n=135

There is no significant difference between the mean infant and child follow-up scores in 2019 and 2020. When the mean number of visits per unit is compared, both January-December and April-December periods in 2020 have significantly lower numbers of visits than the same periods in 2019 (for both comparisons, $p<0.001$).

The mean number of delayed vaccines per FMU is shown in Figure 1. In monthly comparisons, the mean was 3.2 in April 2019 and 6.7 in April 2020, 3.2 in May 2019 and 10.9 in May 2020, 2.4 in June 2019 and 3.9 in June 2020. The differences between the groups were statistically significant in all comparisons ($p<0.001$, $p<0.001$ and $p=0.006$, respectively).

**Figure 1.** Comparison of the mean number of delayed vaccines by months per family medicine unit by years.

The mean number of delayed vaccines was 3.3 in November 2019 and 4.5 in November 2020, 2.9 in December 2019 and 5.7 in December 2020 and the differences between groups were statistically significant (for both comparisons, $p<0.001$).

According to correlation analysis made for the age

of the family physician, working time in the unit, the registered population in the unit and follow-ups, and immunization services, there was no correlation between age, working time and services. A weak positive significant correlation was present between the registered population of the unit and delayed vaccines in both the 2019 April-December and 2020 April-December periods ($r=0.241$ and $p=0.004$; $r=0.257$ and $p=0.002$). When the services examined in the study were compared in terms of gender and specialization status of physicians, there was no significant difference.

Discussion

In our study, services provided by family physicians in Türkiye were examined in terms of the performance scores. It was found that follow-ups and immunization services were continued without any decline despite of delayed vaccines during the pandemic.

Family physicians are evaluated according to certain performance scores which were determined and updated in time by the Ministry of Health. According to the carrying out percentage of these criteria, their salaries are determined in line with the Family Medicine Payment and Contract Regulation. Infant, child, pregnancy follow-ups and immunization services are among these criteria. In a qualitative study conducted in Türkiye, family physicians and family health workers stated that immunization and follow-ups are the most successful services in the family medicine model. They also stated that the salary deduction, when performance scores are not met, is an

effective method in this success and other services that are not involved in performance scores may be ignored because they do not affect the salary (20). Some other services such as autism or cancer screening and postpartum follow-ups, which are not among the performance scores yet but important services in terms of prevention of diseases, can be emphasized as examples in this category. The low percentage of postpartum follow-ups in our study can be explained by the fact that they are not yet included in the performance scores. On the other hand, it is noteworthy that the percentage of postpartum follow-ups increased in the analyzed district despite the pandemic. It should be emphasized that the contribution of the meetings organized periodically by the District Health Directorate with family physicians since November 2019 and the health indicators of the district are evaluated. If postpartum follow-ups are also included in these criteria, we can say that great success can be achieved in infant, child and pregnancy follow-ups, which are included in the performance scores.

During extraordinary health conditions, it is important to carry out other health services without interruption. To maintain well-being, access to health services should be provided when needed and the community should not be deprived of services. The fact that the priority of not only health systems but also the whole world is the COVID-19 pandemic may have caused the neglect of non-emergent healthcare services (21). Studies examining the effects of the COVID-19 pandemic on primary health care have shown that immunization and follow-ups decreased in many countries, especially in the first months of the pandemic (6-8,22). While many countries have been facing similar problems, showing that health systems were caught unprepared for the pandemic, however, it should not be forgotten that the allocation of priorities and resources for the primary effects of the pandemic also affects this situation (22,23). Although these services are not emergency services, they should be monitored closely as long-term adverse outcomes may be seen. Increases in maternal and infant mortality rates, growth retardation in children, rising incidence

of infectious diseases, pregnancy and postpartum period problems can be seen due to disruptions in follow-ups and services (10). According to a modeling study covering 118 countries, it is predicted that maternal and child health services will decrease in the range of 9.8-51.9% during the pandemic and approximately 253,000-1,157,000 child deaths and 12,200-56,700 maternal deaths may occur because of this (9). Similarly, some studies showed that the indirect effects of the Ebola virus epidemic were more severe than the epidemic itself (4,24). According to the findings of our study, it is pleasing that there is not any decrease in follow-ups during the pandemic. The fact that there is no difference among services in terms of descriptive characteristics of the family physicians such as age, gender, unit category, specialization status, working time in the unit and population per unit indicates that the service delivery has reached a certain level throughout the district. However, since these findings were obtained from the records reported by family physicians, the scope and quality of the follow-ups could not be evaluated. In a qualitative study examining the family medicine system in Türkiye, it was reported that as the workload increases, the quality of follow-ups decreased (20). During the pandemic, increased workload because of the cases and contact follow-ups defined to be done daily by family physicians may have disrupted other services or worsened their quality. However, according to the findings of our study, the mean of visit frequency to family physicians was also reduced in the same period. It can also be said that the workload may have decreased, and the quality of follow-ups may have risen because of some regulations aimed at reducing the visits to health institutions such as suggestions to community stay-at-home except for emergencies and automatic extension of drug reports. While evaluating the workload, it should be taken into account that as the registered population per unit increased, the delayed vaccines enlarged in our study.

On the other hand, when reducing both mobility and physical contact is crucial, it is also recommended not to visit health facilities, where the possibility of transmission of the virus is high, for non-emergent

needs and to continue the services possible from a distance (25,26). The sustainability of the service can be ensured by monitoring people remotely with telemedicine tools without visiting the health institution. In our country, the first steps of telemedicine implementations were conducted during the pandemic (27). However, these tools which are mostly used in clinical services have not yet become widespread in primary health care follow-ups.

In many countries, immunization schedules have been disrupted by COVID-19, and the fight against diseases such as polio, measles, cholera, tetanus and diphtheria has been adversely affected (28). Along with the declines in these activities, increases in infectious disease cases have also been reported. According to the statement made by WHO on May 22, immunization programs were disrupted in 68 countries and 80 million infants living in these countries are at risk of at least one disease (29). Although COVID-19 mildly affects infants and children in general, it should be emphasized that they are among the groups at risk in terms of indirect adverse effects of the pandemic due to the need for routine follow-ups and immunization. In a study conducted in South Africa, it was reported that child follow-ups and vaccination decreased by 50% in the first 3 months of the pandemic (8). According to another study, it was shown that vaccination rates diminished in the first months of the pandemic in 15 African countries (11). The increase in delayed vaccines in our study is similar to these findings. WHO has issued various warnings and guidelines to ensure that such services do not disrupt (3). Some recommendations are such as carrying vaccines to living locations of the target population and also performing some follow-ups at home. Each country should put into required implementations in terms of its social characteristics. According to the findings of our study, although vaccination rates are over 97%, it should be noted that delayed doses are not included in this. When the number of standardized delays is examined, it is noteworthy that despite the decrease in the infant population, delayed vaccines increased especially from April to July 2020. During this trimester of the

pandemic, the number of confirmed cases has dramatically risen in Türkiye and regulations that restrict mobility also been declared at the same time (30). The curfew, which started on March 21 for people aged 65 and over, was extended to people aged 20 and younger on April 4. While restrictions on some age groups were continuing, full curfews were implemented across the country for 7 days in April and 8 days in May in total. These implementations were maintained until the transition to normalization was initiated on June 1. The increase in delayed vaccines from April to June is consistent with this pattern. With the slowing rate of the pandemic since July, daily life has partially normalized, and we can say that immunization activities have returned to their routine timelines. However, while making this inference, it should be taken into consideration that this trimester, which is the end of the three months, the maximum period for vaccines can be delayed, also expired in the same month. Despite the increase in delayed vaccine doses, the lack of a significant difference in terms of immunization in monthly comparisons of the last two years can be explained by deducting the delayed vaccines from the target population while estimating the performance scores. On the other hand, when examining the delayed vaccines, it is necessary to consider their reasons.

Our study has some limitations. The findings of our study conducted in a district of Istanbul cannot be generalized. Since the data examined in the study were taken from a database belonging to the Ministry of Health, possible errors and limitations of the data were ignored. Therefore, since we did not have the total immunization targets of units, standardization of the target population had to be done in terms of registered infant populations of FMUs to compare the number of delayed vaccine doses.

Conclusion

Infant, child, antenatal and postpartum follow-ups by family physicians in the examined district of Istanbul were not disrupted during the pandemic. On the other hand, the increase in delayed vaccines is noteworthy, despite the decline in the infant

population. The fact that performance scores do not differ according to the descriptive characteristics of physicians indicates that both successful services such as follow-ups and problems such as delayed vaccines are prevalent among physicians. Interventions should be done to ensure the sustainability of indispensable services, which require face-to-face contact, physical examination or interventional treatment, even during extraordinary conditions such as a pandemic. In

addition, by advancing the quality of remote monitoring, the success of monitoring will reduce social mobility, workload, and direct human and time resources to other health needs. In addition, enhancing the quality of remote follow-ups can contribute to the use of resources in other needed areas by reducing the mobility of the community and the workload of family physicians.

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