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Healthcare provider's performance monitoring for undercovered population during the Covid-19 epidemic, 2021, Tehran: a cross-sectional study

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Abstract

Background Considering the necessity and importance of providing health care to children during the Covid-19 epidemic, this study aims to investigate primary health workers performance for infants under 6 months during the Covid-19 epidemic and parent's satisfaction level with these services.

Methods This was a cross-sectional study conducted among the defined population of Tehran University of Medical Sciences. The descriptive analysis focused on frequencies and percentages. A chi-square test was used to compare the categorical data between the studied groups.

Results Three-hundred seventy-two participants from two District Health Networks of Islamshahr 90 (24%) and Shahr-e-rey 107 (29%) and South Tehran Health Center 175 (47%) were included in the study. About 45% of 2 months old, 54% of 4 months old, and 42% of 6 months old received full basic healthcare package. Coverage of services such as vaccination and height, weight, and head circumference in all three age groups and health networks was 100%. Training in handwashing, touch the face, and hygiene while breastfeeding (64.4%, $p=0.043$) and not to use a pacifier (64%, $p=0.038$) in Islamshahr Health Network was significantly less than other health networks. The level of parental satisfaction with the provided services was 90.1%. There is a significant association between the dissatisfaction of the participants and not receiving the services completely ($p=0.000$).

Conclusion During the Covid-19 pandemic, the quality and quantity of primary health care to children have been declined. The focus of health workers was on essential physical health services for infants, and education was almost neglected during this period.

Keywords Primary health workers, Performance, Infants, Covid-19, Health care

Background

The pandemic of COVID-19 caused by severe acute respiratory syndrome coronavirus that affects families and communities has led to massive consequences [1]. The pandemic has led to disruptions in health care in the perinatal period [2]. Despite COVID-19 having a less severe direct impact on children's health, the indirect effect on healthcare delivery and perceived access to healthcare have been significant [3]. As the COVID-19 pandemic

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expands, many studies have reported substantial changes in the utilization of healthcare services because of such measures as lockdowns and stay-at-home orders. Healthcare utilization decreased during the pandemic, and many people have missed out on much-needed primary care, such as vaccination [4]. Support breastfeeding and shared decision-making between healthcare providers and mothers are a critical component in choosing optimal nutrition for infants [5]. Iron and vitamin A + D supplementation via drops should be continued throughout the period of breastfeeding [6]. In England, at the start of 2020, hexavalent vaccination coverage was 5.8%, and MMR vaccination coverage was 1.0% lower compared with 2019 [7]. In KwaZulu-Natal province, South Africa, following the start of the COVID-19 outbreak, significant declines were seen for children's clinic attendance and hospital admissions. Among service delivery indicators, immunization coverage, vitamin A supplementation, and food supplementation remain low [8].

Many parents are afraid to take their child to a medical care facility with the possibility of being infected. Therefore, caregivers are encouraged to share parent's worries and information with their pediatricians via phone calls, e-mails, or other social media applications [9]. Healthcare providers are responsible for providing accurate, evidence-based information on the consequences of a parent's decisions on their infants' health care. Also, they should try to clarify any misunderstandings for parents and identify sources of parent's anxieties [10]. Information and support provided by professional caregivers to families of children were associated with parental satisfaction. Because families are the ultimate coordinators of their child's care, promoting family-professional partnership and knowledge is a necessary component of the health care provided to children [11]. All aspects of neonatal care must be re-evaluated in the context of the pandemic, and neonatal units of intermediate-level care and neonatal intensive care units (NICUs) must be prepared and adopt practices that follow the best available evidence the outbreak [12]. General practitioners, practice nurses, midwives, and health visitors are well-positioned to counsel prospective and new parents about health care during the Covid-19 pandemic. Healthcare uptake in primary care is highest when parents feel safe and are given timely information [13]. Parents' satisfaction with health care is associated with improving their child's health and understanding medical information. Thus, the parent's satisfaction with health care can be a good proxy variable for the essential quality of care [14].

Therefore, considering the necessity and importance of providing health care to children during the Covid-19 epidemic, this study aims to investigate the healthcare providers performance for infants under 6 months

during the Covid-19 epidemic and parent's satisfaction level with these services.

Methods

Study type

The current study was a cross-sectional study conducted among the under-coverage population of Tehran University of Medical Sciences during the Covid-19 epidemic.

Sample size and data collection procedure

This cross-sectional study was conducted in health centers ($n=14$) of two district health networks of Rey and Islamshahr and the South Tehran Health Center, Tehran, capital of Iran. Using a two-stage cluster sampling, we selected health centers, and within each health center, we used a convenience sampling to recruit people in the study. A total of 372 cases of parents who attended health centers participated in this survey. The samples of this study were selected from the population of children covered by health centers/deputy of health of Tehran University of Medical Sciences (registered in the integrated health system). Also, considering that the service providers are covered by the two district health networks of Rey and Islamshahr and the South Tehran Health Center, the number of samples was based on the percentage of the population of that age group covered in each network. Samples were selected from each health center by care ages, and their details and contact numbers were extracted from the integrated health system.

Outcomes of the study included coverage of services (assessment of danger signs vaccination, measure height, weight, and head circumference, nutrition assessment, prescribing or recommending vitamin drops, prescribing or recommending iron drops (6 months), supplementary nutrition training (6 months), mouth and tooth assessment (6 months), hearing screening, sight assessment, evolutionary disorder (2 and 6 months) parent counseling and general practitioner visit (6 months)), observance of health protocols, training, and satisfaction. Age and resistance were independent variables.

The instruments that measure these topics included a total of 34 questions were developed to assess the demographic status, status of coverage of services, status of observance of health protocols, training status, and satisfaction status of health services.

The training status of healthcare workers was measured based on the parents' self-report. There were eight questions about whether the healthcare provider taught about the health protocols of Covid-19 or not (with the answer yes or no).

Five questions measured parents' satisfaction levels, and five used a Likert scale (three categories): agree (score 1), undecided (0), and disagree (0). Reliability

used for computing the satisfaction score was assessed by calculating Cronbach’s α , which was found to be high (≥ 0.7).

The trained interviewers then contacted the parents of the selected infants/children and completed a checklist designed according to age and care priority (2 months, 4 months, 6 months). The content of the performance checklist healthcare workers/child care providers at the time of visit, parental awareness of child care tips in the event of a corona outbreak, satisfaction with services, and how to follow up on unperformed care. After completing the checklists, the information was entered into SPSS software, and data analysis was performed.

This study has been approved by the ethics committee of Tehran University of Medical Sciences with the code of ethics IR.TUMS.MEDICINE.REC.1400.066.

Statistical analysis

The descriptive analysis focused on frequencies and percentages. A chi-square test was used to compare the categorical data between the studied groups. The statistical significance level was set at $p < 0.05$. The collected data

were analyzed using the Statistical Package for the Social Sciences (SPSS), version 26.

Results

Demographic characteristics

Generally, 372 child parents were included into the study. The participants entered this study from three health networks of Tehran University of Medical Sciences. The sample size of Islamshahr Health Network was 90 people (24%), Southern Health center was 175 people (47%), and Shahr-e-ray Health Network was 107 people (29%) (Table 1).

All participants reported that they were aware of their child’s health care and vaccination needed; also, the method of obtaining this knowledge has reported the training of health workers (79%) and hospital staff (12%), respectively. About 8% of the participants mentioned other methods (social media, public broadcasting, and telephone calls from the health center) as a source of information. We did not find a significant association between the ways to get information with the child’s age ($p = 0.736$) and the health network covered ($p = 0.253$).

Percentage of service coverage

In this study, 45% of 2-month-old, 54% of 4-month-old, and 42% of 6-month-old children received full service. Table 2 showed the coverage of services provided to children by age group and the health network covered. There was no significant association between receiving complete services with age ($p = 0.159$) and children’s health network ($p = 0.844$).

Table 1 Demographic characteristics of participants (N = 372)

Health network	2 months (n = 123)	4 months (n = 123)	6 months (n = 126)	Total (n = 372)
Islamshahr	30(24.4)*	30(24.4)	30(23.8)	90(24.19)
South Tehran	58(47.2)	57(46.3)	60(47.6)	175(47.04)
Shahr-e-Rey	35(28.5)	36(29.2)	36(28.5)	107(28.76)

Table 2 Coverage of services performed according to the age of the child and the health network covered

services	2 months (n = 123)	4 months (n = 123)	6 months (n = 126)	P-value	Islamshahr (n = 90)	South Tehran (n = 175)	Shahr e Rey (n = 107)	P-value
Assessment of danger signs	66(53.7)	82(66.7)	86(68.3)	0.113	56(62.2)	103(59.2)	72(69.9)	0.42
vaccination	123(100)	123(100)	126(100)	-	90(100)	175(100)	107(100)	-
Measure height, weight, and head circumference	123(100)	123(100)	126(100)	-	90(100)	175(100)	107(100)	-
Nutrition assessment	120(97.6)	123(100)	125(99.2)	0.534	90(100)	171(98.3)	107(100)	0.763
Prescribing or recommending vitamin drops	122(99.2)	123(100)	126(100)	0.362	89(98.9)	175(100)	107(100)	0.214
Prescribing or recommending iron drops (6 months)	-	-	126(100)	-	30(100)	60(100)	36(100)	-
Supplementary nutrition training (6 months)	-	-	125(99.2)	-	30(100)	59(98.3)	36(100)	0.574
Mouth and tooth assessment (6 months)	-	-	99(78.6)	-	26(86.7)	48(80)	25(69.4)	0.353
Hearing screening	120(97.6)	118(95.9)	115(91.3)	0.084	85(94.4)	164(94.3)	99(96.1)	0.2
Sight assessment	-	101(82.1)	-	-	22(68.8)	54(93.1)	28(75.7)	0.005
Evolutionary disorder (2 and 6 months)	104(84.6)	-	107(84.9)	0.888	27(84.4)	51(83.6)	32(86.5)	0.855
parent counseling	119(96.7)	101(82.1)	113(89.7)	0.001	83(92.2)	159(91.4)	86(83.5)	0.289
General practitioner visit (6 months)	-	-	104(82.5)	-	25(83.3)	43(71.7)	36(100)	0.012

Values are numbers (percentage)

Vaccination and measurement of children’s height, weight, and head circumference in all three age groups were performed completely. Also, vitamin A + D drops, and multivitamins in the ages of 4 and 6 months and iron drops in 6 months had 100% coverage. Other services were not fully provided for all age groups. Evaluation of risk signs had the lowest percentage of service coverage among 2-month (54%), 4-month (67%), and 6-month (68%) children. However, there was no significant difference between the groups ($p=0.113$). There was a significant difference between the three age groups in the parent counseling service (maternal health, breastfeeding, child development, child nutrition, child prevention, child harm, and environmental factors) ($p=0.001$). According to the findings, oral assessment of 6-month-old children was completed only for 107 children (78%).

The recommendation of multivitamin and A + D drops in Islamshahr Health Network (98.9%) was less than other health networks. Status of service coverage such as assessment of danger signs (non-breastfeeding, recurrent vomiting, seizures, lethargy, and irritability) (59.2%), nutrition (98.3%), general practitioner visit (71.7%), and supplementary nutrition education for 6-month-old children (98.3%) in the Southern Health Center was less than other health networks. Except for general practitioner visits ($p=0.012$), other services were not significantly different from other health networks ($p > 0.05$). The coverage

status of mouth and tooth assessment services (69.4%, $p=0.353$) and parent counseling (83.5%, $p=0.289$) in the Shahr-e-ray Health Network were significantly lower than other health networks. Vision assessment coverage in Islamshahr Health Network (68.8%) was significantly lower than other health networks ($p=0.005$).

Status of observance of health protocols

The status of observance of health protocols to prevent Covid-19 by parents of children and health workers is shown in Table 3. Seventeen percent of the participants did not use disinfectants and disposable covers for the examination bed, physician scales, and stadiometer. Also, 55% of health centers covered by the Southern Health Center have reported inappropriate social distancing. According to the participants, the social distance of health centers covered by Islamshahr Health Network, Southern Health Center, and the Shahr-e-ray was undesirable 9%, 19.7%, and 18.4%, respectively. Observance of social distance ($p=0.003$) and disinfection of surfaces or disposable coating on surfaces ($p=0.048$) in the health network Southern Health Center were significantly less than other health networks. All clients of health centers used personal-protective equipment. Adherence to the health protocol had no significant association with the child’s age ($p=0.98$).

Table 3 Status of observance of health protocols against the covid-19 by clients and health workers and education on ways to prevent virus transmission according to health networks

	Islamshahr	South Tehran	Shahr e Rey	P-value
Social distance status				
Desirable	10(11.2)	6(3.5)	1(1)	0.003
Relatively desirable	71(79.8)	133(76.9)	83(80.6)	
Undesirable	8(9)	34(19.7)	19(18.4)	
Disinfection and other sanitary measures				
Yes	78(87.6)	140(80.5)	91(88.3)	0.048
No	0	10(5.7)	1(1)	
Use of personal protective equipment				
Yes	90(100)	174(100)	103(100)	
No	-	-	-	-
Education titles				
Frequent and correct hand washing	58(64.4)	133(76)	84(78.5)	0.043
Do not touch the face, eyes, and nose (mother and child)	58(64.4)	133(76)	84(78.5)	0.043
Hygiene while breastfeeding (proper handwashing)	58(64.4)	133(76)	84(78.5)	0.043
Do not use glass and pacifier	57(64)	133(76)	84(78.5)	0.038
Observe the appropriate distance between the infant/child and others	57(64)	133(76)	84(78.5)	0.067
Avoid handshake and kissing	57(64)	133(76)	84(78.5)	0.067
Ways of disinfection of appliances (food, sleep) and home	57(64)	133(76)	84(78.5)	0.067
Visit Corona special centers	54(60)	117(66.9)	69(64.5)	0.64

Values are numbers (percentage)

Training status

The training status of Covid-19 virus transmission routes by health workers to health center clients was shown in Table 3 too. Islamshahr District Health Network generally had less training in virus transmission than other health networks. However, training in handwashing, touch the face, and hygiene while breastfeeding (64.4%, $p=0.043$) and not using a pacifier (64%, $p=0.038$) in this health network were significantly less than other health networks. Southern Health Center covered only 76% in most fields (frequent and correct handwashing, do not touch the face, eyes, and nose, hygiene while breastfeeding, do not use glass and pacifier) of Covid-19 virus transmission training. There was no significant difference between health networks in other educational fields (observe the appropriate distance between the infant and others, avoid handshake and kissing, ways of disinfection of appliances and home, visit Corona special centers) ($p > 0.05$).

Satisfaction status of health services

About 335 (90.1%) of parents were satisfied with health services by health workers. Also, others (35 (9.4%)) were dissatisfied with the services provided. Dissatisfaction was not significantly different in age groups ($p=0.653$) and health networks ($p=0.140$) (Table 4).

Only 33 participants expressed their dissatisfaction. Thirty (8%) participants reported insufficient training of health workers, and three (1%) participants reported noncompliance with health protocols in health centers. There was a significant association between participants' dissatisfaction and not receiving full services ($p=0.000$). Twenty-nine (83%) of dissatisfied participants did not receive the services in full.

Discussion

This study investigates the healthcare provider's performance to infants under 6 months covered by the Tehran University of Medical Sciences and parent's satisfaction level with these services during the Covid-19 pandemic. Our study showed that 79% of parents reported that health workers' training is the only way to obtain information. At the same time, health workers did not thoroughly do training in Covid-19 transmission routes.

According to the parents of the children, vaccination, measurement of height, weight, and head circumference, and administration of vitamin A + D, multivitamin, and iron drops were fully covered in all health networks, while some care, including assessment of danger signs, vision, mouth and tooth, hearing, and evolutionary disorder, was not entirely performed for all children.

It seems that health workers tend to speed up the care process to avoid overcrowding in the examination room and to observe the social distance between clients. Therefore, they complete some care without asking the child's parents or examination, only based on their observations. On the other hand, during the Covid-19 pandemic, the duties of health workers (case founding and follow-up of Covid-19 patients) increased, which could affect the quality of other care.

According to the results of our study, vaccination coverage did not decrease during the Covid-19 epidemic. Because the health workers of Tehran health centers reminded their parents about the time of vaccination of children through telephone follow-up, also factors such as parents' level of education and knowledge, lack of inequality in the distribution of vaccines to health centers, easy access to health centers, and lack of restrictions on intracity traffic during the coronavirus pandemic are effective factors in the coverage of vaccinations and measuring height and weight of children [15–17].

Table 4 Investigating association between client's satisfaction and received services with the age of receiving services and the health network covered

	Receive full services	Lack of full services	P-value	dissatisfaction	satisfaction	P-value
Health network						
Islamshahr	40(44.4)	50(55.6)	0.844	4(4.4)	86(95.6)	0.14
South of Tehran	82(46.9)	93(53.1)		17(9.9)	155(90.1)	
Shahr e Rey	52(48.6)	55(51.4)		13(12.6)	90(87.4)	
Age						
2 months	55(44.7)	68(55.3)	0.159	14(11.4)	109(88.6)	0.653
4 months	66(53.7)	57(46.3)		11(8.9)	112(91.1)	
6 months	53(42.1)	73(57.9)		10(8.1)	114(91.9)	

Values are numbers (percentage)

All healthcare workers and clients used personal-protective equipment correctly. About 17% of the participants stated that disinfectants and disposable covers were not used for the examination bed, physician scales, and stadiometer. Also, 55% of participants covered by the Southern Health Center reported the status of social distance as undesirable. The lack of physical space in health centers is the most compelling reason for not observing social distance. In general, the observance of health protocols of the Covid-19 virus in health centers covered by the Southern Health Center was significantly different from other health centers. Inadequate training and failure to fully comply with Covid-19 prevention protocols by health workers were the leading causes of dissatisfaction of our study participants. In this study, satisfaction with the services provided was estimated at 90.1%.

The Covid-19 pandemic, like epidemics in recent years, has put much strain on the health systems of countries, especially countries with fragile health systems <https://www.globalfinancingfacility.org/monitoring-continuity-essential-health-services-during-covid-19-pandemic>. In 2020, countries reported that, on average, about half of essential health services were disrupted <https://www.who.int/news/item/23-04-2021-covid-19-continues-to-disrupt-essential-health-services-in-90-of-countries>. Overall, the Covid-19 virus has reduced 37% of healthcare services [4]. The pandemic has affected many healthcare settings, including child care [18].

During the current pandemic, the late delivery of children in the UK and Italy has led to severe illness and death [19–22]. Decreased child health care leads to malnutrition, increased vulnerability, reduced vaccination coverage, and ultimately mortality, disrupting community health <https://www.globalfinancingfacility.org/monitoring-continuity-essential-health-services-during-covid-19-pandemic> [23, 24]. A study by Singh et al. showed that the Covid-19 pandemic reduced the number of pediatric vaccinations in India by 20% [25].

A study conducted by Balchcrima and colleagues in 15 African countries in 2020 also reported a reduction in the average monthly vaccine dose for children in 13 countries. They reported six countries had a decline of more than 10% in vaccination [26]. Analyzing data reported by more than 63,000 facilities in 10 countries, it was found that during the Covid-19 epidemic by June 2020, children receiving pentavalent vaccines in Liberia, Nigeria, and Afghanistan decreased by 31%, 13%, and 11%, respectively <https://www.globalfinancingfacility.org/monitoring-continuity-essential-health-services-during-covid-19-pandemic>.

A study in Ghana found that only 50% of healthcare workers used personal-protective equipment, and 77% did not keep a physical distance from their clients. Also,

53% of the staff did not provide any information about Covid-19 to the clients. However, 95% of the staff disinfected surfaces with 0.5% chlorine and 70% alcohol and washed their hands frequently [27].

A study in Zambia shows that out of every five children vaccinated in health centers, the parents of one child expressed dissatisfaction with the services provided. Their dissatisfaction was the lack of staff in health centers and the low quality of interaction and communication between staff and clients [28]. The study by Wambua et al. estimated 81% satisfaction with the services provided by Kenyan health centers and reported the waiting time to receive services as one of the factors affecting client satisfaction [29]. According to studies conducted in Africa and Turkish, a significant association has been observed between the quality of health services provided and client satisfaction [30, 31]. The results of the Parchman study in Texas showed a significant association between the satisfaction of clients in health centers with the behavior of physicians and staff [32]. Many scholars reported a significant association between healthcare services and patient satisfaction [31, 33].

During the Covid-19 epidemic, the health systems of many countries were severely damaged, and some health services were disrupted or of poor quality. Iran's health system was also affected. Identifying which services are disrupted, quantifying the level of disruption, and matching these estimates with knowledge of the local context will better inform the response to the health systems.

One of the limitations of the present study was the lack of data collection for research purposes and the incompleteness of this information resulting from participants not answering all the questions on the checklist.

Conclusion

The present study showed that the health workers focused on the essential and physical care of children, and other care, including training, was incompletely provided, which led to increased client dissatisfaction. Also, the most observance of health protocols was in the field of personal-protective equipment and other measures such as observing the social distance between clients and health workers and disinfection of equipment, and levels were less considered by health workers.

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Authors' contributions

FSO, manuscript preparation and drafting the article. SHSH, analysis and interpretation of data. NT, concept and design of study, definition of intellectual content, and final approval of the version to be published. MMH and EH, concept and design of study. AVM, concept and design of study, definition of intellectual content, and review and editing of manuscript. Manuscript has been read and approved by all the authors, and requirements for authorship

as stated earlier in this document have been met. Each author believes that the manuscript represents honest work.

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Availability of data and materials

Data will be made available by the corresponding author to the editor after a request email from the editor. The reason for sharing the data should be justified, and it will be shared after all the authors approved the same.

Declarations

Ethics approval and consent to participate

Tehran University of Medical Sciences Ethical Committee, registration no.: IR.TUMS.MEDICINE.REC.1400.066.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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