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Community Medicine

A RETROSPECTIVE OBSERVATIONAL STUDY TO EVALUATE THE IMPACT OF COVID-19 PANDEMIC ON ROUTINE CHILDHOOD IMMUNIZATION AT THE PRIMARY HEALTH CARE CENTERS OF AHMEDABAD CITY.

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ABSTRACT **Background:** The COVID-19 pandemic has caused significant disruptions in the delivery of essential primary health care services including routine immunization services in various countries including India. This temporary interference can lead to soaring of vaccine preventable illnesses. The recent outbreak of Measles worldwide in the last 12 months depicts a clear picture for a secondary health crisis. So, this study brings forth the impact of pandemic on the routine childhood immunizations in primary health care sectors of Ahmedabad, India and developing appropriate strategies to ensure continuity of services. **Methods:** A retrospective observational study was carried out at the Urban primary health centers distributed across the seven zones/wards of Ahmedabad region and data of children (under 5 years) registered and vaccinated as per universal immunization Programme schedule were retrieved for a period of four years and divided into two comparison groups as pre covid sessions (1st January 2018 till 31st December 2019) and post covid sessions (1st January 2020 till 31st December 2021). The vaccination trends were compared for these two periods and analyzed. **Results:** Routine childhood immunization coverage (among 0 to 5 years old children group) following the pandemic depicted a declining trend with a major set-back recorded in pentavalent and MR vaccination coverage (fall of 40%). Full immunization coverage falls short by 30% (95%+ 2.4% versus 66%+ 3.1%) and it was significant with $p<0.05$ and chi square value of 27.7. Barriers to effective routine immunizations have also been enumerated with pandemic related anxiety and difficulty in community mobilizations being most common. **Conclusions:** It is quite evident that the Covid-19 pandemic has been a major backslider for the routine childhood immunizations in India which needs immediate redressal to prevent the outbreaks of vaccine preventable diseases in future.

KEYWORDS : "pandemic", "routine immunization"," backslider", "barriers".

INTRODUCTION

The coronavirus disease pandemic has wreaked havoc and caused enormous loss throughout the world. According to Health Management Information System (HMIS) report routine health services were severely affected after lockdown [1]. It led to lack of human resources and financial constraint which affected the international and national health programs. Due to formation of micro containment zones and the fear of infectivity, it was difficult to reach the children for immunization.

Childhood vaccines are time sensitive and thus even a small gap in the vaccination coverage of millions of children will put the gains reaped by decades of work in danger. Thus, disruption of Routine immunization would directly impact India's ability to achieve SDGs.

Globally, 23 million children missed out on basic vaccines through routine immunization services in 2020 – 3.7 million more than in 2019 - according to official data published by WHO and UNICEF.(2) Despite the fact that India's immunization programme has been largely successful in reducing the burden of Vaccine preventable diseases (VPDs) over the previous two decades, a considerable proportion of VPDs still persist due to inadequate coverage. According to NFHS 5 (2019-202) data, only 76.4% of children between 12 and 23 months of age in India and 76.3% in Delhi have received all basic routine immunizations. [3]

Any disruption in immunization services will exacerbate the gaps and inequities in vaccine coverage that already exist, perhaps leading to subsequent outbreaks of VPDs [4].

Measles outbreaks have occurred all across the world as a result of immunization gaps, with India being the second-most affected country globally(5) Similarly outbreaks of circulating vaccine derived polio viruses(cVDPVs) of all three serotypes have been reported from 37 countries around the world(6).

Therefore, this study highlights the impact of recent Covid-19 pandemic on the routine childhood immunizations in primary health care sectors of Ahmedabad city.

MATERIALS AND METHODS

A multi-centric retrospective observational study was conducted at the Urban primary health centers (UPHC) distributed across the seven demographic zones of the Ahmedabad city. The selection of Urban primary health centers was based on random sampling.

Information about the registered children under one year of age and their vaccination record as per the Universal immunization programme (UIP) were retrieved from the UPHC database.

Two groups were created based on the commencement of the Covid-19 pandemic for comparison purposes. The pre Covid group included the immunization profile of infants ranging from 1st January 2018 till 31st December 2019 and the post covid group encompasses from 1st January 2020 till 31st December 2021.

All of the information was gathered and total vaccination counts for each vaccine were determined as well as the vaccination trends were compared for these two periods. Also interview sessions with stakeholders of the UPHC were conducted to understand the impact of pandemic on routine immunizations. Data was analyzed using MS Excel and SPSS 26 software.

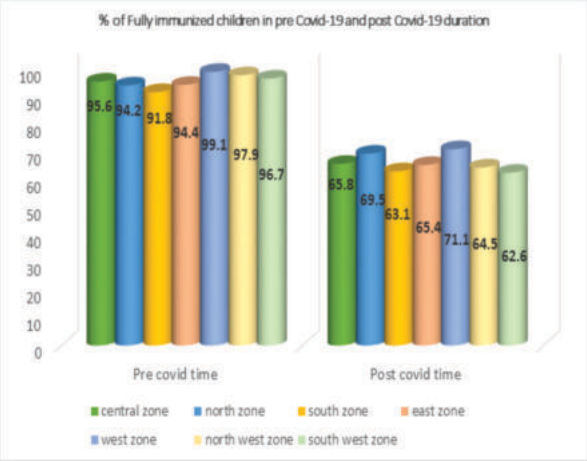
RESULTS

Onset of Covid-19 Pandemic and the lockdown process following it caused a severe rampage to the childhood immunization process both in terms of availability and accessibility. Before the advent of Covid-19 (1st January 2018 to 31st December 2019), the mean coverage of Full

immunization among infants was 95.7%± 2.4% among the selected urban primary health centers of different zones of Ahmedabad city. The coverage of fully immunized infants before 11 months was however 82.7%± 4.7%.

Following the impact of Covid-19 (1st January 2020 till 31st December 2021), it was reported that the mean coverage of Full immunization among infants was 66.03%± 3.1% while the coverage of fully immunized infants before 11 months was however 62.1%± 4.5%.

Comparative trends between pre and post covid period are shown in Graph 1.



Graph 1: Percent of Fully immunized children (cumulative) in pre Covid-19 and post Covid-19 period

Statistically also Covid-19 pandemic has caused a serious downfall in Routine childhood immunization coverage recorded at the randomly selected Urban health centers at Ahmedabad. With $p<0.05$ and $X^2= 27.7$, a significant association between the fall in RI coverage and the pandemic could be established as per Table 1.

Table 1: Percent increase in non-full immunized infants as post Covid-19 pandemic impact.

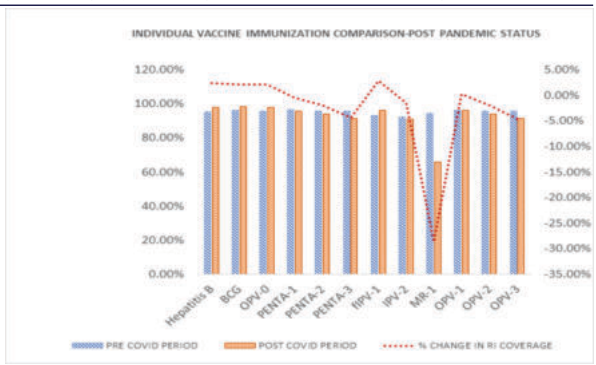
Zone wise urban Primary Health Centres	% Increase in non-Fully immunized children due to Pandemic
Central	29.37
North	23.57
South	28.46
East	29.00
west	28.04
North west	33.12
South west	34.08

When considering the individual vaccine immunization, a backfall in the Measles Rubella immunization has been observed with an average decrease of 28.6% at all the randomly selected UPHC of Ahmedabad city as depicted in Table 2. This variation in MR immunization with increasing covid cases shows significant relation between the two with $X^2= 29.6$ and $p<0.05$.

Table 2: Percent decline in Measles-rubella immunization coverage post Covid-19 pandemic

Zone wise urban Primary Health Centres	% Decrease in MR vaccine coverage due to Pandemic
Central	29.52
North	24.06
South	28.70
East	28.09
west	24.81
North west	32.08
South west	33.28

Similarly, a declining trend though on a smaller scale has also occurred in the Pentavalent vaccine. It was noticed that the dip was more in Pentavalent 3rd dose coverage than the first and second doses. Cumulative variation trends among the individual vaccine's coverage are shown in Graph 2.



Graph 2: Comparison of individual vaccine immunization coverage in post pandemic period.

On interviewing the stakeholders for the cause determination behind the declining trend in routine childhood immunization, various barriers were identified for the same both on part of stakeholders and on the part of beneficiaries as depicted in Figure 1.

FIGURE 1: Barriers to RI during pandemic period

DISCUSSION

Now when this discussion is being done, somewhere, at some part of this globe, a child is facing the problem which would have been avoided if the timely routine immunization was given to them. This is one of the alarming post-pandemic collateral issues which we are currently contending. This study has found out that post pandemic there is a fall by 0.3% in pentavalent vaccine dose 1 coverage, fall by 2% in pentavalent vaccine dose 2 coverage, fall by 4% in pentavalent vaccine dose 3 coverage. Similarly in a cross-sectional survey carried out in Lebanon in April 2020, a substantial decline of 14% in pentavalent vaccine coverage was noted.(7) Another study conducted in Laghman shows fall of 23% in DPT3 coverage.[–(8)]

Another setback was seen in the Measle-Rubella (MR-1) vaccination coverage where post Covid-19 pandemic saw a dip of around 28% on an average. Amongst the UPHC in Ahmedabad city, the range of decline exists between 24.06% to 33.28% with maximum in the selected south west zone UPHC.

A similar study conducted at the tertiary health center of Meerut, Uttar Pradesh during August-December 2020 shows a higher fall of 68.4% in MR-1 coverage.(9)

Another study conducted in east Mediterranean region also shows a similar picture with a decrease of 38% in Measles vaccination coverage being reported in the public sector.(7)

In our study no significant decline was seen in BCG, OPV-0,1,2,3, IPV-1,2 and rotavirus-1,2,3 and PCV-1,2 vaccination coverage among the infants. But the study conducted by Agrawal et al. (2020) saw a fall of 27.9% in BCG and OPV-0 vaccination coverage(9). Another comparative cross-sectional study conducted in Afghanistan shows a fall of 23% in all of IPV, PCV-2, OPV-3 coverage.[–(8)]

There is an overall increase in non-fully immunized children due to pandemic in randomly selected zone wise UPHC in Ahmedabad city with a range of 23.07% to 34.08%.

The overall drop in routine immunization as per this study was 30% (pre pandemic 95.7%± 2.4% versus post pandemic coverage of 66.03%± 3.1%). The retrospective observational study conducted in Rajasthan shows a fall of 9.7 % to 14% in routine immunizations.[10]

Another cross-sectional study conducted in Lebanon show a cumulative fall of 47% in utilization of routine immunization services between October 2019 and April 2020.(7)

Many studies worldwide reported a serious decline and disruption in the routine immunization services during the pandemic, which supports the findings of this study. Even the developed countries like USA, post the National emergency declaration, observed a reduction in routine immunization was observed, mostly in children older than 1 month.(11)

This study therefore proves that covid-19 pandemic has thus caused a serious downfall in routine childhood immunization coverage recorded at the selected urban health centers in Ahmedabad city and with $p<0.05$ and $x^2= 27.7$, a significant association between the fall in RI coverage and the pandemic could be established.

The observed drop in immunization coverage could be relatively due to challenge in community mobilization, deployment to covid 19 duty, transportation restrictions, pandemic related stress and anxiety, limited PPE kit supply, financial constraints, vaccine unavailability. High-risk communication and fear of contacting with covid-19 infection through engaging among community has also made people reluctant to leave homes and seek routine healthcare. A study in Saudi Arabia also found that a 60.9% delay in routine immunization was due to fear of getting covid-19 infection during the pandemic, which supports the findings of this study.[12]

Similar study in Rajasthan, India has also found out that the disruption to immunization services during the COVID-19 lockdown was largely found among children from poorer households, who were less educated, and residing in COVID-19 red zones resulting in under-utilization of routine immunization.[10]

The National Advisory Committee on Preventable Disease on Immunization in Canada (NACI) has noted a serious outbreak of vaccine-preventable diseases (VPDs) in Canada(13) An African study on COVID-19 and routine immunization suggested that the danger of mortality from diseases that can be prevented by vaccination outweighed the risk of death from the potential transmission of COVID-19 during a clinic visit.[14]

However, no such outbreaks of vaccine preventable diseases are reported from the Ahmedabad city post the pandemic.

So, this study reflects the impact of Covid-19 on the routine childhood immunization across the various zones of Ahmedabad city with an emphasis on the urgent revival of the routine immunization uptake despite the pandemic. Parents should be specifically educated on the effects of skipping or delaying a vaccination be reassured of the safety of visiting a healthcare facility with sufficient infection control measures.[15]

Every chance should be used by healthcare professionals to immunize the eligible population.

To avoid any future health catastrophes, both in developing and affluent countries, real-time monitoring and surveillance of vaccine preventable diseases are equally important.(9)

CONCLUSION

The COVID-19 pandemic represents one of the most challenging public health crises of this decade. This pandemic must not be allowed to exacerbate this scenario and allow VPDs to reemerge. We cannot allow greater impairment and mortality from VPDs to be a relic of this pandemic(16).

To prevent an outbreak of diseases that are preventable by vaccination, the health system should develop programmes for catch-up immunisation during the time following the COVID-19 outbreak (17). If a future pandemic or disaster is anticipated, an emergency contingency plan may be created to prevent a disruption to the RI programme.

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