

Original Research Article

The impact of COVID-19 pandemic response on uptake of routine immunizations and the assessment of a “catch-up” drive in the Gwalior district of Madhya Pradesh, India

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ABSTRACT

Background: In the year 2020, immunization services were disrupted worldwide due to COVID-19 pandemic and lockdowns. However, immunization services were soon reinstated to avoid vaccine preventable disease (VPD) outbreaks. The study was conducted to assess the impact of Covid-19 pandemic on routine immunization uptake and to assess the measures taken by the State government for the prevention of potential outbreaks; thereby suggesting measures to nullify the negative impact of COVID-19 (if any) on the immunization coverage in the district.

Methods: It was a descriptive and qualitative study, conducted at two rural blocks of the Gwalior district namely Ghatigaon and Hastinapur. The one-year immunization records were analysed and healthcare workers and parents of dropout children were interviewed.

Results: In Gwalior, the fully immunized child (FIC) coverage dropped to approximately 70% from an average of 90% over the last four years. Forty children were due for vaccination in April 2020 when the services were shut due to lockdown. As compared to pre-Covid lockdown period, the average number of children turning up for immunization, the enrolments of new-borns for BCG vaccination and follow-up vaccinations dropped during lockdown. The most common reason for decline was the fear of contracting COVID-19 infection.

Conclusions: Immunization services should be maintained as much as COVID-19 response measures allow. Decisions related to the operation of immunization services should be taken based on a detailed assessment of the VPD epidemiology, COVID-19 transmission scenario with corresponding mitigation measures and healthcare resources.

Keywords: COVID-19, Pandemic, Immunization, Vaccine

INTRODUCTION

The novel corona virus disease (COVID-19) pandemic has affected more than 200 countries including India. The Government of India (GOI) implemented nationwide lockdown in March 2020 to contain the human-to-human transmission of COVID-19 in the country. The lockdown was announced on March 23rd, 2020 and was extended variably in different parts of the country depending on the

local spread & containment measures.¹ Initially, only the supply of essential commodities and emergency services including medical and law enforcement were exempted. However, this resulted in adversely affecting the service delivery of other important health services such as immunization. In India, universal immunization program (UIP) targets to immunize around 157 million beneficiaries per year against twelve vaccine preventable diseases. This includes 27 million new-borns each year

with all primary doses and around 100 million children from 1 to 5 years of age with booster doses of UIP vaccines. In addition, 30 million pregnant women are targeted for tetanus toxoid (TT)/tetanus and adult diphtheria (Td) vaccination each year.¹ Immunization services were reinstated in May 2020 in Gwalior; amidst lockdown to prevent the increasing backlog of immunization targets and to avoid vaccine preventable disease (VPD) outbreaks and resultant increased burden on health systems already strained by pandemic.² However, the continued expansion of pandemic has drastically altered the health seeking behaviour of the community. In view of social distancing, disrupted transport in lockdown/containment areas and fear of contagion; parents have delayed routine childhood vaccinations despite the resumption of immunization services amidst partial lockdown. Hence, Madhya Pradesh government started a special “catch-up” drive to boost the immunization in the State and reach out to the drop-out beneficiaries.

Objectives

Objective of the study was to assess the impact of COVID-19 pandemic response on uptake of routine immunizations and the assessment of a “catch-up” drive in the Gwalior district of Madhya Pradesh, India in boosting the immunization rate; thereby suggesting measures to nullify the negative impact of COVID-19 (if any) on the immunization coverage in the district.

METHODS

The study was a comparative study, conducted at community health centres (CHCs), primary health centres (PHCs) and sub-health centres (SHCs) of two rural blocks of the Gwalior district namely Ghatigaon and Hastinapur. The convenient sampling methodology was used in the study. Six households (having children up to 2 years of age) were selected from the population under each health facility and included in the study. The one-year immunization records (digital or physical records) from the Immunization Registry starting from October 2019 to September 2020 were analysed. The study period was arbitrarily divided into two parts: pre-COVID lockdown period starting from October 2019 to March 2020 (6 months) and post-COVID lockdown period starting from April 2020 to September 2020 (6 months). During the post Covid period, catch-up drive was initiated from May 2020. The pre-COVID lockdown period was taken as baseline and the impact of lockdown on daily immunization coverage rate for each disease was compared within a geographical area. For pre-COVID lockdown, data was collected retrospectively from relevant records of the immunization sessions of the mentioned time period. For post-COVID lockdown period, interviews of Doctors, ANM, ASHA/ASHA Sehyogi, Health supervisor of the health facility and the parent/family member of the drop-out children were taken in addition to data collection from records. In order to

cater to decrement in immunization by the pandemic, the state government initiated a “catch-up” drive. The first phase of the catch-up drive was launched in the month of May till July 2020. Every facility had two fixed days per week for routine immunization. The catch-up drive was done on the remaining working days of the week from 20th to 30th (10 days) of each month in the State hospitals, District hospitals, PHCs and CHCs. The study analysed various independent variables including age, sex (to look for gender bias), type of child delivery (institutional / home delivery), as well as benefits of catch-up drive. Participant information sheet was provided to every participant to explain the purpose of the study and all steps involved in data collection. Informed consent was taken from the participant by the interviewer before conducting the interview. Those who did not want to participate in the study were excluded. The collected data was tabulated and analyzed by using software like Microsoft Excel and Epi-Info.

RESULTS

The study included a total of 1 CHC, 6 PHCs & 12 SHCs of Ghatigaon and Hastinapur blocks of Gwalior district, catering to approximately 3.2 lakhs population. A total of 114 households having children up to 24 months of age were studied by using convenient sampling methods. Fourteen out of these households had two children under 24 months of age, therefore total number of children included in the study were 128. Out of these 128 children, 81 children were immunized for age, 5 children were defaulters, 2 were never immunized, 40 children were due for vaccination in the month of April when the services were shut due to lockdown (Figure 1).

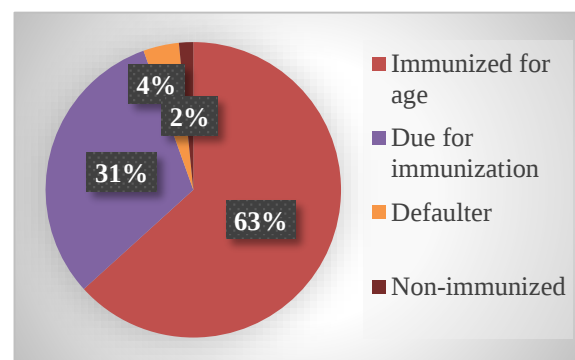


Figure 1: Distribution of children included in the study (n=128).

Vaccination delay was defined as vaccinations that took place one or more month after the scheduled date. Among these 40 children, 21 were males and 19 were females (Figure 2). Three children were born during lockdown in the households under study, one of them was an institutional delivery and received zero dose of BCG, OPV & hepatitis B vaccines. However, the remaining two were born at home and were not even enrolled for immunization (Figure 3).

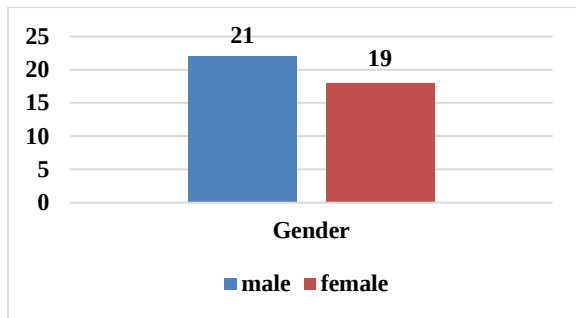


Figure 2: Gender distribution of children who missed immunization (n=40).

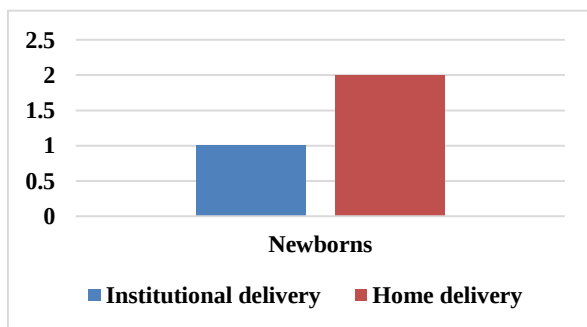


Figure 3: Distribution of new-borns (N=3) according to place of delivery.

In the initial one month of lockdown, all the primary health facilities were shut down and the healthcare staff was diverted to higher health facilities to deal with the pandemic. There was a complete shutdown of routine immunization services in these health centres. Approximately 20% of the mothers in these households were educated till 5th standard and most of them brought their children for immunization at health centres once the immunization services were resumed. However, 40 children including 2 new-borns and 38 follow-up beneficiaries were due for vaccination. Fully immunized child (FIC) coverage (defined as those who have received all the immunization doses till one year of age) was 90% in pre-Covid lockdown period whereas it sharply declined to 70% during the lockdown before resumption of services. After the consistent efforts put up during catch-up drive, the FIC coverage bounced up to 84% (Figure 4).

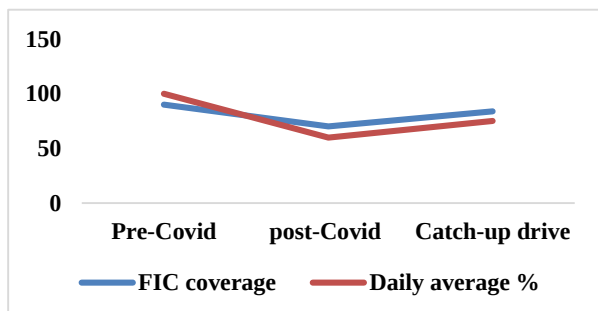


Figure 4: Distribution of FIC coverage and daily average % of children coming for immunization.

Out of 114 households included in the study, 40 children were due for the vaccination in the month of April. After the initiation of the first phase of catch-up drive, majority of the children (N=22) got their missed dose of vaccination in the month of May only. The remaining 18 children got their dose of vaccination in the subsequent months of the first phase of the catch-up drive, i.e., June and July. Hence, by the end of the first phase of the catch-up drive, all 40 children under study; who had missed their vaccination due to lockdown, had been covered (Figure 5).

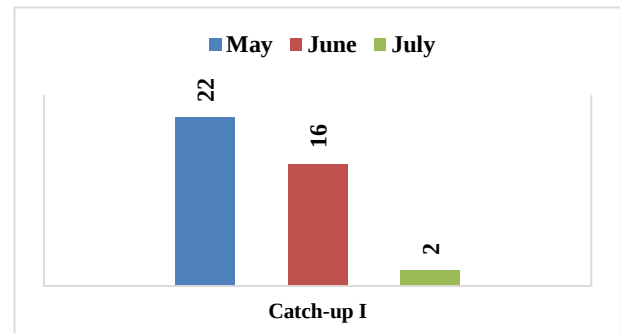


Figure 5: Month-wise distribution of number of left-out children coming for immunization.

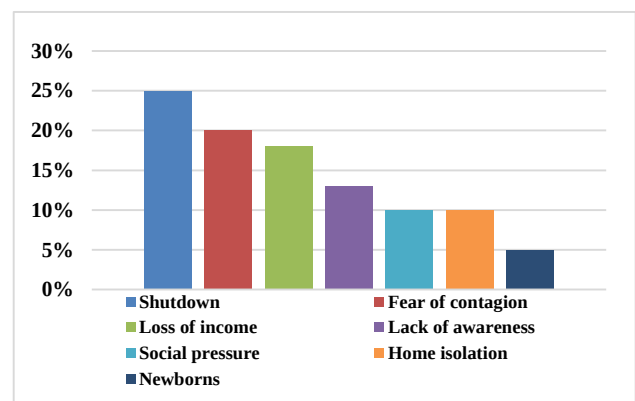


Figure 6: Reasons of missed immunization sessions.

Upon enquiring the parents of these 40 children about the reasons of missed immunization sessions, it was found that 25% (N=10) of them couldn't get their children vaccinated as there was a complete shutdown of the nearby healthcare facilities, 20% (N=8) missed the vaccination due to fear of contagion, 17.5% (N=7) didn't have enough money for commutation to reach the higher healthcare facilities due to loss of source of family income, 12.5% (N=5) cited lack of awareness regarding the consequences of the missed vaccination, 10% (N=4) faced the pressure of being socially outcasted if they went beyond the fixed perimeter of their residential area, another 10% (N=4) were in self/home isolation in view of signs and symptoms suggestive of the corona virus disease in one or more of family members. Whereas the remaining 5% (N=2) were new-borns due for fresh enrolment (Figure 6).

DISCUSSION

The Government of India (GOI) launched “mission indra dhanush” in December 2014 to achieve full immunisation coverage of all children and pregnant women.³ In India, immunisation in the rural & remote areas is mainly being carried out by the accredited social health activist (ASHA) or community health workers under the ministry of health and family welfare (MOHFW). National immunization schedule (NIS) consisting of 6 visits for children up to 24 months of age, covering 11 VPDs including tuberculosis (BCG), polio (oral and inactivated polio vaccine), diphtheria, pertussis, tetanus, haemophilus influenza type B, Hepatitis B (pentavalent vaccine), pneumococcal diseases (PCV), rotavirus diarrhoea, measles & rubella (MR) is being followed in the Gwalior district of Madhya Pradesh.⁴

However, the redeployment of health personnel for pandemic management and control hampered the routine immunizations across the globe.⁵ In the USA, a reduction in routine vaccinations was observed, primarily in children older than one month.⁶ Moreover, an almost 20% decline in MMR vaccination was observed in England. The hexavalent vaccination also decreased, although less significantly than that of MMR.⁷ In Pakistan, a substantial reduction in immunization of 52% was reported during the lockdown period.⁸ Alsuhaibani et al reported an almost 24% vaccination delay in routine vaccination in Saudi Arabia during the first three months of the pandemic.⁹ Interrupted routine essential immunization of children is a major risk for bringing herd immunity below the threshold and poses a significant risk of outbreaks of vaccine preventable infectious diseases like measles, polio etc. as already indicated by the world health organization (WHO).¹⁰ Hence, there is an imminent need for better allocation of limited resources, and use tailored approaches targeted at known high-risk areas and geographies with the highest numbers of missed children.¹¹ This study provides a descriptive analysis of the impact of COVID-19 lockdown on immunization coverage in a rural population. In the study, it was found that approximately 30% of children up to 24 months of age who were earlier receiving their doses regularly; were lagging behind their immunization schedule mainly due to pandemic. There was no significant gender bias in drop-out children. In fact, the number of males was slightly higher as compared to female children. However, this could be explained by higher male to female ratio in the district.

Out of 40 dropouts, 2 were new-borns and both of these new-borns were delivered at home. One new-born included in the households under study was born at government district hospital and was immunized appropriately. Though this observation is not statistically significant, it highlights an important point that those children who were delivered at home during lockdown especially in rural areas; are more prone to have missed their vaccination and this new birth cohort should be

looked into more carefully. After resumption of services in May 2020, it was noted that majority of children who got immunized within the first month belonged to the mothers who were educated till 5th standard or more. This highlights the importance of maternal literacy and its impact on success of these programs. Prior international studies have found parental education to be significantly associated with a positive attitude toward different types of vaccinations.^{12,13} Fully immunized child (FIC) coverage is defined as those who have received all the immunization doses till one year of age.¹⁴ In Gwalior, the fully immunized child (FIC) coverage was approximately 90% over the last four years.¹⁵ However, as per the district immunization officer (DIO, Gwalior); FIC fell to 70% during lockdown and surged back to 84% after consistent efforts of catch-up drive. As per interviews with ANMs and ASHAs: the average number of children turning up for immunization decreased as compared to pre-Covid lockdown period, the enrolments of new-borns for BCG vaccination also dropped during lockdown as more of the deliveries happened at home, follow-up vaccinations also declined during lockdown. The most common reason for the delay was the fear of contracting COVID-19 infection.

Upon grassroot level analysis, various factors responsible for decreased immunization coverage were unearthed. Factors affecting participation of healthcare staff in immunization services included fear of contagion, Lack of proper guidelines and standard protocols with respect to COVID-19, Shortage/unavailability of personal protective equipment (PPE) i.e. mask, face shields, hand sanitizers, gloves etc., Vaccine stock & supply disruption. Factors affecting participation of parents in immunization services included Fear of contagion by going to health facility, social distancing, travel restrictions, lack of public transport, increased cost of travel, lower socioeconomic status in rural areas, low maternal education level and associated lack of awareness. Keeping in mind these factors, catch-up drive was launched. To highlight the significance of immunization, awareness campaign was launched including distribution of IEC material, door to door education, promotion at panchayat level etc. To allay the fear of contagion, social distancing measures were taken at health facilities by increasing the number of days of immunization from 2 per week to 6 per week, thereby reducing the crowding along with ensuring the availability of masks and gloves for health care workers. Disinfection of healthcare facilities on regular basis was done.

The catch-up drive proved to be a massive success amongst the beneficiaries as most of the left-out children were covered in the first phase of the drive only. The second phase of the Catch-Up round started from August till October 2020 to reach out to the few children in the district who were left behind. This study provides an important understanding of the overall scenario regarding immunization delay due to pandemic in India. To the best of our knowledge, this is the only study analysing the

impact of COVID-19 on routine childhood immunization in India. Therefore, the findings may be used as a reference for outlining strategies to improve routine vaccination coverage during natural disasters. Immunization services are a core component of health services. Therefore, routine immunization sessions should be maintained as long as COVID-19 response measures allow. Decisions related to the operation of immunization services should be taken based on a detailed assessment of the VPD epidemiology, transmission scenario of COVID-19 and corresponding mitigation measures in place, and health and immunization system resources.² If regular immunization service providers are diverted to the COVID-19 response, relevant civil society organizations (CSOs) or non-governmental organizations (NGOs) operating in an area, if available, should be mobilized to support the immunization programme. Considering that some of the routine immunization services could be disrupted in the current context, the immunization service providers should start enumerating the cohorts of children who have missed their vaccine doses and develop an action plan for tailor-made catch-up immunization.² A range of simple steps that can be taken to protect vaccinees and caretakers from COVID-19 exposure, such as limiting the number of individuals present at an immunization visit by giving appointments, holding smaller sessions at more frequent intervals, use of outdoor spaces, if possible, and adherence to physical distancing at the health care facility or site.¹⁶ The exact magnitude of children with missed vaccination needs to be assessed carefully keeping in mind the new birth cohort and entry of migrant population from other parts of the country. Moreover, immunization visits can also be used as opportunities to disseminate infection prevention control (IPC) measures to reduce transmission risk of the COVID-19 virus, to identify signs and symptoms of COVID-19 disease, and to provide guidance on what to do if symptoms emerge.¹⁷ Recommendations for modified catch up policies (e.g., adjusting policies to extend age eligibility) or revised immunization schedules (e.g., minimum interval between doses of vaccine) can facilitate catch-up activities.¹⁸ VPD surveillance should be maintained and reinforced to enable early detection and management of VPD cases, and where feasible, contribute to surveillance of COVID-19.¹⁹ While the findings of this study are significant, the study has its limitations. Specifically, the study was conducted on a small sample size that may not be representative of the entire population. Moreover, there may be some recall bias as the study included interviews, and the results may be influenced by subjectivity of author. Lack of detailed data with respect to various factors like disease and dose wise distribution of missed immunization, socioeconomic status, dynamics of caste/religion and geographical factors like residence in COVID red zone etc.

CONCLUSION

Immunization services are backbone of health services. Therefore, routine immunization services should not be

halt for any reasons. The decision should be well calculated in terms of the risk and benefit. Methods to motivate healthcare staff: availability of PPEs to healthcare workers, clear guidelines with respect to immunization during COVID times, maintenance of supply of vaccines in containment zones as well. Global vaccine production has been disrupted, leading to delays in vaccine shipments. To anticipate any possible disruptions in supply, vaccine availability should be ensured for at least three months. Methods to re-institute community trust: public awareness campaigns educating about infection prevention control (IPC) measures, highlighting the importance of completing child's immunization amidst the pandemic, better bilateral personal communication via door to door campaign/phone calls/SMS/social media, organizing outreach program, mobile sessions and periodic intensification of routine immunization services (PIRIs) to reach out to drop-outs, ensuring redistribution of patient load to maintain social distancing, hand hygiene etc.

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