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Original Research Article

Impact of COVID-19 pandemic on vaccinations in children in a primary health centre in Northern India

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ABSTRACT

Background: Pandemics and disease outbreaks necessitate the continuation of routine immunization and vaccination for a specific age group along with safety measures for healthcare professionals. India witnessed the COVID-19 pandemic with a drastic rise in the number of cases across the states and union territories in 2020. Routine childhood immunizations suffered mainly because of an overburdened health system coupled with the fear of COVID-19 infection. The present audit is aimed to study the impact of the interventions made to improve routine immunization in the post-COVID-19 period in children in the age group of 0-16 years suitable for immunization under the National Immunization Scheme.
Methods: A cross sectional study was conducted by retrieving records in the PHC for the impact of COVID-19 on routine immunizations for vaccine preventable disease in the 0-16 age group. Data were retrieved and collected in a predesigned proforma. Archives of each of the years 2019, 2020, 2021, and 2022 for the month of April. The effect of the interventions for improving vaccine coverage in the rural population was evaluated.
Results: A comparison of pre-covid and covid periods showed a significant drop in routine immunization (p=0.007). Higher immunization rates were observed in post covid compared to the COVID period indicating the positive effect of interventions (p=0.0000014)
Conclusions: Vaccination rates improved significantly following interventions in the rural population. Health education on safety precautions for COVID-19 and the importance of routine immunization in the pediatric age group has helped to improve vaccination status.

Keywords: Childhood, Immunization, COVID-19

INTRODUCTION

The corona virus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) first emerged in late 2019 in Wuhan, China and the number of cases rose quickly across the world. India witnessed a drastic rise in the number of cases across all states or union territories in a few months after the first case was detected on 30 January 2020. The COVID-19 pandemic has affected daily life in more ways than one. Although COVID-19 is only seen to cause asymptomatic or mild disease in children, delayed routine immunization due to the pandemic has posed to be a greater concern.[1] It is well established from previous pandemics and disease outbreaks that attention is necessary for continuation of delivery of routine immunization and vaccination for a specific age group along with safety measures to health care professionals.[3] One of the most important public health interventions to limit vaccine-preventable diseases (VPDs) like diphtheria, pertussis, polio, tetanus, and BCG is routine vaccination of children according to the National

immunization schedule (NIS). Immunization programme in India started with the aim to reduce vaccine-preventable diseases. It has partially succeeded in reducing the burden of vaccine-preventable diseases; however, a significant proportion of vaccine-preventable diseases still exist due to suboptimal coverage. Though reported vaccination coverage is always higher, there is a wide gap in reported and evaluated coverage in India.[2] Decades of progress in global health was threatened by the COVID-19 pandemic. India was already striving to achieve the sustainable development goals (SDG) laid down by World Health Organization (WHO), barriers in immunizations could possibly lead to resurgence of vaccine preventable diseases.[4-5] There were steps taken by the Indian Government which included strict lockdowns, limitations on large gatherings of all forms and purposes. Steps were taken to break the viral transmission even among children that lead to closing of schools, and subsequently online classes were promoted as an alternative. The uncertain condition of dealing with the pandemic has caused distressful situation among people of all ages, that is, elders, adults, adolescents, and children. While government took extraordinary measures to fight the spread of the COVID-19 virus in India, attention on other disease and regular healthcare facilities lacked severely. Routine vaccination for children suffered majorly because of pre-existing lack of awareness for the importance of immunization coupled with the fear of COVID-19 infection. Despite all challenges that COVID-19 posed, health services were deemed essential and were functional across the country. In rural populations, routine immunization was made available by the government in outreach services. Health care workers play a pivotal role in delivering the services by spreading awareness of the benefits of immunization. The primary health centre (PHC), Ujwa, is one of the three PHCs under rural health training centre (RHTC) Najafgarh, Delhi. Ujwa caters to an area where a total of 3981 children fall under the age group of 0-16 and are suitable for immunization under the National Immunization Scheme (NIS). Ministry of health and family welfare (MoHFW) issued guidelines which were to be followed for immunization services as detailed in (Table 2).[6] Noticing a sharp drop in the number of vaccinations during 2020 and 2021, measures were taken to increase awareness about the importance of routine vaccinations in children along with allaying anxiety surrounding the COVID-19 disease. An audit was seen coming into shape with small interventions that the doctors along with Anganwadi workers, and Ashas made in the village. The present audit is aimed to study the impact of the interventions made to improve the number of routine immunizations in children under the age group of 0-16 and are suitable for immunization under the National immunization scheme (NIS).

METHODS

A cross sectional study was conducted by retrieving records in the PHC for the impact of COVID-19 on routine immunizations for vaccine preventable disease in the 0-16 age group. Data was retrieved from the archives of each of the years 2019, 2020, 2021, 2022 for the month of April. Data was collected in a predesigned proforma, of the various vaccine given in the pediatric age group in the areas covered by the PHC. The data was categorized into April 2019 as 'pre COVID period', April 2020 and 2021 as 'COVID Period', and April 2022 as the 'post-COVID period' Interventions for improving awareness were made in the village with the help of volunteering locals and anganwadi workers during the lockdown following the guidelines of MoHFW. Intern doctors went door to door to talk about the importance of immunization. Messages were spread via social media, placards, pamphlets that highlighted the policies and guidelines issued by the government. Awareness was spread among the local population, with emphasis to eliminate fear and bias of routine immunization during the COVID-19 pandemic. The various interventions are detailed in (Table 3). To reach-out far and near, announcements were made in public spaces with the help of a loudspeaker. Vaccination drives and Pulse Polio were also conducted to achieve maximum vaccine coverage. Triaging of non-COVID-19 patients in the health centre was done to facilitate immunization in children. The effect of the interventions made by the doctors along with Anganwadi workers, and Ashas for improving vaccine coverage in the rural population, was evaluated. In order to ascertain the differences in vaccinations in the pre-COVID-19 period, COVID-19 period and post COVID-19 period, the values were evaluated by Students t-test, one tail, and paired for statistical significance.

RESULTS

The current audit collected data from April month of each year of 2019, 2020, 2021, and 2022 as tabulated in (Table 1). It revealed that 224 vaccinations were administered in April month of 2019 and subsequently the vaccination figures dropped to 95 and 97 vaccinations during the same months of the pandemic years 2020, and 2021 respectively. The number of vaccinations in children increased to 461 in the post COVID period. The details of the vaccines administered are detailed in (Table 4). A comparison of pre-COVID (2019) and COVID periods (2020) showed a significant drop in routine immunization ($p=0.007$). Also, higher immunization rates were observed in post COVID (2022) compared to the COVID period (2021) indicating positive effect of interventions ($p=0.0000014$).

DISCUSSION

The audit reveals the impact of COVID-19 pandemic on routine immunization of children for vaccine preventable diseases in a rural setting catered by primary health centre (PHC), in Northern India. The COVID-19 pandemic had placed unprecedented demands on the healthcare system. Healthcare for most was temporarily deferred because of social distancing requirements and community reluctance owing to fear of visiting hospitals and healthcare centres. Steps to continue delivery of essential services not only

maintained people's faith in the system but was also crucial to avoid mortality from non-COVID-19 conditions.

Few activities which needed campaigns and meetings in large gatherings were deferred till lockdown restrictions were lifted, however the fear of visiting health centres continued that lead to sharp fall in routine immunization for 0-16 age group children. Parental concerns about COVID-19, local lockdowns, suspended supply chains and reduced healthcare staff and limited PPE to administer vaccines may be other reasons contributing to missed or delayed routine vaccination. In the present audit it was observed that strategies like informing the parents about COVID-19 related precautions and minimizing the risk of transmission encouraged the parents to bring their children for vaccinations. Reminders and education about the importance of timely vaccinations were reiterated to the parents and healthcare workers like the Anganwadi workers, Ashas and doctors attending the rural health centre. United Nations Children's Fund (UNICEF) highlighted that COVID-19 pandemic affected the health care system adversely more so in low income countries leading to disruption in routine immunization services.[7] Abbas et al suggested that risk of mortality from vaccine preventable disease outweighs the risk of death due to possible COVID-19 infection during visit to healthcare centre.[8] The study emphasizes the need for timely vaccination in children. Alsuhaibani et al made a similar observation and demonstrated several barriers to timely administration of vaccine in children during pandemic and suggested that childhood vaccination should be prioritized and strategies to be followed to achieve significant rates even during pandemic.[9] Vaccine-preventable disease remains an important issue that requires adherence to recommendations to prevent severe illness in children.[10]

Table 1: Details of total number of vaccinations.

April month of each year	Vaccinations received by children
2019	224
2020	95
2021	97
2022	461

Table 2: Guidelines for immunization in children during COVID-19 pandemic.

Parameters
Key principles
Guidelines from ministry of home affairs (MHA) and MoHFW pertaining to COVID-19 and related updates will be the primary reference points and no state should violate any COVID-19 guidance.
Practices of social distancing, hand washing, and respiratory hygiene need to be maintained at all immunization sessions irrespective of zones/district categorization by all (i.e., beneficiaries and service providers) in all sessions.
Birth dose vaccination at health facilities would continue irrespective of zones.
Guidelines
Birth doses for institutional deliveries to continue uninterrupted as these beneficiaries are already in the health facilities.
Immunization services are to be provided at facilities wherever feasible, for walk-in beneficiaries.
Every opportunity is to be utilized for vaccinating beneficiaries if they have already reported at facilities. Subsequent vaccination could be provided at SHC or in additional outreach sessions.
Where essential services are operational and restrictions allow, fixed site vaccination and VPD surveillance should be implemented while maintaining physical distancing measures and taking appropriate infection control precautions.
Delivery of immunization services though outreach must be assessed in local context and should be undertaken only if safety of health workers and community is not compromised.
Catch-up vaccination should be conducted as soon as the restriction is eased. This will require tracking and follow-up with individuals who missed vaccinations.
Mass vaccinations should be avoided in areas where restrictions are in place

Table 3: Interventions for improving immunization (0-16 years age group).

Interventions
Home visits by primary health care team
Triaging of no-COVID children for immunization
Message through social media
Loud speakers to spread awareness
Placards in health centre and public places
Ensuring safety by PPE kits for health care workers administering vaccine.
Health education to minimize transmission of COVID and protecting the vulnerable.

Table 4: Details of vaccinations and their comparison in pre COVID, covid and post COVID period.

Parameters	Apr-19	Apr-20	Apr-21	Apr-22
BCG	0	0	1	4
OPV Oral	0	0	0	3
Pentavalent				
1st	-	6	9	18
2nd	19	13	2	31
3rd	30	7	2	32
OPV				
1st	13	6	9	19
2nd	20	13	2	33
3rd	30	7	2	22
DPT				
1st	0	0	0	1
2nd	1	0	0	2
3rd	0	0	0	0
Rotavirus vaccine	0	6	9	18
	0	13	2	31
	0	7	2	32
Fractionated IPV	13	6	9	18
	30	7	2	32
Pneumoccocal vaccine	0	0	0	18
2nd	0	0	0	28
3rd	0	0	0	9
MR1	17	1	2	17
MR2	0	1	7	0
MMR	23	0	0	16
DPT 1st booster+ OPV 1st booster	21	1	7	17
typhoid	0	0	16	34
DPT 2nd booster	4	1	7	22
TD 10	3	0	7	3
TD16	0	0	0	1
Total	224	95	97	461
T Test	0.007		0.0000014	

Limitations

Limitations of this study include a relatively short observation window of one month during the first and second wave of the COVID-19 pandemic. A longer observation window with larger data collected from more number of PHCs later in the COVID-19 pandemic would be helpful. In addition, this study was conducted using a primary health care research network in a large urban centre and thus, results may not be applicable or related to all rural settings. Parental perspectives on vaccines were not measured in this study and may have contributed to delayed vaccinations.

CONCLUSION

Current study indicates that let there is a sharp decline in the number of routine vaccinations of children in the Covid period. Simple strategic measures taken by the health workers and doctors in the PHC, public announcements, placards, spreading message in social media and reassuring the parents was helpful. Health education on safety precautions of COVID-19 and the importance of routine immunization in the pediatric age group has helped to improve vaccination status.

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