Short communication

Childhood Immunization coverage at a tertiary care centre in South India pre and post COVID lockdown - A retrospective study

Abstract

Introduction: Childhood immunisation is the most cost effective method to prevent vaccine preventable diseases and decrease childhood morbidity and mortality. COVID-19 pandemic has affected routine immunisation of children due to various reasons. We aimed to study the attendance to immunisation clinic at our tertiary care hospital prior and during COVID-19 pandemic.

Method: A retrospective study conducted, collected data regarding monthly attendance to the immunisation clinic at our centre for study duration of 30 months, sub-grouped into - January 2019 to March 2020 (pre-COVID) and April 2020 to June 2021 (during COVID). Immunisation clinic at our centre caters to children from first day of life till 18 years, as per National Immunisation Schedule (NIS). Trends in attendance across the months were studied. Statistical analysis were employed to test whether there was a significant reduction in immunisation clinic attendance.

Results: Attendance to immunisation clinic during the 30 month study period was 37418 children. Among these, 29879 children received birth dose vaccines. This cohort was excluded from further analysis as deliveries continued at our maternity centre in both periods of study. Comparing vaccine recipients above the age of 6weeks till 18years across the months, 6222 and 1502 children received immunisation in the pre-COVID and during COVID pandemic respectively. No child received immunisation from April 2020 to July 2020 during national lockdown. Unpaired t-test showed highly significant reduction in attendance to immunisation clinic during the COVID pandemic in comparison to pre-COVID period ($p<0.001$). The reduction in immunisation attendance had greatest affection among recipients of pentavalent vaccine at our centre.

Conclusion: Immunisation among children is significantly hampered during this COVID-19 pandemic as highlighted by our study findings. Vaccination delay leaves young children vulnerable and there is an acute need to increase awareness and catch-up drives to prevent resurgence of vaccine preventable diseases.

Keywords: Immunisation, COVID-19, Vaccine preventable diseases

Introduction

The most cost-effective method to prevent infection and decrease childhood morbidity and mortality is immunisation in early childhood.[1] National immunisation programme provides primary vaccination series to prevent serious but preventable infectious diseases including tuberculosis, poliomyelitis, hepatitis B, haemophilus influenzae type B, rotaviral infection, diphtheria, pertussis, tetanus, measles and rubella. Vaccination delay reduces vaccine coverage, leading to outbreaks.[2] COVID-19 pandemic has significantly hampered access to health care, especially amongst children from lower socioeconomic strata. Vaccine preventable diseases have shown a sudden surge in recent times due to rise in unimmunised status and fall in herd immunity among the children. The disrupted delivery of basic health services as a consequence of the COVID-19 pandemic needs a special highlight. In low- and middle-income countries, like India, the COVID-19 pandemic is an important reason for delaying and missing scheduled vaccinations.[3]

COVID-19 peak in India started in late March 2020 with imposition of national lockdown for containment of the disease spread. Our tertiary care centre in South India had also temporarily shut down out-patient services, catering only to emergency services in the initial four months of pandemic. Immunisation clinic at our tertiary care hospital caters to children from birth till 18years under the national immunisation schedule. Immunisation services were grossly hampered from the onset of COVID-19 pandemic and several governments declared lockdowns. Maternity care at our hospital continued even during lockdown and birth dose immunisation were received by all live neonates born at our centre. Measures were taken by the institute to follow up those babies who received birth dose vaccines by counselling the parents prior to their discharge and constant telephonic reminders to encourage their ward's vaccination. Immunisation clinic attendance remained low even after the efforts undertaken due to parental hesitance and non availability of transport during and post the COVID-19 national lockdown. Parents feared contraction of COVID-19 infection from the hospital premises and hesitated to bring in their wards. This study attempts to analyse the trends in attendance to the immunisation clinic at our centre before and during the pandemic.

Methodology

Study Design: We conducted a retrospective study surveying the attendance to immunisation clinic over the past 30 months from 1st January 2019.

Study Period: 30 month study period; sub-grouped into pre-COVID-19 period from 1st January 2019 to 31st March 2020 (15 months) and during COVID-19 period from 1st April 2020 to 30th June 2021 (15 months).

Study population: All children (0-18y) attending to immunisation clinic with their parents/guardians at Vanivilas Children's hospital during the study period

Data: Attendance and number of recipients of different vaccines at the immunisation clinic during various months of the study period were collected from hospital database.

Statistical analysis: Trends in attendance and vaccine recipients across the months were tabulated and analysed. Statistical analysis with unpaired t-test applied to raw data of attendees across various months among the two study period cohorts were employed to ascertain statistical significance. Similarly unpaired t-test were employed for each vaccine received to test significance of vaccine coverage between the two study periods using Microsoft Excel 2019 software.

Results

37418 children attended to immunisation clinic during the study period, 23573 (62.9%) children during the pre-COVID phase and 13845 (37.1%) children during COVID phase. Of these, recipients of birth dose vaccination of BCG and OPV was 17351 and 12528 neonates respectively. Unpaired t-test for the comparing the babies who received birth dose immunisation between the two study periods showed statistical significance ($p<0.001$). This can be attributed to the transient reduction in deliveries conducted at our maternity centre during the lockdown period. Excluding the birth dose vaccination, 6222 and 1502 children received vaccination at our centre during the study periods respectively.

Applying trends of data spread across the months, unpaired t-test showed high statistical significance between pre-COVID and during COVID periods ($p<0.001$). No child above 6weeks age received any vaccine from April 2020 to July 2020 for a period of 4months at our hospital as it had been temporarily shut outpatient services. Highest statistical significance was noted for Pentavalent vaccination schedule ($p<0.001$) as highlighted in Table-1. Infants aged 6-14 weeks faced the maximum brunt of COVID-19 pandemic by not receiving the Pentavalent vaccine along with fractional Injectable polio vaccine (fIPV) at the appropriate time. Trends of immunisation clinic attendance across various months (Total and Among 6 weeks-18 years age group) is depicted in Figure-1. The graph shows a significant dip during the lockdown period, with a gradual rise in immunisation clinic attendance, though not reaching the previous period's attendance.

Discussion

The immunisation services had to bear the brunt of unprecedented circumstances arisen because of COVID-19 pandemic. Interrupted routine childhood vaccination leads to outbreaks of preventable infections.[4,5] In April 2020, the health management and information system data of India reported a drastic decrease in the number of routine immunisation sessions relative to the previous year. The influence of public misinformation and belief in vaccine safety during the pandemic could be the reason for the drastic fall in immunisation. It is to be emphasised that any flare of vaccine preventable diseases will additionally burden already stressed health care systems.[6] A child with diphtheria reported to our centre during the COVID pandemic secondary to non immunisation and succumbed. Diphtheria, otherwise a preventable disease with vaccination, was fatal for this child.

India accounts for 2.1 million of the 20 million unvaccinated and under-vaccinated children globally (11%) and national lockdown has exacerbated the problem with increasing number of zero-dose children in the country.[7] Ebola outbreak in West Africa from 2014 to 2015 suggested an increased number of deaths caused by other vaccine preventable infections such as measles and tuberculosis exceeded deaths from Ebola due to health system failure.[8,9]

Shet et al., surveyed pediatric healthcare providers in India in 2 rounds in April-June and September 2020 to understand how COVID-19 control measures may have impacted routine vaccination. They reported 33.4% and 7.8% complete suspension of vaccination services due to COVID-19. A 50% or greater drop in vaccination services was reported by 83.1% of respondents in June, followed by 32.6% four months later, indicating slow recovery of services.[10] MacDonald et al., reported a similar decline in vaccine coverage during the pandemic in May-July 2020 in Alberta, Canada, with measles containing vaccine having the largest difference in coverage.[11]

ACVIP recommends that all routine vaccinations be administered as scheduled, even during the COVID-19 pandemic as it is an essential health activity.[12] There is no documented risk of immunising a well child during the COVID-19 pandemic. Deaths prevented by supporting routine

childhood immunisations outweigh the excess risk of deaths from COVID-19 due to visiting vaccination clinics. Public health efforts as well as the media should focus on reinforcing benefit-risk ratios for routine childhood immunisations and access to obtain health maintenance rather than acute care.[4,6]

The birth dose vaccination at all health facilities should be provided to all the eligible babies. A child reporting to the health care facility due to any reason should not be denied immunisation and every opportunity. The primary vaccination series and the vaccines for outbreak prone diseases should be prioritised and postponing these vaccines is to be avoided. If a child is in a healthcare facility for any reason, and eligible for immunisation, this opportunity should be utilised for administering eligible vaccines.[12,13]

The COVID-19 pandemic negatively impacted young children's scheduled vaccinations because of the fear of COVID-19 infection. Identifying these children and offering them the missed vaccinations can decrease their risk of common childhood diseases. House to house campaigns to increase awareness about the dangers of delaying vaccine-preventable diseases must be promoted to caregivers, as well as the promotion of home vaccinations services.[4,5] Vaccination catch-up sessions with innovative strategies such as implementing appointment-only visits, minimising overcrowding, separating immunisation visits from sick children visits, prioritising robust communication efforts which address caregivers' fears of contracting COVID-19, and reminders to caregivers of the importance of routine vaccinations.[14] The way forward should include an increased focus on catch-up campaigns, strong government engagement, effective surveillance and clear public health messaging to ensure restoration of immunisation and essential services for children.[5]

Conclusion

Immunisation among children has been significantly missed and delayed during this COVID-19 pandemic as highlighted by our study. Vaccination delay leaves young children vulnerable and there is an acute need to increase awareness and catch-up drives to prevent resurgence of vaccine preventable diseases.

Ethical approval: Approved by Institutional Ethics committee

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Tables & Figures –

Table 1: Number of children attending immunisation clinic

Vaccine (Timing)	Pre-COVID period (n)	During COVID period (n)	p value	Remarks
BCG, OPV, Hep B (Birth)	17351	12528	<0.001	Hospital deliveries reduced impacting birth dose vaccination

Table 1: Number of children attending immunisation clinic				
Vaccine (Timing)	**Pre-COVID period (n)**	**During COVID period (n)**	**p value**	**Remarks**
Childhood vaccines (6weeks to 18y)	**6222**	**1502**	**<0.001**	**75% decrease in attendance to immunisation clinic**
Pentavalent 1, 2, 3 (6, 10, 14weeks)	4324	972	<0.001	Maximum affected were the infants as parents were hesitant to bring them for wellness visits
MR - 1 (9 months)	790	102	<0.001	
DPT Booster 1, MR 2 (15-18 months)	558	107	<0.001	Significant reduction in immunisation visits among older children as well
DPT Booster 2 (5y)	369	85	<0.001	
Td (10y)	151	41	0.001	Adolescent immunisation coverage is poor in both periods
Td (16y)	30	10	0.11	

Fig 1: Area-Line chart showing a significant dip during the lockdown period. Total attendance (represented by green) includes birth dose vaccination and childhood (6week-18y) vaccination (represented separately by blue).