

Original Research Article

Awareness and acceptance of anticipated pediatric COVID-19 vaccination in rural South India

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ABSTRACT

Background: The objective of this study was to assess the awareness and acceptance of anticipated COVID-19 pediatric vaccination among parents in rural south India.

Methods: Objective questionnaire based online cross-sectional study in out-patient department, school WhatsApp groups and the community between 01 July 2021 to 15 July 2021. Sample size 873. Parents of children less than 18 years of age willing to participate in the study were included. Parents not willing to participate in the study were excluded.

Results: 64.6% parents accepted pediatric COVID-19 vaccination; 96.4% felt it beneficial to vaccinate children prior to re-opening of school. 96.68% were positive that vaccination in children shall play a pivotal role in the projected third wave. 35.39% were hesitant and wanted to delay vaccinating their children and 14.14% do not believe in vaccine efficacy. 14.53% parents were weary of giving vaccine to their children due to personal experience of adverse effects they had suffered, and 22.45% parents refused vaccination due to hearsay adverse effects. 17.6% parents felt that post COVID-19 infection, children don't need vaccination. 38.95% of parents were concerned about interaction of COVID-19 vaccine with other vaccines of immunisation schedule, 19.36% felt that children don't need specific COVID-19 vaccine since the regular immunisation schedule prevents COVID-19 infection.

Conclusions: Parents of rural India are aware of the pandemic and its lasting impact in our society but its effect on children is still beyond their comprehension. Most parents are willing and accept pediatric COVID-19 vaccination, however vaccine hesitancy and misconceptions are significant entities that can derail full coverage of children.

Keywords: COVID-19, Pediatric COVID-19, Pediatric COVID-19 vaccination, Rural, India

INTRODUCTION

The COVID-19 pandemic is an unprecedented challenge that has nearly pushed humanity to its knees. The virus returns through a second wave and a third, pummeling the burden of the disease in the world to 183 million as of July 2021, with 3.9 million deaths worldwide; which is still ongoing.¹ India may have presently stemmed the second wave; however, we are anticipating a third wave, that is

likely to affect the remaining non-immune group which include pediatric population.²

While the severity of the third wave among pediatric age is difficult to predict, a sustained vigorous vaccination drive is our best defence. Clinical trials (phase II/III) for pediatric vaccination have started in AIIMS as of June 2021 using homegrown Covaxin and ZyCoV-D.³ Shortly, vaccines shall be made available for the pediatric age

group, to combat the next deluge of COVID-19. Among the under 18 population in Karnataka, 63.38% are in rural regions.⁴ With 32.7% of the population of rural Karnataka being under 18 years of age, the cohort is extensive and individual self-motivation of the citizens and acceptance of vaccination plays a massive role for the success of such a drive.⁴

Pediatric vaccination essentially depends on the mindset of the caregivers; giving rise to the question; whether they are aware of the anticipated third wave, and are they ready to vaccinate their children; especially among the rural population. This crucial information takes the centre stage for India's triumph over COVID-19 and restoration of economy. We have taken up this study to assess the awareness and public willingness towards COVID-19 vaccination in pediatric age group in rural India. There is no such study published in India.

METHODS

Sample size

Sample size was calculated using the following assumptions in rural Sakaleshpur taluk and nearby regions, children under 18 years of age form 32.7% of the total population of 128633.⁴ Hence considering 99% confidence level with 4.3% margin of error, in a population size of 42,059 children, the recommended sample size was 788 among the community.⁵

A total of 873 parents who were attending the out-patient department of Shrinivasa nursing home, parents of children in Rotary english school (through parents WhatsApp groups) and those in the community willing to participate, were included in this cross-sectional questionnaire-based study conducted online (in view of the ongoing pandemic and lockdown situation) using google forms and circulated via WhatsApp. Questionnaire was prepared in objective form, in regional language Kannada. Our non-medical staff assisted those who were unable to use or didn't possess smartphones in the OPD.

Study period

Study period was from 01 July 2021 to 15 July 2021.

Inclusion criteria

All parents of children less than 18 years of age willing to participate in the study were included.

Exclusion criteria

Parents not willing to participate in the study were excluded.

Informed consent was taken from all parents. A video was recorded and circulated by the authors in which parents

were educated about COVID-19 infection in children and the anticipated pediatric COVID-19 vaccine.

Statistical analysis

The information was collected and analyzed using SPSS statistical software (version 17). Descriptive statistics mean, frequency and percentages of various parameters were calculated. Univariate regression analysis was used to calculate the significance of predictors of vaccine acceptance. The p value<0.05 was considered significant and p<0.01 was considered highly significant.

RESULTS

Our rural community-based study included 873 parents of children in and around Sakaleshpur taluk. Majority of the parents belonged to age group of 30-39 years (41.8%), with educational status of graduation and above (32.65%), and economic status of Below poverty line (66.21%); as shown in Table 1.

About 51.43% of the parents had received at least 1 dose of vaccination, 13.97% were fully vaccinated and 34.59% were not yet vaccinated. Majority of the parents felt that vaccination is mandatory (88.55%). 96.68% were positive that COVID-19 vaccination in children shall play a pivotal role in controlling the third wave. The awareness of parents regarding pediatric COVID-19 vaccination has been shown in Table 2.

64.6% parents readily accepted pediatric COVID-19 vaccination. About 35.4% were hesitant and wanted to wait and see the community response before vaccinating their children. 14.14% of the parents didn't believe in efficacy of vaccination. 14.53% parents were weary of giving vaccine to their children due to personal experience of adverse effects they had suffered, and 22.45% parents refused vaccination due to hearsay adverse effects post vaccination. The acceptance of parents has been shown in Table 3. 16.84% parents reported that their children had already been COVID-19 positive of which 5.38% parents felt that post COVID-19 children don't need vaccination.

Total 38.95% of parents were concerned about interaction of COVID-19 vaccine with other vaccines of immunisation schedule (2.41% felt that it should not be co-administered with regular schedule); whereas 19.36% felt that their child does not need specific COVID-19 vaccine since the regular immunisation schedule prevents COVID-19 infection.

98.74% parents preferred Indian origin vaccines to foreign ones, and 25.77% were contented to get vaccination done with their treating pediatrician.

96.4% parents felt it beneficial to vaccinate children prior to re-opening of school. The predictors of vaccine acceptance in our rural parent community has been shown in Table 4.

Table 1: Demographic details.

Variables		Frequency	Percentage (%)
Age (years)	20-29	141	16.15
	30-39	365	41.8
	40-49	316	36.2
	50-59	51	5.85
Sex	Male	404	46.28
	Female	469	53.72
Economic status-poverty line	Below	578	66.21
	Above	295	33.79
Educational status	Illiterate	47	5.38
	1-5 th standard	49	5.62
	5-10 th standard	245	28.06
	Pre-university	247	28.29
	Graduate and above	285	32.65

Table 2: Awareness of parents about COVID-19 vaccine.

Parameters	Responses	Frequency	Percentage (%)
COVID-19 vaccine is mandatory	Yes	773	88.55
	No	6	0.68
	Do not know	94	10.77
Reasons for taking COVID-19 vaccine	It prevents occurrence of COVID-19	113	12.94
	It prevents life threatening COVID-19	397	45.48
	No need to follow COVID-19 safety precautions	10	1.15
	To avail benefits like travel and work permits	27	3.09
	All of the above	326	37.34
Source of information about COVID-19 vaccine	Television, radio	223	25.54
	Social media	41	4.7
	Friends and relatives	35	4.01
	Government institutions	18	2.06
	Health care workers	65	7.45
	All of the above	491	56.24
Anticipated 3 rd wave of COVID-19 is expected to affect children	Yes	825	94.5
	No	48	5.5
Are children susceptible to COVID-19	Yes	808	92.55
	No	65	7.45
COVID-19 vaccination to be given among COVID-19 recovered children	Yes	720	82.4
	No	153	17.6

Table 3: Acceptance of pediatric COVID-19 vaccination among parents.

Parameters	Responses	Frequency	Percentage (%)
Readiness of the parents to get their child vaccinated when COVID-19 vaccine is available	Readily vaccinate	564	64.6
	Delay vaccination	309	35.4
Acceptance of COVID-19 vaccination of children before reopening of school	Yes	841	96.4
	No	32	3.6
Lack of trust in COVID-19 vaccine	Believe in vaccine efficacy	749	85.86
	Don't believe in vaccine efficacy	124	14.14
Vaccine hesitancy due to hearsay side effects and safety concerns	I hesitate	196	22.45
	I won't hesitate	677	77.55

Continued.

Parameters	Responses	Frequency	Percentage (%)
Vaccine hesitancy due to personal experience of adverse effects post vaccination	I hesitate	127	14.53
	I won't hesitate	746	85.47

Table 4: Predictors of pediatric COVID-19 vaccine acceptance.

Parameters	Age		Economic status		Education	
	P value*	95% CI	P value*	95% CI	P value*	95% CI
Readiness of the parents to get their child vaccinated when COVID-19 vaccine is available	0.1638	1.193-1.386	0.008	1.139-1.328	0.9306	1.276-1.439
Vaccine hesitancy due to hearsay side effects	<0.0001	1.506-1.672	<0.0001	1.453-1.616	0.001	1.596-1.737
Lack of trust in COVID-19 vaccine	<0.0001	1.252-1.390	0.0001	1.314-1.449	0.0015	1.171-1.290
COVID-19 vaccination is essential for containing anticipated 3 rd wave of the pandemic in children	0.1486	1.022-1.094	0.0004	1.058-1.129	0.0436	1.032-1.092
Regular immunization prevents COVID-19	<0.0001	1.271-1.428	<0.0001	1.343-1.497	0.0046	1.216-1.350
Co-administrations along with regular vaccines	0.7305	1.530-1.915	0.8998	1.576-1.957	0.0711	1.730-2.055
COVID-19 vaccination among COVID-19 recovered children	0.0318	1.178-1.331	0.1186	1.043-1.194	0.0391	1.048-1.177

Note: P value<0.05 was significant; CI- Confidence interval.

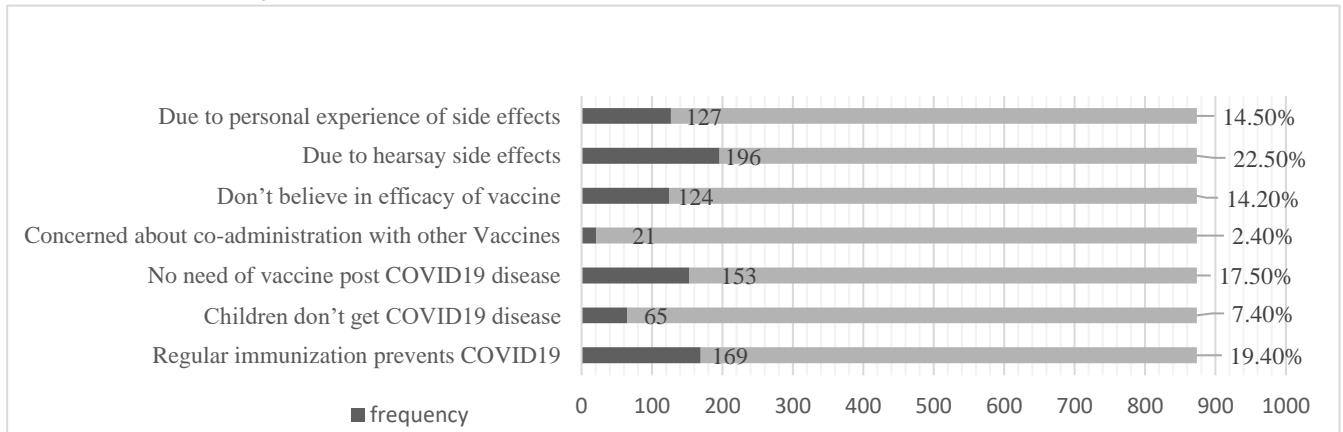


Figure 1: Reasons for pediatric COVID-19 vaccine hesitancy.

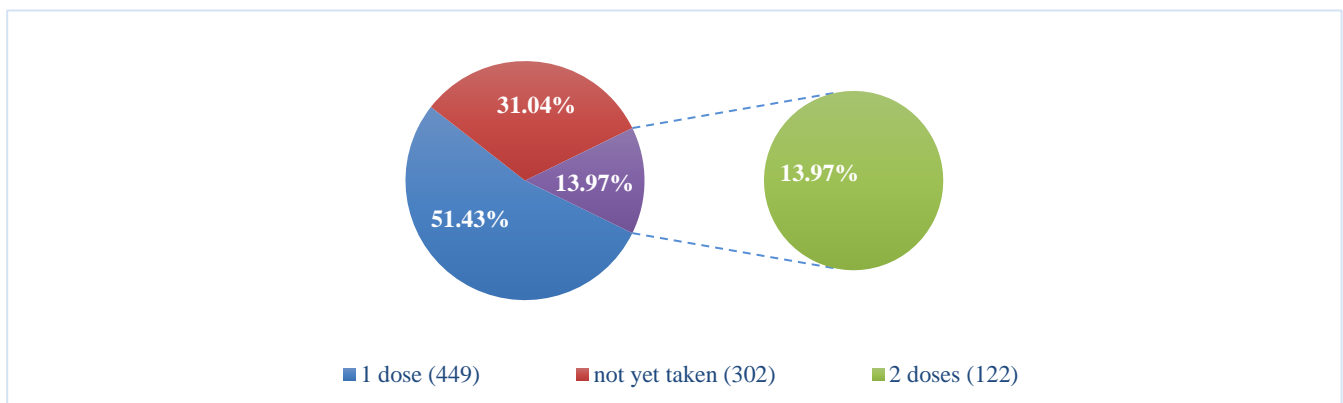


Figure 2: COVID-19 vaccination status among parents.

DISCUSSION

Socio-demographic profile

The rural town of Sakaleshpur taluk lies in the Western Ghats, with majority working as cultivators, and agricultural labourers; and literacy rate of 71.97%; fairly representing most of rural India.⁵ Our study recorded 5.38% illiterate parents, 33.68% parents with school level education and 55.13% parents being below poverty line. The analysis of public behaviour towards anticipated pediatric vaccination for COVID-19 has not been published in our country, hence we took up this study.

Awareness of parents regarding pediatric COVID-19 vaccination

94.5% parents felt that children may be most susceptible in third wave, 96.68% felt COVID-19 vaccination plays a pivotal role in resisting anticipated third wave, and 96.4% felt it was beneficial to vaccinate children before re-opening of schools. 45.48% parents stated the correct reason behind necessity of pediatric vaccination as reduction in severity of COVID-19 infection. However, 12.94% believed it prevents infection completely, 1.15% felt that post-vaccination there is no need to maintain COVID-19 safety precautions, and 3.09% thought that vaccination allows travel, work without hindrance. Majority of parents gave an ambiguous response of all the above reasons (37.34%). A study in England also reflected similar reasons, with 42% believing in protection against disease, 3% felt they could stop COVID-19 preventive behaviour.⁸ Our study population were well aware of the pandemic, with most of them practicing COVID-19 preventive behaviour, and majority of parents were positive of beneficial effects of COVID-19 vaccination, for both adults and children.

Acceptance of pediatric COVID-19 vaccination

The acceptancy of pediatric COVID-19 vaccination worldwide is varied, ranging from above 90% in China to below 52% in Mexico, Russia, 48.2% in England and 1.6% in USA.^{6,8,9} A multicentric global (online) study rated high acceptance rate of 85% in India.⁶ Our study showed that 64.6% parents were readily willing to vaccinate their children, while 35.4% preferred to delay vaccination.

While overall the acceptancy in India is among nations with better compliance, the actual rates seem to be lower in our study as compared to the online survey through the internet quoted. The acceptancy rates were lower among the parents of lower socioeconomic strata (below poverty line), with statistical significance as shown in Table 4.

In our study an overwhelming 98.74% parents preferred vaccines of Indian origin, as opposed to an older multinational study where only 60.4% parents expressed confidence for their nationally approved vaccine.⁶

Reasons for vaccine hesitancy

Recent studies across the world for pediatric vaccination compliance showed that the major reason for hesitancy was fear of side effects (62.1% in England, 55.2% in USA, 28.4% worldwide) and vaccine safety; (32.7% worldwide).^{6,8,9} Our study also showed that parents were concerned about vaccine side effects, with 14.53% parents quoting their personal vaccination experience, while 22.45% parents were hesitant due to hearsay effects of vaccination. Our study additionally revealed a second reason of complacency in parents who believed that COVID-19 does not infect children (7.45%). An Italian study showed that a perception of low risk of serious COVID-19 infection in children was a reason for hesitancy; similarly recorded in England with 3.2% quoting the same.^{8,10}

A third reason for hesitancy observed in the minds of parents was that the regular immunisation schedule shall prevent COVID-19 disease in their children (19.36%). Concerns regarding safety of co-administration of COVID-19 vaccine in their child along with the regular immunisation schedule was also a reason for hesitancy, with 2.41% believing that it should be avoided, and 36.54% being undecided. Our study recorded 14.14% parents who did not believe in pediatric vaccination. This observation in England was as low as 1.2%.⁸ This percentage being significantly high, and regression analysis showing statistical significance among age groups, educational levels and economic status of parents; the matter needs to be taken into serious consideration and positive promotion of vaccination is required.

Few parents presumed that if their child has suffered from COVID-19 infection, he/she is resistant and does not need COVID-19 vaccination (17.6%); much higher than the percentages (3.2%) in another study.⁸ This can lead to negligence and shunning of social restrictions, impacting public health. The various reasons for vaccine hesitancy have been plotted in Figure 1.

Yardsticks of public health status

Our study showed that 34.55% of parent population were un-immunised., while 51.37% population among parents were yet to take the second dose (Figure 2). Thus, vaccine coverage among adult population is far from complete. 16.84% children have already been infected with COVID-19 so far, as per our study population. The first wave saw undiagnosed asymptomatic children, whose role was significant as vehicles of transmission of disease. During the second wave more children have been infected, symptomatic and diagnosed with COVID-19 but less severe disease as compared to adults.

The pandemic trend shows that children are equally susceptible as adults, although there is lack of evidence regarding severity of disease requiring ICU admissions in the anticipated third wave; warranting strengthening of

pediatric vaccination.² Our study showed 25.66% parents preferred to vaccinate their child through their treating pediatrician. Many parents prefer their regular set pediatrician to treat their children, be it an illness or clearing of doubts and concerns. The immunisation of children being handled essentially by pediatricians; acceptance of pediatric vaccines can be significantly boosted, if the vaccines are made available to all practicing pediatricians who can provide them with first-hand information, allay their fears, and build confidence.

Our study was conducted in a rural setup, beyond the outreach of medical teaching institutions, among farming and low-income community, reflecting true India.

Limitations

Since this study was cross sectional, it may not adequately reflect the change in attitude of parents towards pediatric COVID-19 vaccination during the pandemic as time progresses.

CONCLUSION

The pediatric age group being essentially unexposed and un-immunised, are most vulnerable to COVID-19. In spite of parents' awareness regarding the pandemic and its lasting impact in our society, its effect on children is still beyond their comprehension. Our study has identified several new causes of vaccine hesitancy other than safety and side-effects; namely, (1) that COVID-19 does not affect/is very mild in children, (2) concerns regarding co-administration with regular vaccines of immunisation schedule, (3) false complacency that regular immunisation schedule prevents and protects against COVID-19 in children; and that (4) post COVID-19 infection vaccination is not required due to development of lasting immunity. Hence focussed propagation of pediatric vaccination that addresses these misconceptions and allays fears is utmost essential at this juncture.

Recommendations

General awareness about COVID-19 and vaccination is appreciable in the community, however pediatric vaccine specific awareness is still lacking in the community. Significant population of parents are casual regarding the need for pediatric vaccination. A strong positive propagation of immunisation of children is a must, for parents to be prepared mentally and accept the vaccine when it arrives. We have identified few misconceptions and concerns among parents which must be addressed.

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