

Original Research Article

A real-world perspective from Indian pediatricians on typhoid vaccination perceptions and preferences

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ABSTRACT

Background: Typhoid vaccines are not a part of national immunization schedule in India, current survey aimed to evaluate pediatricians' perception, recommendation patterns, and preference regarding typhoid conjugate vaccine (TCV) in children and adults.

Methods: This was an observational, cross-sectional survey amongst 500 pediatricians practicing at various healthcare setups/clinics/hospitals located across India. The perception, recommendation patterns, and preference of pediatricians regarding TCV were assessed using a pre-defined, structured, and self-administered questionnaire which consisted of 25 open- and close-ended questions.

Results: TCV was highly recommended in children aged 9-24 months (61%), with only 57% of the recommended age group being vaccinated. The lowest TCV recommendations were observed in the age groups 5-12 years (35%) and 12-18 years (25%). The predominant barriers for parents who are not getting their >12 years old children vaccinated include lack of parent's awareness that TCV can be given to adolescents (61%) and wrong assumption of parents that their child was vaccinated when young (56%). The top key factors influencing parents in getting their children vaccinated included advice of doctors, mention in the vaccination card, previous vaccination of elder sibling, and children suffering from typhoid.

Conclusions: Overall pediatrician recommendations and parent acceptance rates of TCV for their children is low. Pediatricians included in the study believe that 2 doses of TCV are necessary for paediatric age group. Advice of the doctor, mention of TCV in vaccination card and awareness activities by pharmaceutical companies play a crucial role in improving the typhoid immunization rates with TCV.

Keywords: Typhoid, TCV, Paediatricians, Awareness, Dosage

INTRODUCTION

Typhoid fever is systemic febrile illness caused by ingestion of the bacterium *Salmonella enterica* serovar typhi (*S. typhi*) or *S. paratyphi* through contaminated water and food.¹ In South Asian region, India alone contributes for 82 and 75% of incidence and mortality due to typhoid fever.² In 2017, global burden of disease

(GBD) study estimated 586 incident cases of typhoid/paratyphoid per 100,000 person-years in India.^{3,4} In 2021, Cao et al reported 360 per 100,000 person-years incidence of typhoid fever, with annual estimate of 4.5 million cases and 8930 deaths.⁵ Though several antibiotics are available for treatment of typhoid, considering the growing rates of antibiotic resistance in many countries, the treatment regimen is becoming less effective and more expensive.⁶

The strategic advisory group of experts on immunization (SAGE), in 2017, recommended TCV for infants >6 months of age and older children as a single dose in typhoid endemic countries.⁷ TCVs were shown to have high immunogenicity and efficacy in large-scale trials and were found to be safe in children.⁸

Despite availability of TCVs, these appear to be not adequately utilized in India. Coverage of TCV was reported to be low compared to other vaccines given to same pediatric age group.^{9,10} There is a paucity of studies assessing the current recommendation patterns and perceptions of physicians regarding typhoid vaccination in India. Therefore, this survey conducted to assess pediatricians' perception, recommendation patterns, and preference towards TCV in children and adults.

METHODS

This observational, cross-sectional survey was conducted from October-December 2021 amongst 500 pediatricians. The inclusion criteria of the study included pediatricians practicing at healthcare setups/clinics/hospitals located across India. Pediatricians who were unwilling to participate in the survey were excluded from the survey.

Perception, recommendation patterns, and preference of pediatricians regarding TCV in India, both in children and adults, were assessed using pre-defined, structured, and self-administered questionnaire. Both open- and close-ended questions included in survey questionnaire across different categories as mentioned below:

General practice

It includes Primary medical specialty, total years of experience and primary practice setting

Usage of TCV

Number of patients consulted, number of patients recommended TCV, and number of patients getting vaccinated with TCV across various age groups. Reasons for parents not opting for TCV for their children. Recommendation of TCV by the paediatricians in the children's vaccination card. Percentage of children/ their siblings in which overall vaccination status is checked. Percentage of parents who get their elder child vaccinated (if not vaccinated already) along with the younger child. Preferred number of doses of TCV in adults and children. Counselling parents for getting their children vaccinated. Impact of COVID-19 pandemic on acceptance of the TCV.

Consumer awareness and decision making

Awareness among parents regarding getting their children vaccinated against typhoid. Deciding parameters for parents getting their children vaccinated.

Challenges, barriers, and measures for improving vaccination rate

Major barriers/challenges faced by pediatricians in recommending TCV in both adults and children. Measures taken by the pharmaceutical companies to increase awareness and adoption of TCV.

Statistical analysis and ethical considerations

Descriptive statistics used to present responses of pediatricians. Distribution of responses presented as no. and proportions. Graphical presentation used to depict survey results, as appropriate. Survey conducted as per protocol and principles of declaration of Helsinki. Ethical approval was obtained from Royal Pune independent ethics committee (RPIEC), Pune, India (Ethics approval no.: RPIEC 220922; dated: 26 September 2022). Verbal consent was obtained from participating pediatricians. Deidentified and aggregated survey results analyzed in order to maintain anonymity of pediatricians.

RESULTS

A total of 500 pediatricians were surveyed across different practice settings. Overall, pediatricians across India participated in the survey: North (31%), West (31%), South (26%) and East (12%). Nearly half (49%) of the pediatricians had 11-20 years of experience followed by 22% with 21-30 years, 15% with 5-10 years, 11% with 31-40 years and only 2% had 41-50 years of experience (Table 1). Half of the pediatricians were from standalone clinics (50%), followed by private hospitals/centres (self-owned) (23%), private hospital (visiting) 13%, corporate hospital (11%), charitable hospital (3%), and government hospital (1%) (Table 1).

Table 1: Demographic data of pediatricians in survey.

Variables	N (%)
Total no. of pediatricians participated	500
Region-wise split of pediatricians	
North	31
West	31
South	26
East	12
Years of experience (Years)	
5-10	15
11-20	49
21-30	22
31-40	11
41-50	2
Practice setting	
Standalone clinic	50
Private hospital/centre (Self-owned)	23
Private hospital (Visiting)	13
Corporate hospital	11
Charitable hospital	3
Government hospital	1

Recommendations of TCV by pediatricians

The survey findings revealed that pediatricians recommended TCV to 36% of patients per month, with only 50% of them getting vaccinated. TCV was highly recommended in children aged 9-24 months (61%), with only 57% of recommended age group being vaccinated. The lowest TCV recommendation was in age groups 12-18 years (25%) and 5-12 years (35%) (Figure 1).

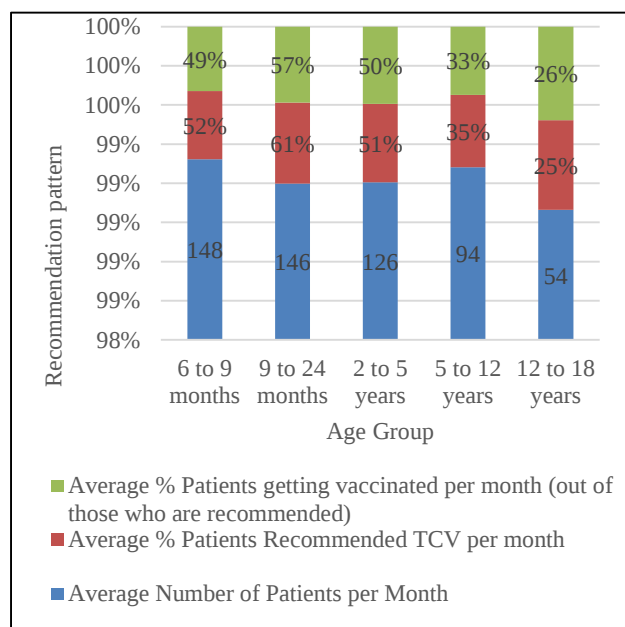


Figure 1: Current recommendation of vaccination among children.

It was identified that despite health care professional's (HCP's) emphasis on TCV, the 'high cost of TCV' (53%) and 'non-mandatory status' (42%) of TCV were barriers for parents who are not getting their <12 years of children vaccinated. For children >12 years, the reasons included lack of parent's awareness that TCV can be given to adolescents (61%) and wrong assumption of parents that their child vaccinated when young (56%). Pediatricians voluntarily check TCV vaccination status in 81% of patients and 46% of siblings of patients (Figure 2).

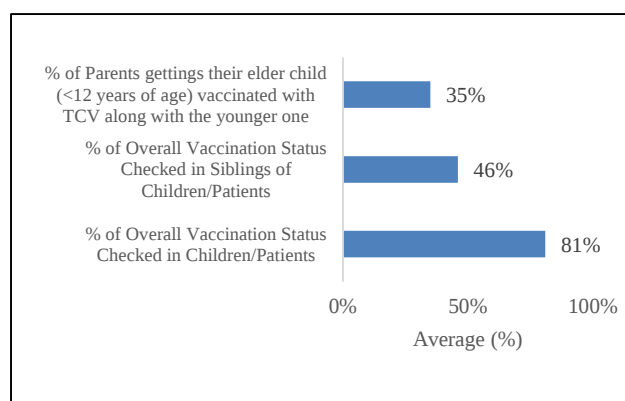


Figure 2: Vaccination status of children.

Modes of counselling

Majority of the pediatricians (92%) themselves counsel the parents for TCV vaccination. Amongst the tools used to counsel the patients, child's immunization card (80%) was identified to be an effective tool for counselling.

Dosage recommendations of TCV by pediatricians

Regarding the dosage recommendations in children, 59% of the pediatricians believed that two doses of TCV are necessary. The reasons for the requirement of two doses were related to its effectiveness (60%) and the manufacturer's recommendations (47%). It was observed that 41% of the pediatricians believe, a single dose of TCV is adequate in children. The primary reasons include guideline adherence (47%), easy to convince parents for a single dose (42%), and manufacturer's recommendation (37%).

In adults, 59% of the pediatricians believed that one dose of TCV is sufficient, which is due to guideline adherence (42%), effectiveness (38%), ease to convince patients (38%), and manufacturer's recommendation (33%). It was observed that 41% of pediatricians believed two doses are necessary in adults due to clinical experience (33%) and manufacturer's recommendation (31%).

Impact of COVID-19 on the acceptance of TCV

Because of the COVID-19 pandemic, 33% of the HCPs believed that the acceptance of TCV has increased, 38% believed that the acceptance rate has remained the same, while 29% thought acceptance rates have decreased.

Awareness of parents about TCV

This survey indicated that 40% of the parents were quite aware of TCV, 29% were somewhat aware, and 32% were not aware. The top 5 reasons influencing the parent's decision regarding TCV were advice of doctors, immunization card indicating vaccination schedule, previous vaccination of elder sibling, children suffering from typhoid, and vaccine cost (Figure 3). Of all the vaccinations (TCV) that were done in a month, about 30% were initiated by the parents.

Barriers faced by pediatricians in recommending TCV

The optional status of TCV in the immunization schedule (37%), the high cost of the vaccine (32%), and typhoid not considered a life-threatening disease (21%) were the primary barriers faced by pediatricians during the recommendation of TCV in children and adults. According to the pediatricians, pharmaceutical companies can increase the awareness and adoption of TCV by using social media to create awareness among parents (56%), by publishing statistics and facts about typhoid infections on social media (48%).

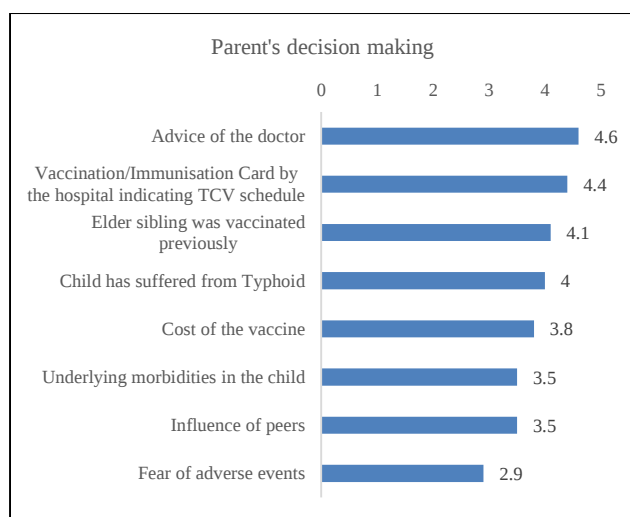


Figure 3: Influencing parameters in parent's decision making.

DISCUSSION

The current cross-sectional survey highlighted the real-world recommendation patterns, preferences, and perceptions of pediatricians regarding TCV in children and adults. In our present survey, it was identified that pediatricians recommend TCV to 36% of patients of which only 50% get vaccinated. The highest recommendations are among children in the age group of 9-24 months. According to the 2021-2022 Indian Academy of Pediatrics recommendation guidelines, TCV is recommended in children aged 6-9 months.¹¹ However, to the best of our knowledge, there are no studies conducted so far which have reported regarding the pediatricians' perception on the recommended patients receiving TCV.

The cost of the vaccine and its "non mandatory" status were identified to be the barriers among parents for not getting their children (<12 years) vaccinated. The lack of awareness that TCV can be administered to adolescents was the primary barrier among parents with children >12 years. Though cost of the TCV was identified to be a constraint among parents, Chauhan et al identified that introduction of TCV is a cost-saving strategy in the urban settings of India. Further, a modelling study conducted by Ryckman et al also identified that TCV could reduce burden and mortality from typhoid and also be cost effective in India.¹²⁻¹⁴

According to the WHO, to prevent the transmission of typhoid, TCV is recommended in infants and children aged six months and older.² In this survey, most paediatricians believe that two doses are necessary for children and one dose of TCV is sufficient in adults. The current survey highlighted that because of COVID-19 pandemic, the acceptance of TCV has increased. However, to the best of our knowledge, there are no Indian studies addressing the acceptance of TCV during

the COVID-19 pandemic. This observation warrants further studies need to be conducted to identify the impact of COVID-19 on the acceptance of TCV.

In this survey, it was identified that 40% of the parents were aware of TCV. Sunny et al conducted a study to evaluate the knowledge, attitude, and practice of vaccination among mothers and to find the relationship between the educational qualification of mothers and the immunization status of the child.¹⁵ Although most mothers had satisfactory knowledge, it was found that 25% of the children were unimmunized or partially immunized. Most importantly, 79% of the mothers were unaware of the availability of typhoid vaccination. Similarly, Sharma et al identified that <1 in 2 respondents knew about the availability of typhoid vaccine.¹² In a study conducted by Sima et al it was found that 19.25% of the participants had not heard about typhoid fever.¹⁶ This survey emphasized the need to create awareness of the symptoms, causes, treatment, and prevention of typhoid among parents.

The limitation of the current study includes the small number of pediatricians, and the opinions and perceptions derived from the study cannot be generalized. Also, as 50% of the pediatricians were from standalone clinics, the real perceptions and awareness of TCV among the parents cannot be estimated. The percentage of pediatricians from the government hospitals was only 1% and hence the recommendations patterns of TCV in the government settings could not be explored thoroughly through this survey.

CONCLUSION

While TCV recommendation varies according to age group, the overall recommendation and acceptance rates of TCV is low. Highest TCV recommendation and acceptance rates are in 9-24 months age group and lowest in 12-18 years age group. The reasons for low rates of catch-up vaccination (in 12-18 years age group) include lack of awareness among parents that TCV can be given to adolescents, and the wrong assumption that their child was vaccinated when young. More than 50% of the respondents believe that 2 doses of TCV are necessary for paediatric age group. As far as parameters that influence parents' decision making are concerned, advice of the doctor and mention of TCV in vaccination card top the list. However, paediatricians believe that awareness activities by pharmaceutical companies play a crucial role in improving the typhoid immunization rates with TCV.

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