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Original Research Article

Parental perspectives on typhoid vaccination: knowledge, awareness, and acceptance in Mysuru district: a cross-sectional study

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ABSTRACT

Background: Typhoid fever remains a persistent public health burden in India, with school-aged children at highest risk. Although the typhoid conjugate vaccine (TCV) has been recommended for inclusion in India's universal immunization programme (UIP), public acceptance remains a challenge. The study aims to assess parental knowledge, awareness, and acceptance of typhoid vaccination, and to identify socio-demographic factors influencing these domains.

Methods: A community-based cross-sectional study was conducted among 385 parents/guardians of children aged 6 months to 15 years in urban and rural areas of Mysuru between October and December 2024. Data were collected using a pre-tested semi-structured questionnaire covering socio-demographic factors, knowledge of typhoid fever, awareness of typhoid vaccines, and vaccine acceptance. Descriptive statistics were used, and associations were tested using chi-square analysis.

Results: Out of 385 participants, 53% were aware of typhoid fever and 51.43% were aware of the vaccine. While 35.32% believed the vaccine was effective, 57.4% were unwilling to vaccinate their children. Fear of side effects (26.7%), cost (19.91%), and lack of awareness (17.19%) were key reasons for vaccine refusal. Only 17.14% had vaccinated their children. Preventive practices, such as maintaining clean sanitation (89.87%) and handwashing (37.14%), were more widely adopted. A significant association was found between age and reasons for vaccine refusal (p=0.0234).

Conclusions: Despite moderate awareness about typhoid fever and its vaccine, vaccine acceptance and uptake among parents in Mysuru remain low. Fear, misconceptions, and lack of knowledge are major barriers. Strengthened health communication, trust-building, and accessible immunization services are essential to bridge the gap between awareness and practice and to enhance the success of typhoid vaccination programs in endemic regions.

Keywords: Typhoid fever, Typhoid conjugate vaccine, Vaccine acceptance, Parental awareness

INTRODUCTION

Typhoid fever remains a significant public health concern in many low- and middle-income countries, particularly in South Asia, where poor sanitation and limited access to clean water facilitate the transmission of *Salmonella typhi*.[1] As of 2019 estimates, there are 9 million cases of typhoid fever annually, resulting in about 110 000 deaths per year.[2] According to the global burden of disease study, India accounts for a large proportion of the global typhoid cases, with an estimated incidence of 377 cases per 100,000 population annually.[3] Children are disproportionately affected, with school-age children and adolescents forming the highest risk group.[4]

Vaccination is a key preventive strategy against typhoid fever. The world health organization (WHO) has recommended the introduction of TCVs in endemic countries, particularly targeting children aged six months

and older.[5] In 2023, the national technical advisory group on immunization (NTAGI) recommended the introduction of the TCV under UIP.[6] However, the successful implementation of any vaccination programme depends not only on supply-side factors but also on community-level acceptance and awareness.

Parental knowledge and attitudes towards vaccines play a critical role in determining the vaccination status of children. Studies have shown that insufficient awareness, vaccine hesitancy, and misconceptions about vaccine safety are key barriers to the uptake of newer vaccines.[7,8]

Understanding the current level of knowledge, awareness, and acceptance of typhoid vaccination among parents is essential to tailor public health strategies. Given the endemicity of typhoid in the region and the potential for vaccine-preventable morbidity and mortality, it is imperative to assess community readiness. Hence, this study was conducted to explore parental perspectives on typhoid vaccination-including their knowledge, awareness, and acceptance in the Mysuru district of Karnataka, South India.

The objective of the study was to assess the knowledge, attitude, and practice regarding typhoid fever and its vaccine and to identify the socio-demographic factors associated with it.

METHODS

A community-based cross-sectional study was done among parents/ guardians of children aged 6 months to 15 years residing in urban (Bannimantap, Bamboo Bazar) and rural (Suttur, Hadinaru, Kadakola) field practice areas of a medical college for at least six months prior to the study. The study was carried out for a period of 3 months (October to December 2024).

According to a study done by Tahir et al awareness among people about TCV p=54.2%, Z=1.96, q=45.8, d=5.

Sample size=Zpq/d^2=381.4~385.[9]

A total of 385 study participants were selected using a convenience sampling method. We excluded parents who were healthcare professionals and those who did not consent or were unavailable during data collection. A pre-tested semi-structured questionnaire was used to collect information from the participants. The tool was developed based on existing literature and WHO vaccination guidelines and included four sections: Socio-demographic details, knowledge of typhoid fever and its prevention, awareness of typhoid vaccines and acceptance and willingness to vaccinate children.

The study was initiated after obtaining approval from institutional ethics committee. Data were entered into Microsoft excel and analyzed using Epi Info TM version 7.2.1. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize participant characteristics and responses. Associations between socio-demographic variables and vaccine acceptance were tested using the Chi-square test.

RESULTS

The mean age of 385 participants was 39.47 years (±12.75 SD). Out of the total, the majority were male (66.49%), and in terms of educational status, 74.03% were literate. Regarding employment, 76.88% of the respondents were employed, and participants were fairly evenly distributed between rural (48.31%) and urban (51.69%) areas. A family history of typhoid was reported by 36.10% of the respondents (Table 1).

Table 1: Sociodemographic characteristics of study participants, (n=385).

Variables	Categories	N (%)
Age (in years)	Mean (SD)	39.47±12.75
Gender	Male	256 (66.49)
	Female	129 (33.50)
Education	Literate	285 (74.03)
	Illiterate	100 (25.97)
Employment status	Employed	296 (76.88)
	Unemployed	89 (23.12)
Residence	Rural	186 (48.31)
	Urban	199 (51.69)
Family history of typhoid	Yes	139 (36.10)
	No	246 (63.89)

Assessment of knowledge in the participants

Out of the total 385 parents/guardians surveyed, 204 (53%) were aware of typhoid fever, while 181 (47%) were not aware. Among those who were aware of typhoid fever (204), a substantial majority-198, were also aware of the typhoid vaccine, whereas only six were unaware of the vaccine (Figure 1).

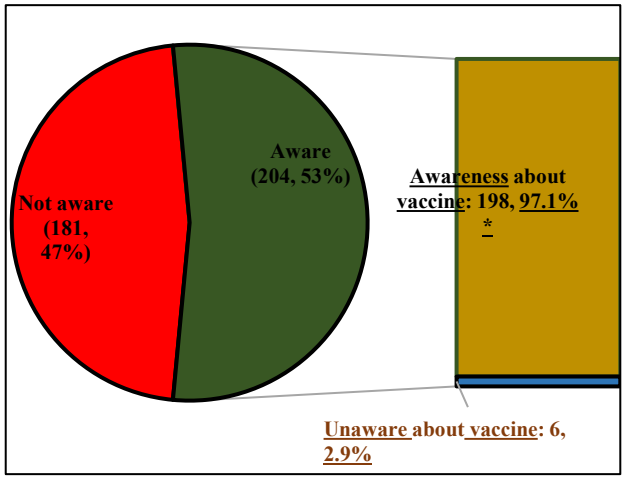

Figure 1: Knowledge about typhoid fever and vaccine among parents/ guardians (n=385).

Among the 204 parents who were aware of typhoid fever, 155 (75.98%) were aware of its causes, 146 (71.6%) knew about its mode of transmission, and 157 (76.96%) could identify at least one symptom of typhoid fever. Among 155, who reported to be aware of causes, 35.48% mentioned poor sanitation, 34.19% mentioned contaminated food and water, and 30.33% identified bacteria as the causative agent. Of 146, 52 believed typhoid spreads through infected persons, 46 mentioned contaminated food or water and 46 incorrectly attributed transmission to mosquitoes, indicating a knowledge gap. With regards to symptoms, 29.29% of 157 recognized skin rashes as a symptom, followed by 24.84% and 23.57% who reported fever and diarrhoea/constipation, respectively, as symptoms, while 22.29% mentioned abdominal pain. Among the 198 participants who were aware of the typhoid vaccine, 62.12% identified the injectable form of the vaccine, 24.74% were aware of the oral form and 13.14% reported that they did not know the form of the vaccine. When asked about how often the typhoid vaccine should be administered, 105 (53.03%) believed it is given once in a lifetime, 40 (20.20%) thought it should be given every 3-5 years and 55 (27.77%) did not know the correct frequency. According to 98 (9.49%) study participants, vaccine is available in private health facilities, 36 (18.18%) were aware of its availability in government facilities and the 64 (32.32%) did not know where the vaccine could be obtained (Table 2).

Assessment of attitude of the study participants

The 134 (34.81%) of parents agreed that typhoid vaccination is important, 136 (35.32%) agreed that the vaccine is effective in preventing typhoid fever but a significant 57.4% disagreed to vaccinate their children (Table 2).

The most common reason reported for refusal was fear of side effects (26.70%), 19.91% indicated the cost of the vaccine as a barrier and 17.19% refused due to a lack of awareness while 36.20% cited "other reasons", which included perceived low risk of typhoid, distrust in the health system, and lack of recommendation from doctors (Figure 2).

Assessment of practice of the study participants to prevent typhoid fever in their children

Among the 385 parents and guardians surveyed, approximately one-third (34.55%) reported always drinking boiled or filtered water, while an almost equal proportion (31.43%) admitted to never doing so. Hand hygiene was relatively better, with 37.14% consistently washing hands before and after using the toilet, and only 7.01% neglecting this practice altogether. When it came to dietary habits, 29.87% always preferred home-cooked food, while 35.84% never did. Similarly, 34.81% avoided street food regularly, yet 37.14% never avoided it, potentially exposing themselves and their children to contaminated food. Sanitation practices showed the highest compliance, with 89.87% maintaining clean surroundings at all times.

Additionally, only 66 (17.14%) participants had actually got their children vaccinated against typhoid, despite awareness of the disease and some preventive practices (Table 2).

Cost was a more prominent reason in the youngest age group (≤25 years) (35.0%) but declined with age. Fear of side effects and lack of awareness were most reported in the 26-50 age group, though fear remained high among those above 50 years.

Other reasons, including mistrust or lack of recommendation, were the most cited reason across all age groups, especially among those >50 years (44.07%) (Figure 2).

The significant Chi-square result (p=0.0234) confirms that age plays a role in the type of concern influencing vaccine refusal (Figure 2). However, there was no significant association between other sociodemographic details like gender, age education, employment status, place of residence of parents/ guardians with knowledge of typhoid fever, awareness on typhoid vaccines, acceptance and willingness to vaccinate children.

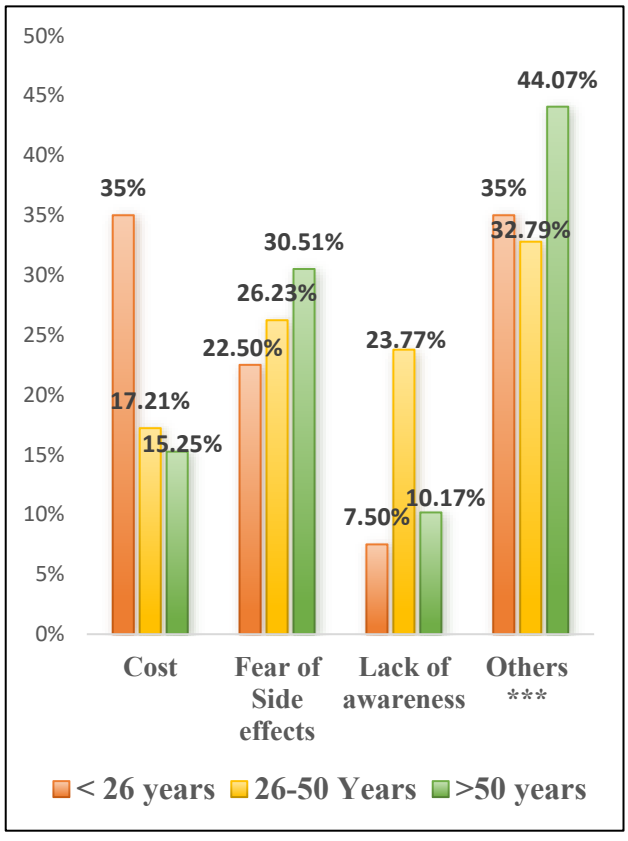

Figure 2: Reasons for refusal of vaccine (n=221).
*** Perceived low risk of typhoid, distrust in health system, lack of recommendation from doctors. **χ^2= 14.62, p=0.0234.

Table 2: Knowledge, attitude and practice of study participants regarding typhoid fever and its prevention.

Variables	Category	N	Percentage (%)
Knowledge about typhoid fever and typhoid vaccine			
Amongst participants aware about typhoid fever, (n=204)			
Causes of typhoid	Poor sanitation	55	-
	Contaminated food or the water	53	-
	Bacteria	47	-
	Not aware	49	24.02
Mode of transmission	Contaminated food or water	46	-
	Infected persons	52	-
	Mosquitoes	46	-
	Not aware	58	28.43
Symptoms	Fever	47	-
	Diarrhoea/ constipation	37	-
	Skin rashes	46	-
	Pain abdomen	35	-
	Not aware	47	23.04
Amongst participants who are aware about vaccine, (n=198)			
Form of vaccine known	Injectable	123	62.12
	Oral	49	24.74
	Don't know	26	13.14
Knowledge of vaccine	Once in a lifetime	105	53.03
	Every 3-5 years	40	20.20
	Don't know	55	27.77
Knowledge of availability	Private facility	98	49.49
	Government facility	36	18.18
	Don't know	64	32.32
Attitude of parents/ guardians towards typhoid vaccine			
Typhoid vaccination is important	Agree	134	34.81
	Neutral	124	32.21
	Disagree	127	32.99
Believe the vaccine is effective in preventing typhoid fever	Agree	136	35.32
	Neutral	129	33.50
	Disagree	120	31.17
Willing to get their children vaccinated	Agree	128	33.25
	Neutral	36	9.35
	Disagree	221	57.40
Practice followed by parents/ guardians to prevent typhoid fever			
Drinking boiled or filtered water	Always	133	34.55
	Sometimes	131	34.03
	Never	121	31.43
Washing hands before eating/after using toilet	Always	143	37.14
	Sometimes	215	55.84
	Never	27	7.01
Prefer eating home-cooked food	Always	115	29.87
	Sometimes	132	34.29
	Never	138	35.84
Avoiding street food	Always	134	34.81
	Sometimes	108	28.05
	Never	143	37.14
Clean sanitation	Always	346	89.87
	Sometimes	30	7.80
	Never	9	2.33

DISCUSSION

This study assessed the knowledge, awareness, and acceptance of typhoid vaccination among parents in urban and rural areas of Mysuru district, Karnataka. The findings reveal moderate levels of awareness about typhoid fever and its vaccine among parents, yet low vaccine uptake, primarily due to concerns about side effects, cost, and lack of awareness. These insights highlight critical gaps in public health messaging and accessibility of vaccination services.

In our study, just over half (53%) of the respondents were aware of typhoid fever, and among them, nearly all (97.1%) were aware of the vaccine. This proportion is higher than that reported in a study conducted in Pakistan by Tahir et al where only 54.2% of the population were aware of TCVs.[9] However, it is concerning that a substantial proportion of those aware still held misconceptions, particularly about the mode of transmission and symptoms, such as wrongly attributing spread to mosquitoes. Similar gaps in knowledge were observed in a study from Nepal, where only 40% of caregivers could correctly identify routes of transmission and typical symptoms of typhoid fever.[10]

In terms of attitudes, only one-third of the respondents agreed that typhoid vaccination is important, and a slightly higher proportion (35.32%) believed in its effectiveness. However, more than half (57.4%) were reluctant to vaccinate their children. This aligns with findings from studies in other low- and middle-income countries where vaccine hesitancy is largely driven by fear of adverse effects, limited knowledge, and lack of trust in the health system.[11,12] Fear of side effects was cited as the most common reason for refusal in our study, especially among those aged 26-50 years, consistent with a qualitative study from Nigeria that highlighted concerns about vaccine safety and the misinformation as key barriers.[13]

The cost of vaccination was also cited as a barrier, especially among the youngest age group. While the inclusion of TCV in India's UIP is expected to alleviate financial concerns, the lack of awareness about its availability in public health facilities-only 18.18% of respondents were aware-suggests that communication gaps need to be urgently addressed.[6,14] Similar implementation challenges were observed in Malawi during TCV rollout, where poor communication and low demand hindered uptake.[15]

Our findings also reveal discrepancies between knowledge and preventive practices. Despite a relatively good understanding of the disease among some respondents, only 17.14% had vaccinated their children against typhoid. This reflects a classic knowledge-practice gap, as noted in studies from Indonesia and Bangladesh, where improved knowledge did not always translate to increased vaccination rates.[16]

Sanitation practices, particularly maintaining clean surroundings and hand hygiene, were better adhered to than dietary precautions. These findings align with WHO recommendations that emphasize WASH (water, sanitation, and hygiene) interventions as complementary strategies to vaccination in typhoid prevention.[5]

Importantly, we found a significant association between age and type of concern regarding vaccination, with mistrust in the health system and lack of awareness being more common among older adults. This suggests that vaccine promotion strategies need to be enhanced, possibly through community-based outreach and stronger physician advocacy.

A major strength of this study is its community-based design, which allowed for the inclusion of participants from both rural and urban settings, providing a broader understanding of parental perspectives on typhoid vaccination in the Mysuru district. The use of a pre-tested, semi-structured questionnaire ensured consistency and reliability in data collection. Additionally, the study addressed multiple dimensions-knowledge, attitude, and practice, giving a comprehensive view of factors influencing vaccine uptake.

However, the study has certain limitations. The use of a convenient sampling method may have introduced selection bias, limiting the generalizability of the findings. Self-reported responses may also be subject to social desirability and recall bias. Moreover, being a cross-sectional study, causal relationships could not be established between the variables. Despite these limitations, the findings provide valuable insights to inform targeted public health interventions.

CONCLUSION

This study highlights suboptimal levels of knowledge, attitude, and practice regarding typhoid fever and its vaccination among parents and guardians in Mysuru district. While 53% were aware of typhoid fever and 51.43% had heard of the vaccine, only around one-third believed in its importance (35.32%) and effectiveness (34.81%), and just 33.25% expressed willingness to vaccinate their children. Alarmingly, only 17.17% had actually vaccinated their children, despite relatively better adherence to WASH-related preventive practices. A significant association was observed between parental age and reasons for vaccine refusal, underscoring the need for awareness campaigns. Strengthening health education, assurance of vaccine safety, and clear provider recommendations-to improve acceptance and uptake of typhoid vaccination and addressing vaccine concerns are essential to improve uptake and reduce the burden of typhoid in endemic areas. Given the burden of typhoid in India and the availability of effective vaccines, bridging the awareness-acceptance gap is crucial to achieving public health goals.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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