

## Original Research Article

# Knowledge, attitude and practices about tetanus toxoid immunisation amongst general population of an urban semi-slum area: a cross-sectional interview-based study from Western India

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## ABSTRACT

**Background:** Members of the public are frequently unaware of tetanus immunisation schedules and its importance in preventing tetanus. This community-based, cross-sectional, complete enumeration, interview-based study was conducted to assess the knowledge, attitude and practices about tetanus toxoid immunisation amongst the general population in an urban semi-slum area located about 30 kms from Mumbai city in Western India.

**Methods:** Respondents comprised adult residents of either sex, who gave written informed consent to participate in the study. After obtaining approvals, the study was explained during routine home visits and the respondents were interviewed at a time convenient to them. A direct face-to-face interview was conducted using a semi-structured proforma and their responses were recorded and statistically analysed.

**Results:** Of the 161 participants (90 males; 71 females), 16.15% were illiterates. 95.65% thought that a single tetanus toxoid injection was adequate to prevent tetanus while none knew that pregnant women are immunised to protect newborns against tetanus. 67.08% were unaware about the need for maintaining cold chain for storage of tetanus toxoid. 96.89% had received only one injection of tetanus toxoid, irrespective of the type of injury or previous immunisation status. The belief that an adult requires tetanus toxoid after every injury exhibited education-wise significant difference ( $p=0.02$ ).

**Conclusions:** Sustained and focussed health education efforts are necessary to combat misconceptions regarding tetanus toxoid immunisation.

**Keywords:** Tetanus toxoid, Knowledge attitude and practices, Tetanus immunisation

## INTRODUCTION

Tetanus is caused by a powerful exotoxin, which is produced during the growth lag phase of the anaerobic bacterium *Clostridium tetani*.<sup>1,2</sup> Contamination of wounds by spores of *Clostridium tetani* is the common source of infection since these spores are pervasive in the environment, chiefly soil and the gastrointestinal tract of domesticated animals. Neonatal tetanus is caused by post-

partum contamination of the umbilical cord at the time of its cutting and dressing. In the central nervous system, this exotoxin prevents the release of inhibitory neurotransmitters (for instance, gamma amino butyric acid or GABA) and thus the excitatory nerve impulses are not constrained.<sup>3</sup>

The principal measures for prevention of tetanus are safe delivery practices and immunisation with tetanus toxoid

(TT).<sup>4</sup> Despite availability of specific guidelines regarding tetanus immunisation, post-exposure TT is often administered by health care providers regardless of the previous immunisation status of the individuals.<sup>5</sup> Emergency departments in most health care facilities provide only post-exposure tetanus immunisation services, which is also incomplete and without any follow-up to complete the primary series of active immunisation.<sup>6</sup> Despite health education efforts by government agencies, members of the public are frequently unaware of tetanus immunisation schedules and its importance in preventing tetanus. Comprehension of the viewpoints of the public towards TT immunisation would facilitate designing of interventions that enable changes in knowledge, attitude and practices.<sup>7</sup>

The present study was conducted to assess the knowledge, attitude and practices about TT immunisation amongst general population of an urban semi-slum area.

## METHODS

This community-based, cross-sectional, complete enumeration, interview-based study was conducted in an urban semi-slum area served by the urban health training centre of a Rajiv Gandhi Medical College, which is located about 30 kms from Mumbai city in Western India. Approval from the Institutional Ethics Committee of Rajiv Gandhi Medical College was obtained. The study was explained to prospective participants during routine home visits. The study was conducted over a two-month period from Feb 2016 to Apr 2016. All adult residents of the urban semi-slum area, of either sex, who gave written informed consent to participate in the study, were interviewed at their homes, at a time convenient to them, using a semi-structured proforma and their responses were recorded. All those who were not adults; adult non-residents who were staying as visitors/guests of the residents in the study area during the period of study and those who did not give written informed consent to participate in the study were excluded.

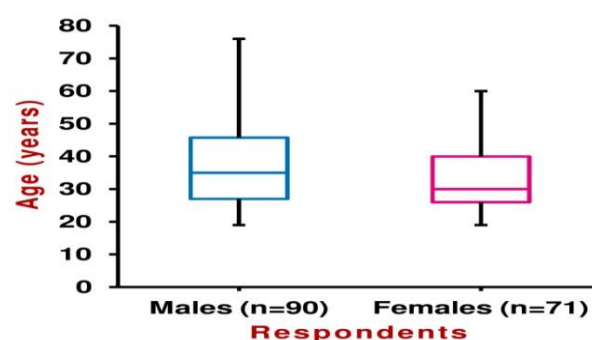
The results obtained were tabulated and statistically analysed using Epi info Version 7.0 (public domain

software package from the centers for disease control and prevention, Atlanta, GA, USA). Categorical data were presented as percentages and continuous data as Mean and standard deviation (SD). Confidence interval (CI) was expressed in the range of (Mean – [2 x Standard Error]) to (Mean + [2 x Standard Error]). Significance of difference in parameters was calculated using Chi-square test (with Mantel-Haenszel correction, where required) at 95% confidence interval ( $p < 0.05$ ).

## RESULTS

### Demographic profile

The participants comprised 161 persons: 90 (55.9%) males (mean age: 37.64 years; SD: 14.23 years; CI= 34.65-40.64 years) and 71 (44.1%) females (mean age: 33.30 years; SD: 10.24 years; CI: 30.87-35.72 years). The gender-wise differences in the minimum age or first quartile and median and third quartile were modest (Figure 1). However, higher age groups showed considerable gender difference with male respondents being more aged than female respondents. 26 (16.15%) respondents and 65 (40.37%) spouses of the respondents were illiterates. 15(9.32%) of the respondents and 8 (4.97%) of the respondents' spouses were educated to a level of graduation and above. 12 male respondents and three female spouses of respondents were self-employed (Table 1).



**Figure 1: Age and gender distribution of respondents.**

**Table 1: Demographic profile of respondents and their spouses.**

Demographic parameters		Respondents		Spouses	
		Females	Males	Females	Males
Education	Illiterate	18 (11.18)	8 (4.97)	27 (16.77)	38 (23.60)
	Primary	9 (5.59)	7 (4.35)	11 (6.83)	23 (14.29)
	Secondary	30 (18.63)	54 (33.54)	22 (13.66)	23 (14.29)
	Higher Secondary	8 (4.97)	12 (7.45)	6 (3.73)	3 (1.86)
	Graduate	6 (3.73)	9 (5.59)	5 (3.11)	3 (1.86)
Occupation	Self-employed	0 (0.00)	12 (4.45)	3 (1.86)	0 (0.00)
	Skilled	3 (1.86)	19 (11.80)	12 (7.45)	7 (4.35)
	Semi-skilled	7 (4.35)	33 (20.49)	12 (7.45)	3 (1.86)
	Unskilled	3 (1.86)	11 (6.83)	9 (5.59)	2 (1.24)
	Others*	58 (36.02)	15 (9.31)	35 (21.74)	78 (48.45)

\* Others = Homemaker / Unemployed / Retired; Figures in parentheses indicate percentages.

**Table 2: Knowledge about tetanus immunisation.**

Topic	Females (n=71)	Males (n=90)	Chi square #	p value	Odds ratio
<b>Under-5 children to be immunised</b>	69 (42.86)	86 (53.42)	0.291	0.598	1.604
<b>Separate immunisation needed for under-5 child</b>	65 (40.37)	81 (50.31)	0.112	0.737	1.204
<b>Cold chain for TT</b>	20 (12.42)	33 (20.50)	1.298	0.255	0.677
<b>Adults need TT every time after injury</b>	46 (28.57)	57 (35.40)	0.036	0.849	1.065
<b>TT given after injury if not taken for 6 months</b>	52 (32.30)	68 (42.24)	0.112	0.738	0.885
<b>Tetanus is life threatening</b>	65 (40.37)	81 (50.31)	0.112	0.738	1.203
<b>Single TT injection to be administered for every injury</b>	68 (42.24)	86 (53.42)	0.005	0.946	1.054
<b>Awareness about TIG</b>	02 (01.24)	03 (01.86)	0.035	0.852	0.841
<b>Only rusted metal injury causes tetanus</b>	57 (35.40)	80 (49.69)	2.318	0.128	0.509

TT = Tetanus toxoid; TIG = Tetanus immunoglobulin; figures in parentheses indicate percentages; # Chi-square test with Mantel-Haenszel correction where required.

**Table 3: Practice of tetanus immunisation as revealed by respondents.**

Practice	Females (n=71)	Males (n=90)	Chi square #	p value	Odds ratio
<b>TT stored on a common shelf</b>	03 (01.86)	04 (02.48)	0.005	0.946	0.948
<b>TT given every time after injury</b>	53 (32.92)	65 (40.37)	0.119	0.730	1.132
<b>TT given every 6 months</b>	22 (13.66)	35 (21.74)	1.084	0.298	0.701
<b>TT given every 6 months to children</b>	22 (13.66)	20 (12.42)	1.581	0.209	1.571
<b>More than 1 injection for tetanus</b>	01 (00.62)	04 (02.48)	1.208	0.272	0.307

TT = Tetanus toxoid; Figures in parentheses indicate percentages; # Chi-square test with Mantel-Haenszel correction where required.

**Table 4: Education-wise difference in knowledge of participants.**

	Educational level		Chi Square value #	p value	Odds Ratio
	Secondary School & above	Less than Secondary School			
<b>Cold chain for tetanus toxoid</b>	42	11	1.17	0.28	0.650
<b>Adults need TT every time after injury</b>	70	33	5.25	0.02 *	0.380
<b>TT given every time after injury</b>	84	34	1.70	0.192	0.564
<b>Metal injury causes tetanus</b>	104	33	1.91	0.167	0.528
<b>TT given every 6 months to children</b>	26	16	4.25	0.04 *	0.454

# Chi-square test with Mantel-Haenszel correction where required; \*statistically significant.

### **Knowledge about immunisation**

155 (96.27%) of the respondents knew that under-five children are immunised against tetanus in the routine immunisation programme. 156 (96.89%) were unaware about tetanus immunoglobulin (TIG). 137 (85.09%) believed that an injury due to rusted iron or metal was responsible for causing tetanus. None knew that pregnant women are immunised to protect newborns against tetanus (Table 2). 139 (86.34%) of the respondents did not know as to how a newborn is protected against tetanus while the rest were aware that neonatal tetanus is a vaccine-preventable disease.

### **Vaccine storage and cold chain**

108 (67.08%) participants were unaware about the need for maintaining cold chain for storage of TT. Moreover, 98 (60.87%) did not know about the conditions in which TT was stored before it was administered to them. 56

(34.88%) said that TT was stored in a fridge or kept on ice packs, 7 (4.35%) responded that the TT vial was kept on a table or a normal shelf before injection (Table 3).

### **Practice of immunisation**

118 (73.29%) of the respondents had been given a TT injection every time they had an injury irrespective of their previous immunization history. 156 (96.89%) had been given only one injection of TT with no follow up irrespective of the type of injury or previous immunisation status. Only 5 (3.11%) were administered two TT injections (Table 3).

### **Knowledge versus educational status of respondents**

Amongst people who were educated to secondary school level or above and those who were not, the differences in relation to the knowledge about storage of TT and in the misconception that a cut with iron or metal causes tetanus

were statistically insignificant ( $p=0.28$  and  $p=0.167$ , respectively). The education-wise difference in the belief that an adult requires TT after every injury was statistically significant ( $p=0.02$ ). This finding could be attributed to the fact that people who were educated to a level of secondary school and beyond had a basic exposure to biological sciences. There was insignificant difference ( $p=0.192$ ) between people who were educated to secondary school level or above and those who were not, in the practice of healthcare provider administering a TT injection every time the person had an injury. This could be attributed to the fact that people, irrespective of their educational status, conclusively trusted their healthcare provider without asking any questions. A significant education-wise difference ( $p=0.04$ ) was found in the practice of healthcare provider administering TT injection to children every 6 months (Table 4).

## DISCUSSION

The objective of the present study was to determine the knowledge and practice of the general population living in a semi-urban slum area about TT immunisation. The study revealed that while 146 (90.68%) knew that tetanus is life threatening, 154 (95.65%) were of the opinion that a single TT injection was adequate to prevent tetanus. Attitudes of the respondents towards pre- and post-exposure prophylaxis against tetanus may be ascribed to their lack of awareness. Poor knowledge of immunisation schedule was reported by a study on adolescent girls conducted in rural Haryana.<sup>8</sup> Respondents who harboured the erroneous belief that TT injection was to be administered after every injury in children and adults, comprised 90.68% and 63.98%, respectively. In the present study, 57 (35.4%) had been administered TT injection every 6 months while the children of 42 (26.09%) participants had been given TT every 6 months. Non-conformity to a pre- or post-exposure immunisation schedule and administration of TT after every injury may lead to adverse hypersensitivity reactions.<sup>9</sup>

A completed primary course of TT immunisation induces protective immunity that persists for at least 10 years; persons who have not completed a primary series may require TT and passive immunization at the time of wound toilet and a booster dose is recommended if TT has not been administered within the preceding 5 years.<sup>9</sup> A North Indian study has also emphasised that propagation of correct information as crucial for the success of the immunisation programme.<sup>10</sup>

In July 2016, the World Health Organization had declared that India had eliminated maternal and neonatal tetanus, which was accomplished using the available health care delivery system.<sup>11</sup> Though a sizeable number of respondents had satisfactory knowledge, the ignorance of other respondents signifies that there is a need to focus on immunisation during health education activities for the general population.

## Limitations

The responses given by the participants could not be independently verified.

## CONCLUSION

Though India has eliminated maternal and neonatal tetanus largely due to the efforts of health care personnel in the public health system, the ignorance of some respondents in an urban semi-slum area suggests that there is a need to focus on immunisation during health education activities for the general population.

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