

Tetanus toxoid vaccination coverage among women of reproductive age in Dhaka city

Abstract

Background: Tetanus is an infectious disease and hence its prevention is important in our society. The purpose of giving Tetanus Toxoid (TT) vaccine to women is to protect them and their newborn infants against neonatal tetanus. A total of 5 doses are scheduled in Bangladesh for lifelong immunity.

Objective: To access the vaccination coverage among the women of reproductive age in Dhaka city.

Methodology: This is a described type of cross-sectional study, conducted for Ten months from March 2022 to December 2022. 200 women of reproductive age group (15-49 years) were included. The technique used in the study was a convenient type of non-probability sampling.

Result: Most of the respondents (45.5%) are within 21-25 years, 18.5% are within 26-30 years. 71.5% of the respondents have taken the TT1 vaccine. 64.9% respondents have taken TT vaccine during pregnancy, where TT1 vaccine was taken by 61 respondents in pregnancy, among which 59 respondents (96.7%) continued to take TT2 vaccine, 35 respondents (57.4%) have continued to take TT3 vaccine, 26 respondents (42.6%) continued to take TT4 vaccine, and finally 24 respondents (39.3%) had taken the TT5 vaccine. Among non-pregnant respondents, 41% (82 respondents) have taken TT vaccine and 92.7% (76 respondents) continued to take TT2 vaccine, 76.8% (63 respondents) continued to take TT3 vaccine, 58.5% (48 respondents) continued to take TT4 vaccine, and 42.5% (37 respondents) continued to take TT5 vaccine.

Conclusion: Tetanus is not uncommon in Bangladesh. Due to lack of proper health education, people are unaware that the TT vaccine is beneficial not only to the mother, but also to the child to prevent neonatal tetanus. So, proper health education should be incorporated to create awareness about the benefits of TT vaccine.

Keywords: tetanus, tetanus toxoid (TT), reproductive age, vaccination, immunization, neonatal tetanus

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Dr Bidita Mitra, Dr Soumyodip Sadhukhan, Dr Sankha Bhowmik RC, Prof Dr Jannatul Ferdousi

Department of Community Medicine and Public Health, Dhaka National Medical College, Bangladesh

Correspondence: Dr Soumyodip Sadhukhan, MBBS, Dhaka National Medical College, Dhaka, Bangladesh, Tel +8801757821350

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Introduction

Tetanus may be described as an acute disease induced by the serotoxin of *Clostridium tetani* and clinically characterized by muscular rigidity which persists throughout illness, punctuated by painful paroxysmal spasms of the voluntary muscles, especially the masseters (trismus or lock-jaw), the facial muscles (risus sardonius), the muscles of the back and neck (opisthotonos), and those of the lower limbs and abdomen. The mortality rate is very high, ranging from 40% to 80%.¹ This infectious disease exists worldwide due to the ubiquity of the bacterium. It cannot be eradicated. People of all ages can get tetanus, but the disease is particularly common and serious in new-born babies. The case prevalence of tetanus is still high, probably due to a lack of environmental hygiene and basic health education and inadequate vaccination. Tetanus is still one of the major killers of adults, children and neonates in developing countries.² Neonatal tetanus is a grave disease caused by a bacterial pathogen transmitted during the child's birth, usually in an unhygienic condition. Neonates typically get affected by the disease during birth when delivered in unhygienic conditions, especially when the umbilical cord is managed by unsterile instruments and substances like ash, soil, or cow dung.³

Neonatal tetanus occurs in newborns whose mothers are not immunized. It presents as progressive difficulty in feeding (sucking & swallowing), with associated hunger and crying. Paralysis or diminished movement, stiffness, rigidity to the touch, and spasms are

characteristic.³ Most non-neonatal traumatic injury cases of tetanus are associated with a penetrating wound inflicted by a dirty object, such as a nail, splinter, fragment of glass, or unsterile injection.² Females are exposed to the risk of tetanus, especially during unsafe home delivery or abortion by untrained birth attendants, and suffer from "puerperal tetanus".³ Tetanus causes neonatorum, one of the leading causes of infant death throughout the world. One approach to prevention of this problem is through improving the quality of prenatal, obstetric, and postnatal maternal and child health services. Another complementary approach is the active immunization of women before or during pregnancy with tetanus toxoid.⁴ Tetanus affects two major vulnerable groups in Bangladesh: pregnant women and newborns, especially those who reside in the rural part of country. Tetanus toxoid is an ongoing vaccination program under EPI in Bangladesh and the target population of this program is women of reproductive age. The program's success results in a reduction in the number of mothers and babies dying from tetanus.³ It has been reported that tetanus claims at least 1 million human lives a year in the world, about half of this being that of new-born infants. In Bangladesh, about 75,000 people contract tetanus annually and 72,000 of them die.⁵ The disease affects all ages and both sexes equally. No age is immune unless protected by immunization. Herd immunity does not protect the individual. In order to prevent neonatal tetanus, women of childbearing age need to be immunized. Generally recommended schedule of non-immunized pregnant women: 2 injections of tetanus toxoid (TT) spaced 4 weeks

apart; the first dose is administered as early as the first trimester and the last dose is administered no later than 24 weeks of gestation. Routine TT vaccination for 15-49 years women consist of 5 doses: TT-1 at the age of 15 years, TT-2 at least 4 weeks after TT-1, TT-2 at least 6 months after TT-1, TT-3 at least 1 year after TT-2, TT-4 at least 1 year after TT-3 and TT-5 at least 1 year after TT-4.⁵

Methology

The current study is a descriptive type of cross-sectional study which included 200 women of reproductive age group (15-49 years), and was conducted over 10 months from March 2022- December 2022. Data collection took place among indoor and outdoor patients at Dhaka National Medical Institute Hospital, Dhaka, a renowned tertiary care Medical College Hospital where people from all over the country visit to seek treatment. Patients residing outside Dhaka city were excluded from this study. The study was approved by the Hospital authority and informed written consent were taken from the patients/attendants after an explanation. The technique used in this study was a convenient type of non-probability sampling. The data was collected through a face-to-face interview using a pre-tested semi structured questionnaire. The collected data was computed and analyzed by using IBM SPSS.

Result

Maximum participants of the total study population (200) are within their reproductive age; 21-25 years (45.5%), 26-30 years (18.5%) 15-20 years (14%), 31-35 years (12%), 36-40 years (6.5%), 41-45 years (2%) and 46-49 years (1.5%) (Table 1). Majority of the total respondents (71.5%) have taken TT vaccine but, 28.5% have not taken TT vaccine (Figure 1). During pregnancy, TT vaccine was taken by 61 respondents, among which 59 respondent (96.7%) continued to take TT2 vaccine, 35 respondent (57.4%) had continued to take TT3 vaccine, 26 respondent (42.6%) continued to take TT4 vaccine, and finally 24 respondent (39.3%) continued to take the TT5 vaccine thereby completing the dose schedule (Figure- 2). Among the nonpregnant respondents who had taken TT vaccine, TT1 vaccine was taken by 82 respondents, among which 76 respondent (92.7%) continued to take TT2 vaccine, 63 respondent (76.8%) have continued to take TT3 vaccine, 48 respondent (58.5%) continued to take TT4 vaccine, and finally 37 respondent (45.2%) continued to take the TT5 vaccine thereby completing the dose schedule (Figure 3). 139 respondents did not continue the dose, 28% due fear, 28.8% were not informed about the completion of the vaccination and rest of the 43.2% for some other reason (Table 2).

Table 1 Age of participant

Age group	Frequency	Percentage (%)
15-20	28	14.0
21-25	91	45.5
26-30	37	18.5
31-35	24	12.0
36-40	13	6.5
41-45	4	2.0
46-49	3	1.5
Total	200	100.0

All the participants were within the reproductive age group, maximum (45.5%) being within 21-25years.

Table 2 Reason of dropout from vaccination

Reason	Frequency	Percentage (%)
Fear about vaccination	39	28.0
Not informed about the completion of vaccination	40	28.8
Others	60	43.2
Total	139	100.0

Most of the respondents did not complete their vaccination due to fear and lack of information.

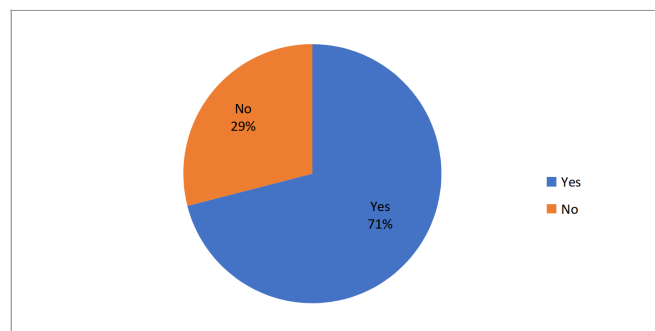


Figure 1 shows majority of the respondents (71.4%) have taken at least one dose of TT vaccine.

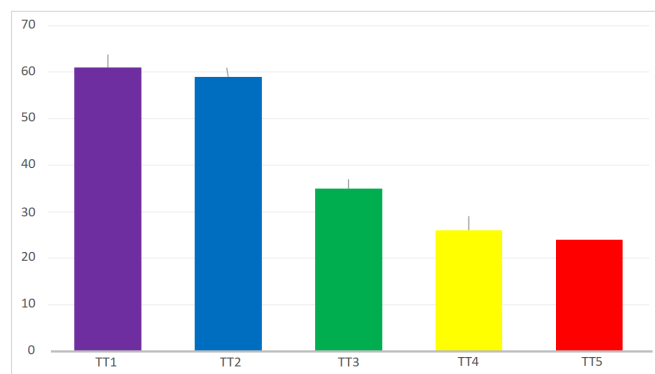


Figure 2 shows TT1 was taken by 61 pregnant respondents, among which 96.7% continued to take TT2 vaccine that gradually decreased to 39.3% for TT5 vaccination.

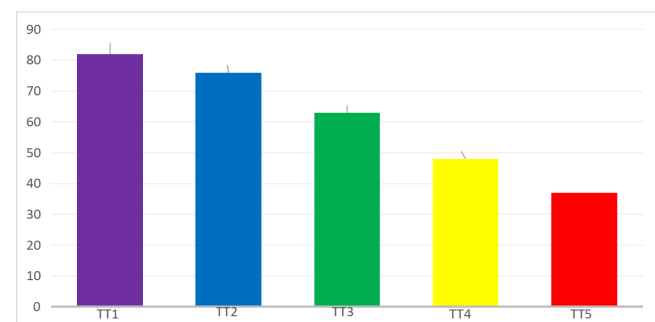


Figure 3 shows TT1 was taken by 82 non-pregnant respondents, among which 92.7% continued to take TT2 vaccine that gradually decreased to 45.2% for TT5 vaccination.

Discussion

Tetanus is a highly painful disease with a high mortality rate. Although tetanus prevention is inexpensive it still poses a significantly high incidence in developing countries, likely due to low levels of health facilities in terms of vaccination and availability of human and material resources. In developing countries tetanus is common among

young age group but in developed countries, tetanus is common in adult population. This observation can be explained by the fact that in developing countries tetanus is common in the young due to lack of effective immunization program and inappropriate treatment of injuries, whereas in developed countries tetanus occurs mainly in elderly due to decline in protective antibodies.² In this descriptive type of cross-sectional study, out of 200 women, most were between 21 to 25 years (45.5%) and the second largest group of 18.5% was from 26-30 years. The other group of 15 to 20 years (14%), when compared to a study done on the women of reproductive age experience from rural community in the year of 2012, even, where maximum percentage of people are in 20 to 24 years age group (39.3%); the percentage was (24.6%),³ whereas here, it was 18.5%. A part of the data included in our study shows the percentage of pregnant women who have taken the TT vaccine. We found 94 respondents in 200, and out of them, the majority of percentage i.e. 63.9% (61 respondents) had taken TT vaccine during pregnancy; however, 35.1% (33 respondents) have not taken the TT vaccine during pregnancy. In a study conducted in Sierra Leone in 2017, the overall prevalence of receiving TT immunization during women's last pregnancy was 96.3% and that of taking at least two doses was 82.12%.⁶ In another study, the tetanus toxoid coverage among the pregnant who were vaccinated with at least two doses of TT during their ongoing pregnancy, was 85%.⁷ 143 respondents (71.5%) of our study population had taken TT vaccine, consisting of both pregnant and non-pregnant women. In a similar study on TT vaccination status of female students of Khulna, it shows 84% have taken the vaccine, and 16% have not.⁸ Also, out of 143 of our respondents, 61 respondents (42.6%) have taken the TT vaccine during pregnancy and the remaining 82 respondents (57.4%) have taken TT vaccine in non-pregnant state. Among them, 139 respondents did not continue vaccination, 28% due to fear, 28.8% were not informed about completion of the vaccination. In a similar study, reasons for dropout included lack of awareness of the need and importance of TT immunization (54.4%), unaware of the need to take the second (TT2) or third (TT3) dose (48.5%), fear of adverse reactions (16.6%), and wrong ideas of contraindications (12.4%).³

Out of our total respondents TT1 vaccine was taken by 61 respondents in pregnancy, among which 59 respondents (96.7%) continued to take TT2 vaccine, 35 respondents (57.4%) continued to take TT3 vaccine, 26 respondents (42.6%) continued to take TT4 vaccine, and finally 24 respondents (39.3%) took the TT5 vaccine. A similar study revealed that the trend of TT immunization (81.8% in 2006 to 49.3% in 2019) and that of taking adequate doses of TT (67.1% in 2006 to 49.9% in 2019) has gradually decreased throughout their study period.⁹ The number of non-pregnant women in our study population who had taken the TT vaccine was 82, among which 76 respondents (92.7%) continued to take TT2 vaccine, 63 respondents (76.8%) have continued to take TT3 vaccine, 48 respondents (58.5%) continued to take TT4 vaccine and 37 respondents (45.2%) completed the course by taking the TT5 vaccine. Another study conducted on women of reproductive age from a rural community showed very similar results; the maximum number of respondents who had taken TT1 vaccine was 83.5%, 79% took TT2, 64.4% took TT3, 46.4% took TT4, and 37% took TT5.³ A single dose does not establish adequate protection; protective antibody levels are generally reached after the second dose, while a third dose can extend immunity for at least five additional years, underscoring the need to complete the schedule rather than rely on one or two doses alone.¹⁰

Conclusion

This study reveals that a significant part of pregnant women had taken TT1 and TT2 vaccine doses as they were under the supervision

of the hospital or were under routine check-up by their physician. But there was a declining tendency in taking TT3, TT4, and TT5 vaccine because of their carelessness and/or surrounding pressure associated with newborn children, the declining tendency is also seen in non-pregnant woman. The reason behind dropout from TT vaccination may be inadequate health education, fear of needles, carelessness about completion of 5 doses, apathy in doctor consultation, transportation problem, financial problems, etc. To overcome this problem of dropout from TT vaccination, giving proper health education, proper knowledge about TT vaccination, counselling on the consequences of not taking TT vaccine, making vaccination program easily accessible and creating an awareness through mass media could be done.

Ethical approval and accordance

The study was approved by Institutional Ethics Committee of Dhaka National Medical College Hospital, memo no.2C/2022, dated-15.03.2025, in accordance with Institutional guidelines, National Ethical Regulations and CIOMS guidelines. Data was collected after taking an informed written consent, after explaining the process. Interviews were conducted in a culturally appropriate setting, respecting the participants' privacy. The study procedure involved no physical, psychological or social harm to the participants.

Acknowledgments

None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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