

Assessment of Pregnant Women's Knowledge about Tetanus Vaccination at Jiblah University Hospital, Yemen

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ABSTRACT

Background: Maternal and neonatal tetanus remains a major global health problem in developing countries including Yemen. World Health Organization introduced Tetanus Toxoid vaccine as one of the primary vaccines targeting Maternal and Neonatal Tetanus. Uptake of vaccination is dependent not only on providing of the vaccination services but also on other influences including knowledge and practice of women.

Objective: To assess pregnant women's knowledge about tetanus vaccination at Jiblah University Hospital, Yemen.

Methods: The study design was based on a descriptive cross-sectional including 100 pregnant women attending the antenatal care unit at Jiblah University Hospital, using convenience sampling method during March 2024. Data were collected by using structured questionnaires and analyzed using SPSS version 26.

Results: About 80 (80%) of respondents had knowledge of tetanus vaccine and 78 (78%) of them, had received at least one dose of vaccine. Hospitals and health centers were the main source of information. Lack of knowledge about the vaccine and its importance was the most common barrier preventing women from receiving the vaccine. Vaccination status, time of vaccination, and number of vaccination doses were statistically associated with women's knowledge of tetanus vaccine.

Conclusion: The data show a high level of knowledge among the respondents regarding the tetanus toxoid vaccine, with the majority reporting having received the vaccine. Lack of knowledge was a major barrier to vaccination for those who had not received it. Vaccination status, time of vaccination, and number of doses were the main factors influencing pregnant women's knowledge of the tetanus vaccine.

Keywords: Tetanus, Tetanus Toxoid Vaccine, Pregnant Women, Knowledge, Jiblah, Yemen

Introduction

Tetanus is a fatal acute non-communicable bacterial disease caused by a neurotoxin produced by *Clostridium tetani*. It has a fatality rate of 80%–100%. Bacterial spores are commonly found in dust, soil and manure and can be transmitted into the body by damage of skin from infected objects. Maternal tetanus (MT) occurs during pregnancy or within 6 weeks after delivery, however Neonatal tetanus (NT) occurs in newborns within

their first month of life and their mothers are non-immunized. Maternal and Neonatal Tetanus (MNT) has often been referred to as a “silent killer” since the victims often die without being officially recorded and considered as indicator of inequity in access to immunization and other maternal, newborn, and child health services [1-4].

Tetanus is a significant public health issue in developing countries. WHO estimated 200,000 newborns died annually. Tetanus is one of the vaccine-preventable diseases. Tetanus Toxoid Containing Vaccines (TTCV) are inexpensive and very

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efficacious, through the life course and considered the feasible cost-effective interventions even in countries that declared elimination of NT and subsequently the MT. In 2016, WHO recommends systematic immunization of women at childbearing age (15–49 years) should receive Tetanus Toxoid (TT) vaccine to protect the birth against tetanus. The first dose given at any time from the age of 15 years, a second dose 4 weeks later, and a third dose 6–12 months after the first two doses. The fourth and fifth doses given with 1 year apart [5-7].

Pregnant women should receive a minimum of three doses of TT which can potentially reduce NT mortality by 94% [1]. In 1989, the 42nd World Health Assembly called for the elimination of neonatal tetanus (MNT) by 1995. WHO estimates that in 2021, 24,000 newborns died from NT, 88% reduction from the situation in 2000 figure of 200,000 and by June 2024, 10 countries have still not reached the MNT status. In many countries including Yemen, TT vaccination is part of routine maternal health care services, where at least two doses of the TT vaccination are given to pregnant women during antenatal care (ANC) visits. Despite tetanus immunization has been included in the national expanded program of immunization in Yemen since 1977, Yemen is one of the 5 remaining countries in the EMR that have not achieved the global elimination target set by WHO and far behind in TT vaccine coverage [8,9].

In 2018, more than 64% of all NT cases in Eastern Mediterranean Region (EMR) were documented from Yemen. Neonatal tetanus incidence consistently stood at 0.1 per 1,000 live births from 2019-2023. NT remains a public health problem in Yemen, where it is one of the major causes of neonatal mortality [9]. The ongoing political conflict in Yemen causes destruction of health infrastructure and worsening access to preventive and curative services [10-12]. In addition, inappropriate health-seeking behavior is a common phenomenon in Yemen that is influenced by many factors, including inadequate or poor maternal and child health awareness. Poor knowledge about vaccination of tetanus has resulted in decreasing the utilization of TT vaccine in Yemen. Nevertheless, literature on maternal health knowledge levels of Yemen is scarce. The present study sought to assess pregnant women's knowledge about tetanus vaccination at Jiblah University Hospital, Yemen and identify the factors associated with good maternal health knowledge.

Materials and Methods

The study design was based on a descriptive cross-sectional study. The study included 100 pregnant women attending the antenatal care unit at Jiblah University Hospital, Yemen using a convenience non-probability sampling method during March 2024. Sociodemographic data, and knowledge–attitude levels were assessed using a pre tested questionnaire during face-to-face interviews. All collected data were analyzed using SPSS version 26. The Chi-square test was used to detect the relationship between variables. A P value < 0.05 was considered statistically significant.

Ethical Considerations

This study was approved by the Ethics Committee of Jiblah University for Medical & Health Sciences (JUMS). Participants' informed consent was obtained prior to data collection. All

collected data was coded and encrypted and was used only for the purposes of the study.

Results

A total of 100 pregnant women aged between 16 and 40 years with age mean 27.65 years were enrolled in this study. Target pregnant women aged between 24- 31 years represented 39 (39%) and age group between 24- 31 years 16-23 years represented 31(31%) while women aged 32- 40 years represented 30 (30%) (Table 1). There was no significance association between age and knowledge of respondents about tetanus vaccine (P = 0.045) (Table 2).

Table 1: Distribution of the Study Group According to Study Variables

Variable	Categories	No.	%
Age (years)	16 – 23	31	31
	24 – 31	39	39
	32 – 40	30	30
Place of residence	Urban	48	48
	Rural	52	52
Education Level	illiterate	11	11
	Primary Level	46	46
	Secondary Level	28	28
	University	6	6
	Postgraduate	9	9
Occupation	house wife	80	80
	Student	14	14
	Worker	6	6
Economic status	<100\$	85	85
	100-150 \$	10	10
	>150\$	5	5
Maternal parity	1 –3	60	60
	4-5	13	13
	>6	27	27
Do you know the tetanus vaccine?	Yes	80	80
	No	20	20
Sources of knowledge about the TT vaccine	Health centers and Hospital	56	70
	TV & social media	1	1.25
	Family and relatives	10	12.5
	Campaign	3	3.75
	By studies	8	10
	Social community	2	2.5
Have you had a tetanus vaccination?	Yes	78	78
	No	22	22
When did you get the vaccine?	after marriage	15	19.2
	Before marriage	22	28.2
	during pregnancy	40	51.3
	un known	1	1.3

How many doses of TT vaccine did you take?	1 does	20	25.6
	2 does	13	16.7
	3 does	15	19.2
	4 does	8	10.26
	5 does	21	26.9
	don't remember	1	1.28
Why didn't you take the TT vaccine?	Lack of knowledge about the importance of vaccination	9	40.9
	Fear of complications from TT vaccination	7	31.8
	Vaccination centers are far from me	2	9.1
	Other reasons	4	18.18

When did you get the vaccine?			0.001
after marriage	15 (100%)	0 (0.00%)	
before marriage	20 (90.91%)	2 (9.09%)	
during pregnancy	37 (92.50%)	3 (7.50%)	
Unknown	1 (100%)	0 (0.00%)	
How many doses of TT vaccine did you take?			0.001
1 does	15 (75%)	5 (25%)	
2 does	13 (100%)	0 (0.00%)	
3 does	15 (100%)	0 (0.00%)	
4 does	8 (100%)	0 (0.00%)	
5 does	21 (100%)	0 (0.00%)	
don't remember	1 (100%)	0 (0.00%)	

Table 2: Association Between Knowledge of Study Sample and Studied Variables (n = 100)

Variable	Do you know about tetanus vaccine		*p value
	Yes No. (%)	No No. (%)	
Age (years)			0.045
16-23	23 (74.19%)	8 (25.81%)	
24-31	36 (92.31%)	3 (7.69%)	
32-40	21 (70%)	9 (30%)	
Place of residence			0.423
Urban	40 (83.33%)	8 (16.67%)	
Rural	40 (76.92%)	12 (23.08%)	
Education Level			0.651
Illiterate	9 (81.82%)	2 (18.18%)	
Primary Level	36 (78.3%)	10 (21.7%)	
Secondary Level	21 (75%)	7 (25)	
University	5 (83.33%)	1 (16.67%)	
Postgraduate	9 (100%)	0 (0.0%)	
Occupation			0.406
house wife	62 (77.50%)	18 (22.50%)	
Student	13 (92.86%)	1 (7.14%)	
Worker	5 (83.33%)	1 (16.67%)	
Economic status			0.096
<100\$	46 (79.31%)	12 (20.69%)	
100-150 \$	32 (86.5%)	5 (13.5%)	
>150\$	2 (40. %)	3 (60%)	
Maternal parity			0.890
1 –3	48 (80%)	12 (20%)	
4-5	26 (78.79)	7 (21.21%)	
> 6	6 (85.7%)	1(14.3%)	
Have you had a tetanus vaccination?			0.001
Yes	73 (93.59)	5 (6.41%)	
No	7 (31.82%)	15 (68.18%)	

* Statistically significant (p< 0.05)

More than half of the sample study was from rural area. Regarding to educational status, 46 (46%) of the target women had primary education, however graduated women represented only 6 (6%). No statistical association was detected. Most of the target women 85 (85%) had monthly income less than 100\$ and only 5 (5%) of women had monthly income more than 150\$. Insignificance association was detected between monthly income and knowledge of tetanus vaccine (P = 0.096).

Regarding the occupation, 80 (80%) of women participated in this study were housewives and only 6 (6%) of the study population were workers. The present study reported there was no significance association between occupation and knowledge of tetanus vaccine (P = 0.406). Concerning number of pregnancy times, nearly, 60 (60%) of participants had become pregnant between 1 and 3 times, where 13 (13%) of them had become pregnant between 4-5 times. Insignificance association between parity and knowledge of tetanus vaccine (P = 0.890). Findings on the level of knowledge of respondents on TT vaccination showed that respondents' level of knowledge was high at 80% (Figure 1). The main sources of their knowledge were hospitals and health centers representing 56 (70%) from other sources, however, 1 (1.25%) of subjects get their knowledge from TV & social media.

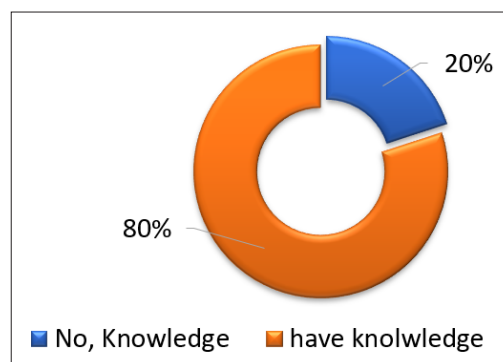


Figure 1: Percentage of Tetanus Vaccine Knowledge Among Study Population

In relation to vaccination status, the present study reported that 78 (78%) of the target pregnant women were vaccinated against tetanus. Majority of the target women get TT vaccination during their pregnancy. Out of 78 (78%) of vaccinated women, only 21 (26.9%) of respondents received 5 doses of vaccine and 15 (19.23%) received 3 doses. A statistical association was detected between women's knowledge and immunization status, timing of TT vaccination, and number of doses.

($P = 0.001$). About 9 (40.9%) of the target women had not received the vaccine due to lack of knowledge about it and its importance while 7% (31.81%) of them believed that the tetanus vaccine was harmful.

Discussion

Tetanus remains a significant public health issue that causes mortality among unvaccinated pregnant women and their infants following unclean deliveries and umbilical cord care practices, especially in low and middle-income countries. WHO recommends that all population worldwide should be vaccinated against tetanus. In order to provide protection throughout adolescence and adulthood, the total vaccine covering rate of tetanus for females in high-risk areas should be 90% [13].

Knowledge about importance of tetanus vaccine in saving life of women, especially pregnant women and their infants can increase vaccine covering rate and achieve global goal for maternal and neonatal tetanus elimination (MNTE). This study aimed to assist the knowledge of pregnant women attending the antenatal care unit (ACU) at Jiblah University Hospital and factors associated with uptake of TT vaccine. In the current study, the majority of respondents 80 (80%) had knowledge of tetanus vaccine. In comparison to studies that were done in Nigeria, Afghanistan and Pakistan, the majority of them had known or heard of tetanus vaccine [13-15].

More than half of participants received their knowledge about TT vaccination from health centers and hospital during their antenatal checkup and only 1 (1.25%) of them from TV & social media. This finding is consistent with studies conducted in Pakistan [13], Nigeria, and Tanzania [3]. Unlike studies carried out in Iraq, and Egypt reported that more than half of respondents have not received any information regarding the TT vaccine by the healthcare providers or doctors [5]. Other studies documented that the majority of the respondents gain knowledge about TT vaccine from television and from family members and friends [16-19]. The observed discrepancy in the sources of maternal knowledge could be attributed to cultural differences, health, healthcare coverage, economic and infrastructural access.

Despite the low immunization coverage in Yemen, this study revealed that 78% of the target women were being vaccinated during their current pregnancy. This finding aligns with researches conducted in Afghanistan [15], and Ethiopia. In contrast, the present result was higher than studies conducted in Turkey, 27.8%, 43 Brazil, 59.2% [22], Iraq, 53.2% [18] Egypt, 63% [5], and in Sudan, 40% [20-23]. However, finding of the current work was lower than results conducted in Nigeria, 93.7% [16], and in Pakistan, 85% [13]. The reason for these disparities may have been due to differences in healthcare delivery systems,

levels of vaccination awareness and information and in the population studied. There was significant association between mothers' knowledge and immunization status ($P = 0.001$). Women acquired their knowledge about TT vaccination during their visiting ANC and received vaccination.

In the current work, about 40 (51.3%) of vaccinated women mentioned that they get their TT vaccination during pregnancy, 37 (92.5%) of them had knowledge about TT vaccination while 15 (19.2%) of respondents received TT vaccination after their marriage. There was statistically significant relationship between knowledge and time of taking TT vaccination ($P = 0.001$). This finding indicates that pregnancy plays a significant role in the vaccination coverage of mothers during pregnancy.

The current study revealed that 20 (25.6%) of vaccinated respondents received one dose of TT vaccine, 13 (16.7%) received two doses, 15 (19.2%) received three doses, 8 (10.26%) received four doses, and 21 (26.9) received five doses. This finding contrasts with a study that documented that 32.8% of pregnant women in low- and middle-income countries received two or more doses of TT vaccine [22]. Among the study subjects, 21 (26.9%) of pregnant women were considered as immunized according to WHO classification [24]. There was direct relationship between number of vaccination doses and women' knowledge about TT vaccination ($P = 0.001$).

About 9 (40.9%) of participants women stated that they did not receive TT vaccine because they lack knowledge about vaccine importance. However, 7 (31.8%) of the target women cited fear of side effects and complications and 2 (9.1%) mentioned that the distance from hospitals and health centers was a barrier and 4 (18.18%) indicated that they did not receive TT vaccine due to other reasons. Similar results were documented from study conducted in Afghanistan [15] while studies carried out in Egypt and Iraq revealed that they lack time and place of vaccination sessions as well as lack of awareness about vaccine importance [5,25].

The current study reported that the highest percentage 39% of respondents were at age group 24-31 years. About 36 (92.31%) of them had knowledge about TT vaccine. Whereas, the lowest percentage 30% of them were in age group between 32-40 years. Among them, 21 (70%) had knowledge about TT vaccine. There was no statistically significant relationship between level of knowledge and age. This result also reported by previous studies from Iraq, Sudan and Turkey [26,27] which reported that tetanus vaccination status was not associated with age of woman [17,25].

Regarding to place of residence, this study stated that 52 (52%) of the study sample were from rural area and 40 (76.92%) of them knew about TT vaccination while 48 (48%) from urban area and 40 (83.33%) of them had knowledge. This finding was in similar with a study conducted in Ethiopia [21]. No statistical association identified between women's knowledge and place of residence.

In this study, 46 (46%) of the study subjects had primary education, 36 (78.3%) of them knew about TT vaccination. It was surprising to note that 9 (81.82%) of illiterate women

studied, and 11 (11%), knew about TT vaccination. A total of 9 (9) of the target women had postgraduate studies and 9 (100%) of them knew about TT vaccination. In despite, there was no statistically significant relationship between level of knowledge and level of education for women, higher education levels will increase the awareness and knowledge of health information.

Concerning occupational status for respondents, the majority 80 (80%) of the target women were housewives, while only 6 (6%) were workers. There was no statistical association between level of knowledge and occupational status. The finding of this study is consistent with studies conducted in Indonesia, Peshawar, Pakistan [13], Khartoum North-Sudan, and in Afghanistan where woman's occupation found to play no role on utilization of TT vaccination. On the other hand, the study resulted in disagreement with results from studies carried out in Kenya and in Ethiopia [21] which indicated that working women have higher level of knowledge about TT vaccination than housewife women.

Regarding economic status for the study sample: the majority 85 (85%) of the study population had monthly income less than 100\$, while 5 (5%) had more than 150\$ monthly. Insignificant relationship between level of knowledge and economic status was detected. The explanation could be that there is no cost for TT vaccination and pregnant women get vaccination free from antenatal care (ANC) in the government health centers and hospitals.

The finding of the current study revealed that 60 (60%) of study sample were multigravida (had 1-3 pregnancies), while the 13 (13%) of them were great multigravida (had 4-5 pregnancies). No significant relationship between number of children and level of awareness was indicated. This finding is in agreement with the study conducted in Karbala city, Iraq [17].

Limitations of the Study

This study relied on a convenience sampling method, which limits the representativeness of the sample and may not reflect the full diversity of pregnant women across hospitals or regions. This may affect the external validity of the results, making it difficult to generalize the results of the current study.

Conclusion

The study results indicate that pregnant women have high knowledge of the TT vaccine. The study revealed that 78% of respondents had received at least one dose of the TT vaccine. However, several barriers to vaccination were identified as major reasons for not receiving the vaccine, including lack of awareness, fear of side effects, and distance from health facilities. This research identified important factors that may influence knowledge of the TT vaccine: immunization status, timing of TT vaccination, and number of doses.

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Author Contributions

Al-Habishi MAQ, Al-Shelh RSA, Al-Hajwah AN, Mukbil SHA, Al-Shelh RSA, Al-Nassiri SH, Al-Dimeni ABA: contributed to data collection and wrote the first draft of the manuscript Al-Mohani SK: contributed to the writing of the final paper and provided vital feedback. All authors critically reviewed and revised the manuscript and approved the final version

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Informed Consent Statement

Informed consent was obtained from all of the participants involved in the study.

Data Availability Statement

The data presented in this study are available from the corresponding author upon request.

Conflicts of Interest

No conflict of interest

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