Original Article

EVALUATION OF KNOWLEDGE AND FREQUENCY OF TETANUS VACCINATION AMONG UNIVERSITY STUDENTS OF KARACHI.

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ABSTRACT:

Background: Knowledge about Tetanus toxoid (TT) vaccination in students is lacking in our setup. The objective of this study was to evaluate the knowledge and frequency of tetanus vaccination among university students of Karachi.

Methods: A crosssectional survey was conducted after. ERB approval was taken from Shaheed Mohtarma Benazir Bhutto Medical College Lyari Karachi. Convenience sampling was used to collect data for six months after the approval in July 2022. Data was analyzed by using SPSS 24. Descriptive statistics were applied for quantitative and qualitative variables. The association of qualitative variables was tested by applying the Chi-square test. P-value <0.05 was taken as significant.

Result: The mean age 21+ 2 years were enrolled. The majority of the students 93.3% had heard about the Tetanus disease and 59.5% had heard of the Tetanus vaccination. A total of 93% of students knew that the Tetanus vaccine is injectable. Only 36% of the students were vaccinated, 25% were unvaccinated, and 39% did not know about their vaccination status. Among the students who were vaccinated, injury was the single most common reason for getting the tetanus vaccine.

Conclusion: The knowledge level and vaccination status of the students were unsatisfactory. So, awareness campaigns and immunization programs should be started.

Key Words: Tetanus, Vaccination, University, Students, Karachi.

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INTRODUCTION

Tetanus is caused by the bacterium Clostridium tetani (C. tetani), which is a gram positive (+ve) strictly anaerobic bacillus. Its spores are present commonly in our environment, especially in damp soil, manure, and on the surfaces of skin and rusty tools like needles, nails and, barbed wires etc. It usually enters human body through an open wound or cut caused by contaminated objects. In most cases, it presents within 14 days of exposure to the bacterial spores, with an incubation period varying from 3 to 21 days. Tetanus cannot be transmitted from one person to another[1-3]. It can occur neonatally due to poor umbilical cord care practices, in adult life following any injury as well as during pregnancy or soon after delivery. Neonatal Tetanus (Tetanus within the first 28 days of life) and maternal Tetanus (Tetanus during pregnancy or within 6 weeks after delivery) in un-immunized or insufficiently immunized pregnant women can be a serious condition and is an important cause of neonatal and maternal

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morbidity and mortality. The significant reasons for acquirement of maternal Tetanus are unhygienic delivery conditions[1, 4, 5].

C. tetani releases toxin called tetanospasmin, an extremely potent neurotoxin responsible for severely painful and sustained muscular contractions and autonomic nervous system dysfunction. Characteristic features include spasm of masseter and other facial muscles, causing risus sardonicus, spasm of muscles of jaw, causing trismus or lockjaw, and muscles of the neck and back, causing a characteristic posture with arched back and extended neck, called opisthotons which can lead to respiratory distress. Spasms of laryngeal muscles can lead to breathing cessation. Prolonged contractions of the vertebral muscles and those surrounding long bones can lead to fractures. Other significant symptoms include seizures, headache, pyrexia, diaphoresis, altered blood pressure, and dysrhythmias, and are due to altered activity of the autonomic nervous system[1, 2, 6].

Tetanus is a vaccine-preventable disease and it can be prevented well by immunization with tetanus-toxoid-containing vaccines, abbreviated as TTCV, which have been included in routine immunization programs globally[1]. There are four types of TTCV, which include: Diphtheria, Tetanus, and Pertussis (DTaP) vaccine, Tetanus, diphtheria, and Pertussis (Tdap) vaccine, Tetanus and diphtheria (Td) vaccine, Diphtheria and Tetanus (DT) vaccine[7]. In Pakistan, infants receive the DTaP vaccine in five doses at two, four, six, and eighteen months of age, with an additional dose administered when the child is four to six years old. Subsequently, a booster shot is recommended every ten years. Pregnant women are advised to receive the tetanus toxoid between the 27th and 36th weeks of pregnancy for prevention of maternal and neonatal Tetanus[8]. It is essential to highlight that inadequate vaccination can be a result of vaccine hesitancy, intuitive thinking or simple lack of awareness among the population. In Pakistan, factors contributing to limited vaccination coverage comprise living in rural regions, no or low level of formal education, insufficient awareness regarding the appropriate time and location of vaccination, and a lack of understanding regarding the significance of getting vaccinated[8]. Past studies have assessed the knowledge regarding Tetanus, its vaccine, and rate of vaccination among pregnant women, women of reproductive age[9,10] and children[11]. Very few studies have focused on vaccination status of university students, especially males, and assessment of their knowledge regarding it[12]. This study will provide knowledge regarding the frequency of vaccination and identify gaps in knowledge and opportunities for improving the attitude of young folks regarding tetanus vaccination.

METHODOLOGY:

This cross-sectional survey was conducted among the students of various universities of Karachi from both the public and private sector. ERB approval was taken from SMBBMC Lyari, Karachi (No. F-SMBBMCL / (ERC) / 2021-22 / 0456, on Date: July 12th, 2022). Sample size was calculated from openepi.com. The hypothesized frequency of outcome in population (p) is unknown, so was taken at 50% as no previous estimates were available from similar populations. At the confidence level of 95% and bound on error of 5%, we obtained a minimum sample size of 384. Considering a non-response rate of about 4%, the adjusted sample size of 402 was enrolled in the study. Data was collected for six months through convenience sampling from July to December 2022. All consenting university students above the age of eighteen years were eligible. A self-structured, pretested questionnaire was self-administered after taking informed written consent from all participants. The information was collected through pre-tested structured questionnaire. The Quantitative variables like age were represented as mean and standard deviation (+) and qualitative variables like gender and ethnicity were represented as frequency and percentage. The association of qualitative variables was tested by applying

Chi-square test. Chi square test was applied to compare the knowledge and practices of public versus private medical college students regarding tetanus vaccination, and to find the association of gender with knowledge and practices regarding tetanus vaccination. P-value of less than 0.05 was taken as significant.

RESULTS:

A sample of N=402 students with a mean age of 21+ 2 years was included. Males were n=90 (22.4%), females were n= 312 (77.6%). Most participants were Urdu speaking 50% (n=202) followed by Punjabi 19% (n=77), Sindhi 11% (n=45), Pashtun 7.5% (n=30), Baloch 1% (n=4) and others 10% (n=41).

Majority of the students 93% had heard of the disease Tetanus (n=375) and total 59.5% (n=239) had heard of Tetanus vaccination as shown in Table 1.

Table 1: Knowledge of study participants regarding Tetanus (N=402)

Knowledge regarding Tetanus	n	%
Have you heard about the disease Tetanus?		
Yes	374	93
No	28	7
Have you heard about the Tetanus vaccination?		
Yes	239	59.5
No	163	40.5
Knowledge about the types of tetanus vaccines		
4 types (correct)	100	25
2 types	178	44
Others	124	31
Mode of vaccine administration		
Injection (Correct)	374	93
Oral/ Nasal	28	7
Site of Tetanus vaccine injection among adults		
Arm	249	62
Buttock	93	23
Thigh	60	15
Recommended time of tetanus vaccine (multiple options correct)		
Right after birth	83	21
Infancy	178	44
Adolescent (12-19yrs)	47	12
After injury or accident	285	71
Recommended doses of vaccine		
5 times (correct)	13	3
4 times	45	11.2
3 times	130	32
2 times	184	45.8
Recommended booster dose of Tetanus		
Every ten years (correct)	85	21
Every three years	147	37
Every five years	151	38
Vaccine recommended for unvaccinated females during pregnancy		
Yes	60	14.9
No	342	85
Tetanus-prone wounds as identified by students (multiple options correct)		
Cut and injury	227	56
Contaminated wound	244	61
Animal bite	186	46
Human bite	49	12
Burns	35	9
Knowledge about adverse effects of tetanus vaccine (multiple options correct)		
Pain/ tenderness on the injection site	260	65
Local reaction	188	47
Fever	152	40
Headache	50	12
Fatigue	68	17
No adverse effects of the vaccine	82	22
Contraindication of Tetanus vaccine (multiple options correct)		
Seizures	142	35
HIV	96	24
Vaccination within past four weeks	142	54

At present, most of the students were either unvaccinated according to the recommended dosage schedule or did not know their tetanus vaccination status. (Figure 1)

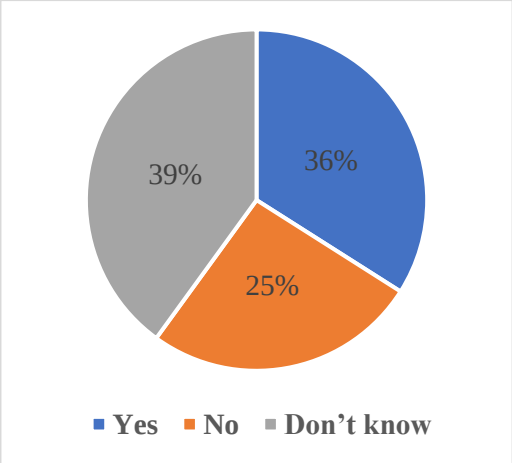

Figure 1: Students' Current Tetanus Vaccination Status.

Most frequent reason for not getting vaccinated was that they never thought of it as necessary (86%) followed by plain laziness (8%) and considering it unimportant (6%). The students who were vaccinated were asked the reason for their vaccination. Injury was a common reason reported by many of the students for getting the tetanus vaccine. (Figure 2)

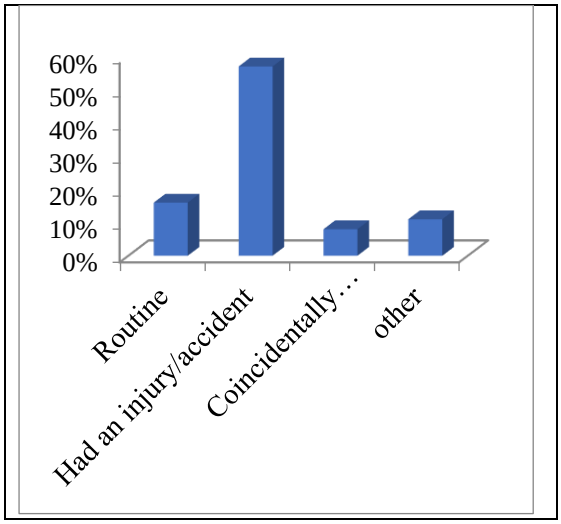

Figure 2: Reason for getting tetanus vaccine.

Students were also assessed for when they received the last dose of vaccine, in case they got any dose in their life-time, and also how many were completely unvaccinated and had never got a single shot. 33% (n=132) of the students did not remember how much time had passed since their last Tetanus Vaccine. Around 16% (n=64) of students got the tetanus vaccine within the previous year, 20% (n=80) got it within last 5 years, 10% (n=40) got it within the last 10 years, 13% (n=52) got it more than 10 years ago and 8.5% (n=34) never got vaccinated against Tetanus.

Table 2: Association of types of institutes with knowledge and practices regarding Tetanus vaccine.

Knowledge And Practices		Public Sector Universities		Private Sector Universities		P Value
		n	%	n	%	
Know about tetanus vaccination	Yes	84	57.1	157	61.5	0.042
	Minimum	51	34.7	60	23.5	
	No	12	8.2	38	14.9	
Site of tetanus vaccine administration in adults	Arm	99	67.3	150	58.8	0.086
	Thigh	16	1.9	44	17.3	
	Buttocks	32	21.8	61	23.9	
Most effective mode of tetanus vaccine	Nasal	4	2.7	5	1.9	0.050
	Oral	3	2	17	6.7	
	Injection	140	95.2	233	91.4	
Tetanus vaccine is recommended during infancy	Yes	77	52.4	105	41.2	0.019
	No	70	47.6	150	58.8	
Tetanus vaccine recommended during pregnancy (if unknown vaccination status)	Yes	26	17.7	34	12.8	0.047
	No	121	82.3	221	86.7	

Tetanus vaccination complete	Yes	40	27	104	40.8	0.037
	No	44	29.9	56	21.96	
	Don't Know	63	42.9	95	37.2	

There was a significant difference between the knowledge of private and public medical college students regarding the tetanus vaccine its recommendation during infancy and pregnancy. There was also a significant difference regarding vaccination status, as almost 40% of private college students said they were fully immunized against Tetanus compared to 27% of students from public sector colleges. (Table-2).

Table 3: **Association of gender and knowledge and practices regarding tetanus vaccine**

Knowledge And Practice		Male		Female		P Value
		n	%	n	%	
Know about tetanus vaccination	Yes	56	62.9	183	58.8	0.735
	Minimum	19	21.3	92	26.6	
	No	14	17	36	11.6	
Site of tetanus vaccine administration in adults	Arm	45	50.6	203	64.9	0.307
	Thigh	20	22.5	40	12.9	
	Buttocks	24	27	69	22.2	
The most effective mode of tetanus vaccine	Nasal	0	0	7	2.3	0.687
	Oral	7	7.9	13	4.2	
	Injection	82	92.1	289	92.9	
Tetanus vaccine is recommended during infancy	Yes	25	27.7	157	50.3	0.0001
	No	65	72.2	155	49.6	
Tetanus vaccine recommended during pregnancy (if unknown vaccination status)	Yes	8	8.8	52	16.7	0.012
	No	82	91.1	260	83.3	
Tetanus vaccination status complete	Yes	43	47.7	101	32.3	0.157
	No	21	23.3	79	25.3	
	Don't Know	26	28.8	132	42.3	

DISCUSSION

This study showed that majority (93%) of the university students knew about the tetanus disease but approximately just a little more than half of them (59.5%) were aware of the tetanus vaccine. Similar results were found in a recent study in South African students where majority (80.7%) of the students knew about the disease, but 65.5% knew about its prevention through vaccine[13]. Though medical university students get quite enough information and have a positive attitude towards vaccination, the students of other disciplines do not get adequate knowledge about the vaccine and its significance[14].

Enhanced maternal knowledge is associated with improved vaccination rates in infants, especially DPT & Hepatitis-B vaccine[15]. This fact should be given due importance as 8.5% of our study population had never got a single dose of tetanus vaccine. The 38.3% had never got a tetanus toxoid dose in reproductive age, especially in the married women of Lahore[16]. A tiny proportion (21%) of our study population knew that the booster doses should be given every 10 years. Study by Kerkez, M., & Çapuk, H., among university students in Turkey, also showed that only 29% of students knew about vaccination to be done every 10 years[17]. Only

15 % students in the current study thought that the vaccine should be given to the un-immunized female in pregnancy. This low positive ratio is critical, as vaccination during pregnancy, especially to the unvaccinated is essential to prevent the chances of maternal or neonatal Tetanus. In a study conducted among female students in Dhaka, 25.7% of students considered pregnant women to be a target group for Tetanus toxoid vaccination[18].

Students had a difference of opinion regarding the types of wounds which can be Tetanus prone, with the majority of them considering contaminated wounds, cuts and injuries to be more prone to tetanus infection, followed by animal bites, human bites and burns. This is similar to a study conducted in India where more than 90% of the study population considered contaminated wounds, animal bites and burns to be Tetanus prone[19].

Current vaccination status among the students was found to be unsatisfactory. The notably low vaccination rate emphasizes the urgency of implementing an intensive and mandatory tetanus vaccination program to expand vaccine coverage. Only 36% of the students were fully vaccinated. Malinga found the very same results (36.7% students vaccinated), M. et al[13].

In our study, a significant difference was found regarding the knowledge and rate of tetanus vaccination among the among private universities students. There were a significantly greater number of completely vaccinated students from private universities as compared to the public ones (table 2). Though, we cannot associate established factors with more excellent rates in private universities and further studies should target the reasons for lower vaccination status in government sector institutes.

The current survey revealed no significant difference between genders about the awareness of vaccination and there was a mixed trend with regards to knowledge of site and most effective mode of vaccine administration. However, a significantly greater number of females considered vaccine to be recommended during infancy and pregnancy, while majority of the males considered it unnecessary in such conditions. More significant percentage of males (47.7%) was completely vaccinated as compared to the females (32.3%) (Table-3). Shafiq, Yasir, et al. have also shown low vaccine coverage in females in his study where less than 50% females were vaccinated[20]. In a study conducted in 2010 in Karachi, only 40% women had received at least 1 out of 5 doses, while only 2.9% were completely immunized[21]. This shows that vaccination coverage has been at a lower level among the females of Pakistan, for a quite long time. Assessment survey in United States by C.A. Rencken, et al. also showed male gender to be more associated with up-to-date vaccination[22].

The current study did not employ random sampling technique and the results cannot be generalized. The study did not enroll equal number of public and private sector students due to constraints. A more representative survey which employs random sampling technique is thus recommended.

CONCLUSION

The knowledge regarding Tetanus vaccination is lacking and the students do not give it due importance. There is an ominous need of advocacy for immunization among adults. Awareness sessions and immunization campaigns should be conducted among university students to improve the tetanus vaccination rates.

AUTHOR'S CONTRIBUTION:

SUA: Research Proposal, Manuscript
GA: Review of Article, Data Collection, Analysis and Results Writing
MTK: Data Collection, Discussion Writing
QS: Research Proposal, Data Collection and Analysis
NR: Review of Article, Data Collection
MA: Review of Article, Data Collection

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