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AWARENESS AND COVERAGE OF TETANUS VACCINE AMONG FEMALE STUDENTS OF KABUL UNIVERSITY IN 2022: A CROSS-SECTIONAL STUDY

Rohullah Sakhi[1*], Sharara Farhadi[2], Sima Hussaini[3], Maghferat Yousufy[4], Nargis Amiri5, Sadaf Ghawsi[6], Diana Sharifi[7], Setara Habibi[8], Arefa Mohammadi [9]

[1] Department of Environmental and Occupational Health, Kabul University of Medical Sciences
[2,3,4,5,6,7,8,9] Kabul University of Medical Sciences (KUMS), Kabul, Afghanistan

Abstract

Background : The Tetanus Toxoid (TT) vaccine is crucial in preventing maternal and neonatal tetanus, a life-threatening infection caused by Clostridium tetani, which releases toxins that affect the nervous system. In regions like Kabul, Afghanistan, limited access to healthcare and high rates of home births increases the risk of tetanus transmission during childbirth. Immunizing female students with TT vaccines provides long-term protection, reducing potential future maternal and neonatal tetanus cases. This study targets female students as they are likely future mothers, and vaccination at this stage helps establish immunity early, supporting community health and contributing to broader public health efforts to reduce tetanus prevalence.

Method: The present study employed a descriptive cross-sectional design, targeting female students at Kabul University. The total population of female students at the university was 7,847, from which a sample size of 402 participants was calculated using Epi Info software. A convenience sampling approach was utilized, and data were collected via a structured questionnaire. Subsequently, the data were analyzed using SPSS version 24.

Results: In this study, respondents ranged in age from 17 to 27 years, with an average age of 20 years. Among the participants, 16.1% demonstrated high awareness, 54.7% had moderate awareness, and 29.2% had low awareness regarding the TT vaccine. Notably, 40.8% of the students identified educational centers as their primary source of information on the vaccine. A majority of students (75.1%) reported having received the vaccine, whereas those who had not cited distance from health centers as a primary barrier, with 23.4% of non-recipients indicating this as their reason for not being vaccinated.

Conclusion : In conclusion, the data reveal a moderate level of awareness among students regarding the TT vaccine, with a majority reporting vaccination. Key barriers to vaccination among non-recipients included limited access to health centers, concerns about side effects, insufficient knowledge, prevalent misconceptions, and cultural barriers. Educational institutions, notably schools and universities, emerged as the primary sources of vaccine-related information, highlighting their critical role in awareness and health education.
Keywords: Toxoid TT, awareness, vaccine coverage, student, university

1. Introduction

Tetanus is an acute infectious disease caused by Clostridium tetani bacterial spores, which are present in various environments, particularly in soil, ash, and animal and human feces. These spores can enter the body through wounds, cuts, and abrasions in the skin, where they multiply. Known for their resistance to heat and disinfectants, these spores can survive for extended periods and pose an infection risk to the general population. However, tetanus is particularly prevalent and severe in newborns and

pregnant women who have not received adequate vaccination with TT (tetanus toxoid) vaccine (Organization 2018).

Recent research indicates that 14 countries, including Afghanistan, Angola, Central African Republic, Chad, Congo, Guinea, Mali, Nigeria, Pakistan, Papua New Guinea, Somalia, Sudan, South Sudan, and Yemen, were unable to eliminate maternal and neonatal tetanus (MNT) by 2021. In these countries, MNT remains a significant public health issue, posing serious risks for maternal and infant health due to challenges in vaccine accessibility and healthcare infrastructure [2].

India, as one of the largest countries in South Asia, achieved the goal of eliminating maternal and neonatal tetanus (MNT) in 2015. Subsequently, in 2018, Kenya became one of the last countries in Africa to announce the elimination of MNT. These achievements underscore the progress made in reducing tetanus-related maternal and infant mortality in these regions through sustained vaccination efforts and improved healthcare access [2].

Unlike smallpox, which was eradicated, eliminating the environmental reservoir of Clostridium tetani is not feasible. Vaccination remains one of the most effective methods to prevent disease, disability, and death from this persistent infectious threat [3]. Despite the availability of an effective vaccine, approximately one million people worldwide still succumb to tetanus each year. This ongoing incidence highlights the critical need for

* **Correspondence: Rohullah Sakhi**
Correspondant affiliation : Department of Environmental and Occupational Health, Kabul University of Medical Sciences, Kabul -Afghanistan.
Email : rohullahsakhi@kums.edu.af

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enhanced vaccination coverage and awareness to prevent this preventable disease.[4].

The World Health Organization (WHO) outlines three key strategies for the elimination of neonatal tetanus (NTT). First, it emphasizes the importance of immunizing women of childbearing age, particularly pregnant women, with a coverage rate exceeding 80%. Second, ensuring clean and sterile childbirth practices is critical to preventing infection during delivery. Lastly, identifying high-risk areas is essential, necessitating targeted interventions that include vaccinating adults to bolster community immunity. Collectively, these strategies aim to significantly reduce the incidence of neonatal tetanus and enhance maternal and infant health outcomes [5].

Despite the development and availability of the TT vaccine, tetanus remains a significant health concern and a leading cause of maternal and infant mortality in many regions worldwide. In developed countries, national immunization programs and high vaccination coverage have led to a substantial decline in cases over the past several decades. In contrast, developing and underdeveloped countries continue to face significant challenges, including inadequate vaccination coverage, irregular healthcare systems, ineffective healthcare delivery, and cultural barriers. Afghanistan, after decades of conflict, exemplifies such challenges with a weak and irregular health system requiring considerable improvement. According to the National Population and Statistics Department of Afghanistan, prenatal care utilization among women is 69.2%, births attended by skilled health personnel stand at 68.1%, and births occurring in health centers are at 62.5%. These statistics position Afghanistan as a country at high risk for maternal and neonatal tetanus due to insufficient vaccination coverage [6].

Over time and across generations, public awareness of tetanus (TT) has diminished, leading to a decreased vigilance among healthcare providers regarding this disease in clinical practice. This decline in awareness can result in patients neglecting to seek preventive treatment and healthcare personnel not recognizing the seriousness of the condition. Although tetanus is a fatal infectious disease, its low prevalence has contributed to its diminishing presence in public consciousness. Consequently, the potentially life-threatening nature of tetanus necessitates rapid diagnosis and prompt treatment. To address this issue, further research is essential to enhance awareness, improve preventive measures, and ensure effective clinical responses to tetanus [7].

Tetanus (TT) has long posed a life-threatening risk to human health. Although advancements in medicine have partially mitigated this health issue, it remains a serious concern. Vaccination plays a crucial role in the prevention of tetanus, serving as the most effective strategy to control and ultimately eliminate this disease. Despite the availability of treatments, vaccination is the primary defense against tetanus, highlighting its importance in safeguarding public health [7].

Afghanistan is one of the countries significantly affected by tetanus (TT), which continues to pose serious risks to maternal and infant health. Unfortunately, the disease has resulted in the loss of both mothers and their babies. In this context, the role of students is crucial, as they can actively disseminate important information about tetanus and the significance of vaccination, particularly among women and girls of reproductive age. Recognizing the urgency of this issue, I felt compelled to conduct this study to explore effective strategies for raising awareness and increasing vaccination coverage. Ultimately, the goal is to contribute to the health of my country by addressing this critical public health challenge.

2. Material and methods

Study Method

In the present research, a descriptive cross-sectional method was employed to systematically investigate the variables of interest related to tetanus vaccination. This approach allows for the collection of data at a specific point in time, providing a snapshot of the current awareness, and vaccine coverage of the target population. By gathering comprehensive information, the study aims to identify barriers contributing to uptake of TT vaccine among female students, this method facilitates the assessment of relationships between variables, such as the correlation between awareness levels and vaccination status.

Place of Research

This study was conducted at Kabul Central University, a prominent public institution located in the third district of Kabul. The university serves approximately 21,000 students from both the capital and various provinces, making it one of the leading universities in Afghanistan. Kabul Central University comprises 21 faculties and 80 departments, offering a diverse range of academic programs and contributing significantly to the higher education landscape in the country.

Study Population

In this study, all female students at Kabul Central University were considered, totaling approximately 7,847 participants. This population served as the research sample, providing a comprehensive representation of female students within the institution.

Sample Size

The target population for this research comprises all female students at Kabul Central University, totaling 7,847 individuals. The sample size was determined using Epi Info software, which calculated a sample of 404 participants based on a confidence interval of 95%, a standard error of 5%, and an anticipated non-response rate of 10%. The calculations were conducted using a Z-value of 1.96 for a 95% confidence level, a probability of success (p) of 0.05, a probability of failure (q) of 0.05, and a margin of error (d) of 50.0. This sample size was selected to ensure the statistical reliability of the findings.

Sampling Method

In this study, a convenience sampling method was employed to select participants. Initially, Epi Info software was utilized to determine a sample size of 366. To account for a 10% non-response rate, the total sample size was adjusted to 402 participants. The questionnaires were administered with clear explanations provided to ensure that respondents understood the purpose and content of the study.

Data Collection Instrument

In this research, quantitative data pertinent to the study topic were collected from participants using a standardized and prepared questionnaire. The questionnaire was structured in two sections: the first section focused on demographics and included three questions, while the second section comprised nine questions related to awareness and coverage of the TT vaccination. Prior to completing the questionnaire, participants were required to sign a consent form.

The assessment of awareness in this study was based on the nine questions in the second section. Each correct response was assigned one point, while incorrect responses received zero points, resulting in a total score ranging from 0 to 12. This scoring system was categorized into three levels of awareness: low awareness (less than 6 points), medium awareness (5 to 9 points), and high awareness (more than 9 points). This classification enables a clear evaluation of the participants' awareness levels regarding the TT vaccination [8].

Data Analysis Method

Upon completion of the data collection phase and the requisite number of questionnaires, the gathered data were organized and entered into a database using SPSS version 24. To ensure the accuracy of the information and address any potential issues, the incoming data underwent a thorough verification process. Subsequently, the responses related to awareness were

scored, and the data were analyzed in alignment with the predetermined objectives of the study. Relevant tables and charts were generated and formatted using Microsoft Excel, facilitating the presentation of the findings in a clear and accessible manner.

Inclusion Criteria

The study focused on all female students at Kabul Central University, who were selected using a convenience sampling method. Participants included individuals who agreed to participate and volunteered for the study.

Exclusion criteria

Exclusion criteria for the study included students who did not consent to participate, as well as professors, employees, and students from Kabul University who were not part of the female student population. Additionally, female students from other universities were also excluded from the research.

Study Variables:

The dependent variable in this study is the awareness and coverage of TT vaccination among female students. Several independent variables are considered to assess their impact on the dependent variable, including age, marital status, place of residence, and sources of information. By examining these independent variables, the study aims to identify factors that influence the awareness and uptake of TT vaccination within the target population.

3. Results

A total of 397 students participated in the research, expressing their satisfaction and responding to the questionnaire items. In contrast, five individuals did not demonstrate satisfaction, resulting in their failure to complete the questionnaire or return it. This participation rate reflects the engagement of the majority of the respondents, contributing to the overall findings of the study.

Section One: Demographic of Participants

The questionnaires were distributed among female students at Kabul University, and upon collecting all data, the responses were entered into SPSS software for data management and analysis. The findings indicate that the respondents were predominantly in their youth, with an age range of 17 to 27 years. The average age of the participants was approximately 20 years, with a standard deviation of 1.50, indicating that most respondents were 21 years old. Analysis of the demographic data revealed that 382 participants were married, while 15 were single. Furthermore, the distribution of participants based on their place of residence showed that 346 individuals (87.2%) lived at home, whereas 51 individuals (12.8%) resided in dormitories. This demographic information provides valuable context for understanding the awareness and coverage of TT vaccination among the female student population at Kabul University.

Table 1: the age of participants

	Minimum age	Maximum age	Standard deviation	Mean	
	۲۷	۱۷	۱,۵۰	۲۰,٦۹۵۱	Age

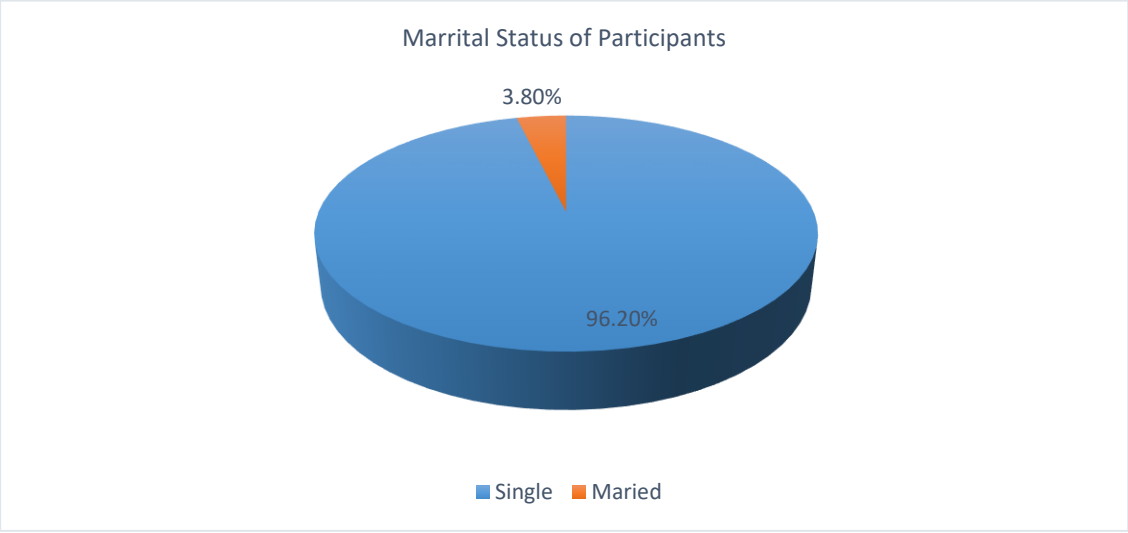

Figure 1: Distribution of Marital Status of Participants.

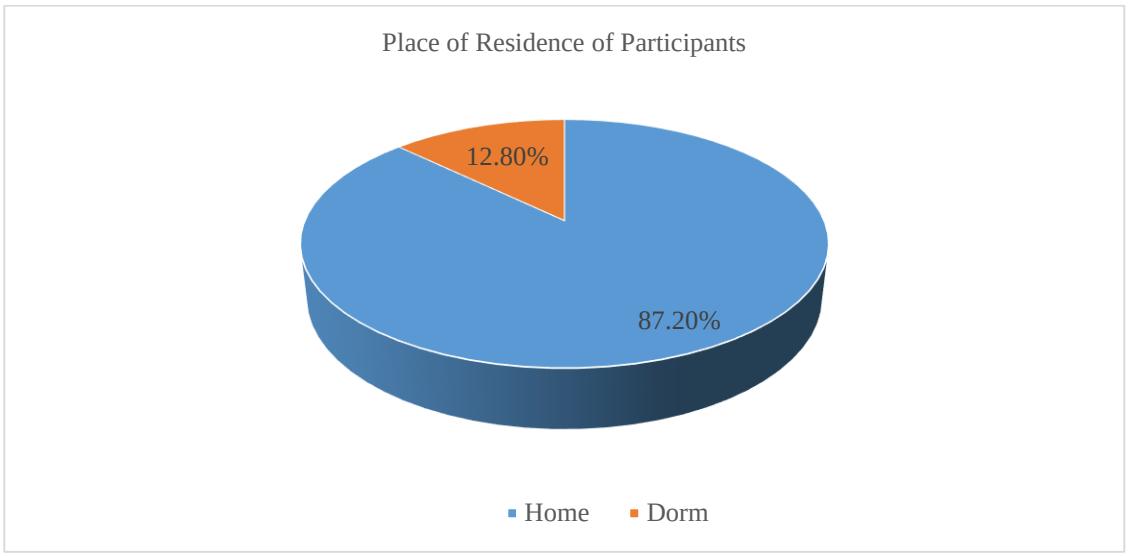

Figure 2: Distribution of participant's place of residence

Section two: awareness

The level of awareness regarding the TT vaccine in this research was classified into three distinct categories: high awareness, medium awareness, and low awareness. A total of 12 questions were utilized to assess participants' awareness, with each question contributing one point to the overall score. The responses were coded in a binary format, where each question was assigned a value of 0 or 1. Participants scoring in the range of 1 to 4 were classified as having low awareness, those with scores between 5 and 8 were categorized as having moderate awareness, and participants with scores ranging from 9 to 12 were identified as having high awareness.

The results indicated that out of the total participants, 64 individuals (16.1%) demonstrated high knowledge regarding the disease and the TT vaccine. In contrast, 217 participants (54.7%) exhibited moderate knowledge, while 116 individuals (29.2%) were classified as having poor knowledge. These findings suggest that the majority of students possess an average level of understanding about the TT vaccine.

Further analysis revealed variations in awareness levels based on marital status. Among the 382 single participants, 16.49% exhibited high knowledge, 54.1% had moderate knowledge, and 29.3% displayed poor knowledge. In comparison, of the 15 married participants, 6.6% had high knowledge, 66.6% had moderate knowledge, and 26.6% had low knowledge.

Additionally, awareness levels were analyzed according to participants' living arrangements. Among those living with their families, 49 individuals (14.1%) had high awareness, 190 individuals (54.9%) had average awareness, and 107 individuals (30.9%) exhibited poor awareness. Conversely, among the participants residing in dormitories, 15 individuals (29.4%) demonstrated high awareness, 27 individuals (52.9%) had average awareness, and 9 individuals (17.6%) displayed poor awareness. These results highlight the importance of contextual factors in shaping awareness levels regarding the TT vaccine among female students at Kabul University.

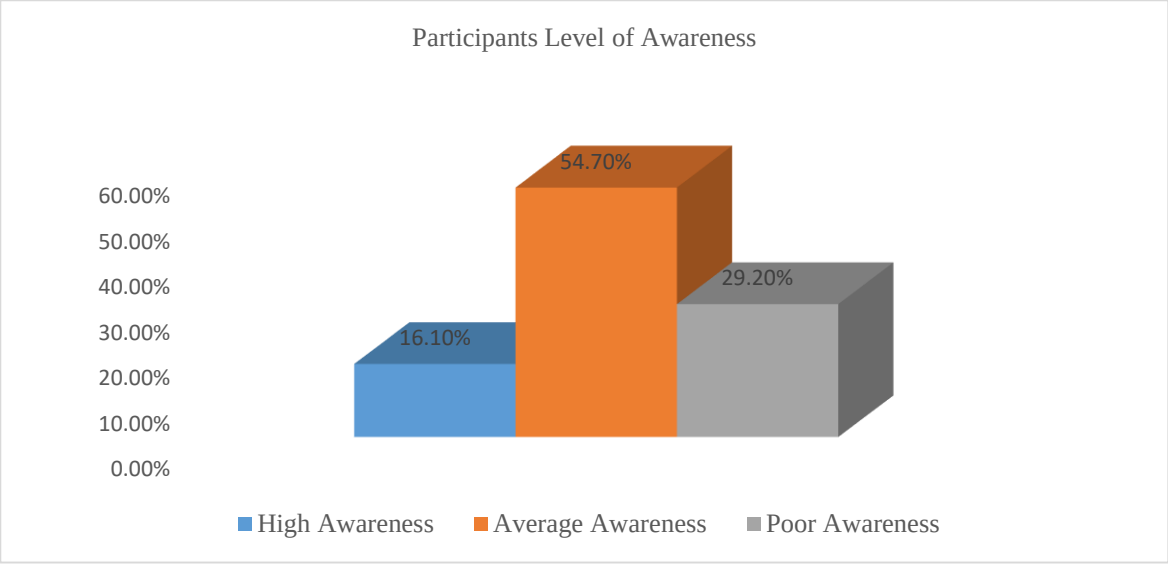

Figure 3: The level of awareness of the participants by Percentage**.**

Section three: Information sources

The questionnaire included a question regarding sources of information, offering four response options: family and friends, educational centers, social media, and health centers. Codes ranging from 1 to 4 were assigned for data entry. The findings indicate that 83 participants (20.9%) identified family and friends as their source of information about the TT vaccine, while 162 participants (40.8%) cited educational centers as their primary source. Additionally, 70 participants (17.6%) indicated social media as a source of information, and 59 participants (14.9%) referred to health centers. These statistics suggest a correlation between the level of knowledge about the TT vaccine and literacy, as a significant number of respondents reported acquiring their knowledge through educational institutions

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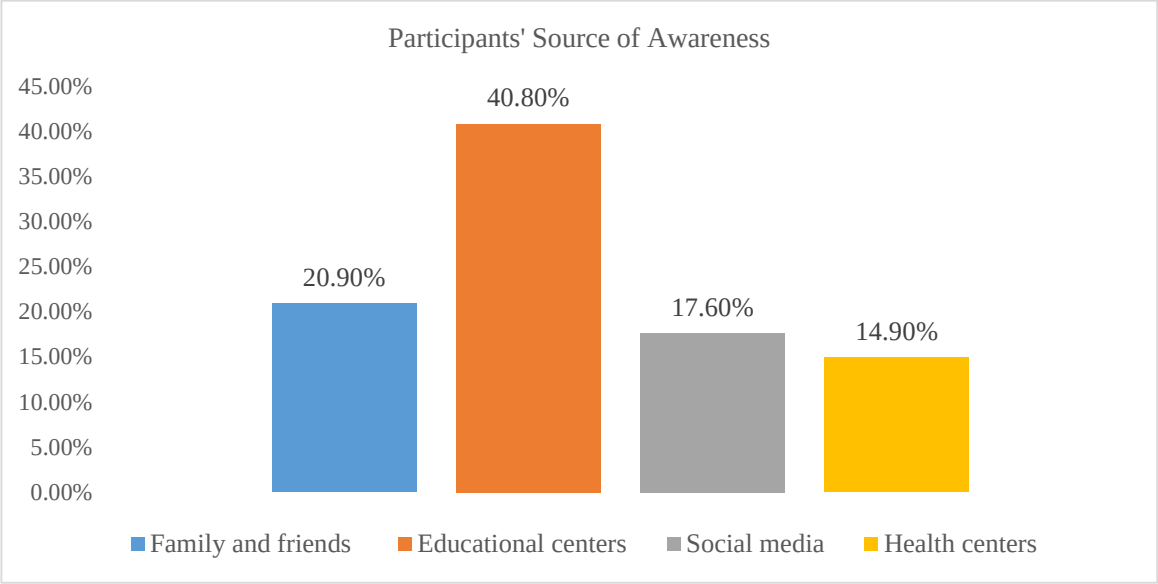

Figure 4: Participants' information sources by percentage.

Furthermore, the data revealed that out of a total of 303 individuals who had received the vaccine, only 87 participants (28.7%) completed all doses of the TT vaccine. Specifically, 40 students (13.2%) received four doses, 67 students (22.1%) received three doses, 53 students (17.5%) received two doses, and 56 students (18.5%) received only one dose of the TT vaccine.

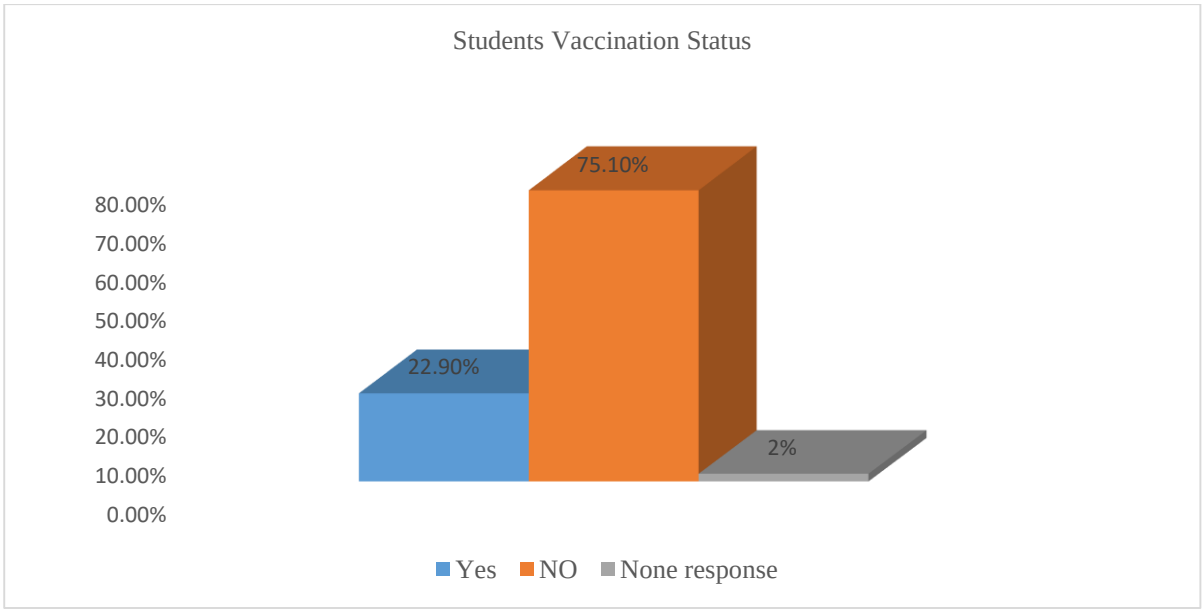

Figure 4: TT vaccination coverage among female students of Kabul university**.**

Among the 94 participants who did not receive the vaccine, the reasons for non-vaccination were varied. Specifically, 23 individuals (24.5%) attributed their non-participation to the distance from health centers, while 26 individuals (27.7%) cited a lack of knowledge about the vaccine. Additionally, 9 participants (2.3%) mentioned negative customs and traditions, 9 individuals (2.4%) reported false beliefs, and 27 participants (28.7%) expressed fear of potential side effects as reasons for not receiving the vaccine. These findings underscore the need for targeted educational interventions and accessible healthcare services to improve vaccination uptake among female students.

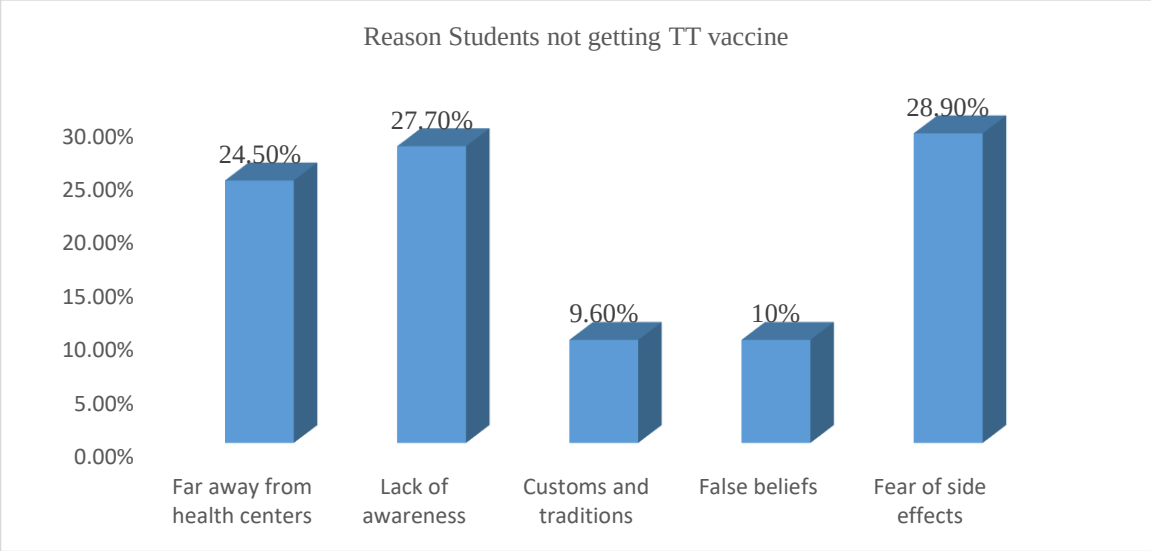

Figure 5: Reason for non-getting TT vaccine

4. Discussion

The analysis of the data collected in this research revealed that 16.1% of students possessed high knowledge regarding the TT vaccine, while 54.7% demonstrated average knowledge, and 29.2% exhibited poor knowledge. These results indicate that the majority of students have a moderate understanding of the TT vaccine. This finding aligns with previous research conducted until May 31, 2014, which involved 512 participants and similarly found that a substantial proportion, specifically 409 individuals, also had average knowledge about the TT vaccine. These consistent findings across different studies suggest a persistent trend in awareness levels among students regarding the TT vaccine. The predominance of average knowledge points to the need for enhanced educational initiatives aimed at improving understanding and awareness of the vaccine's importance, particularly among female students. Addressing this knowledge gap could lead to increased vaccination rates and better health outcomes in the population [9].

The findings of the current research indicate that 76.3% of students have received the TT vaccine, while 23.7% have not. These results reflect a significant level of vaccine coverage among the participants. Notably, this trend is consistent with previous research conducted by Maral in 2001, which evaluated TT vaccination coverage among women. In Maral's study, it was found that 53.3% of women had not received the TT vaccine, highlighting a lower coverage rate at that time compared to the current findings. This increase in vaccination coverage over the years suggests progress in public health efforts and awareness campaigns aimed at promoting TT vaccination. However, the fact that nearly a quarter of students remain unvaccinated underscores the need for continued education and outreach to address barriers to vaccination, ensuring that all individuals, particularly those in vulnerable populations, have access to this critical preventive health measure [10].

The statistics collected in this research reveal that among the students who had not received the TT vaccine, 28.9% cited fear of side effects as their reason for non-vaccination, while 27.7% attributed it to a lack of knowledge, and 24.5% indicated that the distance from health centers was a barrier. These findings align with a study conducted in 1998 titled "Effectiveness of Immunization against Infant TT," which identified similar reasons for non-vaccination. In that study, participants reported 29% cited lack of knowledge, 44% expressed fear of side effects, and 16% mentioned the distance from health centers, along with other factors. Additionally, the current research indicates that the primary source of information regarding the TT vaccine for participants was educational centers, with 40.80% of respondents citing this as their source. Other sources included social media (17.60%), health centers (14.90%), and family and friends (20.9%). In contrast, a 2020 study conducted in public hospitals in Khartoum, Sudan, reported that family members were the predominant source of information (41.4%), followed by media (30.3%) and health centers (18.8%) [11].

These comparisons highlight a shift in the sources of information about the TT vaccine, with educational institutions emerging as a key resource for students in the current study. This emphasizes the crucial role that schools and universities can play in enhancing awareness and understanding of vaccination, ultimately contributing to improved vaccine uptake among students.

Limitations and Strengths of Study

The current research provides valuable insights into the awareness and coverage of the TT vaccine among female students at Kabul Central University. However, it is essential to recognize certain limitations that may affect the interpretation and generalizability of the findings. Firstly, the study's reliance on self-reported data can introduce response bias, as participants may have overestimated their knowledge or vaccination status. Secondly, the convenience sampling method limits the representativeness of the sample, as it may not capture the full diversity of female students across different universities or regions. This could affect the external validity of the findings, making it difficult to generalize the results to the broader population.

Despite these limitations, the findings of this research highlight significant strengths. The analysis indicates that 16.1% of students possess high knowledge of the TT vaccine, while 54.7% exhibit average knowledge, underscoring a moderate understanding among the majority. This trend is consistent with previous studies, suggesting a persistent gap in awareness that calls for enhanced educational initiatives to improve understanding of the vaccine's importance. Additionally, the finding that 76.3% of participants have received the TT vaccine reflects significant progress in vaccination coverage compared to past research, which reported lower rates. This improvement suggests positive outcomes from public health efforts and awareness campaigns.

Furthermore, the study identifies critical barriers to vaccination, including fear of side effects and lack of knowledge, which aligns with findings from earlier studies. The recognition that educational centers serve as a primary source of information for 40.8% of participants highlights the pivotal role of schools and universities in disseminating accurate information and fostering vaccine awareness. This shift emphasizes the need for educational institutions to prioritize health education, ensuring that students are well-informed about the TT vaccine and its benefits.

5. Conclusion

This study assessed the awareness and coverage of the TT vaccine among female students at Kabul Central University. The results indicate that participants primarily belong to the adolescent and young adult age groups, with most demonstrating average knowledge about the TT vaccine. Importantly, 40.8% of students identified educational centers, such as schools and universities, as their most reliable source of information, highlighting the correlation between education and awareness. The research revealed that 76.3% of participants had received the TT vaccine, including those who completed supplemental doses. However, several barriers to vaccination were identified, including lack of awareness, distance from health centers, cultural obstacles, and misconceptions. Notably, 28.9% of students cited fear of side effects as a primary reason for not receiving the vaccine, indicating a significant gap in understanding its benefits.

Overall, the findings underscore the need for enhanced educational outreach within the student population to address misconceptions and improve vaccine uptake. By fostering awareness and providing accurate information about the TT vaccine, educational institutions can play a crucial role in combating this preventable disease and promoting public health.

Recommendations

Based on the findings of this study, several recommendations can be made to enhance awareness and coverage of the TT vaccine among female students at Kabul Central University and similar institutions:

1. Enhance Educational Initiatives: Educational institutions should implement comprehensive health education programs that focus specifically on the TT vaccine. These programs should aim to improve knowledge about TT disease, the importance of vaccination, and address common misconceptions regarding side effects.

2. Engage Health Professionals: Collaborating with healthcare professionals to conduct workshops, seminars, and informational sessions can help provide accurate and reliable information about the TT vaccine. These sessions should also address fears related to side effects and provide evidence-based answers to common concerns.

3. Utilize Multiple Information Sources: In addition to traditional educational settings, health authorities should leverage social media and digital platforms to disseminate information about the TT vaccine. Campaigns can be designed to target young adults, utilizing platforms popular among students to engage them effectively.

4. Facilitate Access to Vaccination: To address the barriers related to distance from health centers, initiatives should be developed to increase accessibility to the TT vaccine. This could include organizing vaccination drives on university campuses or in community centers, as well as providing transportation options for students who face challenges in reaching health facilities.

Ethical Issues

To conduct this study, all ethical considerations and aspects of research integrity were meticulously addressed. The following measures were implemented:

1. The proposal and questionnaire received approval from the instructors of the Public Health Faculty, and an official letter was sent to the Directorate of Student Affairs to obtain formal permission for data collection.
2. Informed consent was obtained from each participant prior to completing the questionnaire, ensuring that they were fully aware of the study's objectives.
3. The study was designed to ensure that no physical or mental harm was inflicted upon participants.
4. Participation in the study was entirely voluntary; prior to data collection, participants were informed about the study's goals and the nature of the information requested.
5. Participants were encouraged to share their information voluntarily, understanding that their contributions would be used solely for research purposes.
6. The privacy, identity, and personal information of all participants were safeguarded, ensuring complete confidentiality and protection against any potential breaches.

Disclosure

The authors declared that they have no declaration of interest

References

[1] W. H. Organization, "www.who.int," 9 5 2018. [Online].

[2] S. Reza and B. Avan, " Eliminating Maternal and Neonatal Tetanus amd Promoting Clean Delivery practices Through Disposable Clean Birth Kits," *Frontiers in Public Health*, 2019.

[3] A. Ramezani and M. Miri, "Evaluation of the impact vaccination program among children and mothers duraning in southern Khorasan province in2005 year," *Iranian Journal of Epidemiology*, pp. 27-32, 2009.

[4] A. M. Ahmadi and N. Hozar, "Impact of trade liberalization on HDI in devloped country," *Strategic Studies of public policy* , pp. 109-134, 2013.

[5] L. Li, W. Liu and S. Liao, "Research on factors affecting neonatal tetanus and its prevention through immunization," *Zhonghua liu Xing Bing xue za zhi*, pp. 83-86, 1996.

[6] S. D. Afghanistan, 2016.

[7] w. H. Organization, "world Health Organization," 2018. [Online].

[8] N. Hart and Okoh, "Awareness and Status of Tetanus Toxoid Vaccination among Female Undergraduate Students in a Nigerian University.," *International African journal*, 2014.

[9] B. Alex-Hart and B. Okoh, "Awareness and Status of Tetanus Toxoid Vaccination among Female Undergraduate Students in a

Nigerian University," *International Journal of Tropical Diseas and Health*, pp. 6-15, 2015.

[10] I. Maral, Z. Baykan, F. Aksakal, F. Kayikcioglu and M. Bumin, "Tetanus immunization in pregnant women: evaluation of maternal tetanus vaccination status and factors affecting rate of vaccination coverage," *Public Health*, pp. 359-364, 2001.

[11] A. M. Amani and A. N. Faiza, "Effect of tetanus toxoid immunization training program on knowledge and attitude on female nursing students in Government Universities in Khartoum State," *International Journal of Nursing and midwifery*, pp. 51-63, 2020.