

A COMPARATIVE STUDY OF RURAL VERSUS URBAN UPTAKE OF TETANUS TOXOID VACCINATION AMONG MARRIED WOMEN OF REPRODUCTIVE AGE

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ABSTRACT

Perspective Of Background

Maternal and neonatal tetanus remains a major public health issue in developing countries despite the availability of effective tetanus toxoid (TT) vaccines. In Pakistan, particularly in rural areas, factors such as low awareness, poor healthcare accessibility, myths regarding vaccination, poverty, and limited maternal healthcare services continue to affect TT vaccination uptake among women of reproductive age. Differences between rural and urban communities also influence healthcare utilization and immunization practices. Therefore, assessing TT vaccination uptake and its associated factors is essential for improving maternal and neonatal health outcomes.

Objective

The objective of this study was to assess tetanus toxoid vaccination uptake among married women of reproductive age (18–49 years) and to determine its association with socio-demographic factors in rural and urban areas of District Hyderabad, Sindh, Pakistan.

Methodology

A descriptive cross-sectional study was conducted among married women attending Taluka Headquarter Hospital Qasimabad Hyderabad and Rural Health Centre Tando Jam. A total of 328 respondents were selected through simple random sampling technique using Zindagi Mehfooz (ZM) software. Data were collected through a structured questionnaire, interviews, immunization cards, and Lady Health Worker verification. Statistical analysis was performed using SPSS version 27. Descriptive statistics including frequencies and percentages were used, while Chi-square test was applied to determine associations between socio-demographic variables and TT vaccination-related factors. A p-value less than 0.05 was considered statistically significant.

Results

The findings showed that 164 (50%) respondents belonged to rural areas and 164 (50%) belonged to urban areas. The majority of respondents were aged 18–25 years. Inferential analysis revealed significant associations between socio-demographic variables and TT vaccination-related practices. Urban respondents demonstrated comparatively better awareness regarding TT vaccination, improved healthcare accessibility, and greater utilization of maternal healthcare services compared to rural respondents. In contrast, rural women experienced more barriers including transportation difficulties, limited healthcare facilities, lower awareness, and greater misconceptions regarding vaccination. Educational status, occupation, monthly income, and husband's educational status significantly influenced TT vaccination uptake and maternal healthcare practices. Fear regarding vaccination, myths, and family influence were also identified as important barriers affecting complete immunization.

Conclusion

The study concluded that socio-demographic factors significantly influence TT vaccination uptake among women of reproductive age in rural and urban areas of District Hyderabad. Urban women showed better healthcare accessibility and awareness, whereas rural women faced greater healthcare barriers and limited immunization-related knowledge. Strengthening awareness campaigns, improving healthcare accessibility, enhancing maternal healthcare services, and promoting community-based immunization programs are necessary to improve TT vaccination coverage and reduce maternal and neonatal tetanus in Pakistan.

INTRODUCTION

Tetanus remains one of the oldest known yet entirely preventable infectious diseases affecting humankind. It is caused by the potent neurotoxin produced by the anaerobic, spore-forming bacterium *Clostridium tetani*. The spores of this organism are ubiquitously present in soil, dust, and animal waste, particularly in tropical and agricultural environments. Due to their remarkable resistance to heat, disinfectants, and environmental stress, these spores can survive for years in the environment.¹ Consequently, while tetanus can be effectively prevented, it cannot be eradicated. Unlike many other vaccine-preventable diseases, tetanus is not transmitted from person to person. Infection occurs when spores enter the body through wounds, lacerations, burns, or through unclean obstetric practices during childbirth.²

Once inside the body, the bacterium produces a powerful neurotoxin known as tetano spasm in, which interferes with normal nerve function. This toxin blocks inhibitory neurotransmitters in the central nervous system, leading to muscle rigidity, painful spasms, lockjaw (trismus), difficulty in breathing, and in severe cases, death. Neonates are particularly vulnerable, as infection often occurs through the umbilical stump when deliveries are conducted under unhygienic conditions. Maternal tetanus may result from unsafe delivery practices, septic abortions, or postpartum infections. In resource-limited settings, the case fatality rate of neonatal tetanus may exceed 70%, reflecting both delayed diagnosis and inadequate access to intensive care facilities.³

The tragedy of tetanus lies in its preventability. Immunization with tetanus toxoid (TT) vaccine is safe, effective, and inexpensive. The vaccine stimulates the body to produce protective antibodies that neutralize the toxin. When administered to women of reproductive age particularly during pregnancy it not only protects the mother but also confers passive immunity to the newborn through trans placental transfer of antibodies. This maternal immunization strategy has proven to be one of the most cost-effective interventions in maternal and child health.⁴

Recognizing the global burden of maternal and neonatal tetanus (MNT), the World Health Organization and UNICEF launched the Maternal and Neonatal Tetanus Elimination (MNTE) initiative in 1999. The initiative defined elimination as reducing neonatal tetanus incidence to fewer than one case per 1,000 live births in every district of a country.⁵

Through a combination of routine immunization, supplementary immunization activities, clean delivery campaigns, skilled birth attendance, and enhanced surveillance systems, global progress has been remarkable. Neonatal tetanus deaths declined dramatically from approximately 787,000 in the late 1980s to fewer than 8,000 in recent years. This success demonstrates the transformative potential of coordinated immunization efforts and international collaboration.⁶

However, despite these achievements, elimination has not been uniformly sustained across all regions. Several low- and middle-income countries continue to report cases due to inequitable access to healthcare services, weak health systems, poverty, and socio-cultural barriers. Pakistan represents a particularly complex case, where progress coexists with persistent disparities. While provinces such as Punjab and Sindh, along with Islamabad Capital Territory and Pakistan-Administered Kashmir, have achieved validation of elimination at different times, national-level elimination remains incomplete. Surveillance data continue to report neonatal tetanus cases annually, and underreporting particularly in rural and marginalized communities suggests that the true burden may be higher.⁷

In Pakistan, maternal immunization services are delivered primarily through the Expanded Programme on Immunization (EPI) in collaboration with maternal and child health services. The recommended TT vaccination schedule requires women of reproductive age to receive at least two appropriately spaced doses during pregnancy for immediate protection, with additional booster doses providing long-term immunity. Antenatal care visits provide a key opportunity for administering TT doses and counseling women regarding the importance of completing the schedule.⁸

Despite the availability of these services, vaccination coverage remains uneven, and a major challenge is the phenomenon of “vaccination defaulters.” Defaulters are women who begin the TT vaccination schedule but fail to complete the required doses.⁹ Partial immunization provides inadequate protection, leaving both mothers and newborns susceptible to infection. From a public health perspective, defaulters signify missed opportunities within the healthcare system and indicate underlying structural and behavioral barriers. Reducing default rates is essential to sustain elimination gains and prevent resurgence.¹⁰

The determinants of TT vaccination uptake and completion are multifactorial and deeply rooted in socio-demographic realities. Education plays a pivotal role in shaping health-seeking behavior. Women with higher educational attainment are generally more informed about preventive healthcare services and more capable of understanding vaccination schedules. Conversely, illiteracy limits awareness and may increase susceptibility to misinformation. Economic status also influences access; transportation costs, lost wages, and competing household expenses may discourage repeated visits to healthcare facilities.¹¹

Age and parity further influence vaccination behavior. Younger women or first-time mothers may be more receptive to health messages delivered during antenatal visits, while multiparous women may rely on previous experiences and

perceive immunization as less necessary.¹² Additionally, marital status and family structure impact decision-making autonomy. In many Pakistani households, healthcare decisions are influenced by husbands or elder family members, particularly mothers-in-law. If these key decision-makers lack awareness or hold misconceptions about vaccination, women may be prevented from accessing services or completing doses.¹³

The rural-urban divide introduces additional complexity. Urban areas are generally perceived to have better healthcare infrastructure, higher literacy rates, and improved transportation networks. However, urban populations are heterogeneous. Informal settlements and peri-urban slums often experience overcrowding, poverty, and limited public services, creating barriers similar to those faced in rural settings. High population mobility in urban slums may also disrupt follow-up schedules, increasing default rates.¹⁴

Problem Statement

Despite global progress in the elimination of maternal and neonatal tetanus (MNT) through widespread use of tetanus toxoid (TT) vaccination and improved antenatal care services, disparities in vaccine uptake continue to persist in many developing countries, including Pakistan. Although Sindh province has achieved validation for MNT elimination, reported neonatal tetanus cases and evidence of under-immunized women indicate that significant gaps remain at district and community levels. In particular, incomplete TT vaccination and defaulting among married women of reproductive age pose a continued risk to maternal and neonatal health outcomes.

Urban and rural populations experience different social, economic, cultural, and healthcare-related conditions that may influence immunization behavior. Rural areas often face barriers such as geographic inaccessibility, limited health infrastructure, shortage of female vaccinators, and irregular outreach services. Conversely, urban areas especially peri-urban and slum settlements may struggle with overcrowded facilities, poverty, low literacy, high population mobility, and weak follow-up systems. These contextual differences suggest that the determinants of TT vaccination uptake may vary significantly between rural and urban settings.

In Hyderabad district, Sindh, while provincial-level elimination status has been achieved, intra-district disparities may still exist. Married women of reproductive age in both rural and urban communities may encounter socio-demographic, cultural, behavioral, and systemic barriers that hinder timely initiation and completion of the recommended TT vaccination schedule. Factors such as low educational attainment, limited decision-making autonomy, vaccine misconceptions, household responsibilities, economic constraints, and inadequate healthcare services may contribute to defaulting.

However, there is limited comparative evidence examining rural versus urban differences in TT vaccination uptake among married women of reproductive age in Hyderabad. The absence of localized, context-specific data restricts the ability of policymakers and health planners to design targeted interventions that address setting-specific barriers.

Therefore, the core problem addressed in this study is the persistent disparity and incomplete uptake of tetanus toxoid vaccination among married women of reproductive age in rural and urban areas of Hyderabad, Sindh, and the lack of comprehensive comparative evidence to identify the determinants influencing these differences. Addressing this problem is essential to reduce vaccination default rates, sustain maternal and neonatal tetanus elimination status, and strengthen maternal and child health outcomes in the region.

LITERATURE REVIEW

Maternal and neonatal tetanus (MNT) has long been recognized as a major yet preventable contributor to maternal and newborn mortality in low- and middle-income countries. The disease is caused by the toxin produced by *Clostridium tetani*, an organism widely present in soil and environmental dust. Because the spores of this bacterium are highly resistant to environmental stress, eradication is not feasible; however, effective prevention through immunization and clean delivery practices is well established. Over the past three decades, global public health efforts have focused on eliminating MNT as a public health problem, with substantial progress achieved through coordinated immunization strategies led by the World Health Organization and UNICEF under the Maternal and Neonatal Tetanus Elimination (MNTE) initiative.

The global literature consistently demonstrates that tetanus toxoid (TT) vaccination during pregnancy is one of the most cost-effective maternal health interventions. Studies conducted in sub-Saharan Africa and South Asia indicate that administration of at least two doses of TT during pregnancy significantly reduces neonatal tetanus incidence and mortality. However, while national coverage statistics in many countries suggest satisfactory uptake, sub-national analyses reveal considerable inequalities. Research from countries such as Nigeria, Ethiopia, India, and Bangladesh shows marked disparities between regions, socio-economic groups, and residential categories.

Several demographic health surveys have highlighted that women residing in urban areas generally report higher TT coverage compared to rural counterparts. Nevertheless, more detailed analyses reveal that urban advantage is often concentrated among wealthier and more educated populations, while urban slum dwellers exhibit coverage levels

comparable to or lower than rural residents. These findings challenge the simplistic assumption that urban residence automatically confers better health outcomes.

A substantial body of literature identifies maternal education as one of the strongest predictors of TT vaccination uptake. Educated women are more likely to access antenatal care services, understand vaccination schedules, and appreciate the protective benefits of immunization. Studies conducted across South Asia demonstrate a positive correlation between years of schooling and likelihood of receiving complete TT doses. Education enhances women's autonomy, negotiation capacity within households, and exposure to health information through media and community networks.

Socio-economic status is another critical determinant. Wealth index analyses from demographic surveys consistently show that women from higher-income households are more likely to complete TT vaccination schedules. Financial stability reduces transportation barriers and opportunity costs associated with repeated healthcare visits. Conversely, poverty increases vulnerability to defaulting, particularly when health facilities are distant or when indirect costs such as lost wages are significant.

Maternal age and parity also influence uptake. Younger and primigravida women often demonstrate higher compliance with antenatal recommendations, possibly due to heightened perceived vulnerability during first pregnancies. Multiparous women may rely on previous childbirth experiences and perceive less urgency in completing recommended vaccine doses. However, evidence is mixed, and some studies report that experience with healthcare systems in previous pregnancies can also enhance compliance.

Beyond socio-demographic factors, cultural norms and behavioral perceptions significantly shape TT vaccination behavior. Vaccine hesitancy driven by misinformation, fear of side effects, and mistrust in public health systems has been documented in multiple contexts. Qualitative studies from South Asia reveal persistent myths regarding TT vaccination, including misconceptions about infertility, miscarriage, or physical weakness following injection. Such beliefs are often reinforced through informal community networks and intergenerational transmission of misinformation.

Decision-making dynamics within households are particularly relevant in patriarchal societies. Research from Pakistan and neighboring countries indicates that husbands and mothers-in-law frequently play decisive roles in determining whether women attend antenatal clinics. Women with limited decision-making autonomy face greater barriers in completing vaccination schedules. This highlights that TT uptake is embedded within broader gender relations and power structures rather than being solely an individual choice.

Health system performance is another critical dimension discussed extensively in the literature. Reliable vaccine supply chains, functional cold chain systems, availability of trained female vaccinators, and respectful provider-patient interactions influence uptake and completion rates. Studies across rural districts in South Asia and Africa identify vaccine stock-outs and irregular outreach sessions as major contributors to defaulting. Women who visit facilities and find vaccines unavailable are less likely to return for subsequent doses.

The role of community-based health workers has received significant attention. In Pakistan, the Lady Health Worker (LHW) program has been shown to improve immunization awareness and follow-up compliance. Areas covered by active LHW networks demonstrate higher TT coverage and reduced dropout rates compared to uncovered areas. These findings underscore the importance of community engagement and door-to-door counseling in sustaining maternal immunization.

Comparative analyses between rural and urban populations reveal complex patterns. Rural women often face structural barriers such as long travel distances, limited transportation, scarcity of health facilities, and shortages of skilled healthcare providers. These logistical challenges increase indirect costs and reduce the likelihood of completing multi-dose vaccination schedules. Additionally, rural settings may have lower female literacy rates and stronger adherence to traditional birth practices, which can limit exposure to formal healthcare services.

Urban areas, in contrast, typically offer greater physical availability of healthcare services. However, the urban advantage is not universal. Rapid urbanization in developing countries has led to expansion of informal settlements where residents experience poverty, overcrowding, and weak public service delivery. Studies from megacities in South Asia indicate that urban slum residents frequently encounter barriers such as overcrowded clinics, long waiting times, and lack of personalized counseling. High population mobility in urban areas also disrupts continuity of care, increasing the risk of defaulting.

Comparative research suggests that determinants of TT uptake differ in emphasis between rural and urban contexts. In rural areas, geographic accessibility and health infrastructure are dominant factors. In urban slums, socio-economic inequality, health system responsiveness, and trust in services may play more significant roles. These nuanced differences highlight the necessity of context-specific investigations rather than relying on broad generalizations.

RESULTS

4.1 RESULTS

In my study this chapter presents the findings and outcomes of the study conducted among the reproductive age from 18 to 49 years old woman respondents. The results were analyzed through SPSS 27 version and organized systematically to provide a clear understanding of the demographic characteristics of the study population in which socio-demographic variables including age, religion, marital status, occupation, educational status, husband's occupation, husband's educational status, monthly income, and residential status discussed in this chapter. Frequencies and percentages were calculated to summarize and interpret the collected data. The detailed descriptions of all variables are presented in the following tables and figures.

TABLE. 01 AGE OF RESPONDENTS

Age Groups	Frequency	Percent %
18-25	149	45.4%
26-33	76	23.1%
34-41	57	17.3%
42-49	46	14.2%
Total	328	100%

TABLE. 02 RELIGION OF RESPONDENTS

Religion	Frequency	Percent %
Muslim	234	71.3%
Non-Muslim	94	28.7%
Total	328	100%

TABLE. 03 MARITAL STATUS OF RESPONDENTS

Marital Status	Frequency	Percent %
Single	2	0.6%
Married	311	94.8%
Separated	5	1.5%
Divorced	7	2.1%
Widow	3	01%
Total	328	100%

TABLE. 05 EDUCATIONAL STATUS OF RESPONDENTS

Educational Status	Frequency	Percentage %
Primary	89	27.1%
Middle	73	22.3%
Metric	47	14.3%
Intermediate	50	15.2%
Graduate	39	11.9%
Post Graduate	30	9.1%
Total	328	100%

TABLE 10 ASSOCIATION OF AGE, RELIGION, MARITAL STATUS AND EDUCATION OF RESPONDENTS

Study variables	Association with Demographic variables (p-value)			
	Age of Respondents	Religion of Respondent	Marital Status of Respondent	Educational status of Respondent
At your home who decides for health-related matters?	0.00*	0.86	0.01*	0.59
How far is the health facility from your house?	0.00*	0.67	0.21	0.21
When you go to hospital, do you find lady doctor or LHV?	0.10	0.03*	0.50	0.09
Does LHW visit your home/colony/village regularly?	0.66	0.85	0.42	0.00*
Have you heard about neonatal tetanus ad maternal tetanus?	0.58	0.03*	0.57	0.12
Do you have Information about vaccination?	0.27	0.38	0.28	0.14
Do you know about Expanded Program on Immunization (EPI)?	0.49	0.02*	0.95	0.32
From where you got information about EPI?	0.00*	0.98	0.18	0.00*
Do you have any knowledge about TT vaccine?	0.06	0.24	0.65	0.37
Myth/belief about TT vaccine?	0.01*	0.64	0.01*	0.91
Source/myth about belief on TT Vaccine?	.023*	0.42	.488	0.85
Do you know about the schedule of the TT vaccine?	0.99	0.53	0.08	0.01*
How many TT vaccine doses you have received?	0.13	0.41	0.81	0.50
Have you retained TT vaccine card?	0.00*	0.23	0.01*	0.66
From where you received these TT vaccine doses?	0.05*	0.80	0.02*	0.37
Is there vaccinator available at hospital during visit?	0.08	0.62	0.02*	0.60
What us the attitude of vaccinator, when you go to hospital for TT vaccine?	0.36	0.85	0.86	0.99
Have you any fear about TT vaccine?	0.08	0.99	0.83	0.51
Number of prenatal visits?	0.97	0.98	0.65	0.04*
Number of postnatal visits?	0.95	0.71	0.39	0.98
Accessibility of Radio or TV?	0.00*	0.00*	0.38	0.98
Time taken to reach health facility?	0.86	0.84	0.21	0.00*
Do outreach session arranged by vaccinators?	0.13	0.55	0.19	0.85
Is there access of routine immunization?	0.63	0.78	0.50	0.00*
Due to miscellaneous	0.10	0.24	0.71	0.00*
Source to information about routine immunization?	0.01*	0.40	0.11	0.00*
Negative family/friends influence	0.00*	0.00*	0.63	0.84
Too busy don't priorities	0.77	0.49	0.76	0.98
Anxious about TT vaccine	0.81	0.00*	0.38	0.01*
No awareness about TT vaccine benefits	0.00*	0.00*	0.06	0.84
EPI too far from home	0.00*	0.87	0.15	0.00*
Changed mind because of rumors	0.00*	0.00*	0.06	0.84
To sterilize their children	0.00*	0.00*	0.06	0.84
Personal favor and disfavor to refusing TT vaccine	0.07	0.00*	0.49	0.88
Religiously when allow push-Imam for TT vaccine	0.81	0.00*	0.38	0.01*
USA and his allies are killing innocent Muslims through that	0.00*	0.00*	0.06	0.84

***Significant Results**

4.1.2 Age distribution of Respondents

In this study the age distribution of respondents shows that the majority of respondents 149 (45.4%) were belonged to the age group of 18–25 years, 76 (23.2%) respondents were between 26–33 years of age, while 57 (17.4%) respondents belong to the age group of 34–41 years and remaining 46 (14.0%) respondents were between 42–49 years. The results indicate that younger women represented the largest proportion of the study population which may be because younger women are generally more socially active and more involved in healthcare-related matters. Their greater participation may also reflect increased awareness and willingness to participate TT vaccination. On the other hand, the lower percentage observed among older age groups may be associated with reduced social participation and limited accessibility regarding vaccination. Overall, the findings demonstrate that the study population was mainly composed of young and economically active respondents, which is important for understanding the overall outcomes of the research. (Table 1)

4.1.3 Religion status of Respondents

In my study the religion status of respondents shown that the majority of respondents 234 (71.3%) were Muslims, while 94 (28.7%) respondents were non-Muslims.

These findings indicate that Muslim respondents constituted the dominant proportion of the study population. The presence of respondents from different religious backgrounds reflects the diversity of the community included in the research. Religion is considered an important demographic factor because it may influence cultural practices, beliefs, attitudes, and healthcare-related behaviors. Different religious groups may also have varying perceptions and practices regarding health awareness and healthcare utilization. Therefore, the inclusion of both Muslim and Non-Muslim respondents enhances the representativeness and reliability of the study findings. (Table 2)

4.1.4 Marital Status of Respondents

Further in this study the marital status distribution of respondents included in the study. The findings reveal that the majority of respondents 311 (94.8%) were married. In comparison, 7 (2.1%) respondents were divorced, 5 (1.5%) were separated, 3 (0.9%) were widows, and only 2 (0.6%) respondents were single.

The results indicate that married women represented the overwhelming majority of the study population. This finding is important because married women are generally more involved in family responsibilities, reproductive health matters, and household decision-making processes. Their experiences and responses may therefore have a significant impact on the study outcomes. The very small proportion of single, separated, divorced, and widowed respondents indicates limited representation of these groups in the study. Overall, the findings suggest that the study population mainly consisted of women living within family systems and marital relationships. (Table 3)

4.1.5 Occupational Status of Respondents

The occupational status of respondents participating in the study. The findings indicate that the majority of respondents 132 (40.2%) were housewives. Furthermore, 75 (22.9%) respondents had government jobs, 56 (17.1%) were employed in private jobs, 36 (11.0%) were unemployed, and 29 (8.8%) respondents worked as laborers.

The findings suggest that housewives constituted the largest occupational category among respondents. Occupational status is an important socioeconomic indicator because it influences income level, awareness, social interaction, and healthcare access. Housewives may have limited exposure to healthcare information and employment opportunities compared to working women. In contrast, respondents employed in government and private sectors may have greater awareness, better financial stability, and improved access to healthcare services. Overall, the occupational distribution reflects variations in the socioeconomic background of the study population. (Table 04)

4.1.14 Results Based on Marital Status of Respondents

Marital status demonstrated statistically significant associations with healthcare decision-making ($p=0.01$), myths regarding TT vaccine ($p=0.01$), retention of TT vaccination card ($p=0.01$), source of TT vaccination doses ($p=0.02$), availability of vaccinator during hospital visits ($p=0.02$), and accessibility of healthcare facilities ($p=0.02$).

The findings indicate that marital status plays a major role in maternal healthcare practices and vaccination behavior. Married women are generally more likely to utilize antenatal healthcare services because of pregnancy-related healthcare needs. However, household decision-making patterns may affect women's ability to independently access healthcare facilities and vaccination services.

The association between marital status and myths regarding TT vaccine indicates that social and family influences may significantly shape vaccination-related attitudes among married respondents. (Table 10)

4.1.15 Results Based on Educational Status of Respondents

Educational status showed statistically significant associations with regular visits by LHWs ($p=0.00$), source of EPI information ($p=0.00$), awareness regarding TT vaccination schedule ($p=0.01$), number of prenatal visits ($p=0.04$), accessibility of healthcare facilities ($p=0.00$), access to routine immunization ($p=0.00$), miscellaneous barriers toward vaccination ($p=0.00$), source of routine immunization information ($p=0.00$), anxiety regarding TT vaccine ($p=0.01$), distance of EPI center from home ($p=0.00$), and religious encouragement regarding TT vaccination ($p=0.01$).

These findings demonstrate that education is one of the strongest determinants affecting healthcare awareness and immunization practices. Educated respondents are more likely to understand the importance of maternal healthcare, preventive vaccination, and antenatal care services. Education also improves health literacy and enables women to identify accurate healthcare information while rejecting myths and misinformation.

The significant association between education and healthcare accessibility indicates that educated respondents may possess greater confidence and awareness regarding utilization of healthcare facilities and immunization services. (Table 10)

DISCUSSION

This chapter discusses the findings of the study titled “A Comparative Study of Rural Versus Urban Uptake of Tetanus Toxoid Vaccination among Married Women of Reproductive Age in District Hyderabad.” The discussion is based on the objectives of the study and the findings presented in Chapter 4. The results are interpreted in light of previous literature, theoretical perspectives, and the local context of Hyderabad, Sindh. The chapter focuses on socio-demographic characteristics, TT vaccination uptake, healthcare accessibility, awareness, myths and misconceptions, and differences between rural and urban respondents.

5.1 Overview of the Study Findings

Tetanus toxoid vaccination remains one of the most effective interventions for preventing maternal and neonatal tetanus. Despite the availability of vaccination services through the Expanded Programme on Immunization (EPI), disparities continue to exist between different population groups. The present study included 328 women of reproductive age, equally distributed between rural and urban areas. The findings demonstrated that demographic, educational, economic, cultural, and health-system factors significantly influence TT vaccination uptake.

The study further revealed that age, educational status, occupation, husband's education, monthly income, and residential status were important determinants of vaccination-related awareness and healthcare utilization. Myths, misconceptions, religious beliefs, family influence, and accessibility barriers were also identified as major obstacles affecting TT vaccination coverage.

5.2 Discussion of Socio-Demographic Characteristics

The findings showed that nearly half of the respondents (45.4%) belonged to the age group of 18–25 years. This indicates that younger women represented the majority of the reproductive-age population included in the study. Similar findings have been reported in studies conducted in Pakistan and other South Asian countries where younger women constituted the largest proportion of maternal healthcare service users. Younger women are generally more likely to attend antenatal clinics and participate in healthcare programs because of increased exposure to health education and social media platforms.

The majority of respondents were married (94.8%), which aligns with the study inclusion criteria focusing on married women of reproductive age. Marriage is often associated with increased utilization of maternal healthcare services because pregnancy and childbirth require regular interaction with health facilities. Previous studies have also reported that married women are more likely to seek antenatal care and vaccination services than unmarried women.

Educationally, most respondents had primary and middle-level education. This finding reflects the educational profile of many communities in Sindh where female literacy rates remain relatively low. Earlier studies have consistently identified education as one of the strongest predictors of maternal immunization uptake. Women with higher education are more capable of understanding vaccination schedules, recognizing the benefits of immunization, and accessing healthcare services. The present findings therefore support previous evidence that educational attainment remains a critical determinant of maternal health behavior.

5.3 Discussion of TT Vaccination Uptake

The principal objective of the study was to compare TT vaccination uptake between rural and urban women. The results demonstrated a statistically significant association between residential status and the number of TT vaccine doses received ($p = 0.00$). This finding suggests that geographical location plays an important role in determining vaccination uptake.

Urban women generally demonstrated better vaccination uptake compared to rural women. This observation is consistent with studies conducted in Pakistan, India, Bangladesh, and Nigeria, where urban residents reported higher immunization coverage because of better healthcare infrastructure, availability of vaccination centers, and improved transportation facilities.

5.12 Conclusion of the Discussion

The findings of this study demonstrate that TT vaccination uptake among married women of reproductive age is influenced by a complex interaction of socio-demographic, economic, cultural, and health-system factors. Significant differences were observed between rural and urban populations, particularly regarding the number of TT doses received and utilization of postnatal healthcare services. Education, occupation, monthly income, husband's education, awareness levels, and accessibility of healthcare services emerged as major determinants of vaccination uptake.

Furthermore, myths, misconceptions, religious misunderstandings, family influence, and conspiracy-related beliefs continue to act as barriers to maternal immunization. The findings support existing national and international literature and emphasize the need for context-specific interventions to improve TT vaccination coverage. Strengthening community awareness programs, expanding LHW coverage, improving healthcare accessibility, and addressing misinformation are essential strategies for sustaining maternal and neonatal tetanus elimination and improving maternal and child health outcomes in Hyderabad and across Pakistan.

5.13 Comparison of Findings with Previous Studies

The findings of the present study are consistent with several national and international studies conducted on tetanus toxoid (TT) vaccination among women of reproductive age. The present study found that educational status significantly influenced awareness regarding TT vaccination, vaccination schedules, prenatal visits, healthcare accessibility, and routine immunization services. Similar findings were reported by Yasir Shafiq et al. (2017) in Karachi, Pakistan, who concluded that low educational status was strongly associated with poor knowledge regarding tetanus vaccination and lower vaccination coverage among women of childbearing age. The study further reported that women with limited awareness regarding free vaccination services were less likely to receive TT vaccination.

The current study also revealed that family influence and healthcare decision-making significantly affected TT vaccination uptake. These findings support the study conducted in peri-urban Karachi by Shafiq et al. (2017), which demonstrated that women whose healthcare decisions were controlled by husbands or other family members were significantly less likely to receive TT vaccination. Family non-supportive behavior was identified as an important predictor of non-vaccination.

The present study identified myths, misconceptions, rumors, and conspiracy-related beliefs as major barriers affecting vaccination acceptance. Similar observations were reported in studies conducted in Pakistan where respondents expressed concerns regarding vaccine safety, fear of side effects, and misconceptions related to vaccination programs. These misconceptions contributed to vaccine hesitancy and reduced vaccination uptake among women of reproductive age.

The findings further indicated that residential status had a significant association with the number of TT doses received and postnatal healthcare visits. Urban respondents generally demonstrated better utilization of vaccination services compared with rural respondents. These results are comparable to the findings reported in Peshawar, Pakistan, where urban women showed higher TT vaccination coverage than rural women because of better access to healthcare facilities, transportation services, and healthcare information.

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