ORIGINAL ARTICLE

COVERAGE AND FACTORS ASSOCIATED WITH TETANUS TOXOID VACCINATION AMONG MARRIED WOMEN OF REPRODUCTIVE AGE: A CROSS SECTIONAL STUDY IN PESHAWAR

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Background: Pakistan has one of the highest maternal mortality rates in the world, with widely prevalent maternal and neonatal tetanus. The purpose of this study was to estimate the coverage and determine the factors associated with tetanus toxoid vaccination status among females of reproductive age in Peshawar. **Methods:** A Cross-sectional study was conducted in Peshawar, Pakistan, from 9 June to 19 June 2010. A total of 304 females of reproductive age (17–45) years were selected from both urban and rural areas of Peshawar through random sampling. A pre-tested structured questionnaire was administered to females. Questions about demographics, income, education of husband, occupation, accessibility to health centres and frequency of visits from health workers was inquired. Knowledge and views on immunization were also asked. **Results**: Overall 55.6% were vaccinated. Urban population was 54.3% while rural population was 45.7%. Reasons for not vaccinating were: No awareness (38.4%), being busy (18.1%), centre too far (18.1%), misconceptions (10.86%), and fear of reactions (4.3%). Most of the females thought immunization was effective (89.5%). Husband education, females' knowledge and views on immunization, income, distance, frequency of health visits were the main factors associated with immunization status. **Conclusion:** Majority of females are not vaccinated. Effective media campaigns on maternal tetanus vaccination should be carried. Lady health workers should be mobilised effectively to increase the vaccination coverage.

Keywords: Tetanus toxoid, immunization, EPI Pakistan

INTRODUCTION

Tetanus is caused by spores of bacterium *Clostridium tetani* when it infects a wound or the umbilical stump. Spores are present in the soil. The disease when occurs in newborn is particularly serious and is called neonatal tetanus. It requires treatment in a hospital and carries a high mortality rate. Due to unsterile procedures during deliveries, it is particularly common in rural areas of under developed countries. WHO estimated neonatal tetanus killed about 59,000 newborns in 2008 alone. Tetanus can be prevented through immunization with tetanus-toxoid-containing vaccines. Neonatal tetanus can be prevented by immunizing women of childbearing age with during pregnancy or outside of pregnancy.[1] In Pakistan 28,882 cases were estimated and with some 21,619 estimated deaths. Estimated MNT mortality rate was 4.08 (per 1,000 live births).[2]

Tetanus that strikes women during pregnancy or within 6 weeks of the termination of pregnancy is called maternal tetanus. A significant number of women die due to maternal tetanus every year. Maternal tetanus is responsible for at least 5% of maternal deaths, approximately 30,000 deaths annually. The true extent of the tetanus death toll is not known as many newborns and mothers die at home which is usually not reported.[1]

As of June 2010, most of the countries had achieved Maternal Neonatal Tetanus (MNT) elimination leaving 40 countries that still have not eliminated the disease. Pakistan is included in countries where more than 50% of the districts are at high risk for MNT because of the limited health infrastructure which is indicated by 50% or lower coverage of Tetanus toxoid (TT) vaccination. There is also a variation in TT coverage even across the provinces of Pakistan. In a study conducted in District Peshawar, 65% of women in urban areas were vaccinated, while in rural areas 60% were vaccinated.[3] While a study in Lahore district showed 87% coverage.[4] The delivery and acceptance of recommended vaccinations is an ongoing challenge for health care providers and public health system.

No recent substantial studies in Khyber Pakhtunkhwa have been done on tetanus immunization, an important health issue. The present study focuses on assessing the different causes of low vaccination coverage of Tetanus toxoid in married women in Peshawar with respect to the users and to compare these finding with other relatively developed urban and rural parts of Pakistan, in order to provide new material for any future approaches.

MATERIAL AND METHODS

This cross-sectional study was conducted from 9th to 19th of June 2010 to determine the coverage and factors

associated with the lack of immunization. The study area was urban and rural areas of Peshawar. Three hundred and four married women aged 17–45 years and having at least one child, were asked about their TT immunization status. Women not in their reproductive age or who did not have any children were excluded. Two-stage cluster random sampling was done. Households were interviewed in areas of Peshawar University Campus, Hashtnagri, and Peshawar Saddar as urban Area, and Naway Kalay and Pawakay village as rural areas.

A researcher-administered standard questionnaire was used as a data collecting tool. The mothers were given a choice to leave any question unanswered or to end the interview anytime they wished. All data was collected through informed consent. Women were asked about their Tetanus toxoid immunization and information concerning demographics, education of husband (None, primary, Middle, Matric, Higher education, Traditional/ Madrassa), occupation and income of husband. Occupation of the women (housewife, government servant, skilled woman, other), knowledge of females regarding immunization (Everything, enough, moderate, little, none) and their views on immunization, whether it was useful or not was also asked. When answered not useful, the reason behind such a view point was inquired. The accessibility of immunization centres from their homes in terms of distance (in Km) was estimated. The frequency of visits from health workers was asked (Never, seldom, often, very often), based upon the number of visits per month. The accessibility to TV/radio was asked. They were asked about their status on each dose of TT and reasons for missed vaccination were noted. Record of immunization was collected through immunization cards but in the absence of cards, memory recall was used.

Data entry and analysis were done using SPSS-16.0. Pearson's χ^2-test was used for statistical testing. A *p*-value of <0.05 was considered significant.

RESULTS

The vaccination coverage for all doses of TT vaccination was: 55.6% completely vaccinated, 22.4% incompletely vaccination, and 22.0% never vaccinated. Vaccination for each dose is given in Table-1.

Reasons for not vaccinating were: No awareness/didn't know importance 40.5%, Busy/family problems 18.1%, centre too far 18.1%, wrong ideas/ sterility 10.8%, Fear of reactions 4.3%, and others 8.2%.

Vaccination cards were present with 59.3% while 46.1% used memory recall. Urban population was 54.3% while rural population was 45.7%. Education for husbands were: none 43.8%, higher education were 19.7%, matric 14.3%, middle 5.8%, primary 14.1% and traditional/maddrassa education 1.6%.

Among the family earners, 41.4% were self-employed, 22.7% were labourers, 19.7% were government employed and 16.7% had been working in miscellaneous disciplines. Most of the women were housewives (89.8%), rest were government employees (4.6%) and skilled women (3.6%).

When asked whether the EPI programme was effective, most of the females replied that it was effective (89.5%). However, a significant number considered it as ineffective or not useful (10.5%). The reasons they gave were: fear of adverse reactions (33.3%), not being useful (30.0%), misconceptions like fear of sterility (20.0%), previous bad experience (10.0%), and others (6.7%).

When asked about the frequency of health workers visits, most answered often (35.2%) and very often (32.6%). However, a significant number answered seldom (18.1%) and never (14.1%).

Most of the females had little knowledge on immunization (31.2%) while a significant number had no knowledge at all (13.8%) and very few knew everything important on TT vaccination (6.9%) (Enough 28.6% and moderate 19.4%).

Cross-tabulation between uneducated and educated females showed a clear pattern of low immunization among uneducated and high immunization among educated ones ($p<0.05$) (Figure-1). Similarly, females who knew more about immunization had a higher rate of immunization. Females who knew everything important about immunization had a higher immunization rate (85.7%) as compared to females with no knowledge on immunization (26.2%). Immunization rates for females with Moderate knowledge was 57.6% and with little knowledge was 33.7% ($p<0.05$).

Immunization rates were high for urban areas in comparison to rural areas (Figure 2). Immunization was high for women whose husbands had government jobs (75% immunized) than labourers (42.0% immunized) and private jobs (52.4% immunized) ($p<0.05$). Women who were government employees (100.0% immunized) or skilled employees of the private sector (68.4% completely immunized) had greater immunization rate than females who were housewives (53.2% completely immunized) and unskilled workers (16.7% immunized) ($p<0.05$).

The income had a great effect on the immunization (Figure-3). The distance had no significant effect on immunization status below 11 km but it had a clear effect on immunization above 11 km (Figure-4). Similarly, respondents who thought immunization wasn't beneficial had a very low immunization status (15.6% immunized) than the respondents who considered immunization beneficial (60.3% completely immunized) ($p<0.05$).

Women who had access to television or radio had greater complete immunization rates (58.8%) than females who had no access to television or radio (10.0%), (p<0.05).

Table-1: Tetanus Toxoid vaccination status

Tetanus dose	Vaccinated		Not-vaccinated	
	Frequency	%	Frequency	%
T1	237	78.0	67	22.0
T2	223	73.4	81	26.6
T3	193	63.5	111	36.5
T4	174	57.2	130	42.8
T5	169	55.6	135	44.4

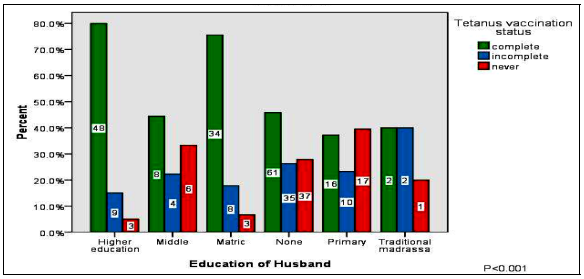

Figure-1: Cross tabulation between education and TT vaccination

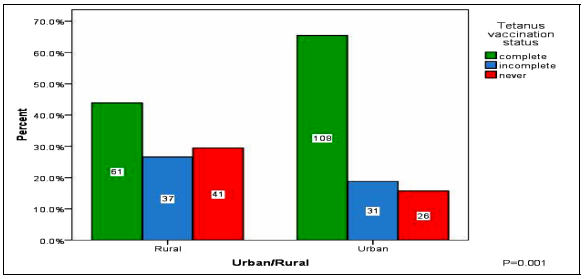

Figure-2: Cross tabulation between Urban/Rural and TT vaccination

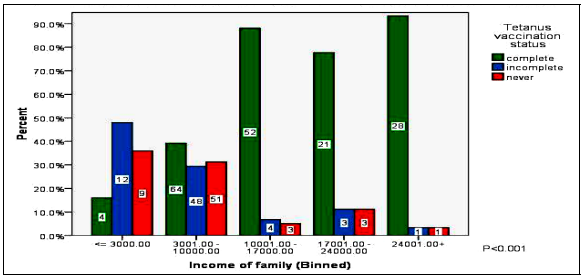

Figure-3: Cross tabulation between income and TT vaccination

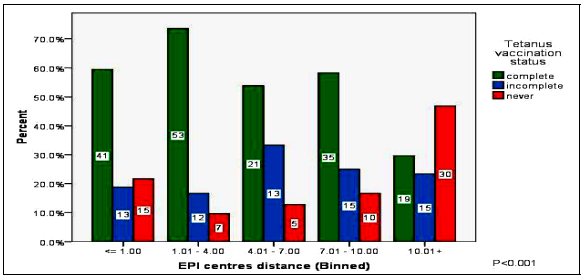

Figure-4: Cross tabulation between distance from vaccination centres and TT vaccination

DISCUSSION

The completed TT vaccination status was 55.6%. However, at least 78.0% had received one dose of TT vaccination (Figure-1). National immunization figures of 2009 showed estimates of 55% for TT2 vaccination.[5] Even these figures mask considerable variations due to the complex demographic situation of Pakistan. A study conducted in Peshawar and other cities showed similar results.[3,4,6] The study showed better results than national estimates.[5] The reasons could be that Peshawar has urban population which usually has higher coverage than rural areas. Studies in other countries with the similar situation revealed similar coverage.[7–9]

Causes of low vaccination were no awareness, busy, centres too far, misconceptions and fear of reactions. This was similar to other studies in Khyber-Pakhtunkhwa[3,4] and elsewhere.[6–9] Only 52.7% had vaccination cards present, memory recall was used in remaining cases as it is considered a reliable method.[10]

Cross tabulation showed low immunization among females whose husbands had lower education status (Figure-1). It was also noted that women having knowledge about immunization and its importance had much greater immunization rates. This clearly shows the impact of education of both men and women's knowledge on immunization, stressing the importance of education in success of immunization. Studies in Pakistan and other countries showed similar results.[6,7,11–13]

Immunization was high for husbands having government and private jobs rather labourer, this relationship could have been due to income difference between these jobs. Similarly, it was noted that government employees were more educated and women who were government employees were much more likely to immunize themselves against TT than housewives. It seems that females who were government employees had better education, economical status and much higher awareness. Such conclusions were also drawn in studies conducted in Pakistan and elsewhere.[7,11,12,14,15]

A high coverage rate was found in urban areas of Peshawar than peripheral suburban and rural areas (Figure-2). This was an expected finding as rural areas of this part of the world are under privileged both economically and socially. Other reasons like low accessibility to health centres and lack of awareness also plays its part. This was consistent with other studies in Pakistan and elsewhere.[7–9,11]

The income of family and the immunization status had a very clear relationship. With income below PKR 3,000 per month, nearly half of the females were not immunized. However, with monthly income above PKR 10,000, most females were immunized (Figure-3). The reasons for low income to play a part in free services like immunization are due to correlated problems like lack of

time, transport, education and awareness. This was consistent with results in Khyber-Pakhtunkhwa and elsewhere. Thus economical uplift of females can dramatically improve immunization.[4,6,7,14]

One of the main causes of low vaccination was distant functional vaccination centres. However, a clear relationship did not exist below 10 Km and above 10 Km, there was a sharp decline in immunizations (Figure-4). This correlation was not uncommon; it has been indicated in many studies. Therefore, a need for improvement in access to health centres is emphasised.[7,9,11,12,14]

The frequency of visits from health workers played a significant role, females who had more visits from health workers showed a significantly higher immunization rate. This was due to better awareness associated with visits from health workers like Lady Health Workers. The rate with which health workers visited women was little higher than what was found in a similar study in Khyber Pakhtunkhwa[3] but much higher than studies in 3 districts of Khyber-Pakhtunkhwa, Punjab and Baluchistan in Pakistan.[16]

The reason behind this better performance by health workers is Peshawar being the capital of province with easier access and facilities. One of the reasons of such better rates could be inclusion of health workers from the NIDs in this criterion, which were not considered in similar studies. Nevertheless, health workers play a very significant role in immunization coverage.[3,12,17–19]

Most of the women (8.8%) thought vaccination was useful but significant number did not consider it useful, indicating the need for health education. There were still misconceptions like sterility and many females considered it as ineffective. This is not an unexpected finding. Thus more work has to be done in awareness among women.[4,7,9,20]

Women who had access to TV/radio had higher immunization (66.4%) than those who did not have access to TV/radio (23.2%). Similar findings were found in other studies conducted in Pakistan. The reason behind this is likely due to the fact that TV and radio are effective ways of media campaigns on immunization, indicating that media campaigns can be a useful way for promoting immunization.[7,8,19,17]

Several methodological issues have to be taken into consideration regarding this study. First, the cross-sectional nature of the factors in this study does not allow us to draw a clear relation between the associated factors found in this study and lack of immunization. Secondly, many of the factors existed simultaneously in the same population (e.g., low income, low literacy, lack of information) or were interdependent, pointing out that improving one factor can show improvement in the other.

The study was conducted in Peshawar which being the capital attracts a substantial amount of immigrants from other parts of the province and especially the under privileged Afghan migrants, which can as whole affect the outcomes in this study. Future approaches to such studies should consider the complex interdependent nature of these variables.

The study considered only married women who had at least one child instead of focusing on every woman of child bearing age. This could give misleading immunization results as it is possible that married women, who have given birth, have a better immunization status.

CONCLUSION

Immunization rate for maternal TT in Peshawar is much lower than other developed parts of the world and most similar cities of our country. Reasons for non immunization were lack of awareness, low literacy, low accessibility and misconception regarding immunizations and associated with poor socioeconomic conditions. These issues have to be addressed, if any significant progress to maternal neonatal tetanus elimination is to be made.

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