

## Original Paper

# Role of Health Education in Raising Tetanus Toxoid Vaccination Coverage among Pregnant Women and Mothers with Newborns in Khartoum North-Sudan, 2019

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### Abstract

*Tetanus is an acute disease caused by the toxin of a bacterium called Clostridium tetani which is often found in soil. It is a life-threatening bacterial disease, which causes severe mortality among maternal, neonatal, and young infant. It is so serious even it can waste pregnancy, harm her baby during pregnancy or after delivery. A quasi experimental community based study was conducted among pregnant women and mothers with newborns in Khartoum North Locality from 2015-2019 with the aim to assess the effectiveness of health education intervening in raising tetanus toxoid vaccination coverage among pregnant women and mothers with new born. 266 participants were selected by using a systematic random sampling technique. The intervention that continued for six months includes; health talks, home visits, video show, presentations with power points, focus groups discussion, exhibitions, distribution of printed materials, pamphlets, brochures and posters. The data was statistically analyzed by using the (SPSS) and significant  $t$  and  $\chi^2$  - tests. The result showed a significant increase in the participants' knowledge after the intervention towards tetanus toxoid at  $P$  value 0.00, the mode of infection with tetanus at  $P$  value 0.00, vulnerable group to tetanus at  $p$  value is 0.00, the seriousness of the tetanus at  $P$  value 0.00, neonatal tetanus at  $P$  value 0.00. There was a significant positive modification of the participants' attitudes towards the easiness to communicate with the health workers at  $P$  value 0.00. The result showed a significant change in the participants' practices towards vaccination against tetanus toxic at  $P$  value 0.00 and significant change towards taking vaccine dose regularly at  $P$  value 0.00. The study recommended that Federal Ministry of Health has to*

*conduct many health education interventions to raise the tetanus toxoid vaccination coverage.*

**Keywords**

*Tetanus, Toxoid, Vaccination, Health, Education*

**1. Introduction**

*1.1 Background*

Tetanus is an acute disease caused by the toxin of a bacterium called *Clostridium tetani* which is often found in soil. It is a life-threatening bacterial disease, which causes severe mortality among maternal, neonatal, and young infant. It is so serious even it can waste pregnancy, harm her baby during pregnancy or after delivery.

Neonatal tetanus usually occurs in newborns through infection of the unhealed umbilical stump, especially when the stump is cut with a non-sterile instrument (WHO, n.d.). Neonatal disease usually present within the first two weeks of life and involves generalized rigidity and painful muscle spasms, which in the absence of medical treatment leads to death in most cases. Tetanus is prevented only through vaccination, which is a simple and effective way to protect the mother and child from certain infections (U.S National Library of Medicine, Human Vaccine and Immunotherapeutic, 2015).

The World Health Organization (WHO) reported that neonatal tetanus kills over 200,000 newborns each year; almost all these deaths occur in developing countries, where there is low coverage of facility-based births, antenatal care and tetanus vaccination. In addition, antenatal care coverage and infant mortality is often unequal between the most- and least-educated, urban and rural, and richest and poorest populations. Therefore, increasing tetanus immunity in countries with low coverage and among disadvantaged populations could help to address inequalities (WHO, n.d.; U.S National Library of Medicine, Human Vaccine and Immunotherapeutic, 2015).

Promoting clean delivery and cord care practices as well as ensuring that women are adequately immunized against tetanus prior to birth can prevent transmission of neonatal tetanus. Study that conducted in Pakistan by Mahnoor et al. (2016), which aimed at determining knowledge, attitude and practice of pregnant women towards tetanus immunization and to identify potential barriers that may hinder them from getting vaccinated. It showed 64.6% of the participants knew what tetanus vaccination was but only 16.7% were able to correctly identify that it was used against maternal and neonatal tetanus and It showed that 56.9% of the participants had been vaccinated.<sup>7</sup> Study that conducted in Sudan by Fadwa (2003), which aimed to study knowledge and behavior of mothers towards tetanus toxoid vaccination and showed high significant association between mother's educational level and their knowledge concerning maternal tetanus at p value 0.000 and significant relationship between mothers ages and vaccination with at least one dose of TT. at P value 0.012 (Fadwa, 2003). Qualitative evidence indicates that most women view antenatal care as a source of knowledge, information and medical safety, and generally appreciate the interventions and advice they are offered. However, engagement may be limited if vaccinations are not explained properly or when women feel their beliefs, traditions and social

support mechanisms are overlooked or ignored by health-care professionals. Lack of engagement may be compounded if services are delivered in a hurried, inflexible, didactic manner study that conducted in central Ethiopia by Birmeta et al. (2012), which aimed to assess the determinants of maternal health care utilization among women who had given birth in the past three years prior to the survey. It showed that when ANC users asked about the personal respect of health workers at ANC unit, the majority 91.2% reported that health workers were respectful for them (Birmeta et al., 2012).

Study that conducted in Iraqi by Tamadur (2015), which aimed to assess the knowledge and practice of mothers on antenatal tetanus vaccine in addition to their tetanus toxoid vaccination status. It showed that only (18.3%) women had completed their tetanus vaccination (Tamadur, 2015). Study that conducted in India by Agarwal et al. (2004), which showed insignificant association between mothers' religion and knowledge concerning maternal tetanus. Study that conducted in India by Aditya et al. (2008), which aimed at examining factors associated with the utilization of maternal healthcare services among urban Indian married adolescent women (aged 13-19 years), who have given live/still births during last three years preceding the survey and showed that about 74% and 68% of mothers with mass media exposure reported using delivery and postnatal care.

The WHO strategy for eliminating maternal and neonatal tetanus includes immunization of pregnant women, supplementary immunization activities in selected high-risk areas, promotion of clean deliveries and clean cord practices, and reliable neonatal tetanus surveillance. For prevention of neonatal and maternal tetanus, WHO recommends giving women a series of five doses of tetanus- toxoid vaccine with a minimum interval between each dose. Each dose increases the level and protection against tetanus. Each dose counts as a dose towards a five-dose schedule even if given before the recommended interval. A woman who receives five doses of tetanus toxoid is fully immunized and is protected against tetanus throughout her childbearing years.

Global vaccination programmes have reduced the global burden of neonatal tetanus deaths and continue to do so; estimates show a reduction from an estimated 146,000 in 2000 to 58,000 (CI: 20,000-276,000) in 2010. As tetanus spores are ubiquitous in the environment, eradication is not biologically feasible and high immunization coverage remains essential (U.S National Library of Medicine, Human Vaccine and Immunotherapeutic, 2015).

### *1.2 Rationale*

Most deaths from maternal and neonatal tetanus occur in countries with low coverage of facility-based births, antenatal care and tetanus vaccination. It is a major components of the strategy to eradicate maternal and neonatal tetanus globally. Vaccination is a simple effective method of prevention, raising the vaccination coverage through health education intervention, will lead to significant reduction in morbidity and mortality among mothers and new born (<http://www.apps.who.int/iris/bitstream/10665/250796/8/9789241549912-websupplement-eng.pdf?ua>).

### *1.3 Justification*

Tetanus vaccine-preventable diseases cause significant morbidity and mortality among maternal,

neonatal, and young infant. Some infections are so serious even they can waste pregnancy, harm her baby during pregnancy or after delivery. World Health Organization (WHO) reported that neonatal tetanus kills over 200,000 newborns each year; almost all these deaths occur in developing countries.<sup>1</sup> Khartoum North is of low tetanus toxoid vaccination, low utilization of mother and child health services and inequality health services distribution, at the same time, the lack of adequate health services and transport in rural area reduce the likelihood of prompt and appropriate use of health services. Place of residence is the other factor that was less likely to give birth in health facility than their urban counterparts.

#### *1.4 Objectives*

##### *1.4.1 General Objective*

To assess the effectiveness of health education intervening in raising tetanus toxoid vaccination coverage among pregnant women and mothers with newborns in Khartoum North Locality.

##### *1.4.2 Specific Objectives*

- To determine the current situation of tetanus toxoid vaccination coverage among pregnant women and mothers with newborns.
- To assess knowledge of pregnant women and mothers with newborns towards tetanus toxoid vaccination.
- To identify attitudes of pregnant women and mothers with newborns towards tetanus toxoid vaccination.
- To identify practices of pregnant women and mothers with newborns towards tetanus toxoid vaccination.

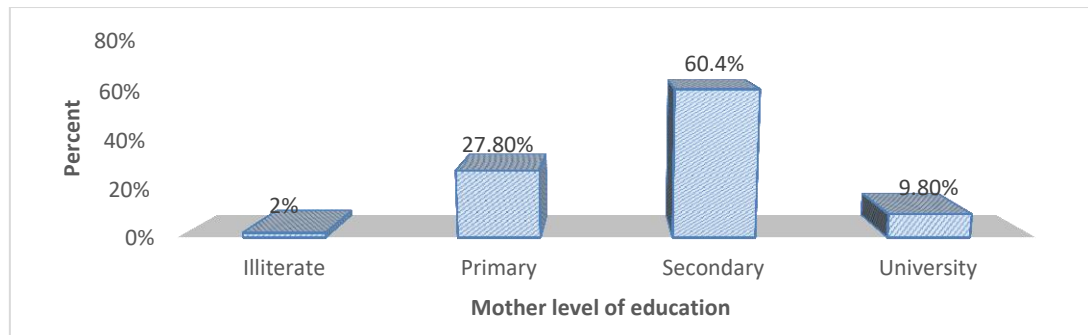
## **2. Materials and Methods**

A quasi experimental community based study was conducted among pregnant women and mothers with newborns in Khartoum North Locality, which is one of the seven localities of Khartoum State. According to 2010 census there were 110785 children less than five years and 185797 women in reproductive age. 266 respondents were participated in the study. Data was collected by questionnaires, interviews and observation methods. The intervention, which continued for six months was prepared and implemented including; the health talks, video shows, focus group discussion, exhibition, distributing printed materials and posters among the respondents. Follow up, and evaluation were conducted. Data was statistically analyzed by using the Statistical Package for Social Sciences (SPSS) and significant tests  $t$  and  $\chi^2$ .

## **3. Result**

The study revealed that, the majority (80.5%) of the participants live in rural area, and the majority's (81.6%) age range between 18-34 years, almost all (98%) the participants are Muslim. Nearly two third (68.30%) of the participants' family monthly income range between (200-800 SDGs) and most (60.8%) of them use public transportation. The majority (81.80%) of mothers are house wife. The following are

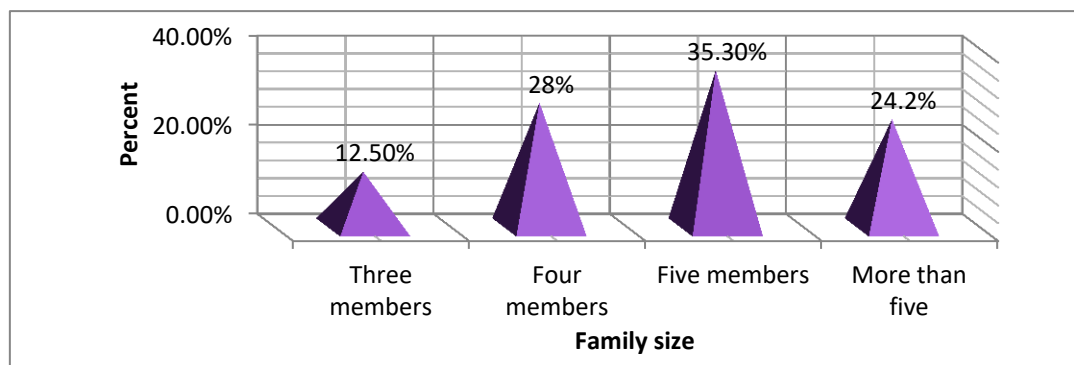
the main findings of the study:



**Figure 1. Distribution of the Participants According to Their Mother Level of Education**

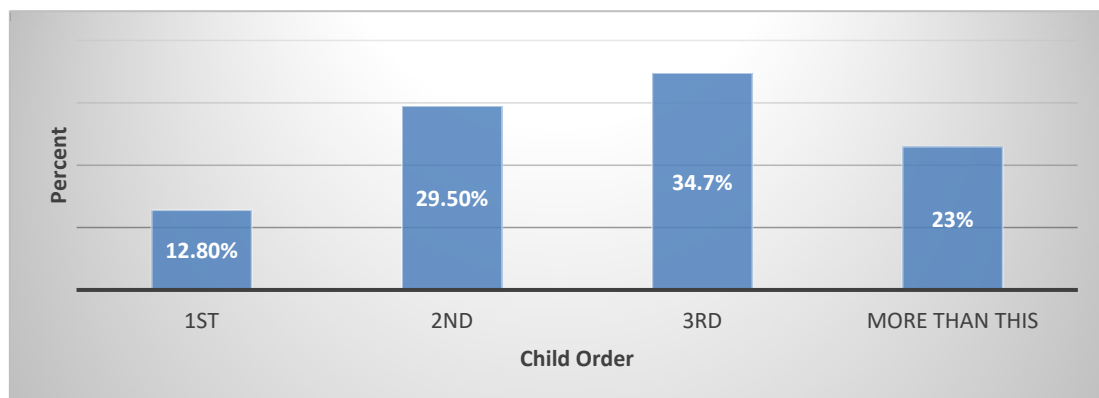
Note. N=266.

The majority (88.2%) of the mothers' level of education are primary and secondary.



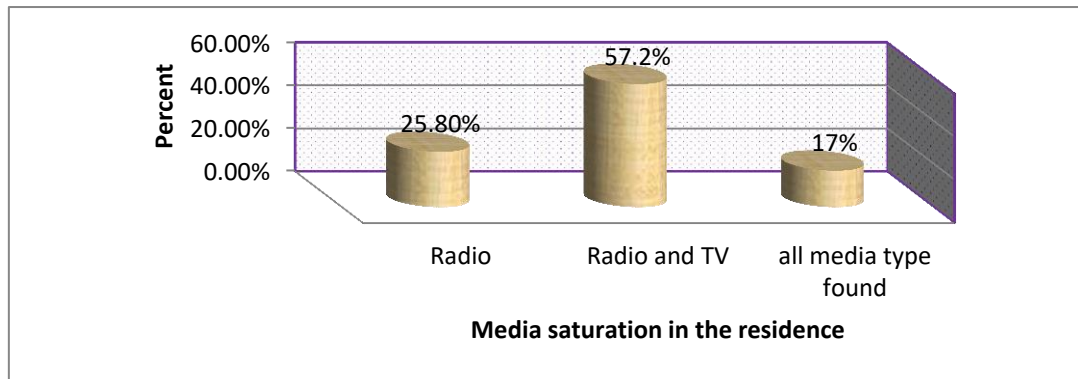
**Figure 2. Distribution of the Participants According to Their Family Size**

Most (63.3%) of the participants' family size range between four and five members.



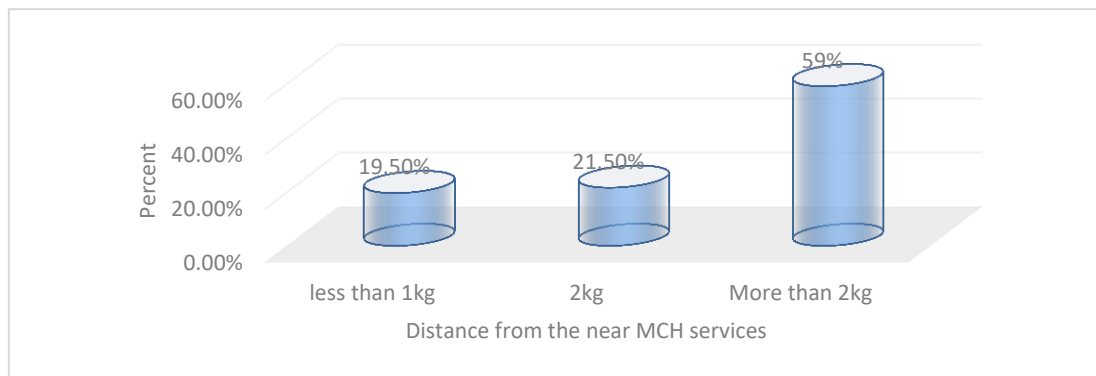
**Figure 3. Distribution of the Participants According to Their Child Order**

The highest (34.7%) child order, is the third in order and (29.5%) the second order respectively.



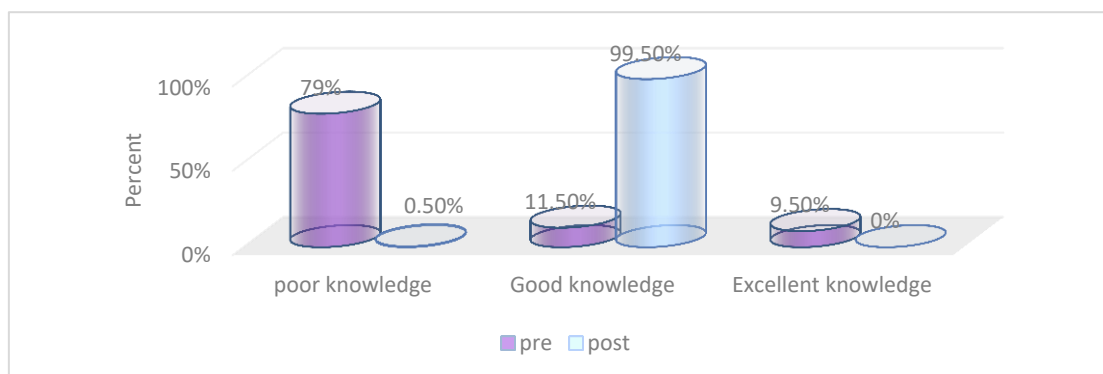
**Figure 4. Distribution of the Participants According to the Dominant Media in the Residence**

More than half (57.2) of the participants have TV and radio.



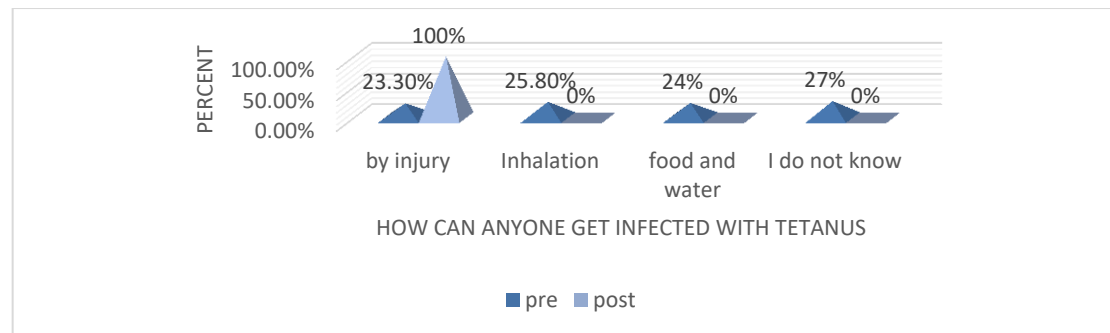
**Figure 5. Distribution of the Participants According to Distance to the Near MCH Services Center**

More than half (59%) of the participants' residence are 2 km or more away from the near MCH services center.



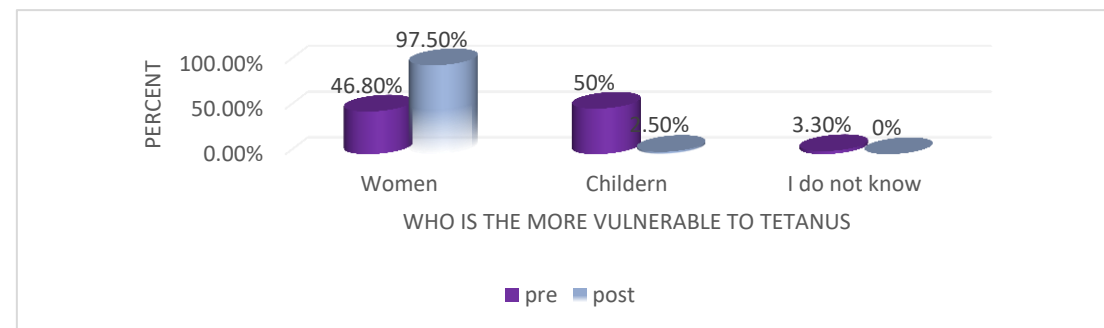
**Figure 6. Distribution of the Participants According to Their Knowledge Concerning Tetanus Toxoid**

There is a significant increase in the participants' knowledge after the intervention concerning knowing tetanus toxoid for good knowledge from 11.5% to 99.5% at t-test 17.616 df 399 and P value 0.00.



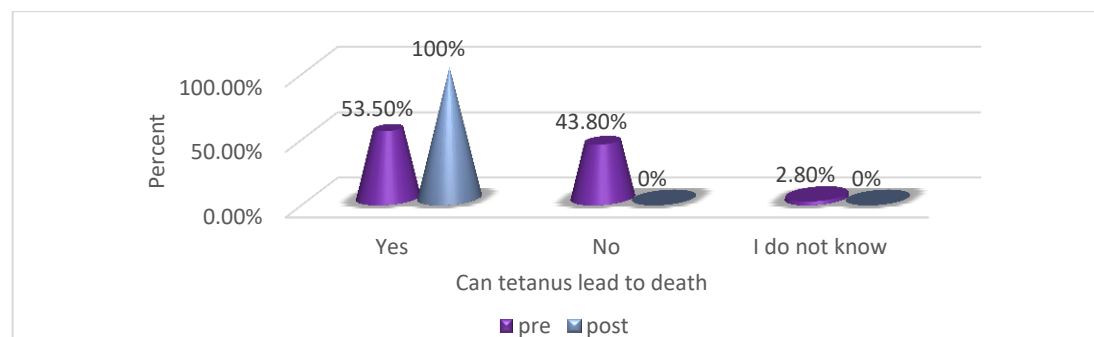
**Figure 7. Distribution of the Participants According to Their Knowledge Concerning Mode of Infection with Tetanus**

There is a significant increase in the participants' knowledge after the intervention concerning the mode of infection with tetanus from 23.30% to 100% at t-test 27.6187 with df 399 and the P value is 0.00.



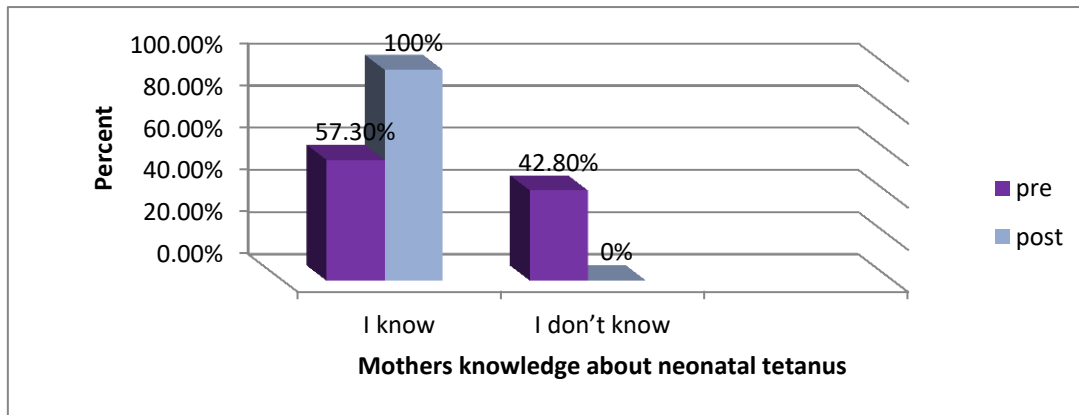
**Figure 8. Distribution of the Participants According to Their Knowledge Concerning the Vulnerable Group to Tetanus**

There is a significant increase in the participants' knowledge after the intervention concerning vulnerable group to tetanus from 46.80% to 97.50% at t-test 19.2687df 399 P value is 0.00.



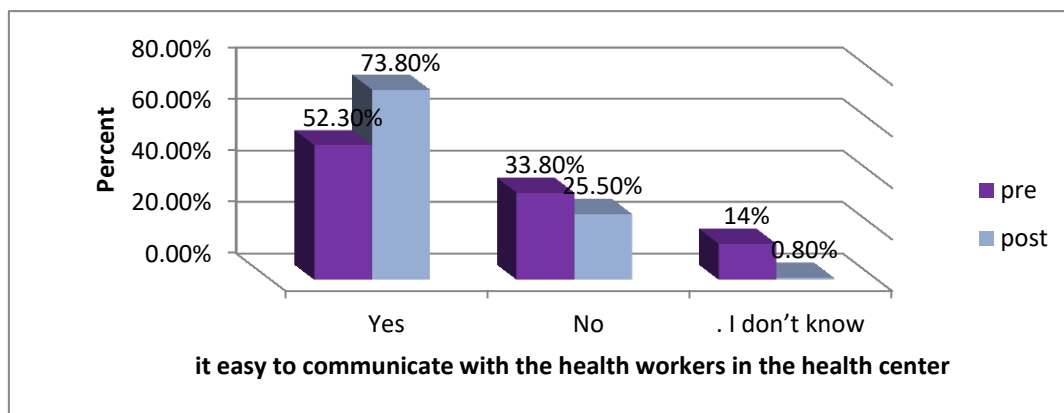
**Figure 9. Distribution of the Participants According to Their Knowledge Concerning the Seriousness of the Tetanus**

There is a significant increase in the participants' knowledge after the intervention concerning the seriousness of the tetanus, from 53.50% to 100% at t-test 17.815 df 399 P value 0.00.



**Figure 10. Distribution of the Participants According to Their Knowledge Concerning Neonatal Tetanus**

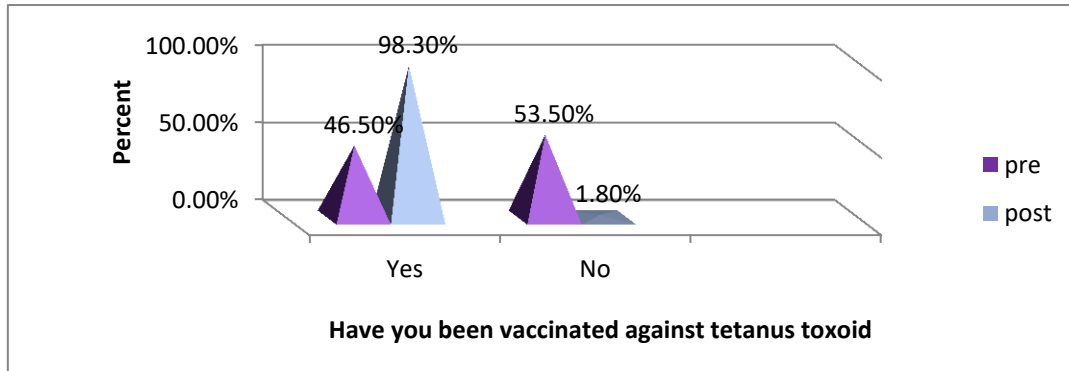
There is a significant increase in the participants' knowledge after the intervention concerning neonatal tetanus, from 57.30% to 100% at t-test 17.261 df 399 P value 0.00.



**Figure 11. Distribution of the Participants According to Their Attitude towards the Easiness to Communicate with the Health Workers**

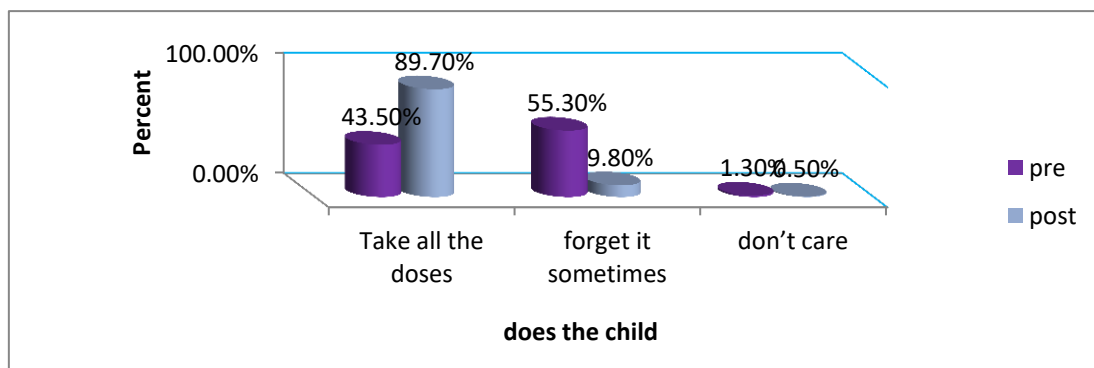
There is a significant positive modification of the participants' attitudes after the intervention towards the easiness to communicate with the health workers, from 52.3% to 73.8% at t-test 10.106 df 399 P value 0.00.





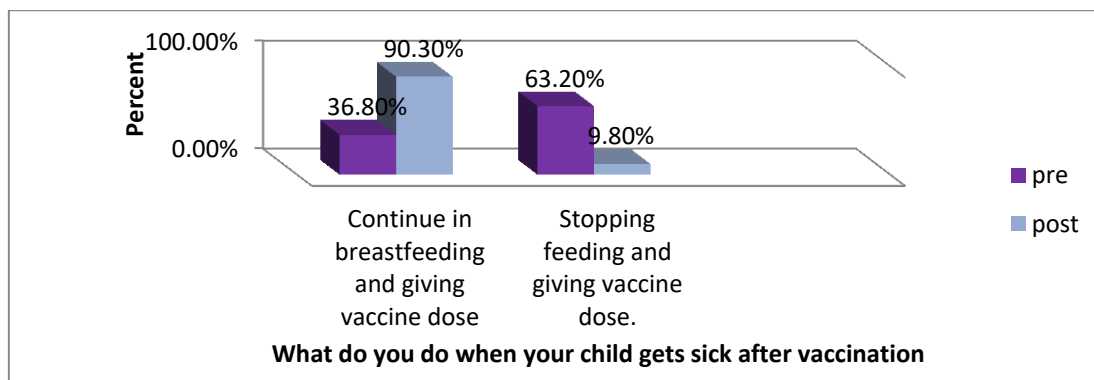
**Figure 12. Distribution of the Participants According to Their Practice Concerning Vaccination against Tetanus Toxic**

There is a significant positive change in the participants' practices after the intervention concerning vaccination against tetanus toxic, from 46.50% to 98.30% at t-test 20.687 df 399 P value 0.00.



**Figure 13. Distribution of the Participants According to Their Practice Concerning Taking Vaccine Dose regularly**

There is a significant change of the participants' practices after the intervention concerning taking vaccine dose regularly, from 43.50% to 89.70% at t-test 13.954 df 399 P value 0.00.



**Figure 14. Distribution of the Participants According to Their Practice Concerning Their Action When Child Gets Sick after Vaccination Dose**

There is a significant change of the participants' practices after the intervention concerning taking vaccine dose, from 36.80% to 90.30% at t-test 41.426 df 399 P value 0.00.

**Table 1. Association between Mothers' Age and Vaccinated against Tetanus Toxoid**

		vaccinated against tetanus toxoid		
		Yes	No	Total
		Percent	Percent	Percent
Mother's age	below 18 years	10.8	10.8	10.8
	18-24 years	43.3	1.0	44.3
	25-34 years	33.5	0.8	34.3
	35 and above	7.8	0.0	7.8
Total		98.3	1.8	100.0

There is an insignificant association between mothers' age and vaccinated against tetanus toxoid at q2 test 1.620 df3 P value = 0.655.

**Table 2. Association between Mothers' Marital Status and Vaccinated against Tetanus Toxoid**

		vaccinated against tetanus toxoid		
		Yes	No	Total
		Percent	Percent	Percent
Mother marital status	Married	96.0	1.8	97.8
	Divorced	1.0	0.0	1.0
	Widowed	1.3	0.0	1.3
Total		98.3	1.8	100.0

There is an insignificant association between mothers' marital status and vaccinated against tetanus toxoid at q2 test .164 df 2 P value = 0.921.

**Table 3. Association between Mothers' Job and Vaccinated against Tetanus Toxoid**

		vaccinated against tetanus toxoid		
		Yes	No	Total
		Percent	Percent	Percent
Mother's job	House wife	80.5	1.3	81.8
	Employer	12.5	0.5	13.0
	Private work	5.3	0.0	5.3
Total		98.3	1.8	100.0

There is an insignificant association between mothers' job and vaccinated against tetanus toxoid at q2 test 1.796 df2 P value = 0.407.

#### 4. Discussion

This study, which was conducted in Khartoum North Locality aimed to assess the effectiveness of health education intervening in raising tetanus toxoid vaccination coverage among pregnant women and mothers with newborns in Khartoum North Locality. The results showed that the majority (88.2%) of the participants' educational level are primary and secondary, where there was insignificant association between mothers' educational level and vaccination against tetanus toxoid at p value 0.959. Education empowers women over their circumstance in life through proper knowledge and awareness and affect their behavior and the utilization of the health services. This result agrees with the study that conducted in Sudan by Adil et al. (2006) which showed a nearly significant positive relationship with the use of T T vaccine. Concerning the mass media more than half (59%) of the participants have T.V and radio. Most common source of tetanus toxoid vaccination information was the mass media; exposure to the mass media has had greater impact on the vaccination coverage. This result agrees with study that conducted in India by Aditya et al. (2008), which showed that about 74% and 68% of mothers with mass media exposure reported using delivery and postnatal care.

Regarding the distance to health facilities more than half 59% of the participant's residences are more than 2 km away from the near MCH services center. This result disagrees with the study that study conducted in Sudan by Adil et al. (2006) which showed that 83.3% of women's who were living closer to the health care services were more likely to have had the routine antenatal care, the distance to the health facility and perceived quality of services also contribute to the utilization.

The result showed that there was a significant increase in participants' knowledge concerning maternal tetanus after intervention at p value 0.00, mode of transmission at p value 0.00, vulnerable groups and seriousness of the disease. These results agree with the finding of study that conducted in Pakistan by Mahnoor et al. (2016) which showed that 64.6% of the participants knew what tetanus vaccination was but only 16.7% were able to correctly identify that it was used against maternal and neonatal tetanus. The study revealed that there was a significant association between mothers' religion and knowledge concerning maternal tetanus, at P value 0.001. This result disagrees with study that conducted in India by Agarwal et al. (2004), which showed that there was no significant association between mothers' religion and knowledge concerning maternal tetanus.

The result revealed that there was an insignificant association between mother's educational level and knowledge concerning maternal tetanus at p value .295. This result disagrees with the study that conducted in Sudan by Fadwa (2003), which showed that there was high significant association between mother's educational level and their knowledge concerning maternal tetanus at p value 0.000.

The study found that there was a significant positive modification of participants' attitude towards the easiness to communicate with the health workers at p value 0.00 This result agrees with the study that

conducted in central Ethiopia by Birmeta et al. (2012) showed that when ANC users asked about the personal respect of health workers at ANC unit, the majority 91.2% reported that health workers were respectful for them.

The study showed that there was a significant change of participants' practices concerning the use of T.T vaccination at p value 0.00, 98.3% of the participants' had been vaccinated after intervention. This result agrees with study that conducted in Pakistan by Mahnoor et al. (2016), which showed that 56.9% of the participants had been vaccinated. But it disagrees with the study that conducted in Iraqi by Tamadur (2015), which showed that only (18.3%) women had completed their tetanus vaccination.

The study revealed that there was an insignificant association between mothers' age and vaccination against tetanus toxoid at P value 0.655. This result disagrees with the study that conducted in Sudan by Fadwa (2003), which showed significant relationship between mother's ages and vaccination with at least one dose of TT. at P value 0.012.

## **5. Conclusion and Recommendations**

### *5.1 Conclusion*

Tetanus is an acute disease and a life-threatening bacterial disease, which causes severe mortality among maternal, neonatal, and young infant. This study concluded that health education intervention proved to be a very effective means to raise the coverage of tetanus toxoid vaccination among the participants. Thus, the overall knowledge about tetanus toxoid disease and vaccination is increased significantly after the intervention and the attitudes of the participants towards tetanus toxoid vaccination was also significantly improved and there is a significant promotion of practices of the participants towards tetanus toxoid vaccination. The intervention enriches the knowledge of the participants, makes positive modification in their attitude and promoting of their practices concerning tetanus toxoid vaccination.

### *5.2 Recommendation*

On the basis of objectives and results of the study, the following recommendations are stated:

- The Federal Ministry of Health has to conduct many health education interventions in the area to raise the tetanus toxoid vaccination coverage.
- The Federal Ministry of Health has to improve the communication skills and social diversities of their vaccination staff.
- The State Ministry of Health has to use mass-media for the outreached pregnant women and mothers with newborns for health message concerning tetanus toxoid vaccination.
- The State Ministry of Health should encourage further studies to identify the determinants of tetanus toxoid.

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