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Research Article

Tetanus Toxoid Immunization Practice among Child-Bearing Age Women of Shashemene Town Oromia Region Southern Ethiopia in 2017

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Abstract

Background: People of all ages can get tetanus but the disease is particularly common and serious in neonatal tetanus. Neonatal tetanus can be prevented by immunizing women of childbearing age with tetanus toxoid, either during pregnancy or outside of pregnancy. Moreover, Maternal and neonatal tetanus is still the major public health problem in about 25 countries, mainly in Africa and Asia. However, the utilization of intervention strategies, like tetanus toxoid immunization/TTI/remains low in these countries.

Objective: To assess Tetanus Toxoid immunization practice of childbearing age women among the women of Shashemene town, Southern Ethiopia, 2017.

Methods: A community-based cross-sectional study was conducted from January 1st to March 30th, 2017 on childbearing age women who live in the study area for at least six months. Based on a simple random sampling technique five Kebeles (local name small district) were selected. The sample size was determined by single population proportion formula and accordingly, the study population with non-respondents was 403 women. To address these study a systematic sampling technique was applied. A semi-structured questionnaire was distributed for each woman.

Result: The study indicated that the response rate of the study was 97.52% (n = 393). Of these, majority of them i.e. 48.6% (n = 191) between 24 and 32 years old; 54.96% (n = 216) of them housewife; 27.23% (n = 107) attended secondary school; 74.05% (n = 291) of them married; and 30.58% (n = 89) of them merchant. The study also revealed that 11.96% (n = 47) were not took even one dose of tetanus Toxoid immunization, 44.53% (n = 175) of them were on vaccination and 23.15%) (n = 91) of them started to take immunization but discontinued and 20.36% (n = 80) had completed their immunization.

Conclusion: The study concluded that the majority of the respondents took three doses of Tetanus Toxoid immunization vaccination. However, certain women were not taken valid Tetanus Toxoid immunization dose. Thus, the authors suggested that regular and frequent health education for the general community and childbearing age women, in particular, encourages further improvement.

Keywords: *Childbearing Age; Immunization; Neonatal; Tetanus Toxoid*

Introduction

Background

Tetanus is a disease that is caused by clostridium tetanus bacteria. Tetanus (lockjaw) results in painful tightening of the muscle in the whole body, which may lead to death in about one out of ten cases. Mortality tends to be very high in the absence of medical treatment case fatality approached 100% with hospital availability of intensive care facilities [1]. Clearly, prevention measures for tetanus are more effective than case management, even if full intensive care were available, and certainly much more cost-effective [2]. TT immunization is a vaccine that protects against tetanus it is provided as a liquid in vials and also in prefilled auto disabled injection devices. It also protects against maternal and neonatal tetanus. The vaccine is an inactivated toxin (Toxoid) that was first produced in 1924 [4,6].

It became commercially available in 1938 and was successfully used extensively during Second World War in the late 1940s; it was combined with diphtheria and Pertussis vaccines to produce the DPT triple vaccine used in many childhood immunization programs, a trial in Papua, New Guinea published in 1965 was the first demonstration that uses of two more doses of tetanus taxied during pregnancy could prevent neonatal tetanus. In the mid1970s, TT vaccination of pregnant women was in clouded in the whose expanded program on immunization [3].

The concentration of tetanus anti-toxin exceeding 0.1 - 0.15 IU/ML, measured by standard enzyme-linked immune sorbent assay is considered protective. These are achieved 24 weeks after the second dose of Tetanus Toxoid in 90% of adults [5]. The aim of TT immunization is to protect women against tetanus infection throughout their childbearing years and this ensures that they are protected against tetanus which accounts for 10,000 death annually worldwide [8]. It is estimated that neonatal tetanus is responsible for 14% of all neonatal deaths globally and it is accounting for up to 25% in some African countries. While maternal tetanus is responsible for about 5% of maternal death annually worldwide [9].

In 2003, there were 1,372 cases of TT immunization report from sub-Saharan African countries, among these 465 cases were reported from the democratic republic of Congo, 315 cases were immunized in Chad, 316 cases in Uganda, and 238 cases were immunized in Guinea [10]. In Ethiopia maternal tetanus Toxoid immunization is implemented as part of the routine immunization program or as supplemental activities as other developing countries the Ethiopia demographic and health survey (EDHS) 2011 reported that 32% of childbearing age mothers had received two or more doses of TT during pregnancy in five years preceding the survey [6].

The problem with TT immunization is low-level access to health facilities, lack of trained manpower, lack of information about TT immunization, transportation shortage, and missed opportunities are among the major problem [8]. As observed in many countries, the high default rate from the TT immunization schedule is mainly the impact of lack of adequate information about the immunization schedule, inconvenient immunization place and time, and fear of immunization side effects [9]. The Global number of cases reported has decreased since the elimination goal for neonatal and total tetanus cases was set even though the numbers must be interpreted with caution as there is great variability in reporting system [14].

In 2003, there were 8, 997 cases of neonatal tetanus report to WHO, among these three countries in Southeast Asia (2.2245 cases in China, 238 in Cambodia, 239 in the Philippines) and three countries in the Indian sub-continent (1.691 in India, 812 in Pakistan, 390 in Bangladesh) and 78% of this were reported from four countries in sub-Saharan (465 in Democratic Republic of Congo, 353 in Chad, 316 in Uganda and 238 in Guiney) [13]. In Ethiopia maternal tetanus Toxoid immunization is implemented as part of the routine immunization program or as supplemental activities as other developing countries and the Ethiopia demographic and health survey (EDHS) 2011 reported that only 32% of childbearing age mothers had received two or more dose of TT immunization during pregnancy in five years preceding the survey [6].

In Ethiopia, Neonatal tetanus is the third killer of children after measles and Pertussis. The reason for which TT immunization failure are cultural believes that it may be an obstacle to get children, husband pressure, lack of knowledge about TT immunization, distance from the health center and also lack of competent health professionals who can facilitate the population to the benefit of TT immunization and others [16].

Therefore, the study sought to assess Tetanus Toxoid Immunization Practice among Child-Bearing Age Women of Shashemene Town Oromia Region South Ethiopia, 2017.

Materials and Methods

Study area and period

The study was conducted in Shashemene town, West Arsi zones, Oromia regional state, south Ethiopia from January 1st to March 30th, 2017. It is found at 255 KMs from Addis Ababa. The study was conducted in Shashemene town. Shashemene town has ten kebeles and projected total population was 100,454, among these 50,654 are males and 49,800 are females, from this 32,129 is Childbearing age women/CBAW/residing with 22,686 housing units (CSA,2007). According to Shashamanne Municipality Office/SMO/, a town has one referral hospital, one district hospital, three health centers, ten health posts runs by the government, one private general hospital, and 94 Private clinics of which 42 are medium clinics and 52 Drug vendors (SMO,2017).

Study design

A community-based cross-sectional study design was conducted.

Source population

Child-bearing age women who reside in the Shashemene town for at least six (6) months.

Study population

Women of childbearing age women in five selected Kebeles.

Study unit

All reproductive age women were selected to fill the questionnaire.

Inclusion criteria

Women in the reproductive age group who residing in the study area for at least six months.

Exclusion criteria

Women, who are critically ill, couldn't talk, listen, or severe form of mentally ill, and who lives in the study area for less than six months were excluded from the study.

Sample size determination

The sample size was estimated using single proportion formula: , where: N is the required sample size, Z is the reliability coefficient at 95% confidence interval (1.96), p is the population proportion, q is equal to 1−p, and d is the acceptable error (0.05). The literature shows that the proportion /p/ of mothers who received at least two TT doses was 50.9% [22]:

Therefore, sample size (n) become, = = = 384. By adding 5% of contingency, the final sample size was 384 + 384 × 5% = 403.

Sampling technique

Shashemene town is purposefully selected for logical reasons; the town is divided into ten kebeles. From the total of ten kebeles, five Kebeles were selected by simple random sampling. The total sample size was then allocated using probability proportional to the size of house households in the selected kebeles. Study participants were selected from households of each kebeles using systematic random sampling. The sampling intervals were obtained by dividing total households in each kebeles selected by the allocated sample. The total households of 01, 03, 04, 05, 010 are 1700, 1088, 1101, 1135 and 1306 respectively. The total household in the selected kebeles is 6330. Our sample size is 403. So that our allocation interval was fifteen [15]. From lists of 15 households starting from the edge of one kebeles I was select the first household by lottery method then continued the next every 15 intervals from the first chosen household. If more than one childbearing age woman were found one of them was selected by lottery method.

Study variables

- **Dependent variables:** TT immunization status.
- **Independent variables:** age, religion, occupation, educational status, ethnicity, and family income.

Data collection instrument

Data was collected by using semi-structured questionnaires by face-to-face interviews. Data questionnaires were prepared in English and then translated to the Afan Oromo version and translated back to English to check the consistency.

Operational definitions

- Child-bearing age women (CBAW): Any women 15 - 49 old irrespective of fertility status.
- Immunization: Protection of the susceptible individual from communicable disease by demonstrating a life modified agent.
- TT2+ coverage: The proportion of women who had received two or more doses of TT vaccine.
- Husband pressure: Negative attitude of the husband toward TT immunization.
- No TT immunization practice: Women took at least one TT dose.
- Good TT immunization practice: Women took two and more TT doses.
- Lack of knowledge about TTI: Being uninformed about how many times and schedule and dose the interval in each round.

Data quality control

After the data were collected using five data collectors from each Kebele. For clarity and precision of data collection, a pretest study was employed prior to full-scale research to test the instrument and strategies using 20 eligible women in 02 Keble. In order to control and ensure the quality of data properly designed data collection instruments were used, the proper sheet was prepared and the collected data was reviewed daily and checked for completeness, by the principal investigator.

Data analysis

Data were processed by categorizing the data and entering it into Statistical Package for Social Software (SPSS) version 20. The output of the result was displayed in frequency, mean, range, and percentage, which were presented in texts, tables, and graphs.

Ethical clearance

For the realization of the study Ambo University (AU), college of Medicine and Health Sciences was written a formal letter to Shashemene town Municipality administrative office then to whom the issue concerns. Then the municipality office also wrote a supportive letter for the concerned bodies including Kebeles.

Dissemination of the Study

The final report was submitted to Ambo University, College of Medicine and Health Sciences, and Shashemene Health Sectors. Finally, it will be attempted to publication.

Result

Sociodemographic

A total of 393 women were interviewed with a response rate of 97.52%. One hundred ninety-one (48.6%) are in the age group of 24 - 32. One hundred seven (27.23%) women have attended secondary school and forty-seven (11.96%) women have never attended any formal education. Two hundred forty (61.07%) of respondents belong to the Oromo ethnic group. The majority (54.96%) of women were housewives by occupation followed by (15.78%) of the student. The majority one hundred fifty-two (38.68%) was a follower of the Muslim religion. Among the total women interviewed two hundred ninety-one (74.05%) women were married. one hundred ninety-eight (50.38%) of the respondents earned below 1500ETB per month. About (67.68%) of family size ranges from three to six persons. The majority of (88.55%) of the respondents have radio or TV in their house. In the case of occupation and educational status of the husband of the respondents, (30.58%) and (31.27%) were merchant and grade 12 and above respectively. Two hundred forty (82.48%) of mothers had the freedom to visit health institutions (Table 1).

No	Variable		Respondents (n = 393)	
			Frequency	Percentage
1	Age	15 - 23	137	34.9%
		24 - 32	191	48.6%
		33 - 41	48	12.20%
		41 - 49	17	4.30%
2	Educational Status	Never attended	47	11.96%
		Only read and write	49	12.47%
		Elementary school	98	24.94%
		Secondary school	107	27.23%
		12 and above	83	21.11%
		Other	9	2.29%

3	Ethnic group	Oromo	240	61.07%
		Amhara	52	13.23%
		Tigre	16	4.07%
		Gurage	27	6.87%
		Other	58	14.76%
4	Occupation	Housewife	216	54.96%
		Maidservant	5	1.28%
		Civil servant	47	11.96%
		merchant	52	13.23%
		student	62	15.78%
		Other	11	2.79%
5	Religion	Orthodox	132	33.59%
		Catholic	12	3.05%
		Protestant	92	23.41%
		Muslim	152	38.68%
		Wake feta	5	1.27%
6	Marital status	Married	291	74.05%
		Unmarried	89	22.65%
		Divorced	10	2.54%
		Widowed	3	0.76%
7	Monthly income	< 1500 birr	198	50.38%
		1500 - 3000 birr	157	39.95%
		> 3000 birr	38	9.67%
8	Family size	< 3 people	80	20.37%
		3 - 6	266	67.68%
		> 6	47	11.95%
9	Having radio or TV	Yes	348	88.55%
		No	45	11.45%
10	Husbands' occupation	Government employee	73	25.09%
		Farmer	41	14.09%
		Civil servant	37	12.71%
		Merchant	89	30.58%
		Other	51	17.53%
11	Husbands' educational status	Never attend	29	7.38%
		Only read and write	32	10.995
		Elementary school	45	15.46%
		Secondary school	82	28.18%
		12 and above	91	31.27%
		Other	12	6.72%
12	Husbands' allowance to visit health institution	Restricted	51	17.52%
		Unrestricted	240	82.48%

Table 1: *Socio-demographic characteristics of the respondent on TTI in Shashemene town, West Arsi zone, Oromia 2017.*

Distribution of tetanus toxoid immunization status

From the total of 393 study participants, 47 (11.96%) were not taking even one dose of tetanus toxoid immunization, 175 (44.53%) of them are on vaccination and 91 (23.15%) of them start to take immunization but discontinued and 80 (20.36%) have completed their immunization. From the total of 91 (23.15%) TT immunization, 15 (16.5%), 34 (37.36%), 26 (28.57%), 16 (17.57%) were discontinued tetanus toxoid immunization after TT1, TT2, TT3, and TT4 respectively.

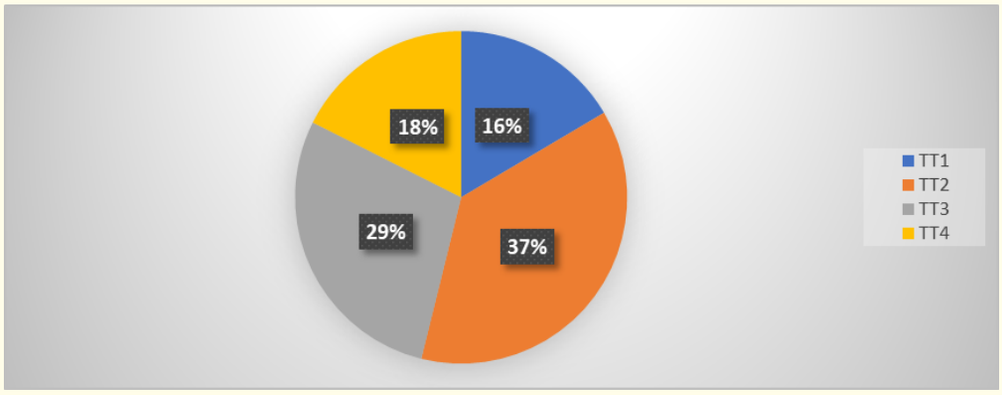

Figure 1: *Distribution of TT immunization among discontinued and at what phase they discontinued.*

From the total of 175 women, those on vaccination 57 (32.6%), 69 (39.45%), 49 (27.97%) took TT2, TT3, and TT4, respectively.

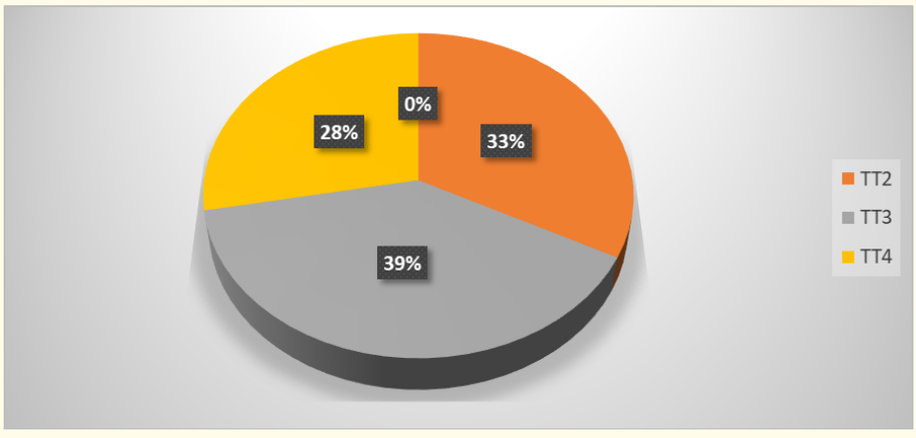

Figure 2: *Distribution of tetanus toxoid immunization among selected women, 2017.*

Source of information and place where they took TT immunization

From the total of 346 women who took TT immunization 108 (31.21%) from the hospital, 140 (40.46%) from the health center, 38 (10.98%) from the clinic, and 60 (17.35%) took from school. From the total of 346 respondents who got information about TT immunization that encourage them to take the immunization, most of them got from health professional 214 (83.59%), 17 (6.64%) from the magazine,15 (5.86%) from mass media and 10 (3.9%) from other sources.

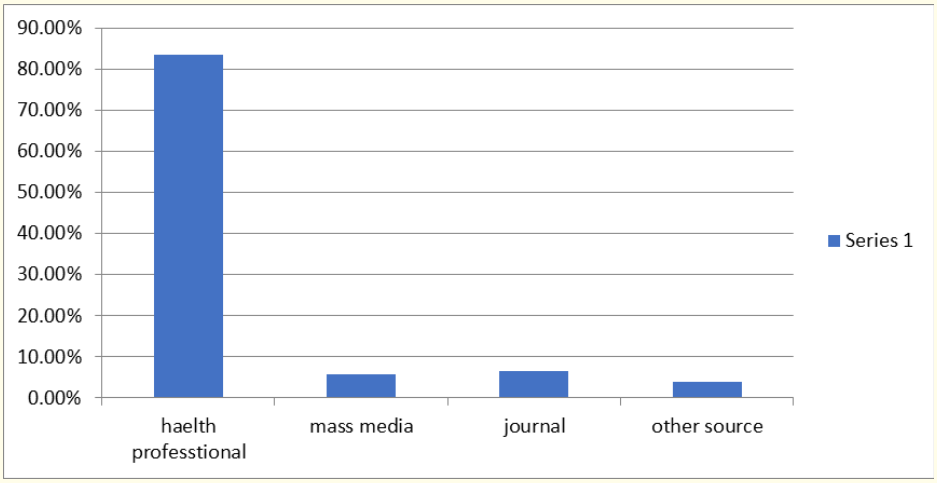

Figure 3: *Information source among those who got information about TTI, 2017.*

Immunization status and education relationship

From the total of 393 study participant women, 336 (85.45%) were educated and immunized, 10 (2.54%) were uneducated and immunized. From uneducated women 28 (7.12%) were not immunized, 19 (4.83%) were educated but not immunized.

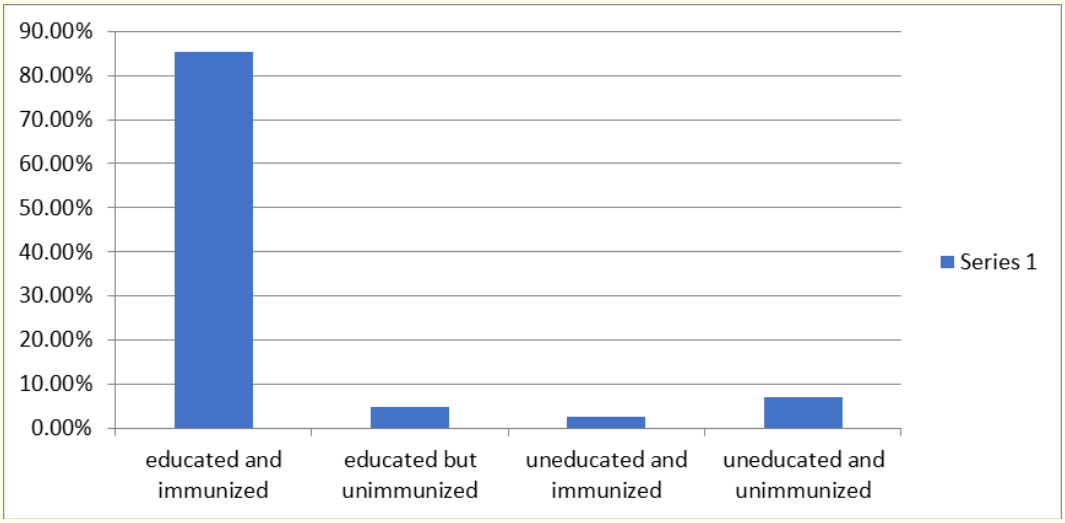

Figure 4: *Shows immunization and educational status relationship among study women, 2017.*

Respondents' view on the quality of immunization service.

Regarding the quality of TT immunization service, two hundred ninety-five (85.26%) of the respondent replied that health workers are respectful and lack of privacy was mentioned as a problem by 67 (19.36%) of the respondents. The majority of the respondent replied that the quality of service given was good 209 (60.40%), satisfactory 96 (27.75%) and 41 (11.85%) were poor respectively.

Variable	Possible response	Respondents (n = 393)	
		Frequency	Percentage
Respectfulness of health workers	Yes	295	85.26%
	No	42	12.14%
	I don't know	9	2.6%
Lack of privacy problem	Yes	67	19.36%
	No	261	75.43%
	I don't	18	5.21%
Quality of service	Good	209	60.40%
	Satisfactory	96	27.75%
	Poor	41	11.85%
Confidence in service provided	Yes	280	80.92%
	No	42	12.14%
	I don't know	24	6.94%
Rank on the behavior of the provider	Very good	87	25.14%
	Good	208	60.12%
	Fair	37	10.69%
	Bad	14	4.05%
Distance from home	Very near	104	30.06%
	Average	201	58.09%
	Far	41	11.85%

Table 2: *Maternal view on the quality of immunization services in Shashemene town, West Arsi, Oromia, Ethiopia, 2017.*

Discussion

This study identified to examine the socio-demographic characteristics of clients and identifies their tetanus toxoid immunization status. In this study mothers with at least two TT doses were found that 57 (32.6%). This finding is lower than the 87% coverage survey conducted in Pakistan this is maybe due to lack of information, inaccessibility of health facility and fear of side effects from 2003 to 2004 [12]. This study revealed that 80 (20.36%) of mothers had received a complete dose of five TTI, which is greater than (17%) study conducted in Pakistan but lower than (51.45%) study conducted in Ethiopia which was conducted in Jimma health center this may be due to difference in the study design [12,13].

Although a large number of respondents received two or more dose of injection considerable number 47 (11.96%) of mothers were not immunized yet, this is less than the results (44%) of a study conducted in Indonesia and less than results (18.6%) study conducted in

Bangladesh [13,20]. A community-based cross-sectional study conducted on assessing knowledge of TT immunization in Tselemt district Ethiopia shows that 43.2%mothers have information that TTI protects mothers and newborn from tetanus. The result is higher in this study 339 (88%) of respondents have got information about TT immunization. This may be due to the community in our study area have access to mass media, health professionals, close to health institutions [17].

A study conducted in Adami Tulu Ethiopia with the title of TT immunization practice among the childbearing age group showed that 26.3% have lack of information, this is higher than the current study 11.96% of the respondent have lack of information about TT immunization this may be due to the local health institution create awareness on TT immunization for the community [18].

Limitation of the Study

- For time and logistics reasons the study was conducted on accessible kebeles so that it might not be generalized to all women in the town.
- The study does not include the rural population.
- Presence of nonresponse rate.

Conclusion

This study indicates that 23.15% of mothers were not taken a valid TT dose. The majority of the respondent was on vaccination and taking three doses of TT immunization. Of those who started but discontinued the immunization 37.36% were stopped at the second dose of immunization. The utilization of tetanus toxoid immunization in the study area is about 88.04% of respondents reported they use TTI. The number of women who those taken complete TT immunization dose in this study area is 20.36%. Majority of women who take the immunization takes from the health center and majority of the husband does not encourage their wife to take the immunization that is only 6.65% of the husband encourage their wife to immunize. The majority of the women (88.04%) have information regarding tetanus Toxoid immunization. Lastly, women who are educated were immunized highly than thus not educated:

1. Regular and frequent health education for the general community and child-bearing age women, in particular, is important to further raising tetanus toxoid immunization coverage.
2. It is desirable to create awareness among both rural and urban women and their husbands and families about the importance of TT vaccination and the consequence of not being immunized.
3. Health extension workers should enable women to exercise their right to make a decision concerning freedom of movement, own health care, and access to the economic resource.
4. Shashmene health office should improve the quality of TTI service.
5. Shashemene town health office has to develop various programs like the TT immunization campaign to improve the immunization status of CBAW.

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their cooperation in conducting this research. Furthermore, we have glad to our participants for their willingness to participate in this study.

Author Contributions

Kuma Kebede is who developed conceiving research idea, methods, data collection, data analysis; also who developed manuscript and accepting comments from reviewers. While, Sina Temesgen who collect, enter, analysis and interpreted the data. Both Authors improved manuscript for publication.

Competing Interests

Not applicable.

Fund Interest

Not applicable.

Availability of Data and Material

We consent the data deposit in a public repository that meets appropriate standards of archiving, citation and curation; supplement information files under alongside of our manuscript; we can provide an explanation and details of any restrictions on access if data are not freely available.

Code Availability

Not applicable.

Ethics Approval

Ethical research conduct was approved by Ambo University Research Office and approved by Ethics Committee of Ambo University. Then, formal letter was written to Shashamanne town.

Consent to Participate

The participants of the briefed about the purpose and written informed consent will be secured from each participant.

Consent for Publication

We give my consent for information about perception of abattoir workers to be published in this Journal.

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