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Predictors for uptake of tetanus toxoid vaccination during pregnancy among women of reproductive age in Tanzania: an analysis of data from the 2015-16 Tanzania demographic and health survey and malaria indicators survey

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ABSTRACT: Uptake of TT vaccine among pregnant women is still low in Tanzania, although Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) recommend all women to receive at least five TT doses in their reproductive life and at least two doses during pregnancy. Little is known about the predictors of TT uptake during pregnancy among women of reproductive age in Tanzania. Therefore, this study aimed to evaluate the predictors for uptake of TT among pregnant women using 2015-2016 data from the Tanzania Demographic and Health Survey and Malaria Indicators Survey (TDHS-MIS). A total of 6924 women of reproductive age from 15 to 49 were included in the analysis. Both univariate and multiple regression analyses were used to determine the predictors of TT uptake during pregnancy among women of reproductive age in Tanzania. The results show that more than half, 3480 (50.3%) of the study population had either no or one tetanus injection. A total of 3444 (49.7%) had two or more tetanus injection during pregnancy. After adjusted for confounders, predictors of uptake of tetanus vaccination were early antenatal booking (AOR=1.174, CI=1.033-1.335, p=0.014), age between 20 to 34 years (AOR=1.433, CI= 1.155-1.778, p=0.001), age >34 years (AOR=1.379, CI=1.065-1.786, p=0.015), rich (AOR=1.261, CI=1.083-1.468, p = 0.003), para 2 - 4 (AOR=0.401, CI=0.343-0.468, p<0.001), para 5 and above (AOR=0.217, CI=0.178-0.265, p<0.001), having primary education, (AOR=0.864 at 95% CI=0.754-0.99, p=0.035), Unguja (AOR=0.434, CI=0.309-0.609, p<0.001), Pemba (AOR=0.34, CI=0.226-0.512, p<0.001) and adequate ANC visits (AOR=0.649, CI=0.582-0.723, p<0.001). In conclusion, based on the findings of the study, more efforts are need to be increased to ensure young women are mobilized to attend to reproductive and child health clinics for TT vaccination, especially on early ANC booking, and the government should find ways to ensure TT vaccination is accessed to all WRA irrespective of their socioeconomic status.

Keywords: Tetanus toxoid, uptake, vaccination.

Abbreviations: AIDS, Acquired immune-deficiency syndrome; **ANC,** Antenatal care; **DHS,** Demographic Health Survey; **MoHCDGEC,** Ministry of Health, Community Development, Gender, Elderly and Children; **SSA,** sub-Saharan Africa; **TDHS-MIS,** Tanzania HIV Demographic and Health Survey and Malaria Indicators Survey; **TT,** Tetanus Toxoid; **WHO,** World Health Organization; **WRA,** Women of Reproductive Age.

INTRODUCTION

Maternal tetanus is bacterial devastating disease acquired during pregnancy and postpartum period, irrespective of whether the pregnancy ended with a live or dead childbirth (Gebremedhin et al., 2020). African region suffers nearly 110,000 maternal and neonatal deaths per year from maternal and neonatal tetanus (World Health Organization,

2006). According to UNICEF report, every one hour, there are four neonatal deaths in SSA. In 2017, it was estimated that about 31,000 neonatal deaths occurred due to neonatal tetanus (UNICEF, 2021). However, a slight decline was observed based on 2018 WHO report of 25,000 neonatal deaths from similar cause (World Health Organization., 2020). In Tanzania, according to respective hospital-based survey of 2006 to 2015, 29.1% of late neonatal deaths were caused by sepsis, neonatal tetanus inclusive (Thwaites et al., 2015). There is no documented report regarding maternal deaths due to maternal tetanus in Tanzania.

Childbirth process subject women and their newborn babies to high risk of contracting tetanus. Newborn babies born to a non-immunized women are prone to neonatal tetanus (NT) (Mehanna et al., 2020; Mihret et al., 2018). Tetanus is a deadly non-communicable infection caused by *Clostridium tetani* which is a vaccine preventable disease (Mehanna et al., 2020).

Maternal and neonatal deaths can be curtailed regarding the adequacy of TT uptake among women of reproductive age (WRA) including antenatal women. The available national and international guidelines for TT vaccine emphasize uptake of 5 doses of TT administered throughout reproductive life (MOHCDGEC, 2018). Taking a 5 doses of TT vaccine helps the woman to develop protective antibodies against tetanus for about 3, 5, 10, and 30 years, for TT2, TT3, TT4 and TT5 respectively (Gebremedhin et al., 2020). World Health Organization emphasizes WRA received 1 to 4 TT vaccines before their current pregnancy, to receive another single booster dose to strengthen their immunity against maternal and neonatal tetanus (World Health Organization., 2016). Evidence shows that for effective protection of neonatal tetanus and its associated deaths, the pregnant woman should have received not less than two doses of TT vaccines during their last pregnancy (National Bureau of Statistics, 2015; Singh et al., 2012). According to research evidence, the maternal uptake of TT during pregnancy, protects the newborn baby against tetanus for a period of three months during postpartum period, and prevents neonatal deaths by 94% (Gebremedhin et al., 2020).

One study done in Colombia showed fewer cases of neonatal tetanus among TT immunized women (World Health Organization., 2016). Only 75% of WRA have receive at least TT2+ vaccine worldwide, while in Africa is only 63% (Gebremedhin et al., 2020). In Tanzania, according to 2015/2016 TDHS, only 52% of WRA received TT1 or TT2 in their last pregnancy (National Bureau of Statistics, 2015), although there was a slight increase compared to that reported in 2010 TDHS of 48% (NBS, 2010).

There are still high cases of home deliveries in African countries, including Tanzania (Exavery et al., 2014; Ngowi et al., 2017), which are attended in poor conditions under untrained attendants. Home deliveries especially those occurring in rural areas increase the risk of maternal and neonatal tetanus and associated deaths (Singh et al., 2012; Yaya et al., 2019). Birth hygiene is also compromised in most of low and middle income countries indicating the need for TT vaccine among WRA, especially during pregnancy (Thwaites et al., 2015). Adequate antenatal care (ANC) services utilization provides a convenient time for pregnant women to receive TT vaccines (WHO, 2006). Studies conducted elsewhere in Pakistan, Bangladesh and Ivory Coast indicated that ANC service utilization promotes TT vaccine coverage among pregnant women (Iqbal et al., 2020; Islam and Masud, 2018; Yaya et al., 2019). Similarly, in Ethiopia, one study showed a positive association between early ANC booking and TT vaccine uptake (Mihret et al., 2018).

On the other hand, sociodemographic characteristics of the woman are linked to adequacy of TT vaccine uptake. Two studies from Ethiopia further indicated younger women were more likely to attend ANC clinics for TT vaccine compared to older women (Mamoro and Hanfore, 2018; Shafiq et al., 2017). Maternal education also matters in TT vaccine uptake as women with primary education or none were less likely to have adequate uptake of TT vaccine during reproductive life, including when they were pregnant in African countries (Anatea et al., 2018; Desta Belihu et al., 2017; Shafiq et al., 2017; Yaya et al., 2019). Educated women are considered to have satisfactory knowledge on maternal health services, including uptake of TT vaccine during pregnancy (Greenaway et al., 2012; Shahabuddin et al., 2017). Other women are hampered by their place of residence which does not favor them to attend reproductive and child health clinics easily for TT vaccination (Anatea et al., 2018; Gebremedhin et al., 2020). Besides, high parity was linked with high uptake of TT vaccine in a study done in Nigeria (Bello and Aduroja, 2017), although the recent study done in Ivory Coast argued against its association (Yaya et al., 2019). Several research evidence support maternal economic status as one of the sociodemographic factors contributing to TT vaccination uptake (Chubike, 2013; Giles et al., 2020; Nozaki et al., 2019; Okafor, 2019). Geographical location of the woman is predicted to contribute to inadequate TT vaccine uptake since it impacts the number and timeliness of ANC services utilization. One study done in Sierra Leone indicated the disparity of ANC service utilization to some locations of the country due to geographical differences (Ayele et al., 2014; Chege, 2018). Sometimes the differences could be contributed by the differences of sociocultural factors between geographical locations (Dapaah and Nachinaab, 2019). With regard to one study conducted in Tanzania to investigate residential context and socioeconomic inequalities in maternal health care utilization, there was a great difference between pregnant women from wealthier and poorer communities on

utilization of ANC services (Langa and Bhatta, 2020), which also could increase the odds of inadequate TT vaccine uptake among the involved individuals.

World Health Organization suggested three main strategies to prevent maternal and neonatal tetanus infection; (i) high coverage of TT vaccine among WRA including pregnant women, (ii) conduction of clean delivery and, (iii) appropriate action in high-risk areas (Gebremedhin et al., 2020). Tanzania, as a country has played a great role to exempt reproductive health services including TT vaccination to WRA including pregnant women. However, still there is low TT vaccine uptake in the country (National Bureau of Statistics, 2015). The predictors for TT vaccine uptake among women of reproductive age in Tanzania have not been analyzed yet. Therefore, this necessitated the need for undertaking analysis of data from the 2015 to 2016 TDHS-MIS to uncover the predictors with the purpose to recommend amenable ways to improve uptake of TT vaccine among women of reproductive age in the country.

METHODOLOGY

Study area and period

The study was conducted in the United Republic of Tanzania from August 22, 2015, through February 14, 2016. Tanzania is among the countries found in East Africa. It is the largest country that covers 940,000 square kilometers and 60,000 square kilometers is inland water. The country lies south of the equator and shares borders with eight countries: Kenya and Uganda to the North; Rwanda, Burundi, the Democratic Republic of Congo, and Zambia to the West; and Malawi and Mozambique to the South.

Study design

It was a national-based cross-sectional study utilizing the 2015 to 2016 Tanzania Demographic and Health Survey and Malaria Indicator Survey (TDHS-MIS) dataset.

Study population

All women of reproductive age (aged 15 to 49 years) who had birth within five years preceding the survey were the study population. However, only 6924 out of 13266 WRA who remembered the timing for antenatal booking of their youngest child were included in the study. Those who were not able to recall the timing and those who did not respond to the questions were removed from the analysis. The study used Individual file recode (TZIR7BFL) with a total of 13266 women who responded to the survey (97% response rate).

Sampling technique

Two stages of sampling were used to obtain a sample for urban and rural areas in Tanzania Mainland and Zanzibar. In the first stage, a total of 608 clusters were selected and in the second stage, a systematic selection of households was involved. A total of 22 households were then systematically selected from each cluster, yielding a representative probability sample of 13,376 households for the 2015 to 2016 TDHS-MIS.

Data collection tool

The 2015 to 2016 TDHS-MIS used household questionnaires and individual questionnaires which was adapted and modified by the National Bureau of Statistics of Tanzania. The questionnaires based on the MEASURE DHS standard AIDS Indicator Survey and Malaria Indicator Survey questionnaires standards. They were translated into Kiswahili, Tanzania's national language. The data presented in this study were from the individual questionnaire. Based on a review of literature assessing the association between uptake of TT vaccine among WRA, including pregnant women and its predictors (Anatea et al., 2018; Ayele et al., 2014; Bello and Aduroja, 2017; Iqbal et al., 2020; Shafiq et al., 2017), candidate variables were abstracted from TDHS-MIS 2015/2016. They included maternal education, wealth index, residence, marital status, parity, age of the woman, ANC visits, ANC booking, and zones or residence (Tanzania Mainland or Tanzania Zanzibar) (NBS, 2015).

Variable measurement

The dependent variable for this study was uptake of TT vaccine. The uptake of TT vaccine was defined as the woman having received at least 2 or more doses of TT vaccine during the current pregnancy and this was considered as the criteria for reporting the proportion of pregnant mothers who had received the required number of TT vaccine doses during pregnancy.

Sociodemographic characteristics were the independent variable for this study which included maternal age, educational level, place of residence, wealth index, marital status, parity, current work of respondent (s) and coming from Mainland Tanzania or Zanzibar Islands. The frequency distribution of each sociodemographic variables was assessed. Other variables under sociodemographic characteristics of respondents were ANC booking which was categorized as early (when booked 12 weeks of gestational age) and late (when booked later than 12 weeks of gestation), and ANC use which was categorized as (i) adequate (if the respondents completed at least 4 ANC visits) and (ii) inadequate (if completed less than 4 ANC visits) (MoHCDGEC, 2018).

Data analysis

Data was entered into the SPSS v 20 software, then were cleaned and transformed accordingly to make the data analyzable using the analysis model chosen. Descriptive statistics was done for sociodemographic characteristics. Chi-square test was used to compare categorical variables and all variables which had $p<0.05$ were further fitted for bivariate and multivariate logistic regression model and crude and Adjusted Odds ratio with 95% confidence interval were computed. Finally, statistically significant association of variables was determined based on Adjusted Odds ratio with its 95% confidence interval and p-value ≤0.05.

Ethics approval and consent to participate

Data collection and the survey content and protocol were approved by Tanzania's National Institute for Medical Research (NIMR), the Zanzibar Medical Ethics and Research Committee (ZAMREC), the Institutional Review Board of ICF International, and the Centers for Disease Control and Prevention in Atlanta, USA. Participants provided verbal consents and the household interviews took place privately. For participants under the age of 18, written consent was requested from their parent or guardian.

RESULTS

Socio-demographic characteristics

Majority of study respondents 5113(73.8%) resided in the rural setting of Tanzania, aged 20 to 34 years 4557(65.8%), had primary education 4209(60.8) and were married 5650(86.1%) Table 1.

Uptake of tetanus toxoid vaccination

More than half, 3480 (50.3%) of the study population had either no or one tetanus injection and 3444 (49.7%) had two or more tetanus injection during pregnancy (Figure 1).

The relationship between women's characteristics and uptake of TT vaccination

The variables which showed significant relationship with uptake of TT vaccination were place of residence ($p<0.001$), age group ($p<0.001$), education level ($p<0.001$), parity ($p<0.001$), ANC booking ($p<0.001$), wealth index ($p<0.001$), marital status ($p<0.001$), zones ($p<0.001$) and ANC use ($p<0.001$) (Table 2).

Table 1. Socio-demographic Characteristics (N = 6924)

Variables	Frequency	Percent (%)
Place of residence		
Urban	1811	26.2
Rural	5113	73.8
Age group		
Less than 20 years	541	7.8
20 to 34 years	4557	65.8
More than 34 years	1826	26.4
Educational level		
No education	1329	19.2
Primary education	4209	60.8
Secondary	1326	19.2
Higher	60	0.9
Parity		
Para one	1595	23
Para 2-4	3154	45.6
Para 5+	2175	31.4
Wealth index		
Poor	2734	39.5
Middle	1363	19.7
Rich	2827	40.8
Marital status		
Never in union	441	6.4
Married	5650	86.1
Widow	119	1.7
Separated	714	10.3
Work status		
Not working	1498	21.6
Working	5426	78.4
Mainland/Zanzibar		
Mainland urban	1618	23.4
Mainland rural	4357	62.9
Unguja (Zanzibar Island)	594	8.6
Pemba (Pemba Island)	355	5.1
ANC visits		
Adequate	3486	50.3
Inadequate	3438	49.7
ANC booking		
Late	5338	77.1
Early	1586	22.9

Table 2. The relationship between women's characteristics and uptake of TT vaccination.

Variables	Adequate TT [n (%)]	Inadequate TT [n (%)]	X2	p-value
Place of residence				
Urban	1119(61.8)	692(38.2)	142.422	<0.001
Rural	2325(45.5)	2788(54.5)		
Age group				
15-19	325(60.1)	216(39.9)		
20-34	2439(53.5)	2118(46.5)	163.314	<0.001
35-49	680(37.2)	1146(62.8)		
Educational level				
No education	571(43)	758(57)		
Primary education	2088(49.6)	2121(50.4)	59.271	<0.001
Secondary	740(55.8)	586(44.2)		
Higher	45(75)	15(25)		
Parity				
Para one	1131(70.9)	464(29.1)		
Para 2-4	1598(50.7)	1556(49.3)	534.498	<0.001
Para 5+	715(32.9)	1460(67.1)		
ANC Booking				
Late booking	2504(46.9)	2834(53.1)	74.715	<0.001
Early booking	940(59.3)	646(40.7)		
Wealth index				
Poor	1215(44.4)	1519(55.6)		
Middle	645(47.3)	718(52.7)	78.659	<0.001
Rich	1584(56)	1243(44)		
Marital Status				
Never in union	306(69.4)	135(30.6)		
Married	2687(47.6)	2963(52.4)	86.940	<0.001
Widow	58(48.7)	61(51.3)		
Separated	393(55)	321(45)		
Mainland/Zanzibar				
Mainland urban	1041(64.3)	577(35.7)		
Mainland rural	2101(48.2)	2256(51.8)	275.044	<0.001
Unguja (Zanzibar Island)	214(36)	380(64)		
Pemba (Pemba Island)	88(24.8)	267(75.2)		
ANC use				
Adequate	1996(57.3)	1490(42.7)	158.710	<0.001
Inadequate	1448(42.1)	1990(57.9)		
Respondent currently working				
No	764(51)	734(49)	1.216	0.27
Yes	2680(49.4)	2746(50.6)		

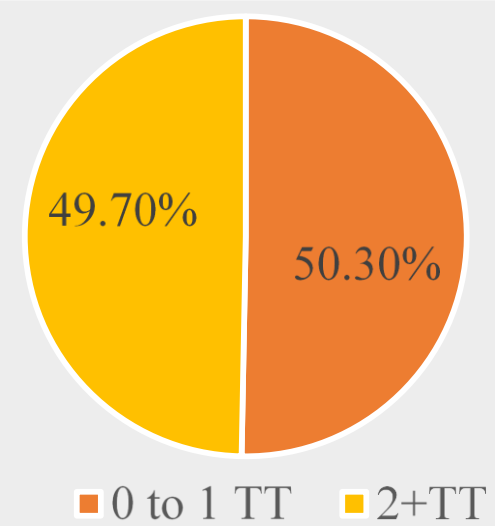

Figure 1. Uptake of tetanus toxoid vaccination.

Predictors for uptake of tetanus toxoid vaccination

After adjusted for confounders, predictors of uptake of tetanus vaccination were early antenatal booking (AOR=1.174 at 95% CI=1.033-1.335, p=0.014), age group of women [20 to 34 years (AOR=1.433 at 95% CI= 1.155-1.778, p=0.001), more than 34 years (AOR=1.379 at 95% CI=1.065-1.786, p=0.015)], wealth index [rich (AOR=1.261 at 95% CI=1.083-1.468, p = 0.003)], parity [para 2-4 (AOR=0.401 at 95% CI=0.343-0.468, p<0.001), para 5 and above (AOR=0.217 at 95% CI=0.178-0.265, p<0.001)], level of education [primary level (AOR=0.864 at 95% CI=0.754-0.99, p=0.035)] zones [Unguja Zanzibar Island (AOR=0.434 at 95% CI=0.309-0.609, p<0.001), Pemba (Pemba Island) (AOR=0.34 at 95% CI=0.226-0.512, p<0.001)] and adequate ANC visits (AOR=0.649 at 95% CI=0.582-0.723, p<0.001) (Table 3).

DISCUSSION

This study assessed predictors for uptake of TT vaccine during pregnancy among women of reproductive age in Tanzania using data from the 2015 to 2016 TDHS-MIS. The odds of adequate uptake of TT vaccine was higher among pregnancy women who had early ANC booking, aged 20 to 34 years, those aged ≥ 34 years, and rich women. On the other hand, the odds of adequate uptake of TT vaccine found to be lower among women with primary education, parity of 2 to 4 or 5+. Similarly, living from Unguja and Pemba Islands and having inadequate ANC visits were also associated with inadequate uptake of TT 2+ vaccine.

The present study showed that the proportion of WRA who received TT 2+ was less than fifty percent (49.7%) which is lower than the cut-off point, despite numerous government interventions which aimed at increasing the coverage (National Bureau of Statistics, 2015). Adequate protection against tetanus is considered only when the pregnant woman in particular, has received at least two doses of TT vaccine during the current pregnancy (MOHCDGEC, 2018). The findings of present study indicated that there is a large number of pregnant women who might be at risk of acquiring and spreading the tetanus infection to their newborn babies (Mihret et al., 2018; Mehanna et al., 2020).

It was also found that early ANC booking determined the uptake of TT vaccine by more than one times. This was in-line with the findings documented by Mihret et al. (2018) who asserted that timely initiation of ANC services increased the likelihood of TT vaccine uptake among WRA in Ethiopia. Early booking provides the woman a chance to receive the required number of TT vaccine during pregnancy, and hence protecting the mother and her inborn baby against tetanus (Mihret et al., 2018).

It was further revealed that inadequate ANC services utilization decreased the odds of getting adequate number of TT vaccine among pregnant women. Similar findings observed showed having four or more ANC visits increased the odds TT vaccine uptake to more than five times in Ethiopia (Mihret et al., 2018). Adequate ANC service utilization provides the woman with adequate exposure to health information regarding different ANC services including the uptake of TT vaccine (Islam and Masud, 2018). Antenatal care service utilization have been recognized as important approach to improve uptake of TT vaccine among women of reproductive age as cited in two studies conducted in Ivory Coast and Pakistan (Iqbal et al., 2020; Yaya et al., 2019). Possible explanation for the observed disparities might be due to such factors as, education level, residence and wealth index of participants which are among the factors predicted to improve ANC uptake (Chege, 2018; Dapaah and Nachinaab, 2019), hence adequate TT vaccine utilization.

This analysis further discovered that the age of the woman increased the odds of TT vaccine uptake. For example, it was noted that those women aged 20 to 34 years and those aged ≥ 34 years were more likely to have adequate doses of TT vaccines compared to their counterparts. Similar to this finding, two studies conducted in Ethiopia indicated the significance of age in uptake of TT vaccine (Mamoro and Hanfore, 2018; Shafiq et al., 2017).

This study further reveals that high parity did not influence uptake of TT vaccine among WRA as those women who had 2 to 4 or ≥ 5 parities showed to be less likely to receive TT 2+ vaccine. This concurred with the findings of a study conducted in Nigeria, which also indicated insignificant association of TT vaccine uptake

Table 3. Predictors for the uptake of TT vaccination

Variable	OR	95%C		p-value	AOR	95%CI		p-value
		Lower	Upper			Lower	Upper	
ANC Booking								
Late booking	1				1			
Early booking	1.647	1.47	1.845	<0.001	1.174	1.033	1.335	0.014
Age groups								
Less than 20 years	1				1			
20 to 34 years	0.765	0.638	0.918	0.004	1.433	1.155	1.778	0.001
More than 34 years	0.394	0.324	0.48	<0.001	1.379	1.065	1.786	0.015
Place of residence								
Urban	1				1			
Rural	0.516	0.462	0.575	<0.001	0.729	0.514	1.033	0.075
Wealth index								
Poor	1				1			
Middle	1.123	0.986	1.279	0.081	1.129	0.981	1.299	0.089
Rich	1.593	1.433	1.771	<0.001	1.261	1.083	1.468	0.003
Educational level								
No education								
Primary education	1.307	1.154	1.48	<0.001	0.864	0.754	0.99	0.035
Secondary	1.676	1.438	1.954	<0.001	0.903	0.743	1.097	0.306
Higher	3.982	2.198	7.216	<0.001	1.374	0.73	2.588	0.325
Parity								
Para one	1				1			
Para 2-4	0.421	0.37	0.479	<0.001	0.401	0.343	0.468	<0.001
Para 5+	0.201	0.175	0.231	<0.001	0.217	0.178	0.265	<0.001
Marital Status								
Never in union					1			
Married	0.4	0.325	0.493	<0.001	0.906	0.718	1.143	0.405
Widow	0.419	0.278	0.634	<0.001	1.059	0.679	1.651	0.801
Separated	0.54	0.42	0.694	<0.001	1.031	0.785	1.355	0.824
Mainland/Zanzibar								
Mainland urban					1			
Mainland rural	0.516	0.459	0.581	<0.001	1.036	0.712	1.507	0.853
Unguja (Zanzibar Island)	0.312	0.257	0.38	<0.001	0.434	0.309	0.609	<0.001
Pemba (Pemba Island)	0.183	0.141	0.237	<0.001	0.34	0.226	0.512	<0.001
ANC visits								
Adequate	1							
Inadequate	0.543	0.494	0.598	<0.001	0.649	0.582	0.723	<0.001

and parity (Bello and Aduroja, 2017). However, the finding was contrary to what was reported by Yaya et al. (2019). According their study conducted in Ivory Coast, parity increased the odds of TT vaccine uptake. It was further claimed that parity of the woman promoted maternal healthcare services utilization including the uptake of TT vaccine (Chubike, 2013). The difference between the current findings and other studies could be due to socio-demographic characteristics of the respondents included in the current study. Sociodemographic characteristics

may alter maternal healthcare service utilization (Jiang et al., 2020). This disparity of research findings could be explained in terms of the methodology. For example, other studies reviewed regarding parity vs. uptake of TT vaccine, used small number of respondents (Bello and Aduroja, 2017; Jiang et al., 2020; Yaya et al., 2019), while the current study was a national survey that involved large number of respondents (NBS, 2016).

It was also found that rich women received adequate number of TT vaccine doses compared with poor women. The findings of several studies done in Africa indicated similar statistical association between the level of income of the women and the uptake of adequate number of TT vaccine (Giles et al., 2020; Nozaki et al., 2019; Okafor, 2019). Previous studies revealed that wealthier women are more likely to afford the costs incurred for accessing ANC services compared to poor women (Ayele et al., 2014; Langa and Bhatta, 2020), hence lacking the opportunity of getting vaccinated against Tetanus. Research evidence from other studies showed that inadequate of ANC visits will decrease the odds of getting adequate number of TT vaccine among women of reproductive age (Iqbal et al., 2020; Mihret et al., 2018; Yaya et al., 2019).

Regarding residence, it was noted that residing in Zanzibar Islands decreased the odds of TT vaccine uptake compared with those residing in Mainland of Tanzania. Since in the Islands, the predominant culture is Islamic religious affiliation, this might be the main reason for the observed disparity. Studies from other parts of Africa documented the role of culture in utilization of different maternal health care services, including uptake of TT vaccine (Ayele et al., 2014; Dapaah and Nachinaab, 2019). However, this needs further research to explore its association with uptake of TT vaccine disparity between Zanzibar and Tanzania Mainland.

Conclusion

Uptake of TT vaccine among pregnancy women can be determined by several factors as it was found in this study. It was found that maternal age, early ANC booking and wealth index of the woman were the main significant predictors towards uptake of TT vaccine. More efforts need to be increased to ensure young women aged <20 years are mobilized to attend maternal and child clinics for TT vaccination. It is further recommended that sensitization should be improved regarding early booking to pregnant women. The government should also find ways to make TT vaccination is accessible to all WRA irrespective of their socioeconomic status.

COMPETING INTERESTS

Authors declare that they have no competing interest.

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