

## Research Article

# A qualitative study on perspectives of pregnant and postnatal mothers on accessing Tetanus Toxoid vaccine in Hai District Kilimanjaro region Tanzania

Asia Hemed Kipengele<sup>1,2</sup>, Sweetness Naftal Laizer<sup>1,3</sup>, Perry M Cyril<sup>1</sup>, Zuhura Lintu<sup>1,2</sup>, Nateiya M Yongolo<sup>1,2</sup>, Neema Allen Ng'unda<sup>1,3</sup>, Irene Haule<sup>4</sup>, Blandina Theophil Mmbaga<sup>1-3</sup> and Agnes Cyril Msoka<sup>1,3,5\*</sup>

<sup>1</sup>Kilimanjaro Clinical Research Institute (KCRI), P.O BOX 2236 Moshi, Tanzania

<sup>2</sup>Kilimanjaro Christian Medical Center (KCMC), P.O BOX 3010 Moshi, Tanzania

<sup>3</sup>Kilimanjaro Christian Medical University College (KCMUCo), P.O BOX 2240 Moshi, Tanzania

<sup>4</sup>Hai District Hospital BOX 1750 Hai, Kilimanjaro, Tanzania

<sup>5</sup>Kilimanjaro College of Health and Allied Sciences, School of Nursing Box 3012, Moshi, Tanzania

**Received:** 18 October, 2021

**Accepted:** 26 October, 2021

**Published:** 27 October, 2021

**\*Corresponding author:** Agnes Cyril Msoka, Kilimanjaro Clinical Research Institute (KCRI), P.O BOX 2236 Moshi, Tanzania, E-mail: [a.msoka@kcri.ac.tz](mailto:a.msoka@kcri.ac.tz), [agnesmsoka14@gmail.com](mailto:agnesmsoka14@gmail.com)

**Keywords:** *Tetanus toxoid*; Pregnant and postnatal mothers; Tanzania

**Copyright:** © 2021 Kipengele AH, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

<https://www.peertechzpublications.com>



## Abstract

**Background:** Antenatal care for pregnant and postnatal mothers is the main entry gate for maternal *Tetanus Toxoid* (TT) vaccination. In developing countries including Tanzania, pregnant and postnatal mothers especially in rural communities have been experiencing barriers to maternal vaccination. The study aimed to explore perspectives of pregnant and postnatal mothers on accessing TT vaccine in Hai District Kilimanjaro Region Tanzania.

**Methods:** A descriptive qualitative study was conducted during baseline assessment from October 2020 to May 2021, in 10 remote villages. Pregnant and postnatal mothers attending antenatal and postnatal services were selected purposively based on their availability and convenience, A semi-structured interview guide relevant to the study objectives was used to guide the interviews. Focus Group Discussion (FGD) and In-depth interviews (IDIs) were conducted; and thematic analysis was used to obtain themes and subthemes.

**Results:** A total of 15 mothers aged 18 to 40 years participated in the study. Most of the mothers were Christians, married with 1 to 5 children. Majority had completed primary level education engaged in small-scale farming. Main themes were extracted namely: Unreliable vaccine information, Healthcare workers attitude, Overworked with household activities, adherence of appointment dates for vaccination after delivery and role of Traditional medicine during pregnancy.

**Conclusion:** The role of healthcare providers are critical component for the appropriate transfer of vaccine information to the mothers and their spouses during clinic visits, to eliminate vaccine misconceptions hence improving overall tetanus vaccine uptake. Quality of information from reliable sources could be an important factor to upgrade the awareness of pregnant mothers on maternal vaccination.

## Background

Certain pregnant and postpartum women may not appreciate their increased susceptibility to acquiring tetanus infection [1]. False beliefs about immunization during pregnancy and its severity and the effectiveness of the vaccination have been associated with reduced maternal uptake of the tetanus vaccine in developing countries [2,3]. Similarly, many pregnant women may be uninformed of their risk of infection and then exposing their infants and infant's increased liability to neonatal tetanus [4,5]. Perceived susceptibility to disease and accurate understanding of the inconsistent severity of the tetanus disease in pregnancy and pertussis in neonates appear to be necessary precedents to acceptance of vaccination in pregnancy. Likewise, a study on maternal immunization revealed a worry about acquiring infection was the strongest predictor of vaccine intention [6,7].

A global systematic review study through country survey revealed that overall, pregnant women believe vaccines are essential for the protection of their infants and the community, but various concerns and misinterpretations persist around vaccine safety and efficacy, which prejudice the trust of expectant mothers in immunization [5,8,9].

Pregnancy and postpartum period are associated with elevated risks to both mother and infant from transmittable disease [10,11]. Vaccination of pregnant women, also called maternal immunization, has the potential for protection in pregnant women, fetuses and infants from several vaccine-preventable diseases. Maternal immunoglobulin G antibodies are actively transferred through the placenta to provide passive immunity to newborns during the first months of life until the time for infant vaccinations or until the period of greatest susceptibility has passed. Years of experience suggest that maternal immunization against influenza, tetanus or pertussis has an acceptable safety profile that is well tolerated, effective and confers significant benefits to pregnant women and their infants [12].

Antenatal Care (ANC) for pregnant and postnatal mothers is the main gate for maternal vaccination intervention, however different factors such as access to healthcare, recommendation of a vaccine by a healthcare worker, women understanding of vaccines and acceptance showed a large impact on vaccination uptake [13,14]. In Tanzania by 2004 to 2005 about 94% of pregnant women had at least one ANC visit and 62% of women had 4 or more visits and 80% received at least one TT shot and 56% received two or more TT doses with factors like higher education, wealth strata and urban residence determining the likelihood of receiving two or more doses of TT [15]. Studies done among pregnant women in Dar es Salaam identified a few barriers that led to late ANC visits hence some of them not receiving the targeted TT vaccinations, these barriers are lack of awareness and misconceptions, social-cultural beliefs, distance from health facilities, community barriers and health system barriers [16,17]. Some of these barriers were reflected as well in study conducted across four regions in Kenya [18].

Similarly maternal care in African countries revealed the

poor quality of care in most of the rural districts, plus inadequate human resources coupled with inadequate knowledge and skills [19]. Evidence from a number of studies proposes that the cost of accessing care is a critical contributing factor of whether or not care is required especially when a properly equipped health facility is far away in remote areas, infrastructure for transport is lacking, and in which communities are mostly poor, as evidenced by a large number of people living below the poverty line [15,17,19].

However, pregnant women have been recognized as an ideal target population in which to develop interventions for the promotion of vaccinations, considering that the antenatal period is the time when attitudes and beliefs about childhood vaccines first take shape, and that pregnancy signifies a strategic teachable moment for advocating the health promotion and behavior change [6,7]. This study therefore conducted an exploration on perception of pregnant and postnatal mothers on challenges faced in getting maternal tetanus vaccination in districts of Kilimanjaro Region with the aim of supporting the development of interventions and promoting further research in maternal vaccination in the community.

## Methodology

A descriptive qualitative study that involved Focus Group Discussion (FGD) and In Depth Interview (IDI) was conducted for baseline assessment of the pregnant and postnatal mothers; on their perception on accessing TT for improving maternal vaccination in Hai District Kilimanjaro region.

## Study area

Baseline study was conducted in remote villages of Hai District in Kilimanjaro Region Tanzania. A sample of ten health facilities in remote villages were identified and selected. These health facilities are named KIA, Rundugai, Sanya station, Kawayi, Narumu, Mtakuja, Tindigani, Kikavu Chini, mkalama and Mbatakeru. These health facilities served remote hard to reach villages occupied by mixed farmers communities and nomadic pastoralist Maasai communities.

## Ethical approval

A formal ethics application was submitted through the College Research Ethics Review Committee (CRERC) for review and approval where ethical clearance no. 2484 was granted. Permission was also obtained from the Medical Officer of Hai district. Prior to data collection, the researcher met with all the heads of the village health facility to explain the objectives, procedures, issues of confidentiality, the importance of voluntary participation and the need for individual informed consent. With assistance of the heads of the health facility, the recruited mothers were told about the general purpose of the study and their responses were anonymous.

## Research instruments

Semi-structured interview guides prepared in Kiswahili dialect (local dialect in Tanzania) were used to generate data.



The interview guides were based on the literature review of global, regional and district evidence to date on vaccination services for the pregnant and postnatal mothers. The interviews also sought demographic information of the participants.

### Focus group discussion approach

A bilingual Swahili-English linguist assisted in reading the translated versions to check for clarity of the guides for the FGDs, before the study. After the initial translation, the same linguist translated the versions back to English to check the accuracy of the translations.

A total of 15 mothers, participated in FGD and IDIs. The mothers were purposively at their convenience selected from Health facilities serving 10 villages in rural Hai District. The FGD group comprised of eight mothers and seven mothers participated in IDI. The sample size was determined according to the attainment of saturation point when there was enough information from the participants to meet the required objectives [20]. The sessions began with the researcher thanking the mothers for their acceptance to participate in the study; and a brief introduction of the research purpose. This was followed by the researcher reading out the written informed consent so that each mother was well-informed before she could make a decision to participate in the FGD and IDIs or withdraw. It was stressed that participation in the study was entirely voluntary. The mothers were encouraged to be open and honest in discussions. They were also asked to give their personal opinions, comments, seek clarifications or say anything related to the discussion. The researcher then carefully outlined the norms applicable to such group discussions and assured them that privacy and confidentiality was to be observed regarding the contents of the discussion. It was also emphasized that any experience revealed or anything

said by a group member represented her personal opinion remain confidential.

The researcher encouraged values of self-confidence, respect for one another, and safeguarding one another's secrets while emphasizing the importance of sharing experiences among group members.

All group sessions were tape-recorded, and the researcher acted as the discussion leader. All details of the process were noted and kept on record. On average, each FGD took about two hours and each IDI took sixty minutes. Thereafter mothers were invited to ask questions and acknowledged for their co-operation.

### Data analysis

The audio recordings were firstly transcribed to text in Kiswahili, and then were translated into English to facilitate the analysis by AHK, SNL and PC. The transcriptions and translations were verified against the audio-recordings for accuracy and adjustment by NY and ZL. The data was managed through thematic analysis. The analysis involved interpretation of the data through listening to recordings, multiple readings of the translated transcripts, and stepwise construction of codes and categories by AHK, SNL, NY and AM. The categorization included identification of the themes.

## Results

### Participant's demographics.

In total, 15 mothers, 8 pregnant and 7 postnatal mothers attending ANC in the selected health facilities serving 10 villages, participated during baseline assessment in IDIs and FGD. Mothers age ranged between 18-40 years. Majority of the mothers were Christians, married having primary school education engaged in small-scale farming (Table 1).

**Table 1:** Demographic characteristics of the mothers involved in IDIs and FGD (N=15).

Village	Age (yrs)	Sex	Religion	Marital Status	Education Status	Number of Children	Occupation
Narumu	25	F	Christian- RC	Single	Primary	01	Farmer
Narumu	32	F	Christian- RC	Married	Primary	03	Farmer
Narumu	35	F	Christian- RC	Married	Primary	05	Farmer
Narumu	33	F	Christian- RC	Married	Primary	03	Business woman
Narumu	40	F	Christian- RC	Married	Primary	04	Farmer
Narumu	21	F	Christian	Married	Primary	03	Farmer
Usari	28	F	Christian- RC	Married	Primary	03	Farmer
Narumu	22	F	Christian	Married	Primary	01	Farmer
Usari	30	F	Christian- RC	Married	Primary	05	Farmer
Usari	29	F	Muslim	Single	Secondary	01	Businesswoman
Rundugai	24	F	Muslim	Married	Secondary	01	Pump attendant
Rundugai	18	F	Muslim	Married	Primary	00	Farmer
Sanya Station	27	F	Christian- Lutheran	Married	Secondary	04	Farmer
Sanya Station	28	F	Christian	Married	No formal education	03	Farmer
Rundugai	26	F	Christian	Single	College	01	Businesswoman



## Analysis

Mothers' views were processed under thematic analysis described by Braun and Clarke [20], that undergo through codes and category to get the main themes and subthemes (Table 2).

### Description of the main themes and sub- themes

**Main themes were extracted namely:** Unreliable vaccine information with multiple unreliable sources of information on tetanus vaccine was expressed by both pregnant and postnatal mothers to be rather confusing and causing them to have misconceptions on the TT vaccine, this was witnessed as the major challenges faced by mothers leading to most of them missing their vaccine schedules and for some not completing their doses after delivery. Healthcare workers attitude cited as also important part and others being, household chores overload, adherence of appointment dates for vaccination after delivery and role of traditional medicine during pregnancy.

### Multiple sources of information

Most mothers experienced insufficient information related to ANC services offered in their respective health facilities. It was observed that these health facilities had shortage of staff whereby a single nurse was expected to service many mothers hence leading to large burden to staff and failure for staff to deliver required services efficiently, which included relaying proper information to mothers on the ANC and vaccines. This led for mothers to seek information from other unreliable sources like fellow mothers and relatives which result to misconceptions and wrong information. Quality of information from reliable sources could be an important factor to upgrade the awareness of pregnant mothers on maternal vaccination. Either the study revealed multiple sources of information reported by the mothers for them sounds to be confusing.

### This was evidenced as.

*For we mothers is until you ask maybe fellow woman by saying; what vaccine have you received? or until you ask other women then they tell you, then when you reach antenatal clinic that's when you tell them that you haven't yet received something, or a certain medication, maybe anti-malarial or something I was not given (FGD. Postnatal mother R. 3).*

Another woman with the same experience reported: *Yes, they don't tell you what is available and what is not, until you inquire*

*from your fellow pregnant women, what they have received then you tell the Health Care providers to give it to you (IDI. Pregnant mother R. 1).*

Furthermore, there was an experienced lack of appropriate vaccine information; although health care providers have a key role in providing appropriate information and immunization schedules. It is still observed that there is a gap in the delivery of vaccination information. Some mothers were not sure of the required number of tetanus doses as they received insufficient information from fellow mothers or relatives which was based on their personal experiences or preferences. As quoted from one of the mothers attending Rundugai health facility:

*I have asked around, after you get those three vaccinations when you come again you get another one vaccination, I don't know two, they become five. I just asked my fellow, not a nurse. (IDI. Pregnant mother R. 4).*

However, some of the women received information from healthcare providers but the information was complex for them to understand which further led to more confusion. This was evidenced by one woman communicated the informed knowledge and said:

*The doctor said that injection is a must; for a pregnant woman even when you have already started getting the injection, it is a must. If you don't get the injection the child in the womb will not grow (IDI. Pregnant mother R.5).*

### Overworked with household activities

There was a reported experience of an added burden of scheduled clinic attendance to the day-to-day responsibilities performed by the mothers. Most of the clinic days would overlap with other responsibilities hence resulting in a challenge of punctuality and/or attendance of the mothers on the appointment days. This was evidenced from a mother attending Narumu dispensary:

*You wake up in the morning, maybe you sweep the house, when you finish you cook tea, and if you have a small child, you prepare them then you come to the clinic. You ask your neighbor, 'please can you help keeping an eye on my house I'll be back in a few minutes' (IDI. Pregnant Mother R.2).*

Another woman added apart from daily home chores, seasonal activities such as farming interfere with clinic attendance: *You might find a person doesn't know that her clinic day is due, maybe they have gone to the farm, when she gets back, she realizes she hasn't attended. (IDI Pregnant Mother R. 1).*

Furthermore, on top of the usual mothers' household responsibilities, most mothers have elaborated a lack of spousal support to be one of the factors that add to the challenge of attending ANC and thus receiving vaccines. This is evidenced by an experience shared by a pregnant mother from Narumu village:

*Yes, it happens, sometimes you are required to come with your husband to start clinic, if he refuses you can't go. And even when you go without him you will be sent back and told you will get the services*

**Table 2:** Themes and subthemes regarding pregnant and postnatal mothers' perspectives on accessing TT vaccination.

Main Theme	Sub-themes
Multiple sources of information	Communication barrier Sources of information not reliable
Overworked with household activities	Burden with domestic chores
Health care provider approach	Demand for more HCW Attitudes of healthcare workers
Adherence of appointment dates for vaccination after delivery	Poor adherence to vaccine schedule
Role of Traditional medicine during pregnancy	Herbal remedies given after delivery



only when he comes with you. Maybe you find someone to talk to him and convince him to agree to come with you (IDI. Pregnant Mother R.14).

It is obvious that reducing any associated burden for antenatal care services including family and spouse support could keep the mothers at ease in attending the antenatal services.

### Healthcare provider approach

Some mothers reported experiencing poor communication skills from the healthcare providers when attending the clinic. Some of them felt they were not offered a chance to ask questions or express themselves, harsh language from the healthcare providers which further led to poor subsequent clinic attendances. Lack of proper communication between the health care provider and mothers attending antenatal service is linked to maternal satisfaction which positively impacts attendance and uptake of maternal services including tetanus vaccines. The mother who shared her experience presented as:

*Yes, sometimes you get there in the antenatal clinic and you find the providers, they are not in the mood of giving me the vaccine, so for such reasons there are some vaccinations that I missed (IDI. Pregnant Mother R. 6).*

Another mother explained low number of nurses at the health care center and treatment of mothers who missed their vaccine appointment dates affects attendance and vaccine uptake in general; *The attendants here are not enough, they should be added (IDI. Pregnant mother R. 4).*

*When you come the following month, for example when you come the day after they asks why you didn't come the previous day? When they get scolded for example the Maasai, if you scold them sometimes, they might not come again or transfer to another ANC clinic (IDI. Pregnant mother R.3).*

### Informal Rules/Mistreatment

Furthermore, other mothers reported some informal rules were enforced by healthcare providers, whereby mothers with no formal partners (unmarried) were not offered vaccines until they came with their partners to the clinic or until they had a formal letter from a government official indicating they are unmarried. This led to many of them feeling ashamed and avoiding attending the clinic for the whole pregnancy hence missing tetanus vaccine. *There are barriers when you attend clinic for the first time and you are not accompanied with your spouse (FGD Postnatal mother R.5).*

### Another mother added by saying

*You will be returned and if your spouse has travelled then you will need to get a letter from the village chairperson then to come and get service (FGD. Postnatal Mother R 7).*

### Role of traditional medicine during pregnancy

The use of traditional and complementary medicines for maternity-related health complaints was learnt to be common, applicable for various minor complaints during and

after delivery. Some mothers trusted and opted for traditional treatments for most of their pregnancy-related discomforts therefore these mothers undermine the importance of vaccines and other maternal services (ANC and PNC).

**This experience was expressed by the mothers and one quoted as:** *After delivery, a woman may experience stomach pain, there is a herbal medication of leaves from a tree, they are given; for that pain, they boil the leaves like tea and drink so if she gives birth today, if she gets stomach pain tomorrow she is given even the roots. mmmm, in the morning people bring tea, so they brought it for her together with the tea but in different container and she drank (IDI postnatal Mother R. 03).*

### Another mother reported

*Other Maasai don't attend clinic for the whole time of their pregnancy, we take them to older mothers who knows how to look at the child in the womb, if the child is not positioned well, they touch the mother's belly and the child changes position. If they have nausea, they are given traditional medication called Rugukwei or cow fat, they even give birth at home, the old mothers help them (IDI Postnatal Mother R. 0.4).*

### Adherence of appointment dates for vaccination after delivery

In this study it was found that some mothers didn't come to complete their scheduled vaccine appointments especially after giving birth because they didn't know if they are still required to finish the remaining doses. This was directly attributed to lack of vaccine education hence causing missed opportunities in postnatal tetanus vaccination. This was evidenced by two mothers who shared their experiences: *There are others after they give birth, they stop coming for vaccination completely. (IDI. Postnatal Mother. 03).*

*Some do not understand since has finished all five vaccinations see that is not going to be injected again so education is needed there after you have been injected vaccination is for how long your supposed to be injected again (IDI, Postnatal Mother R. 04).*

### Discussion

In this study, both pregnant and postnatal mothers reported multiple sources of information on tetanus toxoid as one of the challenges faced, many sought vaccine information from their peers or older women, this was caused by communication barrier due to health care providers constrained with caring activities because of shortage of staff, left them with little to no time required to provide proper information of the TT vaccine services. This was evidenced by studies done in Australia and Dar es salaam Tanzania which showed Communication between mothers and healthcare providers led to reliable source of information for the maternal vaccination which is crucial to build a strong foundation of maternal awareness [16,21]. However, both pregnant mothers and postnatal mothers could not air out the importance of proper communication from the health care providers, but they only explain their experience of the challenges encountered on TT vaccine services as they reported to the dispensary.



To enable the mothers to acquire experience of proper communication with health care providers despite the shortage of staffing, could be solved through promoting healthy lines of communication that offer multiple avenues in information gathering for patients and families to enhance integrated vaccination into their routine antenatal care practices [21-24].

Healthcare providers are a critical component for transmission of knowledge to the mothers attending the maternal vaccination within the Hai district. This lines with some of the studies that witnessed challenges with shortage of staffing, limited resources and training standing as barriers to delivering comprehensive information during health consultations [22,24]. Also a study done in Atlanta USA have confirmed that healthcare providers are an integral part in providing maternal vaccination information to women [25]. The same to a study conducted in Nigeria on manpower capacity and reasons for staff shortage which witnessed that, a mere branding of health policies without improving the setup of the health system inclusive the manpower capacity and quality as well as staff-patients ratio will be wasteful efforts in delivery of the health services [26].

In our study, while all healthcare providers were knowledgeable of maternal vaccinations, yet the findings in the baseline study revealed the mothers attending the antenatal services had no knowledge of the number of doses required for the tetanus toxoid, indicating existence of gaps in the current immunization programme in the healthcare system. This is in line with the study done in south Africa and London England that found maternal knowledge, attitudes and beliefs play a substantial role in vaccine hesitancy [22,27]. While research conducted in Zambia was contrary as, although mothers had poor knowledge about vaccines, they expressed positive attitude about maternal and child immunization [28].

Some pregnant mothers trusted and opted for traditional treatments for most of their pregnancy-related discomforts and undermine the importance of TT vaccines and Antenatal Clinic attendance. This was also observed in a study done in Zambia where traditional practices coupled with paternal and community rumours also had a significant influence on women's attitudes and uptake of immunization [28]. Study findings from a more developed countries have shown that achieving vaccine acceptance among pregnant women and maternity Healthcare Professionals [HCPs] remains a considerable public health challenge [19,29].

Informal rules that involve mistreatment of the mothers during maternal health services was also a challenge to the side of the mothers especially the single mothers advised to be accompanied with spouses to the clinic. Those could not do so were mistreated by the healthcare providers. This kind of the approach in management of the maternal health services prompted a negative attitude which was among the challenges reported as health care providers failing to provide efficient services due to their attitude. This is in reference to other studies where the mothers raised their concerns regarding their mistreatment at maternal health clinics marked with providers' attitudes being a major hindrance to cope with the proper service provided [21,27].

Adherence to the timely vaccination is key to prevent vaccine-preventable diseases in pregnant mothers and future generations by eradicating diseases. But in this study, we learnt that most mothers could not adhere to the wing schedule of the maternal vaccinations especially after giving birth despite being told to come back for TT vaccines. Most didn't know its mandatory and some were occupied with domestic issues which overall made them overlook the importance of the remaining TT vaccine doses. This is concurrent with a study from Israel and Nigeria regarding postnatal mothers who failed to adhere to the appointment dates for vaccination after delivery as were not sure of its importance after delivery, this was directly attributed to lack of vaccine education hence causing missed opportunities in postnatal tetanus vaccinations [30,31].

### Strengths and limitations of the study

The key strength of this study was the involvement of the mothers from 10 villages in Hai district, these villages have distinct background characteristics of the indigenous community that provided a successful way to highlight the required findings. The qualitative approach provided room to capture the mother's perspectives and life experience. Despite the strengths, the limitations include the study was conducted in one district and in a period of 8 months, hence the findings may not necessarily reflect the experience in other districts in Tanzania and lack of full assessment of the impact of the intervention introduced by this study.

### Conclusion

In this study the findings showed that, multiple unreliable sources of information on tetanus vaccine were expressed by both pregnant and postnatal mothers to be rather confusing and causing them to have misconceptions on the TT vaccine. It was learnt that health care providers are a critical component for the appropriate information in the transfer of vaccine information to the mothers and their spouses during clinic visits, to eliminate vaccine misconceptions hence improving overall tetanus vaccine uptake. Further, continuous education is needed within families for a better understanding of the importance of the maternal TT vaccine. The study recommends spousal support and good mother-provider relationship is essential to ensure that the pregnant and post-natal mothers receive all the required TT doses. Also, in hard-to-reach remote rural areas with health staff shortage integration of Community health workers and community leaders in health education campaigns to ensure a large coverage hence improving general uptake of health services including vaccines.

### Acknowledgements

The authors would like to acknowledge the support from Immunizing Pregnant women and INfants neTwork [IMPRINT] with Grant no. ITCRZ Q3238; funded by the GCRF Networks in Vaccines Research and Development which was co-funded by the MRC and BBSRC. Further the authors express sincere gratitude to the IMPRINT administrative management for their endless effort to make the project successful. Furthermore



special acknowledgements are extended to Marion Sumari-de Boer for assisting the process of qualitative data analysis.

The authors would like also to extend thanks to the research team at the Kilimanjaro Clinical Research Institute, administrative management from Hai district and the mothers who agreed to participate in this project.

### Author's contribution

AHK, SNL, AM and BTM were involved in the conception and design of the study. AH, SL, ZL, PC, IH and AM were involved in data collection and AHK, SNL, AM, PC, and NY were involved in analysis of the data. NN and BTM involved in critical review of manuscript. All authors reviewed and approved the final manuscript.

### References

- Danchin MH, Costa-Pinto J, Attwell K, Willaby H, Wiley K, et al. (2018) Vaccine decision-making begins in pregnancy: Correlation between vaccine concerns, intentions and maternal vaccination with subsequent childhood vaccine uptake. *Vaccine* 36: 6473–6479. [Link: https://bit.ly/3CsI9ty](https://bit.ly/3CsI9ty)
- Mohd Azizi FS, Kew Y, Moy FM (2017) Vaccine hesitancy among parents in a multi-ethnic country, Malaysia. *Vaccine* 35: 2955-2961. [Link: https://bit.ly/30VRvz3](https://bit.ly/30VRvz3)
- Corben P, Leask J (2018) Vaccination hesitancy in the antenatal period: A cross-sectional survey. *BMC Public Health* 18: 566 [Link: https://bit.ly/3vMhgbx](https://bit.ly/3vMhgbx)
- SAGE Working Group on Vaccine Hesitancy. Report of the Sage Working Group on. 2014. [Link: https://bit.ly/3JCvNvd](https://bit.ly/3JCvNvd)
- Olander EK, Darwin ZJ, Atkinson L, Smith DM, Gardner B (2016) Beyond the "teachable moment" - A conceptual analysis of women's perinatal behaviour change. *Women and Birth* 29: e67-e71. [Link: https://bit.ly/2ZnBu4R](https://bit.ly/2ZnBu4R)
- Bechini A, Moscadelli A, Sartor G, Shtylla J, Guelfi MR, et al. (2019) Impact assessment of an educational course on vaccinations in a population of medical students. *J Prev Med Hyg* 60: E171–E177. [Link: https://bit.ly/3mbcqGG](https://bit.ly/3mbcqGG)
- Larson HJ, Clarke RM, Jarrett C, Eckersberger E, Levine Z, et al. (2018) Measuring trust in vaccination: A systematic review. *Hum Vaccines Immunother* 14: 1599–1609. [Link: https://bit.ly/2XJLkgk](https://bit.ly/2XJLkgk)
- Larson HJ, de Figueiredo A, Xiaohong Z, Schulz WS, Verger P, et al. (2016) The State of Vaccine Confidence 2016: Global Insights Through a 67-Country Survey. *EBioMedicine [Internet]* 12: 295-301. [Link: https://bit.ly/3EIp1gP](https://bit.ly/3EIp1gP)
- Raude J, Fressard L, Gautier A, Pulcini C, Peretti-Watel P, et al. (2016) Opening the 'Vaccine Hesitancy' black box: how trust in institutions affects French GPs' vaccination practices. *Expert Rev Vaccines* 15: 937–948. [Link: https://bit.ly/3CkGuoT](https://bit.ly/3CkGuoT)
- Grant CC, Chen MH, Bandara DK, Marks EJ, Gilchrist CA, et al. (2016) Antenatal immunisation intentions of expectant parents: Relationship to immunisation timeliness during infancy. *Vaccine* 34: 1379-1388. [Link: https://bit.ly/3Bm5Qla](https://bit.ly/3Bm5Qla)
- Gualano MR, Bert F, Voglino G, Buttinelli E, D'Errico MM, et al. (2018) Attitudes towards compulsory vaccination in Italy: Results from the NAVIDAD multicentre study. *Vaccine* 36: 3368-3374. [Link: https://bit.ly/2ZiBzpU](https://bit.ly/2ZiBzpU)
- Dubé E, Vivion M, Sauvageau C, Gagneur A, Gagnon R, et al. (2016) Nature Does Things Well, Why Should We Interfere? *Qual Health Res* 26: 411–425. [Link: https://bit.ly/2ZnSBn5](https://bit.ly/2ZnSBn5)
- Giles ML, Mantel C, Muñoz FM, Moran A, Roos N, et al. (2020) Vaccine implementation factors affecting maternal tetanus immunization in low- and middle-income countries: Results of the Maternal Immunization and Antenatal Care Situational Analysis (MIACSA) project. *Vaccine* 38: 5268–5277. [Link: https://bit.ly/3CfJrXD](https://bit.ly/3CfJrXD)
- Wilson RJ, Paterson P, Jarrett C, Larson HJ (2015) Understanding factors influencing vaccination acceptance during pregnancy globally: A literature review. *Vaccine* 33: 6420–6429. [Link: https://bit.ly/3GjBpQ6](https://bit.ly/3GjBpQ6)
- National T, Map R, Plan S (2015) United Republic of Tanzania Ministry of Health and Social Welfare The National Road Map Strategic Plan To Accelerate Reduction of Maternal , Newborn and Child Deaths in Tanzania. [Link: https://bit.ly/3pE5mV2](https://bit.ly/3pE5mV2)
- Mgata S, Maluka SO (2019) Factors for late initiation of antenatal care in Dar es Salaam, Tanzania: A qualitative study. *BMC Pregnancy Childbirth* 19: 415. [Link: https://bit.ly/3nt1XWs](https://bit.ly/3nt1XWs)
- Pathirana J, Nkambule J, Black S (2015) Determinants of maternal immunization in developing countries. *Vaccine* 33: 2971-2977. [Link: https://bit.ly/3mdi2jx](https://bit.ly/3mdi2jx)
- Nganga SW, Otieno NA, Adero M, Ouma D, Chaves SS, et al. (2019) Patient and provider perspectives on how trust influences maternal vaccine acceptance among pregnant women in Kenya. *BMC Health Serv Res* 19. [Link: https://bit.ly/3mcY8Fo](https://bit.ly/3mcY8Fo)
- Giles ML, Mason E, Muñoz FM, Moran AC, Lambach P, et al. (2020) Antenatal care service delivery and factors affecting effective tetanus vaccine coverage in low- and middle-income countries: Results of the Maternal Immunisation and Antenatal Care Situational analysis (MIACSA) project. *Vaccine* 38: 5278–5285. [Link: https://bit.ly/3vNfo7f](https://bit.ly/3vNfo7f)
- Braun V, Clarke V (2006) Using thematic analysis in psychology. *Qual Res Psychol* 3: 77–101. [Link: https://bit.ly/3mfuy21](https://bit.ly/3mfuy21)
- Regan AK, Hauck Y, Nicolaou L, Engelbrecht D, Butt J, et al. (2018) Midwives' knowledge, attitudes and learning needs regarding antenatal vaccination. *Midwifery* 62: 199–204. [Link: https://bit.ly/3CbnJUR](https://bit.ly/3CbnJUR)
- Wilson R, Paterson P, Larson HJ (2019) Strategies to improve maternal vaccination acceptance. *BMC Public Health* 19: 1-11. [Link: https://bit.ly/2Zk9Vsz](https://bit.ly/2Zk9Vsz)
- Krishnaswamy S, Lambach P, Giles ML (2019) Key considerations for successful implementation of maternal immunization programs in low and middle income countries. *Hum Vaccines Immunother* 15: 942–950. [Link: https://bit.ly/3pBEy7Q](https://bit.ly/3pBEy7Q)
- Lutz CS, Carr W, Cohn A, Rodriguez L (2018) Understanding barriers and predictors of maternal immunization: Identifying gaps through an exploratory literature review. *Vaccine* 36: 7445–7455. [Link: https://bit.ly/2ZiHfAe](https://bit.ly/2ZiHfAe)
- Ellingson M, Chamberlain AT (2018) Beyond the verbal: Pregnant women's preferences for receiving influenza and Tdap vaccine information from their obstetric care providers. *Hum Vaccines Immunother* 14: 767–771. [Link: https://bit.ly/2ZrYvDm](https://bit.ly/2ZrYvDm)
- Aluko JO, Anthea R, Marie Modeste RR (2019) Manpower capacity and reasons for staff shortage in primary health care maternity centres in Nigeria: a mixed-methods study. *BMC Health Serv Res* 19: 10. [Link: https://bit.ly/3jCMthy](https://bit.ly/3jCMthy)
- Godongwana M, Myburgh N, Adedini SA, Cutland C, Radebe N (2021) Knowledge and attitudes towards maternal immunization: perspectives from pregnant and non-pregnant mothers, their partners, mothers, healthcare providers, community and leaders in a selected urban setting in South Africa. *Heliyon* 7: e05926. [Link: https://bit.ly/3EeeHqI](https://bit.ly/3EeeHqI)
- Larson Williams A, Mitrovich R, Mwananyanda L, Gill C (2019) Maternal vaccine knowledge in low- and middle-income countries—and why it matters. *Hum Vaccines Immunother* 15: 283–286. [Link: https://bit.ly/3GhFKlp](https://bit.ly/3GhFKlp)



29. Bisset KA, Paterson P (2018) Strategies for increasing uptake of vaccination in pregnancy in high-income countries: A systematic review. *Vaccine* 36: 2751–2759. [Link: https://bit.ly/3pDphUj](https://bit.ly/3pDphUj)
30. Balogun SA, Yusuff HA, Yusuf KQ, Al-Shenqiti AM, Balogun MT, et al. (2017) Maternal education and child immunization: The mediating roles of maternal literacy and socioeconomic status. *Pan Afr Med J* 26. [Link: https://bit.ly/3GptKQr](https://bit.ly/3GptKQr)

31. Drezner D, Youngster M, Klainer H, Youngster I (2020) Maternal vaccinations coverage and reasons for non-compliance - A cross-sectional observational study. *BMC Pregnancy Childbirth* 20: 541. [Link: https://bit.ly/3jCKREv](https://bit.ly/3jCKREv)

### Discover a bigger Impact and Visibility of your article publication with Peertechz Publications

#### Highlights

- ❖ Signatory publisher of ORCID
- ❖ Signatory Publisher of DORA (San Francisco Declaration on Research Assessment)
- ❖ Articles archived in worlds' renowned service providers such as Portico, CNKI, AGRIS, TDNet, Base (Bielefeld University Library), CrossRef, Scilit, J-Gate etc.
- ❖ Journals indexed in ICMJE, SHERPA/ROMEO, Google Scholar etc.
- ❖ OAI-PMH (Open Archives Initiative Protocol for Metadata Harvesting)
- ❖ Dedicated Editorial Board for every journal
- ❖ Accurate and rapid peer-review process
- ❖ Increased citations of published articles through promotions
- ❖ Reduced timeline for article publication

Submit your articles and experience a new surge in publication services (<https://www.peertechz.com/submission>).

*Peertechz journals wishes everlasting success in your every endeavours.*