Supplement document

This supplement document consists of preliminary study, theoretical framework, methodological approach and qualitative responses for the findings.

Preliminary Study

To conduct preliminary observations prior to the study reported below, the primary investigator (M.M.) joined One World Health (OWH), a faith-based organization, on a mission trip to serve as a volunteer healthcare worker at the Masindi Kitara Medical Center (MKMC) in Uganda. During that mission trip, the investigator also served as a nurse at three offsite temporary village clinics. During the preliminary observation period, relationships were established with MKMC management staff, midwives, nurses, and local community healthcare workers.

Theroretical Framework

Fahy and Parratt's (1) critical feminist perspective proposes the theory of *Birth Territory,* in which midwives advocate and empower women, influenced by Michel Foucault's concepts of power and knowledge, though originally framed for hospital deliveries. They describe the theory of *Birth Territory* by expanding on Foucault's concept to show how integrative power used by midwives in the medical setting can assist the mother's birthing decisions (1). This view aligns with how TBAs can gain adequate knowledge regarding neonatal airway management and practice with integrative power, a form of shared decision making, which harnesses the ability of the mother and the healthcare provider to make combined decisions that support mothers during home-based births. This increase in knowledge reflects the capacity of their identified power to make decisions while assessing the neonate and implementing measures to resuscitate the neonate as necessary. In addition, the feminist praxis approach emphasizes midwifery practice that focuses on the needs of women providing healthcare for women, and hence, contributing to the generation of knowledge (2). The two principles of feminist praxis outlined by Barnes (2) are: 1) research that benefits women; and, 2) research as means of social change, in this case providing a way to review the teaching (3-6)methods of the interventions regarding neonatal resuscitation, particularly to TBAs with low literacy level.

Several prior studies have used a feminist perspective to explore the hidden healthcare needs of vulnerable populations and to empower those who are oppressed and discriminated against in the healthcare system (4-7). Feminists advocate detailed analysis with flexible and subjective thinking to represent women's experiences in a patriarchal society(8) (9). This study used an unstructured style, uninhibited by strict research guidelines, as recommended for feminist studies (10), and adopted a non-hierarchical approach when interviewing to create equal exchange and promote reciprocity and reflexivity (11). The non-hierarchical approach was reflected in the investigator's observation and participation as co-equal providers in birth events and invited facility and collaboration in planning. This feminist perspective provided the rural midwives and TBAs the ability to voice their concerns regarding the facilitators and barriers to providing adequate newborn care and airway management. Figure 1 depicts the feminist perspective for midwives and TBAs to represent factors that influence their role in neonatal care. This focused ethnographic study draws from the postcolonial feminist perspective aligned with the critical feminist theory to analyze the data, further explained in the analysis.

Methodological Approach

Using ethnography as a platform, the focused ethnographic methodology in this study features a short-term field visit with semi-structured observations at the MKMC in Uganda. The focused ethnographic approach examines cultures and subcultures among a specified community where the participants have knowledge of an identified issue (12). The identified issue for this research is the practice of neonatal airway management at the MKMC and affiliated villages. Table 2 illustrates the components of the focused ethnographic approach.

The short duration of the field trip was compensated by the intensive data collection tools, including immersion in the setting, photographs, interviews with subsequent transcriptions, a focus group discussion (FGD), and audio recordings, following recommendations for effective focused ethnography (13, 14). During the two weeks, semi-structured observations were conducted using the HBB guidelines as criteria to evaluate midwives' neonatal airway management. In addition, through iterative data

collection from multiple sources, such as field observations, photographs (restricted to the medical center), semi-structured interviews, and FGDs, the data was then analyzed guided by a feminist theoretical framework. Reflexivity and bracketing were incorporated with qualitative content analysis (11), with data documented and stored to provide an audit trail.

The Researchers

As a source of reflexivity expected in focused ethnography (15), the principal investigator has over 20 years of experience as a nurse anesthetist and a background in labor and delivery nursing. She has volunteered with mission trips to other LMIC, where she taught neonatal airway management to nurses and midwives. She lived in Uganda for 14 years and is able to speak Swahili, one of the national languages. A novice investigator, she was guided by an experienced researcher with expertise in ethnography, feminist perspectives, and sociolinguistics, who has conducted research in LMIC regarding TBAs. Her role in this study was as a qualitative methodologist mentor, familiar with cultural adaptations both practically and theoretically (16)

Findings

Barriers to Providing Neonatal Airway Management in Home-Based Births Based on Social Inequalities Experienced by TBAs and Mothers

Participant identification as follows:

TBA Facilitator (TF), Program Manager (PM), Business Administrator (BA),

Public health Coordinator (PC), Nurse Manager (NM), Midwife (MW).

Barriers Related to Healthcare System Hierarchy

> **TF**: They were fearing long ago, they were conducting deliveries fearing that they would prison them. Because they are not supposed to conduct.
>
> We held a workshop; we told them now no more delivers. You are supposed to examine these mothers, help educate them on hygiene and environment, and escort them for labor (to the hospital).

The perception that TBAs were afraid they would be imprisoned if they conducted or admitted conducting deliveries is noteworthy. This perception of fear was also seen while coding and analyzing the FGD.

Cultural Practices, Attitudes, and Beliefs at Community Level that Limit Access to Healthcare Facilities for Female Workers in a Disenfranchised Social Position

The PM described two rituals that typically occur to bless the newborn.

> **PM**: 1) Many of our communities they believe that when a mother delivers, you should get the placenta, then the father of the kid should go dig a hole in the corner and bury that one. We call it "Umuko". Carries the child to adulthood and provides a good life. 2) Traditional "leaves", so they squeeze it immediately when the baby is born, after certain time they pour the "leaves" (over the baby's body) to give blessings to the baby. So ... married by a very rich man or if the baby is a man, he will be very courageous.

These rituals reflect a desire to provide a better future for the child, yet it is difficult to accommodate those cultural practices at the healthcare facility. Therefore, births by the TBAs in a home-based environment provide opportunity to accommodate the families expected cultural practices.

Cultural Beliefs and Attitudes

The PM noted privacy and birth attendant age as reasons why mothers deliver at home.

> **PM:** …they feel it is not good for a younger midwife or any midwife whom you are older than to see you naked. Rather go be delivered by very old Traditional Birth Attendant. Culturally, that is how they see it.

The mothers are not comfortable having younger women as midwives, which is more likely to occur in the health facility. Mothers feel that their privacy is maintained better at home with a midwife who is older.

Sister N, a midwife, clearly communicated during an interview that midwives are respected as long as the baby delivered is alive. If the baby dies, which may not be due to the midwife's skills, she

feels that the community will directly point to her as the cause of the baby's death. It was difficult for the midwife to say the words, "dying" or "the baby is dead"; instead she used the word, "opposite."

> **Sister N:** They always respect the midwives. First of all we bring new life to the community and the mother. But when it becomes the opposite, they say "you killed the baby, you killed my child."

Sister N also recognized that the TBAs are discouraged from practicing and they have less knowledge. She thinks the mothers who receive services from TBAs are "behind" and are not progressive enough to receive services from the hospital. This account identifies a social barrier between TBAs and midwives.

Another social barrier, noted by the PC, was that mothers do not take advantage of antenatal care services offered for free at the MKMC, due to culturally based reasons. They fear the facility will not respect their cultural practices or the rituals expected in pregnancy and childbirth.

Lack of Access to Health Facility and Financial Support

The PM identified several issues with community infrastructure, such as inadequate and congested roadways and the pressures of population growth, which they reported as having tripled over the past 20 years. The business administrator (BA) further described the lack of health facilities available in this rural area. The TF mentioned similar issues and highlighted the lack of financial support for pregnant mothers. In contrast, the BA believed there was a misconception among mothers that hospitals are prohibitively expensive.

> **PM**: So I think inaccessibility to health services is one of the factors, why mothers opt to deliver from their home.
>
> Financial and infrastructural in terms of the roads. Surely, it has just started raining here, if you move 15 kilometers from the town to many places, you will get stuck. Even a motorcycle may not go through. So assuming that a mother wants to deliver 20 kilometers (away), it becomes hard.
>
> **TF**: Plus it is very far and no transport, no money, so they (mothers and family members) would refuse.

BA: Secondly, in the rural Masindi district, apart from the government hospital, this is the only other health facility that gives delivery services.

Some of them also have a misconception about hospitals, they think hospitals are very expensive, hospitals are for the rich.

Home-Based Birthing as Alternative to Healthcare Facility

Though the FGD was planned with the seven TBAs, one of the midwives suggested we seek demographic information from the TBAs in a private manner because one of the questions included "place where they delivered the babies". Answers to this question required privacy. Providing privacy and protection, especially to the vulnerable TBA population regarding personal information, reflects our application of the feminist perspective to this research. In keeping with the flexibility recommended in focused ethnography, individual demographics were collected in a private space during a break. After the break, participants returned to the focus group. According to the TBAs' answers, home-based births occur in various remote areas, such as in a hut, at the banana plantation, near the roadside, near a lake, or on a farm. In those remote areas, the TBA is usually conducting the birth by herself; therefore, the neonate and the mother receive care simultaneously from one person. Attention to the neonate, who may need immediate attention to assist with breathing, may be delayed until after the mother receives care. As mentioned by the nursing manager (NM): "The midwife at the hospital or facility has someone else to assist as needed, and the TBA is the only one taking care of the mother." In contrast, the TBAs during the FGD gave the following responses to the question, "Do you ask for help if the baby is having difficulty breathing?"

1) No.

2) We use our knowledge to save the baby.

3) It is already an emergency, call for another attendant (TBA) to help.

TBA Access to Education and Airway Management Supplies

The TBAs' formal education ranged from primary level 4 to secondary level 6. The TBAs had vast childbirth experience ranging from 12 to 21 years. Most of their knowledge base did not align with current HBB standards of care. The five steps of the HBB guidelines is as follows: 1) Recognizing infant not crying, 2) Positioning head, 3) Clearing the airway, 4) Stimulating, 5) Recognizing breathing, 6) Initiating ventilation within one minute.

During the FGD, when asked, "Describe if the baby is having difficulty breathing, how do you help the baby?" the TBAs shared the following responses relaying their knowledge of neonatal airway management.

We use the "Panga" (a farming tool to cut large stems – similar to machetes) to bang together and create a loud noise over the head to wake the baby up.

Hold the baby upside down and slap on the legs.

Wipe nose and mouth with a cloth.

Provide oxygen as fresh air by fanning with a cloth.

Refer to the hospital when everything fails.

Only one of the HBB guidelines for helping a neonate in distress was addressed, "stimulation" by slapping the child's legs. The other responses reported by the TBAs' did not align with the current HBB guidelines for neonatal airway management.

The lack of adequate supplies for TBAs to conduct a safe childbirth was evident in several accounts from the midwives, TBAs, and their facilitator based on their responses to, "What things or equipment would you like to better take care of the baby? The midwives in the FGD identified equipment that they had seen or knew was used in birth kits in previous years when births by TBAs were legal:

1) Bulb syringes

2) Scissors

3) Clamping forceps

4) Protective gear, such as boots, aprons, and uniforms.

Facilitators to Assisting the TBAs in Accessing Educational Resources of Neonatal Airway Management from a Previously Non-supportive Social System

Midwives Have Adequate Education to Teach TBAs

All five midwives at the MKMC have at least three years of education and have been practicing midwifery for three to eight years. The NM's dual professions of midwife and practicing nurse anesthetist equip her with excellent knowledge of neonatal airway management. All staff midwives were able to verbalize the HBB guideline steps very clearly and they thought that most of the basic steps could be taught to the TBAs.

Value of the Medical Center to Provide Educational Resources for the TBAs

The MKMC is willing to hold training for the TBAs because it will benefit their center. If TBAs are taught at the center, they will likely refer mothers to the facility sooner. The BA expanded on this by saying that educational programs for TBAs at the facility will build positive relationships between midwives and TBAs, and thus, increase trust and facilitate teamwork for taking care of mothers and neonates. Another benefit noted by the manager is that center-based training will provide an opportunity for the midwives to receive continuing education and review; moreover, the midwives will act as "change agents" for their own empowerment as well as the TBAs in delivering more effective and safe neonatal care. The BA summarized the overall benefits of a training program this way:

> **BA**: I appreciate that one (*teaching TBAs at the facility)*, it is a great thing for the Traditional Birth Attendants, for the midwives, and even for the management team within here, because we can make advance in our communities by assuring that our mothers have safe deliveries. Those who cannot make it to the facility, because we still have a number that cannot make it, will be handled by those we shall have trained and what I want to assure you that, even these who come here for training, the number may look small will obviously take this information to their colleagues where they come from… this may help the number of our referrals to grow.

Learning Preferences of the TBAs that Privilege Their Formerly Marginalized Strengths

TBAs with a low literacy level expressed various learning preferences, defined as individuals' preferred means for absorbing new information and retaining skills (17). The TBAs were willing to learn neonatal airway management and were enthusiastic about receiving new information. During the FGD, when asked if there were different ways of helping the baby breathe better, "would you like to learn them?" all the TBAs answered "yes".

Use of Local Language and Culturally Appropriate Learning Preferences

The TF voiced that the person planning training needed to become familiar with their local living areas before creating training methods for TBAs and midwives.

> **TF**: You have to go to their areas … You have to look at their homes, so when you call them for training and being that they will be trained, you have to be exemplary in the community, so that one will take some time. It is the assessment.

In addition to the assessment of the environment, the TF mentioned the need to use the local language. The training materials, including the first five steps of the HBB guidelines, have to be translated. The TF verbalized willingness to help translate the five steps in the local language. "You can even get help to translate in local language, draw picture and we shall team up." The TF followed up by describing the teaching process that she has used successfully to teach TBAs.

> **TF:** Before you start training, you give them a pre-test. They may not know how to write, but we formulate questions. You sit with her as you are counseling her. For example, how do you get to put (place) the baby. How do you do this and this. They can tell you what they do, and you can identify what you are going to teach them, during that interview. Then you start the process for two weeks, and then afterwards, give them a post test. Then you set them to go (to perform), in the community. There are three phases… pre-test, performance, and post-test.

The PC who teaches preventive health sessions for the village communities described a similar process to follow up existing training.

PC: Problem solve with them, why are you not doing that or is there some additional challenge as you had not initially perceived. I think, not just using visuals and using demonstrations, but also understanding education learning is a process. It just does not end at the training session. Sometimes needing additional support and follow-up.

Preferred Learning Methods

Further discussion regarding learning preferences occurred during the interview with the TF. The MKMC midwife, who accompanied the researcher, and the TF exchanged ideas about learning preferences for the TBAs.

TF: They have flip charts. They even show them videos, or a scenario, or a drama.

MW: or a song

Learning preferences, such as a pictorial chart, a song, a poem, a scenario or drama, or a demonstration, suggested by the TF, midwives, or PC, were later confirmed by the TBAs when answering the FGD question, "how would you like to learn and remember the steps to help the baby breathe?

1) Use of charts containing with pictures

2) Through demonstration, drama

3) Use of poems, song

The NM and the PC (PC) further emphasized re-demonstration and engaging the TBAs to develop the teaching material and to critique their peers during the training. Both SF and PC agreed that paper format to take home such as pamphlets will not work for TBAs to learn and remember the resuscitation steps; rather a song or poem can be remembered and taught to others in the village area.

NM: Here what we tell them, because most of them they are illiterate, so we call like few people, we teach them and it is normally through demonstration and then if we have some charts for the baby from step one to maybe five, this is what we can do. To teach them and if you want return demonstration you can also ask for someone who is willing to come up and demonstrate but

mostly it is through demonstration and telling them what exactly they can do. Because giving them the paper may not help much.

PC: To be more visual or hands on, less verbal based.

I will show a short video, but it is something visual or audio, that will get people thinking about the topic and what they already know or what they what to learn.

Actually demonstrating, and then I give them time to actually have a volunteer come over. Few volunteers we have them trying to do the steps and rest of them will give feedback. They can say "oh no, no, no that not right, you need to do this." They will try to say what the next step for that person to perform. And then …sort of assessment at the end to see whether or not that they are able to do it.

So, I think as long as it is connected together, because just teaching the song, they will remember the steps, but they might not be able to implement the steps. I think if we can connect them with the demonstration, and going line by line through the poem and then putting it all together with the poem and having them practice all together. I think if there is a way to connect them. I think that will be helpful. In general, a lot of people here, they are very big on drama, very big on songs something they relate to, and it is part of culture.

The above accounts from TF, TBAs, MWs, NM and PC revealed the learning preferences such as demonstrations, pictorial charts, poems, songs, and drama as culturally appropriate.

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Table 1. Seven Characteristics of Ethnography

	Characteristics of Ethnography (LeCompte & Schensul p.12)	**Study**
1	Natural setting not laboratory.	Maternity clinic in MKMC a rural area in Uganda and affiliated villages.
2	Involves face to face interactions with the participants.	Face-to-face interactions occurred as the researcher presumed the role of participant – observer during 10 days of volunteering in the labor and deliver rooms with midwives and in the operating room with an anesthetist to observe the airway management skills.
3	Presents an accurate reflection of participant perspectives and behaviors.	Accurate reflection of the midwives' perspective regarding newborn care and airway management gathered by interviews and observation during newborn care.
4	Uses inductive, interactive, and recursive data collection and analytic strategies to build local cultural theories.	Observations and perceptions collected to determine their beliefs about the initiation and support of newborn respiration, training for neonatal airway management, and cultural practices associated with assisting breathing during the perinatal period.
5	Uses multiple data sources, including both quantitative and qualitative data.	The researcher will collected data from multiple resources by observing the environment where the TBAs and midwives practice at the MKMC, in particular, direct observations using the ENC guidelines during immediate newborn care. Observing the TBAs and midwives interacting with the other staff members will provide the researcher with insight of their communication skills. Additional data regarding health care providers' structural organization by hierarchy collected during semi-structured interview with the clinic director. Interactions during FGD with TBAs A quantitative checklist adopted from the Neonatal Resuscitation Program and HBB program. Guideline components followed during births, for simple frequencies and patterns, while observing 3 births.
6	Frames all human behavior and belief within a sociopolitical and historical context.	Historically, midwives and TBAs have provided a majority of maternal child healthcare (MCH) in rural areas of developing nations. Due to current global awareness of higher neonatal mortality rate compared to the high-income countries, the WHO has addressed the Sustainable Development Goal #3 to

		reduce the mortality rate and focus on teaching MCH providers adequate neonatal resuscitation management.
7	Uses the concept of culture as a lens through which to interpret results	This study explored the cultural practices, values and beliefs of newborn care and airway management provided by the midwives and TBAs in rural clinic in Uganda.

Table 2. Application of Focused Ethnographic Characteristics

Focused ethnographic characteristic	**Application to this study**
Conceptual orientation of a single researcher	Single PI (Marvesh Mendhi)
Focus on a discrete community	Rural area of Masindi, Uganda
Used in academia as well as for development in healthcare services	Future development of culturally tailored neonatal airway management intervention for TBAs
Problem focused and context-specific	To reduce neonatal deaths caused by birth asphyxia
Involvement of a limited number of participants	Limited to total of 12 (midwives and TBAs) Three clinic manager, one TBA facilitator and one public health coordinator
Participants usually hold specific knowledge	Newborn care knowledge and practice
Episodic participation observation	Two weeks of preliminary visit followed by two weeks for data collection visit to Masindi Uganda by the PI to participate and observe newborn care and airway management

Table 3. TBA Focus Group Demographic Detail Questionnaire Summary

TBA number	Years of experience	Average # of childbirths assisted per month	Type of education for childbirth and level of education	Practices and professions besides MCH	Age, y	Sex
1	21 years	5 without referral	Secondary 1 Trained TBA Counseling HIV patients	Tailoring Farming	63	Female
2	21 years	6 handled 5-6 referred 10-12 total	Primary Trained TBA Counseling HIV patients Family planning	Farmer	60	Female
3	More than 15 years	6 or more	Secondary 2	Counselor VHT TBA Community based facilitator Farmer	54	Female

4	12 – 15 years	1 – 2 Most are referred	Secondary 4	TBA Nursing A Farmer	42	Female
5	20 years	15	Primary 4 Trained TBA	L. C. 1 (local district) Chairperson	65	Female
6	19 years	30	Primary 7 Trained TBA	Peasant Farmer	60	Female
7	15 years	4 - 5	Primary 6	Peasant Farmer	68	Female

Abbreviations: MCH, maternal-child healthcare; TBA, traditional birth attendant.

Due to low literacy of TBAs, demographic data were verbally taken and recorded by the staff midwives at Masindi Kitara Medical Center. This took place individually (one-on-one) to provide privacy for the Traditional Birth Attendants to answer the questions.

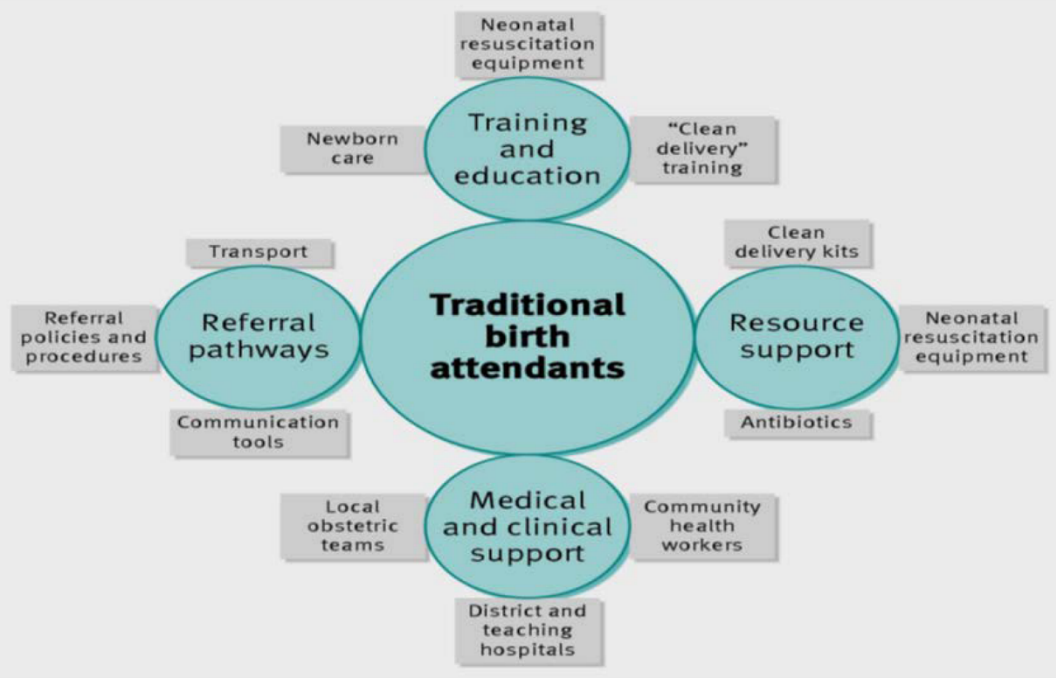

Figure 1. Conceptual Model of Traditional Birth Attendant Support Systems. Used with permission, Wilson, A., Gallos, I. D., Plana, N., Lissauer, D., Khan, K. S., Zamora, J., . . . Coomarasamy, A. (2011). Effectiveness of strategies incorporating training and support of traditional birth attendants on perinatal and maternal mortality: meta-analysis. Bmj, 343(dec01 1), d7102-d7102. doi:10.1136/bmj.d7102.

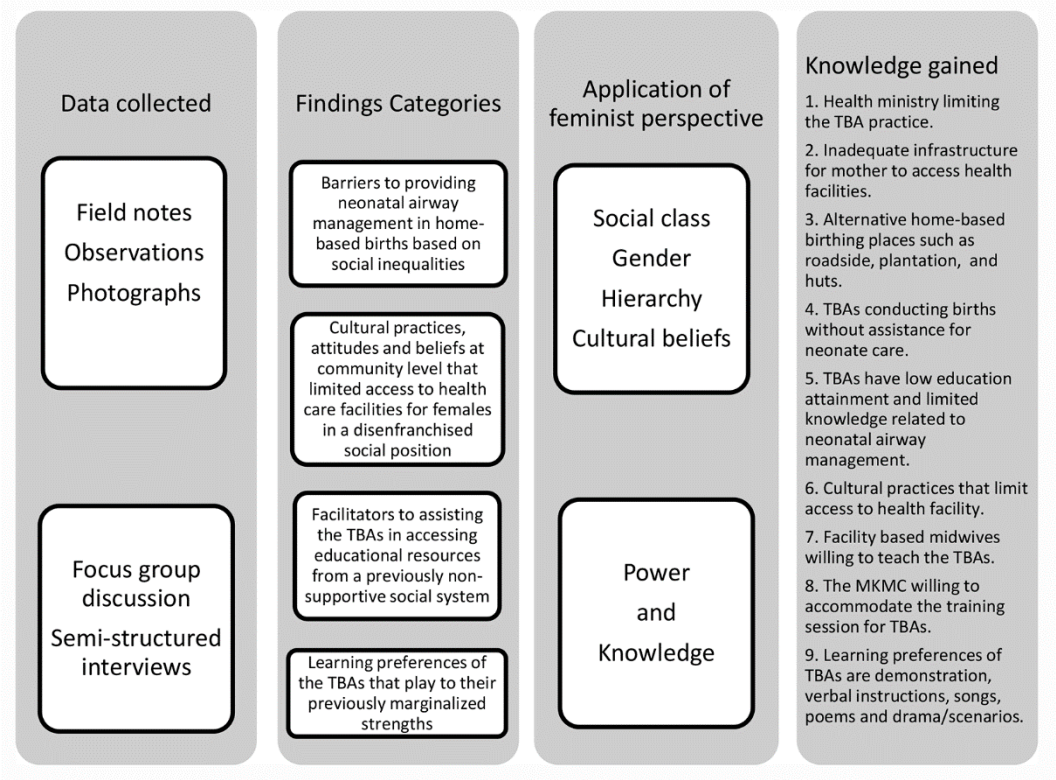

Figure 2. Visual Display of Data Collection and Analysis with Feminist Perspective.