

Assessing health workers knowledge, practices, and perceptions of PMTCT services using modified obstetric care as a tracer condition in the Lindi Region of Tanzania.

By

Dr. Sisty Joseph Moshi

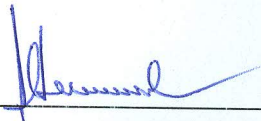
A dissertation submitted in partial fulfillment of the requirement for the degree of Master of Science (Applied Epidemiology) of Muhimbili University of Health and Allied Sciences

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Certification

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled **Assessing health workers knowledge, practices, and perceptions of PMTCT services using modified obstetric care as a tracer condition in the Lindi Region of Tanzania** in partial fulfillment of the requirements for the degree of Master of Science in Applied Epidemiology of the Muhimbili University of Health and Allied Sciences.

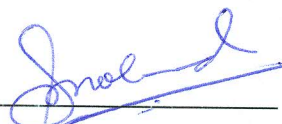


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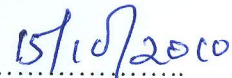
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Dedication

This work is dedicated to my family. My father, Mr Joseph Kimanganu Moshi, my mother Sabina Joseph Moshi, my wife Redempta, my daughters Lulu, Siaglory and Angela and my son Joseph.

List of abbreviations

1	AIDS	Acquired Immune – Deficiency Syndrome
2	AMO	Assistant Medical Officer
3	ANC	Antenatal Care
4	AOR	Adjusted Odds Ratio
5	ARM	Artificial Rupture of Membranes
6	ARV	Anti-Retro-Viral
7	CD4	Cluster Of Differentiation 4
8	CHAI	Clinton HIV/AIDS Initiatives
9	CHMT	Council Health Management Team
10	CI	Confidence Intervals
11	CMLE	Conditional maximum likelihood Estimate
12	C/S	Caesarian Section
13	DC	District Council
14	DMO	District Medical Officer
15	DRCHCo	District Reproductive and Child Health Co-coordinator
16	FGD	Focused Group Discussion
17	GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit or or Tanzania Germany Technical Cooperation
18	HIV	Human immunodeficiency Virus
19	ID	Identification
20	IEC	Information Education and Communication
21	IPD	In Patients Department
22	MD,	Medical Doctor
23	MO	Medical Officer
24	MOC	Modified Obstetric Care
25	MoHSW	Ministry of Health and Social Welfare
26	MSc	Masters of Science
27	MTCT	Mother To Child Transmission
28	OPD	Out Patients Department

- 29 OR Odds Ratio
- 30 PMTCT Prevention of Mother To Child Transmission
- 31 PHD Doctor of Philosophy
- 32 RCHCo Reproductive and Child Health Co-ordinator
- 33 RHMT Regional Health Management Team
- 34 RMO Regional Medical Officer
- 35 STI Sexually Transmitted Infections
- 36 TFELTP Tanzania Field Epidemiology and Laboratory Training Program
- 37 THIS Tanzania HIV Indicator Survey
- 38 TTCL Tanzania Tele-Communication Limited
- 39 UNICEF United Nations Children Education Funds
- 40 WHO World Health Organization
- 41 WRA Women in Reproductive Age

Definition Of Terms

- 1 Trained staff These include medical doctors, assistant medical officers, clinical officers and nurses. This classification bases on the basic professional training.
- 2 Health attendants These include health workers that have been employed basically as attendants in the health system. They have none or very basic medical training. They were not employed to do professional medical tasks but due to shortage, they may do some professional work.
- 3 PMTCT trained health Any medical personnel that has undergone formal PMTCT training, worker regardless of his /her professional qualification.
- 4 Academic The qualification of health workers categorized in the type of certificate qualification awarded (degree, diploma or certificate).
- 5 Cadre Professional title of the health workers (Medical Doctor, Assistant medical officer)

Abstract

Assessing health workers knowledge, practices, and perceptions of PMTCT services using modified obstetric care as a tracer condition in the Lindi Region of Tanzania.

Background. Modified obstetric care (MOC) is the combination of selected obstetric practices designed to minimize chances of transmitting HIV from mother to her neonate. In some areas PMTCT has reduced vertical transmission to less than 4%. However in Tanzania a high proportion of exposed neonates (13%) still seroconvert to HIV. This situation led to initiation of this study whose main objectives were to determine the health workers knowledge, practices, and perceptions of PMTCT services using modified obstetric care as a tracer condition. Results of this study would provide data for improvement of PMTCT services.

Materials and methods. This was a cross sectional study in which data were collected using structured questionnaire and focused group discussion. The sample size was 72, however the study included 90 of all 96 health care workers trained on PMTCT and working in all 7 hospitals of Lindi region.

Results. Levels of health workers general knowledge on MOC were found to be moderate (64.4%) and low (34.4%). Factors found to influence level of general knowledge were being a diploma holder, (AOR = 3.5, 95% CI = 1.327 -9.282, p – value 0.00,) and being trained staff (AOR = 4.00, 95% CI = 1.396 -12.9, 4 p – value 0.0).

Those who had knowledge that minimizing vaginal examination' is a part of modified obstetric care was 71%. (n = 64). Knowledge level being influenced by being a diploma holder (AOR = 3.45, 95% CI =1.327 -9.282) and being trained on PMTCT by MoHSW (AOR = 3.17, 95% CI = 1.22 -8.43). Avoiding ARM as MOC strategy was known by 85.6%. (n = 77). Level of knowledge was being influenced by being a trained health worker, (p – value =0.00, AOR18.29, CI =4.85 - 77.65). Avoiding routinely suction was known by 91.1% of the respondents. Knowledge being influenced by being diploma holder, (p – value = 0.00, AOR 3.38, 95% CI = 1.39 – 8.45), trained health staff (p- value = 0.01, AOR = 4.17, CI = 1.4 – 12.9) and being placed

in the labour ward, (p – value =0.04, AOR = 2.67, CI =1.007 -7.24).The rest of the MOC interventions were not known.

More than 90% of the health care workers perceived the known intervention as useful. Failure to implement the recommended interventions was reported to be due to patients complications.

Conclusion. A large proportion of study population had low to moderate knowledge about the modified obstetric care. This may be the reason for poor PMTCT performance. It is recommended that PMTCT be amended to include all modified obstetric care procedures for its improvement.

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CHAPTER 1

Introduction

1.1 Background

Mother-to-child transmission (MTCT) of Human Immunodeficiency Virus (HIV) refers to the transmission of HIV infection from HIV-infected mothers to their infants. MTCT can occur during pregnancy, labour and delivery or breastfeeding (WHO, 2006). Without intervention, the overall risk of MTCT is approximately 20-45 %, (MoHSW, 2007). It is estimated that, about 20% of vertical HIV transmission occur during pregnancy, 50% during delivery and 30% during breast feeding (MoHSW, 2007).

Worldwide each year, an estimated 590,000 infants acquire HIV infection from their infected mothers and most of this occurs in the developing countries where resources are limited. (Decock *et al*, 2000, Bajunirwe *et al*, 2004). Immediate impact of MTCT of HIV is increase in the burden of diseases, hence reversing the gain in child survival that has already been obtained. (Decock *et al*, 2000, Israel *et al*, 2003).

Risk factors associated with MTCT of HIV includes high maternal viral load and low CD4 count (new infection or advanced AIDS); viral, bacterial or parasitic placental infections for example malaria and STIs. (MoHSW, 2007) Other risk factors includes early rupture of membranes (4 hours or more before delivery), invasive delivery procedures that increases contact with mother's infected blood or body fluids (episiotomy, artificial rupture of membranes, vacuum extraction delivery), complicated deliveries (breech delivery and first infant in multiple births), and chorioamnionitis (from untreated STIs or other infections). (MoHSW, 2007) Post natal factors include long duration of breastfeeding, mixed feeding (breastfeeding combined with other foods or fluids before 6 months of age), oral disease in the infant (thrush or mouth sores), breast abscesses, nipple fissures, and mastitis (MoHSW 2007).

To control child HIV/AIDS burden, Prevention of Mother to Child Transmission of HIV (PMTCT) strategies were adopted to minimize the incidence of transmission of HIV from infected mothers to their children. PMTCT has several components which includes routine HIV counselling and testing, ARV treatment and prophylaxis, safer delivery practices, (also known as modified obstetric care), counselling for safer infant feeding practices. Post partum care for mothers, infant feeding and follow up, partner and family involvement, together with family planning.

PMTCT is being rolled out within the contexts of acute shortage of human resource for health. This rollout included staff training, infrastructure improvement and community mobilization. For example health workers are trained on the use of protective gear, safe use and disposal of sharps, sterilization of equipment and safe disposal of contaminated materials. Other PMTCT strategies taught to health workers are ⁽¹⁾to minimize vaginal examinations (perform it only when necessary using sterile technique); ⁽²⁾the use of non invasive foetal monitoring techniques to assess need for early intervention; ⁽³⁾avoidance of prolonged labour by using oxytocic drugs to shorten labour when appropriate; ⁽⁴⁾avoidance of artificial or early rupture of membranes (before 7 cm dilation) unless necessary; and ⁽⁵⁾ avoidance of unnecessary trauma during delivery which include all invasive procedures like scalp electrodes, scalp sampling, routine episiotomy, instrumental delivery, and use safe transfusion practices. (MoHSW 2007)

Success of PMTCT in any setting depends on the extent that the health system, healthcare providers, the clients and respective communities support its implementation. The health system has to provide enough and adequate space for service provision, adequate and regular supply of equipment and human resources. At the same time there has to be community awareness, support and involvement. In addition, health workers must adapt with increased demand on their time, acquire and sustain PMTCT skills and knowledge while maintaining optimal attitudes and practices.

PMTCT roll out is still going on both in urban and rural areas of Tanzania. Achievement of the desired PMTCT outcome will depend more on the performance of health workers.

At the same time, health workers performance is reflected by their PMTCT knowledge acquired, perceptions, practices as well as ability to accommodate increasing workload. This study aims to assess health workers knowledge, practices, and perceptions of PMTCT services using modified obstetric care as a tracer condition. This study was done in Lindi Region, Tanzania, 2009.

1.2 Problem statement

If PMTCT is been properly implemented, vertical transmission of HIV has almost been controlled, and is less than 4%. (Gibb *et al.* 1997; WHO, 2010) On the other hand, the problem of HIV vertical transmission is still prominent in Africa. Although it has not formally been researched, results from dry blood spots from HIV exposed children shows that 13% of exposed children seroconvert to HIV infection. This indicates that PMTCT is not properly implemented in Tanzania.

PMTCT guidelines on modified obstetric care stipulate several interventions that have been proved to reduce MTCT risks. These include the safe use and disposal of sharps, safe disposal of contaminated materials and equipment sterilization, minimized vaginal examination, use of sterile technique, avoidance of prolonged labour, avoidance of routine artificial rupture of membranes, avoidance of unnecessary trauma during delivery, minimized use of blood transfusion, clamping of the cord immediately after birth, and avoiding milking the cord. Others PMTCT practices include covering the cord with gloved hand or gauze before cutting to avoid splash of cord blood, using suction only when the infant shows signs of distress or aspiration, use of mechanical suction at less than 100 mm Hg pressure or bulb suction and administration of ARV prophylaxis. If all of these guidelines were been adhered to, MTCT would be very low. The high rate of MTCT in Tanzania signify poor adherence to PMTCT guidelines.

Modified obstetric care success is influenced by the quality of existing health system together with health care workers. Knowledge and perception of modified obstetric care among health care will determine the way they will practice it. This means that if knowledge is poor, performance will also be poor. Also if the health workers do not

perceive modified obstetric care as useful intervention, then their implementation will be poor. Implementation will be poor because these interventions will not be practiced by the health workers.

The level of knowledge about modified obstetric care among health workers is not known. Also how health care workers perceive modified obstetric care intervention is not known. And how all these affect the practice of modified obstetric care, is not known. This study explored the health workers knowledge, perceptions and practices of PMTCT practice using modified obstetric care as a tracer condition.

1.3 Rationale

This study aims to assess health workers knowledge, perceptions and practices of PMTCT services using modified obstetric care as a tracer condition in Lindi Region, Tanzania, 2009. This is done because it is been suspected that, problems of PMTCT may be in health workers knowledge, or perception or practice. Success on PMTCT depends on motivation of health workers towards providing PMTCT services, existence and sustained appropriate knowledge, practices, and perceptions as well as the existing context. The study shall provide information that will enhance realization of the objectives of the PMTCT program in Tanzania.

1.4 Objectives

1.4.1 Main Objective

To determine health workers knowledge, practices, and perceptions of PMTCT services using modified obstetric care as a tracer condition in Lindi Region, Tanzania, 2009.

1.4.2 Specific Objectives

- i. To determine percentage of PMTCT trained health workers with appropriate knowledge on modified obstetric care as a part of PMTCT interventions in Lindi region.

- ii. To determine percentage of health workers who appropriately perceive modified obstetric care as a part of PMTCT interventions in Lindi region.
- iii. To determine percentage of health workers practicing appropriately modified obstetric care as a part of PMTCT interventions in Lindi region.
- iv. To determine factors influencing implementation of PMTCT among health workers in Lindi Region.

1.5 Literature review

1.5.1 Paediatric HIV/AIDS and PMTCT

Worldwide approximately 2 million children were living with HIV in 2007, up from 1.6 million in 2001. (UNAIDS, 2009) It is estimated that 370,000 children were newly infected with HIV in 2007 – approximately 14 percent of the total new infections (MoHSW, 2007). An estimated 270,000 children died of AIDS-related illnesses in 2007, which was 14% of all children deaths. In 2007 there were about 1.8 million children living with HIV in sub-Saharan Africa, which was 90% of all HIV-positive children worldwide. (UNAIDS, 2009) Children make up approximately 6 percent of all people living with HIV in Tanzania.

In Tanzania, by 2008 there were 140,000 children living with HIV/AIDS. This is an increase from 100,000 children in 2001 (UNAIDS, 2009). In Lindi region, it is estimated about 3,000 children are living with HIV/AIDS, (THIS, 2008)

High burden of HIV among children in Tanzania is due to high Mother to Child Transmission of HIV (MTCT) and this is a big problem in Sub-Saharan Africa. This is particularly due to large total population of women of reproductive age (WRA) which is estimated to be over 140 million (UNAIDS 2004). With a prevalence rate of 6%, (THIS 2008) HIV/AIDS remains a serious problem in Tanzania, second to malaria. Without intervention, HIV-infected mothers will continue to pass HIV to their children at a rate of between 20 to 45% (MoHSW 2007). Hence there is a need to implement strategies to prevent MTCT especially in rural and remote settings.

Prevention of HIV transmission from mother to the child (PMTCT) is a strategy that has been found to control MTCT in the developed countries. (Gibb, *et al*, 1997) This strategy was adopted in all Sub Saharan Africa including Tanzania in the late 1990s. One of the components of PMTCT is modified obstetric care, also known as safe delivery services.

1.5.2 Modified obstetric care

Modified obstetric care is the combination of selected obstetric practices that aim to minimize chance of transmitting HIV from HIV positive mother to her neonate. These practices include minimizing vaginal examinations. This is so because vaginal examinations could inflict trauma to the mother and the foetus or both and then introduce some infection (inflammation) and hence increasing chances of MTCT (MoHSW 2007). So it is recommended that vaginal examination be done only when necessary using sterile technique (MoHSW, 2007).

Modified obstetric care strategy also discourages prolonged labour. This is because prolonged labour is associated with increased rate of MTCT of HIV (Tejedor *et al*, 2003). So the use of oxytocic drugs or any other means available to shorten labour in HIV infected mothers is recommended. (MoHSW, 2007)

Artificial rupture or prolonged rupture of membranes (four or more hours prior to delivery) is associated with increased MTCT approximately by 25 in every hour. (Tejedor *et al*, 2003, Penn *et al*, 2006). Membranes can rupture spontaneously at the onset of labor, or some hours before delivery especially in obstructed or prolonged labour. Some health workers can rupture it in an attempt to hasten delivery. In any case the fetus is exposed to maternal vaginal fluids for significant amount of time. When foetus sustain bruises during passage, the probability of MTCT become much higher. It is therefore advised to avoid artificial rupture of membranes (before 7 cm dilation) unless when absolutely necessary. (Guidozzi *et al*, 2009, Phanuphak *et al*, 2010)

Trauma to foetus or mother during delivery increases the chances of MTCT. (MoHSW 2007) Trauma can result from invasive procedures like the use of fetal scalp electrodes, scalp sampling, episiotomy and instrumental delivery. The use of invasive intrapartum procedures entailed a three-fold increase in perinatal HIV transmission. (Tejedor *et al*, 2003A). So these procedures should be avoided (Guidozzi *et al*, 2009, Phanuphak *et al*, 2010)

Elective caesarian section before the onset of labour or membrane rupture is highly encouraged as it has been associated with 50% to 81% reduction of MTCT when compared with vaginal delivery (Gibb, *et al*, 1997, Read *et al*, 2005, Harms *et al*, 2005). However, in Tanzania, the capacity for doing caesarean section to reduce MTCT is low, therefore it is indicated only for other obstetric complications; it is not recommended for the purpose of reducing MTCT in Tanzania (MoHSW, 2007).

Other PMTCT strategies include clamping the cord immediately after birth (Penn *et al*, 2006), and avoid milking the cord or squeezing it towards the infant. (Israel *et al*, 2003). Also covering the cord with gloved hand or gauze before cutting to avoid splash of cord blood. (MoHSW, 2007) Foetal suctioning should be done only when the infant shows signs of distress or aspiration and with mechanical suction at less than 100 mm Hg pressure or bulb suction, rather than mouth-to mouth suction (MoHSW, 2007)

Gentle cleansing of the vagina with antiseptics at regular intervals after membrane has ruptured has been shown to reduce MTCT of HIV. (Biggar *et al*, 1996, Israel *et al*, 2003). Results from several studies suggest that contact with maternal cervico-vaginal secretions during birth is a risk factor for MTCT of HIV (Biggar *et al*, 1996, Gaillard *et al*, 2000). In a large trial performed in Malawi, lavage of the vagina using chlorhexidine showed no overall difference in rates of transmission. However, in those cases where the membranes had been ruptured for more than 4 hours, 4 hourly vaginal cleansing showed significant reduction of HIV vertical transmission. (Biggar *et al*, 1996). Also cleansing of the neonate soon after delivery may help to reduce the risk of infant. Despite all these facts, the Tanzanian PMTCT guideline is silent over some of them.

1.5.3 Human resource for Health and Modified Obstetric Care

Provision of PMTCT services should be, and therefore has been integrated with the health care system to ensure efficiency and sustainability (WHO, 2010, Shabarova. *et al*, 2003, Mazia *et al*, 2009). In line with WHO guidelines, PMTCT service in Tanzania has been integrated within the existing health care system (MoHSW, 2007).

Integration of PMTCT into the health care system has been achieved through the reproductive and child health services as many women and children who are at risk for MTCT access these services. In addition, since some PMTCT program elements are similar to ongoing safe motherhood program integration would be more efficient and effective. With some additional resources and training, current personnel can implement the expanded program in existing facilities (Israel *et al*, 2003). However PMTCT integration is within the context of acute shortage of human resource, inadequate physical infrastructure and poor management (UNICEF, 2002). Despite the integration, the program will largely depend on the existing human resource, infrastructure and management. Consequently health workers are implementing PMTCT while facing various constraints.

Human resource factors that may affect PMTCT practice includes staff shortage (Msuya, *et al*, 2004), inadequate skills (Ntabaye *et al*, 2004), inappropriate attitude, improper perceptions and heavy work load (Israel *et al*, 2003). Consequently it will manifest as poor motivation and dissatisfaction among staff providing PMTCT.

Adequate skills and knowledge about PMTCT are among very important tools for proper implementation of PMTCT. Knowledge and skills of a health worker will be influenced by basic education whether primary, secondary or above and contents of the PMTCT training received. Also it will depend on the motivation of the health worker providing the services. Perception of a health worker about PMTCT will depend on level of education together with social and economic context. Proper practice of PMTCT will depend on level of knowledge, motivation, personal attitudes and perceptions and enabling environment (Kim *et al*, 2008).

Poor motivation is the problem experienced by health workers in many countries with limited resources. From the perspective of health professionals, the challenges include lack of equipment, frequent shortages of supplies and a mounting workload – all these exacerbated in small and rural facilities. Furthermore, despite decentralization efforts, key

functions of human resource management (recruitment, overall staff distribution, remuneration, promotion and transfers) remain highly centralized. (GTZ, 2006)

1.5.4 PMTCT training in Tanzania.

In Tanzania, PMTCT curriculum was developed by the Ministry of Health and Social Welfare. The mode of training and the material for training have been standardized by the Ministry of Health and Social Welfare. To ensure quality care for HIV-positive patients, program staff developed comprehensive training for health workers. This training was given in intensive courses and workshops lasting several days or weeks, according to the level of knowledge/training of the staff, and it was reinforced regularly with refresher courses. (Harms, *et al*) In the beginning, PMTCT training and hence PMTCT services provision aimed to the trained nurses, i.e. nurse midwives. (Msuya *et al* 2004.). But because most health facilities in Tanzania are facing with severe shortage of such staff, confining PMTCT services to midwives only became difficult. (Msuya *et al* 2004) So, currently PMTCT training is provided to all health care workers working in all levels of all health facilities, and all departments, priority being given to those working with pregnant women.

Training sessions are prepared by any organization that has secured funds. Participants are health workers of all cadres, (preferably nurses and clinicians), mixed in the same class. To ensure standardized quality of training, each training have to be conducted for at least 14 days, using training curriculum prepared by the Ministry of Health and Social welfare. Also trainers (at least one) have to be appointed by the Ministry of Health and Social Welfare.

CHAPTER 2

Materials and Methods

2.1 Study design

A cross sectional study was done in Lindi region from December 2009 to January 2010

2.2 Study area

Lindi region was established in 1971 as the fourth largest region in the country constituting 7.1% of the country's area. It is located in the South-east of Tanzania bordered with the Indian Ocean to the east, Coast Region to the north, to the south is Mtwara Region and to the West are Ruvuma and Morogoro Regions. The Region lies South of Equator between latitudes 7.55 and 10 south, longitudes 36.51 and 40 east.

Lindi has a total of 67,000 sq. km of which 18,000 sq. km. (27%) is in the famous Selous Game Reserve in Liwale District.

Altitude of the Region ranges from 0 meters above sea level (ASL) along the coastal belt to about 500 meters in the hinterland. There are isolated hills, which exceed 500 meters above sea level like Kilimarondo, west of Nachingwea DC; Litou in Liwale DC, Matumbi hills in Kilwa DC, while Lindi DC has the famous plateaus of Rondo and Makonde.

The major perennial rivers in the region are Lukuledi, Mbwemkulu, Mavuji and Matandu. There are also three inland water marshes (lakes) all of which are in Lindi DC, two are at Rutamba and the third one at Nkowe, which offers fresh water for fishing, Tilapia being the main species.

The main climatic feature for most of the Region is a long dry spell from May to October, followed by a period of rainfall from November to April. However the global warming and climatic changes has an effect on the rainfall pattern. The rainfall pattern is not

uniform, it has different seasonal interruptions. The mean annual rainfall is between 980 – 1200mm.

Temperature varies from 24.3°C to 27.0°C depending on the prevailing seasonal winds which are northerlies (Hot), locally known as KASKAZI and southerlies (Cool) or KUSI. Generally coastal area is hotter than the hinterland. The aforementioned plateau and hills areas have slightly cooler temperatures.

The region falls under the savannah. This is characterized by long grass and scattered trees, known as Miombo woodlands. The natural forests offer a wide range of hard wood timber, internationally recognized like ebony and mahogany to mention a few. These are excellent for making furniture, parquets and carvings. The mangrove forests cover the coastal areas. Other valuable forest products include nutritious honey and a wide range of mushroom and game meat.

Administratively, the region is divided into five districts with six councils, namely Lindi Town, Kilwa, Nachingwea, Ruangwa, Liwale and Lindi Rural. It has the 28 divisions, 118 wards, and 453 villages.

The Population and Demographic Census carried out in August 2002 reported Lindi Region to have a total of 190,791 households. The average size of household was 4.1 and the population stood at 791,306 people. Extrapolation from the 2002 census, the region was having a population of 829,205 by the end of 2008.

There are 155 kilometres of paved road and 3567 kilometres of dirt roads. There are three airports; Lindi Town, Nachingwea and in Kilwa Masoko. Lindi and Kilwa Masoko also provide harbours services. TTCL provides both landline and mobile telephones services. Three other telephone companies (Vodacom, Tigo and Zain) also operate mobile networks within the Region.

The region has a total of 188 health facilities: 9 hospitals, 17 health centers and 162 dispensaries with a total of 1331 beds.

Fifty six percent of the hospitals, 94% of the health centers and 92% of the dispensaries are government owned. All hospitals and health centers provide PMTCT services. About 25% of all health workers have been trained on PMTCT.

2.3 Study population

Study population included entire health workers that have been trained on PMTCT and are working in hospitals in Lindi region.

2.4 Sample size

Sample size was calculated by using the formula $n = \frac{z^2 p(100-p)}{\epsilon^2}$ where n = sample size, z = standard deviation, p is the proportion from the previous studies, and ϵ = accepted margin of error.

Given that standard deviation 'z' at 95% confidence interval is 1.96, and accepted margin of error was selected to be 0.1 or 5% and $p = 25\%$ i.e. proportion of health workers in Lindi that are trained on PMTCT. (Lindi, 2009)

$$\text{Sample size} = 1.96^2 \times 25 \times (100 - 25)/10^2 = 72$$

However study enrolled all 96 health care workers who had received training on PMTCT and were working at hospital level in Lindi region and 90 out of them were reached for interview.

2.5 Sampling Procedure

All health workers that were trained on PMTCT and were working at hospital level in Lindi region were selected for the study and then interviewed. These health workers were working in the regional hospital (26), Nyangao and Kipatimu mission hospitals (11 and 4

respectively). Kilwa, Ruangwa, Nachingwea and Liwale district hospitals (18, 17, 10, and 10 respectively). They were reached for interview at their working stations.

2.6 Data collection procedures

The researcher travelled to the respective hospitals. The District reproductive and Child health coordinator (DRCHCo) was consulted for the list of health workers trained on PMTCT in the respective hospital. With assistance from DRCHCo, participants were traced in their working departments, homes and other places. Brief explanation was given to each participant and then requested to participate. Those who accepted were interviewed using structured questionnaire.

Data were collected using various methods.

- I. Structured questionnaire. Ninety health care workers trained on PMTCT in all hospitals in Lindi region were interviewed. Information collected included demographic characteristics of the interviewee, academic qualification, institution that provided training on PMTCT. Knowledge of PMTCT especially modified obstetric care. Perception on PMTCT and modified obstetric care, PMTCT practice level and the factors that influenced them to practice modified obstetric care.
- II. Focused group discussion. The focused group discussion was conducted in Liwale district hospital, which was selected randomly among 7 hospitals in the region. (Simple random sampling technique was used) All health workers that were available on the day of the FGD were included. There were 8 participants that included three nurse officers, 2 Public Health nurses and 3 Health Attendants. Topics for discussion are shown in the FGD guide attached as Appendix 3 and Appendix 4.

2.7 Ethical clearance and permission for data collection.

The study was carried out in line with existing ethical guidelines. Ethical clearance was obtained from the Muhimbili University of Health and Allied Sciences Research and Publications Committee. Approval for data collection was provided by the supervisors of this study. Permission to collect data was granted by Regional Medical office for Lindi

region and the District Medical Office for each district. Participants were requested verbally to participate and were given an option to refuse if they didn't like.

2.8 Data collection.

Principal investigator interviewed all health workers that were trained on PMTCT individually using structured questionnaire. He also led the focussed group discussion. All 3 nurse officers, 2 Public Health nurses and 3 Health Attendants were invited to participate in the FGD. These also had participated in the quantitative part of the study.

2.9 Data management

2.9.1 Data quality

All information was collected by investigator himself. Everyday after data collection, all collected information was cross-checked looking for omission and inappropriate entries. Problems were corrected in the same day to ensure good data quality.

2.9.2 Data entry.

Make view was prepared and then all the collected information was entered in Epi Info software version 3.5.1. Frequencies and cross tabulations were run to detect errors in data entry.

2.9.3 Data analysis

Quantitative data from the questionnaires were analysed using Epi Info software version 3.5.1. First demographic information was analysed by frequency and cross tabulation. The purpose was to associate them with knowledge, perception and practice. Then individually, levels of knowledge, attitude and practice were analysed. Knowledge and perception over each modified obstetric procedures was cross tabulated per each demographic variable.

2.9.4 Calculations of statistical associations.

Statistical associations were calculated using Open Epi software. For those variables with participants;-

- More than 10 in all cells, uncorrected tests for association (Chi square and p-values) were used.
- 10 or less in any of the cells, Yates corrected measures of association (Chi square and p-values) were used.
- 5 or less, Fisher exact (odd ratio and confidence limits) was considered.
- Odds ratio 'Taylor series' was considered as crude odd ration
- CMLE Odds Ratio was considered as adjusted odd ratio.

2.9.5 Measurement of knowledge.

Knowledge was measured using a set of 22 questions that were in the question and aimed at measuring knowledge. These questions are shown in the table 1 below.

Table 1. Questions used to measure PMTCT modified obstetric care knowledge among PMTCT trained staff in Lindi region.

Question Number	Contents of the question and expected correct responses	Score for correct responses
12	Can you define for me PMTCT?	1
14	Briefly can you tell me what PMTCT is, and what is actually done? ¹ (HIV/AIDS counselling and testing services, ² Modified obstetric care/safe delivery services, ³ Use of ARVs, ⁴ Replacement feeding.	4
18	What is supposed to be done to a HIV infected woman when she comes to the ward for delivery? I. Before delivery; - ¹ Minimize vaginal examinations, ² avoid prolonged labour by using oxytocic drugs to shorten labour when appropriate ² , ^{3a} avoid artificial or early rupture of membranes (before 7 cm dilation) unless	4

	necessary, ⁴ vaginal cleansing after rupture of membranes ⁴ .	
	II. During delivery;- ¹ avoid unnecessary trauma during delivery, like routine episiotomy, and instrumental delivery, ² perform elective caesarian section before the onset of labour or membrane rupture, ³ clamp the cord immediately after birth, ⁴ avoid milking the cord (squeezing it towards the infant), ⁵ Cover the cord with gloved hand or gauze before cutting to avoid splash of cord blood.	5
	III. After delivery; - ¹ Avoid unnecessary foetal suction, ² cleansing of the neonate soon after delivery	2
19	PMTCT guideline has recommended differentiating vaginal examinations in HIV infected women. What is the recommended difference? ¹ Reduce unnecessary vaginal examinations.	1
23	PMTCT guideline has recommended having special consideration when rupturing membranes in HIV infected women as compared to other women. What is the recommended difference? - ¹ Avoiding routine artificial rupture of membranes, ² If membranes rupture early, (more than 4 hrs before delivery), clean the vagina with antiseptic regularly.	2
30	PMTCT guideline has recommended differentiating episiotomy done to PMTCT clients as compared to other delivering women. What is the recommended difference? ¹ Avoiding routine episiotomy.	1
	What is best mode of delivery that reduces the chances of transmitting HIV from mother to her neonate? - ¹ C/Section.	1
42	What instructions are to be followed about suction of the oropharynx of the infant soon after delivery? ¹ Avoid routine suction, suck only when necessary.	1
	Total	22

CHAPTER 3

All questions had equal weight and were administered equally to every participant regardless of their level of basic level of education, cadre, duration of PMTCT training, organisation that trained him/her on PMTCT and time elapsing between training and time of study.

Results were categorized into low, moderate and high levels of knowledge. Each question that was answered correctly was given 1 mark. Obtaining 22 marks was equated to 100% and 0 mark was equal to 0%.

1. Low level = respondent answered correctly less than 50% of the 22 questions.
2. Moderate level = respondent answered correctly 50 – 74% of the 22 questions
3. High level = respondent was able to answer 75 - 100% of the 22 questions

Qualitative data from focused group discussion were analysed manually.

CHAPTER 3

Results

3.1 Social demographic characteristics of the study respondents;

The study aimed to interview all health workers that were trained on PMTCT in Lindi region and are working at hospital level. Reports from RCHCo in the regional and districts levels revealed that, there were 96 health care workers that were trained on PMTCT in the whole of Lindi region who were working in the hospital level. However interviewer managed to interview 90 of them. This corresponds to response rate of 94%.

The age distribution was from 20 to 59 years with a median and mode of 45 years. There were more Christians (70 %) than Moslems (30%). All had completed college education in the level of either certificate or diploma qualification. Social demographic characteristics are summarized in table 2.

Table 2. Social demographic characteristics of interviewed health care workers trained on PMTCT in Lindi region.

Social demographic characteristics	Category	Number	Percentage
Sex	Male	14	15.5
	Female	76	84.4
	Total	90	100.0
Age groups	40 years and bellow	28	31.1
	Above 40 years	62	68.8
	Total	90	100.0
Religion	Christian	63	70.0
	Muslim	27	30.0
	Total	90	100.0
Academic qualifications	Certificate	43	47.7
	Diploma	47	52.2
	Total	90	100.0

Cadre	Trained health care workers (Clinicians and nurses)	73	81.1
	Health attendants	17	18.8
	Total	90	100.0
Distribution of respondents according to the hospital.	Sokoine	24	26.6
	Nyangao	10	11.1
	Ruangwa	17	18.8
	Nachingwea	9	10.0
	Liwale	10	11.1
	Kilwa	18	20.0
	Kipatimu	2	2.2
	Total	90	100.0
Institution that provided PMTCT training.	MoHSW	59	65.56
	RHMT/CHMT/CHAI	31	34.4
	Total	90	100.0
Placement at the hospital	Antenatal clinic	21	23.3
	Labour ward	31	34.4
	Other departments	38	42.2
	Total	90	100.0

3.2 Knowledge.

A very small proportion (1%) of respondents had high level of knowledge. Many (64.4%) had moderate knowledge level, while the rest had low level of knowledge (34.4%). Those with diploma were 3.5 times more likely to have moderate level of knowledge compare to those with certificate (AOR 3.51, 95% CI = 1.32 - 9.28). Also trained staffs were 4 times more likely to have moderate knowledge than health attendants (AOR 4.01, 95% CI = 1.396 -12.94). The rest of the social demographic factors were not found to influence general knowledge significantly.

Only 12.2% (n = 11) of the interviewed health workers were able to clearly explain that modified obstetric care is a part of PMTCT, but not associated with any of the social demographic characteristics.

The knowledge about specific procedure that constitute modified obstetric care was also assessed. The proportion of health workers who had retained knowledge on 'minimizing vaginal examination during labour' as part of modified obstetric care was 71%, (n = 64).

Table 3

Table 3. Association between various socio-demographic factors on knowledge about the dangers of conducting excessive vaginal examinations during labour in HIV infected women.

Social demographic Factor		Total studied	Respondents with appropriate knowledge		Chi square	Crude OR	95 % Confidence interval	Adjusted OR	95 % Confidence interval
			No	%					
Sex	Male	14	12	85.7	1.72	2.7	0.5 - 13.3	2.7	0.6 - 19.3
	Female	76	52	68.4		1	-	1	-
Age (years)	40 or less	28	20	71.4	0.04	1.0	0.3 - 2.7	1.0	0.3 - 2.8
	Above 40	62	44	71.0					
Academic qualification	Diploma	43	39	90.7	6.74	3.5	1.3 - 9.2	3.4	1.3 - 9.6
	Certificate	47	25	53.1		1	-	1	-
Cadre	Trained staff	73	55	75.3	3.36	2.7	0.9 - 8.0	2.6	0.8 - 8.2
	Health attendants	17	9	53.9		1	-	1	-
Institution provided training	MoHSW	59	47	79.7	6.09	3.2	1.2 - 8.3	3.1	1.2 - 8.4
	Others	31	17	54.8		1	-	1	-
Placement at the hospital	Labour ward	31	24	77.4	0.91	1.6	0.5 - 4.4	1.6	0.5 - 4.6
	Other sections	59	40	67.8		1	-	1	-

NB. Italicized figures shows statistically significant associations

Further analysis with adjusted odds ratio was done. Indicators that were adjusted for included sex, age, academic qualification, cadre, institution that provided training and hospital placement. Results showed that those who had diploma were three times more likely to have knowledge about vaginal examination as a modified obstetric care strategy

compared to those with certificates, (AOR = 3.45, 95% CI =1.327 -9.282, Table 3) Also those who were trained by MoHSW were three times more likely to have retained this knowledge compare to those trained by other institutions. (AOR = 3.17, 95% CI = 1.22 - 8.43, Table 3). Other socio demographic factors were not found to be statistically significant associated with this knowledge.

The proportion of health care workers who had knowledge that 'avoiding artificial rupture of membranes' is part of modified obstetric care was 85.6%. (n = 77). Female staffs were 5 times more likely to have this knowledge than male. (AOR = 4.72, 95% CI = 1.267 -17.6). Also trained health staffs (clinical officers, MD, AMO and nurses) were 19 times more likely to have this knowledge as compared to health attendants (AOR 18.29, CI =4.85 - 77.65) . Other socio demographic factors were not found to be statistically significant associated with this knowledge. (Table 4).

Table 4. Association between various socio-demographic factors and knowledge about the dangers of artificial rupture of membranes in HIV infected women.

Social demographic Factor		Total studied	Respondents with appropriate knowledge		Chi square	Crude OR	95 % Confidence interval	Adjusted OR	95 % Confidence interval
			No	%					
Sex	<i>Male</i>	<i>14</i>	<i>9</i>	<i>11.6</i>	<i>6.0</i>	<i>4.7</i>	<i>1.2 -17.6</i>	<i>4.6</i>	<i>1.1- 17.7</i>
	<i>Female</i>	<i>76</i>	<i>68</i>	<i>88.3</i>		<i>1</i>	-	<i>1</i>	-
Age (years)	40 or less	28	24	85.7	0.9	0.5	0.1 - 1.4	0.5	0.1 - 1.5
	Above 40	62	53	85.5		-	-	-	-
Academic qualification	Diploma	43	43	61.0	2.8	2.8	0.8 -10.0	2.8	0.8 -11.3
	Certificate	47	34	44.1		1	-	1	-
Cadre	<i>Trained staff</i>	<i>73</i>	<i>69</i>	<i>89.6</i>	<i>25.1</i>	<i>19.4</i>	<i>4.8 - 77.6</i>	<i>18.2</i>	<i>4.6 - 82.9</i>
	<i>Health attendants</i>	<i>17</i>	<i>8</i>	<i>10.3</i>		<i>1</i>	-	<i>1</i>	-
Institution provided training	MoHSW	59	51	66.2	0.1	1.2	0.3 -4.1	1.2	0.3 - 4.1
	Others	31	26	33.7		1	-	1	-
Placement at the hospital	Labour ward	31	27	35.0	0.0	1.2	0.3, 4.3	1.2	0.3 - 4.9
	Other sections	59	50	64.9		1	-	1	-

NB. Italicized figures shows statistically significant associations

The proportion of the health workers that had knowledge about avoiding traumatic procedures (episiotomy and forceps during delivery) as a modified obstetric care strategy was 86.7%. (n = 78). Those with diploma were 4 times more likely to have this knowledge as compared to those with certificates. The rest of the social demographic factors were not found to influence this knowledge. (Table 5)

Table 5. Association between various socio-demographic factors and knowledge about traumatic procedures during labour in HIV infected women.

Social demographic Factor		Total studied	Respondents with appropriate knowledge		Chi square	Crude OR	95 % Confidence interval	Adjusted OR	95 % Confidence interval
			No	%					
Sex	Male	14	11	14.1	0.9	0.4	0.1 - 2.1	0.4	0.1 - 2.5
	Female	76	67	85.9		1	-	1	-
Age (years)	40 or less	28	24	85.7	0.0	0.8	0.2 - 3.2	0.8	0.2 - 4.4
	Above 40	62	54	87.1		-	-	-	-
Academic qualification	<i>Diploma</i>	43	41	52.5	4.0	5.5	1.1-26.9	5.4	1.0- 54.3
	Certificate	47	37	47.4		1		1	
Cadre	Trained staff	73	65	83.3	0.9	2.5	0.6 - 9.5	2.4	0.4 - 11.0
	Health attendants	17	13	76.4		1	-	1	-
Institution provided training	MoHSW	59	51	78.4	0.0	1	-	1	-
	Others	31	27	87.1		1.0	0.2 - 3.8	1.0	0.2 - 5.2
Placement at the hospital	Labour ward	31	28	90.3	0.1	1.6	0.4 - 6.7	1.6	0.4 - 8.2
	Other sections	59	50	84.7		1	-	1	-

NB. Italicized figures shows statistically significant associations

Among the PMTCT interventions is that 'one should not routinely suck (by using anything) the mucus from the oral cavity of HIV exposed newborns'. A high proportion, (91.1 %, n= 82) of the respondents had this knowledge. This knowledge was found to be influenced by being a diploma holder, (AOR = 3.38, 95% CI = 1.39 – 8.45), trained

health worker (AOR = 4.17, CI = 1.4 – 12.9) and working in the labour ward (AOR = 2.67, CI = 1.007 -7.24 and p – value =0.04). (Table 6)

Table 6. Association between various socio-demographic factors and knowledge about suction of the oral cavity in neonates of HIV infected women.

Social demographic Factor		Total studied	Respondents with appropriate knowledge		Chi square	Crude OR	95 % Confidence interval	Adjusted OR	95 % Confidence interval
			No	%					
Sex	Male	14	11	78.5	1.2	1.9	-	-	-
	Female	76	71	93.4		1	0.6 -6.07	1.9	0.5 - 6.2
Age (years)	40 or less	28	27	96.4	0.6	2.4	0.2 -22.5	2.4	0.0 - 3.4
	Above 40	62	55	88.7		1	-	-	-
Academic qualification	Diploma	43	36	76.6	7.4	3.4	-	<i>1</i>	-
	Certificate	47	21	48.8		<i>1</i>	<i>1.31 -8.4</i>	3.3	<i>1.3 -8.6</i>
Cadre	Trained staff	73	51	69.9	7.0	4.2	-	<i>1</i>	-
	Health attendants	17	6	35.3		<i>1</i>	<i>1.3 -12.9</i>	4.1	<i>1.3 - 13.6</i>
Institution provided training	MoHSW	59	40	67.8	1.4	0.5	-	<i>1</i>	-
	Others	31	17	54.8		<i>1</i>	0.2 - 1.4	0.5	0.2 - 1.4
Placement at the hospital	Labour ward	31	24	77.4	4.0	2.7	-	<i>1</i>	-
	Other sections	59	33	55.9		<i>1</i>	<i>1.0 -7.2</i>	2.6	<i>1.0 - 7.6</i>

NB. Italicized figures shows statistically significant associations

Little or nothing was known about other modified obstetric care interventions and there stratification did not reveal meaningful results.

Table 7. Knowledge of other modified obstetric care interventions among PMTCT health care workers in Lindi region.

No	Intervention	Respondents with appropriate knowledge	
		No	%
1	Avoid prolonged labour by using oxytocic drugs to shorten labour when appropriate ² ,	8	8.9
2	Vaginal cleansing after rupture of membranes.	0	0.0
3	Perform elective caesarian section before the onset of labour or membrane rupture,	7	7.8
4	Clamp the cord immediately after birth	6	6.7
5	Avoid milking the cord (squeezing it towards the infant),	10	11.1
6	Cover the cord with gloved hand or gauze before cutting to avoid splash of cord blood.	0	0.0
7	Cleansing of the neonate soon after delivery	0	0.0

3.3 Perception.

Perceptions of the respondents over PMTCT, and modified obstetric care were assessed. High proportion of the respondents had positive perception towards PMTCT including modified obstetric care. High proportion (98.89%) perceived that avoiding artificial rupture of membranes would avoid mother to child transmission of HIV, (Table 10). Similarly a high proportion (97.81) perceived that PMTCT would reduce the HIV transmission in addition to avoiding episiotomy, (97.78%). On the contrary, very small proportion (5.6%) perceived the fact that vaginal cleansing with antiseptic would prevent HIV transmission from mother to child.

Table 8. Perceptions of PMTCT health workers on the various modified obstetric care procedures.

Strategy/procedure	Agree (%)		Disagree	
	Number	Percent	Number	Percent
PMTCT generally reduces MTCT of HIV.	88	97.7	2	2.2
Minimizing vaginal exam will reduce chances for HIV MTCT	81	90.0	9	10.0
Avoiding artificial rupture of membrane reduces chances for HIV MTCT	89	98.8	1	1.1
Cleansing the vaginal canal with antiseptic when membranes ruptures early reduces chances for HIV MTCT	5	5.5	85	94.4
Avoiding episiotomy reduces chances for HIV MTCT of HIV.	88	97.7	2	2.2
Caesarian section reduces chances of HVI MTCT	80	88.8	10	11.1
Avoiding routine oral cavity suction will reduce chances for HIV MTCT	89	98.8	1	1.1

3.4 Practice

Respondents were asked according to their knowledge after training if one of their colleagues had acted contrary to requirements of modified obstetric care in the previous 12 months. About a quarter, (27% n=17) of the respondents reported vaginal examination for HIV infected woman at the frequency more than recommended.

They were also asked if one had observed rupture of membranes contrary to practice. About a fifth (17.7%), reported to have observed artificial rupture of membranes in HIV infected pregnant women contrary to guidelines.

Vaginal cleansing was not known and was not being practiced. Over one third (34.4%, n=22) of the respondents reported episiotomy to HIV infected mother contrary to the

guidelines. About two fifth (38.9%) respondents had observed oral cavity suction of HIV exposed child contrary to guidelines.

3.5 Factors influencing practice of modified obstetric care in Lindi region.

Respondents were asked what factors contributed to lack of implementation of modified obstetric care as part of PMTCT strategies. In general 100% of the respondents stated that, failure to implement was due to patients' complications. Artificial rupture of membranes in HIV infected women was done due to either complication (59%), or patients reaching second stage of labour without spontaneous rupture of membranes (41%). None of the respondents reported to have cleansed the vaginal canal with antiseptic when the membranes ruptured early because this procedure was not known to any of them. Episiotomy was performed due to complications (100%), either prolonged second stage or tight perineum. Suction to HIV exposed children was reported to be due to foetal complications (100%) Table 9 summarizes factors hindering implementation of modified obstetric care strategies.

Table 9. Factors hindering implementation of modified obstetric care among PMTCT health workers in Lindi region.

SN	Strategy	Factor hindering implementation	No	%
1	Recruit all eligible clients	Poor clients cooperation	55	61.5
		Shortage of staff	21	23.1
2	Minimizing vaginal exam will reduce chances for HIV MTCT	Clients complication	18	100.0
3	Avoiding artificial rupture of membranes reduces chances for HIV MTCT	Complications	5	41.0
		Patients reaching second stage of labour without rupture of membranes.	7	59.0
4	Avoiding episiotomy reduces chances for HIV MTCT	Complication	22	100.0

3.6 Focused group discussion.

Generally the knowledge of PMTCT is good in all of the participants. But when modified obstetric care was being discussed, some items were not known to all of the discussants. In general, focussed group discussion did not give any additional information different from those found in the quantitative results above.

Intensive discussion was done on the factors influencing implementation of PMTCT at facility level. The coverage of PMTCT among pregnant women in Lindi was reported to be good. Most of the women that come to the ante natal clinic, agreed to test for HIV.

Discussants concurred that if one was counselled and then tested, would be thinking on how to cope with the results. Most of them feared family rejection, loss of friends, and mental disturbances. They were also reported to be worried of confidentiality and feared that health providers would disclose their results without their will. The observation was supported by the following statements from some discussants.

- *'If someone is very close to the hospital, or has a relative or lover who works in the hospital, she may refuse to test fearing the results to be disclosed'. February 12th 2010, Liwale district hospital.*
- *'If someone is aware of her status and she has not told her partner, and she is not willing to take drugs, she will refuse to test' February 12th 2010, Liwale district hospital.*

Known interventions are usually implemented. If not implemented, is because there was a reason for not implementing. For example one discussant said,

- *'If a woman is on second stage and the foetus is not coming out, then episiotomy must be performed, otherwise the neonate will die.' February 12th 2010, Liwale district hospital.*

Caesarean section is known but is not done routinely. Reasons given with discussants were,

- *'PMTCT 1 is not an indication for caesarean section, women may end up with infections, deterioration and then die. Doctors will refuse and women will refuse'*
February 12th 2010, Liwale district hospital.

In general, FGD did not give any additional information more than that found with qualitative party of this study.

CHAPTER 4

Discussion

Generally, compare to other components of PMTCT, knowledge about modified obstetric care as part of PMTCT is low among PMTCT health workers in Lindi region. Only 12.2% (n = 11) could mention it spontaneously when asked about components of PMTCT. Another study that was done in Mbeya Tanzania demonstrated the same (Harms et al, 2003). This gives a picture that this concept is not in the fore head of health workers, and its implementation is in jeopardy.

Out of 11 procedures that are been proposed worldwide as part of modified obstetric care interventions, only 4 are well known among PMTCT trained health workers in Lindi. These include minimizing vaginal examinations (71%), avoiding artificial rupture of membranes (77%), avoiding traumatic procedures (86.7%) and avoiding suction in the oral cavity of exposed neonates (91%) The rest of the interventions are known to very few or none. The reason for this selectivity is not well understood. No study has been done previously to address the knowledge of these interventions among the health workers. But search from the literature and PMTCT training manual in Tanzania shows that emphasis is put on those four interventions. (MoHSW, 2007) Except for the elective caesarian section, the rest of the interventions are not even mentioned. The use of caesarian section as PMTCT strategy is prohibited. '*Caesarean section is indicated only for obstetric reasons; it is not recommended for the purpose of reducing MTCT in Tanzania*'. (MoHSW, 2007) There is no reason given for this statement in that manual. This one has been mentioned but in the negative side, but the rest of the intervention are not even mentioned. This may have contributed the poor knowledge among PMTCT trained health workers. This poor knowledge will lead to poor practice or no practice at all. The end result is poor performance of PMTCT program in Tanzania as compared to the developed countries.

In this study, there were five factors that were found to influence level of knowledge. These factors included being a female, trained staff, diploma holder, trained on PMTCT by MoHSW and working in labour ward.

The idea that, being trained personnel (all health workers except health attendants) will influence the level of knowledge was foreseen even before. During curriculum development it was stated that only trained staff will be trained on PMTCT. But due to shortage of trained staff, and the fact that health attendant are playing a great role in the labour ward, they had to be included in the program. Now the problem is here that their level of knowledge is low, what can be done? This is a subject that will need to be researched further on how to improve PMTCT knowledge among junior health workers. All of the health attendants are certificate holders, none has a diploma. Some of the trained personal also has certificates (example all nurse midwives) Analyzing them together may have pulled down some trained certificate holders to look as if all have poor knowledge.

Those trained on PMTCT by MoHSW had good probability of having more knowledge as compared to those trained by other organization. Prior situational analysis showed that all training sessions, regardless of the organizer, have to use the same curriculum, and is usually a mixed class, of trained personnel and health attendants. So this difference in the level of knowledge may reflect the question of quality of training. Those trainings prepared by MoHSW are properly designed and well supervised with qualified trainers. Those prepared by other organizations including regional and district authorities are likely to have quality problems because of logistic difficulties. It is now high time to look into how to improve the quality of all PMTCT training regardless of who is preparing it. No study has looked at this somewhere else.

Those who were trained on PMTCT and stationed in the labour ward also had high probability to have some of the knowledge as compared to those stationed somewhere else. The lesson here is to place all those trained on PMTCT in labour ward, otherwise knowledge decay will make their training obsolete.

Although the perception of health care workers toward modified obstetric procedures was good, still the practice against guideline was high. The reason given in most cases was

complications from the patients and that the risk of not performing the procedure outweighs the risks of performing it. This is a challenge because we need to explore further, what makes it so late that later it requires to risk the neonate. Why better interventions are not implemented earlier.

Those interventions that seem to have been neglected by Tanzania PMTCT program, has been proved to be effective in other places. Elective caesarian section has been proved to be effective in reducing MTCT in several studies. (Gibb, *et al*, 1997, Read *et al*, 2005, Harms *et al*, 2005) This study was unable to explore from the authority the reason for omitting elective caesarian section as PMTCT intervention. But some literature questioned its feasibility in Tanzania. '*However, in Tanzania, the capacity for doing caesarean section to reduce MTCT is low, therefore caesarean section is indicated only for obstetric reasons; it is not recommended for the purpose of reducing MTCT in Tanzania*' (MoHSW, 2007). However as this country has a lot of variation in the health care system, (from referral hospitals to dispensaries); and variations among HIV infected pregnant women (highly knowledgeable to illiterate, high social class to low). It could be more appropriate for health care provider to decide what to offer to the client depending on the prevailing circumstance. There are some highly motivated clients that are ready to prevent their newborns. These should be given all available options. Using a blanket statement (*However, in Tanzania, the capacity for doing caesarean section to reduce MTCT is low*) for the whole country is not appropriate.

The same applies for other interventions that have been left by the Tanzania PMTCT system. These are; avoid prolonged labour by using oxytocic drugs to shorten labour when appropriate, vaginal cleansing after rupture of membranes, clamp the cord immediately after birth, void milking the cord (squeezing it towards the infant), over the cord with gloved hand or gauze before cutting to avoid splash of cord blood and cleansing of the neonate soon after delivery. These all could be given the same weight like others in the training manuals and sensitizations. Health care workers would know them. The decision to practice them will left to be determined by the health provider depending on the prevailing circumstance.

CHAPTER 5

Conclusion and Recommendation

5.1 Conclusion

In general, the level of appropriate knowledge on modified obstetric care as a part of PMTCT interventions in Lindi region is moderate in two third and poor in one third. For specific procedures appropriate knowledge was high in procedures like minimizing vaginal examination, avoiding artificial rupture of membranes, avoiding traumatic procedures and avoiding suction of the oral pharynx of the exposed children. But it is poor in procedures like shortening of labour, cleansing the vaginal canal with antiseptic when membranes ruptures 4 or more hours before delivery, clamping umbilical cord soon after delivery, avoiding milking the cord blood to the neonate, covering the cord with gauze before cutting it so as to avoid splashing of blood, and cleansing (bathing) the baby soon after delivery.

Being a diploma holder, being trained health personnel, being trained on PMTCT by the MoHSW and being placed in the labour were the significant predicting factor for the level of knowledge.

The percentage of health workers appropriately practicing selected modified obstetric care as a part of PMTCT interventions in Lindi region is good in some procedures and poor in some. It is good in those procedures that are well known and poor in those unknown procedures.

All known modified obstetric care procedures are well perceived as a part of PMTCT interventions by health workers in Lindi region and they all agree that they are useful in preventing MTCT.

Factors influencing implementation of PMTCT modified obstetric care procedures among health workers in Lindi Region include knowledge, adequacy of staff, policy of the MOHSW over the procedure, fear of complication to the patient and when the risk of immediate complication outweighs the risk of MTCT.

5.2 Recommendations

- 1 The training of PMTCT should put more emphasis on modified obstetric care as part of PMTCT. It should not be regarded that they are not feasible because areas are different. All procedures should be taught and the health worker will determine whether it is feasible in his/her environment or not.
- 2 Health workers working in PMTCT program should be encouraged to implement modified obstetric care and supportive supervision should be conducted on that.
- 3 MoHSW should make HIV infection an indication for C/S unless the client objects or the environment is not conducive.
- 4 People trained in PMTCT should be stationed where they can practice.
- 5 IEC materials produced for PMTCT should put more emphasis on modified obstetric care as part of PMTCT.

CHAPTER 6.

References ✓

AMREF 2008. The Standard Operating Procedures and Clinical Audit for Integrated facility-Based PMTCT Services.

<http://www.amref.org/silo/files/standard-operating-procedures--and-clinical-audit--for-integrated-facilitybased-pmtct-services.pdf>. (accessed on 14th October 2009)

Bajunirwe, F., Massaquoi, I., Asiimwe, S., Kanya, M.R., Arts, E.J., Whalen, C. C.: Effectiveness of nevirapine and zidovudine in a pilot program for the prevention of mother-to-child transmission of HIV-1 in Uganda. *African Health Sciences*, Vol. 4, No. 3, December, 2004, pp. 146-154.

www.ncbi.nlm.nih.gov/pubmed/15687066 (accessed on 11th September 2010)

Biggar R. J., Miotti, P. G., Taha, T. E., Mtimavalye L., Broadhead, R., Justesen, A., Yellin, F., Liomba, G., Miley, W., Waters, D., Chipangwi, J. D., Goedert, J. J.: Perinatal intervention trial in Africa: effect of a birth canal cleansing intervention to prevent HIV transmission. *Lancet*. Jun 15; 347(9016):1647-50, 1996.

De Cock, K., Glenn M., Fowler, M. G., Mercier, E., Vincenzi, I., Saba, J., Hoff, E., Alnwick, D. J., Rogers, M., Nathan Shaffer, N.: Prevention of Mother-to-Child HIV Transmission in Resource-Poor Countries. *Translating Research Into Policy and Practice. JAMA*. Vol. 283 No. 9, March 1, 2000.

Gaillarda, P., Verhofstede, C., Mwanumbac, F., Claeyssa, P., Chohanc, V., Mandaliyac, K., Bwayod, J., Plumb, J., Temmermana, M.: Exposure to HIV-1 during delivery and mother-to-child Transmission. *AIDS*, 14:2341 – 2348, 2000.

Gibb, M., MacDonagh, S. E., Tookey, P. A., Duong, T., Nicoll A., Goldberg, D. J., Hudson, C. N., Peckham, C. S., and Ades A. E.: Uptake of interventions to

reduce mother-to-child - transmission of HIV in the United Kingdom and Ireland. AIDS 1997, 11:F53–F58. 1997.

GTZ, 2006. PMTCT Prevention of Mother-to-Child Transmission of HIV in Kenya, Tanzania and Uganda. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH Dag-Hammarskjöld-Weg 1-5 65760 Eschborn.

Guidozzi, F., Black, V.: 2009. The Obstetric Face and Challenge of HIV/AIDS. Journal of clinical obstetrics and gynecology. Volume 52, Number 2, 270–284, 2009.

Harms, G., Kunz, A., Theuring, S., Odera, J., Mbezi, P., Kabasinguzi, R.: Prevention of Mother-to-Child Transmission of HIV in Kenya, Tanzania and Uganda. The German HIV Peer Review Group, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH Dag-Hammarskjöld-Weg 1-5, 2007.

Harms, G., Mayer, A., Karcher, H.: PMTCT Prevention of Mother-to-Child Transmission of HIV in Kenya, Tanzania and Uganda. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH Dag-Hammarskjöld-Weg 1-5 65760 Eschborn. 2003.

Harms, G., Schulze, K., Moneta, I., Baryomunsi, C. Mbezi, P., Poggensee, G.: Mother-to-child transmission of HIV and its prevention: awareness and knowledge in Uganda and Tanzania. Journal of Social Aspects of HIV/AIDS. Vol. 2 No. 2 July 2005. Page 258.

Israel, E., Kroeger, M.: Integrating Prevention of Mother-to-Child HIV Transmission into Existing Maternal, Child, and Reproductive Health Programs. Number 3, January 2003.

www.pathfind.org/.../Technical_Guidance_Series_3_PMTCTweb_01.pdf.o-chil. (accessed on 24th November 2009)

Kim, J. Y., Mungherera, L., Belfer, M., Betancourt, T., Holman, S. R., Mary C., Fawzi, S.: Integration and expansion of prevention of mother-to-child transmission (PMTCT) of HIV and early childhood intervention services September 2008. Joint learning initiative on children and HIV/AIDS. Learning group 3: Expanding access to services and protecting human rights. François-xavier bagnoud center for health and human rights. Harvard school of public health. 651 Huntington ave., 7th fl. Boston, MA 02115

Lindi, 2009. United Republic of Tanzania, PMORALG. Lindi regional annual health services report, 2009.

Mazia, G., Narayanan, I, Warren, C., Mahdi, M., Chibuye, P., Walligo, A., Mabuza, P., Shongwe, R., Hainsworth, M: Integrating quality postnatal care into PMTCT in Swaziland. Global Public Health, Volume 4, Issue 3 May, pages 253 – 270, 2009.

MoHSW: Prevention of mother to child transmission of HIV program. Tanzania National PMTCT Guidelines: Ministry of Health and Social Welfare Tanzania. 2007. P 3-4. 2007.

MoHSW: Tanzania HIV indicator survey, (THIS). Ministry of Health and Social Welfare, Tanzania. P 69. 2008

Msuya G., Msaky H., Reeler A., Kironde S., Nzima M., Munisi W., Manumbu C., Ntyangiri E., Wilfert C.: Motivating staff for PMTCT through comprehensive training: The Tanzania experience. International Conference on AIDS (15th : 2004 : Bangkok, Thailand). *Int Conf AIDS*. 2004 Jul 11-16; 15: abstract no. B12629.

Ntabaye, M. K., Lusiola, G. J: Understanding barriers to PMTCT in Tanzania: findings of a baseline survey. International Conference on AIDS (15th : 2004 : Bangkok, Thailand). *Int Conf AIDS*. 2004 Jul 11-16; 15: abstract no. B11396, 2004.

Phanuphaka, N., Lolekhab, R., Chokeyhaibulkitc, K., Voramongkold, N., Boonsuke, S., Limtrakul A., Limpanyalert, P., Chasombat, P., Thanprasertsuki, S., Leechawengwong, M.: 2010.: Thai national guidelines for the prevention of mother to-child transmission of HIV: March 2010. *Asian Biomedicine* Vol. 4 No. 4 August 2010; 529-540.

Penn, Z., Dixit, A.: Human immunodeficiency virus infection in Pregnancy. *Current Obstetrics & Gynaecology* (2006). 16, 191–198.

Read, J. S., Newell, M. L.: Efficacy and safety of cesarean delivery for prevention of mother-to-child transmission of HIV-1. *Cochrane Database of Systematic Reviews* 2005, Issue 4. Art. No.: CD005479. DOI: 10.1002/14651858.CD005479, 2005.

Shabarova Z., Nizova, N., Posokhova, S., Smith, J. P., Schechter K., Frank, V., Tyapkin, G.: Model of health care delivery system reorganization on PMTCT in resource-limited settings (Odessa region, Ukraine). *IAS Conference on HIV Pathogenesis and Treatment* (2nd : 2003 : Paris, France). *Antivir Ther.* 2003; 8 (Suppl.1): abstract no. 1071, 2003.

Tejedor, A. G., Perales, A., Maiques, V. : Duration of ruptured membranes and extended labor are risk factors for HIV transmission. *International Journal of Gynecology and Obstetrics* 82. 17–23, 2003.

UNAIDS: Women and HIV/AIDS: Confronting the Crisis. A Joint Report by UNAIDS / UNFPA / UNIFEM. 2004. ISBN: 0-89714-708-1.

http://www.genderandaids.org/downloads/conference/308_filename_women_aids_1.pdf (accessed on 14th October 2009)

UNAIDS: 09 AIDS epidemic update December 2009. UNAIDS/09.36E / JC1700E. 2009 http://whqlibdoc.who.int/unaid/2009/9789291738328_eng.pdf.

X er (accessed on 4th October 2010)

UNICEF: Evaluation of the UNICEF-Sponsored Prevention of Mother To Child HIV Transmission (PMTCT) Pilot Sites in Tanzania (Field Evaluation, 2-10

er December, 2002)

WHO: Antiretroviral drugs for treating pregnant women and preventing HIV infection in infants: towards universal access: recommendations for a public health approach. Geneva, World Health Organization, 2006.

X er <http://www.who.int/hiv/pub/mtct/antiretroviral/en/index.html> (accessed on 10 November 2009).

WHO: PMTCT Strategic Vision 2010–2015. Preventing mother to child transmission of HIV. To reach the UNGASS and Millennium Development Goals. Moving towards the elimination of paediatric HIV. ISBN 978 92 4 159903

X er 0 (NLM Classification: WC 503). 2010:

[http://www.broadcasthivafrica.org/PMTCT_Strategic_Vision_\(WHO\).pdf](http://www.broadcasthivafrica.org/PMTCT_Strategic_Vision_(WHO).pdf).

(accessed on 08 September 2010)