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Exclusive Breastfeeding: Mothers' awareness and healthcare providers' practices during antenatal visits in Mvomero, Tanzania.

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ABSTRACT

Chronic child malnutrition is high in developing countries such as Tanzania where approximately 42% of children below five years are stunted as a result of chronic malnutrition. Exclusive breastfeeding (EBF) may give the best start as an effective strategy to protect infants from malnutrition which causes 60% of infant deaths worldwide. Therefore, intentions to breastfeed, feeding practices decided and antenatal visits give a prime opportunity to provide counselling to ensure optimal practices.

The aim of this study was to assess the awareness of exclusive breastfeeding among first time pregnant women attending antenatal clinics and breastfeeding counselling practices of healthcare providers in comparison with the WHO recommendations.

A cross sectional study of eighty first time pregnant women attending antenatal clinics at Mzumbe Health Centre which is located in a town near main roads and Tangeni dispensary which is located in a remote area far from the main roads, and six out of eight nurses providing antenatal care in these facilities was carried out. Questionnaires were used to evaluate women's breastfeeding knowledge and future intentions to breastfeed and nurses' breastfeeding knowledge and counselling practices.

About 94% of women intended to breastfeed, among these, only 23.8% intended to do so exclusively for six months. Women's knowledge in EBF was generally limited; about 94% of women had never received breastfeeding counselling at the antenatal clinic, 61% received BF information from their mothers, grandmothers and mothers-in-law, 37.5% said glucose water should be given immediately after delivery. Common reasons for introducing solids were; baby will be old enough (55%), baby will be hungry (32.5%), advised by the nurse (7.5%). There were no differences in breastfeeding knowledge between the two facilities, that is being located near the main roads did not change or influence women's knowledge in breastfeeding.

Nurses had satisfactory knowledge of how to solve breastfeeding problems and breastfeeding in special situations. Much of this knowledge appeared to be based on personal and clinical experience as only nurse had received training in breastfeeding. However, nurses' knowledge on WHO breastfeeding recommendations was limited. Only

three nurses said they train mothers about exclusive breastfeeding and it is only these three who knew the recommended age for introduction of solid foods. Three nurses said they would recommend exclusive breastfeeding until four months and only two nurses were able to identify the correct picture of latching on and attachment of the baby to the breast. Generally pregnant women and the nurses had limited knowledge in EBF matters.

Although the antenatal visits provide an excellent opportunity to ensure that pregnant women are aware of optimal breastfeeding practices, the nurses who provide care during these visits had limited knowledge on the recommendations. Findings highlight a need to focus on information and education to women and nurses.

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CONTRIBUTION OF AUTHORS

This study was conducted by Hadijah Mbwana, supervised by Dr. Cath Conlon and Dr. Pamela von Hurst. The contribution of each member of the research team is described below:

Hadijah Mbwana determined the study concept, did literature review, ethics application and approval in Tanzania, designed questionnaires, recruitment of subjects, collection of data, preparation of databases, designed and conducted the research, statistical analysis, interpretation of results and preparation of thesis manuscript.

Dr. Cath Conlon and Dr. Pamela von Hurst supervised the design and conduct of the research, reviewed ethics application, were consultants for development of the questionnaires, gave analytical support and overseeing the preparation and editing of the thesis manuscript.

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LIST OF ABBREVIATIONS

AFASS	Acceptable, Feasible, Affordable, Sustainable and Safe
ARI	Acute Respiratory Infection
ARV	Antiretroviral
BFHI	Baby Friendly Hospital Initiative
BKCPQN	Breastfeeding Knowledge and Counselling Practices Questionnaire for Nurses
BKQPW	Breastfeeding Knowledge Questionnaire for Pregnant Women
BMI	Body Mass Index
GIT	Gastro Intestinal Tract
HDL	High Density Lipoprotein
HT LV	Human T-cell Leukaemia Virus
IQ	Intelligence Quotient
LBW	Low Birth Weight
LDL	Low Density Lipoprotein
MCH	Maternal and Child Health
MTCT	Mother To Child Transmission
NBS	National Bureau of Statistics
PMTCT	Prevention of Mother to Child Transmission
RCHS	Reproductive and Child Health Survey programme
SIDS	Sudden Infant Death Syndrome
SPSS	Statistical Package for Social Sciences
TACAIDS	Tanzania Commission for AIDS
TDHS	Tanzania Demographic and Health Survey
TMOH	Tanzania Ministry of Health
UNAIDS	Joint United Nations Programme on HIV and AIDS
UNICEF	United Nations Children’s Fund
WHO	World Health Organization

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DEFINITION OF TERMS

Breastfeeding counselling: A two-way communication between educators and recipients aimed at changing behaviour from inappropriate to appropriate breastfeeding practices (WHO/UNICEF, 1993).

Exclusive breastfeeding: The infant receives only breast milk (including expressed breast milk), but no other liquids or solids with the exception of drops or syrups consisting of vitamins, mineral supplements or medicines (WHO, 2004b).

Mixed feeding: Breastfeeding a child while giving non-human milk or other foods and liquids (WHO, 2004b).

Not breastfed: Not fed on breast milk (WHO, 2004b).

Colostrum: Thick yellowish secretion from the breast within the first few days after delivery (WHO, 1999).

Pre-lacteal food: Giving the infant feeds or fluids before initiating breastfeeding after birth (WHO, 1999).

Initiation of breastfeeding: Whether the mother either puts the baby to the breast or the baby is given any of the mother's breast milk within the first 48 hours of birth (Department of Health, 2005).

Duration of breastfeeding: The length of time that infants who were initially breastfed continue to receive breast milk, even if also receiving other foods (WHO, 1999).

CHAPTER 1: INTRODUCTION

The study was carried out in Mvomero district in Morogoro region in Tanzania. Tanzania is situated in East Africa in the sub Saharan region (Figure 1.1), the area of the African continent which lies south of the Sahara; the worlds' second largest desert. Mainland Tanzania lies between the area of the great lakes -Victoria, Tanganyika, Nyasa and the Indian Ocean. Mvomero is one of the five districts of Morogoro region of east-central Tanzania (Figure 1.2).

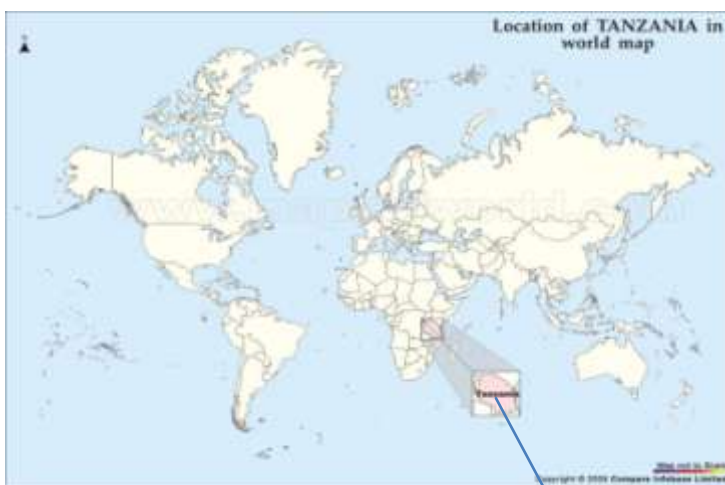


Figure 1.1 Map of the world showing location of Tanzania.

Source: <http://www.mapsofworld.com/tanzania/tanzania-location-map.html>



Figure 1.2 Maps of Tanzania and Morogoro Region showing Mvomero District

Source: <http://www.tanzania.go.tz/census/census/morogoro.htm>

The under-five child mortality rate is very high in Tanzania. In the period of 2006-2010 it was reported to be 81 per 1000 live births (National Bureau of Statistics [NBS] & ICF Macro, 2010) compared to 6 per 1000 live births in New Zealand (World Bank, 2010). A major factor contributing to infant and child mortality is malnutrition. The current Tanzania Demographic and Health Survey (TDHS) reports that approximately 42% of children below five years are stunted as a result of chronic under nutrition (NBS & ICF Macro, 2010). Malnutrition of the foetus starts during intra-uterine life when the mother has inadequate food intake as a result of food insecurity, poor caring practices, lack of information on proper diet (Lartey, 2008), and unhealthy living environments (NBS & Opinion Research Corporation [ORC] Macro, 2005). Other factors which contribute to maternal malnutrition in sub-Saharan Africa include micronutrient deficiencies, high rates of HIV infection and malaria (United Nations Children's Fund [UNICEF], 2005). The situation becomes worse after delivery when the infant is not exclusively breastfed and due to early introduction of nutritionally-poor complementary foods. The Tanzania National Strategy for Growth and Reduction of Poverty Strategy paper of 2011 targets to increase the prevalence of exclusive breastfeeding from 50% (2010) to 60% by 2015 (International Monetary Fund, 2011). Increasing rates of exclusive breastfeeding is a global goal which is urgently required as an intervention for child survival (UNICEF, 2009).

Exclusive breastfeeding means giving infants only breast milk with no addition of other foods or drinks including water (World Health Organisation [WHO]/ UNICEF, 2003). The WHO recommends an early initiation of breastfeeding of one hour after birth and exclusive breastfeeding for six months (WHO, 2001b; WHO/UNICEF, 2003). Exclusive breastfeeding for the first six months of life is estimated to lower infant death by 13% (Jones et al., 2003). Other dangers associated with not breastfeeding as recommended include high infant death rates caused by lowered protection against harmful bacteria and other gastrointestinal infections and slow recovery from illnesses (WHO, 2001b).

In Africa, the majority of mothers fail to practice exclusive breastfeeding as recommended (UNICEF, 2006b). This is caused by factors such as lack of self-security, breast soreness, poor infant positioning, mothers' perception of inadequate milk supply and lack of necessary support and information from healthcare providers (WHO, 2001b). There are cultural, social and economic barriers to exclusive breastfeeding including practices of pre-lacteal feeding,

giving drinking water and herbal teas (Shirima, Gebre-Madhin and Greiner, 2001). In Tanzania, studies report early introduction of non milk foods such as thin maize porridge and animal milk as early as a few weeks or months after birth (NBS & ICF Macro, 2010; Shirima et al., 2001). In some societies like the Yoruba of Nigeria, exclusive breastfeeding is regarded as threatening to the infant because they believe the infant needs drinking water to suppress thirst and accelerate faster growth (Davies-Adetuyogbo, 1997).

In Tanzania, breastfeeding is a universal practice with 94% of children less than 15 months of age being breastfed (NBS & ORC Macro, 2005). The TDHS indicates 59% of women practise early initiation meaning those babies who were put to breast within one hour after delivery. It is also reported that in the first month of babies' lives 80.5% of them are exclusively breastfed, the median age for exclusive breastfeeding is 1.8 months and the median age for total breastfeeding is 21 months (NBS & ORC Macro, 2005).

HIV/AIDS is an epidemic in Tanzania with approximately 1.2 million people aged 15 and over living with HIV. An estimated 100,000 Tanzanians were newly infected with HIV in 2009. In the same year, 86,000 people died from AIDS in Tanzania (Joint United Nations Programme for AIDS (UNAIDS), 2010). In Tanzania women are the most affected group and comprise 60% of people living with HIV (Tanzania Commission for AIDS [TACAIDS], 2008). As HIV prevalence data are only obtained from blood donors and pregnant women attending antenatal clinics, the majority of women in Tanzania do not know their HIV status. Therefore, it is necessary to promote exclusive breastfeeding for all women regardless of their HIV status together with providing accurate information on infant feeding recommendations for HIV-positive women. In 2010, the USAID in collaboration with other governmental bodies carried out an evaluation of the HIV infant feeding training program in Tanzania part of which looked at training staff looking after women in the antenatal and postnatal period on exclusive breastfeeding. This evaluation revealed that very few staff had received training on infant feeding counselling, no refresher training had been conducted and that no specific guidelines for monitoring the infant feeding counselling program had been developed (Luseno et al., 2010).

Despite the well documented benefits of exclusive breastfeeding both to the mother and the baby (Kramer & Kakuma, 2002; WHO, 2002), and recommendations by the WHO (WHO,

2001b; WHO/UNICEF, 2003), only 50% of women in Tanzania breastfeed their infants exclusively for six months (NBS & ICF Macro, 2010). This is slightly higher than the rest of the sub-Saharan Africa where only 30% of infants less than six months of age are exclusively breastfed and only 42% of women start breastfeeding within one hour after delivery (UNICEF, 2006b).

In Tanzania it is recommended that pregnant women attend at least four antenatal visits throughout their pregnancy (Tanzania Ministry of Health and Social Welfare [TMOHSW], 2002). Available information shows that 96% of pregnant women attend at least one antenatal visit whereas 62% attend four or more visits (NBS & ICF Macro, 2010). Women who attend antenatal clinics are usually attended by nurse practitioners who provide antenatal care and they depend on them for guidance and counselling during pregnancy (TMOHSW/ Reproductive and Child Health Survey programme [RCHS], 2008).

In Tanzania, the current infant feeding recommendations are in accordance with the WHO recommendations (WHO, 2001b, WHO/UNICEF, 2003). In order to be compatible with the WHO recommendations, healthcare providers dealing with antenatal care should promote breastfeeding whenever a chance is available (WHO/UNICEF, 1989). Due to the high rates and long duration of breastfeeding in Tanzania, bottle feeding is not a significant issue. However, available evidence suggests that breastfeeding practices may not meet the current recommendations for exclusive breastfeeding (Shirima, 2000; Shirima, 2001; (NBS & ICF Macro, 2010). Antenatal visits may provide a platform for healthcare providers to give information about the exclusive breastfeeding practices. The information and counselling provided by healthcare providers is usually taken to be the most influential because mothers see them as their role models in matters related to breastfeeding (Hillenbran & Larsen, 2002).

The Baby Friendly Hospital Initiative (BFHI) was launched by the WHO and UNICEF in 1991. Since its launch, this initiative has had meaningful impact on breastfeeding practices in developing countries through implementation of the 'Ten Steps to Successful Breastfeeding' which explain in detail the practices needed by maternity services to support breastfeeding. In order for a maternity facility to be declared 'baby friendly', it should follow the ten steps indicated in Box 1.1. The second step of this policy says that all healthcare staff should be

trained in the skills necessary to implement breastfeeding. Step five of the initiative involves guidance and support regarding breastfeeding. Moreover, in many developing countries training in breastfeeding is usually voluntary, not well structured and not usually consistent (WHO/UNICEF, 1989).

Despite national efforts to promote exclusive breastfeeding for the first six months after delivery, the majority of women provide water, glucose water and formula milk to their infants by the end of the first month (NBS & ICF Macro, 2010). This may be due to cultural beliefs that breast milk is not enough for the infant. It is likely that despite the policies to promote breastfeeding, many mothers do not get effective information, advice and support regarding exclusive breastfeeding and continuation of breastfeeding. Therefore so as to understand barriers and limitations to exclusive breastfeeding, the purpose of this study was to assess the awareness of exclusive breastfeeding among first time pregnant women attending antenatal clinics and to assess breastfeeding counselling practices of healthcare providers in comparison with the WHO recommendations. Knowledge of exclusive breastfeeding among pregnant women and healthcare providers was also assessed.

Box 1.1: The Ten steps to successful breastfeeding

Every facility providing maternity services and care for new-born infants should:

1. Have a written breastfeeding policy that is routinely communicated to all healthcare staff
2. Train all healthcare staff in skills necessary to implement this policy
3. Inform all pregnant women about the benefits and management of breastfeeding
4. Help mothers initiate breastfeeding within 30 min of birth
5. Show mothers how to breastfeed, and how to maintain lactation even if they should be separated from their infants
6. Give new-born infants no food or drink other than breast milk, unless *medically* indicated
7. Practise rooming in-that is, allow mothers and infants to remain together, 24 h a day
8. Encourage breastfeeding on demand
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic

WHO/ UNICEF (1989). *Protecting, promoting and supporting breastfeeding: The special role of maternity services*. Geneva: WHO.

CHAPTER 2: LITERATURE REVIEW

2.1. BREASTFEEDING

The WHO defines breastfeeding as when the child has received breast milk either direct from the breast or expressed (WHO, 1991). Breastfeeding is recognised worldwide as being beneficial to both the mother and the baby. Breast milk is known to be the best source of nutrients and protective antibodies for the baby. Breast milk goes through various transitional stages; colostrum is the first stage that occurs during late gestation to few days after delivery. It is creamy, yellow coloured and is much thicker than the milk that is produced in the later stage (WHO/UNICEF, 1993). Colostrum is richer in protein, vitamins, minerals, and the all-important antibodies compared to the milk in later gestation. The antibodies help to protect the baby from many illness-causing bacteria in the environment. Colostrum is also a mild laxative which helps the baby pass the meconium; the tar like stool of the first days: and helps prevent jaundice. Breast milk then goes through a transitional stage and finally mature milk which again changes its composition during the course of lactation (WHO/UNICEF, 1993). Breastfeeding meets all the necessary nutrient and fluid needs of the infant and the changing needs of the child until four to six months of age (WHO/UNICEF, 1993).

2.1.1. Exclusive breastfeeding

Exclusive breastfeeding is the act of feeding the infant only breast milk from his/her mother without the addition of any other food or fluid (even water) (WHO, 1991). However, it is allowed to give vitamins, minerals and medicines in addition to breast milk. Exclusive breastfeeding also applies to a child who receives only breast milk or fed only breast milk from a wet nurse (WHO, 1991).

Exclusive breastfeeding is extremely important in developing countries where limited access to clean water increases the risk of diarrhoeal disease if replacement feeding is used (WHO, 2000a). Other factors which render exclusive breastfeeding very important in developing countries include high rates of HIV, poverty and food insecurity as in lack of enough nutritious food for children and mothers (WHO, 2000a).

Some of the known benefits of breastfeeding are more likely to happen when the infant is exclusively breastfed. Lower rates of cancers and diabetes during childhood are specific to infants who were exclusively breastfed (Ortega-Garcia et al., 2008; Owen, Martin, Whincup, Davey-Smith, & Cook, 2006). On top of that, infants who receive complementary foods below six months are reported to have higher rates of gastrointestinal infections compared to infants who are exclusively breastfed (Khadivzadeh & Parsal, 2004). Exclusive breastfeeding for the first six months has been shown to provide all the nutrients the baby requires and not affecting their growth, development and health (Kramer & Kakuma, 2002).

2.1.2. Composition of human breast milk

Human breast milk is specific for human babies and it is ideal for infant feeding. Breast milk contains necessary nutrients, antibodies and other factors important for growth and development which make it uniquely a perfect food for babies and it is sustainable, safe and available (Riordan, 2005). However, it does not provide adequate vitamin D which is required to build healthy bones and teeth in children. Amount of vitamin D in breast milk is determined by vitamin D status of the mother, therefore maintaining vitamin D status of exclusively breastfed babies depends on whether their mothers' vitamin D status is normal and/or synthesize additional vitamin D through routine sunlight exposure (WHO, 2002).

It is important to note that the composition of breast milk changes during the whole period of breastfeeding and even through a single feed (Lawrence & Lawrence, 2005; Riordan, 2005). Breast milk is composed of 10% solids and 90% water. The solids are important for energy and growth and the water maintains hydration (Lawrence & Lawrence, 2005). The main solid components of breast milk are fat, carbohydrate and protein. The component which varies most in breast milk is fat, and it provides approximately half of the energy in breast milk. Fat is needed for growth and development of the infant and it acts as the main source of energy (Lawrence & Lawrence, 2005; Riordan, 2005). Most carbohydrate in breast milk is in the form of lactose. It provides energy to infants. There are high levels of protein in colostrum and in the milk in early stages of lactation, but the levels gradually decrease as lactation continues. Breast milk contains many types of protein but the major types are whey and casein which all support growth and development (Lawrence & Lawrence, 2005). Apart from whey and casein, breast milk contains other important proteins such as;

- Antibodies which help to fight against bacterial and viral infections.
- Bifidus factor which encourages the growth of lactobacillus; a bacteria that helps prevent the growth of other harmful stomach bacteria.
- Lactoferrin which binds to iron and helps the baby absorb iron. It also prevents the growth of harmful microorganisms that use iron.
- Lipase, amylase, lysozyme and other enzymes that help in digestion and create a healthy environment in the baby's intestines (Riordan, 2005).

On top of the above components breast milk is also rich in vitamins, minerals, growth factors, enzymes and anti-infective properties (Riordan, 2005). Table 2.1 below indicates the composition of some of the key nutrients found in breast milk per 100ml. Therefore apart from meeting the nutritional requirements of babies, breast milk also protects against infections through its defence properties like secretory immunoglobulin A, lactoferrin, lysozyme, anti-inflammatory factors, cytokines, nucleotides, macrophages, and lymphocytes (Oddy, 2001).

The composition of breast milk varies depending on factors such as the gestational age, maternal nutritional status, stage of lactation, gestational age, maternal dietary habits, genetic make-up and it also varies between mothers (Lawrence & Lawrence, 2005; Riordan, 2005).

Table 2.1: Composition of some of the key nutrients found in breast milk

Component	Mean value for mature breast milk (per 100mL)
Energy	280 (Kj)
Energy	67 (kcal)
Protein	1.3 (g)
Fat	4.2 (g)
Carbohydrate	7.0 (g)
Sodium	15 (mg)
Calcium	35 (mg)
Phosphorus	15 (mg)
Iron	76 (mcg)
Vitamin A	60 (mcg)
Vitamin C	3.8 (mg)
Vitamin D	0.01 (mcg)

Kj= Kilo joules, Kcal= kilocalories, g=gram, mg= milligram, mcg= microgram
 The composition of breast milk changes during the whole period of breastfeeding and even through a single feed, indicated are the average values

Source: NHMRC (2003). Dietary guidelines for children and adolescents in Australia, incorporating the Infant feeding guidelines for health workers. Australia: NHMRC.

2.2. WORLD HEALTH ORGANIZATION BREASTFEEDING RECOMMENDATIONS

Prior to 2001, the WHO recommended that infants be exclusively breastfed for four to six months, after which point complementary foods can be introduced (WHO, 1995). In 2001, an expert WHO consultation on the optimal duration of exclusive breastfeeding (WHO, 2001a), led the WHO to change its recommendations to exclusive breastfeeding for the first six months of life (WHO, 2001b). This recommendation was supported by a systematic review commissioned by the WHO to evaluate the health outcomes of infants and mothers when exclusive breastfeeding is done for six months and when it is done for three to four months (Kramer & Kakuma, 2002). This led to the current recommendation for exclusive breastfeeding for the first six months followed by introduction of complementary food thereafter and continued breastfeeding for up to two years and beyond (WHO/UNICEF, 2003).

Compliance with this recommendation has important child health and nutritional benefits in developing countries due to the meaningful protection that breastfeeding provides to infants against diarrhoeal diseases and pneumonia (Black, Morris, & Bryce, 2003). In many developing countries, clean water and safe, nutritious first foods are scarce therefore complimentary foods given are usually nutritionally inadequate and contaminated which increases the rate of gastrointestinal infections and growth faltering (Black et al, 2003). In addition, various population studies in developing countries have indicated that children between three to fifteen months are at the greatest risk of nutritional deficiency which is correlated with poor breastfeeding and complementary feeding practices (Shrimpton et al., 2001).

Some observational studies in developing countries have reported reduced risk of gastrointestinal tract infections in infants who were exclusively breastfed for six months. Khadivzadeh and Parsal (2004), carried out a study in Iran to compare the growth and morbidity of infants who were exclusively breastfed for six months and those breastfed for four to six months. Among other results, the study revealed lower rates of diarrhoea in exclusively breastfed infants for four to six months compared to those who were given complementary foods before that age. Another study done in Nigeria also reported fewer episodes of illnesses including diarrhoea in infants breastfed for six months compared to infants who were introduced to complementary foods before six months (Onayade, Abiona,

Abayomi, & Makanjuola, 2004). Consistent with the results observed in developing countries, Kramer et al. (2000), carried out an intervention trial to assess the influence of exclusivity of breastfeeding on gastrointestinal and respiratory infection in a developed country. Results indicated that infants from the intervention group which was based on the Baby Friendly Hospital Initiative (BFHI) had a reduced risk of getting one or more gastrointestinal tract infections.

Therefore the WHO (2001b), recommends exclusive breastfeeding for the first six months. This means that only breast milk is given to the infant, without the addition of any other food or drink- not even water. WHO also recommends breastfeeding for two years or more after the introduction of complementary foods at 6 months of age that are safe and give adequate nutrition.

The WHO also recommends that mothers breastfeed frequently and on demand until two years of age or beyond. This means breastfeeding the infant as often as it wants, day and night. The use of bottles and pacifier teats is discouraged, because of the high hygiene standards necessary for their safe use (WHO/UNICEF, 2003). In order to improve feeding practices, the WHO/UNICEF recommends that mothers and health care providers have access to objective, consistent and complete information regarding appropriate feeding practices without the influence of commercial advertisements. Also women must have access to healthcare providers' support to help them initiate and continue breastfeeding and to deal with the difficulties encountered during the process. Healthcare providers must have enough knowledge to provide this support and guidance.

To achieve these standards, the WHO recommends that every health facility that provides maternity services fully practice the ten steps to successful breastfeeding. All the important messages about breastfeeding should be comprehensively taught to all healthcare providers offering maternity services. The WHO, in collaboration with UNICEF, created a forty-hour breastfeeding counselling training course to train healthcare providers to give skilled support to breastfeeding mothers and help them solve problems related to breastfeeding (WHO/UNICEF, 1993).

2.3. HIV AND BREASTFEEDING

Despite the numerous health benefits of breastfeeding to infants, however, the human immunodeficiency virus (HIV) can be passed from an HIV positive mother to her infant via breastfeeding. Mother to child transmission (MTCT) can occur at any time during pregnancy, delivery or breastfeeding. The cumulative risk of transmission increases as breastfeeding extends. The general chance of MTCT of HIV when no measures are taken to prevent it is 30-40%, with breastfeeding accounting for 5-20% of such cases (WHO, UNICEF, UNPF & UNAIDS, 2007). “In 2008, an estimated 430,000 new HIV infections occurred among children under the age of 15 years in the globe. Most of these new infections are believed to stem from transmission in utero, during delivery or post-partum as a result of breastfeeding” (UNAIDS, 2009).

Infant feeding recommendations for HIV positive women differ between developed and developing countries. This is because in developing countries there are limited resources and infrastructure. Factors such as lack of access to clean water, health services and sanitation can all lead to an increased risk of infections, diseases and infant death (WHO, 2010). In developing countries like Tanzania, the WHO (2010), recommends that HIV positive women exclusively breastfeed their infants for six months, after which time they should introduce other foods while continuing to breastfeed until at least one year. Pregnant women who are HIV positive receive antiretroviral (ARV) drugs throughout pregnancy and during breastfeeding. Healthcare providers’ support is greatly needed to help women stick to their drug regimen and to continue to exclusively breastfeed for six months. These practices have been shown to reduce the HIV infection rate by 2% (Kilewo et al., 2008).

WHO recommends that HIV positive women residing in countries where it is not possible to access a consistent supply of ARV drugs throughout pregnancy and during breastfeeding exclusively breastfeed for the first six months, after which time they rapidly cease doing so and introduce replacement soft foods and milk (WHO, 2010). This is recommended because mixed feeding by such mothers was reported to increase HIV transmission (WHO et al., 2007a).

2.4. BREASTFEEDING PRACTICES

2.4.1. Initiation of breastfeeding

The information available shows that breastfeeding initiation rate is very high in developing countries. It is reported that the prevalence of breastfeeding is 90% in developing countries. Moreover, the initiation of breastfeeding is universal in sub-Saharan Africa. In most countries in Africa, the median duration of breastfeeding is 18 to 24 months (Mukuria, Kothari, & Abderrahim, 2006). Table 2.1 indicates the percentages of children breastfed within one hour of birth and those ever breastfed at some point and the median duration of any breastfeeding in some African countries as reviewed from demographics and health survey data collected from 1998-2004.

Table 2.2: Percentages of children breastfed within 1 hour of birth the median duration of any breastfeeding in African countries (2006).

Countries	% of children breastfed within 1 hour of birth	% of children ever breastfed	Median duration of any breastfeeding (months)	Countries	% of children breastfed within 1 hour of birth	% of children ever breastfed	Median duration of any breastfeeding (months)
Benin	48.6	97.1	21.8	Mali	32.3	96.9	21.7
Burkina Faso	33.3	98.4	24.5	Mauritania	61.0	95.2	20.6
Cameroon	31.9	93.6	17.4	Mozambique	64.7	98.3	22.6
Chad	34.3	98.4	21.3	Namibia	80.9	95.1	18.6
Cote d'Ivoire	27.8	96.6	20.5	Niger	28.3	97.9	20.6
Eritrea	77.9	98.0	21.8	Nigeria	31.9	97.4	18.6
Ethiopia	51.8	96.3	25.5	Rwanda	48.1	97.1	22.1
Gabon	71.4	86.2	12.1	Tanzania	59.3	95.3	20.9
Ghana	46.3	97.0	22.5	Togo	19.9	97.4	24.4
Guinea	26.0	92.3	22.4	Uganda	31.6	98.3	19.9
Kenya	52.3	96.8	20.1	Zambia	51.2	98.4	21.4
Madagascar	62.4	98.3	21.6	Zimbabwe	63.0	97.7	19.6
Malawi	72.1	98.3	23.3				

Source: Mukuria, A.,G., Kothari, M.,T., & Abderrahim, N. (2006). Infant and Young Child Feeding Practices Updates. Calverton, Maryland, USA: ORC Macro.

2.4.2. Exclusive breastfeeding practices

Despite high rates of initiation of breastfeeding, exclusive breastfeeding practices are not common in developing countries. Only approximately one third of infants under six months are exclusively breastfed. There are however variations in different regions (UNICEF, 2006b). East Asia so far has the highest rates of exclusive breastfeeding at 43%, with Eastern and Southern Africa at 41%. The region with the lowest reported exclusive breastfeeding rate is Western and Central Africa at 20% (UNICEF, 2006b). Despite the low rates of exclusive breastfeeding in sub-Saharan Africa, the available data indicate that these rates improved between 1990 and 2004 -going from 15% to 32% (UNICEF, 2006b). This rise is attributed to the BFHI practices and breastfeeding promotion and support programmes that have been well established. A study by Abrahams and Labbok (2009), examined the impact of BFHI on exclusive breastfeeding trends. Data for this study were obtained from demographic and health surveys of 72 developing countries. Results of this study indicated annual significant increases in the rates of exclusive breastfeeding after the introduction of BFHI compared to before its introduction.

Reports indicate that the overall rate of exclusive breastfeeding for children below six months in sub-Saharan Africa is 30%. The top statistic of 39% comes from Eastern and Southern Africa, followed by 28% in Northern Africa and Middle East and 21% in West and Central Africa (UNICEF, 2007). However, there is a significant limitation to the data on exclusive breastfeeding rates in children under 6 months. The data involved were gathered using different methods in different countries. Also, the data were collected in cross sectional studies involving children below five years of age; therefore, there is a possibility of recall bias which could cause exaggerated rates. Despite this drawback, information on the median duration of exclusive breastfeeding in many African countries can be used to show a definite trend of the duration being shorter than the recommended six months. This highlights the need to improve both the rates of exclusive breastfeeding and the rate of those continuing this for six months.

2.5. BENEFITS OF BREASTFEEDING

2.5.1. Health benefits of breastfeeding for children

Breastfeeding is the natural way of feeding infants and has a number of health benefits. These are both short term and long term and relate to infant health, mental and motor development.

2.5.1.1. Morbidity

The most easily perceived benefits of breastfeeding are the short term ones that contribute to the reduction of incidence of diseases. Respiratory tract infections, otitis media and other infections have been reported to affect infants who received breast milk less than those who did not receive breast milk. Kramer et al. (2001), compared the possibility of getting one or more occurrences of gastro intestinal tract (GIT) infection, two or more occurrences of respiratory tract infection and atopic eczema and recurrent wheezing in infants who were exclusively breastfed and those who were not. They found out that exclusively breastfed babies had a 40% lower risk of getting GIT infections and a 46% lower risk of atopic eczema compared to babies who were not exclusively breastfed to 3-6 months.

Clemens et al. (1999), indicated that infants who initiated breastfeeding in the first three days had reduced incidences of diarrhoea in their first six months of life in comparison to those who initiated breastfeeding after three days.

2.5.1.2. Mortality

One of the most significant benefits of breastfeeding is the greatly reduced risk of infant mortality. It was reported that in Latin America infants who were exclusively breastfed for the first three months followed by partial breastfeeding up to at least 12 months were protected from 55% of the infant mortality caused by diarrhoea and acute respiratory infection (ARI) (Betran, Onis, Lauer, & Villar, 2001).

Early initiation of breastfeeding was reported to reduce neonatal deaths by 16% in Ghana (Edmond et al., 2006). Therefore, it is important to develop breastfeeding programs that stress early initiation of breastfeeding, especially in sub-Saharan Africa where rates of neonatal and infant mortality are unacceptably high.

Arifeen et al. (2001), indicated that exclusive breastfeeding reduces deaths related to acute respiratory infections (ARI). Their study to assess the effect of exclusive breastfeeding on infant death risk reported that infants who were not breastfed or who were partially breastfed were 2.4 times more at risk of dying from ARI than infants who were exclusively breastfed. It was also reported that the chance of infant death due to pneumonia following inadequate breastfeeding was 2 times greater than in infants who received adequate breastfeeding (Victoria et al., 1999).

2.5.1.3. Intellectual and motor development

Many studies indicate that breastfed children score higher in intellectual and motor development tests than children who were not breastfed (Dewey, 2001; Horwood, Darlow, & Mogridgr, 2001; Mortenson, Michaelsen, Sanders & Reinich, 2002). Mortenson et al. (2002), confirmed that children who were breastfed had better test scores on the Danish Wechsler Adult Intelligence scale, which involves verbal and performance tests, than children who were not breastfed. However, these studies did not take into consideration other factors that may influence the results such as the socio-economic status of women and education level.

It has been estimated that infants who were exclusively breastfed for the first six months tend to crawl earlier, are able to sit sooner and are more likely to start walking by 12 months than infants who began eating solids from the age of four months (Dewey et al., 2001). Also, children who continue to breastfeed up to 8 months or more were reported to have higher verbal and Intelligence Quotient (IQ) test scores compared to children who were not breastfed or who stopped breastfeeding before they were 7 months of age (Horwood et al., 2001). One meta-analysis involving 20 studies concluded that the mean advantage in cognitive development scores of breastfeeding was higher than that of formula feeding. Also, a greater advantage was seen in infants who were breastfed for longer (Anderson, Johnston, & Remley, 1999).

Although not very clear, there are biological links between breastfeeding and mental development. Breast milk is reported to contain more long chain polyunsaturated fatty acids, which are reported to be crucial for brain growth, than formula milk and other breast milk substitutes (Gomez-Sanchiz, Canete, Rodero, Baeza, & Avila, 2003). Also, the direct contact

of the mother and the baby that occurs during breastfeeding is believed to cause mental and emotional activation and bonding, which contribute to growth advantages (Holme, MacArthur, & Lancashire, 2010).

2.5.1.4. Chronic diseases

Various studies have observed positive associations between breast milk and chronic or non-communicable diseases. According to Gillmann et al. (2001), children who received breast milk for more than seven months were 20% less likely to be overweight and obese than children who received breast milk for less than three months. It was also reported that infants who were not breastfed at the time of discharge from the hospital after delivery had a higher risk of getting diabetes than those who were breastfed at discharge (Jones et al., 1998).

A case control study showed an inverse association between a lowered risk of child leukaemia and having received breast milk. The reduced risk of leukaemia in childhood was higher in children who received breast milk for more than six months (Shu et al., 1999). Also, a link has been established between early nutrition in pre-term infants and blood pressure in later life. Singhal, Cole and Lucas (2001), reported that the mean blood pressure of children aged 13-16 years who were born pre-term and received breast milk from milk banks was lower than that of children of the same age who received formula. Another study reported that adults who were bottle fed or received formula during their infancy had increased fasting insulin, higher LDL cholesterol and lower HDL cholesterol than adults who were exclusively breastfed during their infancy (Ravelli, van der Meulen, Osmond, Barker, & Bleker, 2000).

Most of the above studies used randomised controlled trials which are the most robust study designs for hypothesis testing of issues concerning evidence on effectiveness. Also most samples consisted of adolescents or adults which permitted the focusing on the long term benefits of breastfeeding.

2.5.1.5. Obesity

In recent years, there has been a rise in the prevalence of childhood obesity especially in developed countries. This rise has been associated with extensive avoidance of breastfeeding (Langley-Evans, 2009). This situation has brought up questions of whether

nutrition in the early days of life is linked to childhood obesity. A systematic review aimed at finding a possible link between breastfeeding and childhood obesity indicated that infants who were breastfed were 22% less likely to suffer from childhood obesity compared to infants who received formula (Arenz, Ruckerl, Koletzko, & von Kries, 2004).

Other benefits of breastfeeding to the infant include reduction of the risk of sudden infant death syndrome (Alm et al., 2002; Saadi et al., 1993), protection against asthma and allergy (Eigenmann, 2004), protection against lymphoblastic leukaemia (Kwan, Buffler, Abrams, & Kiley, 2004), and protection against inflammatory bowel disease (Klement, Cohen, Boxman, Joseph, & Reif, 2004).

2.5.1.6. Infant growth and development

Breast milk is ideal for infant growth and development as it has an appropriate balance of nutrients that are easily digested and bioavailable (Dewey, 2000). The low concentration of the amino acids methionine, phenylalanine, and tyrosine, and high levels of cysteine and taurine prevent damage of the central nervous system in infants thus aiding neurodevelopment (Picciano, 2001). Studies indicate that exclusive breastfeeding for six months provides adequate nutrition for normal growth of the infant up to six months of age (Dewey, 2001). Evidence indicate that breastfed infants gain weight rapidly during the first two to three months of life followed by a relatively slower growth rate compared to formula fed infants (Nommsen-Rivers, & Dewey, 2009). It was reported that this is because breastfed infants self-regulate their energy requirements by maintaining a lower body temperature and metabolic rate than formula fed infants (Dewey, 2001).

2.5.2. Maternal health

Breastfeeding is reported to have short term and long term benefits for the mother. In the short term, early initiation of breastfeeding encourages the release of the oxytocin hormone, which is believed to aid in uterine contractions and to reduce postpartum bleeding (Labbok, 2001). Exclusive breastfeeding also delays the return of fertility, therefore helping to reduce short birth intervals. This is important for the health of the mother and the survival of young children and it has been indicated that there is an increased mortality risk among children born after short birth interval (Muhuri & Menken, 1997). Breastfeeding women return to their pre pregnancy weight faster than formula feeding women and also form a strong bond with their babies (Labbok, 2001).

The long term benefits of breastfeeding to the mother include reduced risk of breast cancer (Tryggvadottir, Tulinius, Eyfjord, & Sigurvinsson, 2001; Collaborative Group on Hormonal Factors in Breast Cancer, 2002) and ovarian cancer (Ness et al., 2000; Riman et al., 2002). Breastfeeding also lowers a mother's risk of getting iron deficiency anaemia, as it delays the return of menstruation by up to 30 weeks after delivery (Labbok, 2001). This helps to improve the health of the breastfeeding woman because iron deficiency anaemia is associated with body weakness, fatigue, vertigo, dizziness, pallor, headache, ringing in the ears and headache (Henly et al., 1995). For the breastfeeding woman, iron deficiency anaemia has been reported to be a contributing factor for low milk supply, plugged ducts and mastitis, and delayed healing of sore nipples (Henly et al., 1995).

2.5.3. Economic benefits of breastfeeding

On top of the individual benefits, breastfeeding can produce important economic benefits by lowering direct and indirect expenses. Among the direct costs that can be lowered by breastfeeding are hospital costs such as paying to see a physician and laboratory costs for stool examination in case of diarrhoea (Drane, 2004). The costs of buying formula milk and other breast milk substitutes are reduced by exclusive breastfeeding.

Indirectly, breastfeeding can reduce time and other costs incurred by parents when taking care of ill children (Drane, 2004). Working mothers usually go back to work before their child is 1 year old. When their children fall sick, they usually have to miss work. As evidence shows, children who are exclusively breastfed are less likely to get infections than formula fed babies or those who are not breastfed exclusively. Therefore, it is likely that mothers who breastfeed exclusively will miss fewer work days as a result of ill children than mothers who formula feed.

2.6. CONTRAINDICATIONS TO BREASTFEEDING

Despite the large number of benefits of breastfeeding, there are a few conditions that contraindicate breastfeeding in the best interests of the infant.

2.6.1. Medical problems

Breastfeeding is contraindicated for infants with galactosemia. This is an autosomal-recessive disorder where an enzyme galactose-1-phosphate from the liver is non-functional. Infants with this disorder are not able to metabolize galactose, and this can result in mental

retardation and failure of the liver. When this condition is suspected, breastfeeding should be stopped immediately and the mother should start giving solids and other non milk foods (Hale, 2004).

In mothers with pulmonary tuberculosis, the WHO recommends breastfeeding to continue and that there is no need to separate the infant from the mother, but the close contact between them should be minimised and the following precautions should be observed; a mask or similar device should be worn by the mother during breastfeeding, washing hands carefully and identifying other household members infected. In any situation, the mother should receive a full course of treatment. Treatment of the infant with hydrazine (INH) at the dose of 10 mg/kg, once a day for six months is recommended. When chemoprophylaxis dose is finished, the infant should be given intradermal Bacillus Calmette-Guerin (BCG). Breastfeeding should be maintained in all these phases (WHO, 1998).

2.6.2. Viruses

Various viral diseases can be transmitted via breast milk, which can impact breastfeeding. In developed countries where replacement feeding is acceptable, feasible, affordable, sustainable and safe (AFASS), the WHO recommends HIV positive mothers avoid breastfeeding. However, in developing countries where replacement feeding is not AFASS, exclusive breastfeeding is recommended for the first six months and partially for at least one year for women who are HIV positive (WHO, 2010).

Women who have Human T-cell Leukaemia Viruses 1 or 2 (HT LV-1 or -2), which are associated with leukaemia and lymphoma, are advised not to breastfeed. Also, women who have herpetic lesions on their breasts should not breastfeed. If there are no lesions on the breast the infant can be breastfed, but the mother should take measures to cover any lesions and she should wash her hands before breastfeeding to reduce cross-contamination (Hale, 2004).

2.6.3. Medications

Nearly all drugs are excreted into breast milk, but most of them are safe for the infant. Those that are contraindicated during breastfeeding should clearly be stated to mothers so that they can avoid breastfeeding while on the medication. Women who are being treated with radioactive isotopes, antimetabolites or chemotherapeutic agents are advised not to

breastfeed up to the time when the medications are no longer excreted in breast milk (Hale, 2004).

2.7. FACTORS AFFECTING BREASTFEEDING IN AFRICA

Breastfeeding can be affected by various factors, including psychological and environmental factors, which all influence the decision to breastfeed. Wambach et al. (2005), highlighted that women who are married, educated, older, wealthier and those with a positive opinion about breastfeeding are more likely to initiate breastfeeding early. Studies suggest that if social networks do not provide enough support, they have a negative effect on the initiation and continuation of breastfeeding. Turnbull-Plaza, Escalante-Izeta and Klunder-Klunder (2006), found out that maternal and paternal grandmothers of the child together with physicians were the ones who most influenced exclusive breastfeeding, but in contradiction, it is the same people who disrupted its continuity. Similarly, healthcare providers' support and the general social atmosphere in which a woman lives both influence the initiation and maintenance of breastfeeding. Exclusive breastfeeding practices and the duration of breastfeeding are also influenced by similar factors as the initiation of breastfeeding, but also by breastfeeding education programmes, breastfeeding support, previous experience and other emotional elements (Wambach et al., 2005).

Psychological and environmental factors that affect breastfeeding outcomes have been reported in various studies. It is said that 99% of mothers in Africa breastfeed their infants, although mixed feeding is widely practiced with foods and fluids like water, cereals, infant formula, teas, animal milk and herbal preparations from as early as the first week after birth. This is usually encouraged by improper health advice and beliefs that 'fluids help to relieve pain or herbal preparations give strength to the infant'. Almost all these habits have been shown to be unhealthy and dangerous to the infant and they increase the chances of infants acquiring infectious diseases such as diarrhoea and respiratory infections (Wambach et al., 2005).

A study carried out by Kakute et al. (2005), in Cameroon identified the following as ethnic barriers to exclusive breastfeeding; influences to practice mixed feeding from elders in the village and from family members because mixed feeding is a tradition and the conviction that breast milk is not a complete food for the infant as it does not make the infant gain

sufficient weight. In Ghana, barriers to breastfeeding were identified as breast and nipple problems, lack of enough breast milk and influences from family and other community members (Otoo, Lartey, & Perez-Escamilla, 2009). Various studies have suggested ways to effectively deal with education programs (Biancuzzo, 2003; Mattar et al., 2007). These options include acceptable approaches that allow everyone to be involved and that encourage community support (Biancuzzo, 2003). All programs to support and promote breastfeeding must take into consideration cultural practices and the particular needs of the population concerned.

The responsibility of a nurse in antenatal and postnatal care setting is to assist and help to sustain interventions to overcome the needs of underprivileged populations. The rights, cultural beliefs, traditions and religious beliefs of each population must be respected when giving care (International Council for Nurses, 2006).

In their study to investigate infant feeding practices of HIV positive women, Adjeuyigbe, Orji, Onayade, Makinde, and Anyabolu, (2008), reported that women who had received counselling mentioned that the major reasons they preferred to exclusively breastfeed were because they were filled with fear of stigmatisation. These women had not told their partners about their HIV infection and their economic status prohibited them from buying infant formula.

2.8. BREASTFEEDING IN TANZANIA

The baby friendly hospital initiative (BFHI) was initiated in Tanzania in 1992. Currently almost one fourth of maternity hospitals in the country have been declared 'baby friendly'. This implies that mothers who attend antenatal clinics in these hospitals are believed to have access to the current information on recommended infant feeding (TMOHSW & RCHSP, 2008). Nevertheless, not much is known regarding the effectiveness of BFHI in promoting exclusive breastfeeding in Tanzania.

In Tanzania the only source of nationally representative data on infant feeding for children below 5 years of age are the Tanzania demographic and health surveys (TDHS), which were carried out periodically in 1992, 1996, 2005 and 2010. These surveys questioned mothers regarding the last 24 hours of their breastfeeding practices for all their children below five years of age. The current TDHS of 2010 indicates that nearly all children were breastfed

(97%) and were said to have initiated breastfeeding in the first 24 hours after delivery (NBS & ICF Macro, 2010). The median duration of overall breastfeeding is reported to be 21 months and the median duration of exclusive breastfeeding is reported to be one month. This report did not indicate the indices of variation for median values. Most mothers are reported to have given pre-lacteal feeds and started feeding solids within a few weeks or months of birth.

In Tanzania, low birth weight (LBW) that is below 2.5 kg is a significant public health problem. The TDHS 2005, reported 7% of babies were below 2.5 kg at birth but with great variation among regions (NBS & ORC Macro, 2005). It is important to note that approximately 50% of women in Tanzania give birth at home; therefore there is a considerable number of women whose infants may not be expressed in the LBW rates. There is however, a declining trend in the prevalence of LBW. The main factor correlated to low birth weight is reported to be low socio-economic status. Other correlated factors include maternal malnutrition, poor maternal health, short birth intervals, intrauterine infections and adolescent pregnancies (Leach & Kilama, 2009). Exclusive breastfeeding has been reported to sustain better growth during the first six months of life in LBW babies. A study done in India by Faisal, Ali, Khan and Ahmed (2010), compared the weight gain pattern of exclusively breastfed babies LBW and term normal babies during the first six months of life. That study grouped LBW babies as cases and term normal babies as controls. These babies were followed up monthly during child health clinic attendance for six months. Anthropometric data and type of feeding were recorded. Results indicated satisfactory, comparable weight gain between exclusively breastfed LBW babies and normal babies. That is approximately 630g per month and 710g per month in case and control groups respectively in the first three months. The lack of growth difference between the two groups was linked to the exclusive breastfeeding practices during these early months of life but also it may be due to the small sample size used in the study. During six months of follow up, an average daily weight gain of 19.83 grams and 22.79 grams were observed in case and control groups respectively. Therefore, nutrition education on breastfeeding is important and it was shown to reduce the risk of malnutrition and mortality in LBW babies (Thakur et al., 2011).

It has also been reported that, there is an increased risk of LBW among adolescent mothers as compared to their older counterparts (Wort, Warsame, & Brabin, 2008). This could be because at this age, the adolescent has increased requirements for macronutrients because she requires nutrients for growth of her body and for the development of the placenta and the foetus. Tanzania has high adolescent pregnancy rates which affect the health of the girls, education and their future employment. The available information indicates that about 8000 girls drop out of school every year due to pregnancy (Ministry of Education and Vocational Training (MoEVT), 2010).

Maternal mortality continues to be a public health problem throughout sub-Saharan Africa. The 2010 TDHS indicated a maternal mortality ratio of 454 deaths per 100,000 live births for a ten year period preceding the survey (NBS & ICF Macro, 2010). The WHO ranked Tanzania sixth among the thirteen countries with highest levels of maternal mortality which together account for 67% of all maternal deaths occurring in the world (WHO, 2000b). Among other health problems that pregnant women encounter in Tanzania, iron deficiency anaemia as a consequence of inadequate diet intake and it is a major one which is associated with negative effects on the mother and the neonate. It has been greatly associated with LBW (Elhassan, Abbaker, Haggaz, Abubaker, & Adam, 2010). The 2005 TDHS reported the prevalence of anaemia among pregnant women to be 48.4% (NBS & ORC Macro, 2005). Approximately half of pregnant women in Tanzania give birth at home and not at health facilities (NBS & ORC Macro, 2005), therefore, they may not be attended by skilled personnel which contributes to increased maternal mortality due to excessive bleeding during child birth, (Elhassan, et al, 2010).

2.9. BREASTFEEDING PRACTICES IN TANZANIA

2.9.1. Initiation of breastfeeding

The TDHS reported 59% of women in Tanzania practiced early initiation of breastfeeding (NBS & ORC Macro, 2005). Studies done in different areas in Tanzania report varying rates of initiation of exclusive breastfeeding, with higher rates in urban areas compared to rural areas. Shirima et al. (2000), reported initiation of breastfeeding within 1 hour in an urban area of Morogoro to be at a rate of 82%, whereas the rate in the rural area was 52%. Agnarsson et al. (2001), reported in their survey that 20% of the 108 mothers surveyed

initiated breastfeeding within the first two hours after delivery. A recent study reported 91% of women initiated breastfeeding within the first hour in Western Tanzania (Nkala & Msuya, 2011). The most common reason given by mothers who delayed this process was that there was no milk and that colostrum is bad (Agnarsson et al., 2001).

2.9.2. Pre-lacteal feeds

Some studies have reported pre-lacteal feeding in some areas in Tanzania. Agnarsson et al. (2001), reported that 32% of infants were given pre-lacteal feeds within their first 3 days of life. Women who delivered in hospital were more likely to give pre-lacteal feeds than women who delivered at home. The majority of women who gave pre-lacteal feeds indicated they were advised to do so by a nurse midwife; the rest said they were advised by friends or it was their own decision. These were given while mothers are waiting for breast milk to come. Nkala and Msuya (2011), reported that 22% of women in Western Tanzania gave pre-lacteal feeds. The most common pre-lacteal feeds included glucose water, plain water, juice and formula milk.

2.9.3. Colostrum feeding

In Tanzania, the traditions related to colostrum feeding are reported to vary across tribes. For example the Wagogo people from Dodoma region believe that colostrum is good for the infant, even though they do not link it to nutritional benefits, they feed it because they believe that the infant has to remove it from the breast to allow real milk to come out. A study by Mabilia (2003), reported that 100% of infants from Dodoma were fed colostrum. On the other hand, a considerable proportion of women in other parts of the country are reported to have discarded colostrum. Agnarsson et al. (2001), reported that 46% of women in the Tabora region discarded colostrum. In this area, there was no taboo against colostrum but women who participated in this study said they discarded colostrum because it would cause digestion problems to the infants due to its thickness: the infants' stomach cannot handle it.

Shirima et al. (2001), reported that 43% of mothers in rural areas discarded colostrum whereas 10% did the same in an urban area and in Mbulu area, 34% of women were said to discard it (Agnarsson et al., 2001). In this pastoralist community, infants are given plain water or diluted animal milk, and in situations where labour had been prolonged, infants are fed a mixture of water and hot ash immediately after delivery to cool them down from the

long process of birth. This is a common traditional belief in this population that when labour is prolonged, then the infants are born very tired and need some sort of relief. The most common reasons cited by mothers for discarding colostrum were that it was dirty and sticky and thus would be hard on the baby (Agnarsson et al., 2001).

2.9.4. Exclusive breastfeeding

The available information indicates that exclusive breastfeeding to six months is rare and minimal. Shirima et al. (2000), indicated that exclusive breastfeeding was not practiced in rural or urban areas. Agnarsson et al. (2001), indicated that in the Tabora region, 75% of children were breastfed exclusively from birth; however, post 2 months of age only 50% were exclusively breastfed. Most infants are reported to have been given animal milk, thin maize porridge and water by two months. Mothers said that they started early feeding because they did not have enough breast milk.

According to the current TDHS (NBS & ICF Macro, 2010), there has been an increase in the number of mothers who breastfeed their children exclusively for their first six months; the rate went from 13.5% in 2004 to 23% in 2010. The report indicates that 81% of babies below 2 months of age are exclusively breastfed, while only 23% of infants between 4-5 months are exclusively breastfed. Table 2.3 indicates breastfeeding status by age in Tanzania.

Table 2.3: Breastfeeding status by age in Tanzania

Age in months	Not breastfeeding (%)	Exclusively breastfeeding (%)	Plain water only (%)	Non milk liquids/ juice (%)	Other milk (%)	Complementary food (%)	Total	No. of all children under 3 years
0-1	0.8	80.5	6.4	1.1	2.9	8.3	100.0	245
2-3	2.0	51.1	11.1	1.8	12.0	22.0	100.0	305
4-5	2.2	23.1	6.6	3.8	3.1	61.2	100.0	290
6-8	3.3	2.3	2.6	0.2	1.2	90.4	100.0	391
9-11	3.7	1.2	0.1	0.0	1.6	93.4	100.0	410
12-17	8.6	0.4	0.0	0.1	0.4	90.4	100.0	804
18-23	39.5	0.6	0.2	0.0	0.0	59.7	100.0	774
24-35	89.9	5.5	0.0	0.0	0.0	4.6	100.0	1,450

Breastfeeding status refers to a "24-hour" period (yesterday and last night).

A breastfeeding child who receives other milk but not complementary foods is classified in the Other Milk category

Any children who get complementary food are classified in that category as long as they are breastfeeding as well.

Source: National Bureau of Statistics & ICF Macro. (2010). *Tanzania Demographic and Health Survey 2009–10. Dar es Salaam*: National Bureau of Statistics & ICF Macro.

2.9.5. Duration of breastfeeding

Recent data show that breastfeeding is continued for a long time in Tanzania (Table 2.2). Mabilia (2003), reported that the duration of breastfeeding in central Tanzania is 2-3 years. The 2010 TDHS reports 94% of children are still breastfed at age 12-15 months. Shirima et al. (2001), reported that the average age that mothers stopped breastfeeding altogether was 24 months. Reasons given for stopping breastfeeding were that the child was old enough and that the child refused the breast.

2.9.6. HIV and infant feeding in Tanzania

Data from Tanzania HIV/AIDS and Malaria Indicator Survey (THMIS) 2007 - 2008, indicate that the prevalence of HIV/AIDS among sexually active women (15-49 years) is 6.6% and prevalence of HIV among pregnant women attending antenatal clinics for the first time ranged from 4.2 to 32.1% in selected sentinel sites (TACAIDS, 2008). The current Tanzanian infant feeding recommendations for HIV positive mothers are compatible with the WHO (WHO, et al., 2010), recommendations which call for mothers who are HIV positive to continue exclusively breastfeeding up to six months and then continue to breastfeed after six months until replacement feeding is AFASS for mothers and their infants.

Early rapid cessation of exclusive breastfeeding was formerly recommended in Tanzania as per WHO, UNICEF and UNAIDS (2004b), recommendations, but this was reconsidered in 2007 following unfavourable health outcomes. Negative health consequences for the mother included mastitis (WHO, et al., 2007a), and on the infant side included growth failure, HIV transmission due to the rapid introduction of solid food and mortality (Arpadi et al., 2009). The rapid introduction of solid foods reduces the protection of the intestinal mucosa provided by exclusive breastfeeding which in turn increases the risk of HIV passage (WHO, et al., 2004). The Tanzanian Ministry of Health has prepared standardised training materials for workers of different groups in the health sector to increase their awareness of

these new recommendations in the context of HIV/AIDS. The national guidelines for prevention of mother to child transmission (PMTCT) call for individualised counselling and follow up for all mothers receiving this care.

2.9.7. Reasons why women do not breastfeed exclusively

Various factors have been identified which prevent women from breastfeeding exclusively. Shirima et al. (2001) reported that mothers' knowledge about infant feeding options influenced their practices. Women who had satisfactory knowledge regarding maintenance of breastfeeding were reported to have high rates of exclusive breastfeeding compared to those who had poor knowledge. Also those mothers who knew the dangers of pre-lacteal feeds were reported to have high rates of exclusive breastfeeding compared to those who did not know the dangers of pre-lacteal feeds. Lack of information about breastfeeding and less contact with the health facility was also correlated to low rates of exclusive breastfeeding. Shirima et al. (2001) reported that mothers who were educated about breastfeeding during antenatal visits tended to breastfeed exclusively and predominantly for longer periods compared to mothers who did not receive any information. Other factors that prevent women from breastfeeding exclusively include the cultural values and practices surrounding the use of colostrum; many regard it as bad for the infant. Another factor is mothers' perceptions of inadequate breast milk (Mabilia, 2003; Shirima, 2001). Many women worry about whether their babies are getting enough milk. This may be because they see their babies feed often or seem hungry soon after being breastfed. However, it is normal for a baby to feed often because breast milk is digested faster than formula milk (WHO, 2001b).

2.10. ANTENATAL BREASTFEEDING EDUCATION

Antenatal breastfeeding education is defined as breastfeeding information given to pregnant women in various forms. This can involve an individual or group, home visiting programmes, peer education programmes or clinic appointments aimed specifically at imparting breastfeeding knowledge (Lumbiganon et al., 2008).

2.10.1. Antenatal breastfeeding education and breastfeeding outcomes

Antenatal breastfeeding education is said to have positive outcomes on breastfeeding because it is believed to influence decisions to initiate and continue breastfeeding. Although

various studies concerning this topic have been conducted, very few were conducted in the sub-Saharan Africa region where exclusive breastfeeding is very important for infant survival.

Mattar et al. (2007), carried out a randomised controlled trial to assess the effectiveness of an antenatal education program on breastfeeding practices in Singapore. The study included three groups of mothers attending antenatal clinics; the first group was provided with materials for breastfeeding education together with individual coaching from a counsellor. The second group only received breastfeeding educational material (without counselling) and the third group received only normal antenatal care. The results indicated that mothers from the first group had higher rates of exclusive breastfeeding and pre-dominant breastfeeding at three months and six months than mothers in group three, who received routine antenatal care alone. The study concluded that antenatal education significantly improves breastfeeding outcomes up to three months postpartum and that, in addition to providing educational material, health care providers should try to do individual counselling on breastfeeding during the antenatal period.

Another quasi-experimental study was done in Taiwan by Lin, Chien, Tai and Lee (2008), to assess the efficacy of a prenatal education programme. The indicators of efficacy included breastfeeding knowledge, attitudes, levels of satisfaction, breastfeeding problems and exclusive breastfeeding rates. The experimental group were provided with a 90 minute educational programme on breastfeeding on a group basis from the second trimester to the 36th week of pregnancy. The control group, who were of similar age and education/work status (and age of pregnancy), did not receive any education on breastfeeding. Results indicated high levels of satisfaction for the experimental group. The experimental group had higher breastfeeding outcomes, which were measured by the indicators mentioned above, than the control group. At three days and one month after delivery, the experimental group had higher breastfeeding rates (although the differences were not statistically significant).

Ingram, MacArthur, Khan, Deeks and Jolly (2010), carried out a systematic review to find out if antenatal peer support affects rates of breastfeeding initiation. The review involved randomised controlled trials and cohort studies that had controls and quasi-randomised trials. Studies selected were those that at least minimised bias in the form of selection, performance and measurement. Eleven studies were selected, comprising a total of 5,445

women. The results indicated that targeted antenatal peer support improved rates of initiation of breastfeeding.

Another study was carried out in Ghana by Aidam, Perez-Escamilla and Lartey (2005), to assess the influence of lactation counselling on exclusive breastfeeding. Pregnant women attending antenatal clinics at the time of the study were randomised into two intervention groups and one control group. The first intervention group received exclusive breastfeeding support during the prenatal, perinatal and postnatal periods. The second intervention group received exclusive breastfeeding support in the perinatal and postnatal periods only. The control group received health support unrelated to breastfeeding. The experimental groups received two educational sessions in the pre-natal period followed by nine home visits for six months after delivery. The results indicated that at six months after delivery 90% of women in the experimental group had breastfed exclusively in the past month, and 74% in the second experimental group had done the same. In the control group only 48% had exclusively breastfed in the past month. Also, the proportion of women who exclusively breastfed within six months was significantly higher in the first and second groups (39.5%) than in the control group (19.6%). The sharp rise in exclusive breastfeeding rates was related to the lactation counselling, especially in the prenatal period.

Another study carried out in Dhaka, Bangladesh found that peer counselling improved breastfeeding outcomes. The prevalence of exclusive breastfeeding was found to be 70% in the intervention group, which received 15 breastfeeding counselling home visits provided prenatally and postnatal. The prevalence of exclusive breastfeeding in the control group, who did not receive any counselling, was 6%. Also, mothers in the intervention group were reported to initiate breastfeeding earlier and were less likely to give pre-lacteal feeds than mothers in the control group (Haider, Ashworth, Kabir, & Huttly, 2000). However, as much as the evidence above shows that antenatal breastfeeding education improves breastfeeding outcomes, this type of counselling is not common in developing countries. A study conducted in India indicated that almost half of the women who were attending antenatal clinics did not receive any information about breastfeeding (Chaturvedi & Banait, 2000).

Another study in India by Dhandapany, Bethou, Arunagirinathan and Ananthkrishnan (2008), evaluated whether antenatal counselling on breastfeeding is adequate. This descriptive study involved pregnant women in their third trimester who were admitted to a maternity ward, some of whom were booked and some of whom were not. The results indicated that only 21% of the mothers who were booked had received antenatal breastfeeding counselling. Breastfeeding knowledge was higher in mothers who received counselling compared to those who did not. That study was more reliable than other studies assessing effectiveness of antenatal education towards breastfeeding because it included the uniformity of counselled and not counselled groups, which were similar in demographic characteristics, thus enabling more precise comparisons to be made. On the other hand, the study did not say if the Indian culture had any bearing on the decisions made. The authors concluded that the antenatal counselling given during the time of the study was not adequate in the hospital concerned. However, a limitation of this study was that it did not evaluate whether healthcare providers were properly educated in matters related to breastfeeding, so that they are able to deliver proper information to mothers effectively.

2.11. HEALTHCARE PROVIDERS AND BREASTFEEDING

One of the most important factors that influences the initiation and continuation of breastfeeding is the provision (or lack thereof) of proper information and support to the mother during both the antenatal and post natal periods. Various studies have indicated that mothers who get skilled support and advice on breastfeeding tend to have more positive opinions regarding breastfeeding and tend to breastfeed longer (Sikorski, Renfrew, Pindaria, & Wade, 2003; Renfrew, 2006). Interventions aimed to increase the breastfeeding knowledge of healthcare providers have been shown to increase breastfeeding initiation rates (Dyson, McCormi, & Renfrew, 2005), and further skilled support from healthcare providers tends to increase the length of time mothers exclusively breastfeed (Britton, McCormic, Renfrew, Wade, & King, 2007).

On the other hand, when the support and advice given by healthcare providers is not adequate and appropriate, breastfeeding outcomes are negative (Montalto, Borg, Buttigieg-Said, & Clemmer, 2010). On top of that, healthcare providers who do not receive training in breastfeeding counselling are not confident in their ability to support and advise women,

thus they are not able to give proper counselling (Britton, McCormic, Renfrew, Wade, & King, 2007).

2.11.1. Role of healthcare providers

Healthcare providers are believed to greatly influence mothers' decisions to breastfeed and their desire to continue breastfeeding. Studies indicate that the support of healthcare providers can improve breastfeeding initiation and duration rates. Therefore healthcare providers are required to be knowledgeable in matters related to breastfeeding support and management. A study by Kieffer, Novotny, Welch, Mor and Thiele, (1997), indicated that healthcare providers are very influential in terms of women's decisions regarding infant feeding.

However, studies indicate that the majority of healthcare providers are less knowledgeable about breastfeeding than they should be and that they do not give mothers sufficient, correct information and support; sometimes they do not provide it at all. Bernaix (2000), assessed the features of nurses and the factors that enhance their ability to deliver effective information, technical and emotional support to breastfeeding mothers. He found out that the supportive behaviour of nurses was determined by their knowledge regarding breastfeeding and the way they intended to give support. Nurses were found to be deficient in breastfeeding knowledge, thus supportive behaviour was also lacking.

Spear (2004), reported in his study to assess nurses' knowledge and behaviour in promoting breastfeeding that, although nurses were knowledgeable regarding breastfeeding, about a quarter of them indicated that they were not comfortable to observe women breastfeeding in public. Other knowledge gaps observed in this study included some nurses were not sure if the breast milk composition of adolescent mothers is the same as that of adult mothers. The composition of breast milk is the same irrespective of age (Lawrence & Lawrence, 2005). Again Freed et al. (1995), examined a random sample of healthcare providers in different settings. He found out that all providers from different specialties had significant deficits in information on clinical management of breastfeeding and the benefits of breastfeeding. Personal experience of breastfeeding or of a partner breastfeeding was found to strongly influence the confidence of healthcare providers when offering counselling about breastfeeding.

It is also reported that healthcare providers use their personal experience of breastfeeding to advise and support women; those who do not have personal experience usually do not give advice on breastfeeding (Dillaway & Douma, 2004). Many healthcare providers identify personal experience as the most important source of their knowledge regarding breastfeeding (Brodribb, Fallon, Jackson, & Hegney, 2009). Nurses who have breastfed their own children have an emotional connection with mothers who breastfeed and thus they are closer to them than nurses who have never breastfed their own children. This emotional connection influences nurses' positive attitude towards breastfeeding and counselling in general (Dillaway & Douma, 2004).

2.11.2. Obstacles to supporting breastfeeding amongst healthcare providers

Studies in various countries have reported obstacles that discourage healthcare providers from providing support to breastfeeding mothers. These obstacles include a lack of adequate knowledge among healthcare providers (Brodribb, Fallon, Hegney, & O'Brien, 2007a), lack of personal breastfeeding experience (Brodribb, Fallon, Jackson, & Hegney, 2007b), inadequate skills and a lack of time to appropriately advise and counsel mothers (Dillaway & Douma, 2004).

2.11.3. Summary

Breastfeeding is shown to provide both short time and long term benefits to the baby such as reduced morbidity and mortality, increased intellectual and motor development, fewer incidences of chronic diseases and better infant growth and development. Breastfeeding has also been shown to benefit the mothers in a number of ways such as reduction of postpartum bleeding, delaying the return of fertility, helps women return to their pre-pregnancy weight faster and creating a social bond with their babies. In the long term, breastfeeding has been reported to reduce the risk of breast and ovarian cancer to women, and lowers the risk of iron deficiency anaemia. As well as the individual benefits, breastfeeding can produce important economic benefits by lowering direct and indirect expenses. Exclusive breastfeeding is extremely important in developing countries where limited access to clean water increases the risk of diarrhoeal disease if replacement feeding is used, there are high rates of HIV, and issues such as poverty and food insecurity result in a lack of enough nutritious food for children and mothers.

Antenatal breastfeeding education is said to have positive outcomes on breastfeeding because it is believed to influence decisions to initiate and continue breastfeeding. Also healthcare providers are reported to greatly influence mothers' decisions to breastfeed and their desire to continue breastfeeding. However, studies in various countries have reported obstacles that discourage healthcare providers from providing support to breastfeeding mothers which include a lack of adequate knowledge among healthcare providers, inadequate skills and a lack of time to appropriately advise and counsel mothers. Therefore healthcare providers are required to be knowledgeable in matters related to breastfeeding support and management.

CHAPTER 3: METHODOLOGY

Figure 3.1: Mzumbe Health Centre; Waiting area for antenatal clinic and outside appearance



3.1. Aim and Objectives

3.1.1. Aim

The aim of this study was to assess the awareness of exclusive breastfeeding among first time pregnant women attending antenatal clinics and evaluate counselling practices of healthcare providers in two health care facilities in Mvomero district in Tanzania.

3.1.2. Objectives

- To assess knowledge of exclusive breastfeeding among 16+ weeks pregnant women attending antenatal visits
- To determine whether pregnant women intend to exclusively breastfeed their babies until six months of age
- To assess knowledge of exclusive breastfeeding among healthcare providers dealing with pregnant women during antenatal visits

- To explore how well breastfeeding counselling given to pregnant women matches the WHO's recommendations

3.2. Study design

The study design was cross sectional by using questionnaires designed to evaluate exclusive breastfeeding knowledge of mothers and health care providers and also to determine breastfeeding counselling practices of health care providers.

3.3. Setting

The study was conducted in Mvomero district in Morogoro region of East Central Tanzania. Administratively the district is divided into 17 wards. Mvomero is a rural district with a total population of 260,535. It has 45 health facilities which include 3 hospitals, 3 health centres and 39 dispensaries. The study was conducted at antenatal care clinics of two public health facilities in Mvomero district. These are Mzumbe Health Centre (MHC) (Figure 3.1) which is located in a town centre near the main Iringa-Dar es Salaam road. It is easily accessible by tarmac road. A health centre in Tanzania is expected to cater for 50,000 people (TMOHSW, 2003). The second health facility is Tangeni dispensary (Figure 3.2) which is located in a remote area far from the main roads. The dispensary was accessed via a dirt road. A dispensary is expected to cater for between 6,000 and 10,000 people (TMOHSW, 2003). This area was selected because it is within a new district formed from the existing Morogoro rural district a few years ago. Due to this fact, there are very few studies already done in the district and breastfeeding in this group as a district unit of population has not been studied. The selection of the area was also influenced by the working experience of the researcher in the area. So it was easily reached and communication was easy by using Swahili, the national language.

Figure 3.2: Tangeni Dispensary, Morogoro, Tanzania.



3.4. Participants

The study was designed to include two kinds of respondents. First: First time pregnant women in their 16+ week of pregnancy attending antenatal clinics. The study involved a convenience sampling method where any woman available and meeting the inclusion criteria was interviewed by using a questionnaire to assess their knowledge of exclusive breastfeeding. Second: Nurses providing care to pregnant women during antenatal visits. Data were collected between June-July, 2011.

3.4.1. Recruitment of participants

All pregnant women attending antenatal clinics during the days of data collection were approached in the waiting area of the antenatal clinics. Those meeting the study criteria of being first time mothers and above 16 weeks pregnant were explained the purpose of the study verbally, and confidentiality of response was assured. Their questions and concerns were answered and cleared. Those willing to participate gave oral consent. All information about the study such as the purpose, procedure, benefits and alternatives to participate was explained verbally to each woman meeting the inclusion criteria. Participants were given sufficient time to consider whether or not to participate in the study. Those who were willing were required to give verbal agreement "I agree to participate" to participate in the study. Oral consent was obtained because majority of this population are illiterate; that is they are not able to read and write. This is due to children in rural areas in Tanzania lacking the opportunity to attend school following financial difficulties and little or no access to

educational resources (Malale & Materu, 1999). Interviews were conducted privately after their clinic appointments.

All health care providers providing antenatal care were personally approached by the researcher and given information sheets to read about the study. They were given a chance to ask any questions they had concerning the study. Those willing to participate gave written consent.

3.4.2. Participant selection

The inclusion criteria for pregnant women were

- i. First time mothers who were 16+ weeks pregnant attending antenatal clinics. We chose first time mothers in order to eliminate previous breastfeeding experience as a factor in their knowledge of breastfeeding.
- ii. Able to give oral consent.
- iii. Able to conduct an oral interview.
- iv. Willing to participate.

Eligible healthcare providers were those who advise and take care of pregnant women when they come in for antenatal clinics.

3.4.3. Participant exclusion

Pregnant women were excluded if they were less than 16 weeks pregnant and if they possess a clinical or medical educational background or work experience. This is because we wanted to eliminate the influence of education and work experience which could be a source of bias in their breastfeeding knowledge.

3.4.4. Sample size

A convenience sample of eighty pregnant women based on the time and funds available to conduct the study was included. Forty mothers were interviewed from each health facility. This target number for each health facility was pre-determined based on past attendance records where the Health Centre receives an average of 5-6 first time mothers daily and the dispensary receives an average of 3-5 first time mothers each day for the 5 working days.

Six out of eight nurses providing antenatal services in the two health facilities were included. Four of these were from Mzumbe health centre and two from Tangeni dispensary. The

other two nurses from Tangeni dispensary declined to participate. One nurse said she will be on annual leave during the time for data collection and the other one did not give any reasons for declining. These were chosen because in Tanzania, nurses are the main providers of antenatal and delivery care in all health facilities. These consist of nurses who have been trained at various levels of the health system for at least two to four years in maternal and child health aiding, nursing and midwifery care.

3.5. Ethical approval

This study was reviewed and approved by the Massey University Human Ethics Committee: Northern, Application 11/018. Doctor Ralph Bathurst, Chair, Massey University Human Ethics Committee: Northern, telephone 094140800 extension 9539, email: humanethicsnorth@massey.ac.nz. Confidentiality of participants was ensured by assigning identification numbers for each participant. No harm to participants was envisioned and any discomfort during interview was minimised by the researcher. The purpose of the study was explained verbally to the pregnant women, most of whom were illiterate, and oral consent was obtained before any data was collected. Nurse participants read an information sheet (Appendix 1) and signed a consent form (Appendix 2) before responding to the self-administered questionnaire. All participants were informed that participation was optional and that they had a right to decline to answer any particular question. Also approval to conduct the study from the healthcare facilities was obtained from the Morogoro Regional Medical Office. A research permit (Appendix 3) was issued which introduced the researcher to the administration of the health facilities.

3.6. Data collection

3.6.1. Questionnaire development

Two questionnaires were developed for collecting the data of the study. One questionnaire was developed to determine pregnant women's knowledge of breastfeeding and future intentions to breastfeed and the other to determine the current practices and breastfeeding knowledge of nurses providing antenatal care. Questions were formulated based on WHO breastfeeding recommendations, study instruments used in similar and previous research and published literature of studies on breastfeeding knowledge, attitudes and practices.

i. The Breastfeeding Knowledge Questionnaire for Pregnant Women (BKQPW)

A literature review was performed in January to March 2011 using PubMed to identify potentially relevant articles on exclusive breastfeeding and specifically any research which addressed mothers' intentions to breast feed, knowledge of breast feeding, questionnaire based research addressing breast feeding practices and current recommendations for breast feeding. Databases were originally searched for abstracts using combinations of the following key words: 'breastfeeding', 'knowledge', 'women and attitude', 'exclusive breastfeeding' 'early infant feeding' and 'pre-lacteal feeds'. Full text articles in English which contained the search items were retrieved and reviewed as to their relevance for supporting the development of this questionnaire. Reference lists in key articles were also used as a guide to search for other similar articles. In addition WHO recommendations for exclusive breast feeding (WHO, 2001b; WHO/UNICEF, 2003), and the TDHS methodology were reviewed. Google Scholar was also used as a search engine as potential sources of relevant information may not have been published, and in order to obtain specific breastfeeding practices in Tanzania (which the researcher has personal experience with) and also reported in others studies such as giving pre-lacteal feeds, early introduction of solid foods and water supplementation (Shirima et al., 2000; Shirima et al., 2001; NBS & ORC Macro, 2005). After an extensive review of the current available evidence, research and survey findings, the methodology used to obtain these results were considered for their relevance to Tanzania. Questions in the BKQPW were developed based on the findings from previous research (Hanif et al., 2010; Ekambaram, Bhat, & Ahamed, 2010), the TDHS (NBS & ICF Macro, 2010), some questions were adapted from similar research (Ismail & Sulaiman, 2010), and questions were also designed based on the WHO breastfeeding recommendations (WHO, 2001b).

In order to make sure that respondents interpret questions in the same way intended, the final English- version of the BKQPW was translated into and administered in Swahili, the national language of Tanzania. The translation was done by the researcher herself. The translated BKQPW was pre-tested on six pregnant women attending MCH clinics at Mzumbe health centre to ensure that questions are worded clearly. Feedback from the pre-testing was incorporated and changes were made to the questionnaire. The changes made included changing the inclusion criteria of pregnant women to be 16 weeks and above gestational

age instead of third trimester. This was done in order to incorporate more women in the study because first time pregnant women in third trimester attending antenatal visits were fewer than expected.

The 48 item BKQPW (appendix six) consisted of four parts:

Demographic characteristics. In order to determine if there are any factors that influence women's knowledge of breastfeeding, these included the level of literacy, highest education level, occupation and family monthly income.

History of pregnancy. In order to examine if any relationships exist between pregnancy factors and breastfeeding knowledge, this part contained five questions to identify characteristics in the areas of: If a woman had ever been pregnant before this pregnancy, gestational age, gestational age at first attendance to antenatal clinic visits and how many times a woman had attended antenatal clinics during the period of data collection. Some of these questions such as 'what was the gestational age when you first attended antenatal clinic during this pregnancy' and 'how many times did you receive antenatal care during this pregnancy' were adapted from the questionnaire used in the current TDHS (NBS & ORC Macro, 2010).

Breastfeeding knowledge. From the literature review various factors were identified as important knowledge and practices associated with exclusive breastfeeding such as colostrum and initiation of breastfeeding, duration of breastfeeding, practical aspects of breastfeeding, effective breastfeeding, advantages to baby and mother, and breastfeeding problems (Shirima et al., 2000; Hanif et al., 2010; Ismail & Sulaiman, 2010). This section contained 34 items intended to assess women's knowledge of the above breastfeeding factors.

Additional questions such as 'how often should a baby be breastfed', 'how soon after delivery should the baby be put on the breast if the delivery is normal and the mother and baby are fine?' and 'what should be given to a baby immediately after a safe delivery?' were formulated based on the WHO breastfeeding recommendations (WHO, 2001b; WHO/UNICEF, 2003). There were additional questions which asked women whether breastfeeding should continue during certain circumstances such as 'maternal and child illnesses and menstruation'. These questions were adapted and modified from previous

research by Ekambaram, Bhat and Ahamed (2010), and others such as during 'pregnancy, HIV infection and alcohol consumption' were designed based on the WHO breastfeeding recommendations (WHO, 2001b; WHO/UNICEF, 2003). As one of the objectives of the study was to determine women's knowledge of breastfeeding, questions in this section were all closed ended in order to obtain more specific information with similar meaning on women's knowledge and be able to interpret it correctly. A mixture of 'yes', 'no' or 'does not know' responses, multiple response questions and Likert scale questions ranging from one to five with one being 'strongly agree' and five being 'strongly disagree' were used.

Future intentions to breastfeed. Another objective was to determine whether women intended to breastfeed their babies until six months of age, this section intended to assess mothers' plans, intentions to breastfeed, age of introducing solid foods and stopping breastfeeding altogether. These questions such as 'do you intend to breastfeed? If 'yes' for how long? and if 'no' what are the reasons for not intending to do so', 'when do they intend to introduce solids to their babies' and 'reasons for introducing solids at particular age mentioned' were largely based on the WHO breastfeeding recommendations (WHO, 2001b; WHO/UNICEF, 2003). This section contained five questions; three of them were open-ended which allowed mothers to express their ideas more openly and honestly.

ii. Breastfeeding Knowledge and Counselling Practices Questionnaire for Nurses (BKCPQN)

A literature review was performed in January to March 2011 using PubMed to identify potentially relevant articles on exclusive breastfeeding and specifically any research which addressed healthcare providers' knowledge of breastfeeding, and their attitude and practices of breastfeeding counselling, questionnaire based research addressing breastfeeding counselling practices of healthcare providers and current recommendations for breastfeeding. Databases were originally searched for abstracts using combinations of the following key words: 'breastfeeding', 'knowledge', 'practices', 'counselling', 'healthcare providers', 'recommendations', and 'antenatal clinics'. Full text articles in English which contained the search items were retrieved and reviewed as for their relevance for supporting the development of this questionnaire. Reference lists in key articles were also used as a guide to search for similar articles. In addition, WHO breastfeeding recommendations for exclusive breastfeeding (WHO, 2001b; WHO/UNICEF, 2003), were

reviewed. As potential sources of relevant information may not have been published, and in order to obtain local, country specific and older references, Google Scholar search engine was also used. After an extensive review of the current available evidence, research and survey findings, the methodologies used to obtain these results were considered for their relevance to Tanzania. In order to ensure that contents were measuring the concepts intended, round table discussions were held with experts in the field of questionnaire design and maternal and infant nutrition to discuss the relevance of questions and study design to Tanzania.

Questions in the BKCPQN were developed based on the findings from previous research and study instruments used in similar and previous research (Freed, et al., 1995; Cantrill, Creedy, & Cooke, 2003), and other questions were also designed based on the WHO breastfeeding recommendations (WHO, 2001b; WHO/UNICEF, 2003). Freed et al. (1995) and Cantrill et al. (2003), developed breastfeeding knowledge questionnaires to assess general attitudes and knowledge of breastfeeding among health professionals. Some items from these questionnaires were modified to suit the Tanzanian context and used to assess knowledge and practices of nurses.

The questionnaire was pre-tested on one nurse providing antenatal care at Tangeni dispensary to ensure that questions are worded clearly. This nurse was not among the six nurses who took part in the study. Feedback from the pre-testing was incorporated and few changes were made to the questionnaire including reformulating questions that appeared to be unclear, language editing and amending some questions to suit the situation of nurses in Tanzania.

The 46 item BKCPQN (appendix five) consisted of four parts:

Demographic characteristics. (gender, highest education attained, nursing category, whether they had children; if 'yes' whether their children were breastfed). These were included in order to determine if such factors may influence nurses' knowledge and practices.

Breastfeeding education. This section contained ten questions aimed to obtain background education characteristics of nurses such as where they obtained their qualifications, sources of their breastfeeding knowledge, if they had received any training in breastfeeding

counselling, length of training if any and topics covered during the training. This could help to determine the contribution of education and training on the knowledge and practices of breastfeeding counselling. These questions were largely based on those asked by Freed et al. (1995), however, they were adapted to the Tanzanian context.

Practices of breastfeeding counselling. One of the main objectives of the study was to determine breastfeeding counselling practices of nurses during antenatal visits. In order to examine how and which information regarding breastfeeding is given to pregnant women, this part contained 18 questions to assess various aspects of practices of breastfeeding information conveyed. These were measured using a mixture of 'yes', 'no' or 'does not know' responses, multiple response questions, open-ended questions and pictures requiring them to identify correct positioning of an infant to the breast. These questions were largely based on the WHO breastfeeding recommendations (WHO, 2001b; WHO/UNICEF, 2003). For some other items, nurses were asked to check as many options as applied. The "Check all that apply" questions collected information on advice that nurses would give if; a woman develops mastitis, complains of breast milk insufficiency and sore nipples, and symptoms which could indicate signs of poor attachment of the baby to the breast. These questions were adapted and modified from the breastfeeding questionnaire developed by Freed et al., (1995).

Breastfeeding knowledge. From the literature review various factors were identified as important knowledge and practices associated with exclusive breastfeeding such as importance of colostrum, initiation and duration of breastfeeding, health benefits of breastfeeding to the baby and the mother and breastfeeding problems and in special situations (Freed et al., 1995; Cantrill et al., 2003). In order to assess nurses' knowledge of the above breastfeeding factors, 11 questions measured in Likert scale ranging from one to five with one being 'strongly agree' and five being 'strongly disagree' were adapted from Freed et al. (1995), modified to meet the Tanzanian context and included in the questionnaire. In addition, seven questions were used to investigate knowledge related to the advice the nurses would give in certain breastfeeding situations. Respondents indicated 'yes', 'no' or 'do not know' as to whether they would advise a woman to stop breastfeeding in these different situations. This part of the questionnaire was largely based on the

breastfeeding questionnaires by Cantrill et al. (2003), and Freed et al. (1995). Two more multiple response questions were included asking what advice the nurse would give in a situation where the mother perceived that her baby is getting insufficient breast milk and if she develops mastitis.

3.6.2. Interviews

Pregnant women were interviewed by using a structured questionnaire to assess their knowledge in areas of breastfeeding such as: Importance of colostrum and initiation of breastfeeding, duration of feeding, practical aspects of breastfeeding, effective feeding, advantages to the baby and the mother, breastfeeding problems and future intentions to breastfeed. The questionnaire also included socio-demographic characteristics of the group. Knowledge about breastfeeding was measured by asking participants a series of questions on the above areas to capture their acquaintance with the mechanics and benefits of exclusive breastfeeding. Questions also were designed to determine maternal knowledge level about benefits of colostrum. The researcher administered the questionnaire to each woman in a private room after their clinic appointments by asking each question and recording answers as given. The researcher answered any questions which the respondents asked about the questions to ensure that they fully understood the question.

3.6.3. Nurses self-administered BKCPQ

The nurses completed a self-administered questionnaire to assess their knowledge in breastfeeding and practices of breastfeeding counselling. The use of a self-administered questionnaire was considered the most effective way of collecting data from the nurses because it minimises disruption to their clinical practices. The questionnaires were collected and returned from the office of the head nurse in a special tray put aside specially for this purpose in order to observe confidentiality of the participants. In addition, nurses were asked to identify a correct picture indicating positioning and attachment of infants to the breast.

3.7. Statistical analysis

Data were analysed using SPSS package version 17 (SPSS Inc., Chicago, IL, USA).

Questionnaire results were numerically coded for questions which involved multiple sections. All variables were tested for normality using the Kolmogorov-Smirnov and Shapiro-

Wilk tests and homogeneity using the Levene test. All variables were categorical and were described by using the frequencies and percentages. Pearson's chi square was used to assess the differences in breastfeeding knowledge between the clinic groups. Spearman's correlation coefficients were calculated for non-parametric data to assess the relationships between demographic and knowledge variables.

The main outcomes to be defined were:

- Frequency of correct answers for basic exclusive breastfeeding knowledge among pregnant women and their nurses
- Breastfeeding counselling practices of nurses in relation to WHO recommendations
- Whether women intend to breastfeed their babies exclusively for six months
- Age that most women intend to introduce solid foods
- Age that most women intend to end breastfeeding altogether
- Most common reasons for introducing solids at a particular age

3.8. Dissemination of results

Research subjects and the general public will be given verbal information on the results of the study at the Mother and Child Health Clinics where data collection took place.

A summary of the results will be published in a peer reviewed journal and also presented at a nutrition workshop by the Tanzania Ministry of Health.

CHAPTER 4: RESULTS

4.1. Characteristics of women

The main characteristics of participating women are shown in Table 4.1.

Table 4.1: Characteristics of women (n=80)

Characteristics	n (%)
Literacy level	
Not able to read and write	25 (31.2)
Can read and write to some extent	24 (30.0)
Can read and write	31 (38.8)
Education level	
No formal education	25 (31.2)
Standard 1-4	12 (15.0)
Standard 5-7	15 (18.8)
Secondary school	12 (15.0)
High school	5 (6.2)
Certificate level	7 (8.8)
Diploma level	2 (2.5)
University level	2 (2.5)
Occupation	
Housewife	18 (22.5)
Casual worker	36 (45.0)
Formally employed	11 (13.8)
Self employed	15 (18.8)
Family monthly income	
< 100,000 Tshs	44 (55.0)
100,000-300,000 Tshs	27 (33.8)
400,000-500,000 Tshs	5 (6.2)
> 500,000 Tshs	3 (3.8)
Stage of pregnancy	
16-20 weeks	18 (22.5)
21-25 weeks	11 (13.8)
26-30 weeks	25 (31.2)
31-35 weeks	10 (12.5)
36-40 weeks	16 (20.0)
Started antenatal clinic	
At 6-10 weeks	6 (7.5)
At 11=15 weeks	20 (25)
At 16-20 weeks	49 (61.2)
At 21-25 weeks	5 (6.2)
How many times have attended AC during this pregnancy	
Once	20 (25)
Twice	26 (32.5)
Thrice	17 (21.2)
Four times	17 (21.2)
Where plan to have delivery	
Hospital	99 (98.75)
Home	1 (1.25)

Tshs= Tanzanian Shillings (100,000 Tshs≈ 61 USD), AC= Antenatal Clinic

4.2. Characteristics of Nurses

Six nurses participated in this study. All nurses were female and had breastfed children of their own. The majority were public health nurses (66.7%). Half of them had reached Diploma level as their highest education level. Summary of the nurses' characteristics are indicated in Table 4.2.

Table 4.2: Demographic characteristics of Nurses (n=6)

Characteristics	n (%)
Education level	
Secondary school	1 (16.7)
High school	1 (16.7)
Diploma	3 (50)
Nursing category	
Nursing Officer	1 (16.7)
Public health nurse	4 (66.7)
MCH aider	1 (16.7)
Have children <input type="checkbox"/>	6 (100)
Own children breastfed	6 (100)

*All the nurses were female and had children of their own; MCH= Maternal and Child Health

4.3. Frequency of women's responses to breastfeeding knowledge questions

Frequency counts for all variables in the breastfeeding knowledge questionnaire for pregnant women were obtained.

4.3.1. Colostrum and initiation of breastfeeding

Although the majority of women (58.8%) knew that immediately after birth a baby should only be given breast milk, there was a high percentage of the mothers (37.5%) who believed that babies should be given glucose water and 3.8% who did not know what a baby should be given immediately after delivery. When asked about how soon a baby should be put to breast after delivery, 52.8% knew that it is within 1 hour after delivery. The majority of the women (63.8%) said colostrum was important and among these 33.8% said colostrum is important because it provides babies with protection against infection and illness.

4.3.2. Duration of breastfeeding

More than half of pregnant women (57.5%) knew that a baby should be breastfed on demand. Only 28.8% were aware that breast milk alone is sufficient for the baby for six months while 41.3% thought 4-5 months is the appropriate age to start solid foods. About 93.8% of the women were aware that breastfeeding should be continued up to two years. More than half of women (52.5%) believed that it is right to give water to a baby after every breastfeed. Women's responses regarding the duration of breastfeeding are summarised in Table 4.3.

4.3.3. Introduction of solids

When asked when they intend to introduce solid foods 35% said 4 months, 25% said 3 months, 23.8% said six months, 12.5% said 5 months, 2.5% said 2 months and 1.2 % said they will introduce solids at less than 1 month. Reasons given for introducing solids at the mentioned age included; baby will be old enough to start solids (55%), baby will be hungry (32.5%), advised by the MCH nurse (7.5%), advised by relatives and friends (2.5%) and that's the age their mother introduced solids to them (2.5%).

4.3.4. Advantages of breastfeeding to mother and baby

Women's responses to questions of knowledge of advantages of breastfeeding both to the mother and the baby were assessed through a 5-point Likert scale ranging from 'strongly agree' to 'strongly disagree'. Although the majority of women were neutral (Neither agree nor disagree) to many of the question aspects such as 'breastfeeding helps to stimulate uterine contraction' (72.5%), the majority agreed that 'babies sleep well after they receive adequate breastfeeding' (97.5%) and 'babies will gain weight if they receive effective breastfeeding' (97.5%). Also, 85% agreed that 'a baby who received breastfeeding is less prone to get diarrhoea'. All responses are shown in Table 4.4.

Table 4.3: Women’s responses on questions about duration of breastfeeding (n=80)

Questions asked	Response	n (%)
How often should a baby be breastfed?	On demand	46 (57.5)
	By routine	3 (3.8)
	Does not know	31 (38.8)
How long do you think breast milk alone without even water is sufficient for the baby?	2 Months	5 (6.3)
	3 Months	17 (21.3)
	4 Months	18 (22.5)
	5 Months	4 (5)
	6 Months	23 (28.8)
	Does not know	13 (16.3)
What age is appropriate to start giving solid foods to a baby?	Between 2-3 months	16 (20)
	Between 4-5 months	33 (41.3)
	6 Months	25 (31.3)
	Does not know	6 (7.5)
Baby should be allowed to breastfeed for at least 10–20 minutes for each feeding	Yes	12 (15)
	No	34 (42.5)
	Does not know	34 (42.5)
Do you intend to give your baby formula milk in the first 6 months of life?	Yes	5 (6.3)
	No	75 (93.8)
Breastfeeding should be continued up to 2 years even though the baby has received solid food	True	75 (93.8)
	False	5 (6.3)
Mothers may mix breastfeeding and formula feeding once baby starts taking solid food	True	35 (43.8)
	False	45 (56.3)
Giving water to baby is encouraged after every breastfeeding	True	42(52.5)
	False	38 (47.5)

Table 4.4: Frequency of women’s responses to questions regarding advantages of breastfeeding to mother and baby and effective breastfeeding (n=80)

Questions asked	*Agree n (%)	Neither agree nor disagree n (%)	*Disagree n (%)
Breastfeeding reduces the risk of lung infection among babies	23 (28.7)	47 (58.8)	10 (12.5)
Baby who received breastfeeding is less prone to get diarrhoea	68 (85)	10 (12.5)	2 (2.5)
Breast milk provides baby with more protection from allergy compared to formula milk	53 (66.2)	26 (32.5)	1 (1.2)
Breastfeeding causes good development of baby’s teeth and gum	36 (45)	39 (48.5)	5 (6.2)
Breastfeeding is beneficial for the mother	68 (85)	12 (15)	0 (0)
Exclusive breastfeeding is beneficial in spacing birth	64 (80)	16 (20)	0 (0)
Breastfeeding helps to stimulate uterine contraction	7 (8.8)	58 (72.5)	15 (18.8)
Mothers who practiced breastfeeding may achieve pre-pregnancy weight faster	20 (25)	58 (72.5)	2 (2.5)
Mother who practiced breastfeeding is less likely to experience breast problems	38 (47.4)	15 (18.8)	27 (33.8)
Babies will gain weight if they receive effective breastfeeding	78 (97.5)	2 (2.5)	0 (0)
Correct positioning helps to achieve effective breastfeeding	41 (51.2)	38 (47.5)	1 (1.2)
Babies sleep well after they receive adequate breastfeeding	78 (97.5)	2 (2.5)	0 (0)

*Strongly agree’ and ‘agree’ were combined, and ‘strongly disagree’ and ‘disagree’ were combined

4.3.5. Breastfeeding problems and future intention to breastfeed

The people most frequently mentioned to help with problems related to breastfeeding were other family members (33.8%), mother (31.2%), MCH nurse (27.5%), friends (6.2%) and husband or partner (1.2%). When asked about their future intentions to breastfeed (93.8%) said 'yes'. Of those who intended to breastfeed 66.2% intended to do so for 1-2 years, 28.8% for 7-12 months. Those who did not intend to breastfeed (3.8%) claimed to have health problems that did not allow them to do so and 1.2% said their relatives never breastfed because they had no milk so they assume the same will happen to them.

4.3.6. Breastfeeding in certain circumstances

The majority (77.5%) of the women knew that breastfeeding should continue during maternal illness. All women were aware that breastfeeding should continue during menstruation and child illness. All responses concerning breastfeeding in certain situations are presented in Table 4.5.

Table 4.5: Responses given by women on questions about breastfeeding in certain circumstances (n=80)

Questions asked	Responses	n (%)
In your opinion, should breastfeeding continue during:		
Pregnancy	Yes	29 (36.3)
	No	31 (38.8)
	Does not know	20 (25)
Maternal sickness	Yes	62 (77.5)
	No	10 (12.5)
	Does not know	8 (10)
Child sickness	Yes	80 (100)
Menstruation	Yes	80 (100)
Mother on medication	Yes	29 (36.3)
	No	29 (36.3)
	Does not know	22 (27.5)
HIV infected	Yes	27 (33.8)
	No	40 (50)
	Does not know	13 (16.3)
Alcohol drinking	Yes	36 (45)
	No	26 (32.5)
	Does not know	18 (22.5)

4.3.7. Sources of information and support regarding breastfeeding

More than half of women (65%) had received support and information regarding breastfeeding from various sources. Of these, 22.5% received this information from their mothers and 35% preferred other family members for support regarding breastfeeding. All responses are presented in table 4.6

Table 4.6: Sources of information and support regarding breastfeeding (n=80)

Questions asked	Response	n (%)
Has anyone else given you support and information regarding breastfeeding?	Yes	52 (65)
	No	28 (35)
Who gave you support and information regarding breastfeeding?	Mother	18 (22.5)
	Grandmother	17 (21.3)
	Mother in law	14 (17.5)
	Friends	1 (1.3)
	Relatives	2 (2.5)
Where else would you go for support regarding breastfeeding	Not applicable	28 (35)
	Husband or partner	11 (13.8)
	Mother	12 (15)
	Other family member	28 (35)
	Friends	10 (12.5)
MCH Nurse	19 (23.8)	

4.4. Frequencies of nurses' responses to breastfeeding knowledge and practices questions

A total of six nurses out of eight who provide antenatal care in these facilities participated in the study, four from the Mzumbe health Centre and two from Tangeni dispensary. The other two from Tangeni dispensary declined to participate.

4.4.1. Breastfeeding education

Half of the nurses obtained their nursing qualification from Muhimbili Medical College which is the largest in the country; the remaining three obtained their qualifications from other colleges which include Nkinga nursing college, KCMC medical college and Massana College of nursing. When asked about sources of their breastfeeding knowledge, two nurses said it was from feeding their own children, two said clinical experience and the remaining two mentioned personal reading. The nurses indicated a deficit in breastfeeding training, for example only one nurse had undergone training in matters related to breastfeeding, and the rest had never undergone any training regarding breastfeeding. The nurse who received training regarding breastfeeding indicated that it lasted for one week and it was provided by the Tanzania Food and Nutrition Centre (TFNC).

Regarding breastfeeding recommendations, all six nurses were aware of the recommendations on exclusive breastfeeding for six months and the use of bottles, teats and pacifiers. Only 3 nurses knew the recommendation for demand breastfeeding. When asked if they educate mothers about these breastfeeding recommendations, only 2 nurses said 'yes'.

4.4.2. Counselling behaviour in line with WHO breastfeeding recommendations

When asked if they discuss importance of colostrum with pregnant women all nurses said 'no'. Responses to other questions regarding counselling about breastfeeding recommendations are presented in Table 4.7.

Table 4.7: Frequency responses of nurses regarding knowledge of WHO breastfeeding recommendations (n=6)

Questions asked	Responses	n
How long do you recommend mothers to exclusively breastfeed	4 months	3
	6 months	3
Why recommend exclusive breastfeeding until that age	To help the digestive system mature	3
	Allow body receive greater protection from illnesses	2
	Helps protect baby from iron deficiency	1
At what age do you recommend to start solid foods	4 months	3
	6 months	3
Why do you recommend this age for starting solids	Digestive system is mature to handle solids	2
	Baby is able to sit up thus feed comfortably	2
	Baby will have teeth to chew	1
	Missing data	1
Identification of correct latching on form pictures	Correct	2
	Incorrect	4
Demonstrates correct positioning and attachment to breast*	Never	6
Advise against pacifier use*	Yes	6
What advice do you give to HIV+ mothers regarding breastfeeding and feeding	Exclusive breastfeeding followed by early cessation	4
	Infant replacement feeding with home prepared formula	2

*All nurses had never demonstrated positioning and attachment to the breast. All nurses advised against the use of pacifiers

4.4.3. Breastfeeding knowledge

Nurses indicated high knowledge on breastfeeding during certain circumstances that may affect breastfeeding. For example when asked whether breastfeeding should continue during maternal and child illness and menstruation, all of them said 'yes'. However, nurses did not have enough knowledge on other breastfeeding scenarios; for example when asked if breastfeeding should continue when the mother is on medication and during alcohol drinking only one nurse said 'yes'. Regarding if women should continue breastfeeding during pregnancy 5 nurses said 'yes', when a mother is HIV infected 2 nurses said she should continue breastfeeding, 2 nurses said she should not continue to breastfeed and the remaining 2 did not know whether a HIV positive mother should breastfeed or not.

Other questions about nurses' breastfeeding knowledge were asked in the form of a 5-point Likert scale ranging from 'strongly agree' to 'strongly disagree'. Results are summarised in Table 4.8. All the nurses agreed that breast milk is the ideal food for the baby. Participants indicated different levels of knowledge when asked whether mixing breastfeeding with formula feeding reduces breast milk supply, 2 agreed, 2 were neutral and 2 disagreed with this statement.

Table 4.8: Nurses' responses to questions regarding breastfeeding knowledge (n=6)

Questions asked	Agree n	Neither agree nor disagree n	Disagree n	Missing
Breast milk is the ideal food for babies	6	0	0	-
Exclusive breastfeeding provides all nutrition up to six months except vitamin D	6	0	0	-
Exclusive breastfed babies have fewer infections compared to formula fed babies	5	1	0	-
Breastfeeding is beneficial to a mother's health	6	0	0	-
Breastfeeding provides health benefits for infants that cannot be provided by formula	2	1	2	1
Supplementing breastfeeding with formula feeding in first two weeks is a cause of breastfeeding failure	1	5	0	-
Growth patterns of breastfed infants differ from those of formula fed infants	5	1	0	-
Development of sore nipples is a normal part of breastfeeding	0	1	5	-
Breast milk alone is enough for approximately six months	6	0	0	-
A breastfeeding woman is less likely to become pregnant 3 months after delivery than a formula feeding woman	6	0	0	-
Mixing breastfeeding with formula feeding reduces breast milk supply	2	2	2	-

4.4.4. Practices of breastfeeding counselling

All the 6 nurses agreed that counselling by healthcare providers is effective in encouraging more women to breastfeed and were aware that a baby should be put to the breast within the first hour after delivery. When asked if they counsel pregnant women about exclusive breastfeeding, 3 nurses said 'yes' and that they do it 'sometimes'. For those who said they counsel about exclusive breastfeeding indicated covering topics summarized in Table 4.9.

Table 4.9: Frequency responses of nurses regarding practices of breastfeeding counselling (n=6)

Questions asked	Yes n	No n	Not applicable n
Discuss importance of colostrum with pregnant women	2	1	3
Discuss initiation of breastfeeding with pregnant women	1	2	3
Discuss duration of breastfeeding	1	2	3
Discuss practical aspects of breastfeeding	0	3	3
Discuss effective feeding	2	1	3
Discuss advantages to baby	2	1	3
Discuss advantages to mother	1	2	3
Discuss breastfeeding problems	0	3	3
Discuss expression of breast milk	3	0	3
Discuss complimentary feeding	3	0	3

Not applicable = Those who said they do not counsel women about breastfeeding

4.4.5. Breastfeeding problems

Regarding options that may help to resolve sore nipples, all the nurses said that seeking expert assistance with positioning and attachment helps resolve sore nipples while 2 nurses thought to stop feeding on the affected side will help resolve problem of sore nipples and 2 said advising mothers to apply breast milk to nipples will help resolve sore nipples. None of the nurses suggested checking symptoms of nipple thrush nor advising mothers to apply lanolin to help resolve sore nipples. When asked about symptoms that could indicate poor attachment to the breast nurses suggested the following; Baby feeding unsettled (4), sore and cracked nipples (5), repeated engorgement (5) and mastitis (3).

On the side of the options to help resolve the problem of breast milk insufficiency, all nurses mentioned increasing frequency of breastfeeding and seeking expert assistance with positioning and attachment. One nurse mentioned advising mothers to drink more fluid will help to resolve breast milk insufficiency. Regarding the advice to be given to women with mastitis 3 nurses said it is better to continue breastfeeding when a woman has mastitis, 3 nurses also said that women with mastitis should stop feeding on the affected side while 2 nurses said women with mastitis should stop feeding altogether.

4.5. COMPARISONS BETWEEN VARIABLES OF BREASTFEEDING KNOWLEDGE AND CLINIC GROUPS

4.5.1. Frequency comparison of breastfeeding knowledge

Pearson's chi square tests were performed to determine whether breastfeeding knowledge aspects were equally perceived between mothers from Mzumbe health centre and mothers from Tangeni dispensary and to determine any associations between responses. Responses differed significantly between the mothers from the two clinics with regards to the variables 'babies gain weight if breastfeed effectively' and 'breastfeeding helps achieve pre-pregnancy weight faster' ($p=0.02$ and $p=0.049$) respectively. Mothers from Tangeni were more likely to agree than mothers from Mzumbe, (Table 4.10). Generally the majority of women from both centres neither agreed nor disagreed to these statements which indicate that they will not be motivated to breastfeed exclusively. No significant differences in responses to all the remaining variables of breastfeeding knowledge were seen between mothers from the two clinics.

Table 4.10: Frequency comparison of significant aspects of breastfeeding knowledge between mothers from Mzumbe (n=40) and mothers from Tangeni (n=40)

Breastfeeding knowledge variable	Agree n (%)	Neither agree nor disagree n (%)	Disagree n (%)	P* value
Babies gain weight if breastfed effectively				0.002**
Mzumbe	6 (15)	29 (72.5)	5 (12.5)	
Tangeni	12 (30)	19 (47.5)	9 (22.5)	
Breastfeeding helps achieve pre-pregnancy weight faster				0.049**
Mzumbe	3 (7.5)	31 (77.5)	6 (15)	
Tangeni	4 (10)	27 (67.5)	9 (22.5)	

*Chi square test indicates differences between mothers from the two clinics in terms of agreements. Values were calculated from categories from agree to disagree.

**Test significant

4.5.2. Breastfeeding in certain circumstances

Table 4.11 indicates frequency comparison of responses of breastfeeding variables in certain circumstances between mothers from Mzumbe and Tangeni mothers. There was a statistically significant difference between clinic group and the variable 'breastfeeding should continue when a mother is on medication' ($p=0.005$). That is more women from Mzumbe would breastfeed less during this situation compared to Tangeni women. No statistics were performed on two variables 'breastfeeding should continue during menstruation and breastfeeding should continue during child illness' because all the nurses answered 'yes'. The rest of the variables regarding breastfeeding in certain circumstances showed no significant differences with clinic group ($p>0.05$).

Table 4.11: Frequency comparisons of significant aspects of breastfeeding knowledge in special situations (n=80)

Breastfeeding knowledge in special situations Mothers were asked whether:	Mothers from Mzumbe		Mothers from Tangeni		P** value
	HC n=40	%	dispensary n=40	%	
Breastfeeding should continue when Mother is on medication					0.005
Yes	13	32.5	16	40	
No	21	52.5	8	20	
Does not know	6	15	16	40	

** Chi-square test

4.5.3. Reasons given for introducing solids at a particular age

Various reasons were given by mothers regarding introducing solids at a particular age and responses did not differ significantly between clinics ($p=0.269$). Majority of women (60% and 50%) from Tangeni and Mzumbe respectively mentioned 'baby will be old enough to start solids' to be their major reason for introducing solids. Advice to do so by the MCH nurse was declared by only 10% of women from Mzumbe and 5% of women from Tangeni.

4.5.4. Age for introduction of solid and ending breastfeeding

Pregnant women mentioned various ages that they plan to introduce solid foods to their babies and when they plan to end breastfeeding altogether. The responses did not differ significantly between the clinics. About 37.5% of women from Mzumbe planned to introduce solids at 4 months and 32% of women from Tangeni planned to do in the same age. Only 22.5% of Mzumbe women planned to introduce solids at the recommended age of six months and 25% of women from Tangeni planned to do the same. Majority of mothers from both clinics planned to end breastfeeding when their children are 1 to 2 years old at 75% and 57.5% for Tangeni and Mzumbe respectively.

4.5.5. Relationships between demographic characteristics and knowledge variables of women

Spearman's rank order correlation was run between level of literacy, highest level of education attained, occupation and monthly family income and various variables of breastfeeding knowledge. The correlation analysis revealed various positive and inverse significant correlations between demographics and knowledge variables. For example, the level of literacy was found to be positively correlated with the variable 'how often a baby should be breastfed' ($R= 0.517$; $P<0.01$). Therefore, knowing how to read and write increased a woman's knowledge of breastfeeding on demand. Highest level of education attained was significantly correlated with the variable 'when mothers intend to introduce solid foods' ($R=0.418$; $P<0.01$). This means that women with higher education of at least secondary school intended to introduce solid foods at a right age of six months. Occupation was positively correlated with 'giving water is encouraged after every breastfeeding' ($R=0.621$; $P=0.039$). That is women who were employed were more likely to continue breastfeeding for longer duration than unemployed women. Monthly family income was inversely correlated with 'how soon should a baby be put on the breast after delivery' ($r=-0.535$; $p=0.025$). Therefore, women with higher family monthly income were more knowledgeable in this variable compared to those with lower income. The correlation coefficients between demographics and breastfeeding knowledge variables are presented in Table 4.12.

Table 4.12: Correlation coefficients (r) between demographic characteristics and knowledge variables of (n=80)

	Level of literacy	Highest level of education attained	Occupation	Monthly family income
How soon should baby be put on breast after delivery	-0.495**	-0.362**	-0.535*	-0.510 **
What to be given to baby immediately after delivery	-0.489**	-0.387**	-0.379**	-0.321 **
Where else would go for support for breastfeeding matters	0.486**	0.365**	0.448**	0.385**
Is there importance of feeding colostrum	-0.295**	-0.190	-0.357**	-0.218
Why colostrum is important	-0.380**	-0.385**	-0.337*	-0.445 **
How often should a baby be breastfed	-0.517**	-0.295**	-0.0334 **	-0.380 **
How long is breast milk alone sufficient	0.188	0.216	0.084	0.255*
Intend to give formula within six months	-0.187	-0.198	-0.237*	0.255*
Appropriate age to start solid foods	0.495**	0.550**	0.481**	0.417 **
Breastfeeding should continue up to 2 years	-0.145	-0.168	-0.089	-0.127
Mother may mix breastfeeding with formula feeding	-0.523**	-0.539	-0.481**	-0.456 **
Giving water is encouraged after every breastfeeding	0.580**	0.594**	0.621*	0.571 **
Baby should be breastfed during the night	-0.112	-0.082	-0.029	0.010
Do you intend to breastfeed the baby to be born	0.102	0.106	0.117	0.015
For how long do you intend to breastfeed	0.182	0.184	0.231*	0.033
Most important people to help with breastfeeding problems	0.546**	0.542**	0.468**	0.488**
When intend to introduce solid food	0.415**	0.418*	0.385**	0.383 **

Spearman's correlation coefficients were calculated for all variables because they were not normally distributed

*Correlation is significant at the 0.01 level (2-tailed)

**Correlation is significant at the 0.05 level (2-tailed)

4.5.6. Summary

The study found out that about 94% of pregnant women intended to breastfeed, 64% were aware that colostrum is important, and 52.8% were aware of the need to initiate breastfeeding within 1 hour after delivery. However, the study also found out that 94% of women had never received breastfeeding counselling from the antenatal clinics, 61% received breastfeeding information from their female relatives, and only 23.8% intended to breastfeed exclusively for six months. On the side of nurses, the study found out that they had satisfactory knowledge of how to solve breastfeeding problems and breastfeeding in special situations. Much of this knowledge appeared to be based on personal and clinical experience. Nurses' knowledge on WHO breastfeeding recommendations was limited. Only one nurse had received training in breastfeeding. Three nurses said they train mothers about exclusive breastfeeding and it is only these three who knew the recommended age for introduction of solid foods. Only two nurses were able to identify a correct picture indicating attachment of the baby to the breast. There were no differences in breastfeeding knowledge between women of Mzumbe and Tangeni. Generally pregnant women and the nurses had limited knowledge in exclusive breastfeeding matters.

CHAPTER 5: DISCUSSION

The aim of the present study was to assess the awareness of exclusive breastfeeding among first time pregnant women attending antenatal clinics and counselling practices of healthcare providers in two health care facilities in Mvomero district in Tanzania. It has been shown that antenatal breastfeeding education as a single intervention improved rates of exclusive breastfeeding up to six months after delivery because it prepares a woman mentally for exclusive breastfeeding (Su et al., 2007). To our knowledge, this is the first study in Tanzania to assess breastfeeding knowledge among first time pregnant women. By targeting the antenatal period which is a critical time for infant feeding decision making, in conjunction with assessing the knowledge and practices of healthcare providers; this study provides information on essential targets for interventions to increase exclusive breastfeeding.

5.1. Characteristics of women

The current study reflected a specific population of generally poor mothers, a substantial proportion with no formal education which is reflective of Mvomero district. The educational characteristics of these women are similar to the Tanzanian population where 50% of women have completed primary education which means they are able to read and write (National Bureau of Statistics [NBS] & ICF MacroSM, 2010). Compared to all the Tanzanian population of women, these pregnant women who took part in the study were slightly better educated (20% vs.16.2% beyond secondary school) (NBS & ICF MacroSM, 2010).

The level of income among the participants was very low with the majority of households earning less than 100,000 Tshs (61 USD) per month. Mvomero is a new rural district with less development and community facilities. Most of the first time pregnant mothers who participated in this study were casual workers, were 21 to 30 weeks pregnant, started antenatal clinics at between 16-20 weeks and planning to have a hospital delivery. More than half (58%) of pregnant women from Morogoro region were reported to have delivered in a health facility (NBS & ICF Macro, 2010), whereas 98% of the women in this study were planning to have a hospital delivery. The reason for this big difference might be because the group studied had not yet given birth. Usually women have to walk or travel long distances to attend maternal services. For a woman in labour pain, it is difficult to walk a long distance

for delivery. Therefore to avoid delivering their children on the way to the clinic, pregnant women opt to deliver their babies at home with the help of traditional birth attendants.

5.2. Characteristics of nurses

Six out of the eight nurses employed to care for pregnant women during antenatal visits from two health facilities in Mvomero district were recruited. According to the past attendance records, these eight nurses (two declined to participate) are responsible for providing antenatal care to approximately 64 pregnant women every day. All the nurses who took part in the study were female. This study is particularly important because it is the first study to our knowledge that has investigated both the breastfeeding knowledge and counselling practices among healthcare providers in Tanzania. Healthcare providers play an important role of informing and educating women about infant feeding. Therefore, assessment of health professional breastfeeding knowledge can help to identify learning deficits, inform the content of breastfeeding education programs and improve practice (Dykes, 2006).

All nurses who took part in the study had breastfed their own children and two nurses mentioned that it was this experience that acted as their major source of breastfeeding knowledge. Relying solely on personal experience as the source of breastfeeding knowledge may influence the range of help and advice that can be given and restrict the range of problem solving strategies able to be offered by healthcare providers (Dillaway & Douma, 2004). This concern is supported by various inaccurate responses to breastfeeding recommendations questions given by nurses in this study which stresses the need for breastfeeding education for nurses who are already in service and for those training in the future.

5.3. FREQUENCIES OF WOMEN'S RESPONSES TO BREASTFEEDING KNOWLEDGE QUESTIONS

Due to very few studies having been done on breastfeeding knowledge during the antenatal period, this discussion is also based on other studies of women who have already given birth. This study provides important information on the breastfeeding knowledge of women in the antenatal period which adds to previous studies on breastfeeding knowledge done in Tanzania which only focused on women who have already given birth. Assessing antenatal

breastfeeding knowledge may be an essential target for good intervention towards promotion of exclusive breastfeeding because it is the time when most women make their decisions about infant feeding. Therefore it prepares a woman mentally for exclusive breastfeeding and motivates the mother to reduce the fears she might have regarding breastfeeding (Chaturvedi & Banait, 2000; Su et al., 2007).

5.3.1. Colostrum and initiation of breastfeeding

Previous studies in Tanzania reported high prevalence of pre-lacteal feeding and discarding of colostrum (Shirima et al., 2000; Shirima et al., 2001; Nkala & Msuya, 2011). However, this study indicates most mothers knew that babies should receive the first milk. There appeared to be different views about the health benefits of colostrum for an infant. About 64% of respondents said that colostrum is important and they knew that colostrum and breast milk was the best food and that only colostrum should be given to the baby immediately after a safe delivery. This positive result could be explained by the positive breastfeeding culture of the Tanzanian women. On the other hand, those who thought colostrum is not important said it is because the first milk is not good for the infant indicating perceptions not in agreement with exclusive breastfeeding recommendations.

Early initiation of breastfeeding is important for the health of the infant and successful establishment and maintenance of breastfeeding. (Mikiel-Kostyra, Mazur, & Boltruszko, 2002). Shirima et al. (2001), reported 84% of rural mothers and 93% of urban mothers in Tanzania initiated breastfeeding within six hours after delivery which reflected their knowledge of the importance of early initiation of breastfeeding. That study did not report the proportion of mothers who initiated breastfeeding within 1 hour after delivery which is recommended by the WHO. A delay in the onset of breastfeeding has been reported to have an increased risk of neonatal mortality (Edmond et al., 2006). In the current study, 52.8% of mothers were aware of the need to initiate breastfeeding within 1 hour of birth. The difference between results of the current study and those of Shirima et al. (2001), could be due to the women in that study being informed either during the antenatal or postnatal period on the benefits of early initiation. The results of this study are encouraging as more than half of the women knew that breastfeeding should be initiated within the first hour of delivery which may predict high rates of initiation of breastfeeding in this population. In this

study, participants had three misconceptions about why babies should not be put to the breast within the first hour: 'there is no milk before then', 'colostrum is not good for the baby' and 'the mother needs to rest after the birth process'. These incorrect ideas could be influenced by tradition and cultural values of this semi-rural population. In order to solve this problem of such misconceptions, educating the public on the current breastfeeding recommendations particularly through breastfeeding campaigns which not only target the mother but the general community and social networks may be useful. This result also supports the need for breastfeeding education during the antenatal period.

5.3.2. Duration of breastfeeding

More than half of the women had the perception that it is good to give water to a baby after every breastfeeding. Shirima et al. (2001), also reported high prevalence of water supplementation in rural and urban areas of Morogoro region. Only 28.8% of pregnant women interviewed were aware that babies less than six months of age should not be given water or anything else to eat or drink, and that breast milk alone is sufficient for the infant until six months of age. The WHO recommends no water supplementation in exclusively breastfed babies (WHO, 2001b). This is because breast milk contains enough average daily fluid requirements for healthy infants which are in the range of 80–100 ml/kg in the first week of life to 140-160 ml/kg between 3-6 months of life (Pan American Health Organization [PAHO]/WHO, 2003), if breastfed exclusively and on demand. The content of breast milk is 88% water and it contains very low amounts of solutes, therefore there is no need of water to flush out the excess solutes (PAHO/WHO, 2003). However, it is recommended to increase children's water consumption through fruit juices and small amounts of boiled water after six months as the types of complementary foods they consume will affect their water needs (PAHO/WHO, 2003). It is possible that this recommendation for older children is extrapolated by these women or they think that breast milk is only food for the baby and not fluid, and this could be the reason why the majority thought giving water to the infant after every breastfeeding is good for the infant. There is sufficient evidence that giving anything other than breast milk interferes with the baby's demand suckling and also increases the prevalence of diarrhoea (Koyanagi et al., 2009). Meanwhile, it has been demonstrated that exclusively breastfed babies do not need water supplements even in hot climate (Sachdev, Drishna, Uri, Satyanarayona, & Kumar,

1991). The WHO recommends continuation of breastfeeding for up to two years and beyond (WHO/UNICEF, 2003). In the current study, women were well aware of the age to stop breastfeeding altogether. About 94% of pregnant women believed that breastfeeding should continue until the child is two years of age. This is a very encouraging result which may mean a long duration of breastfeeding as recommended in this population.

The findings of this study showed that more than half of women knew that babies should be breastfed on demand. Both Shirima et al. (2000), and Shirima et al. (2001), reported results which are similar to those of the current study, that breastfeeding on demand was highly practised in both rural and urban areas of Morogoro region. This practice is in line with the WHO recommendations which emphasize demand feeding (WHO/ UNICEF, 2003).

5.3.3. Introduction of solids

Negative effects of early introduction of solid foods continue to be an important concern for the health of the Tanzanian infants. In this study, only 31.3% of women thought six months is the appropriate age to start giving solid foods. The results from this study are in line with findings from the TDHS (NBS & ICF Macro, 2010), which identified that most babies in Tanzania are not exclusively breastfed for the first six months of life. The lack of knowledge about the recommended age for introduction of solid food among the first time mothers in our sample is probably the major contribution to the large number of women who intended to introduce solid foods at less than six months. Similar results were reported by Shirima et al. (2000), that introduction of solid foods in rural areas was done at a median age of 2 months and 2.5 months in urban areas of Morogoro. This study indicates that the majority of women intend early initiation and long duration of breastfeeding, but very few intend to breastfeed exclusively. Therefore, as an essential target, future interventions in Tanzania must target exclusivity beginning in the antenatal period.

5.3.4. Future intentions to breastfeed

In Tanzania, breastfeeding rates are very high at 94% (NBS & ORC Macro, 2005). This was also reflected in this study where the proportion of pregnant women who intended to breastfeed their babies was high at 93.8%. Although the participants were pregnant women who had not started breastfeeding, their early decision would bring a positive outcome after childbirth. These results are similar to those of a study by Hoyer and Pokorn (1998), which showed that the time of decision to breastfeed, was important to determine the duration of

breastfeeding and that the intention to breastfeed was a good indicator of the actual initiation and duration of breastfeeding. In that study, 77.3% of pregnant women intended to breastfeed. This early choice of women allowed them to have better intellectual and physical preparation. Therefore, targeting education in the antenatal period may be a crucial strategy to increase rates of exclusive breastfeeding.

Although participants in our study viewed breastfeeding as the best nutrition for infants, the majority did not support exclusive breastfeeding, but rather, supplementation of breast milk with water and home-made foods. Only 28.8% of mothers were aware that breast milk is sufficient for the baby for the first six months without addition of any other food or drink. A study by Davies-Adetugbo (1997), reported similar findings after assessing the knowledge and attitudes of breastfeeding in poor, rural communities of Nigeria. Mothers in that study mentioned breastfeeding as the best nutrition for their babies, on the other hand, they did not practice exclusive breastfeeding but rather, supplemented breast milk with other fluids and formula. Similar practices were reported by Shirima et al. (2001), in Tanzania that early introduction of thin porridge was common among mothers in Morogoro region. These practices can lead to reduced breast milk production, early cessation of breastfeeding and bottle feeding (Hill, Humenick, Brennan, & Woolley, 1997).

5.3.5. Advantages of breastfeeding to mother and baby

Mothers in this study did not fully understand all the health benefits of breastfeeding, both to the infant and the mother, suggesting a need to emphasize this information in antenatal breastfeeding education in the population studied. Looking at the knowledge of participants seen in table 4.4, it is shown that as many as 72.5% did not know that 'breastfeeding helps to stimulate uterine contraction' and that 'mothers who practiced breastfeeding may achieve pre-pregnancy weight faster'. If women understand this benefit, it may increase breastfeeding rates as more women will breastfeed in order gain their pre-pregnancy weight quickly (Labbok, 2001), which is fast gaining popularity among Tanzanian young mothers.

Although the majority of the pregnant women knew that breast milk provided the best nutrition for the baby as seen in the results, they were not aware of other benefits such as breastfeeding reduces the risk of lung infection among babies, breastfeeding causes good

development of baby's teeth and gum and that a mother who practiced breastfeeding is less likely to experience breast problems. These gaps in women's knowledge provide an important opportunity to further promote breastfeeding. Shirima et al. (2000), reported that the advantages of breastfeeding mentioned by mothers were only those related to the infant and none to the mother. This reflects another area for stressing breastfeeding education and information to pregnant women. However, majority of women were aware of some advantages as they strongly agreed that babies sleep well after they receive adequate breastfeeding and that babies will gain weight if they receive effective breastfeeding. Women in this study were also aware of some key benefits of breastfeeding such as 'exclusively breastfed babies are less prone to get diarrhoea' (61.2%) and 'exclusive breastfeeding is beneficial in spacing birth'; which would promote a positive attitude towards breastfeeding.

Evidence shows that gaps in mothers' breastfeeding knowledge are not only common in developing countries but also in developed countries. A study done in the United States of America to assess attitudes and beliefs about breastfeeding reported that the greater number of participants was aware of the health benefits of breastfeeding for infants but only one third were aware that there are health benefits for the mother too (Khoury, Hinton, Mitra, Carothers, & Foretich, 2002).

5.3.6. Sources of breastfeeding information and support

More than half (65%) of pregnant women mentioned receiving breastfeeding information from sources other than the MCH nurses. Although health care providers' advice is not the only expected source of information, it is interesting to note that a higher number of the respondents received breastfeeding information from other sources such as their mothers (largest proportion), grandmothers, friends and relatives rather than the physician and the media. This result may be explained by the Tanzania culture that pregnant women are usually supported and taken care of by their mothers, grandmothers or other female relatives, and the way they practice breastfeeding is usually due to the information they receive from such people. Contrary to this finding, a study done in Uganda among antenatal and postnatal women reported health facilities as the major source of breastfeeding information (Petit, 2008). This could be because participants in that study included mothers

who had already given birth who might have been informed about breastfeeding before and after discharge from the hospital.

The finding of this study that the mother was most likely to provide breastfeeding information is contrary to the popular, local belief in other African countries that grandmothers have a very strong influence in providing breastfeeding and infant feeding information (Davies-Adetugbo, 1997; Sear, Mace, & McGregor, 2000; Aubel, Toure, & Diagne, 2004). Also, McLorg and Bryant (1989), reported that grandmothers were the most important advisers on infant-feeding issues in Mexico. The effect of receiving information from people other than healthcare providers was reported by Shirima et al. (2001), who identified that mothers who received breastfeeding information from traditional birth attendants or someone other than healthcare providers reported a shorter duration of exclusive breastfeeding. The fact that more respondents received information about breastfeeding from the family and almost none from other sources provides an important basis for targeting future interventions as education and communication activities on exclusive breastfeeding in Tanzania are only targeting mothers, usually in their antenatal visits during pregnancy or for child health care. Therefore, it would be important that the Tanzanian national strategy on the promotion, protection, and support of breastfeeding contain a component of information, education, and communication activities aimed at these influential family members to improve their knowledge of the need for exclusive breastfeeding in infants up to six months.

Breastfeeding support from the mother's network of relatives, friends and healthcare providers is important for breastfeeding success because it may help to build and support mothers' confidence, improve their feeding technique and solve breastfeeding problems; in this way, encouraging exclusive breastfeeding until six months and increasing breastfeeding duration (Haider, Kabir, Huttly, & Answorth, 2002). In developing countries, this kind of support depends on experience and cultural beliefs of support givers. Therefore, it is important to provide information to the whole community about advantages of exclusive breastfeeding and the need to provide support to breastfeeding mothers. This can be done through public campaigns, focus group discussions and peer counselling. Respondents in our study were asked to identify the most important person they would go to in case they experienced breastfeeding problems. The most frequently identified persons to help with

problems related to breastfeeding in order of importance were other family members, mother, MCH nurse, friends and husband or partner. On the contrary, Shirima et al. (2000), reported the major sources of infant feeding support during problems were healthcare providers and the mother of the maternal side. This difference could possibly be because women in the latter study were informed about feeding issues after delivery thus respondents of the current study had not had a chance to get informed as they were still in their antenatal period. This indicates the importance of communicating infant feeding recommendations and breastfeeding problem solving strategies to women not only during the postnatal period but also during the antenatal period and to healthcare providers and all members of the family involved with pregnant women.

5.3.7. Breastfeeding in certain circumstances

There are certain circumstances that may affect breastfeeding and reduce the rates of early initiation, exclusivity and duration of breastfeeding. The women in this study were asked about some certain circumstances which may affect breastfeeding. The respondents in this study were generally quite knowledgeable about breastfeeding in these circumstances, such as whether breastfeeding should continue during maternal illness, child illness and during menstruation. These were encouraging findings among these first time mothers to be. However, the majority of women did not know whether breastfeeding should continue during alcohol drinking, pregnancy, HIV infection and when the mother is on medication. Similar to these results, Shirima et al. (2001), reported that 84% of mothers from rural areas and 61% from urban areas of Morogoro believed that a woman should stop breastfeeding as soon as she becomes pregnant. This could be due to cultural beliefs surrounding breastfeeding in these populations. Breastfeeding campaigns and education programmes should be more focused on the special conditions where breastfeeding should or should not continue.

To date there have been many studies conducted regarding mothers knowledge of breastfeeding but they did not tackle women's knowledge of alcohol during breastfeeding. However, Jones et al. (2011), found that both midwives and pregnant women were comfortable to discuss the topic but they were not knowledgeable regarding the recommendations and risks associated with alcohol drinking during pregnancy and

breastfeeding. Generally, little is known regarding how women perceive and understand the issue of alcohol consumption while breastfeeding in Tanzania. In the current study, 45% of the respondents were aware that breastfeeding should continue during alcohol drinking. When a breastfeeding mother consumes alcohol, a small amount of alcohol passes freely into her breast milk and passes freely out of breast milk after approximately two hours after alcohol consumption for women of average weight. It is therefore more desirable to breastfeed the infant when no alcohol is remaining in breast milk and blood (WHO, 2001b). However, the WHO recommends avoiding alcohol or at least restricting alcohol consumption (drink occasionally), during lactation (WHO, 2001b).

5.4. FREQUENCIES OF NURSES' RESPONSES TO BREASTFEEDING KNOWLEDGE AND PRACTICES QUESTIONS

Pregnant women's knowledge and intentions about breastfeeding may be influenced by healthcare providers' support and information. Healthcare providers must be responsible for this and should make sure that counselling and practices that support and promote exclusive breastfeeding are accessible to all women (Lumbiganon et al., 2008). The results are discussed in relation to existing literature concerning breastfeeding knowledge and practices of healthcare providers and recommendations for breastfeeding.

5.4.1. Breastfeeding knowledge and counselling behaviour in line with WHO breastfeeding recommendations

These questions surveyed knowledge on major breastfeeding recommendations by the WHO (WHO, 2001b; WHO/UNICEF, 2003). All six nurses involved in the study indicated that they have never demonstrated correct positioning and attachment of the baby to the breast to women during antenatal visits. Also only 2 nurses were able to identify a correct picture demonstrating correct positioning of the baby to the breast. This result was contrary to that of a recent study carried out in South Africa to assess knowledge and practices of nursing staff regarding the BFHI. That study found out that 89% of nurses involved in the study were able to demonstrate the correct positioning of the baby to the breast (Daniels & Jackson, 2011). This difference could be caused by the nurses in the latter study having received training on breastfeeding and infant feeding issues during their time in service to update their knowledge.

However, the results of the current study were similar to a study carried out in Nigeria to assess the knowledge, attitude and practices of health workers in local government facilities regarding BFHI. That study which also involved nurses without prior breastfeeding training indicated that only 5.2% of the nurses were able to demonstrate the correct positioning and attachment of the baby to the breast (Okolo & Ogbonna, 2002). A study which used ultra sound to indicate the way a baby removes milk from the breast indicated that correct positioning and attachment of the baby at the breast is vitally important for the effective transfer of milk and may be the most important measure to prevent a number of breastfeeding problems (Woolridge, 1986). Therefore it is important for healthcare providers providing antenatal care to know this and correctly demonstrate it to the women in order to make those who would otherwise not breastfeed due to breast problems caused by improper attachment breastfeed successfully. Healthcare providers have been believed to be in the appropriate place to promote and support breastfeeding; even so, unavailability of practical instruction and direction of proper breastfeeding technique may have effects on the positive results of breastfeeding, thus training is greatly needed (Leavitt, Martinez, Ortiz, & Garcia, 2009). By gaining suitable knowledge and skills, healthcare providers can help increase the rate of exclusive breastfeeding and the duration of breastfeeding. Staff training together with refresher courses on breastfeeding recommendations should be introduced to all health facilities to enable nurses providing antenatal care to obtain necessary skills and knowledge. The preparation and distribution of pamphlets and posters that contain major breastfeeding recommendations could be taken into consideration.

Three nurses said that they would recommend breastfeeding until four months contradicting the WHO recommendations which require infants to be exclusively breastfed up to six months (WHO/UNICEF, 2003). This could be due to not receiving any training on breastfeeding. These nurses did not know the recommended age for introduction of solid foods. They suggested introducing solid food before six months. Evidence shows that, infants who were exclusively breastfed for six months suffered less from gastrointestinal infections and experienced no growth deficits compared to infants who were exclusively breastfed for less than six months (Kramer & Kakuma, 2002).

All nurses knew the recommendation against the use of pacifiers. Step 9 of the ten steps to successful breastfeeding recommends no use of bottles, teats or pacifiers to enable mothers

to establish and sustain breastfeeding (WHO/UNICEF, 1989). This could be because the use of pacifier is not a common practice in Tanzania.

Although only three nurses said they train mothers about breastfeeding recommendations, all the six nurses recognised that counseling by healthcare providers is effective in encouraging more women to breastfeed. This reflects nurses' personal choice to breastfeed their own children. Other studies also reported the majority of nurses do not train women about breastfeeding but they do recognize the need for practical and emotional support (Ebersold, Murphy, Paterno, Sauvager, & Wright, 2007; Sheehan et al., 2009). The current study found out that only three nurses reported to be counselling pregnant women about breastfeeding and only in response to being asked. Aspects of breastfeeding which were reported to be discussed included the importance of colostrum, effective feeding and advantages of breastfeeding to the baby. These results were consistent with those of other studies that reported that a number of healthcare providers did not have enough breastfeeding knowledge and they were not prepared to give proper breastfeeding counseling to mothers (Amir & Ingram, 2008; Izatt, 1997). Even though these results were expected, they have drawn attention to the need to reinforce the advantages and importance of breastfeeding among healthcare providers.

5.4.2. Breastfeeding problems and certain circumstances

It is important that healthcare providers in health facilities are able to show and inform mothers the right way to manage any problems that they may encounter during breastfeeding. Nurses in this study gave three suggestions for solving the problem of sore nipples, two of them were inappropriate (stop feeding on the affected side and advising mothers to apply breast milk to nipples). The most likely reason for a painful nipple is poor attachment of the baby to breast and another possible reason is breast thrush, in this situation application of an anti-fungal to the breast and examining the baby's mouth for oral thrush would be appropriate responses (WHO/UNICEF, 1993).

Nurses in this study responded well to the question which asked them to state signs of poor attachment of the baby to the breast. Among the reasons that were mentioned by most of the nurses were: baby feeding unsettled, sore and cracked nipples, repeated engorgement and mastitis. With regard to management of breastfeeding for women with mastitis, three

nurses said that women with mastitis should stop feeding on the affected side while two nurses said women with mastitis should stop feeding altogether. This indicated poor knowledge of mastitis management among nurse participants. Even though these nurses are not the ones to look after mothers when they have given birth, this result is a cause for concern. For the appropriate management of mastitis, it is advised that breastfeeding mothers should not give the breast a rest; instead they should continue breastfeeding on demand so that the milk is removed from the breast (Savage-King, 1998).

All nurses were aware that increasing frequency of breast milk feeding and seeking expert assistance with positioning and attachment can solve the problem of breast milk insufficiency and increase lactation. However, one nurse suggested advising mothers to drink more fluid will help to resolve breast milk insufficiency. Gaps in the knowledge regarding ways to solve the problem of breast milk insufficiency have been reported in other studies of breastfeeding mothers (Hannula, Kaunonen, & Tarkka, 2008). Evidence shows that no significant change occurs in the composition and quantity of breast milk when more fluids are taken (Morse, Ewing, Gamble, & Donahue, 1992). All the nurses in this study knew at least two ways to solve the problem of breast milk insufficiency which include increasing the frequency of breastfeeding and seeking expert assistance with positioning and attachment.

Nurses were asked about certain circumstances which may affect breastfeeding. Nurses in this study showed good responses to the majority of these questions such as when asked whether breastfeeding should continue during maternal illness, child illness, menstruation, and during pregnancy. Although only three nurses were currently counselling women on breastfeeding; this might be due to their practical experience in the clinical years. It appears that pregnant women were knowledgeable in the same areas as nurses regarding breastfeeding in special situations which may affect exclusive breastfeeding. However, nurses had insufficient knowledge in areas such as breastfeeding during HIV infection and alcohol drinking; the same deficit as the women they take care of during antenatal visits. All the nurses were aware that breast milk is the ideal food for the infant and that breastfeeding is beneficial to the mother's health.

Another key finding was that the knowledge about supplementation of breast milk with formula was discouraging because five nurses out of six were neutral to the statement that 'supplementing breastfeeding with formula feeding in first two weeks is a cause of breastfeeding failure'. Evidence indicates that, mothers who breastfeed exclusively had significantly greater breastfeeding rates compared to mothers who supplemented breast milk with formula and other types of milk (Hill et al., 1997). Our finding that the majority (5 nurses) were not aware that supplementing breastfeeding with formula feeding in first two weeks is a cause of breastfeeding failure is consistent with a previous study (Freed et al., 1995).

5.4.3. Breastfeeding education

The major sources of breastfeeding knowledge reported by nurses were gained from clinical experience, breastfeeding their own children and personal reading. The reason for this could be because there is no internal, routine training of healthcare providers in health facilities. A study carried out in Australia showed similar findings where doctors reported personal experience as their major source of breastfeeding knowledge (Brodrigg et al., 2009). The nurses indicated lack of formal training, only one nurse had undergone training in breastfeeding, and the rest had never undergone formal training on breastfeeding after graduation. Initial training could be a good source of breastfeeding information to the nurses. This result is contrary to the requirement of the Baby Friendly Hospital Initiative (BFHI). Both facilities involved in this study are declared 'baby friendly'. The BFHI policy requires breastfeeding education courses to be provided for all nurses and other healthcare providers. Healthcare providers can be at risk of being a negative influence, especially when they give women incorrect, unsatisfactory and contradictory breastfeeding information and recommendations (Nelson, 2006). The lack of on-going training for nurses dealing with pregnant women indicated a gap which requires to be looked at by the health facilities. The findings of this study were similar to a previous study that healthcare providers and nurses were not knowledgeable enough to provide breastfeeding counselling to women (Freed et al., 1995).

In other countries, provision of education and training regarding breastfeeding in the form of programs was reported to be successful to improve the knowledge and practices of healthcare providers and to promote breastfeeding (Kronborg, Vaeth, Olsen, & Harder,

2008). This study supports the need for healthcare providers to acquire more knowledge regarding breastfeeding and to improve their education in order to be able to encourage exclusive breastfeeding for women during pregnancy. Educating women on breastfeeding during pregnancy helps to prepare them mentally to do so and has been shown to increase rates of exclusive breastfeeding (Su et al., 2007).

The findings of this study indicated inadequate knowledge and breastfeeding practices among the nurses despite the fact that the health facilities are supposed to be 'baby friendly'. This is a major obstacle to recommended breastfeeding practices. It indicates the need for baby friendly hospital initiative training for the nurses of these health facilities to respond to the concern and growing need for recommended breastfeeding practices.

5.5. Frequency comparison of breastfeeding knowledge between the two clinics

The only two breastfeeding knowledge variables that differed significantly between women from Mzumbe health centre and Tangeni dispensary were 'babies gain weight if breastfed effectively' and 'breastfeeding helps achieve pre-pregnancy weight faster' ($p=0.020$ and $p=0.049$) respectively. Mzumbe women were the least knowledgeable regarding 'baby gains weight if breastfed effectively'. Equally, 77.5% of Mzumbe women did not know that breastfeeding helps achieve pre-pregnancy weight faster.

Of particular importance, the breastfeeding knowledge of women from Tangeni regarding these two variables was significantly better than that of women from Mzumbe. This could be because the level of literacy of the former was slightly higher than that of the latter. No significant differences in breastfeeding knowledge in all the remaining variables were seen between mothers from the two clinics. This could be because the studied population comes from a rural district, being located in a town centre with major interactions from people coming from outside this area did not influence change in cultural beliefs, knowledge and values among these first time pregnant women attending antenatal clinics. Shirima et al. (2000), reported that mothers in urban areas were more knowledgeable in some aspects of infant feeding issues compared to rural mothers. The definition of 'urban' used in that study and the current study are not similar thus results cannot be compared.

The only breastfeeding in special situations knowledge aspect that differed significantly between women from Mzumbe health centre and Tangeni dispensary was 'breastfeeding

should continue when a mother is on medication' ($p=0.005$). Tangeni women were more knowledgeable in this aspect than Mzumbe women. This could be because the level of literacy of Tangeni women was slightly higher than that of Mzumbe women. The rest of the variables regarding breastfeeding in certain circumstances showed no significant differences between clinics. Therefore, no relationships in the knowledge of breastfeeding in special situations were observed between clinics. Similarly, studies in Mali and Zimbabwe also found no differences in practices of exclusive breastfeeding in both urban and rural areas (Haggerty, Pande, & Sanchez, 1998; Central Statistical Office, 1995), respectively. However, Shirima et al. (2001), reported significant differences in beliefs that might affect breastfeeding practices between rural and urban areas. Other studies that focused in breastfeeding patterns of rural and urban areas have reported that rural women breastfeed longer than urban women (Davies-Adetugbo, 1997; Nath & Goswami, 1997; Ahmed, Parveen, & Islam, 1999; Shirima et al., 2000).

Various reasons were given by mothers regarding introducing solids at a particular age and responses did not differ significantly between clinics ($p=0.269$). Regarding the age for solid food introduction, pregnant women mentioned various ages that they plan to introduce solid foods to their babies and when they plan to end breastfeeding altogether. The responses did not differ significantly between the clinics ($P>0.05$). Thus there were no differences in the age mentioned by Mzumbe and Tangeni women for introducing solid foods. Lack of differences between the two clinics can be explained by the fact that, the sample was from a rural population, being situated close to the main roads did not change the knowledge and perception of these women regarding breastfeeding. The results of the current study are different to those of Shirima et al. (2001), done in Tanzania that reported that residing in the urban area was associated with better breastfeeding practices compared to residing in rural area. This difference could be explained by the differences in the definition of 'urban' used in these two studies. In Ethiopia, just like in Shirima et al (2001), being a resident in an urban area was associated with early initiation of breastfeeding practices compared to being a rural resident (Setegn, Gerbaba, & Belachew, 2011).

5.6. RELATIONSHIPS BETWEEN DEMOGRAPHIC CHARACTERISTICS AND KNOWLEDGE VARIABLES OF WOMEN

5.6.1. Relationships between the level of literacy and breastfeeding knowledge

Correlation analysis showed a significant negative relationship between the level of literacy and the variable 'how soon a baby should be put on breast after delivery' ($R = -0.495$; $P < 0.01$). Therefore women who were able to read and write had low knowledge and understanding of this breastfeeding variable. In contrast, other studies found that literate women were the ones who initiated breastfeeding earlier compared to illiterate women. Rasania, Singh, Pathi, Bhalla and Sachdev (2003), reported significant correlation between literacy status and the initiation of breastfeeding where literate women initiated breastfeeding earlier compared to their illiterate counterparts. Another study that reported similar results was that done by Kulkarni, Anjenaya and Gujar (2004), in India which reported more than half of the literate mothers were relatively more knowledgeable on the importance of initiating breastfeeding soon after delivery compared to illiterate mothers. The reason for the difference between the current study and previous studies could be because literate women who are usually employed do not get enough time to attend public breastfeeding campaigns due to their tight work schedules thus lack the information in such matters also not being informed about breastfeeding recommendations during antenatal visits. The results of this study emphasises the need to provide accurate information and education to pregnant women during antenatal visits which are highly attended by women in Tanzania regardless of their literacy status.

Correlation analysis showed significant inverse relationship between the level of literacy and the variable 'what to be given to a baby immediately after delivery' ($R = -0.489$; $P < 0.01$). Therefore, being able to read and write was associated with low knowledge in the question. In breastfeeding mothers, the knowledge of understanding of what is to be given to a baby immediately after delivery can be assessed by looking at the prevalence of pre-lacteal feeding. A study by Chatterjee and Saha (2008), done in India to assess how demographic factors affect infant feeding practices reported 47.06% of literate mothers and 66.66% of their illiterate counterparts gave pre-lacteal feeds to their infants. In that study, illiteracy was found to be a significant factor for pre-lacteal feeding. These results pinpoint the influence of beliefs and cultural factors affecting mother's knowledge and practices of

breastfeeding regardless of their literacy status and indicate a starting point for education intervention.

A significant positive relationship was observed between literacy level and the variable of knowledge 'how often a baby should be breastfed' ($R= 0.517$; $P<0.01$). Therefore, knowing how to read and write increased a woman's knowledge of breastfeeding on demand.

Contrary to this finding, Grover, Chhabra and Aggarwal (1997), reported that illiterate mothers were seen to practice breastfeeding on demand more compared to women with high school or college education in a rural area of India. This difference could be due to the fact that women in the area studied had received breastfeeding information from people surrounding them especially family members. Illiterate women are more likely to be stay at home mothers thus get enough time to breastfeed on demand compared to the literate ones who might fail to practice demand breastfeeding due to being committed to their jobs.

Other positive significant relationships were observed between literacy level and variables 'where to go for support on matters related to breastfeeding' ($R=0.486$; $P<0.01$), 'appropriate age to start solid foods' ($R=0.495$; $P<0.01$), 'giving water is encouraged after every breastfeeding' ($R=0.580$; $P<0.01$) and when women intended to introduce solid foods ($R=0.415$; $P<0.01$). Therefore, illiterate women were less knowledgeable compared to literate ones.

Other studies also reported positive relationships between literacy status and breastfeeding knowledge and positive attitudes. Kaufman, Skipper, Small, Terry and Mcgrew (2001), also found positive relationship between the level of literacy and the practice of initiation of breastfeeding among women. That study assessed how literacy affects breastfeeding initiation and continuation among mothers who attended post natal clinic in the low income State of New Mexico. It revealed that 42 women among 61 who participated had initiated breastfeeding shortly after delivery, among these 31 were grouped in the higher literacy group and 11 belonged to the lower literacy group, majority of women who never breastfed at all belonged to the lower literacy group. In summary, the results from the current study strengthen previous studies showing relationship between the level of literacy and the time of initiation of breastfeeding after delivery as the knowledge they have now will greatly influence their practices after delivery. Therefore, increasing the literacy level of especially

rural populations by adult education programmes may help to increase rates of initiation and exclusive breastfeeding within the required time.

5.6.2. Relationships between occupation and breastfeeding knowledge

Correlation analysis showed both positive and negative relationships between occupation and various variables of breastfeeding knowledge according to the WHO recommendations (WHO/UNICEF, 2003). Negative significant relationships were observed between occupation and variables 'how soon should a baby be put on breast after delivery' ($R=-0.535$; $P<0.01$) and 'mother may mix breastfeeding with formula feeding' ($R=-0.481$; $P<0.01$). Therefore, working women had lower understanding and knowledge in these variables of breastfeeding recommendations compared to women who were not working. In the current study, 22.5% of women were not working, the rest were either casual workers, self-employed or formally employed.

Similarly, previous studies on women who have already given birth have shown relationship between occupation and breastfeeding knowledge, attitude and practices in such a way that mothers who were not working were positively associated with exclusive breastfeeding compared to working mothers. Ong, Yap, Foo and Tai (2005), assessed the effect of working status on breastfeeding in Singapore. The study noted that a high percentage of mothers who were not working breastfed for more than two months more compared to working mothers and that the most quoted reasons to stop breastfeeding at between two to six months were related to work issues. Similar results were reported by Senarath, Dibley and Agho (2007), in Timor-Leste and Tan (2011), in Malaysia. Although exclusive breastfeeding is reported to be positively associated with knowledge and intentions to breastfeed during pregnancy (Aidam et al., 2005), it might be that working mothers in the previous studies had to introduce solids earlier in preparation to go back to their work or following them being tired with the day's work thus failure to keep up with both work and breastfeeding. It could also be that non-working mothers in the current study were not informed about breastfeeding by their social networks.

Positive correlations were observed between occupation and variables 'place to go for support regarding breastfeeding' ($R=0.448$; $P<0.01$), 'appropriate age to start solid food' ($R=0.481$; $P<0.01$), and 'giving water is encouraged after every breastfeeding' ($R=0.621$;

P<0.01). Therefore, having any sort of occupation predicted the understanding and knowledge in these variables of breastfeeding recommendations. Various studies have shown positive correlation between occupation and breastfeeding knowledge. Rojjanasrirat and Sousa (2010), reported that most participants in the study who were low income employed pregnant women were very knowledgeable of the benefits and recommendations for exclusive breastfeeding. Consistent with this finding, Rojjanasrirat (2004), reported high determination, knowledge and positive attitudes towards breastfeeding among women who had just returned to work from maternity leave.

5.6.3. Relationships between monthly income and breastfeeding knowledge

Correlation analysis showed both positive and inverse relationships between monthly family income and various variables of breastfeeding. Inverse significant relationships were observed in variables 'how soon should a baby be put on breast after delivery' (R=-0.510; P<0.01), 'importance of colostrum' (R=-0.445; P=0.002) and 'mother may mix breastfeeding and formula feeding' (R=-0.456; P<0.01). Therefore high monthly family income was associated with low understanding of these variables. Similar findings were reported by previous studies. Becerra and Smith (1990), found an increased risk of not initiating breastfeeding among mothers with high income status compared to their low income status counterparts. In Egypt a negative relationship was found between socio economic status and exclusive breastfeeding behaviour, where mothers of high socio economic status tended to end breastfeeding earlier than the recommended age (Hossain et al., 1994). However, this observation is complex because income status is usually related to other factors that cannot be measured directly like values and socio cultural beliefs (Becerra & Smith, 1990).

Positive correlations were observed between monthly family income and variables 'appropriate age to start solid food' (R=0.417; P<0.01) and 'giving water is encouraged after every breastfeeding' (R=0.571; P<0.01). Therefore high monthly family income was associated with a higher understanding of these breastfeeding variables and low income was associated with a lower understanding. This could be because women from lower income status do not have access to professional education. Understanding of breastfeeding matters during the antenatal period determines women's practices after delivery (Duong et al., 2005). A study by Coulibaly, Seguin, Zunzunegui and Gauvin (2006), indicated that

mothers from lower socio economic class had lower incidence and duration of breastfeeding compared to women from higher socio-economic status. Similarly, Dennis (2003), reported that women with low income status practiced early cessation of breastfeeding more compared to women with medium or high income status.

Results of the current study indicate that breastfeeding knowledge in the studied population is associated with monthly family income status, therefore emphasizing the need to initiate breastfeeding promotion and intervention programmes that are aimed at diverse populations.

5.6.4. Relationships between highest level of education attained and breastfeeding knowledge

Correlation analysis showed both positive and negative relationships between highest level of education attained by the mother and various variables of breastfeeding knowledge. Positive significant correlations were observed between highest level of education attained and variables 'appropriate age to start solid foods' ($R=0.550$; $P<0.01$), 'giving water is encouraged after every breastfeeding' ($R=0.594$; $P<0.01$) and when mothers intend to introduce solid foods ($R=0.418$; $P<0.01$). Therefore, having attained higher education beyond secondary school predicted women's knowledge and understanding in these breastfeeding variables. Our results indicate that, higher level of education had positive beneficial effects on breastfeeding knowledge and understanding of the above variables. This could be because higher education levels are linked with knowledge and practices of positive health behaviour.

On the other hand, an inverse significant relationship was observed in variable 'what is to be given to a baby immediately after a safe delivery' ($R=-0.387$; $P<0.01$). Therefore, women with higher education level had lower knowledge and understanding of this variable compared to women with no or lower education levels.

Similar to the findings of the current study which indicate both positive and negative relationships between maternal education level and breastfeeding knowledge, previous studies have also reported varying evidence between maternal education level and breastfeeding practices.

In Italy, a study reported a shorter duration of breastfeeding being associated with lower maternal educational levels in a study to assess factors associated with breastfeeding initiation and duration rates (Riva et al., 1999). Another study in Kenya found out those women with at least secondary school education had a 10% lower risk of introducing solid foods early and earlier cessation of breastfeeding compared to mothers with no education (Mukuria et al., 2006).

In Cameroon on the other hand, inverse results were observed. A study by Pascale, Laure, and Enyong (2007), to assess factors affecting breast feeding as well as the nutritional status of infants (0-12) months indicated the percentage of mothers who stopped breastfeeding their babies altogether between 9-12 months increased as the education level of the mothers increased. These are mothers who stopped breastfeeding earlier than the recommended time. In Bangladesh, it was found that as maternal education level increased the risk of early cessation of breastfeeding also increased with women with higher education beyond secondary school having the greatest risk (Akter & Rahman, 2010).

5.7. Limitations of the study

The present study was the first study in Tanzania to determine first time pregnant women's awareness and their healthcare providers' practices of exclusive breastfeeding counselling during antenatal visits. Women in this study were a convenience sample of pregnant women attending antenatal clinics from two health facilities of Mvomero district in Tanzania. Due to the sample of convenience, geographical locale, and use of instruments that have not been subjected to psychometric analysis, the findings are not open to generalization beyond the sample. It is recognised that the convenient sample of 40 per health facility may not have been adequate enough to make the between group comparisons effectively as it may have led to under or over representation of pregnant women within the sample. Nevertheless, this study provides useful information about the breastfeeding knowledge base of first time pregnant women. In order for the results of this study to be considered when formulating and implementing specific community- based educational interventions to promote exclusive breastfeeding in Tanzania, a larger, random sample would be needed.

Another limitation was the short time frame to conduct this study which did not allow follow up of women after delivery to see if their intentions led to exclusive breastfeeding and proper age for introduction of solid foods.

Also, the number of nurses involved in this study was very small; this was due to them being the only healthcare providers providing antenatal care in these health facilities (two declined to participate). However, it provides good preliminary data of breastfeeding education and counselling practices of the nurses providing antenatal care in these two health facilities. The study has identified areas of poor knowledge all of which has never been researched in Tanzania prior to this study. Therefore, the results of this study may serve to encourage other governmental bodies to further evaluate the breastfeeding knowledge of healthcare providers and to strengthen the training of nurses likely to deal with antenatal care and put in some form of training to keep the nurses updated all the time.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

There were many areas in which breastfeeding knowledge was incomplete and nurses and the women were not fully aware of the WHO breastfeeding recommendations. Also it was observed that there was a high frequency of antenatal attendance, but nearly all these attendees had not received information and counselling regarding breastfeeding which may have contributed to mothers' lack of knowledge. This indicates that the requirements of the BFHI are not fulfilled therefore the possibility for improving exclusive breastfeeding for six months through antenatal care clinics is underutilised.

The study has observed that even though a small number of women would initiate breastfeeding within 1 hour after delivery, the majority intended to breastfeed for up to 1-2 years thus long duration of breastfeeding. However, it is observed that exclusive breastfeeding for six months would be rare as the majority of women intended to introduce solid foods before six months. The major sources of information on breastfeeding for pregnant women were mothers, grandmothers and mothers-in-law which may explain the perceptions of pregnant women which are not in agreement with the current breastfeeding recommendations. There were no differences in breastfeeding knowledge between women of the two health facilities.

Although nurses were knowledgeable in some aspects of breastfeeding, they appeared not to be ready to educate and counsel women. Nurses' major sources of breastfeeding knowledge were their own breastfeeding experiences, clinical experience and personal reading which may explain the unsatisfactory knowledge that has been observed in this study. Also nurses' knowledge deficits have been identified in some important areas of breastfeeding such as the duration of exclusive breastfeeding, correct attachment and positioning of the infant to the breast and breastfeeding in special situations. These deficits can negatively affect the quality of information provided to pregnant women during antenatal visits.

Accurate breastfeeding counselling and advice by healthcare providers with emphasis on the current breastfeeding recommendations can improve the breastfeeding knowledge of

first time pregnant women thus increase rates of exclusive breastfeeding which in turn may reduce infant morbidity and mortality rates.

It is important to note that the basis for the current WHO exclusive breastfeeding recommendation of up to six months is the reduced rate of infection. Therefore, this recommendation is appropriate for developing countries like Tanzania with high morbidity and mortality from infections. However, in other developed countries like New Zealand where rates of infection are very low, this recommendation needs to be reviewed.

6.2. Recommendations

Potentially, the findings of this study indicate various important policy implications for breastfeeding interventions. Strategies to encourage mothers to follow breastfeeding recommendations should concentrate on improving their knowledge and understanding of the recommendations and must target exclusivity beginning in the antenatal period. It is necessary to improve mothers' knowledge, attitudes and perceptions regarding breastfeeding practices during antenatal visits which are highly attended by mothers in Tanzania.

In order to accomplish step two of the 'Ten steps to successful breastfeeding', efficient on-going training about breastfeeding knowledge and skills for all healthcare providers providing antenatal and postnatal care is recommended. Education programmes which target nurses who provide both antenatal and postnatal care in health facilities is recommended in order to improve knowledge of the current nurses in practice. This could be a one-off training programme, on-going training programme or repeated refreshers programmes to enable nurses have updated information on breastfeeding recommendations. This can go in hand with provision of breastfeeding leaflets and resources made available in waiting areas and counselling rooms for both nurses and mothers to have a look at. HIV being wide spread presently, it is especially important that all healthcare staff are in a position to offer evidence based counselling about infant feeding choices for HIV positive mothers.

Training on breastfeeding, based on WHO recommendations, should be included into the curricula of nursing and medical schools so that future healthcare providers can use the knowledge and skills gained in such training to promote and support exclusive breastfeeding at the health facilities. In the current study, none of the nurses mentioned nursing school as their source of breastfeeding knowledge.

Healthcare providers' support for breastfeeding mothers has been shown to improve breastfeeding rates (Aidam et al., 2005), but no evaluation of the adequacy of healthcare providers' breastfeeding related training has been conducted. In addition, there is a limited body of literature regarding the attitudes of healthcare providers towards breastfeeding in Tanzania. Given the health benefits of breastfeeding for both the mother and baby, it is

important to assess the knowledge, experience and attitudes that these professionals bring to the health facility.

Public seminars and campaigns should be regularly carried out to educate the community, all social networks and old women who did not attend school about exclusive breastfeeding practices, as they were mentioned to be the major source of breastfeeding information to first time mothers, this will help them to advice their daughters, daughters-in-law and grand-daughters the right practices of exclusive breastfeeding.

Another strategy may be the use of trained community based counsellors which have been found to be useful in increasing exclusive breastfeeding rates in other countries like Uganda (Nankunda et al., 2006).

Future study with larger sample size will improve the power to fully assess pregnant women's awareness of exclusive breastfeeding and healthcare providers' practices during antenatal visits.

It is strongly recommended that the Nurses component of the study be repeated with a larger sample size. The results would be very useful in informing what needs to be addressed with respect to how and when the counselling services should be provided to the mothers in similar settings in Tanzania.

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APPENDICES

APPENDIX ONE:

Participant Information Sheet



MASSEY UNIVERSITY

Institute of Food, Nutrition and Human Health
Massey University
Private Bag 102904
North Shore City
Auckland
0745
New Zealand

STUDY: Exclusive Breastfeeding: Mothers' awareness and healthcare providers' practices during antenatal visits in Morogoro, Tanzania.

INFORMATION SHEET

Researcher: Hadijah Mbwana: MSc Human Nutrition

I kindly request you to participate in a study that is aimed at assessing breastfeeding knowledge among pregnant women and nurses providing antenatal services and also to assess the practices of these nurses towards breastfeeding counselling.

Participation

The participation in this study is voluntary; you can also withdraw at any time from the study if you feel uncomfortable. Confidentiality will be ensured by not using your names or address on the questionnaire. There are no risks involved in participating in this study.

Criteria

Eligible mothers to participate in the study will be first time pregnant women in their 16+ weeks gestation attending the MCH, able to give verbal consent, able to conduct an oral interview, willing to participate in the present time and those without a clinical or medical educational background and work experience.

Eligible healthcare providers will be those who deal with pregnant women when they come in for MCH clinics.

Study Tool

Nurses will be expected to fill in a questionnaire with forty six (46) questions, some questions will need a 'yes' or a 'no' answer, some questions will need you to choose answers from the list given and some questions will require you to fill you answer in the spaces provided.

Pregnant women will perform an interview for a questionnaire with fifty two (48) questions which will be administered by the researcher herself.

Benefits

The study has no immediate benefits to the respondents, but will have benefits later in the overall antenatal breastfeeding counselling and in reducing infant morbidity and mortality rates.

Approval

This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application 11/018. If you have any concerns about the conduct of this research, please contact Dr Ralph Bathurst, Chair, and Massey University Human Ethics Committee: Northern, telephone 09 414 0800 x 9570, email humanethicsnorth@massey.ac.nz.

I welcome any question if you have any about the study and your participation. Should the need to contact me arise, please use the contact details below.

Hadijah Mbwana

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APPENDIX TWO

Participant Consent Form



MASSEY UNIVERSITY

Institute of Food, Nutrition and Human Health
Massey University
Private Bag 102904
North Shore City
Auckland
0745
New Zealand

STUDY: Exclusive Breastfeeding: Mothers' awareness and healthcare providers' practices during antenatal visits in Morogoro, Tanzania.

PARTICIPANT CONSENT FORM – INDIVIDUAL

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I agree to participate in this study under the conditions set out in the Information Sheet.

Signature:

Date:

Full Name - printed

APPENDIX THREE

Research Permit

MOROGORO REGIONAL COUNCIL

ALL CORRESPONDENCE SHOULD BE DIRECTED TO THE COUNCIL DIRECTOR

Tel: 023 3099

REGIONAL MEDICAL OFFICER

P. O. BOX 110

MOROGORO

TANZANIA

13th May, 2011

In reply please quote:



Ref. No. FD/K /161/ 2011

Medical Officer I/C

Morogoro Region

RE: RESEARCH PERMIT

This is to introduce to you Ms **Hadijah A. Mbwana** a student from **Massey University – New Zealand**, Department of Food, Nutrition and Human Health who is registered for **Masters in Human Nutrition**.

She has been given permission to collect data in the health facilities which purpose is to **explore the effectiveness and practices of exclusive breastfeeding counselling provided to pregnant women during antenatal visits** in Mvomero district Morogoro Tanzania.

Kindly provide her with all the necessary assistance and support required in order to enable her fulfill these activities comfortably.

Best wishes

Dr. M. M. Z. MASSI,

REGIONAL MEDICAL OFFICER,

MOROGORO REGION

REGIONAL MEDICAL OFFICER
P. O. BOX 110
MOROGORO

APPENDIX FOUR

Ethical Approval



MASSEY UNIVERSITY
ALBANY

28 April 2011

Hadijah Mbwana
c/- Dr C Conlon
College of Sciences
Massey University
Albany

Dear Hadijah

HUMAN ETHICS APPROVAL APPLICATION – MUHECN 11/018

"Awareness and Practices of Pregnant Women and Health Care Providers towards Exclusive Breastfeeding Counselling provided during Antenatal Visits"

Thank you for your application. It has been fully considered, and approved by the Massey University Human Ethics Committee: Northern.

Approval is for three years. If this project has not been completed within three years from the date of this letter, a reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

Dr Ralph Bathurst
Chair
Human Ethics Committee: Northern

cc: Dr C Conlon
College of Sciences

Te Kūnenga
ki Pūrehuroa

Research Ethics Office

Private Bag 102 904, Auckland, 0745, New Zealand Telephone +64 9 414 0800 ex 9539 humanethicsnorth@massey.ac.nz

APPENDIX FIVE

Breastfeeding knowledge and counselling practices questionnaire for nurses



MASSEY UNIVERSITY

BREASTFEEDING KNOWLEDGE QUESTIONNAIRE

TO BE COMPLETED BY HEALTH CARE PROVIDERS WHO PROVIDE ANTENATAL SERVICES TO PREGNANT WOMEN

All information provided in this questionnaire will be treated confidentially.

We really appreciate you taking the time to fill out this questionnaire. If you have any questions as you complete this questionnaire, please contact **Hadijah Mbwana** at 0713-803410 or 0786-655315. To make this simple follow these instructions:

- i. Please answer all questions by ticking the box corresponding to the chosen alternative or by writing your opinion in the space provided
- ii. Please note that you have the right to decline to answer any particular question but for those you answer please do it as honestly, frankly and objectively as possible
- iii. Answer according to your own personal opinion and experience, for, there is no right or wrong answer
- iv. Please return the completed questionnaire in the attached envelope to the office of the Head Nurse by the submission date below.

ADMINISTRATIVE DETAILS

Questionnaire No:

Name of Hospital/Clinic:

Today's Date:

Submission date:

SECTION A: DEMOGRAPHIC DATA

1. Gender
 - Male
 - Female

2. Highest education level attained:
 - Secondary school
 - High school
 - Certificate level training
 - Diploma level training
 - University level education

3. What is your nursing category?
 - Nursing officer
 - Public health nurse
 - Nurse midwife
 - MCH aider
 - Other (specify)

4. Do you have any children?
 - Yes
 - No

5. 3.If YES, how many were breastfed?

SECTION B: BREASTFEEDING EDUCATION

6. Where did you obtain your nursing qualification from?

7. From which of the following sources did you obtain your knowledge about breastfeeding? (Please select all that apply)
 - Medical school
 - Lectures
 - Own children breastfed

- Clinical experience
- Personal reading
- Other (specify)

8. Did you undergo any training in breastfeeding counselling?

- Yes
- No

9. If YES in No. 6 above, how long was the training? Please tick one

- 1 week
- 2 weeks
- 3 weeks
- 4 weeks
- 5+ weeks
- Not applicable

10. Where did you receive this training?

11. Who provided this training?

12. What topics were covered during this training? Please tick all applicable

- Importance of colostrum
- Effective feeding
- Advantages to baby
- Advantages to mother
- Duration of feeding
- Breast milk expression
- Problems with breastfeeding
- Practical aspects of breastfeeding
- Other (specify)
- Not applicable

13. Do you know the following breastfeeding recommendations? Tick all that apply

- Initiation of breastfeeding
- Exclusive breastfeeding
- Breastfeeding frequency
- Use of bottles, teats or pacifiers

14. Do you train pregnant mothers about these recommendations during antenatal visits?

- Yes
- No

15. How long have you been providing antenatal services? Please tick one

- Less than 1 year
- 1-5 years
- 6-10 years
- 11-15 years
- 16+ years

SECTION C: PRACTICES OF BREASTFEEDING COUNSELLING

16. Do you think counseling by healthcare providers is effective in encouraging more women to breastfeed

- Yes
- No

17. Do you counsel pregnant women regarding exclusive breastfeeding?

- Yes
- No

18. If YES in question 16 above, how often do you discuss breastfeeding with pregnant women every time you see them?

1. Always
2. Usually
3. Sometimes
4. Infrequently
5. Never

6. Not applicable

19. Please tick all the issues below regarding exclusive breastfeeding that you discuss with pregnant women when they come for antenatal visits

- Importance of colostrum
- Initiation of breastfeeding
- Duration of feeding
- Practical aspects of breastfeeding
- Effective feeding
- Advantages to the baby
- Advantages to the mother
- Breastfeeding problems
- Expression of breast milk
- Complementary feeding
- Other (specify)

20. What do you do to a pregnant woman who intends to bottle feed? (Tick all applicable)

- Attempt to convince her to breastfeed?
- Explain to her advantages of breastfeeding
- Assess if the reason is behind breastfeeding history
- Assess medical belief example HIV positive

21. What information do you give to mothers who ask about the use of artificial teats or pacifiers?

- No use of pacifiers
- Counsel about safe and appropriate use of pacifiers
- It is a parental choice determined by the needs of their new-born
- They are the cause of breastfeeding difficulties
- Other (specify)

22. Why do you give that information in question 20 above?

23. How long do you usually recommend that a mother continue to exclusively breastfeed? Months

24. Why do you recommend mothers to exclusively breastfeed until that age?.....
.....

25. At what age do you recommend mothers start feeding solid foods to their breastfeeding babies? Months

26. Why do you recommend mothers to start feeding solids at this age?.....
.....

27..... If a mother complains of sore nipples which of the following options will help to resolve the problem (tick all that apply)

- Stop feeding on the affected side
- Check for symptoms of nipple thrush
- Advise mother to apply breast milk to nipples
- Seek expert assistance with positioning and attachment
- Advise mother to apply lanolin to nipples
- Do not know

28. Which of the following symptoms could indicate POOR attachment at the breast: (Tick all that apply)

- Baby feeds very frequently and is unsettled
- Mother has sore and cracked nipples
- Mother reports repeated engorgement
- Mother has mastitis

Do not know

29. If a mother complains of breast milk insufficiency which of the following options will help to resolve the problem: (Tick all that apply)

Increase frequency of breast milk feedings 1

Top up each breastfeed with a bottle of formula

Seek expert assistance with positioning and attachment

Advise mother to drink more fluids

Do not know

30. If a woman develops mastitis, what do you usually advise her to do about breastfeeding? (Tick all that apply)

Continue to feed on both sides

Stop feeding on the affected side

Stop feeding altogether

Prescribe antibiotics

Do not know

31. Which of the following pictures shows the correct latching on (positioning of the baby's mouth at the breast to initiate suckling)? Please circle the letter corresponding to the correct picture.

A



B



32. Do you demonstrate the correct positioning and attachment of the baby to the breast?

1. Always ()

- 2. Usually
- 3. Sometimes
- 4. Infrequently
- 5. Never

33. What advice do you give mothers who are HIV positive regarding breastfeeding/ feeding their infants?

- Exclusively breastfeed followed by early cessation
- Infant replacement feeding with commercially prepared formula
- Infant replacement feeding with home prepared formula
- Manually expressing and heat treating breast milk with cup feeding
- Wet nursing by an HIV negative woman
- Do not know
- Other (specify)

SECTION D: BREASTFEEDING KNOWLEDGE

In the following questions please state how you agree or disagree with the following statements:

34. Breast milk is the ideal food for babies

- 1. Strongly agree
- 2. Agree
- 3. Neither agree nor disagree
- 4. Disagree
- 5. Strongly disagree

35. Exclusive breastfeeding provides all the nutrition required by a healthy new born up to the age of six months with the possible exception of vitamin D.

- 1. Strongly agree
- 2. Agree
- 3. Neither agree nor disagree
- 4. Disagree
- 5. Strongly disagree

36. Exclusive breastfed babies have fewer gastrointestinal infections, respiratory illnesses, eczema and/or allergic reactions than formula fed babies

1. Strongly agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree

37. Breastfeeding is beneficial to a mother's health

1. Strongly agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree

38. Breastfeeding provides health benefits for infants that cannot be provided by formula

1. Strongly agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree

39. Supplementing breastfeeding with formula during the first two weeks of life is a cause of breastfeeding failure

1. Strongly agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree

40. Growth patterns of breastfed infants differ from those of formula fed infants

1. Strongly agree
2. Agree

3. Neither agree nor disagree
4. Disagree
5. Strongly disagree

41. Development of sore nipples is a normal part of breastfeeding

1. Strongly agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree

42. Breast milk alone can satisfy most babies for approximately the first six months

1. Strongly agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree

43. A woman who is fully breastfeeding is less likely to become pregnant three months after delivery than a woman who is formula feeding

1. Strongly agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree

44. Mixing breastfeeding with formula feeding reduces breast milk supply

1. Strongly agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree

45. How soon after delivery should the baby be put on the breast if the delivery is normal and the mother and baby are fine?

- Within 1 hour after birth
- From 1-8 hours after delivery
- 9 hours or more after delivery
- Does not know
- Any other (specify)

46. In your opinion, should breastfeeding continue during: Please tick one option

	Yes	No	Do not know
Pregnancy			
Maternal sickness			
Child sickness			
Menstruation			
Mother on medication			
HIV infected			
Alcohol drinking			

THANK YOU FOR YOUR TIME AND COOPERATION!

APPENDIX SIX

Breastfeeding knowledge questionnaire for pregnant women (English)



MASSEY UNIVERSITY

BREASTFEEDING KNOWLEDGE QUESTIONNAIRE

TO BE ADMINISTERED TO PREGNANT WOMEN ATTENDING ANTENATAL VISITS

ADMINISTRATIVE DETAILS

Questionnaire No:

Name of Hospital/Clinic:

Date of Interview:

This questionnaire asks about breastfeeding. I really appreciate you taking the time to complete this interview.

We would like to ask you some questions about what you know and think about breastfeeding. There are no 'right' or 'wrong' answers. Accurate and thoughtful responses will allow us to pinpoint general knowledge and understanding on breastfeeding.

All of the data collected is anonymous and your answers will be held in strict confidence.

SECTION A: DEMOGRAPHIC DATA

1. Which of the following statements best describes your level of literacy?
 - I am not able to read or write
 - I can read and write to some extent
 - I can read and write

2. What is your highest education level attained?
 - No formal education
 - Standard 1-4
 - Standard 5-7
 - Secondary school
 - High school
 - Certificate level training
 - Diploma level training
 - University level education
 - Adult literacy

3. What is your occupation?
 - Housewife
 - Casual worker
 - Formally employed (specify type of job)
 - Self-employed (specify)

4. How many people live in your house?

5. What is the range of your family monthly income (Tick one)
 - Less than 100,000 Tshs
 - Between 100,000-300,000 Tshs
 - Between 400,000-500,000 Tshs
 - Above 500,000 Tshs

SECTION B: HISTORY OF PREGNANCY

6. Have you ever been pregnant before?
- Yes
 - No
7. How many weeks pregnant are you?
8. At what age of pregnancy did you start attending antenatal clinic?
Enter age of pregnancy in weeks:
9. How many times have you attended the clinic during this pregnancy?
- Once
 - Twice
 - Thrice
 - Four times
 - Other (please specify)

SECTION C: BREASTFEEDING KNOWLEDGE

SECTION C I: COLOSTRUM AND INITIATION OF BREASTFEEDING

10. Have you ever received breastfeeding counselling during these antenatal visits?
- Yes
 - No
11. Has anyone else given you support and information regarding breastfeeding?
- Yes
 - No
- If YES mention them:
12. Where else would you go for support regarding breastfeeding? Tick all applicable
- Husband or partner
 - Mother

- Other family member
- Friends
- MCH Nurse
- Other (specify)

13. What should be given to a baby immediately after a safe delivery?

- Breast milk
- Formula milk
- Cow's milk
- Glucose water
- Plain boiled water
- Salt solution
- Sugar-salt solution
- Any other (specify)

14. How soon after delivery should the baby be put on the breast if the delivery is normal and the mother and baby are fine?

- Within 1 hour after birth
- From 1-8 hours after delivery
- 9 hours or more after delivery
- Does not know
- Any other (specify)

If the first option is selected then go to question 17 and skip question 14

If any other selections then go to question 18

15. Why should the baby be put on the breast within the first hour immediately after birth?

(Probe and tick all applicable responses)

- To create a strong bond between mother and baby
- To stimulate milk production
- Baby is hungry after the birth process
- To give the baby the first yellowish milk for protection
- I do not know

Any other (specify)

16. Why should the baby be put on the breast within (state the actual duration mentioned in question 16) after birth?

There is no milk before then

The first yellowish milk is not good for the baby

The mother needs to rest after the process of giving birth

Any other (specify)

17. Where do you plan to have your delivery?

Hospital

Home

Other (specify)

18. Is there any importance in feeding a baby the first yellowish milk?

Yes

No

19. If YES, why do you think so? Tick all that apply

provides babies with substances that help to fight diseases

provides babies with protection against infections and illnesses

The baby will not feel hungry because it is heavy

Do not know

Other (specify)

Not applicable

SECTION C II: DURATION OF BREASTFEEDING

20. How often should a baby be breastfed?

On demand

By routine

Other (specify)

Do not know

21. Baby should be allowed to breastfeed for at least 10–20 minutes for each feeding

- Yes
- No

22. How long do you think breast milk alone without even water is sufficient for the baby?

- Less than one week
- One week to two weeks
- One to three months
- Six months
- Other (specify)

23. Do you intend to give your baby formula milk in the first 6 months of life?

- Yes
- No

24. What age is appropriate to start giving solid foods to a baby?

- Less than 1 month
- Between 2-3 months
- Between 4-5 months
- 6 months
- Above six months

25. Breastfeeding should be continued up to 2 years even though the baby has received solid food

- True
- False

26. Mothers may mix breastfeeding and formula feeding once baby starts taking solid food

- True
- False

SECTION CIII: PRACTICAL ASPECTS OF BREASTFEEDING

27. Giving water to baby is encouraged after every breastfeeding

True

False

28. The baby should be breastfed during the night

True

False

29. In your opinion, should breastfeeding continue during: Please tick one option

	Yes	No	Do not know
Pregnancy			
Maternal illness			
Child illness			
Menstruation			
Mother on medication			
HIV infected			
Alcohol drinking			

SECTION C IV: EFFECTIVE BREASTFEEDING

In the following questions please state how you agree or disagree with the following statements:

30. Babies will gain weight if they receive effective breastfeeding

a. Strongly agree

b. Agree

c. Neither agree nor disagree

- d. Disagree
- e. Strongly disagree

31. Correct positioning helps to achieve effective breastfeeding

- a. Strongly agree
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

32. Babies sleep well after they receive adequate breastfeeding

- a. Strongly agree
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

SECTION C V: ADVANTAGES TO BABY

33. Breastfeeding reduces the risk of lung infection among babies

- a. Strongly agree
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

34. Baby who received breastfeeding is less prone to get diarrhea

- a. Strongly agree
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

35. Breast milk provides baby with more protection from allergy compared to formula milk

- a. Strongly agree
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

36. Breastfeeding causes good development of baby's teeth and gum

- a. Strongly agree
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

SECTION C VI: ADVANTAGES TO MOTHER

37. Breastfeeding is beneficial for the mother.

- a. Strongly agree
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

38. Exclusive breastfeeding is beneficial in spacing birth

- a. Strongly agree
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

39. Breastfeeding helps to stimulate uterine contraction

- a. Strongly agree
- b. Agree

- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

40. Mothers who practiced breastfeeding may achieve pre-pregnancy weight faster

- a. Strongly agree
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

41. Mother who practiced breastfeeding is less likely to experience breast problems

- a. Strongly agree
- b. Agree
- c. Neither agree nor disagree
- d. Disagree
- e. Strongly disagree

SECTION C VII: BREASTFEEDING PROBLEMS

42. Where would you go for support in case you experienced breastfeeding problems?

- Husband or partner
- Mother
- Other family member
- Friends
- MCH Nurse
- Other (specify)

43. Who do you think are more important people to help in problems related to breastfeeding?

SECTION D: INTENTION FOR FUTURE BREASTFEEDING

44. Do you intend to breastfeed the baby to be born?

- Yes
- No

45. If YES for how long do you intend to breastfeed for?

46. If NO why don't you intend to breastfeed?
.....

47. When do you intend to introduce solid foods to the baby to be born?

48. Why do you intend to introduce solid foods at this age?

- Baby will be hungry
- Baby will be old enough to start solids
- That's the age my mother introduced solids to me
- Advised by relatives or friends
- Other (specify)

THANK YOU VERY MUCH FOR YOUR PARTICIPATION

APPENDIX SEVEN

Breastfeeding knowledge questionnaire for pregnant women (Swahili)



MASSEY UNIVERSITY

DODOSO LA UFAHAMU KUHUSU UNYONYESHAJI WA MAZIWA YA MAMA

INAWAHUSU WANAWAKE WAJAWAZITO WANA OHUDHURIA KLINIKI

TAARIFA ZA KIUTAWALA

Namba ya dodoso:

Jina la kituo cha afya:

Tarehe ya usaili:

Dodoso hili linahusu unyonyeshaji. Nashukuru sana kwa kuchukua muda wako kujadiliana name. Nitapenda kukuuliza maswali kuhusu kitu gani unajua au kufikiri juu ya unyonyeshaji wa maziwa ya mama. Hakuna jibu sahihi wala lisilo sahihi. Majibu ya umakini yatatuzesha kufafamu uelewa wa jamii kuhusu unyonyeshaji maziwa ya mama.

Takwimu zote zinazokusanya ni siri na majibu yako yatatunzwa katika usiri mkubwa.

SEHEMU A: TAKWIMU ZA WATU

1. Je ni ipi hali yako ya kielimu katika haya yafuatayo?
 - Siwezi kusoma na kuandika
 - Naweza kusoma na kuandika kidogo
 - Naweza kusoma na kuandika

2. Je ni kiwango gani cha juu cha elimu ukichofikia?
 - Sikusoma kabisa
 - Darasa 1-4
 - Darasa 5-7
 - Kidato
 - Vidato vya juu
 - Ngazi ya cheti
 - Ngazi ya Diploma
 - Chuo kikuu
 - Elimu ya watu wazima

3. Unafanya kazi gani?
 - Mama wa nyumbani
 - Kibarua
 - Nimeajiriwa
 - Nimejajiri

4. Nyumba unaishi inaishi watu wangapi?

5. Kipato cha familia yako kwa mwezi ni kiasi gani?
 - Chini ya shilingi 100,000
 - Kati ya shilingi 100,000-300,000
 - Kati ya shilingi 400,000-500,000
 - Zaidi ya 500,000

SEHEMU B: HISTORIA YA UJAUZITO

6. Umeshawahi kuwa mjamzito kabla ya ujauzito huu?
 - Ndio
 - Hapana
 -

7. Ujauzito wako ni wa wiki ngapi?

8. Ulianza kuhudhuria kliniki wakati ujauzito wako ukiwa na wiki ngapi?
Andika katika wiki:

9. Je umewahi kuhudhuria kliniki ya wajawazito mara ngapi kwa mimba hii?

- Mara moja
- Mara mbili
- Mara tatu
- Mara nne
- Nyingine(Taja)

SEHEMU C: UELEWA KUHUSU UNYONYESHAJI

SEHEMU C I: MAZIWA YA AWALI NA KUENZA KUNYONYESHA

10. Je umewahi kupatiwa ushauri kuhusu unyonyeshaji maziwa ya mama unapokuja kliniki?
- Ndio
 - Hapana
11. Kuna mtu yoyote amewahi kukupa taarifa au mawazo kuhusu unyonyeshaji?
- Ndio
 - Hapana
- Kama yupo ni nani kwako?
12. Nani mwingine unaweza kumuomba msaada wa mawazo kuhusu unyonyeshaji? (Tiki majibu yote atakayokutajia)
- Mume au baba wa mtoto
 - Mama
 - Wanafamilia wengine
 - Marafiki
 - Manesi wa kliniki ya wajawazito
 - Wengineo (Taja)
13. Mtoto mchanga anatakiwa kulishwa nini mara tu baada ya kuzaliwa?
- Maziwa ya mama
 - Maziwa ya kopo
 - Maziwa ya ng'ombe
 - Maji ya glukosi
 - Maji yaliyochemshwa
 - Mchanganyiko wa maji na chumvi
 - Mchanganyiko wa naji sukari na chumvi
 - Mengineo (Taja)
14. Je ni muda gani baada ya kujifungua mtoto anatakiwa kunyonyeshwa, kama mama amejifungua salama nay eye na mwanae hawajambo?
- Ndani ya saa 1 baada ya kujifungua
 - Kati ya saa 1 hadi 8
 - Masaa 9 au zaidi

- Sijui
- Mengineyo (Taja)

Kama amechagua jibu la kwanza nenda swali la 16 na ruka swali la 17, kama amechagua majibu mengine nenda swali la 17.

15. Kwanini unafikiri mtoto anatakiwa kunyonyeshwa ndani ya saa moja mara baada ya kujifungua?

- Kutengeneza ukaribu kati ya mama na mtoto
- Kuchochea uzalishwaji wa maziwa
- Mtoto anakuwa na njaa baada ya jitihada za kutoka tumboni
- Kumpa motto maziwa mazito ya njano yale mwanzo
- Sijui
- Mengine (Taja)

16. Kwanini unafikiri motto anatakiwa kunyonyeshwa ndani ya (Taja muda aliotaja katika swali la 15)?

- Kutakuwa hamna maziwa kabla ya hapo
- Maziwa ya mwanzo yale mazito ya manjano si mazuri kwa motto
- Mama anahitaji kupumzika baada ya zoezi la kujifungua
- Mengine (Taja)

17. Je umepanga kujifungulia wapi?

- Hospitali
- Nyumbali
- Pengine (Taja)

18. Je unadhani kuna umuhimu wa kumpa motto maziwa ya kwanza yale mazito nay a manjano yanayotoka siku za mwanzo baada ya mama kujifungua?

- Ndiyo
- Hapana

19. Kama NDIYO, kwanini unafikiri hivyo? (Tiki yote atakayokutajia)

- Yanamsaidia mtoto kua vijiudu vinavyosababisha magonjwa
- Yanasaidia kumpa mtoto kinga dhini ya magonjwa
- Mtoto hatapata njaa haraka maana ni mazito sana
- Sijui
- Nyingine (Taja)
- Haimhusu

SEHEMU C II: MUDA WA KUNYONYESHA

20. Mtoto anatakiwa kunyonya mara ngapi kwa siku?
- Kila anapohitaji
 - Kwa ratiba maalum
 - Nyingineyo (Taja)
 - Sijui
21. Je ni sahihi kumnyonyesha mtoto kwa muda wa dakika 15-20 kila mara anayonyonya?
- Ndiyo
 - Hapana
22. Unafikiri maziwa ya mama pekee bila hata maji ni chakula tosha kabisa kwa mtoto hadi umri gani?
- Chini ya wiki moja
 - Wiki moja hadi mbili
 - Mwezi mmoja hadi mitatu
 - Miezi sita
 - Nyingineyo (Taja)
23. Je una mpango wa kumpa mwanao maziwa ya kopo katika miezi sita ya mwanzo?
- Ndiyo
 - Hapana
24. Umri gani ni sahihi kuanza kumpa mtoto vyakula vya kulikiza? (vyakula vingine zaidi ya maziwa ya mama)
- Chini ya mwezi mmoja
 - Kati ya miezi 2-3
 - Kati ya miezi 4-5
 - Miezi 6
 - Zaidi ya miezi sita
 - Sijui
25. Ni sahihi unyonyeshaji maziwa ya mama uendeleo hadi mtoto afikishe miaka 2 hata kama anakula vyakula vingine?
- Kweli
 - Skweli

26. Ni sahihi kwa mama kumpa maziwa ya kopo na maziwa ya mama mtoto ambae ameanza kula vyakula vingine.

- Kweli
- Si kweli

SEHEMU C III: MASUALA YA UHALISIA KATIKA UNYONYESHAJI

27. Kumpa mtoto maji ya kunywa kunahimizwa sana kila baada ya kumnyonyesha

- Kweli
- Si kweli

28. Mtoto anatakiwa kunyonya usiku

- Kweli
- Si kweli

29. Kwa maoni yako Je ni sahihi kuendelea kumnyonyesha mtoto wakati wa:
Changua moja

	Ndiyo	Hapana	Sijui
Ujauzito			
Mama mgonjwa			
Mtoto mgonjwa			
Hedhi			
Mama anatumia dawa			
Ameathirika na virusi vya UKIMWI			
Mlevi wa pombe			

SEHEMU C IV: KUNYONYESHA KWA UFANISI

Katika maswali yafuatayo, tafadhali nieleze ni kwa kiasi gani unakubaliana au unakataa kuhusu sentensi zifuatazo.

30. Watoto wataongezeka uzito kama watanyonyeshwa ipasavyo

- 1) Nakubali kabisa
- 2) Nakubali
- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

31. Njia sahihi ya kumweka mtoto katika ziwa inahamasisha unyonyeshaji ipasanyo

- 1) Nakubali kabisa
- 2) Nakubali

- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

32. Watoto wanapata usingizi mzuri baada ya kunyonya maziwa ya kutosha

- 1) Nakubali kabisa
- 2) Nakubali
- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

33. Maziwa ya mama yanapunguza hatari ya mtoto kupata homa za mapafu

- 1) Nakubali kabisa
- 2) Nakubali
- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

34. Mtoto anaenyonya maziwa ya mama si rahisi kupata magonjwa ya kuhara

- 1) Nakubali kabisa
- 2) Nakubali
- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

35. Maziwa ya mama yanamlinda zaidi mtoto na mzio (aleji) ukilinganisha na maziwa ya kopo

- 1) Nakubali kabisa
- 2) Nakubali
- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

36. Unyonyeshaji maziwa ya mama unasaidia katika ukuaji mzuri wa meno na fizi za mtoto

- 1) Nakubali kabisa
- 2) Nakubali
- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

SEHEMU C V: FAIDA ZA KUNYONYESHA KWA MAMA

37. Mama anaponyonyesha anapata faida za kiafya

- 1) Nakubali kabisa
- 2) Nakubali
- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

38. Kunyonyesha kikamilifu ni njia ya asili ya uzazi wa mpango

- 1) Nakubali kabisa
- 2) Nakubali
- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

39. Kunyonyesha kikamilifu kunasaidia kupunguza tumbo baada ya kujifungua

- 1) Nakubali kabisa
- 2) Nakubali
- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

40. Mama anayenyonyesha kikamilifu anarudia uzito wake wa kabla ya ujauzito haraka zaidi kuliko asiyenyonyesha.

- 1) Nakubali kabisa
- 2) Nakubali
- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

41. Mama anayenyonyesha kikamilifu sio rahizi kupata matatizo na magonjwa ya matiti.

- 1) Nakubali kabisa
- 2) Nakubali
- 3) Nakubali na sikubali
- 4) Sikubali
- 5) Sikubali kabisa

SEHEMU C VI: MATATIZO WAKATI WA KUNYONYESHA

42. Je ukipata matatizo wakati wa kunyonyesha, utamuendea nani kwa ajili ya msaada?

- Mume au baba wa mtoto

- Mama
- Wanafamilia wengine
- Marafiki
- Muuguzi wa kliniki ya mama na mtoto
- Wengineo (Taja)

43. Je unadhani ni watu gani muhimu wa kutoa msaada na mawazo kuhusu matatizo yanayojitokeza wakati wa kunyonyesha?

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SEHEMU D: NIA YA KUMNYONYESHA MTOTO ATAKAEZALIWA

44. Je una mpango au nia ya kumnyonyesha mtoto atakae zaliwa?

- Ndiyo
- Hapana
- Sijapanga bado

45. Kama jibu ni NDIYO, je unapanga kumnyonyesha hadi afikishe umri gani?

46. Kama jibu ni HAPANA, je kwanini huna nia ya kumnyonyesha?

.....

47. Je utamuanzishia vyakula vingine (zaidi ya maziwa ya mama) akiwa na umri gani?

.....

48. Je ni sababu gani inakufanya upange kumuanzishia vyakula vingine katika umri huu?

- Kwa umri huo atakuwa na njaa
- Atakuwa mkubwa na umri huo unaruhusu
- Huo ndio umri ambao mama yangu aliniazishia vyakula vingine
- Ndugu, jamaa na marafiki ndivyo wanashauri
- Nyinginezo (Taja)
-
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NASHUKURU SANA KWA USHIRIKI WAKO