Predictors of appropriate breastfeeding knowledge among pregnant women in Moshi Urban, Tanzania: a cross-sectional study

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Abstract

Background: Knowledge on infant feeding among pregnant women is essential when promoting optimal breastfeeding practices. This study aimed to assess the knowledge of women on optimal breastfeeding during pregnancy and associated factors as well as performance of the health system in reaching women with information on breastfeeding and infant feeding issues.

Methods: A cross-sectional study was conducted from October 2013 to April 2014 among pregnant women, in their third trimester, attending for routine care at two primary health care facilities in Moshi urban, northern Tanzania.

Results: A total of 536 women were enrolled, with mean age of 25.9 (SD 5.7) years. Only 51% (n = 274) reported to have received counselling on breastfeeding from their healthcare providers during the current pregnancy. More than seven out of ten pregnant women were knowledgeable about key issues regarding appropriate breastfeeding practices: importance of colostrum (95%), time of breastfeeding initiation (71%), exclusive breastfeeding (EBF) (81%), and time of introducing complementary feeding (83%).

Receiving counselling on breastfeeding during the current pregnancy (Adjusted Odds Ratio [AOR] 3.7; 95% Confidence Interval [CI]: 2.4, 5.7), having two children (AOR 2.6; 95% CI : 1.5, 4.4), having three or more children (AOR 3.5; 95% CI: 1.8, 6.9) and intention to breastfeed the child exclusively (AOR 3.6; 95% CI: 2.0, 6.5) were significantly associated with appropriate breastfeeding knowledge.

Conclusions: The health system failed to reach the 49% of women who did not receive counselling on infant feeding. Pregnant women who had received counselling on optimal breastfeeding and women with more than one child were more likely to have knowledge of optimal breastfeeding practices.

Keywords: Breastfeeding knowledge, Infant feeding, Exclusive breastfeeding, Optimal breastfeeding practices, Predictors, Tanzania

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Background
Despite strong evidence on immediate and long term health benefits of optimal breastfeeding in children, as shown by different studies [1–11], its practice remains very low. The initiation of breastfeeding, that is breastfeeding within an hour after delivery, is not highly practiced in many countries. In Tanzania for example, breastfeeding initiation within 1 h after birth was reported to be 59% in the 2004–2005 Tanzania Demographic and Health Survey (TDHS) and 49% in the 2010 TDHS [12, 13]. In South Asia, initiation of breastfeeding within 1 h after birth is low. Studies in India, Bangladesh and Pakistan have reported early initiation of breastfeeding prevalence of 36.4, 24 and 8.5% respectively [14].

It was estimated that in 2010 only 39% of infants aged less than six months were exclusively breastfed (EBF) in developing countries, a slight increase from 33% in 1995 [15]. In Sub Saharan Africa (SSA) countries where breastfeeding is widely practiced, only 35% of infants’ are exclusively breastfed with wide variability between countries. Data from the Demographic and Health Surveys (DHS) show that the coverage of EBF is higher in Eastern Africa (range 32–63%) compared to Southern (32–36%) or West Africa (13–25%) [16]. In order to achieve the benefits of optimal breastfeeding, more emphasis is needed on transmitting knowledge to women on the practice of optimal breastfeeding.

Several studies have evaluated prevalence and the factors influencing EBF in various SSA settings among women with infants aged six months to 12 months [17–20]. Results showed knowledge of EBF and counselling on breastfeeding during pregnancy or after delivery to be important factors influencing EBF [21, 22]. A study in Central Nepal showed that with support from health care workers and family members mothers were enabled to practice successful breastfeeding [23]. However, there is limited literature on the level of knowledge on optimal breastfeeding practices among women during pregnancy and how this may influence future optimal breastfeeding practices.

This study aims to describe the level of knowledge on optimal breastfeeding practices and associated predictors among pregnant women in Moshi municipality, northern Tanzania. This area has been chosen because studies have shown that EBF is not commonly practiced, hence to find out what is really the problem. It also assessed the source of information on breastfeeding among pregnant women attending routine antenatal care at primary health centres.

Methods
Study design and site
This is a cross-sectional study that aimed to describe infant feeding knowledge among pregnant women and factors influencing exclusive breastfeeding and complementary feeding among women enrolled in their third trimester of pregnancy. This paper will report on factors affecting optimal breastfeeding knowledge and its source among women during pregnancy in Moshi Municipality, northern Tanzania.

Enrolment of the pregnant women was conducted between October 2013 to April 2014 and the follow up was done up to June 2015 in the two largest government primary health care clinics (PHC), Majengo and Pasua located in Moshi municipal, in Kilimanjaro region.

Study sample
The study population included pregnant women, who were in their third trimester and attending routine care at the two clinics. Purposive sampling was used to recruit participants for the study. All pregnant women who were attending antenatal clinic from the two clinics were considered eligible for the study. Pregnant women were first informed about the study, its aims and follow up requirement. They were informed that the study will assess their knowledge of breastfeeding, and that after enrolment they will be followed up during delivery, at 7 days and then monthly up to 6 months and finally every third month up to 1 year. Those who met the inclusion criteria and who gave informed consent were invited to participate. A total of 536 pregnant women participated in the study [24].

Data collection procedure
Face to face interviews were conducted using questionnaires to collect information on: socio-economic and demographic factors, frequency of antenatal clinic (ANC) use, infant feeding and breastfeeding counselling offered, infant feeding method preferred, knowledge about exclusive breastfeeding, knowledge of optimal breastfeeding practices, and on their perception and intention to exclusively breastfeed their infants. They were also asked about the optimal time for the initiation of breastfeeding, giving of colostrum, introduction of complementary feeding and the duration of breastfeeding as recommended in Tanzania.

The local language Swahili, was used in all interviews.

Data processing and analysis
The data were entered, cleaned and analyzed using SPSS versions 22 (SSPS, Chicago, IL, USA) [25]. Continuous data were summarized by using means and median with respective measures of dispersion, while proportions were used to summarize categorical variables. The odds ratio (OR) with its associated 95% confidence interval was used to assess the strength of association between knowledge on optimal breastfeeding practices and
predictor variables. Logistic regression analysis was used to control for confounding factors.

**Categorization of knowledge of optimal breastfeeding practices**

The assessment of correct knowledge on EBF was based on two variables: a) understanding that the child is to be given breast milk only (except medications), and b) this should be practised from birth up to 6 months of the infant’s life. Adequate knowledge of optimal breastfeeding practices was considered to be correct information for the following three variables: a) that breastfeeding should be initiated within 1st hour after birth, b) the duration and definition of exclusive breastfeeding, and c) the appropriate age to introduce complementary feeding. The categorization was based on WHO recommendations and the definition of optimal breastfeeding practices.

**Ethical considerations**

Ethical clearance was obtained from Ethics Committee of Kilimanjaro Christian Medical University College (Ethical Clearance certificate number 899) and the Regional Committees for Medical and Health Research Ethics (REK) of Norway. Permission to conduct the study at Moshi Municipal facilities was sought from the District Medical Officer of Moshi Municipal and the Heads of Majengo and Pasua Health Committees.

Written informed consent was sought from each participant before enrolment and for those who could not write, a right thumb print was used. Research subjects were identified by a code number in all of the questionnaires.

**Results**

Table 1 shows the socio-demographic and reproductive health characteristics of the participants (n = 536).

| Variables                  | Number | Percent |
|----------------------------|--------|---------|
| **Age**                    |        |         |
| 15–24                      | 260    | 48.5    |
| 25–34                      | 230    | 42.9    |
| 35–45                      | 46     | 8.6     |
| **Marital status**         |        |         |
| Married/cohabiting         | 479    | 89.4    |
| Single/separated/divorced  | 57     | 10.6    |
| **Education**              |        |         |
| None                       | 13     | 2.4     |
| Primary                    | 325    | 60.6    |
| Secondary and above        | 198    | 36.9    |
| **Employment**             |        |         |
| Yes                        | 365    | 68.1    |
| No                         | 171    | 31.9    |
| **Water source**           |        |         |
| Within the compound        | 391    | 72.9    |
| Around the village         | 145    | 27.1    |
| **Meal frequency**         |        |         |
| One                        | 9      | 1.7     |
| Two                        | 23     | 4.3     |
| Three                      | 485    | 90.5    |
| Four and above             | 19     | 3.5     |
| **Alcohol**                |        |         |
| No                         | 461    | 86      |
| Occasionally               | 70     | 13.1    |
| Daily                      | 5      | 0.9     |
| **No. Living children**    |        |         |
| 1                          | 173    | 34.5    |
| 2                          | 92     | 18.4    |
| 3 and above                | 48     | 9.6     |
| **Age of last born**       |        |         |
| < 2years                   | 32     | 6.4     |
| 2–4years                   | 112    | 22.4    |
| > 4years                   | 164    | 32.7    |
| **Place of last delivery** |        |         |
| (n = 333)                  |        |         |
| Hospital                   | 316    | 95      |
| Home                       | 17     | 5       |
| **ANC visits**             |        |         |
| (n = 525)                  |        |         |
| Once                       | 17     | 3.2     |
| 2–3 times                  | 344    | 65.5    |
| 4 or more times            | 164    | 31.2    |
61.2% of the women were able to answer all of the three components correctly (i.e. initiation of breastfeeding within 1 h after birth, exclusive breastfeeding and knowledge on time to introduce complementary feeding) and were thus considered to be knowledgeable on optimal breastfeeding practice.

The women were also asked about their sources of information on optimal breastfeeding practices. Many 54% (290) reported to have received the information from health facilities, followed by media 36.0% (191), see Fig. 1.

**Predictors of knowledge on optimal breastfeeding practices**

In a bivariate logistic regression, single mothers had decreased odds of having knowledge on optimal breastfeeding practice compared to married/cohabiting mothers, Table 3. Women whose last born was older than 4 years of age also had decreased odds on knowledge about optimal breastfeeding practices (OR 0.3; 95% CI: 0.1, 0.8) compared to others. The odds of having knowledge on optimal breastfeeding practices was 2 times higher among women aged 25–49 years and 3 times higher among women with 2 or more pregnancies. The odds of having knowledge on optimal breastfeeding practices was four times higher among women who received counselling on breastfeeding or infant feeding during antenatal care attendance compared to others. Other factors like education and partner’s education were assessed but not associated with knowledge on infant feeding (see Table 3).

In multivariate logistic regression, counselling on infant feeding options (AOR 3.7; 95% CI: 2.4, 5.7), intention to practice EBF (AOR 3.6; 95% CI: 2.0, 6.5) and gravid 2 (AOR 2.6; 95% CI: 1.5, 4.4) and gravid 3 or more (AOR 3.5; 95% CI: 1.8, 6.9) remained associated with knowledge on optimal breastfeeding practices.

**Discussion**

In this study it was found that at least half of the women who attended antenatal care had received counselling on optimal breastfeeding practices (51%). The results also showed that women who received counselling on infant feeding options during pregnancy and have been pregnant more than once had higher knowledge on optimal breastfeeding practices than others.

The results showed that almost half of the women who attended antenatal care had not received counselling on breastfeeding and on infant feeding (49%). This is notable, given that 96.7% of the pregnant women in this study had attended for antenatal care two or more times. The results are similar to those from Tanga in Tanzania and Northwest Ethiopia where most women
attended antenatal care but few received counselling on infant feeding. In the study from Muheza district in Tanga region, 80% of the women attended for antenatal care at least once but only 39% had received counselling on infant feeding practices [22]. The study in Ethiopia showed that 78% of the women attended antenatal care at least once but only 48% had received counselling on infant feeding practices [26]. Even among those who receive counselling, the information given is suboptimal. For example only 42% of those counselled were informed about exclusive breastfeeding. Few women were counselled about attachment (23%), positioning (28%) or about breast problems like mastitis (10%) which are key when initiating and maintaining breastfeeding. The

Table 3 Factors affecting appropriate knowledge on breastfeeding practices among pregnant women in Moshi urban

| Variables                        | Number | Appropriate breastfeeding knowledge n (%) | OR 95% CI | AOR 95% CI |
|----------------------------------|--------|-------------------------------------------|-----------|------------|
| **Age**                          |        |                                           |           |            |
| 14–24                            | 260    | 132 (50.8)                                | 1         | -          |
| 25–34                            | 230    | 145 (63.0)                                | 1.6 (1.2, 2.4) | 0.9 (0.5, 1.6) |
| 35–49                            | 46     | 31 (67.4)                                 | 2.0 (1.0, 3.9) | 0.9 (0.3, 2.6) |
| **Education**                    |        |                                           |           |            |
| None                             | 13     | 5 (38.5)                                  | 1         | -          |
| Primary Education                | 325    | 193 (59.4)                                | 2.3 (0.1, 7.3) | -          |
| Secondary and higher education   | 198    | 110 (55.6)                                | 2.0 (0.6, 6.3) | -          |
| **Marital status**               |        |                                           |           |            |
| Married/cohabiting               | 479    | 285 (59.5)                                | 1         | -          |
| Single/separated/divorced        | 57     | 23 (40.4)                                 | 0.4 (0.3, 0.8) | 0.5 (0.3, 1.1) |
| **Number of pregnancies**        |        |                                           |           |            |
| 1                                | 188    | 71 (37.8)                                 | 1         | -          |
| 2                                | 171    | 113 (66.1)                                | 3.2 (2.1, 5.0) | 2.6 (1.5, 4.4) |
| 3 and Above                      | 177    | 124 (70.1)                                | 3.9 (2.5, 6.0) | 3.5 (1.8, 6.9) |
| **Antenatal visits**             |        |                                           |           |            |
| Once                             | 17     | 14 (82.4)                                 | 1         | -          |
| 2–3 times                        | 344    | 204 (59.3)                                | 0.3 (0.1, 1.1) | 0.3 (0.1, 1.5) |
| 4 and above                      | 164    | 83 (50.6)                                 | 0.3 (0.1, 0.8) | 0.2 (0.0, 1.0) |
| **Counselling on appropriate breastfeeding practices** | | | | |
| Yes                              | 274    | 203 (74.1)                                | 4.3 (2.9, 6.2) | 3.7 (2.4, 5.7) |
| No                               | 262    | 105 (40.1)                                | 1         | -          |
| **Age of last born**             |        |                                           |           |            |
| < 2 years                        | 32     | 28 (87.5)                                 | 1         | -          |
| 2–4 years                        | 112    | 79 (70.5)                                 | 0.3 (0.1, 1.1) | -          |
| > 4 years                        | 163    | 108 (66.3)                                | 0.3 (0.1, 0.8) | -          |
| **Partner’s age**                |        |                                           |           |            |
| 14–24                            | 80     | 33 (41.3)                                 | 1         | -          |
| 25–34                            | 282    | 177 (62.8)                                | 2.4 (1.4, 3.9) | 1.7 (0.9, 3.2) |
| 35–49                            | 139    | 84 (60.4)                                 | 2.2 (1.2, 3.8) | 0.9 (0.4, 2.2) |
number of pregnant women that did not receive counselling on breastfeeding implies that the health system is missing the opportunity to improve women's knowledge on appropriate infant feeding practices hence making it harder to improve the uptake and adherence to the recommended optimal breastfeeding practices. The Tanzania Focused Antenatal Care Guideline recommends that all women should receive counselling on breastfeeding as early as the first trimester [27].

In this study, counselling on breastfeeding and infant feeding during pregnancy was associated with acceptable levels of knowledge on optimal breastfeeding practices. While having knowledge on its own does not imply change in practice, several studies have shown that counselling during pregnancy not only improves knowledge, it also influences EBF practices. Studies in Kigoma and Kilimanjaro Tanzania, Zambia and Malawi have shown that women who received counselling from health providers during the antenatal or immediate postnatal periods were more likely to practice exclusive breastfeeding [20, 28, 29]. Given that 96% of pregnant women in Tanzania attended antenatal care at least once, and the finding that counselling on breastfeeding improves both knowledge and practice, health care workers should take the opportunity to educate women who attend during pregnancy and for postnatal care on breastfeeding and other key interventions to improve the health of the newborn and children. More emphasis should be put on improving counselling skills and knowledge to pregnant women as soon as they attend for antenatal care.

While only 51% of these pregnant women reported receiving counselling on breastfeeding from providers, more than 70% had knowledge of individual components of optimal breastfeeding practices. Other sources of information may have influenced their knowledge. In this study 36% (191) of the women received information on breastfeeding from the media (TV, newspapers, mobile, brochures), 30.9% (164) from close family members (mothers, sisters, mother in-law) and 30.1% (160) from neighbours. This was also found in a study by Asfaw et al. [30] in Central Ethiopia where 30.4% of women had also received information from the media and 18.4% from their friends. This shows that other sources of communication can be a good source of knowledge on appropriate feeding practices. The Ministry of Health and Social Welfare (MOHSW) should therefore develop a media strategy on optimal breastfeeding practices using radio, television drama and mobile technology, with short messages as another way of imparting knowledge to the community in general and women of reproductive age on appropriate breastfeeding and infant feeding practices.

In this study, 70.7% of the women knew that breastfeeding should be initiated within 1 h. In a study done in Kilimanjaro among women with children less than 36 months, the initiation of breastfeeding within 1 h after birth was 80% [21]. Knowledge on the optimal initiation of breastfeeding probably has an influence on practice. In the TDHS 2010 report it was reported that initiation of breastfeeding within 1 h after birth in Tanzania is only 49% which has dropped from 59% in the 2004 report. This is very low and can affect the other components of optimal breastfeeding practices. Delayed initiation of breastfeeding has been found to have implications for the health of infants. Early initiation of breastfeeding within 1 h after birth has been found to reduce neonatal mortality by 22.3 and 16.3% if breastfeeding was initiated within 1 day [22]. Hence women should be taught the importance of initiating breastfeeding within 1 h as early as when they are still pregnant and soon after birth to be encouraged to start breastfeeding.

Knowledge on appropriate/optimal breastfeeding practices in this study was 61.2%, this is low given most pregnant women attended antenatal clinic more than once (96.7%). While more than 95% of Tanzanian children are breastfed for an average of 20.9 months, the other components of optimal breastfeeding practices are not performed adequately, like initiation of breastfeeding within 1 h after birth (49%), EBF (50%) or introduction of other foods and prelacteal feeding (37%) [12, 13]. It may be that the health providers are satisfied as long as the women breastfeed the children, and they forget to stress the importance of other components and their advantages in optimal growth and prevention of morbidity and mortality [2, 3, 5, 11]. There is a need to improve the training of providers on breastfeeding and child feeding issues in general. The country needs to come up with a communication strategy that will be simple and user friendly, for the women and community on breastfeeding and infant feeding practices in Tanzania. This can then be used both at facilities and in communities to contribute in improving poor breastfeeding and nutrition indicators among infants and children as a whole.

Women with three or more children were three times more likely to have knowledge on optimal breastfeeding practices than women with fewer children. This might be because the more children the woman has, the more likely she have visited the ANC more times and have received counselling every time they visit. They have also received a lot of information during postnatal visits.

Limitations and strengths of the study

The study included pregnant women in urban Kilimanjaro hence the findings cannot be generalised for rural women in Kilimanjaro or Tanzania in general. Further, the study evaluated knowledge on optimal
breastfeeding practices during pregnancy hence it is difficult to assess whether knowledge would lead to practice after delivery. Despite the weaknesses, this study is among the few studies that have addressed the knowledge on all optimal breastfeeding practices and not only exclusive breastfeeding.

**Conclusion**

Based on the findings of this study we can conclude that women’s knowledge on optimal breastfeeding practice is still a low 61.5%. Ninety nine per cent of the women attend for antenatal care and 49% did not receive counseling on breastfeeding and on infant feeding practices. The study also shows that many women intended to practice EBF after delivery (83%) but few received counselling on attachment, positioning and how to deal with breast problems, an important issue to support women with their intention. Gravida and counselling were shown to have a positive influence on knowledge about optimal breastfeeding practices. Therefore emphasis should be put on making sure that every pregnant woman attending antenatal care receives counselling on appropriate infant feeding practices. Other channels of disseminating information on optimal breastfeeding practices for child growth and survival, like the media should also be used. Combining facility based and community methods of counselling might help in increasing the number of women who are aware of the importance and improve the adherence to optimal breastfeeding practices.

**Abbreviations**

ANC: Antenatal care; AOR: Adjusted odds ratio; DHS: Demographic health survey; EBF: Exclusive breast feeding; HPC: Primary health care; SSA: Sub Saharan Africa; TDHS: Tanzania demographic health survey; WHO: World Health Organisation

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**Availability of data and material**

The dataset analysed for the current study is available from the corresponding author on reasonable request.

**Authors’ contributions**

THH, KM, JK, JGU, BS, MW and SEM contributed to the design of the study. THH, KM and JK collected the data. THH, MM, DJD and SEM analysed the data. THH, MM, BS, MW and SEM interpreted the results. THH prepared the manuscript and all the other authors reviewed the manuscript before submission. All authors read and approved the final manuscript.

**Competing interests**

The authors declare that they have no competing interests.

**Consent for publication**

Not applicable.

**Ethics approval and consent to participate**

Ethical clearance was obtained from Ethics Committee of Kilimanjaro Christian Medical University College (Ethical Clearance certificate number 899) and the Regional Committees for Medical and Health Research Ethics (REK) of Norway. Permission to conduct the study at Moshi Municipal facilities was sought from the District Medical Officer of Moshi Municipal and the Heads of Majengo and Pasa Health Committees. Written informed consent was sought from each participant before enrolment and for those who could not write, a right thumb print was used. Research subjects were identified only by a code number in all of the questionnaires.

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