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Feeding practices and nutritional status of infants in Morogoro Municipality, Tanzania

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Abstract: Breast feeding practice especially exclusive breast feeding (EBF) is a major determinant of child growth and development. In Tanzania, most women breastfeed their infants for long periods, but many introduce alternative feeding too early in life. The objective of this study was to determine factors affecting EBF and the relationship between feeding practices and the nutritional status of infants. This cross-sectional survey, using a semi-structured questionnaire, was conducted in Morogoro Municipality in Tanzania. The study involved lactating women recruited from five randomly selected health facilities. Demographic, clinical, knowledge and practices related to infant feeding as well as infant anthropometric information were collected. Infant nutritional status was assessed based on weight-for-age, height-for-age and weight- for- height. There were wide variations in knowledge and practice of breastfeeding among women. Majority (92%) of the respondents gave colostrums to infants although more than 50% did not know its benefits. Eight percent of the respondents discarded colostrums on the account that it is not good for their neonates. Only 23.1% of the respondents thought that infants should be breastfed exclusively during the first six months of infancy. Ninety–eight percent of infants < 1 month of age received breast milk only, compared with 28.5% of infants aged 2-3 months and 22.3% among those who were above 3 months of age. No child in the ≥4 months old was exclusively breastfed. Over 80% of the infants had normal weights, 13% were stunted and 8% wasted. EBF was associated with higher scores for height- for- age Z ($P<0.05$) and weight- for- height Z ($P<0.01$). Age, education level and occupation of respondents were important predictors of EBF. Overall, breast feeding practices in the study population were largely suboptimal. As a result, considerable proportions of children had poor health indicators. Thus, correct breastfeeding practices should be supported and promoted to improve the well-being of children.

Key words: breastfeeding, practice, infant, nutritional status, Tanzania

Introduction

Breastfeeding play a crucial role in child nutrition and development status. Studies have shown that infant weight and height gains during early postnatal life are influenced by infant feeding practices (Picciano *et al.*, 2001). Several guidelines have been developed to promote appropriate infant feeding including the optimal duration of exclusive breastfeeding (EBF). The World Health Organization recommends EBF for the first six months of life (WHO, 2000). This recommendation is based on evidence of the importance of good nutrition in the early months of life and the role it has in achieving good health. The benefits include prevention of disease and infection in childhood (Mihrshah *et al.,* 2003; Hannon *et al.,* 2004) and improved cognitive and motor skills development (Sacker *et al.,* 2006; Kramer *et al.,* 2008).

Breastfeeding practices are determined by various factors including cultural norms, beliefs, mother's knowledge and previous experience (Amal *et al.,* 2007; Nkala & Msuya, 2011). These factors operate differently across communities and therefore, do affect child health to varying degrees. In Tanzania, 42% of children are stunted (TDHS, 2010). Stunting in children leads to delay in motor and mental development and increased morbidity and mortality, low physical strength and low economic productivity in adulthood (Grantham-McGregor *et al.,*

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1996; Hacker & Ryan, 2003; Semba, 2008). Nutritional problems of children are to a large extent associated with inappropriate feeding practices (Cernades *et al.*, 2003).

Any breast feeding is beneficial, however, EBF, where the infant only receives breast milk with no additional foods or drinks, has been shown to have short- and long-term benefits for both mother and child (WHO, 2000). Although breast feeding is a norm for most mothers in Tanzania, much remains unclear about the actual practices of infant feeding, their influence on infant nutritional status and the predictors of breast feeding. The objective of this study was to determine the relationship between feeding practices and the nutritional status of infants aged <6 months in Morogoro Municipality in Tanzania.

Materials and Methods

Study area and design

The study was conducted in Morogoro Municipality in Tanzania. The Municipality is located at latitude 6° 49'S and longitude 37°40' E, approximately 200 km west of Dar es Salaam and about 500 m above sea level. It has a population of 2,218,492 people of whom 50.7% are females and 49.3% are males (NBS, 2013). The study area has a one administrative division with 19 wards and 17 health facilities offering Reproductive Child Health services. Five randomly selected facilities, namely, Uhuru, Sabasaba, Mafiga, Kingulwira and Morogoro Regional Hospital were involved in this study carried out in 2010. Sample size was estimated using the following formula (Amin, 2002):

$$N = \frac{(Z)^2 P(1-P)}{\lambda^2}$$

Where N=sample size; P=percentage of women attending antenatal clinic whose children were 0-6
λ=maximum error

Since P was not known for the study population, its value was assumed to be 50% as it ensures maximum sample size (Nwankwo & Nwoke, 2009). Further, a maximum error of 10% and a non- response rate of 30% were assumed. A sample size of 130 women was obtained. Thus, in each facility, 26 women were randomly selected.

A semi-structured questionnaire was used to obtain information such as demographic characteristics, infant weight and length, health care and infant feeding practices. In addition, two health service providers in each facility were selected for interview. Only children who were biological off springs of mothers attending clinic were included in the measurements.

Anthropometric measurements

Infants, of both sexes aged 0-6 months, were measured for height (cm) and weight (kg) to assess their nutritional status. Weight was measured on an electronic SECA weighing scale (SECA Vogel and Halke, Haamburg, Germany) that had a digital display. Height was measured with a portable Harpenden stadiometer (Holtain Ltd, London, UK). Readings were made to the nearest 0.1cm. Adherence to the measuring techniques and recording procedures were observed to reduce measurement error.

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Data analysis

Data were analyzed for descriptive statistics such as frequencies and percentages using Statistical Package for Social Sciences (SPSS) version 12. Binary Logistic Regression Analysis was used to identify socio-demographic factors that are significantly associated with EBF. In addition, t-tests were used to compare average z- scores on nutritional status indicators between exclusively breastfed and non-exclusively breastfed children. Nutritional status was analysed using Epi- Info statistical package where height for age Z-score (HAZ), weight for age Z-score (WAZ) and weight for height Z- score (WHZ) were used to classify children according to degree of nutritional status.

Ethical consideration

Ethical approval was obtained from the Sokoine University of Agriculture, Human Studies Ethics Committee. Permission was sought from the Morogoro Region Health authority to conduct the study in the health facilities. Participants were requested for their informed consent to affirm their willingness to participate in the study.

Results

Characteristics of subjects

A total of 130 lactating women participated in the study. Most of them (72.3 %) were 21 to 35 years old while 16.2 % were below 20 years. Majority of the women (80 %) in this study had attained primary education and 10% had secondary school education (Table 1). Self employed and civil services constituted over 60% of the occupation of the respondents. The proportion of women with lower parity (1-2) and higher parity (5-7) was 70.8% and 10.8 %, respectively.

Table 1: Social-demographic characteristics of subjects (n=130)

Category	Response	Frequency	Percent
Age of mothers (years)	<20	21	16.2
	21-35	93	72.3
	>36 and above	15	11.5
Marital status	Married/living together	117	90.0
	Single/widowed/divorced	13	10.0
Education level	No formal education	8	6.2
	Primary education	104	80
	Secondary	13	10
	Posts secondary	5	3.8
Occupation	Civil servant	18	13.8
	Self-employed	54	42.3
	Housewife/home maker	49	37.7
	Student	8	6.2
Parity	1-2	92	70.8
	3-4	24	18.5
	5-7	14	10.8

Infant feeding practices and breast feeding management

Only 16% of mothers initiated breastfeeding one hour after delivery. For the majority of subjects (84%), breastfeeding was initiated 24 hours post delivery. The majority (92%) of

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women gave colostrums to their infants. However, 50% of them did not know its benefits (Table 2). Eight percent of the mothers discarded colostrum on the account that it was not good for their neonates. Instead, infants were offered other fluids especially water before mature milk was excreted. Almost all infants (98%) children were breastfed but 70% were fed on demand. Sixteen percent of the babies were breastfed 1-2 times a day. Although the health benefits of breastfeeding were acknowledged widely, opinions and practices regarding optimal duration of EBF were divided. Ninety–eight percent of infants under 1 month received breast milk only, compared with 28.5% of infants aged 2-3 months and 22.3% among those who were above 3 months of age. No child in aged above 4 months was exclusively breastfed.

Table 2: Breast feeding management of the respondents

Variable	Response	Frequency	Percent
Importance of colostrums	Nutrition and protection	62	47.7
	Do not know	68	52.3
Appropriate time for EBF (in months)	1	5	3.8
	2	13	10.0
	3	37	28.5
	4	29	22.3
	5	16	12.3
	6	30	23.1
Indicator that the baby is getting enough breast milk	Weight gain/good health	92	70.8
	Not crying	38	29.2
Problems experienced in breast feeding	Engorgement	16	12.3
	Painful breast	15	11.5
	Cracked nipple	10	7.7
	Mastitis	5	3.8
	Not enough milk	41	31.5
	Breastfeed only one breast	5	3.8
	None	38	29.2
Action taken if a baby is < 4 months and the mother feels that the baby is not getting enough breast milk	Thin porridge/cow's milk	79	60.8
	Baby formula	5	3.8
	Increase frequency of breastfeeding	23	17.7
	Express breast	5	3.8
	None	18	13.8

Nutritional status of infants

The majority of infants (89.7%) were within the range of normal weights. There was a higher prevalence (6.1%) of underweight among female than male infants (4.2%) children. Similarly, stunting (height for age Z score < -2) was more prevalent among females (8.1%) than males (4.9 %). The stunting rate of females and males combined was 13 % but only 8% of children were wasted (weight for height Z score < -2). The exclusively breastfed children had higher Height-for- Age Z score ($p< 0.05$) and Weight- for- Height Z score ($p< 0.01$) than children who were not exclusively breastfed (Table 3).

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Table: 3. Average scores for Height- for- Age (HAZ), Weight- for- Age (WAZ) and Weight- for-Height (WHZ) for exclusively breastfed and non- exclusively breastfed children

Indicator	Exclusively breastfed children			Non-exclusively breastfed children			t- value	P-value
	N	Mean	SD	*N*	Mean	SD		
HAZ	36	3.7	0.92	94	3.3	0.67	2.35	<0.05
WAZ	36	3.9	0.87	94	3.8	0.75	0.63	>0.05
WHZ	36	4.7	0.63	94	3.8	0.59	7.5	<0.01

Results of binary logistic regression analysis indicate a significant ($P<0.05$) association between age, education level and occupation of respondents and exclusive breastfeeding. Women who attained at least secondary education were 1.68 times more likely to practice EBF compared to those with primary or no formal education (Table 4). Women who were self-employed or not employed/ housewives were four to five times more likely to practice EBF than women with formal employment.

Table 4: Results of Binary Logistic Regression Analysis for reporting EBF (dependent variable) against various socio-demographic variables (independent variables)

Predictor	**Response**	β	**S.E**	**Wald-Statistic**	**Odds ratio Exp (β)**	**P-value**
Age of mother	<20 (Ref.)	0.45	0.12	14.06	1.57	<0.05
	20 – 35	0.73	0.19	14.76	2.08	<0.05
	≥ 36					
Marital status	Married/living together (Ref.)					
	Single/widowed/divorced	-0.06	0.10	0.36	0.94	>0.05
Educational level	No formal education (Ref.)	0.52	0.14	13.80	1.68	<0.05
	Secondary and above					
Occupation	Formal employment (Ref.)					
	Self- employed	1.34	0.45	8.87	3.82	<0.05
	Others (e.g. housewife)	1.56	0.51	9.36	4.76	<0.05
Main source of income	Salary/self-employed (Ref.)					
	Husband support	0.24	0.94	0.07	1.27	>0.05
Parity	1 -2 (Ref.)	0.22	0.79	0.08	1.25	>0.05
	More than 2					

Nagelkerke sq. = 0.57; Ref.=Reference category

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Discussion

Findings in this study show that socio-demographic characteristics of mothers have significant influence on feeding practices. The low level of women's education as observed in the present study has potential negative and indirect effects on child nutrition, feeding patterns and overall improvement of the socio-economic conditions (Huq & Tasnim, 2008). Low level of education is also associated with indirect effects on the understanding of nutrition and food aspects as well as improvement of socio-economic conditions (Mosha & Philemon, 2010). The Tanzania Health Survey (TDHS, 2010) report showed the likelihood of children being fed appropriately increases with mother's education. However, mothers who were formally employed indicated that both the frequency and duration of breastfeeding were affected as work conditions were not always conducive for optimal breast feeding. In Malta, Montalto *et al.* (2010) observed a general lack of support for breast feeding in the workplace, and many women stopped breast feeding. Supportive environment for breast feeding has been described as a critical determinant for successful breast feeding after 3 months or longer (Meek, 2001).

Breastfeeding initiation, the start of breastfeeding within one hour after delivery (WHO, 2000), was practiced by a small proportion of women. Delayed initiation deprives infants of the immunological and nutritional benefits of colostrum, and is likely to increase risks of neonatal mortality or impede optimal nutritional status (Edmond *et al.,* 2006). Colostrum is particularly rich in immunoglobulins, antimicrobial peptides, and other bioactive molecules, including growth factors. It is important for the nutrition, growth and development of infants and confers immunologic defence to neonates (Playford *et al.,* 2000; Lawrence & Pane, 2007). Breastfeeding for the first six months of infants' lives has been found to be a cost effective intervention in saving children's lives and can avert 13 – 15 % of the 9 million deaths of children under 5 years old in low and middle income countries (Jones *et al.,* 2003). Our study shows that prevalence of EBF is below the national average of 50 % (TDHS, 2010) and the prevalence of 36 % in low income countries (WHO, 2009).

The suboptimal breast feeding practices in terms of frequency and duration observed for most infants is not uncommon in Tanzania. For instance, as low as 19 % prevalence of EBF was found in Mbeya (Poggensee *et al.,* 2004) whilst in Morogoro, EBF was reported as rare and of short duration (Shirima *et al.,* 2000). These low rates of EBF are nonetheless not limited to Tanzania alone. Coutsoudis *et al.* (2001), in a prospective study in South Africa, reported a median duration of EBF of three weeks and a probability of 29 % of finding women breastfeeding at three months.

The low prevalence of EBF means early introduction of breast milk substitutes such as formula and other kinds of milk to infants. Often, milk substitutes provide too few calories andexpose the infants to the risk of infection (Imdad *et al.,* 2011).A meta-analysis from three developing countries showed that infants who were not breastfed had a six-fold greater risk of dying from infectious diseases within the first two months of life than those who were breastfed (WHO, 2000).

Nutritional status of children on the basis of weight-for-age (indicator of underweight), height-for-age (indicator of stunting) and weight-for-height (indicator of wasting) show considerable variations when compared with the national averages of nutritional status of children of similar ages. The present study demonstrates that10.3 % of children are underweight. This proportion is higher than the national average (8.7 %)for age<6 months(TDHS, 2010).Such variations could be due to differences in infant feeding practices and the many factors influencing child care including education, attitude towards EBF,

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knowledge about good breast feeding practices and cultural differences. Moreover, the sample sizes were different. The observed proportion of stunting children in our study (13 %) is lower than the national average (18.3%) for children in the age <6 months (TDHS, 2010). Stunting is a common problem in Tanzania (Matee *et al.,* 1997; Mamiro *et al.,* 2005; Leah, 2007; Clemens & Demombynes, 2012), and may have serious implications. It is worth noting that children deprived of nutrients for healthy growth are also deprived of nutrients for healthy brain development and healthy immune system (Amsalu &Tigabu, 2008).

The proportion of wasted children in the present study is higher than the national average (6.4 %) for children of similar age (<6 months) in Tanzania (TDHS, 2010). Wasting represents a more accurate reflection of current period of sickness and short term food shortage that led to significant weight loss; it also indicates deficit in tissue and fat mass compared with amount expected in a child of the same height or length and may result either from failure to gain weight or from actual weight loss (WHO, 2000). It is intriguing to note that non-exclusively breast fed children have had significantly lower scores of HAZ and WHZ than their counterparts. The findings are consistent with those from other studies (Kikafunda *et al.,* 1998; Playford *et al.,* 2000; Saha *et al.,* 2008; Amsalu & Tigabu, 2008) which show that inappropriate feeding practices can have profound consequences for the growth, development, and survival of children. Studies from Bangladesh and Brazil have shown that breastfed children, who were given additional food during the first six months of life, had two to threefold higher mortality from diarrhoea and pneumonia than infants who were exclusively breastfed (Black & Victora, 2002; Saha *et al.,* 2008). In contrast, a positive association between EBF and health status of the children has been documented (Smith &Haddad, 2000; Sheehan *et al.,* 2001). Thus, for the children to grow well, EBF needs to be supported and its importance communicated to prospective mothers taking into account, the predictors of EBF.

Specific individual differences in attitudes, beliefs and experience are known to influence the decision to breast feeding practices and therefore, as indicated in this study, predictors of EBF vary widely. Findings from other studies show that having higher years of education, giving birth at older age, having had previous pregnancies and living with a partner are associated with increased likelihood of six-month EBF (Dubois & Girard, 2003; Millar & Maclean, 2005; Semenic *et al.,* 2008; Al-Sahab *et al.,* 2010). Thus, it is plausible that background characteristics of mothers constitute the basis for designing interventions that aim to improve the breastfeeding practices in a particular area. A major limitation of this study is that the sample size was small and therefore, the findings cannot be generalized.

In conclusion, breast feeding practices in the study population were largely suboptimal. As a result, considerable proportions of children had poor health indicators. Thus, correct breastfeeding practices should be supported and promoted since proper nutrition during infancy is essential for attaining and maintaining good health. Because standards explicitly identify EBF as the normative mode for growth and development and survival of infants, accurate information on the importance of early initiation of breastfeeding andsix months of EBF would be particularly important.

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