Magnitude and Determinants of Bottle Feeding in a Peri-Urban Community

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LISTS OF ABBREVIATIONS

ANC Ante Natal Care

ARI Acute Respiratory Infection

BRHP Butajira Rural Health Project

HC Health Center

HS Health Station

KAP Knowledge, Attitude and Practice

MCH Maternal and Child Health

PA Peasant Association

UDA Urban Dwellers Association

WHO World Health Organization

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ABSTRACT

A descriptive cross-sectional survey was conducted in Butajira Woreda, south western Ethiopia, for a period of two months to determine the extent of bottle use in child feeding, factors associated with its use and the time of introduction of supplementary feeding. A total of 1536 households with children 0-23 months were included in the study. The study found out the overall prevalence of bottle feeding to be 11.3% and the prevalence among children on supplementary feeding to be 16.7%. Only 6.3% of the bottle fed children were on bottle alone. Residence, maternal education and occupation were significantly associated with the practice of bottle feeding in the crude analysis and after adjusting for parental and child characteristics ($P < 0.05$). Only 53.3% of the children received timely supplementary feeding, that is, between 4-6 months. Thirty four percent of children beyond the six months of age were found to be on exclusive breast feeding. Child bottle feeding practice was significantly associated with early introduction of supplementary feeding, $P<0.05$.

The extent of bottle feeding in the studied community is quite high and was found to be practised more among the relatively well to do members of the community, a trend which was seen in the developed world at the beginning of the century.

Improvement in maternal and child health services including health education are recommended.

INTRODUCTION

Breast feeding is an unequalled way of providing the ideal food for the healthy growth and development of infants .Breast feeding also has a unique biological and emotional influence on the health of both the mother and child (1). Most women know that breast feeding is the best way to feed a baby, but there are many pressures on them not to breast feed. Traditionally, women have always breast fed and learnt to do it from their mothers and other women in the community. But increasingly, bottle feeding is being considered as the modern and better way to feed the baby (1,2). Artificial formulas are sometimes promoted very aggressively and are even provided in hospitals. Once a mother starts to give formula, and stops breast feeding, it is difficult to restart breast-feeding because of a disturbance in the most crucial mechanism of successful lactation -the let-down reflex (1,3). Any factor interfering with the suckling at the breast by the infant will interfere with this mechanism and affect milk secretion, eventually causing the breasts to dry up. On the other hand, an infant who is used to sucking from a bottle may have difficulty sucking from a breast, because of the different sucking techniques employed (3).

Declines in breast feeding have been observed in developed countries since 1930s and then subsequently in the developing countries, particularly in urban areas and among educated and working women (3,4). This decline was accompanied by a shift to bottle feeding. However, this shift is being reversed in developed countries while most developing countries are still catching up. Although the elite in developing countries may look to these developed countries as trend setters, the return to traditional ways may take many years.

Extensive investigations have determined the advantages of breast feeding, but little attention has been paid to bottle feeding. Bottle feeding may be hazardous due to over-dilution of the supplement or faulty hygienic techniques used in its preparation, particularly in developing countries. Poor hygiene predisposes children to diarrhoeal diseases and malnutrition (5,6).

In Ethiopia, morbidity reports and community-based surveys have shown that diarrhoeal diseases and malnutrition are major public health problems, and major cause of morbidity and mortality in children (7-9). Other studies demonstrated a decline in breast feeding prevalence and duration and a rise in the prevalence of bottle feeding which is more pronounced among urban, better educated, and working women (10-13). Though the

hazards of bottle feeding affect both urban and rural children, the impact seems to be more pronounced in rural areas where access to health services is very low ,water supply is neither adequate nor safe, hygienic practice is poor and nutritional problems are abundant. Yet, to date there are no data on the prevalence of bottle feeding in Ethiopia. A very limited information on bottle feeding is incorporated in the few studies available on breast feeding in the country, and these reports fail to provide information necessary for later action. This study is thus designed to determine the prevalence and risk factors of bottle feeding in order to develop preventive intervention programmes in areas where bottle feeding is being practices.

Background of the study area

The study was conducted in Butajira Woreda which is located 130 Kms South of Addis. The total population of the Woreda is 227,600 according to the 1994 estimate(14). The Woreda is organized into 82 peasant associations (PAs) and 4 urban dwellers associations (UDAs). The major ethnic group is *Gurage* with further subdivision to minor ethnic groups, and the population is predominantly Muslim. Maize and Inset (false banana) are the main crops. Approximately 10.9% of the population is urban.

The Woreda has one health centre (HC), two health stations (HS) and six drug shops which serve the Woreda as well as the population of the adjoining Woredas. There is no hospital in the woreda; patients are referred to the two hospitals outside the Woreda 120 and 140 Kms south and west of Addis respectively. The major causes of under five mortality were acute respiratory infections (ARI) and diarrhoeal diseases according to the 1989 survey (15).

The Butajira rural health project (BRHP) was introduced in the area in 1986 with the purpose of developing a continuous demographic surveillance system and providing a base-line population and sampling frame for other health related activities to be carried out in the area. BHRP includes 9 PAs and 1 UDA which were selected randomly to represent the rural and the urban areas. A base-line census was performed in 1987 and since then, demographic surveillance with monthly visits to individual houses has been going on. Six of the PAs have health posts with a trained community health worker for each. No intervention programmes which could affect the study outcome were employed in the study villages by the project.

LITERATURE REVIEW

I. The problem of bottle feeding: changes in trends

The history of artificial infant feeding is one of repeated failure. Feeding bottles have been found in the graves of Roman infants (3). Early infant feeders were made of hollowed cow's horns with perforated ends, porcelain, and metal (silver spoons for the rich). In the 18th century boat shaped containers took the place of the earlier feeding bottles. In the 19th century the use of glass bottles spread rapidly. The invention of the rubber nipple, Pasteur's work on milk hygiene and the availability of an increasing variety of infant foods were some of the reasons that made artificial feeding of the infant easier in this century (3,16).

The prevalence and duration of breast feeding have declined in many parts of the world since the beginning of 1930s for a variety of social, economic and cultural reasons (3). Industrialization and urbanization with increased employment of women and early separation of mother and infant have contributed significantly to deteriorating breast feeding practices. The introduction of modern technology, the adoption of new life-styles affecting women's perspective about breast feeding, and wider availability of breast milk substitutes and feeding bottles have also reduced the

importance attached to the traditional practice of breast feeding in many societies. With this reduction of breast feeding, a rise in bottle feeding was observed in developed countries followed by developing countries (17,18). The change from breast to bottle in the industrialized countries of North America and Western Europe was not without its problems. The problems were similar to those encountered now in the developing countries or poor communities of some developed countries where the bottle has replaced the breast.

However, since the late 1970s the trend away from breast feeding is being reversed in Western countries, particularly among the educated women aware of the important advantages of breast milk. For instance, a study in Uppsala, Sweden, in 1978 have shown the prevalence of breast-feeding to rise to 34% from a mere 2% in 1972 (3). This trend was also seen in several other Western countries (19,20).

Many developing countries have cultures which strongly favour breast feeding. Mothers are expected to breast feed and statistics show high rate of breast feeding initiation or ever breast fed incidence, in most cases more than 95%. In these countries, breast feeding in public is widely accepted during the first few months, so that an observer sees many babies at breast (21). In this context, it may be wondered if any breast feeding

programme is necessary. However, the apparent persistence of breast feeding is masking the use of the third nipple - the bottle-, the eroding durations of breast feeding and sub-optimal breast feeding patterns which have detrimental effects for child health including spacing.

As in many other developing countries, surveys in Ethiopia have demonstrated a high breast feeding initiation rate ranging from about 91% in urban areas to 100% in rural areas (11-13). These studies have also shown that early supplementation is being practised both in urban and rural areas. For example, in the study of socio- cultural factors related to breast feeding in Jimma town, the overall prevalence of breast feeding was 96.5% (12). In this study, of those who were given milk as supplement, 76.5% were given the milk with bottles. Another survey conducted in rural Gamu Gofa in 1990 found that 34% of children under 6 months of age were partially breast fed , but the method of feeding for the latter group was not mentioned.

II. Determinants of breast feeding and bottle feeding

Several factors have been found to have association with the practices of bottle feeding in different parts of the world. Most of the factors are interrelated and difficult to assess their effect on bottle feeding independently of each other and without seeing their effect on breast feeding.

1. Social class, Education and Employment

A woman's education and social class have been observed to affect her motivation to breast feed, but the way it exerts its effect is different in different parts of the world. In many industrialized countries, breast feeding nowadays is becoming more common among educated and upper class women (19,20,22). On the other hand, in developing countries, the educated and upper class women tend to feed their infants artificially (23-26). In a survey of 3 districts of Istanbul, prevalence and duration of breast feeding was higher among mothers living in low socioeconomic status where as mothers in high socioeconomic status show tendency toward artificial feeding and weaning. In the same study, increased level of education had an inverse relation with breast feeding. Another study in four third world urban areas demonstrated that work has strong effect in pushing women towards bottle feeding and that bottle feeding is clearly

associated with early weaning (27). In this study, more than 80% of mothers working out of home used bottle to feed their babies while less than 50% of those not working out used it. Studies in Ethiopia also came up with similar findings (11-13). In a recent study in Addis, a large proportion of mothers who were educated, were from middle /high socioeconomic status and who worked outside their home were found to bottle feed their infants (28).

2. Rural and Urban difference

Many studies have shown residence to have an effect on infant feeding practice. This effect was also seen to be different in different parts of the world. In developed countries, artificial feeding has spread throughout the society and is as common in rural areas as in urban. While in developing countries it is commoner in towns (26,27,29). Though there is no information of the use of bottle, a survey done in Ethiopia in 1981 on the rates and duration of breast feeding on different population group demonstrated a difference in the initiation and duration of breast feeding in the urban elite, urban poor and traditional rural mothers where it is low in the first group (11). Another community based study in Jimma town in 1987 found the mean duration of breast feeding to be 4.4 months. 76.5% of mothers who

have started supplementing their children's diet with milk gave it with bottle. In the same study, only 30% of mothers considered breast feeding superior than bottle feeding for a child of 4-6 months (12).

3. KAP of health workers towards breast feeding / infant feeding

Studies conducted in developing countries have found out that though the attitude of most of the health workers is generally good towards breast feeding, their knowledge of its physiology and management of breast feeding problems is below standard (31-36). In addition, hospital practices of separating mother and baby after delivery, prelacteal bottle feeding ("till the mother's milk come in") and lack of support for the mothers who have difficulty in breast feeding all play major role in influencing maternal attitude in infant feeding. In the review of data from 22 developing countries, it was seen that the attendance by a medical worker of the most recent delivery was associated with subsequent bottle use (23). A recent national breast feeding survey in Ethiopia on KAP of mothers and health professionals demonstrated that there is frequent separation of infants and mothers after delivery in hospitals with late initiation of breast feeding and giving newborns glucose water by bottle before lactation is initiated (37).

4. Promotion of commercial infant foods.

Artificial baby milk is marketed in many ways, often using the same words used to discuss breast feeding. Through these media presentations, there is one message: formula feeding and breast feeding are equivalent, so similar that modern women can choose either without guilt (38). Although the WHO code explicitly states that discussions of artificial feeding must include its risks as well as the benefits of breast feeding (39), such a complete message is rarely provided. In addition, provision of free formula samples to newly delivered mothers is commonly practised in health institutions (17,38). This pressure may push a mother to bottle feed her baby whatever her income is.

III. Consequences of bottle feeding

1. increased morbidity

Feacham reviewed literature on the relative risk of diarrhoeal disease morbidity to infants on different feeding modes. 35 studies were reviewed and all suggested that breast feeding is protective against diarrhoeal diseases up to one year of age. Furthermore, this protective effect does not appear to continue after cessation of breast feeding. There is also evidence of considerably increased diarrhoeal disease severity among bottle fed infants compared to those breast fed (40).

Other prospective studies have shown that the risk of acquiring diarrhoeal diseases, and its severity and mortality are higher among bottle fed infants (41-44). A study in rural south west Ethiopia on patterns of breast feeding and their association with diarrhoeal diseases has also demonstrated that the risk of diarrhoea was higher in infants who were partially breast fed than exclusively breast fed though the method of feeding for the latter group was not mentioned (45).

Bacteriological studies of apparently "clean looking bottles and teats" have demonstrated contamination of the contents with organisms causing gastroenteritis (46-48). The findings in these studies were similar for both urban and rural areas, and higher and lower socio-economic classes as well.

In Butajira Woreda, Ethiopia, where diarrhoeal diseases and acute respiratory infections are the major causes of morbidity and mortality, the 1987 survey indicated that the risk of mortality among non breast-fed under five children was 2.5 fold greater than those who were breast fed (15). The corresponding risk for infant mortality was more than 5 fold. Ten fold increase in diarrhoea mortality among infants was associated with failure to breast feed. It was also observed that prolonged breast feeding had a positive effect on survival, even beyond the infancy period.

The other morbidity associated with bottle feeding is malnutrition. Malnutrition in bottle fed infants can be caused in two interrelated ways: over dilution of the feeds, which could inturn be due to the high cost of the milk substitute or infection. Nutritional needs will not be met because not enough milk can be bought regularly. The expensive breast milk substitute which is bought by low income third world mothers will be overdiluted to make it stay as long as possible, resulting in a gradually worsening state of under-nutrition. Studies from developing countries demonstrated that the overdiluted and contaminated bottle feedings have strong association with infection and malnutrition in children receiving them (44,47,51-54). Incidence of malnutrition was found to be higher among infants who received bottle feeding for the major part of their life than those exclusively breast fed in Arabic villages in Israel (54). In Yemen, in a survey conducted among urban, rural and slum population, 65% of children under 2 years of age who received bottle feeding received overdiluted formula (55). Another study in the same country found out that bottle feeding carried 8 times higher risk of malnutrition as compared to breast feeding in infants under six months of age (56). Malnutrition caused by bottle feeding may lead to a failure to achieve optimal physical and mental development; treatment and

rehabilitation of its victims is a costly drain on the nation's economy.

2. Economic consequences

Among the most serious adverse consequences of the shift from breast to bottle are the economic consequences for both the family and the nation. The cost of buying enough milk for infant feeding is far too high for many low income families, let alone buying the necessary things for its preparation. In an examination of data from Calcutta, Reutlinger and Selowsky found that approximately 50% of an employed mother's earnings were spent to replace breast milk not provided, assuming that she continues to breast feed while at home (17). If she stopped breast feeding altogether and used cow's milk with a feeding bottle, she would spend 75% of her income. If she used a manufactured product, she would have to use her whole income: a decision yielding all cost and no benefit. These problems make it difficult for a mother in less developed countries to bottle feed infants without untoward effects: mainly malnutrition and infection.

3. Earlier return of ovulation and greater risk of pregnancy

The shift from breast feeding to bottle feeding may also contribute to problems of over population particularly in areas where contraceptive use is low, due to earlier onset of ovulation. Although it is by no means a reliable method of birth control, breast feeding is helpful for birth spacing (57). This is especially important either when there are no alternative methods available, when the couple chooses not to use other family planning methods, or when they want to delay the introduction of other family planning methods (57,58). More frequent pregnancies will adversely affect the health of both the child and the mother.

OBJECTIVES

1. General

   To assess the magnitude of bottle feeding and identify factors associated with its use.

2. Specific

   To determine the prevalence of bottle feeding.

   To identify factors associated with bottle feeding.

   To determine the time of introduction of bottle feeding.

5. Data collection

Twenty grade 12 graduates and four BRHP enumerators who live in the study area and who can speak the local language were recruited for data collection and supervision respectively, and were trained for five days on data collection and interviewing techniques. Special emphasis during training was given for some questions which needed careful attention and probing during questioning. Training included demonstration of different types of feeding bottles for later assessment of the quality. Role plays and actual field practices were also part of the training.

The questionnaire was pretested on villages not selected for the survey and some modifications were made. Data were collected using a structured pretested questionnaire prepared for mothers of children between 0-23 months through a house-to-house visits. A mother was interviewed to obtain general socio-demographic information and her current child feeding practice. Repeat visits were performed where first visits had been a failure. Three visits on different occasions were made before declaring a household unavailable for the survey. Regular supervision was conducted by the trained supervisors and a research coordinator. The principal investigator checked on the quality of data at the end of each day for timly correction.

6. Measurement

The dependent variable in this study was the presence of bottle feeding. Major independent variables identified were age of the child and mother, religion, ethnicity , birth order of the child, place of delivery and birth attendant, marital status, sex of child, ANC attendance, socio-economic status (SES) of the family, parental educational status, employment state/occupation of parents and residence place.

7. Data Management and Analysis

Data entry, cleaning and analysis were completed using EPI-INFO version 5 and SAS statistical packages. Descriptive, bivariate and multivariate techniques were used in the analysis. To compute the time of introduction of supplementary feeding for the children, 491 children who were on exclusive breast feeding at the time of the survey are excluded.

8. Ethical considerations

Verbal consent was obtained from each study participant after selectively disclosing the purpose of the stusy. Children who were found sick during the house to house visits were either given treatment at the spot or were referred to Butajira health center for proper management.

RESULT

Out of a total of 5621 households registered in the survey area, 5259 (93.6%) were visited during the survey. Of these, 262 (5%) households were away for the duration of the survey. This made the response rate 88.9%.

A total of 1573 households were identified as having children aged 0-23 months. Of these, 37 were excluded since respondents were not mothers. This left 1536 mother-child pairs for the analysis.

1. General Information of the Study Population.

1.1. Parental demographic and socio-economic information.

Of the total 1536 respondents, 1333 (86.6%) were from the rural villages while 203 (13.2%) were residents of Butajira town. The mean age of mothers was 29.8 years with a standard deviation (S.D) of 6.82 years. Nearly 800 (50.9%) mothers were below the age of 30 years, 640 (41.7%) were between the age range of 30-39 and 114 (7.4%) were above 40 years (Table 1).

The majority (93.2%) of mothers were from the Gurage ethnic group and Muslim religion followers (76.8%). Meskan was the major ethnic subgroup in the studied population comprising 50.2%. Nearly 1500 (97.4%) mothers were married. 1431 (93.2%) had no work outside the home

and 1294 mothers (84.2%) were not educated. Of the 166 mothers who had formal education, the majority (77.7%) had elementary school education. No mother had an education beyond the twelfth grade.

Only 15.9% of the families had corrugated iron roofed houses and only 12.2% of the families own latrine. The main sources of water were river (44.2%) and well (44.2%). Tap water is used by 10.9% of the families and almost all users are residents of the Butajira town.

1448 (94.2%) families had an estimated monthly income lower than 200 birr. And only 10 (0.7%) claimed to have a monthly income more than 500 birr. The monthly income of the remaining 5.1% was between 201 to 500 birr. Seventy percent of the families own at least one cow /ox and the remaining 30% do not own any. Families in the town generally do not own cattle. Seven hundred fifty seven (49.3%) families grew some kind of cash crop. Pepper is the predominant cash crop (41.1%), followed by chat (29.6%), false banana (15.8%) and teff (13.5%).

The majority of the spouses, that is, 858 (55.9%) were below 40 years of age. The mean age was 40.21 years with a S.D of 0.58 year. Most of the spouses, that is, 1314 (85.5%) were engaged in farming. The remaining 14.5% are government employees, merchants or are engaged in other activities. Eight hundred and four spouses (52.4%) were illiterate, 281 (18.3%) were able to read

only and 451 (29.3%) had formal schooling. Of those who attended formal education, 76.3% had an educational level between grade 1-6, and 1.8% above the twelfth grade.

Table 1. Maternal Socio-Demographic Characteristics, Butajira Woreda, 1994.

Maternal characteristics	Number (n=1536)	Percent
Residence		
Urban	203	13.2
Rural	1333	86.8
Total	1536	100
Age		
15-19	78	5.1
20-29	704	45.8
30-39	640	41.7
40+	114	7.4
Total	1536	100
Religion		
Christian	356	23.2
Muslim	1180	76.8
Total	1536	100
Ethnicity		
Meskan	772	50.2
Selti	296	19.3
Sodo	153	10.0
Mareko	151	9.8
Dobi	60	3.9
Others	104	6.8
Total	1536	100
Marital status		
Married	1496	97.4
Divorced	16	1.0
Widowed	24	1.6
Total	1536	100
Occupation		
No work outside home	1431	93.2
Work outside home	105	6.8
Total	1536	100
Education		
Neither read nor write	1294	84.2
Read only	76	5.0
Grade 1-6	129	8.4
Grade 7-8	20	1.3
Grade 9-12	17	1.1
Total	1536	100

1.2. Age and sex distribution of the children.

In this study, 52.4% of the children were male and 47.6% were females. The age of the majority of the children (70%) was below twelve months and the mean age was 9.9 months. Of these children, those up to six months comprise 51.8%. One hundred seventy five (11.4%) children were first born, 456 (29.7%) were second and third born or the remaining 905 (58.9%) were either fourth or beyond (Table 2).

Table 2. Demographic Characteristics of the Study Children, Butajira Woreda, 1994.

Characteristics	Number (n=1536)	Percent
Age		
<4 months	260	16.9
4-6	297	19.3
7-11	519	33.8
12-23	460	30.0
Total	1536	100
Sex		
Male	805	52.4
Female	731	47.6
Total	1536	100
Birth order		
1st	175	11.4
2nd	215	14.0
3rd	241	15.7
4+	905	58.9
Total	1536	100

2. Feeding Pattern

2.1. Overall prevalence

Of the total 1536 children between the age of 0-23 months, 491 (32%) were exclusively breast fed, 1005 (65.4%) were partially breast fed and 40 (2.6%) were not breast fed at the time of the survey (Table 3). The overall prevalence of bottle feeding was 11.3%. If children on exclusive breast feeding are excluded, the prevalence of bottle feeding is 16.6%. Nearly 94% (163) of bottle fed children were also breast feeding and only 11 (6.3%) children were on bottle feeding alone.

Out of the total 491 children who were on exclusive breast feeding, 204 (41.6%) were less than four months of age, 81 (16.5%) were 4-5 months, 168 (34.2) were 6-12 months and the remaining 38 (7.7%) were 13-23 months of age.

Out of the total 174 bottle fed children, 105 (60.3%) were below the age of 12 months (of these 24.8% were below the age of four months), 91 (52.3%) were males, and 31 (17.8%) and 98 (56.3%) were first and fourth or later born respectively. The children characteristics included in this study were found to have no association with bottle feeding.

Table 3. Breast & Bottle Feeding Status and Methods Used in Feeding Children, Butajira Woreda, 1994.

Methods	Number	Percent
Breast Feeding Status (n=1536)		
Partial breast feeding	1005	65.4
Exclusive breast feeding	491	32.0
No breast feeding	40	2.6
Total	1536	100
Bottle Feeding Status (n=1536)		
No bottle feeding	1362	88.7
Breast and bottle feeding	163	10.6
Bottle alone	11	0.7
Total	1536	100
Methods Used in Supplementary Feeding (n=1045)		
Cup	244	23.3
Cup and Spoon	12	1.2
Bottle	155	14.8
Bottle and Cup	19	1.8
Hand	615	58.9
Total	1045	100

2.2. Bottle feeding in relation to parental Socio-Demographic and Socio-economic characteristics.

Bottle fed (n=174, "cases") and non bottle fed children (n=1362, "controls") were compared on selected parental socio-demographic and economic characteristics, that is, by place of residence, parental age, marital status, ethnicity, religion, occupation, education and SES of the family to look into associations using the odds ratio. As shown in table 4, only residence place, occupation and education showed statistically significant association with bottle feeding practice. Maternal age, marital status, ethnicity and religion were not associated with bottle feeding (P>0.05).

The chance of bottle feeding was higher for mothers living in urban area than those living in rural areas (OR =6.22, 95%CI =4.76,8.84) (Table 4). Higher chances of bottle feeding was observed among mothers who work outside the home than those who do not work outside (OR =3.02, 95%CI =1.89,4.83). Illiterate mothers are less likely to bottle feed their children compared to all levels of educated mothers, a statistically significant association (OR =0.58, 95% CI =0.37,0.92).

Eventhough the proportions of bottle fed children were higher in families who have corrugated iron roofed houses, who have latrine and use tap water and the odds

of bottle feeding was significantly higher for these group, the association was not stable after adjusting for parental socio-demographic & economic and children demographic variables (Table 5).

Again higher proportions of bottle fed children were seen in families with educated and non farmer fathers with significantly higher odds for bottle feeding, but the association disappears after adjusting for other parental socio-demographic & economic and children demographic variables (Table 6). No association was observed between parental age and bottle feeding practice.

Table 4. Comparison of Bottle-fed and Non-bottle-fed Children by Maternal Socio-Demographic Characteristics, Butajira Woreda, 1994.

Characteristics	Bottle-fed # (%)	Non bottle fed # (%)	OR crude(95%CI)	OR adjusted(95%CI)
Residence				
Urban	70(40.2)	133(9.8)	6.22(4.37,8.84)	2.39(1.02,5.64)
Rural	104(59.8)	1229(90.2)	1.00*	1.00*
Age				
15-19	14(8.1)	63(4.6)	1.00*	
20-29	74(42.5)	630(46.3)	0.52(0.28,0.98)	0.85(0.40,1.79)
30-39	66(37.9)	574(42.1)	0.51(0.27,0.97)	1.08(0.47,2.49)
40+	20(11.5)	95(7.0)	0.94(0.44,2.01)	1.59(0.59,4.26)
Religion				
Christian	45(25.9)	311(22.8)	1.00*	1.00*
Moslem	129(74.1)	1051(77.2)	0.84(0.59,1.21)	1.04(0.69,1.56)
Work outside home				
Yes	147(84.5)	1284(94.2)	1.00*	1.00*
No	27(15.5)	78(5.8)	3.02(1.89,4.83)	1.72(1.00,3.00)
Education				
Not literate	107(61.5)	1187(87.2)	0.23(0.16,0.33)	0.58(0.37,0.92)
Literate	67(10.9)	175(4.2)	1.00*	1.00*

* Reference group

Table 5 Comparison of Bottle-fed and Non-bottle-fed Children by Housing characteristics, Butajira Woreda, 1994.

Characteristics	Bottle fed # (%)	Non bottle fed # (%)	OR crude(95%CI)	OR adjusted (95%CI)
Housing				
Corrugated iron	75(43.1)	170(12.5)	5.31(3.73,7.57)	1.42(0.66,3.06)
Thatched	99(56.9)	1192(87.5)	1.00*	1.00*
Latrine				
Present	69(46.9)	118(8.7)	6.93(4.77,10.1)	1.95(0.92,2.58)
Absent	105(11.7)	244(91.3)	1.00*	1.00*
Water Source				
Tap	61(35.1)	107(7.9)	6.33(4.31,9.31)	4.58(0.43,4.80)
Others	113(64.9)	1255(92.1)	1.00*	1.00*

* Reference group

Table 6. Comparison of Bottle-fed and Non-bottle-fed Children by Selected Paternal Socio-Demographic Characteristics, Butajira Woreda, 1994.

Characteristics	Bottle fed #(%)	Non bottle fed #(%)	OR crude(95%CI)	OR adjusted(95%CI)
Age				
15-29	35(20.1)	206(15.1)	1.00*	1.00*
30-39	61(35.1)	556(40.8)	0.65(0.41,1.01)	0.79(0.45,1.38)
40-49	34(19.5)	361(26.5)	0.55(0.34,0.92)	0.70(0.35,1.41)
50+	44(25.3)	239(17.6)	1.08(0.67,1.75)	1.09(0.55,2.17)
Occupation				
Farmer	112(64.4)	1202(88.3)	1.00*	1.00*
Merchant	36(20.7)	83(6.1)	3.62(2.23,5.88)	1.11(0.57,2.15)
Others	26(14.9)	77(5.6)	4.65(3.00,7.20)	1.16(0.61,2.21)
Education				
Not literate	60(34.5)	745(54.7)	0.41(0.29,0.57)	0.69(0.47,1.02)
Literate	114(65.5)	617(45.3)	1.00*	1.00*

* Reference group

2.3. Birth history of the index child in relation to child feeding practice.

Ninety nine of 174 bottle feeding mothers, that is, 56.9% have attended antenatal clinic at least once while pregnant with their index children. The chance of bottle feeding was significantly lower for mothers who have never attended antenatal clinic (OR 0.31, 95% CI= 0.22.0.43) compared with the attendants even after adjusting for parental socio-demographic and economic variables.

A total of 108 (7.0%) children were delivered in health institutions. While in general, the proportion of mothers who delivered their index child in health institutions was higher in the bottle fed group, no significant association was observed between bottle feeding and place of delivery (P >0.05).

2.4.Time of introduction of supplementary feeding.

Three hundred and five (29.2%) mothers started supplementary feeding for their children before the age of four months and 183 (17.5%) after the age of 6 months (Table 7). Supplementary feeding was introduced before the six months of age for 96% of the bottle fed children compared with non bottle fed (79.8%). Introduction of supplementary feeding was significantly earlier for bottle fed children and Chi Square for trend was also significant ($X^2 = 4.15$, $P < 0.05$).

Table 7. Time of Introduction of Supplementary Feeding, Butajira Woreda, 1994.

Age (months) Supplementary feeding started	Bottle fed # (%)	Non-bottle # (%)	OR (95%CI)
<2 months	31(17.8)	39(4.5)	19.99 (7.69,54.09)
2-3 months	43(24.7)	192(22.0)	5.63 (2.42,15.18)
4-6 months	93(53.5)	464(53.3)	5.04 (2.29,13.11)
>6 months	7(4.0)	176(20.2)	1.00 *

* Reference group

2.5. Reasons for supplementation and types of supplementary feedings.

The main reasons cited by mothers to start supplementary feeding for their children are summarized in table 8.

The main supplementary feeding used were Cow's milk & milk products (36.5%) and water & water based drinks(33.9%). Higher proportion of bottle feeding mothers used tea and cereal-based gruel to feed their children compared with the non bottle fed (Table 9).

Table 8. Reasons For Early Supplementation, Butajira Woreda, 1994.

Reasons given	Number	Percent
Insufficient milk quantity	612	51.1
Child age appropriate	351	29.3
Work load of the mother	125	10.4
Illness of either child or mother	56	4.7
Others	53	4.5
Total	1197	100

Note: Totals not equal 1045; more than one response was possible.

Table 9. Types of Supplementary Foods Used to Feed Children, Butajira Woreda, 1994.

Type	Number	Percent
Cow's milk and milk products	607	36.5
Water and water based drinks	564	33.9
Adult food	334	20.1
Cereal based gruel	158	9.5
Total	1663	100

Note: Totals no equal 1045; more than one response was possible.

2.7. Quality of Bottle Feeding.

Mothers prepare the supplementary feeding and feed their children in 88.5% and 84.5% of the bottle fed children respectively. The remaining proportion of feeding was prepared by siblings, grandmothers or other women in the household. One hundred sixty six (95.4%) children had only one feeding bottle and 116 (66.7%) of the bottles were of 'poor quality'. Of the bottles which were considered to be of a 'better quality', more than half had a cloth covering so that the interior is not readily visible.

4.6%, 40.8%, 27% and 27.6% of mothers clean the bottles they use to feed their children once a week, once a day, twice a day and after each feeding respectively. While cleaning the feeding bottles, 35 (20.1%) mothers boil the bottles with the teats, 107 (61.5%) use hot water with or without soap, and 32 (18.4%) use cold water with or without soap.

DISCUSSION

Sixteen percent of the children receiving supplementary feedings received them by bottle, and nearly 30% of these were below the age of six months. This figure is quite low compared with recent findings in Jimma town (76%) and Addis Ababa (77.7%) which are both very urban compared to the survey area (12). But the figure seems quite high and worrisome when seen with the context that bottle feeding is only a problem of mothers who are most influenced by western cultures such as those living in the towns and that it is started very early in life, as early as in those younger than one month. In this study it was observed that supplementation with bottles is significantly earlier than the recommended minimum age of the child, which makes the problem even worse as the consequences of bottle feeding on the health of the child and the mother are well established (16,17). On the other hand, the proportion of children who are on exclusive breast feeding beyond the six months of age is high. This also is a problem since breast milk alone is not enough after the age of 4-6 months (3,15,16).

Nearly 94% of the bottle fed children were also breast feeding at the time of the survey showing that in this study, bottle feeding is used as a supplement rather than a replacement to breast feeding. This may be

'advantageous' for the child since the risks of abrupt weaning seems to be minimized, though a follow up study to clarify this issue is required. But the effect of complimentary bottle feeding on child spacing and maternal health should not be overseen especially in such area where contraceptive prevalence is very low and the population is predominantly muslim (14,17). This is also an area for future research.

Most authors have found that residence, parental education, socio-economic status of the family, work place of the mother, and place of delivery of the index child are positively associated with bottle feeding. On the other hand, there is no universal consensus on the effect of religion, ethnicity, marital status and parental age on bottle feeding (22,25-27,29). This study also demonstrated no association between the practice of bottle feeding and parental age, marital status, religion and ethnicity.

In this study, mothers working outside the home and who have been educated are seen to bottle feed more than their counterparts. Similar findings were documented in Haiti and Cameroons (26,30) that mothers who attended regular school and work outside the home tend to wean early, bottle feed more and breast feed less. The association observed between place of residence and bottle feeding in this study was also in agreement with

other studies in developing countries (26-29).

Studies in urban towns of four developing countries have demonstrated that hospital delivery and attendance of a delivery by health professional is associated with bottle feeding (27,60). In this study, the chance of bottle feeding was significantly higher among mothers who attended ANC with their index child compared to their counterparts. This may be a reflection of the influence of social status in utilization of health services rather than the effect of attending ANC.

Limitations

In this study, measurement of socio-economic status of a household was found difficult since most respondants were not open in responding to the questions designed to assess the SES of a family. There is also evidence that information on income in many studies in Ethiopia are unreliable (62). Parental age shares the same concern. Thus it is difficult to say that the associations obtained with these variables reflect the true picture. Similarly, the information obtained on the time of introduction of supplementary feeding could be questioned since a problem of recall could be attached with it. This was considered during the study design and ways to minimize this problem were incorporated in it. But it is still very difficult to say for certain that there is no problem of recall.

Because of the difference in the methodology used and the set ups of the study areas, the findings of this study are by no means a replica of other studies both in the developed and developing countries. In general, the findings of this study reflect the situation that has been seen in developed countries earlier than the 1970's -before the reversal of the trend away from breast feeding-, and in many of the developing world nowadays (3). In fact it is very interesting to see that bottles are being used to feed children in this community which is in contrast to the general belief that bottle feeding is a problem of urban towns.

Validity

The results of this study are assumed to be internally valid. A relatively large sample size was utilized to minimize the role of chance. Introduction of selection bias was minimized by utilizing randomly selected study villages and by obtaining high participation rate (nearly 90% of the mothers participated). The english questionnaire was translated to amharic with back translation to maintain its consistency and for possible cases of households who cannot understand amharic, the questionnaire was translated into *Guragigna* -the local dialect- with back translation again and a copy was kept with each interviewer. Reliability was maintained by prior

training of interviewers and supervisors, and a regular supervision by a research coordinator and the principal investigator. A standard pretested and closed ended questionnaire was used to control for possible introduction of inter-observer and intra-observer biases during interviewing. Multivariate analysis using logistic regression model was performed to control for possible confounding effect of certain variables.

Generalization

It will be difficult to generalize the results of this study to the country as a whole because of the country's wide cultural and ethnic diversity. Additionally the woreda is closer to Addis Ababa, the capital town, and other small business centred towns which makes it different from other remote woredas far away from the capital with respect to accessibility.

Since it was not the aim of the study, this study fail to see the health effects of bottle feeding both to the child and the mother. I urge other researchers to carry out similar researches in other areas of the country and to look into the health effects of bottle feeding, especially its effect on infant mortality and birth spacing since in countries like Ethiopia where health service coverage and contraceptive prevalence is very low, it may contribute to the ill health of mothers and children.

CONCLUSION

This study have demonstrated that the level of bottle feeding in this community is quite high. Though bottle feeding is given as a supplement rather than replacement to breast feeding in the studied population, the prevalence is still considered high for such a community. Moreover bottle feeding is being introduced very early in the child's life, at the time when the child would have been benefited from exclusive breast feeding. Furthermore, exclusive breast feeding is being practised at the age when the child should start supplementary feeding.

The study have also shown that bottle feeding is more common among mothers living in the town, those with better educational level, who work outside the home and those with access to antenatal services.

RECOMMENDATIONS

1. MCH activities particularly ANC and postnatal programmes should be strengthened so that the necessary information in child feeding could be given at the time when it is needed most.
2. Operational research should be carried out on the causes of this shift in infant feeding practice and strategies should be planned to remove the causes.

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STUDY ARCHITECTURE

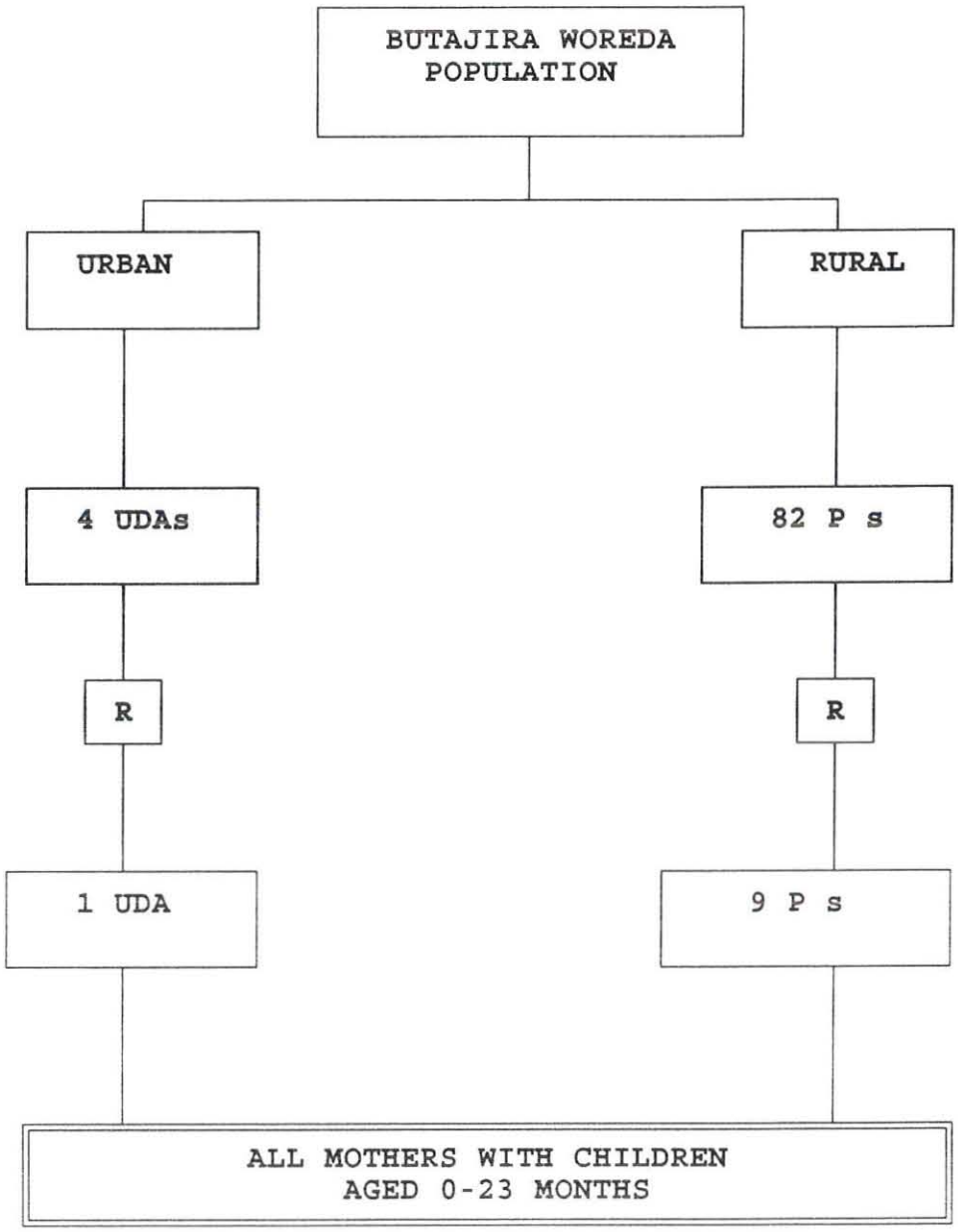
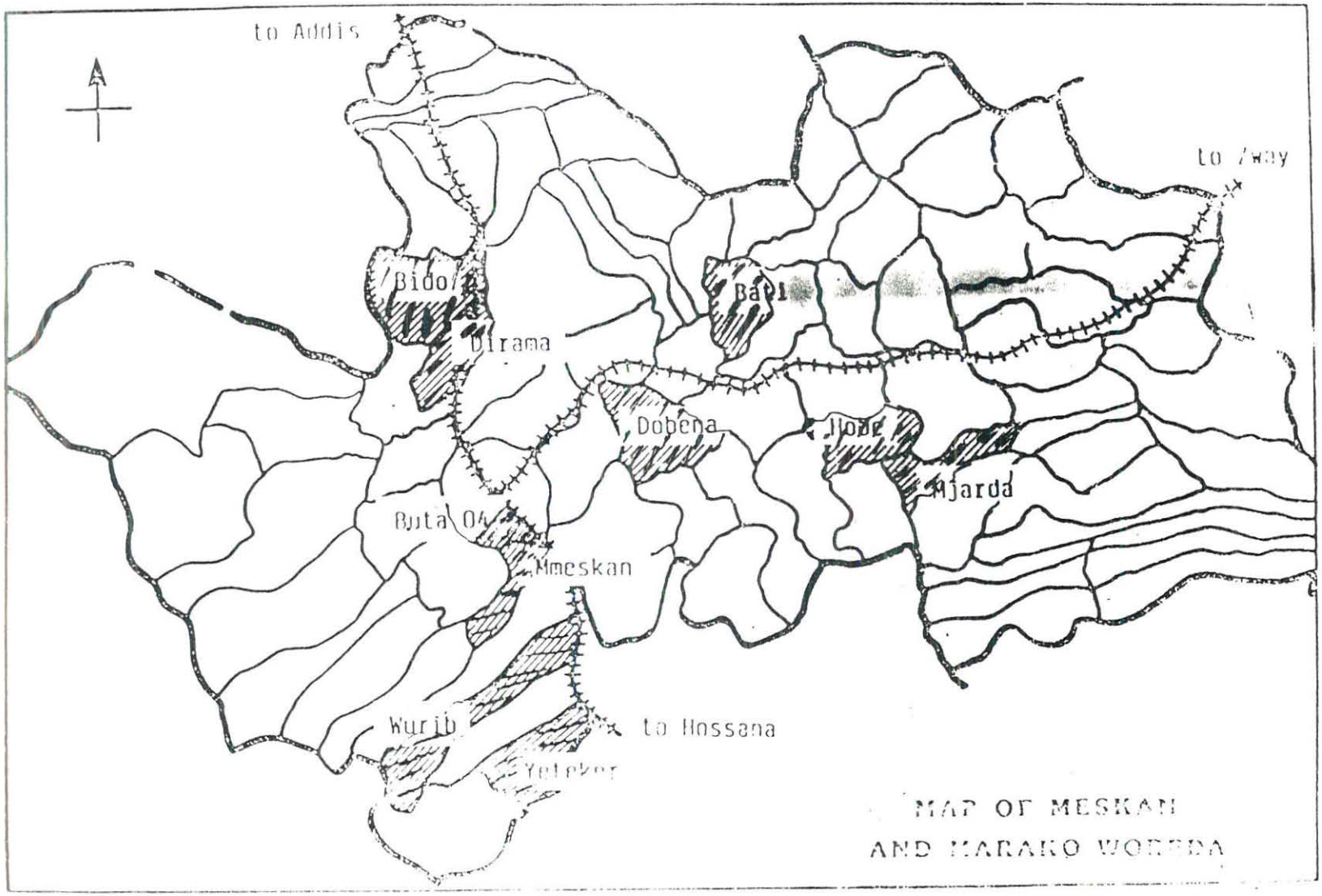


Figure 1



MAP OF MESKAN
AND MARAKO WOREDA