

**CHARACTERISTICS OF CAREGIVERS AND HOUSEHOLDS  
PRACTICING BOTTLE-FEEDING IN KISUMU EAST DISTRICT**

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## ABSTRACT

There is documented evidence of increased risk of infant mortality in formula-fed versus breast-fed infants and young children. The potential danger especially in resource-poor settings with poor water and sanitation conditions is well known. In reducing risks associated with the sanitation of feeding equipment, bottle-feeding is often discouraged with cup and spoon promoted as better alternatives. To determine the characteristics of caregivers and households with bottle-fed young under-twos in a rural community of Kisumu East district, a cross-sectional descriptive survey using a structured questionnaire was carried out. The data were analyzed using SPSS version 17.0. Frequencies for non-continuous data were obtained and the relationship between the background variables and the bottle-feeding of the infant/child was established through the chi-square test. A total of 494 caregivers with young ones, under-twos, were interviewed. The findings from the study showed that of the 406 respondents addressing questions on bottle-feeding the previous night prior to the survey, 91 (22.4%) were practicing infant bottle-feeding. Answers to the question “who assisted the mother during delivery”, revealed that 88 children were bottle-fed, 38(43.2%) of whom were delivered under skilled attendance while out of the 314 children not bottle-fed, 145 (46.2%) were delivered under skilled attendance. Some of the indicators found to be significantly different included: main source of household income which was found to be significantly associated ( $p=0.044$ ) with bottle-feeding, child’s age was significantly ( $P =0.008$ ) different with respect to bottle-feeding and breast-feeding initiation after birth was significantly ( $p = 0.004$ ) associated with bottle-feeding. The tendency to bottle-feed was lower among those with complete immunization status compared to those with incomplete immunization. This association with immunization indicates that facility delivery coupled with faithfulness in visits throughout the immunization schedule, promotes contact with the health facility staff and potentially has a significant role in promoting good infant and child feeding practices. In conclusion, infant/young child bottle-feeding is still a public health issue in resource-poor settings. Promotion of safe infant/young child feeding practices for improving nutritional and health status of children especially in the resource-poor settings should be advocated especially where bottle-feeding is still in high use. There is need for community-based strategies to bring about a change that addresses the current prevalence of bottle-feeding found in the study area.

**Key words:** Bottle-feeding, Caregivers, Exclusive breast-feeding, infant

## INTRODUCTION

Infant and Young Child Feeding (IYCF) comprises various dimensions, namely: the type, the quality, the texture, the nutrient density, the frequency of feeding and the diversity of the diet. In addition to these, the safety of food fed and the manner in which it is fed to the child have been added as new dimensions to the whole spectrum of IYCF [1]. Breast-feeding is the oldest, natural and physiological way of feeding infants and young children recommended by all religions and is the universally endorsed solution in the prevention of early malnutrition [2, 3]. Breast-feeding has many advantages and is the best source of nutrition for infants. However, to protect the baby in some situations, formula rather than breast-feeding may be recommended. This may be due to some medical conditions, such as the mother being infected with the human immunodeficiency virus (HIV) or hepatitis B [4]. A fundamental risk in using breast-milk substitutes stems from their inappropriate preparation and unsafe feeding [5]. It is evident that the critical IYCF practices are faulty around the world, with literature indicating that only 37% of infants are exclusively breast-fed for the first six months [1]. According to Kenya national bureau of statistics report, although in Kenya the proportion of those exclusively breast-fed improved from 13% in 2003 to 32% in the year 2009, this is still lower than the world's estimates [6, 7].

Bottle-feeding is a rather common practice in Kenya, with more than one-quarter of children less than one year being bottle-fed [6]. Supplementing breast-milk before six months of age is unnecessary and discouraged because of the likelihood of contamination, which may result in the risk of diarrheal diseases. However, there are still some inadequate practices particularly regarding exclusive breast-feeding and bottle-feeding. To some mothers, bottle-feeding is perceived to be more convenient and more acceptable in public but it is not as good as breast-feeding for the baby [8]. The adverse effects of bottle-feeding are profound in the under-developed world due to limited economic resources, lack of clean water, unhygienic surroundings and illiteracy amongst mothers [7, 9]. Feeding bottles are more difficult to keep clean than cups, and the ingestion of pathogens can lead to illness and even death. Pacifiers can also easily become contaminated and cause illness [7, 10].

Bottle-feeding is associated with many medical risks including: cow-milk allergy and intolerance, increased risk of respiratory and gastro-intestinal diseases, high incidence of otitis media and oral malocclusion and dental caries. Another hazard of bottle-feeding is over dilution of milk which results in malnutrition [9]. In addition, opting not to breast-feed precludes and/or brings all of the processes involved in lactation to a halt. This is because bottle-feeding simulates child loss at a mothers' physiological level since the mother child touch is lost, and may also play an important role in postpartum depression [11]. Moreover, feeding bottles with artificial nipples and pacifiers (teats or dummies) may cause nipple confusion and infants may refuse to breast-feed after their use. The potential distressful effects of bottle-feeding on health and survival of children have led to a global campaign against bottle use [9].

It is recommended that after six months of age, any liquids given should be fed by cup rather than by bottle [12, 13]. Despite the worldwide knowledge among lay people on

advantages of breast-milk and increasing medical research showing the benefits of breast-feeding for both mothers and babies, many women opt to bottle-feed their infants occasionally or routinely [2, 8, 9, 14]. It is for this reason that the study set out to characterize the caregivers and households in a resource-poor setting that practice bottle-feeding to further understand the contextual issues in the light of the Global Strategy on IYCF.

## METHODOLOGY

### *Study design*

This paper reports on the characteristics of caregivers and household with an under two year-old infant/child who are bottle-fed. The paper is based on data from a larger study on Knowledge Attitude and Practice (KAP) of Caregivers in feeding of children under five years of age that was conducted in the rural community of Kisumu East district. The study was a cross-sectional descriptive survey using a structured questionnaire, key informant interview guide and focus group discussions. Two sub-locations were purposively selected based on their implementation of the community strategy (CS) with Nyahera implementing CS while Kanyawegi not implementing CS. The two sub-locations were clustered by villages and the households selected based on clustering by village and having a child under five years of age. The sampling plan was designed using “probability proportionate-to-size” cluster sampling to reach households with proportional allocation to the number of households within the sub-location.

The data collected included background socio-demographic and economic information as well as the infant and young child feeding practices adopted by the households that participated in the study. Of all the 582 households interviewed in the larger study, a total of 494 were caregivers with children under two years of age and were interviewed on the child’s current feeding practices including bottle-feeding in the last 24 hours prior to the survey.

The data were analyzed using Statistical Package for Social Sciences (SPSS) version 17.0. Frequencies for non-continuous data were obtained before carrying out statistical analysis. The relationship between the background variables and the bottle-feeding status of the child was established through the chi-square test. The research was approved by the ethical committee of the Great Lakes University of Kisumu. Each caregiver filled in and signed an informed consent form before taking part in the study. Further, the study participants were allowed to opt out of the study at any time they felt unable to continue.

## RESULTS

Of the 494 caregivers (with children under two years of age) interviewed, 406 responded to the question on bottle-feeding. At the time of study, out of 406 caregivers, 91 (22.4%) bottle-fed their children under two years. In maternal and child health care, immunization and skilled birth attendance is often a proxy indicator of contact with health care providers. The proportion of children born under a skilled



attendant and bottle-fed was almost equivalent to those born under unskilled attendant and not bottle-fed. Caregivers to 88 children who were bottle-fed responded to the question “who assisted the mother during delivery”. Out of the 88 children, 38(43.2%) were delivered under skilled attendance. On the other hand, out of the 314 children not bottle-fed, 169 (53.8%) were delivered under skilled attendance while 145 (46.2%) under unskilled attendance as shown in Table 1.

Bottle-feeding was found to be significantly ( $P = 0.008$ ) different with respect to the child’s age; this was similar even among the immunized as shown in Figure 1. Comparatively during the first three months, the proportion of infants bottle-fed [11 (12.1%)] and those none bottle-fed [40 (12.7%)] were almost equivalent, as shown in Table 1. When comparing the proportion of those immunized and bottle-fed against those immunized and not bottle-fed, the proportion of those bottle-fed showed a decline with increase in number of immunizations’ antigens received compared to those who were not bottle-fed as shown in Figure 1. Bottle-feeding among those not immunized seemed to be increasing with the increase in immunization level shown in Figure 2.

Breast-feeding initiation after birth is significantly ( $p = 0.004$ ) associated with bottle-feeding. A large proportion [188 (60.1%)] of those who did not bottle-feed, initiated breast-feeding within the first hour after delivery compared to [37 (41.1%)] those who bottle-fed as shown in Table 2. The introduction of fluids within three days was common amongst bottle-fed infants/young children than those not bottle-fed. Some focus group respondents commented that the mother experienced pain during breast-feeding initiation. The following quotes are typical examples:

*An aneno ni sama nyathi kokadwa chako dhoth nyaka otem yuayo thuno for some hours koro sama otemo yuayo thunonoendo, nyaka iwinj malit ,nyakaiwinj malit sama pod otemo yuayo –sani korka inyuol chak pod kobiwo koro nyaka iwinj malit giedendi* [when initiating breast-feeding, the child sucks for long before the milk flows out and it is often painful] (FGD R2 Kanyawegi).

Seche ma koro eka anyuolo nyathi kodwro chako dhodhe aparo ni dho thuno seche moko litga koro iluoro dhodho nyathi lakin ko tieko ndalo adek kamee to nyathi nyalo dhoth adhodha maber, to sechego ma nyathi ok dhodh ma thuno bod litno to nyathi ywak.[ Just after birth and you want to initiate breast-feeding, the breast teat at times is painful so you fear breast-feeding but after three days the baby can breast-feed well. And when the baby does not breastfeed well, again the breasts are painful.] (FGD R5 Nyahera).

The main source of household income and the age of the infant are significantly associated ( $p=0.044$ ) with the bottle-feeding status as shown in Table 3. The water source and mode of water treatment were not significantly different among those who bottle-fed compared to those who did not. Approximately 27% of those who bottle-fed and (98) 31% who did not, used water from unprotected sources. Of these households that bottle-fed 10 (40%) added chemical to their drinking water, 10 (40%) boiled while the remaining 5 (20%) did not treat their water at all. Generally no-

chemical water treatment was reported in approximately 183 (45%) of the total households with children under two years of age. Caregivers' marital status was not significantly associated ( $p=0.702$ ) with the infant and/or young child's bottle-feeding status.

## DISCUSSION

The study reports on the characteristics of households and caregivers who practice bottle-feeding in Kisumu East district. The study confirms that it is highly desirable that the newborns are introduced to breast-feeding immediately after delivery or better still within one hour after delivery as is the current global policy [11]. However, this is often not the case with bottle-feeding which is highly discouraged still prevalent in Kenya, with up to about one-quarter of children under six months using a bottle with a nipple [7]. According to Kenya Demographic and Health Survey 2003, about 22% of children less than one year used bottles, which confirms that more than one-quarter of children less than one year are still bottle-fed [6]. The low exclusive breast-feeding may also be attributed to high poverty level couple with high HIV prevalence. Those who are HIV positive may have resorted to bottle-feeding due to fear of infecting their young ones. Because of high poverty level, the mothers are forced to go out to fend for their families leaving behind the young ones.

Samina [8] argues that bottle-feeding is not a simple, straightforward or safe practice as is commonly believed but that it requires availability of fuel, clean water, appropriate equipment, time for preparation and basic knowledge of hygiene. A good proportion of Kisumu East district rural settings do not access water from a protected source with about 45% of the households using untreated water. About 27% of the households with children under two years of age and practicing bottle-feeding confirmed using water from unprotected sources. This is a potential risk to gastrointestinal infection among the under twos especially when they are bottle-fed, and the water not treated given the difficulty in cleaning the baby bottles compared to cups and spoons, which is a promoted alternative [7, 11, 12].

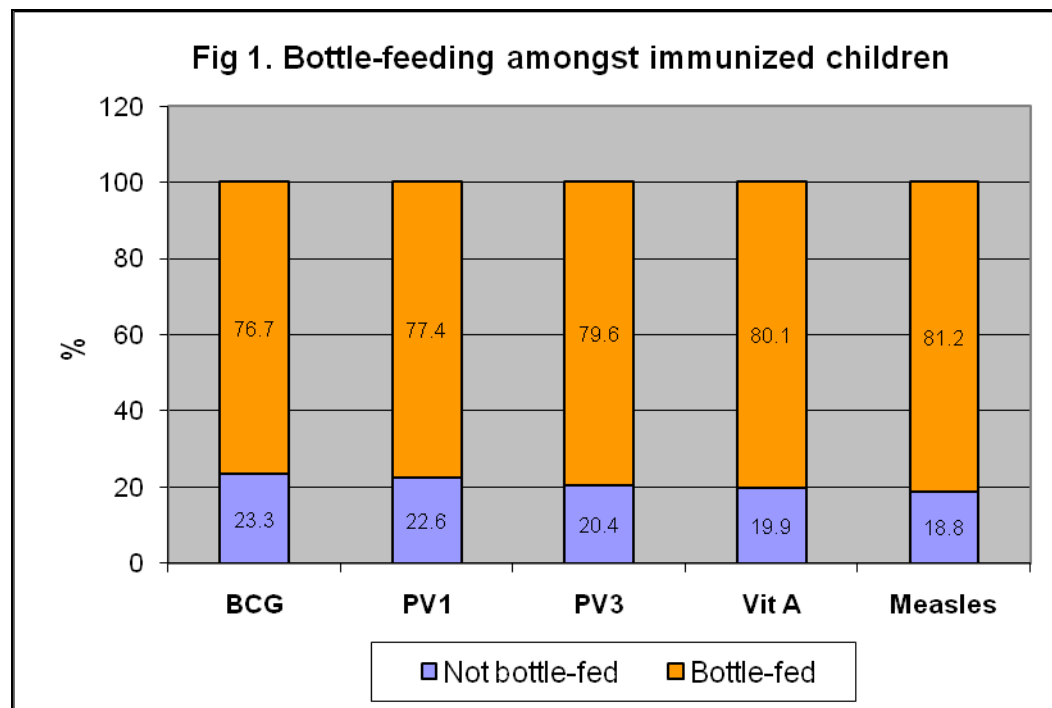
The study confirms that children older than one month are introduced to other foods besides breast-milk with high proportions of those greater than 9 months of age being bottle-fed. The Kenya Demographic and Health Survey 2008-2009, documented that after 8 months of age the proportion of children being exclusively breast-fed declines to less than 1% [7]. Indicating that bottle-feeding appears to get more common as the age of infants increased which is similar to the findings of Ogunba [9]. The place of delivery for the newborn was not statistically significant in terms of bottle-feeding with a large number of infants born under skilled attendance [51(56.7%)] likewise being bottle-fed. Facility delivery alone cannot discourage bottle use, but coupled with constant scheduled visits throughout the immunization schedule, then the health facility staff have a significant role in promoting good infant and child feeding practices.

The level of immunization had a positive association with bottle-feeding practice, clearly indicating that health facilities play a significant role in discouraging bottle-

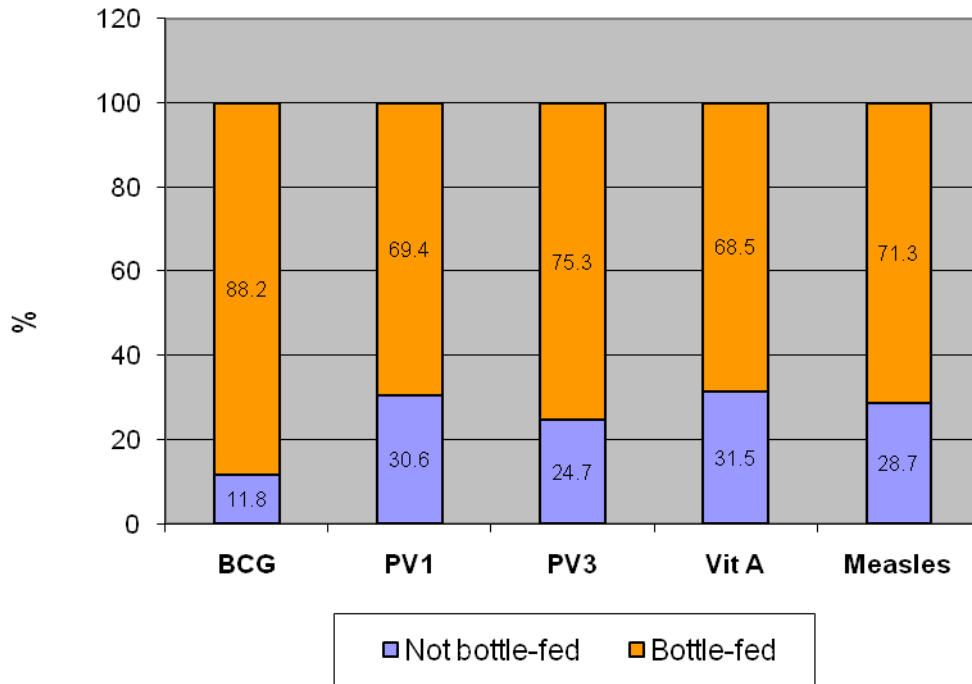
feeding. Commitment to the scheduled immunization is an indicator of a mother's informed commitment to the baby's welfare. The higher proportion of bottle-feeding among those with salaried employment can be attributed to the fixed working hours, which is usually common in salaried employment, ability to meet the cost that comes with bottle-feeding, the exposure to information of aggressive formula products in the market as well as the belief that breastfeeding and working outside home are incompatible.

## CONCLUSION

Bottle-feeding is a public health issue in resource poor settings. There is need for promotion and protection of optimal infant feeding practices for improving the nutritional and health status of children especially in the rural setting. Therefore, there is need to educate mothers on safe breast-feeding and timely and correct introduction of complementary foods. Health education programs focused on promoting breast-feeding are recommended including the use of cups and spoon rather than bottle-feeding. There is need for community-based strategies to bring about a socio-cultural change in current prevalence of bottle-feeding found in the study; another one to promote is campaigns to discourage mixed feeding for infants as is evident in the study if the Global Strategy on IYCF is to be a reality in the resource-poor settings.



**Fig 2. Bottle-feeding amongst none immunized children**





**Table 1: Association between index child characteristics and bottle-feeding status**

| Characteristic of index children |                       | Bottle-feeding | No Bottle-feeding | P-value |
|----------------------------------|-----------------------|----------------|-------------------|---------|
|                                  |                       | % (n)          | % (n)             |         |
| Who conducted the delivery       | Skilled Attendant     | 56.8 (50)      | 53.8 (169)        | 0.354   |
|                                  | Non-Skilled Attendant | 43.2 (38)      | 46.2(145)         |         |
|                                  | Total                 | 100 (88)       | 100 (314)         |         |
| ANC visits                       | 4+ Visits             | 44.9(40)       | 47.4 (147)        | 0.834   |
|                                  | 3 Visits              | 27.0 (24)      | 25.5 (79)         |         |
|                                  | 1-2 Visits            | 19.1 (17)      | 20.6(64)          |         |
|                                  | No Visit              | 9.0 (8)        | 6.5 (20)          |         |
|                                  | Total                 | 100 (116)      | 100 (432)         |         |
| Age in months                    | 0-3 Months            | 12.1 (11)      | 12.7 (40)         | 0.008   |
|                                  | 4Months<6Months       | 19.8(18)       | 8.3 (26)          |         |
|                                  | 6Months<9Months       | 11.0 (10)      | 7.6 (24)          |         |
|                                  | 9Months and above     | 57.1 (52)      | 71.4 (225)        |         |
|                                  | Total                 | 100 (91)       | 100 (315)         |         |

**Table 2: Association between initial child feeding and bottle-feeding status**

| Characteristic of index children           |                       | Bottle-feeding<br>% (n) | No Bottle-feeding<br>% (n) | P-value |
|--|-----------------------|-------------------------|----------------------------|---------|
| Breast-feeding initiation                  | Within the first hour | 41.1(37)                | 60.1(188)                  | 0.004   |
|  | After the first hour  | 52.2(47)                | 33.5(105)                  |         |
|  | Don't Remember        | 6.7 (6)                 | 6.4 (20)                   |         |
|  | Total                 | 100 (90)                | 100 (313)                  |         |
| Baby fed on Colostrum                      | Yes                   | 83.3 (75)               | 83.7(262)                  | 0.833   |
|  | No                    | 13.3 (12)               | 14.1(44)                   |         |
|  | Don't Remember        | 3.3 (3)                 | 2.2 (7)                    |         |
|  | Total                 | 100 (92)                | 100 (320)                  |         |
| Other liquids given within the first 3days | Yes                   | 28.9 (26)               | 19.6 (61)                  | 0.144   |
|  | No                    | 71.1 (64)               | 80.4 (251)                 |         |
|  | Total                 | 100 (90)                | 100 (312)                  |         |

**Table 3: Association between the characteristics of the care giver and bottle-feeding status**

| Characteristic of caregiver and household |                     | Bottle-feeding | No Bottle-feeding | P-value |
|---|---------------------|----------------|-------------------|---------|
| Age of caregiver                          | Less than 19        | 19.8 (17)      | 10.8 (33)         | 0.127   |
|   | 19-34               | 68.6 (59)      | 71.8 (219)        |         |
|   | 35-49               | 9.3 (8)        | 13.4 (41)         |         |
|   | 50+                 | 2.3 (2)        | 3.9 (12)          |         |
|   | Total               | 100(86)        | 100(305)          |         |
| Caregivers Education level                | None                | 2.4 (2)        | 4.0 (12)          | 0.420   |
|   | Primary             | 80.7 (67)      | 73.8 (220)        |         |
|   | Secondary           | 16.9(14)       | 22.1 (66)         |         |
|   | Total               | 100 (83)       | 100 (298)         |         |
| Caregivers marital status                 | Monogamy            | 67.5 (54)      | 72.1(202)         | 0.702   |
|   | Polygamy            | 16.3 (13)      | 14.6 (41)         |         |
|   | Others              | 16.3 (13)      | 13.2 (37)         |         |
|   | Total               | 100 (80)       | 100 (280)         |         |
| House hold income source                  | Farming             | 50.0 (45)      | 49.5 (155)        | 0.044   |
|   | Self employed       | 28.9 (26)      | 31.3 (98)         |         |
|   | Salaried            | 10.0 (9)       | 3.2 (10)          |         |
|   | Remittance          | 11.1 (10)      | 16.0 (50)         |         |
|   | Total               | 100 (90)       | 100 (313)         |         |
| Type of Housing                           | Permanent           | 7.8 (7)        | 11.2 (35)         | 0.646   |
|   | Semi-permanent      | 63.3(57)       | 61.3 (192)        |         |
|   | All Temporary       | 28.9 (26)      | 27.5 (86)         |         |
|   | Total               | 100 (90)       | 100 (313)         |         |
| Main household water source               | Unprotected source  | 27.2 (25)      | 31.2 (100)        | 0.275   |
|   | Protected source    | 72.8(67)       | 68.8 (221)        |         |
|   | Total               | 100 (92)       | 100 (321)         |         |
| Water treatment                           | Chemical treated    | 55.4 (51)      | 50.9 (164)        | 0.260   |
|   | No Chemical treated | 44.6 (41)      | 49.1(158)         |         |
|   | Total               | 100 (92)       | 100 (322)         |         |

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