

Assessment of Promotion of Foods Consumed by Infants and Young
Children in Nepal: Assessment and Research on Child Feeding (ARCH)
– Nepal Country Report



Child Health Division
DoHS, MoHP



Helen Keller
INTERNATIONAL

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List of Abbreviations

ANC	Antenatal care
ARCH	Assessment and Research on Child Feeding
BFHI	Baby-friendly Hospital Initiative
BMS	Breast-milk substitute
CPCF	Commercially produced complementary food
CPF	Commercially produced food for general consumption commonly fed to children less than two years of age
DoHS	Department of Health Services
FCHV	Female Community Health Volunteer
HKI	Helen Keller International
HMIS	Health Management Information System
IBFAM	International Baby Food Action Network
IFPRI	International Food Policy Research Institute
IGBM	Interagency Group on Breastfeeding Monitoring
IYC	Infant and young child
IYCF	Infant and young child feeding
HKI	Helen Keller International
MoHP	Ministry of Health and Population
NDHS	Nepal Demographic and Health Survey
NHRC	Nepal Health Research Council
NICU	Neonatal intensive care unit
NPR	Nepalese rupee
NUTEC	Nutrition Technical Committee
ODK	Open Data Kit
OPD	Outpatient department
PPS	Probability proportional to size
SD	Standard deviation
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
USD	United States dollar
WHO	World Health Organization

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1. Summary:

Despite improvements in the nutritional status of children in Nepal over the last 15 years, 41% of Nepalese children less than five years of age are stunted, 11% are wasted and 39% are underweight (MOHP, 2011). Commercially produced complementary foods can help improve nutritional status of young children if they are fortified and of optimal nutrient composition. However, other commercial snack foods may be detrimental to young child feeding by potentially increasing consumption of foods high in salt or sugar and displacing consumption of other more nutritious options. Breast-milk substitutes, including infant formula and other commercial milks, are also detrimental when they displace breastfeeding.

In 1992, Nepal passed the *Mother's Milk Substitutes (Control of Sale and Distribution) Act*. The Act was passed to regulate the sale, distribution and promotion of substitutes for breast milk within Nepal, including breast-milk substitutes and 'any other such food or beverage marketed or otherwise distributed as is suitable for feeding to the infant' (Nepal Government, 1992). Helen Keller International's Assessment and Research on Child Feeding (ARCH) project implemented a study to assess mothers' exposure to commercial promotions for infant and young child food products inside and outside the health system of Kathmandu Valley, as well as mothers' utilization of commercial food products for child feeding. A health facility-based, cross-sectional survey was conducted among 304 mothers being discharged after delivery and 309 mothers of children less than 24 months of age who were utilizing child health services.

Results indicate that while utilization of breast-milk substitutes is low among mothers of young children (6.2% of children 0-5 months of age and 7.5% of children 6-23 months of age), pre-lacteal feeding of breast-milk substitutes is prevalent (reported by 56.0% of mothers that had been discharged after delivery). Commonly reported promotions for breast-milk substitutes and commercially produced complementary foods included recommendations for use from health professionals, specifically nurses and doctors; 41.1% of mothers that had been discharged after delivery reported a recommendation to use a breast-milk substitute from a health professional, and 24.6% of mother of children 6-23 months of age reported receiving a recommendation from a health worker to use commercial infant cereal. Observations of television advertisements were also reported; approximately 20% and 15% of mothers reported observing a television advertisement for a breast-milk substitute or commercial complementary food, respectively. Few mothers reported observation of commercial advertisements for breast-milk substitutes inside a health facility (reported by 3.6% of mothers that had been discharged after delivery and 8.4% of

mothers of children less than 24 months of age). No mothers reported receiving a sample of a breast-milk substitute, bottle or teat from a health professional.

Continued breastfeeding was high among mothers interviewed (92.7% of mothers of children 12-15 months of age); however, only one-third (39.5%) of infants 0-5 months of age were exclusively breastfed. One-half (51.8%) of children 6-23 months of age achieved a minimum acceptable diet in the day prior to interview, and consumption of commercially produced snack food products was high (76.8% of children 6-23 months of age). Promotions for commercial food products commonly fed to infants and young children, particularly snack products, were reported by interviewees to be prevalent in Kathmandu Valley; 87.1% of mothers of children less than 24 months of age reported observing promotions.

Provision of lactation management training to health workers could strengthen breastfeeding counseling among health professionals, and potentially aid in reducing the high rates of pre-lacteal feeding and encourage exclusive breastfeeding among mothers. In order to improve diets during the complementary feeding period, development of national standards for complementary food products are recommended. Nutritious snack options should be promoted for the complementary feeding period; consumption of commercially produced snack foods high in sugar and salt and low in nutrients should be discouraged.

2. Introduction:

Exclusive breastfeeding for the first six months of life with continued breastfeeding up to two years of age or beyond is the optimal course of feeding for infants and young children (WHO and UNICEF, 2003). A child's nutritional needs increase around the age of six months; therefore, it becomes necessary to introduce complementary foods in a timely, safe and adequate manner, while continuing to breastfeed. This period commonly corresponds to growth faltering in young children, and is an important focus area for preventing future childhood malnutrition (Shrimpton, 2001).

In Nepal, growth impairment associated with poor nutrition occurs primarily during the first two years of life, a period when adequate nutrient intake is needed to avoid lifelong effects of malnutrition (HKI, Nepal, 2010). Despite improvements in the nutritional status of children in Nepal over the last 15 years, 41% of Nepalese children less than five years of age are stunted, 11% are wasted and 39% are underweight (MOHP, 2011).

Breastfeeding is prevalent in Nepal, where 70% of infants under six months of age are exclusively breastfed (MOHP, 2011). Continued breastfeeding up to 24 months of age is also high; ninety-three percent of infants 12-15 months of age are breastfed in Nepal, with the rate of breastfeeding remaining high for children 21- 23 months of age. However, pre-lacteal feeding is common; approximately 28% of

Nepalese children residing in urban areas have been fed something other than breast milk in the first three days after birth (MOHP, 2011).

Additionally, complementary feeding practices in Nepal show room for improvement. Early introduction of complementary foods, which has the potential to negatively affect a child's nutritional status by displacing breast milk in the diet, is common in Nepal; three percent of breastfeeding children aged 2-3 months receive some kind of solid or semisolid food, a figure which rises to 23% by 4-5 months of age (MOHP, 2011). With regard to infant and young child feeding (IYCF) minimum standards, which account for dietary diversity, feeding frequency and consumption of breast milk, milk or other milk products, only 37% of children in urban households and 24% of Nepalese all overall are fed in accordance with recommended practices (MOHP, 2011).

The 2006 Nepal Demographic and Health Survey (NDHS) illustrated that 21% of infants 6-8 months of age, 35% of those 9-11 months of age and 55% of those 12-23 months of age ate sugary snack foods (defined as biscuits, sweets, candies, chocolates, pastries or cakes) in the previous day (MOHP, 2007). A 24-hour recall survey of young children in 16 districts across Nepal by the International Food Policy Research Institute (IFPRI) reported consumption of savory snacks, such as chips or *dal mat (chanachur)*, and sweet snacks, including biscuits, candies, chocolates, or other sweets, to be 52.0% at 9-11 months and 63.5% at 21-23 months of age (Cunningham, 2013). These consumption patterns are cause for concern; often, these food products are energy-dense and nutrient-poor, and are inappropriate for infant and young child feeding as they have the potential to displace more nutritious foods. Commercially produced complementary foods can help improve nutritional status of young children if they are fortified and of optimal nutrient composition (and not high in sugar or salt). However, other commercial snack foods may be detrimental to young child feeding by potentially increasing consumption foods high in salt or sugar and displacing consumption of other more nutritious options.

The Nepali government has affirmed its commitment to support optimal breastfeeding practices. In 1992, Nepal passed their own national legislation for commercial infant and young child food products, the *Mother's Milk Substitutes (Control of Sale and Distribution) Act*. The Act was passed to regulate the sale, distribution and promotion of substitutes for breast milk within Nepal, including breast-milk substitutes and 'any other such food or beverage marketed or otherwise distributed as is suitable for feeding to the infant' (Nepal Government, 1992). However, because the Act defines an 'infant' as a child under 12 months of age, this policy only applies to breast-milk substitutes and commercial complementary food products marketed for children 0-11 months of age.

Specific provisions with regard to the health care system are outlined in Clause 8 of the Act. Health care workers must promote proper breastfeeding practices and must be familiar with provisions of the *Mother's Milk Substitutes Act* and the information it contains. Health care workers may not accept gifts or incentives from manufacturers or distributors of breast-milk substitutes, distribute product samples, or promote the use of breast-milk substitutes. Additionally, Clause 9 of the Act states that manufacturers and distributors should not advertise in a manner to promote any product, that they should not promote any product in a manner to state or make the general population believe that bottle-feeding is equal to or better than breast-feeding. "Promotion" refers to the introduction of any product to any person or introducing any person to a product, through use of any of the following methods:

1. Advertising
2. Use of printed materials, including the name of the proprietary product, logo, graphic or books, pamphlets or posters containing other images.
3. Distribution of any material containing the name of a manufacturer or the distributor, or logo, or name of the proprietary product, logo, graphic or any other images in nominal cost or for free.
4. Exhibition of products and,
5. Any other methods

The prohibition also applies to television, radio, film, video, or telephone advertising, as well as promotion in print media, including the use of symbols, photographs, images, billboards, information or exhibition of related materials. A section within the clause prohibits the distribution of samples of any product to anyone. These prohibitions apply to promotions in the general public space, as well as specifically being prohibited within the Nepal healthcare system (Nepal Government, 1992). This includes prohibition of discounts of products or free samples of products to health workers and direct contact with potential customers or the general public within the premise of a "Health Care Agency" (Nepal Government, 1992).

Understanding what messages mothers in Kathmandu Valley receive from the health system and outside from the commercial sector about infant and young child feeding is needed in order to reinforce positive messages and discourage inappropriate promotion of commercially produced foods for infants and young children, including breast-milk substitutes, commercial complementary foods and commercial foods for general consumption. It is also important to ensure that breast-milk substitutes are not being promoted, which would be in violation of the International Code of Marketing of Breast-milk Substitutes (WHO, 1981) and Nepali law (if the product is for children under 1 year of age). Numerous studies have been conducted on infant feeding and promotion practices through interviews with mothers in health facilities. The Interagency Group on Breastfeeding Monitoring (IGBM) and UNICEF (2007) developed a sampling

methodology which has been used in Pakistan (Save the Children and Gallup Pakistan, 2013), Botswana (IGBM and UNICEF, 2005), and Poland, Thailand, Bangladesh and South Africa (Taylor, 1998). Other studies have used similar methods to assess health system practices related to infant feeding in Burkina Faso and Togo (Aguayo et al, 2003), Jamaica (Hamilton, 2002), the Philippines (Sobel et al, 2011), and Quebec (Haiek, 2012). A country level study in the Ukraine (Babak et al, 2004) used questionnaires developed by the International Baby Food Action Network (IBFAN) to collect information from mothers in health care facilities, from retail outlets, and from product labels. These studies have documented promotion of breast-milk substitutes (BMS) within health systems, including provision of free samples and presence of promotional materials, and have also documented point of sale promotions, which are all prohibited by the International Code of Marketing of Breast-milk Substitutes (WHO, 1981).

Brownlee (2009) has proposed methods to obtain information on maternity center practices related to breastfeeding and compliance with the Baby Friendly Hospital Initiative. In Honduras, Ecuador and El Salvador, Perez-Escamilla (2004) documented that monitoring health system practices through interviews with mothers brought about improved breastfeeding practices. Women were asked about their prenatal and delivery experiences, such as whether breastfeeding was discussed during prenatal visits, whether infants were given other liquids in the hospital, and whether staff helped mothers with breastfeeding at/after delivery. This information was fed back to health center staff and led to improvements in health system practices.

Helen Keller International (HKI) is implementing a project titled “Assessment and Research on Child Feeding (ARCH)”, which intended to gather information on the promotion of foods consumed by infants and young children in four countries (Cambodia, Nepal, Senegal and Tanzania). As part of the ARCH project, a study, ‘Assessment of promotion of foods consumed by infants and young children in Nepal,’ was conducted in partnership with Nepal’s Ministry of Health and Population’s Child Health Division; findings from this study are detailed in this report.

This study sought to build the understanding around mothers’ exposure to commercial promotions for infant and young child food products in Kathmandu Valley, and their utilization of these products. While building upon the methods and research mentioned above, this study sought to gather additional information not included in previous studies. First, prior research has focused on mothers’ exposure to promotions during pregnancy and delivery of a child, while this study captured recall information on mothers’ exposure during the first 1,000 days of a child’s life – from conception until 2 years of age. Additionally, this study sought to gather information on promotions and consumption of complementary foods, in addition to breast-milk substitutes. Finally, while some surveys have gathered information on

consumption of ‘sugary snack’ foods, it was felt that the prevalence of consumption of a greater range of specific snack products often eaten by young children, such as biscuits, candy, soft drinks, and savory chips/crisps, needed to be documented in order to develop policies and messages to discourage their use in infant and young child feeding. Consequently, this study gathered consumption data on a range of commercially produced foods for general consumption that are commonly fed to young children, including various snack products.

3. Materials and Methods:

3.1 Research objectives

The ARCH ‘Assessment of promotion of foods consumed by infants and young children in Nepal’ study seeks to assess exposure to promotional practices among mothers utilizing the health system in Kathmandu Valley, Nepal, as well as to assess their current infant and young child feeding practices, including utilization of commercially produced foods.

The primary objectives of the study are to:

- Estimate the prevalence of promotional practices occurring within the health system for breast-milk substitutes (including infant formula, follow-on formula, and growing-up/toddler milks)
- Estimate the prevalence of promotional practices occurring within the health system for complementary foods (including advice on home-prepared and commercially produced complementary foods) and supplements for infants and young children
- Document breastfeeding support and complementary feeding guidance provided in health facilities

The secondary objectives of the study are to:

- Document consumption by infants and young children of breast milk, breast-milk substitutes, complementary foods (both home-prepared and commercially produced complementary foods), supplements, and commercially produced foods for general consumption commonly fed to young children
- Document mothers’ exposure to promotion of commercial food products occurring outside the health system

3.2 Definitions

This study uses the following definitions for the categories of food under observation:

Breast-Milk Substitutes (BMS): The *Code* defines a breast-milk substitute as, “any food being marketed or otherwise represented as a partial or total replacement for breast milk, whether or not suitable for that purpose” (WHO, 1981). The ARCH Project defines breast-milk substitutes to include infant/starter formula (to be used from birth up to six months of age), follow-up formula (to be used from 6 months to

12 months), and other milk or milk-like products (in liquid or powdered form) marketed or otherwise represented as suitable for feeding children younger than two years of age, including growing-up milk and toddler milks, but excludes other beverages and foods marketed or otherwise represented as a partial or total replacement for breast milk.

Commercially Produced Complementary Foods (CPCF): Any commercially produced food or beverage product, excluding breast-milk substitutes, that contains a label indicating the product is intended for children younger than two years of age, by:

- (a) Making use of the words baby/babe/infant/toddler/young child in the context of a child's age e.g. baby food (food for babies), not the size/maturity of the product e.g. baby potato (young potato),
- (b) Recommending an age of introduction less than two years on the label, or
- (c) Using an image of a child appearing younger than 2 years of age or an image/text of infant feeding (which could include a bottle).

Types of commercially produced complementary foods include cereal/porridge, homogenized/pureed food, snacks/finger food, gravy/soup, tea/water/juice, etc.

Commercially produced foods for general consumption commonly fed to children less than two years of age (CPF): Foods commonly fed to, but not marketed specifically for, children younger than two years of age e.g. soda/carbonated beverages, 100% juice/juice drinks, bottled water, condensed milk/evaporated milk, chocolate/milk beverages, biscuits/cookies, savory snacks (chips, crisps), sweet snacks (cakes/doughnuts and candy/sweets/chocolate), processed cereals (e.g. maize meal), breakfast cereals, instant noodles and peanut butter.

3.3 Research design and study population

This study utilized a cross-sectional, multi-stage cluster randomized design. Because variables of interest included breastfeeding practices, the study was limited to only mothers and did not include other caregivers of children. Data were collected through structured interviews using two questionnaires for two separate study populations: 1) mothers who had just been discharged from a maternity ward after delivery and 2) mothers of children less than 24 months of age who were utilizing child health clinics at a facility. The former study population was interviewed regarding experiences and practices during their pregnancy or since the recent delivery of their newborn, while the latter study population was asked to recall experiences and practices since the birth of their youngest child less than 24 months of age. Data were gathered from a period of December 2013 – February 2014.

Because prior studies have indicated commercial products to be more widely available in urban areas (Sweet et al, 2012), the study populations included in this survey were limited to mothers currently living in and utilizing health facilities within Kathmandu Valley, defined as the geographical area within the limits of Kathmandu, Lalitpur and Bhaktapur districts. Mothers living outside of Kathmandu Valley, but utilizing delivery or child health services in the Valley were excluded from participation in the survey. Additionally, in order to obtain a sample of mothers who held equal opportunity to successfully breastfeed, mothers with any of the following characteristics were excluded:

1. Mothers of infants/young children with congenital diseases or who were in the neonatal intensive care unit (NICU);
2. Mothers who experienced severe delivery complications during the birth of their newborn/youngest child;
3. Mothers whose newborn/youngest child is a twin or from a multiple birth;
4. Women who were not mothers of the child less than 24 months present with them at the health facility;
5. Children too ill for interview.

3.4 Sample size

In their studies of caregivers, Taylor (1998), IGBM/UNICEF (2005), and Save the Children and Gallup Pakistan (2013) interviewed about 800 women (400 pregnant and 400 with children less than 6 months of age) in each site (often in capital cities). Other studies have had much smaller sample sizes ranging from 50 to about 300 caregivers (Aguayo et al, 2003; Hamilton, 2002; Sobel et al, 2011; Perez-Escamilla, 2004; Babak et al, 2004; and Haiek, 2012). The Baby-Friendly Hospital Initiative (BFHI) self-assessment tool to help health systems assess practices around breastfeeding support (Brownlee, 2009) suggests collecting 30 interviews with mothers in one month in each health facility and report BFHI compliance if 80% of mothers respond affirmatively to questions related to the BFHI global criterion. The IGBM and UNICEF (2005) methodology uses 800 women with infants < 6 months because “the sampling of 800 women gives a 95% power to observe at least one reported violation if the true prevalence is 2%. If the prevalence is 10%, the sample size generates an estimate of population prevalence with a standard error of 1%.” Because of the high cost of collecting such a large sample size, and the desire to develop a methodology that could be replicated in subsequent years on a regular basis by local governments and interested stakeholders, a higher standard error was used in this study.

The sample size for this study was calculated to detect a 10% prevalence rate of exposure to promotions within the health system, with a measurement error of $\pm 5\%$. Using a standard of error of 0.0255 and assuming a design effect of 2 to account for the cluster design, a sample size of 280 for mothers at discharge and 280 for mothers of children less than 24 months of age was considered adequate. Due to the

cluster sampling design utilized (described below), the final sample size was slightly higher than 280; the final sample was 304 mothers being discharged after delivery and 309 mother of children less than 24 months of age utilizing child health services. A total of 452 mothers being discharged after delivery were approached for interview. Twenty-six (5.8%) mothers refused participation and 122 (27.0%) were excluded based on at least one of the criteria detailed above; 101 (22.3%) of mothers lived outside of Kathmandu Valley, 20 (4.4%) infants had been in the NICU after delivery, 8 (1.8%) mothers reported severe complications during delivery, and 2 (0.4%) children were from a multiple birth. The final sample of successfully completed interviews among mother discharged after delivery was 304 mothers. A total of 435 mothers utilizing child health services at a facility were approached for interview. Fifty-four (12.4%) of these mothers refused participation and 72 (16.6%) mothers were excluded; 56 (12.9%) mothers lived outside of Kathmandu Valley, 12 (2.8%) infants had been in the NICU after delivery, 6 (1.4%) mothers reported severe complications during delivery, and 1 (0.2%) mother whose child was too ill for interview. The majority of refusals by mothers were due to the mothers not having time and needing to leave the health facility after their child received services. The final sample of successfully completed interviews among mother with children under 24 months of age utilizing child health services was 309 mothers.

3.5 Sampling procedure and data collection

In order to reflect the significant share of Nepal's urban mothers who utilize private facilities, a proportion of the sample for each study population was taken from private facilities; approximately 28% of urban Nepali mothers with facility-based deliveries deliver at private facilities (MOHP, 2011). Therefore, 30% of both discharge mothers and mothers of children less than 24 months utilizing child health clinics were interviewed at private facilities.

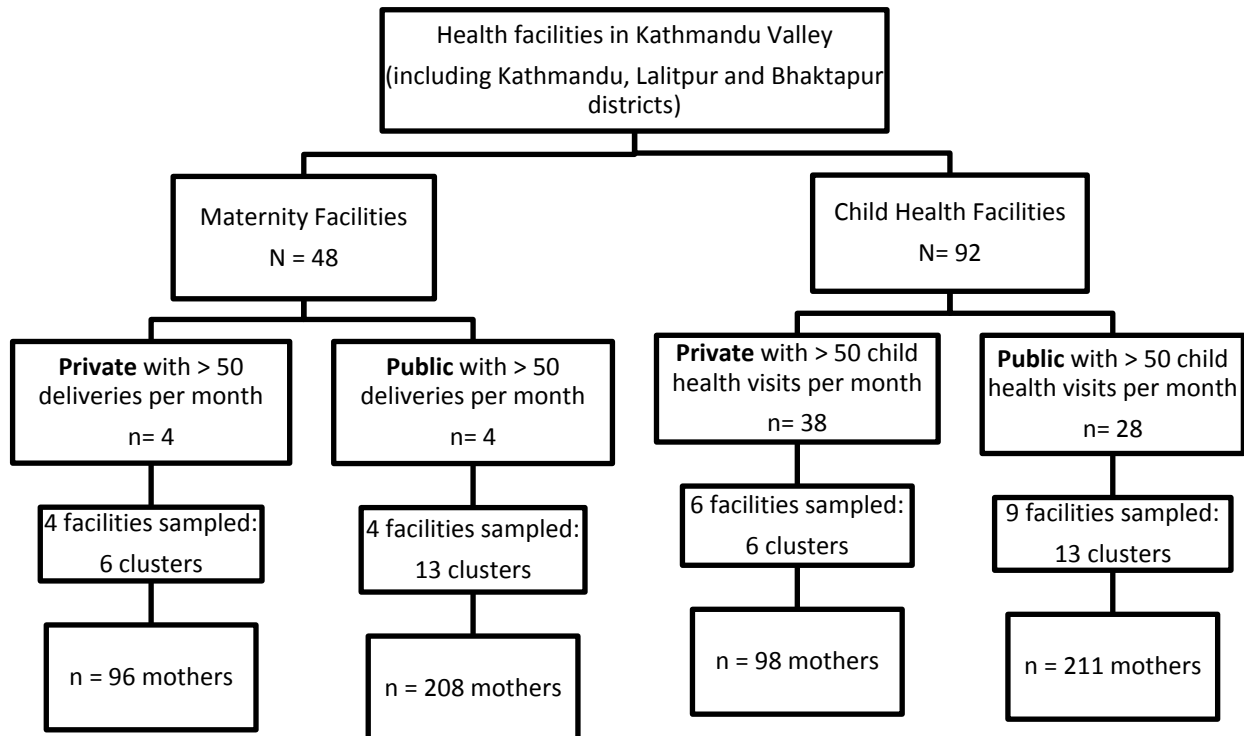
Lists of all health facilities, including both public and private, offering maternity and/or child health services were obtained from the Health Management Information System (HMIS) database from the District Public Health Offices for the 3 districts in Kathmandu Valley. This included national hospitals, referral hospitals, and health centers; health posts were excluded. In addition, this same data source had utilization rates for these facilities, which included total number of deliveries and number of child health visits, including out-patient department and immunization. The rates were then calculated as the monthly average per facility; for example, if annual data was obtained, the rates were thus divided by 12 months.

Health facilities were then sampled by allocating clusters using probability proportional to size (PPS). The calculated monthly utilization rates served as each facility's 'population'. Facilities for mothers discharged after delivery and facilities for mothers of children < 24 months of age were sampled separately, though some facilities offered both delivery and child health services and were thus included in both sampling frames.

Due to logistics and the need to complete data collection within 8-10 weeks, facilities with less than 50 deliveries/child health visits per month were excluded from the sampling frame. This excluded 40 out of 48 facilities for delivery, but the 8 included in the sampling frame represented 91.0% of all facility-based births in Kathmandu Valley. For facilities with child health services, this excluded 26 out of 92 child health facilities, but the 66 included in the sampling frame represented 98.3% of all child health visits in Kathmandu Valley health facilities.

Clusters of 16 mothers each were assigned across facilities in the sampling frame; the total of 16 mothers per cluster was chosen to allow for even distribution of child ages across 4 age categories (0-5.9; 6-11.9; 12-17.9; and 18-23.9 months). In Nepal, 13 clusters were sampled in each sampling frame of public facilities and 6 clusters were sampled for private facilities, allowing for 30% of the total sample to be sourced from private facilities. Because sampling of facilities was proportional to size, larger facilities had a greater chance of being sampled for multiple clusters, while smaller facilities had a greater chance of being sampled for only one cluster. **Figure 1** details the sampling of facilities and mothers for each study population across public and private health facilities.

Figure 1. Sampling profile for mothers and facilities



Two sampling procedures were utilized for the two study populations. In both cases, sampling of mothers was exhaustive in order to maximize the number of interviews completed per day and to ensure data collection completion within the timeframe required of the study:

Mothers at discharge: Sampled facilities were alerted of data collection approximately one week prior to survey. Survey site managers worked closely with nurses-in-charge to identify those mothers for discharge, and enumerators interviewed mothers after they had completed the discharge procedure and paperwork. Interviews continued until all mothers scheduled for discharge that day had been interviewed, or until the sample for the facility in question had been reached.

Mothers with children under 24 months: Sampled facilities were alerted of data collection approximately one week prior to survey. Women with children at clinics offering child health services, either in the immunization or outpatient department (OPD), at a sampled health facility were approached for interview by site managers. Survey site managers screened every woman with a child who passed through the entrance/exit point of the child health clinic area. Women were first screened to assess: 1) if they were the mother of the child with them; 2) if this child was under 24 months of age and 3) if they lived in Kathmandu Valley. Site managers also assessed the age of the child to verify if an interview was still needed for the specific age category. All exclusion criteria, including those assessed during screening, were included in the formal questionnaire used for interviewing mothers.

Approval for this study was obtained from the Nepal Health Research Council (NHRC) prior to data collection.¹ Informed consent was obtained from all participants prior to the conducting of any interview.

3.6 Questionnaire design

Two questionnaires were developed to obtain data from the separate study population of interest, mothers at discharge after delivery and mothers with children under 24 months of age utilizing child health services; details of questionnaire sections are shown in Table 1.^{2,3} Both questionnaires collected data on mothers' characteristics, including: age, marital status, caste, educational attainment, household assets and drinking water source, and details regarding antenatal care and delivery of the youngest child. Data collected specifically on the youngest child included: age, gender, and birth order. Data on pre-lacteal feeding, current breastfeeding practices for the newborn/youngest child were collected among both study

¹ Approval was obtained on December 2, 2013 (Registration No. 156/2013).

² Questionnaires available upon request.

³ Questions regarding exposure to promotions were adapted from the Interagency Group on Breastfeeding Monitoring Protocol (IGBM, 2007).

populations, and current complementary feeding practices were collected among mothers with children less than 24 months of age. Data to assess these infant and young child feeding practices were gathered in accordance with the WHO guidelines on IYCF practices (WHO, 2008). Both questionnaires asked mothers to report on promotional practices experienced inside and outside the health system, for both breast-milk substitutes and commercially produced complementary foods; mothers at discharge were asked to recall exposure experienced during pregnancy and after delivery of their newborn, while mothers of children under 24 months were asked to recall promotional exposure only after the birth of their youngest child. Finally, mothers of children less than 24 months of age utilizing child health services were asked to report dietary information for this child. Standardized questionnaires were used to obtain information on which foods and liquids were consumed by the youngest child on the day and night prior to the day of interview. Additionally, data were gathered on the weekly frequency of consumption, reasons for feeding, and expenditure for home-prepared complementary foods and commercially produced snack foods commonly fed to young children, as well as on the types of foods mothers aspired to feed their youngest child and reasons for this aspiration.

Table 1. Questionnaire topic sections

Section	24 Month	Discharge
Mother characteristics	X	X
Child characteristics	X	X
Childcare practices	X	
Breastfeeding practices	X	X
Infant feeding in last 24 hours and last week	X	
Complementary food advice	X	
Health communication	X	X
Advice and information	X	X
Promotions	X	X
Samples	X	X
Gifts	X	X

Data were collected using a mobile technology system in order to allow for immediate data entry, reduction in data errors, and prompt analyses. The questionnaires were designed in Microsoft Word and then entered in Formhub, an open-source online platform that allow data to be collected via phones or tablets, using the Android application Open Data Kit (ODK) Collect, and data submitted online to a web-based database (Formhub, 2013). The questionnaires were translated from English into Nepali, back translated into English to ensure accuracy, and uploaded into Formhub in Nepali. Interviews were

conducted in Nepali using the Samsung Galaxy tab 2.07 model tablet. Submitted questionnaires were reviewed weekly to ensure data quality.

3.7 Statistical analyses

Data were cleaned and analyzed using SPSS version 21 (SPSS Inc.). Proportions and mean \pm standard deviation (SD) were used to describe the samples. Differences in age categories and associations were assessed through bivariate comparison, using 2-sided Fisher's exact chi-square test for proportions.

3.7.1 Creation of variables

Several variables of interest were created during analysis of the datasets.

Infant and young child feeding (IYCF) definition: IYCF indicators assessed in this study were defined according to the WHO's guidelines for assessing IYCF practices (WHO, 2008). Complementary feeding indicators, including minimum dietary diversity, minimum meal frequency, and minimum acceptable diet, were limited to children 6-23.9 months of age, while breastfeeding indicators were assessed across the entirety of both samples.

Safe source of drinking water: Main sources of drinking water reported by mothers were categorized into 'safe' and 'unsafe' sources. 'Safe' water included: piped water, a tube well, a borehole, a protected well, protected spring, or bottled water. 'Unsafe' water included: water from an unprotected well, unprotected spring, water from a tanker truck or small cart, rainwater, or surface water.

4. Results:

4.1 Demographics and socio-economic characteristics

Demographic and socio-economic characteristics for mothers of newborns discharged after delivery and mothers of children less than 24 months of age visiting child health services are shown in **Table 2**. The majority of all mothers were currently married at the time of interview, and almost two-thirds of mothers in each study population reported their newborn/child under 24 months of age to be their only child (62.2% [n=189] of discharged mothers and 59.9% [n=185] of mothers visiting child health clinics). Among those that were currently married, 14.5% (n=44) of mothers discharged after delivery and 13.6% (n=42) of mothers visiting a child health clinic reported that their husband currently worked outside of Kathmandu. Ninety percent of mothers in each study population had attended any level of formal education; 19.1% (n=58) of discharged mothers and 21.7% (n=67) of mothers visiting child health clinics reported attending university or higher graduate studies. Only 15.1% (n=46) of discharged mothers and 9.7% (n=30) of mothers visiting child health clinics reported currently working outside the home, and almost all mothers of children less than 24 months of age (95.5%, n=295) reported themselves to be the main caregiver of their youngest child.

Just over half of the children included in this survey were male – 56.2% (n=171) of newborns and 51.1% (n=158) of children less than 24 months of age were male. The mean age of newborns referred to in interviews with mothers discharged after delivery was 2.2 days; the mean age of children less than 24 months of age was 11.6 months, as would be anticipated given the effort made to sample children across an equal distribution of ages 0 -23 months. Almost all mothers had received some antenatal care (ANC) during pregnancy with their youngest child; 93.7% of women living in urban Nepal had received ANC according to the most recent NDHS (MOHP, 2011). Approximately one-third of the children referenced in this survey were delivered by caesarean section, and most mothers discharged after delivery and mothers of children less than 24 months delivered of their youngest child with the assistance of a health professional, including a doctor, nurse or auxiliary nurse midwife (99.0% and 95.5%, respectively). According to the 2011 NDHS, the rate of C-section deliveries across urban Nepal is 22.3% (MOHP, 2011).

Almost all mothers reported a safe source of drinking water for their household, and for both study populations the mean number of household members per sleeping room in the house was 2.7 persons. The majority of mothers reported that their household owned a television (86.2% of discharged mothers and 90.6% of mothers visiting child health clinics), and almost half of all mothers reported that their household owned a motorbike. Only 6.3% (n=19) of mothers with newborns and 5.5% (n=17) of mothers with a child under 24 months of age reported that their household owned a car.

Table 2. Demographic and socio-economic characteristics

	Mothers discharged after delivery (<i>n</i> = 304)	Mothers with children < 24 months (<i>n</i> = 309)
<i>Mother</i>		
Age (years) (mean ± SD)	25.0 ± 4.6	26.0 ± 4.7
Parity (number) (mean ± SD)	1.5 ± 0.6	1.5 ± 0.7
Marital status (%)		
Married	99.7	99.7
Divorced, widowed or separated	-	-
Single	0.3	0.3
Level of education (%)		
None	7.6	7.1
Non-formal education	2.3	3.9
Primary	19.7	12.0
Secondary	28.0	28.5
Upper secondary	23.4	26.9
Tertiary education	19.1	21.7
Caste (%)		
Dalit	3.6	3.2
Disadvantaged janajati	31.3	24.6
Disadvantaged non-dalit terai caste	1.0	2.9
Religious minority	0.0	0.3

Advantaged janajati	30.3	23.0
Upper caste	33.9	46.0
Works outside the home (%)	15.1	9.7
Main caregiver of child (%)	_*	95.5
Received antenatal care (%)	99.3	99.0
Assisted delivery (%)	99.0	95.5
<i>Child</i>		
Age (mean \pm SD)	2.2 \pm 2.5 (days)	11.6 \pm 6.8 (months)
Sex (female) (%)	43.8	48.9
C-section delivery (%)	29.3	28.2
<i>Household</i>		
Safe source of drinking water (%)	95.7	97.7
Household members per sleeping room (mean \pm SD)	2.7 \pm 1.0	2.7 \pm 1.1
Assets, ownership (%)		
Bicycle	23.0	18.1
Car	6.3	5.5
Motorbike	45.4	47.2
Refrigerator	39.1	43.0
Television	86.2	90.6

SD, standard deviation. *Question not asked among discharged mothers as child was just born.

Several differences in demographic and socio-economic characteristics were found when comparing mothers attending public versus private health facilities in Kathmandu Valley. Ownership of refrigerators, motorbikes, and cars was higher among mothers attending private health facilities, as compared to those attending public facilities, for both mother populations (data not shown). While the proportion of mothers who ever attended school were similar between public and private facilities, the education level among mothers who were utilizing private health facilities was higher as compared to those utilizing public facilities. This difference was particularly marked among mothers discharged after delivery; 47.9% of mothers in private maternity wards had attended grade 11 or higher (including university), as compared to 19.7% of mothers in public maternity wards.

In addition to these characteristic differences, there were also some differences in aspects related to delivery of the youngest child. Both mothers at discharge and mothers with children under 24 months of age attending private facilities reported higher rates of C-section deliveries as compared to mothers attending public facilities. 40.6% of discharged mothers from private maternity wards delivered via C-section, as compared to 24.0% of discharged mothers from public maternity wards. A similar rate was determined among mothers with children under 24 months; 37.8% of those seeking child healthcare in private facilities reported their youngest child was delivered via C-section, as compared to 23.7% of those seeking child healthcare in public facilities.

4.2 Promotion within the Health System

4.2.1 Breastfeeding and IYCF counseling:

Article 6 and Article 7 of WHO's International Code of Marketing of Breast-milk Substitutes and Clause 8 of Nepal's *Mother's Milk Substitutes Act* specifically call upon health facilities and health workers to protect, promote, and encourage breastfeeding (WHO, 1981; Nepal Government, 1992). As many mothers look to healthcare professionals and health workers for guidance on infant and young child feeding, these actors can play an influential role in early childhood nutrition. Information was gathered from mother participants in order to assess mothers' experience of advice and counseling within health facilities that would support and encourage optimal breastfeeding and complementary feeding practices. Mothers discharged after delivery in a maternity ward were asked about their exposure to breastfeeding counseling and IYCF messages throughout their pregnancy and during delivery and mothers with children under 24 months of age visiting child health clinics were asked to recall this exposure since the birth of their youngest child; results are shown in **Table 3**.

Among mothers discharged after delivery who received ANC during this pregnancy, 11.6% (n=35) reported receiving breastfeeding information during an ANC visit; comparatively, 28.8% (n=88) of mothers utilizing a child health clinic who received ANC during their last pregnancy reported receiving breastfeeding information ($p < 0.001$). The most commonly reported breastfeeding messages received among mothers in both study populations were related to promotion of exclusive breastfeeding and early initiation of breastfeeding. Messages regarding the risks of feeding infant formula, the risks of feeding other foods/liquids before 6 months, and increasing breastfeeding during and after illness were the least commonly reported information received by mothers.

In addition, mothers were asked to report their exposure to educational messages on infant and young child feeding; 45.4% (n=138) of mothers at discharge and 59.9% (n=185) of mothers of children less than 24 months visiting a child health clinic reported having heard, seen or read an education message on IYCF. Among mothers at discharge that reported exposure to IYCF messaging, 50.7% (n=70) reported this exposure to messaging during pregnancy and 39.1% (n=54) reported that this message occurred during pregnancy as well as right after their newborn was delivered. Among mothers that were able to recall the IYCF message received, the most common educational messages reported were related to exclusive breastfeeding (77.0% [n=97] of discharged mothers and 72.2% [n=114] of mothers with children less than 24 months) and the introduction of complementary foods at 6 months of age (43.7% [n=55] of discharged mothers and 52.5% [n=83] of mothers with children less than 24 months). Specific messages regarding complementary feeding practices, including frequent feeding, feeding a variety of

foods, increased consistency as child grows and safe preparation and storage of foods were less common in both study populations.

Table 3. Breastfeeding and IYCF messaging within the health system

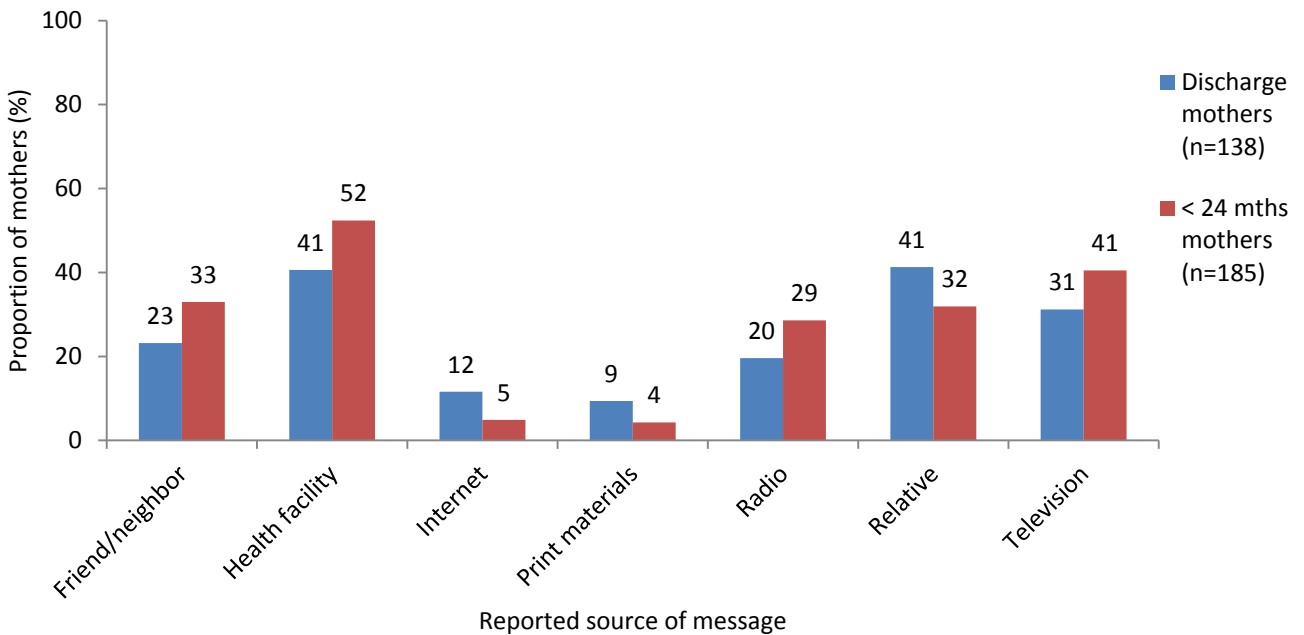
	Mothers discharged after delivery (<i>n</i> = 304)	Mothers with children < 24 months (<i>n</i> = 309)
Receiving information on breastfeeding from a health worker during ANC (%) ¹	11.7	28.8
Breastfeeding messages received during ANC (%) ²		
Continued breastfeeding until 2 years and beyond	14.3	33.0
Demand breastfeeding	5.7	4.5
Exclusive breastfeeding	62.9	84.1
Early initiation	51.4	68.2
Feeding colostrum	25.7	40.9
Frequent breastfeeding (8-12 times a day)	22.9	11.4
Increased breastfeeding during/after illness	0.0	1.1
Risks of feeding infant formula	2.9	1.1
Risks of feeding other foods/liquids before 6 months	2.9	5.7
Heard, saw or read any IYCF educational message (%) ⁴	45.4	59.9
Content of IYCF education message (%) ⁵		
Continued breastfeeding until 2 years and beyond	23.8	29.7
Exclusive breastfeeding	77.0	72.2
Early initiation	34.1	40.5
Feed BMS if breast milk is not sufficient	0.0	1.9
Feeding colostrum	29.4	25.9
Feeding frequently	16.7	25.9
Feeding iron-rich foods	1.6	2.5
Feeding variety of foods	11.9	23.4
Increase consistency as child grows	1.6	4.4
Increase feeding during and after illness	0.8	0.6
Increase quantity as child grows	4.8	5.7
Introduction of complementary foods at 6 months	43.7	52.5
Responsive feeding	1.6	1.9
Safe and clean food preparation and storage	0.0	2.5

¹ Among mothers that received antenatal care during pregnancy with youngest child (*n*=298 for mothers at discharge; *n*=306 for mothers visiting child health clinic); ² Among mothers that received breastfeeding information during ANC for last pregnancy (*n*=35 for mother at discharge; *n*=88 for mothers visiting child health clinic); ³ Among mothers that delivered in a health facility (*n*=303 for mothers at discharge; *n*=296 for mothers visiting child health clinic); ⁴ Time reference was during pregnancy or delivery for mothers at discharge, and since the youngest child was born for mothers with children less than 24 months; ⁵ Among mothers that recalled the IYCF message content (*n*=126 for mothers at discharge; *n*=158 for mothers visiting child health clinics).

Reported sources of this IYCF educational messaging are shown in **Figure 2**. For both study populations, the most common sources of IYCF educational messages were health facilities, relatives, friends or neighbors, and television. While health facilities were reported as the most common source of IYCF information, personal contacts, particularly relatives, were also very commonly reported; 41.3% (n=57) of mothers at discharge and 31.9% (n=59) of mothers with children less than 24 months who reported exposure to an IYCF message reported the source as a relative. Mothers and sisters of the participants were the most common relative type providing these messages, accounting for approximately half of these messages in both study populations (data not shown). Receiving messages from other children in the household that attend school, a community gathering, community health workers, Female Community Health Volunteers (FCHV), or pharmacists were the least common, being reported by less than 3% among both study populations.

Among both study populations, information on exclusive breastfeeding was the most commonly received message, during both ANC visits and from exposure to other IYCF messaging routes. Overall, 36.8% (n=112) of mothers discharged after delivery and 50.2% (n=155) of mothers with children less than 24 months of age reported exposure to a message on exclusive breastfeeding either during ANC or through another educational message source.

Figure 2. Reported sources of IYCF messages*



*Among mothers who reported exposure to IYCF educational message

Approximately two-thirds of mothers in both study populations (64.5% of discharged mothers and 67.9% of mothers utilizing child healthcare) reported receiving assistance in positioning and/or attachment for breastfeeding from a health worker after delivery of their newborn/youngest child. However, among mothers discharged after delivery, rates of assistance with positioning/attachment were significantly higher in private health facilities as compared to public (83.3% vs. 55.1%, $p < 0.001$).

4.2.2 *Recommended use of commercial products from health workers:*

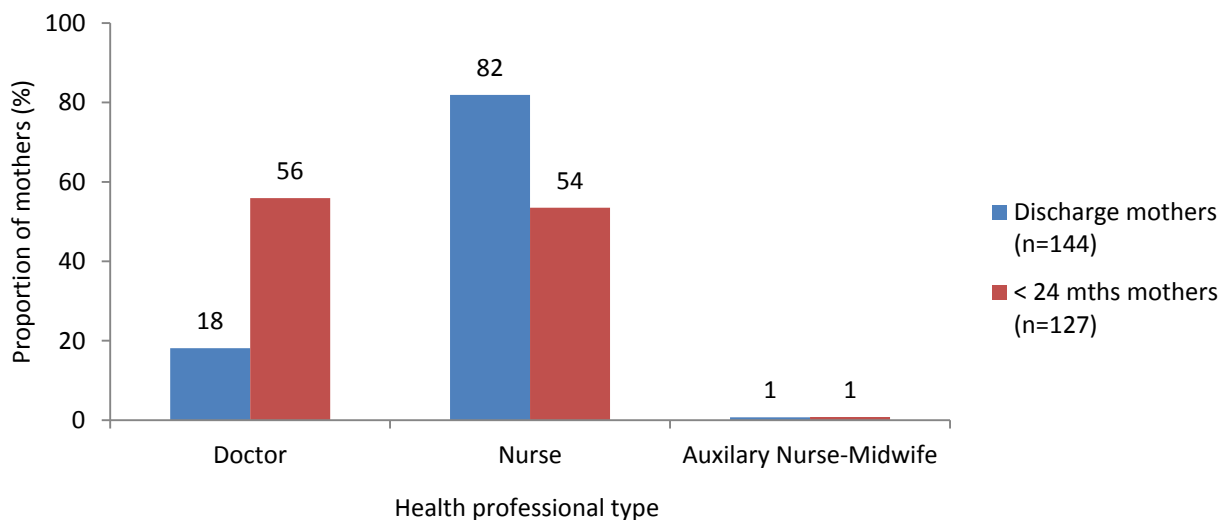
In addition to gathering information regarding advice and counseling on optimal infant and young child feeding received by mothers in the health system, mothers were also asked about recommendations received from health professionals for use of breast-milk substitutes or other types of milk, including powdered milk, liquid tinned milk, fresh animal milk or condensed milk. Mothers were also asked about health workers' recommendations to feed particular foods during the complementary feeding period. Clause 8.3 of Nepal's *Mother's Milk Substitutes Act* states that '*health workers shall not allow any act inhibiting the commencement and expansion of breastfeeding, whether directly or indirectly*' (Nepal Government, 1992); health worker recommendations of breast-milk substitutes or other milks as a replacement for breast milk may contribute to delayed initiation of breastfeeding and/or discontinuation of breastfeeding.

Recommendations for breast-milk substitute use by health professionals were commonly reported in both study populations. Among all mothers discharged after delivery, 47.4% ($n=144$) received a recommendation from a health professional, either during pregnancy or just after delivery, to feed their newborn breast-milk substitutes; recommendations from health professionals accounted for 83.2% of all recommendations made to discharged mothers. Similarly, 41.1% ($n=127$) of mothers with children less than 24 months of age had received a recommendation by a health professional since the birth of the child to feed a breast-milk substitute, with these recommendations accounting for 76.5% of all recommendations received by mothers (other sources of breast-milk substitute recommendations are discussed below). Rates of these recommendations were similar across age groups, with 44.4% ($n=36$) of mothers of children 0-5 months, 32.1% ($n=25$) of mothers of children 6-11 months, 42.9% ($n=33$) of mothers of children 12-17 months, and 45.2% ($n=33$) of mothers of children 18-23 months having received such a recommendation from a health professional ($p=0.298$).

The majority of these mothers reported recommendations by health professionals to use a breast-milk substitute in the first 3 days after delivery of their youngest child; health professional recommendations to

use infant formula for pre-lacteal feeding were reported by 40.8% (n=124) of mothers discharged after delivery, and 33.3% (n=103) of mothers utilizing child health clinics. Among mothers who reported receiving a recommendation for breast-milk substitute use from a health professional, the specific type of health professional making the recommendation varied between the study populations; see **Figure 3**. Nurses made the majority of recommendations (81.9%, n=118) for breast-milk substitutes to mothers being discharged after delivery, while recommendations from doctors and nurses were similar among mothers with children less than 24 months of age (55.9% [n=71] versus 53.5% [n=68]).

Figure 3. Health professional type recommending breast-milk substitute*

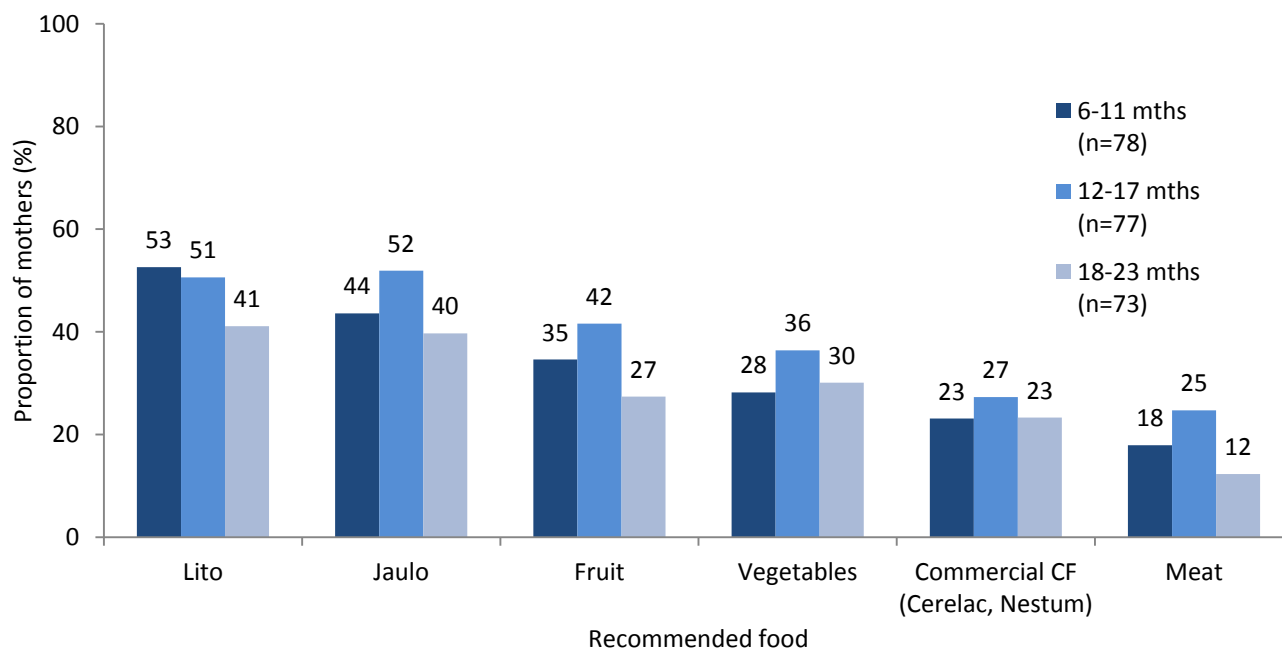


*Among mothers that reported receiving a recommendation from a health professional to feed breast-milk substitute

Among mothers being discharged after delivery, rates of breast-milk substitute recommendations from health professionals were significantly higher for mothers that delivered in private health facilities, as compared to public (67.7% vs. 38.0%, $p < 0.001$). There was no difference between mothers utilizing child health clinics in private versus public facilities (39.8% vs. 41.7%, $p = 0.407$). Among those that received a health professional recommendation to feed their newborn/youngest child breast-milk substitute, around one-third (31.5% [n=34] of discharged mothers and 34.0% [n=34] of mothers with children less than 24 months) were recommended to feed a specific brand of breast-milk substitute. The majority of these brand recommendations were for Lactogen – 91.2% (n=31) of discharged mothers and 97.1% (n=33) of mothers visiting child health clinics. Recommendations by health professionals to feed other types of milks were rare. No mothers at discharge after delivery reported receiving such a recommendation during their pregnancy or after delivery, and only 4.2% (n=13) of mothers with children less than 24 months of age reported receiving such a recommendation from a health professional since their youngest child was born.

Mothers with children 6-23 months of age visiting a health facility for child health services were also asked if health workers recommended particular foods for complementary feeding; results by age category are shown in **Figure 4**. *Lito*⁴ and *jaulo*⁵ were the foods most commonly recommended by health workers for children 6-23 months of age, with 48.2% (n=110) and 45.2% (n=103) of mothers, respectively, reporting such a recommendation. Commercially processed infant cereals, including internationally and locally manufactured brands, were less commonly recommended by health workers, with 24.6% (n=56) of mothers of children 6-23 months of age reporting a recommendation to feed their child such a product. The trends of various food recommendations are generally maintained across age categories; mothers of children 12-17 months of age reported more recommendations across almost all foods, as compared to mothers of children 6-11 months and mothers of children 18-23 months, however, this was not statistically significant.

Figure 4. Foods recommended by health worker to mothers of children 6-23 months



4.2.3 Advertisements and branding display within the health system:

Clause 9.5 of Nepal's *Mother's Milk Substitutes Act* prohibits promotion by manufacturers within any health facilities; promotions are defined to include advertisements as well as use of equipment or materials that feature a brand or logo of the breast-milk substitute manufacturer (Nepal Government,

⁴ Roasted grain flour or roasted grain/bean/lentil cooked in water or milk

⁵ Rice and lentils cooked together

1992). Mothers in both study populations were asked to report their exposure to such promotions within the health system. Observation of commercial advertisements for breast-milk substitutes within the health system was not common among mothers interviewed; 3.6% (n=11) of mothers discharged after delivery and 8.4% (n=26) of mothers visiting child health clinics reported seeing, hearing or reading such an advertisement within a health facility during pregnancy or since their youngest child was born, respectively. Among both study populations, slightly more mothers attending public health facilities (4.8% [n=10] of mothers discharged after delivery and 9.5% [n=20] of mothers with children less than 24 months) reported observation of a breast-milk substitute advertisement within a health facility, as compared to mothers attending private facilities (1.0% [n=1] of mothers discharged after delivery and 6.1% [n=6] of mothers of children less than 24 months); however this difference was not significant ($p=0.165$ for mothers discharged after delivery; $p=0.521$ for mothers of children less than 24 months). The majority of these health facility-based advertisements, 90.9% (n=10) of those observed by discharged mothers and 92.3% (n=24) of those observed by mothers of children less than 24 months, were for Lactogen brand. Observations of advertisements for commercially produced complementary food products in a health facility were rare, reported by only 2.3% (n=7) of discharged mothers and 2.6% (n=8) of mothers with children less than 24 months.

Mothers reporting observations of breast-milk substitute or commercial complementary food branding or logos on health facility equipment or materials were also rare; 4.9% (n=15) of mothers discharged after delivery and 6.8% (n=21) of mothers visiting child health clinics reported such an observation, during pregnancy or since the birth of their youngest child, respectively. Almost all cases of observed branding were reported to have occurred on posters displayed in a health facility.

4.2.4 Receipt of IYC food product samples or branded gifts:

Mothers were asked if they had received a sample of a breast-milk substitute, bottle, pacifier or teat from a health professional. In addition to being prohibited in Clause 8 of Nepal's *Mother's Milk Substitutes Act*, the absence of health workers' provision of breast-milk substitute product sample and materials for bottle feeding is used as an indicator for hospitals certified under the Baby Friendly Hospital Initiative (Nepal Government, 1992; Brownlee, 2009). In Kathmandu Valley, no mothers in either study population reported receiving such a sample from a health professional. Receipt of a free complementary food product sample was also very rare among mothers interviewed; no mothers at discharge after delivery reported receiving such a sample during pregnancy or after delivery of their newborn and only 3 of 309 mothers of children less than 24 months of age received a sample. Two of these 3 mothers received the

sample from a health professional, and 1 received the sample from a non-governmental organization (NGO).

Mothers were also asked to report any gifts received from someone other than a friend, family member or neighbor; this question was followed up by a series of questions to identify if the gift was provided by a health professional and if any branding, particularly from an infant and young child (IYC) food product manufacturer, was displayed on the gift. Among mothers in both study populations, gifts received included diapers (5.6% [n=17] of discharged mothers and 4.9% [n=15] of mothers with children less than 24 months) or a set of baby clothes (8.6% [n=26] of discharged mothers and 5.8% [n=18] of mothers with children less than 24 months). All of the gifts of diapers and baby clothes were given to mothers by health facility staff. Diapers were typically given by nurses, and either a nurse, auxiliary nurse-midwife, or a health facility administrator provided the baby clothes. None of the mothers reported any branding on these gifts.

4.3 Promotion outside the Health System

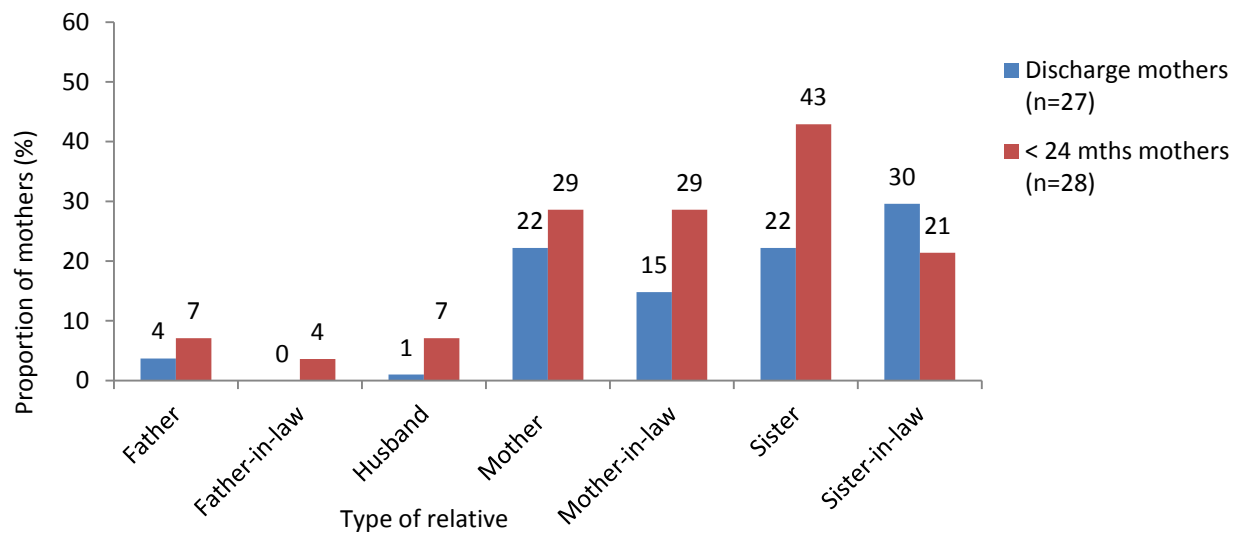
Clause 9 of Nepal's *Mother's Milk Substitutes Act* stipulates that manufacturers should not publically advertise to promote either breast-milk substitutes or commercial complementary foods, including via television, radio, public display of materials, exhibition of images, or 'any other method' (Nepal Government, 1992). Therefore, in addition to information regarding exposure to promotion of IYC food products inside the health system, mothers were asked to report their experience of promotions outside of the health system, including recommendations to use IYC food products, commercial promotions for breast-milk substitutes, commercially complementary foods and commercially produced foods for general consumption commonly fed to children less than 2 years of age. Overall, promotion outside the health system for IYC food products was reported to be low in Kathmandu Valley; however, promotion for commercial foods for general consumption, commonly fed to young children, was high.

4.3.1 Sources of advice and recommendations outside the health system

Mothers may receive advice and recommendations on infant and young child feeding from many sources beyond health workers and outside the health system, including through personal and commercial interactions. Mothers were asked to report all sources of recommendations received for use of breast-milk substitutes or other milks for their youngest child. As reported above, the most common source of recommendations among mothers in both study populations were health professionals. The next most commonly reported sources of recommendations for breast-milk substitutes were from personal contacts. Nine percent (n=27) of mothers discharged after delivery and 9.1% (n=28) of mothers with children less than 24 months of age reported receiving a recommendation from a relative, and 4.9% (n=15) of discharged mothers and 7.1% (n=22) of mothers with children less than 24 months reported receiving a

recommendation from a friend or neighbor. The types of relatives making these recommendations are shown in **Figure 5**; recommendations from mothers, mothers-in-law, sisters and sisters-in-law were the most commonly reported. Recommendations from commercial sector sources were rare. No mothers reported receiving recommendations for breast-milk substitutes from company representatives, and only 1.0% (n=3) of mothers of children less than 24 months of age reported receiving a recommendation from a shop owner/pharmacist.

Figure 5. Proportion of mothers that received breast-milk substitute recommendation from relative, by relative type*



* Among mothers who reported a breast-milk substitute recommendation from a relative

Reports from mothers regarding recommendations to feed their youngest child other types of milks (powdered or liquid form, fresh animal milk, and condensed) were very low among mothers discharged after delivery (5.9%, n=18) but were reported by almost one-quarter of mothers with children less than 24 months of age (24.3%, n=75). These recommendations were more common among children 6-23 months of age; 11.1% (n=9) of mothers of children 0-5 months reported such a recommendation, as compared to 28.9% (n=66) of mothers of children 6-23 months of age (p=0.001). Almost all of these recommendations were for feeding fresh animal milk specifically. Eighty-eight percent of these latter recommendations were reported among mothers whose youngest child was 6-24 months of age, indicating that recommendations were more commonly occurring during the complementary feeding period. Among mothers of children less than 24 months that received a recommendation to feed their child milks other than breast-milk substitutes, the most common source of recommendations were family members (65.3%, n=49), followed by friends or neighbors (24.0%, n=18). As detailed in the previous section, a small proportion of these recommendations were also made by health professionals (17.3%, n=13). Of those

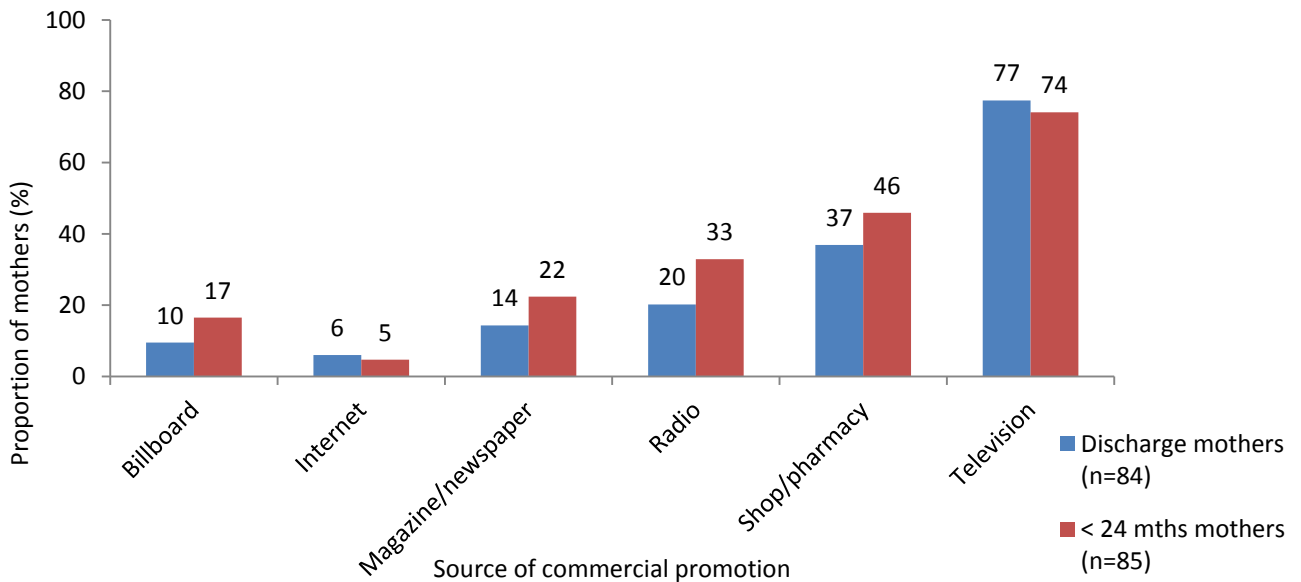
that reported receiving this recommendation from a family member, mothers and mothers-in-law were the most common source of recommendation.

4.3.2 Commercial advertisements outside the health system

To assess levels of promotions occurring beyond the health system, mothers were asked about general exposure to various promotional practices for commercial food products fed to infants and young children. Mothers in both study populations were asked if they had seen, heard, or read a commercial promotion for various commercial products, including breast-milk substitutes, commercially produced complementary foods, and commercially produced foods for general consumption commonly fed to young children. Mothers discharged after delivery were asked to recall during their pregnancy and since delivery of their newborn, while mothers with children less than 24 months of age were asked to recall their exposure since the birth of their youngest child.

Overall, 27.6% (n=84) of discharged mothers and 27.5% (n=85) of mothers with children under 24 months of age reported observing a breast-milk substitute promotion. The proportion of mothers that observed this promotion inside a health facility is reported in the previous section. The locations of commercial breast-milk substitute promotions which occurred outside the health system are shown in **Figure 6**. Television was the most commonly reported source of promotions, cited by approximately three-quarters of mothers in both study populations who reported observing a promotion (21.4% of all mothers discharged after delivery and 20.4% of all mothers of children less than 24 months of age). Observation of commercial promotions in shops or pharmacies was the second most commonly reported location, being reported by just over one-third of discharged mothers and almost one-half of mothers of children less than 24 months who had observed a commercial breast-milk substitute promotion (10.2% of all mothers discharged after delivery and 12.6% of all mothers of children less than 24 months of age). Again, almost all mothers who observed commercial promotions for breast-milk substitutes cited Lactogen as the brand promoted.

Figure 6. Proportion of mothers reporting promotions for breast-milk substitutes, by promotion source*



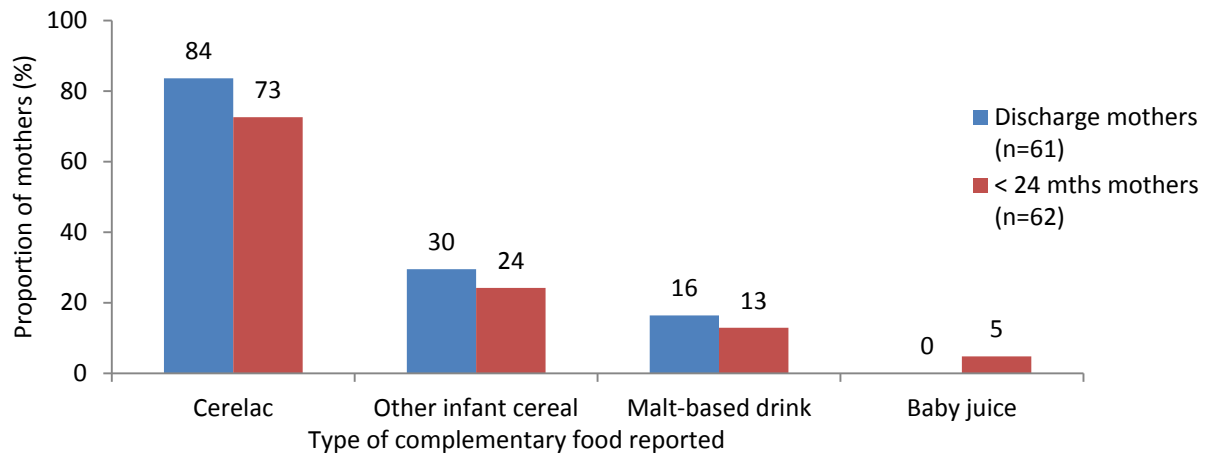
* Among mothers that reported observing a promotion for breast-milk substitute

Mothers were also asked to report if they had heard, seen or read any promotion for a commercially produced complementary food product; for both study populations, 20.1% (n=61 for discharged mothers; n=62 for mothers of children less than 24 months) of all mothers reported observing a promotion. Mothers reported several types of complementary food products as promoted, shown in **Figure 7**. Cerelac infant cereal was the most highly reported commercial complementary food product promoted, followed by other infant cereals, including commercially produced *sarbottam pitho*⁶. Mothers in both study populations reported promotions for malt-based drinks as falling in the category of ‘commercial drinks of foods specifically for infants and young children.’ While prior study that analyzed labels of some malt-based drinks available in Kathmandu Valley showed that they do not specify feeding for children less than 24 months of age (Pereira et al., 2014), some mothers in this survey considered these products as specifically for their young children. Similar to findings for breast-milk substitutes, the most commonly reported sources of promotion for commercial complementary foods among mothers who observed them were television or shops and pharmacies. Approximately three-fourths of mothers in both study populations that observed a complementary food promotion, reported observing this promotion on television (14.8% [n=45] of all discharged mothers and 14.6% [n=45] of all mothers of children less than 24 months of age). Reported observations of promotions in shops or pharmacies was higher among mothers discharged after delivery (60.7% [n=37] of discharged mothers that observed a promotion; 12.2%

⁶ Flour often made of soybean, wheat and maize; commonly used as a complementary food in Nepal

of all discharged mothers) as compared to mothers with children less than 24 months of age (35.5% [n=22] of those that observed a promotion, 7.1% of all mothers with children less than 24 months of age; p-value=0.005).

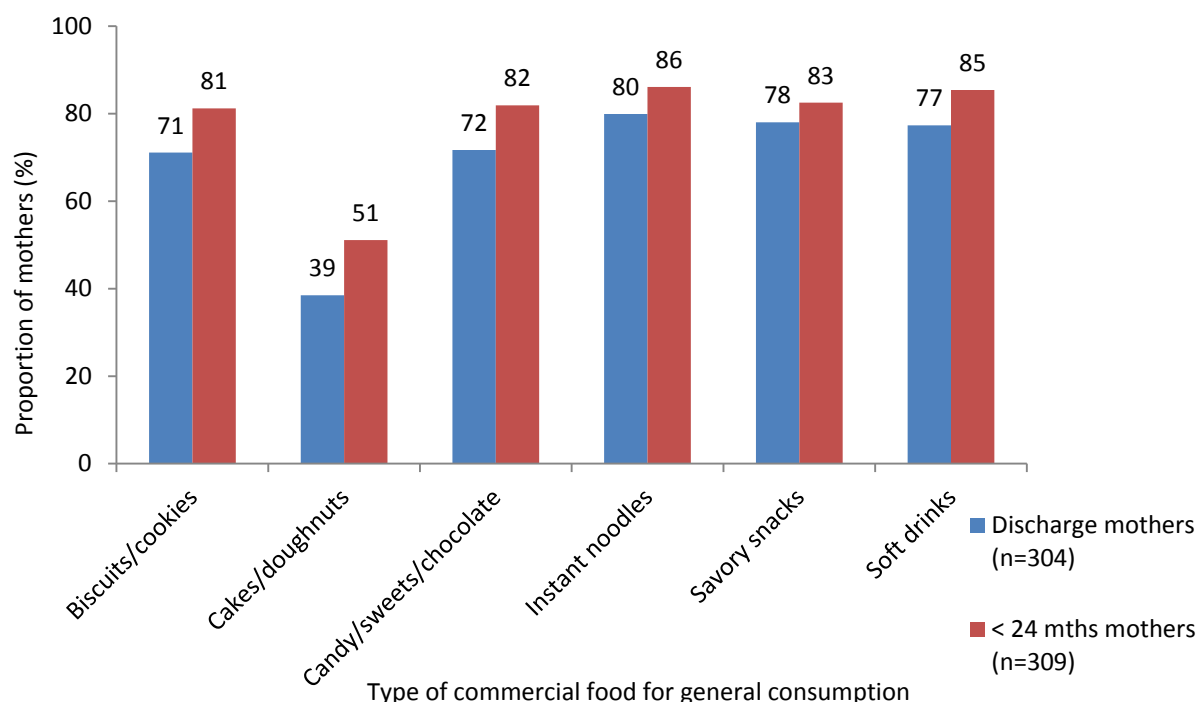
Figure 7. Proportion of mothers who observed a promotion for a commercial complementary foods, by food type*



* Among mothers that reported hearing, seeing, or reading a promotion for a commercial complementary food

Mothers were also asked to report if they had heard, seen or read any promotions for commercially produced foods for general consumption commonly fed to young children; these included commercial snack foods such as savory crisps, biscuits, candy or soft drinks. These promotions included those targeting children and those targeting the general population. Promotions for these commercial food products were much more commonly reported by mothers as compared to promotions for either breast-milk substitutes or commercially produced complementary foods; overall, 80.3% (n=244) of discharged mothers and 87.1% (n=269) of mothers of children less than 24 months of age reported observing such a promotion. **Figure 8** presents the proportion of mothers reporting promotions among different types of commercial foods for general consumption. Generally, promotion was high across all types, but was highest for instant noodles, with 79.9% (n=243) of discharged mothers and 86.1% (n=266) mothers of children under 24 months of age reporting a promotion. Observation of commercial promotion for cakes/doughnuts/spongescakes was least commonly reported by mothers, however, still high overall, with approximately one-third of discharged mothers and one-half of mothers of children less than 24 months of age reporting a promotion for this type of snack food.

Figure 8. Proportion of mothers who observed a promotion for a commercial food for general consumption, by food type



4.3.3 Other promotional practices for IYC food products

In addition to observation of commercial advertisements for IYC food products, mothers were also asked about exposure to other promotional practices sometimes employed by manufacturers, including receipt of free samples, discounts or coupons. Exposure to these other promotional practices was very low among mothers in both study populations. No mothers reported receiving any free samples of either breast-milk substitutes or commercially produced complementary foods outside the health system. Additionally, no mothers at discharge after delivery reported receiving a discount or coupon for either breast-milk substitutes or commercially produced complementary food either during pregnancy or since the delivery of their newborn. Only 1% (n=3) of mothers of children less than 24 months of age utilizing child health clinics reported receiving a discount or coupon for a breast-milk substitute or a commercially produced complementary food product.

4.4 Infant and young child feeding practices

In addition to gathering information on exposure to promotional practices for commercial food products, mothers were asked about current infant and young child feeding practices; this included breastfeeding practices among mothers being discharged after delivery, and breastfeeding and complementary feeding practices among mothers of children less than 24 months of age.

4.4.1 Early breastfeeding practices

Breastfeeding initiation and practices by mothers soon after delivery were documented among both study populations; findings are shown in **Table 4**. Over half of mothers (53.7%, n=166) with children less than 24 months of age initiated breastfeeding early, defined as within one hour after delivery (WHO, 2008), while 40.8% (n=124) of mothers discharged after delivery initiated breastfeeding early with their newborn (difference was significant; p-value=0.001). Among mothers at discharge, early initiation of breastfeeding was significantly higher among mothers who delivered at public facilities (52.4%, n=109), as compared to private (15.6%, n=15; p-value < 0.001). Immediate initiation of skin-to-skin contact with the youngest child was low, occurring among less than 9% of mothers in both study populations. Pre-lacteal feeding, referring to the provision of liquids other than breast milk in the first 3 days after delivery, was common, with around half of mothers in both study populations reporting pre-lacteal feeding for their youngest child. Rates of pre-lacteal feeding among mothers discharged after delivery in public facilities (48.6%, n=101) were found to be significantly lower, as compared to private facilities (74.0%, n=71; p-value <0.001).

Table 4. Early breastfeeding practices among mothers

	Mothers discharged after delivery (<i>n</i> = 304)	Mothers with children < 24 months (<i>n</i> = 309)
Early initiation of breastfeeding, %	40.8	53.7
Immediate initiation of skin-to-skin, %	8.6	8.7
Pre-lacteal feeding, %	56.6	44.0

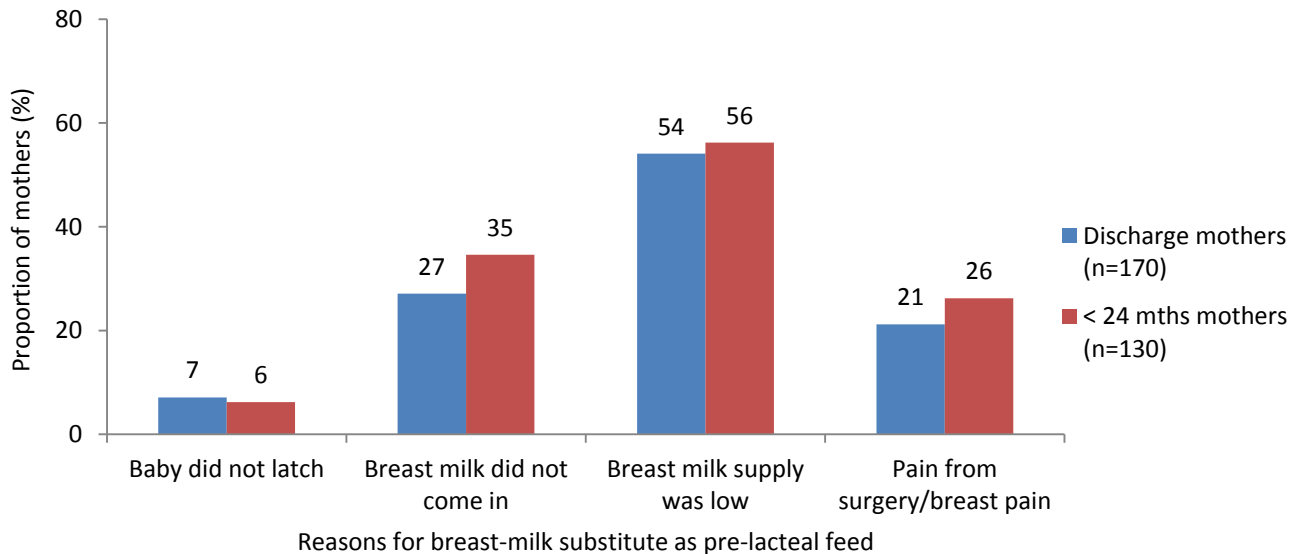
Among mothers who gave their youngest child something to drink other than breast milk in the first 3 days after delivery, breast-milk substitute was the most commonly used liquid for pre-lacteal feeding. Ninety-nine percent (n=170) of mothers discharged after delivery who practiced pre-lacteal feeding fed their newborn a breast-milk substitute, and 95.6% (n=130) of mothers of children less than 24 months who pre-lacteal fed used a breast-milk substitute. Plain water (not bottled) was the second most common liquid used for pre-lacteal feeding, however, this was only reported among 4.1% (n=7) of discharged mothers and 4.4% (n=6) of mothers of children less than 24 months who provided a pre-lacteal feed.

Approximately three-fourths (73.5%, n=125) of mothers discharged after delivery who gave a breast-milk substitute as a pre-lacteal feed reported using Lactogen brand, while approximately one-fourth (25.9%, n=44) fed their newborn Farex brand. Conversely, almost all (95.4%, n=124) mothers of children less than 24 months who gave a breast-milk substitute as a pre-lacteal feed reported using Lactogen brand, and only 3.1% (n=4) reported using Farex brand. Almost all mothers in both study populations that fed a breast-milk substitute in the first 3 days after delivery obtained the breast-milk substitute by purchase, versus receiving it for free or from another mother in the delivery ward (90.6% [n=154] of discharged

mothers; and 93.1% [n=121] of mothers with children less than 24 months). As detailed above, health professionals, specifically doctors and nurses, were reported as recommending breast-milk substitutes by the majority of mothers who practiced pre-lacteal feeding.

Though pre-lacteal feeding of breast-milk substitutes was high among mothers interviewed in this survey, many mothers reported that this was not actually what they wanted for their newborn. Nearly two-thirds (59.4%, n=101) of discharged mothers and half of mothers of children less than 24 months (50.8%, n=66) who provided breast-milk substitutes as a pre-lacteal feed reported having not wanted breast-milk substitutes fed to their newborn. The common reasons mothers reported pre-lacteal feeding of breast-milk substitutes to their newborn are shown in **Figure 9**. The most common reasons mothers reported were related to their own breast milk supply. Over half of mothers in both study populations reported using a breast-milk substitute as a pre-lacteal feed because their own breast milk supply was low and around one-third of mothers in both study populations reported pre-lacteal feeding a breast-milk substitute because their breast milk had not yet come in. Mothers who reported that they thought their own breast milk supply was low were asked why they believe this was so; the majority of these mothers reported their own breast milk supply as low due to their poor health or nutrition. Several also reported that lactation is generally poor on the first day after delivery, and some reported their milk supply to be low because it was their first child.

Figure 9. Proportion of mothers giving breast-milk substitute as pre-lacteal feed, by reason*



*Among mothers who reported use of breast-milk substitute as pre-lacteal feeding

4.4.2 Current breastfeeding practices

Current breastfeeding practices were assessed among mothers of children less than 24 months of age; results are shown in **Table 5**. Almost all children had ever been breastfed, and the majority was currently breastfeeding at the time of interview. Ninety-three percent (n=51) of mothers of children 12-15 months of age reported that their child was still breastfeeding, and 79.1% (n=34) of children 20-23 months of age were currently breastfeeding. Exclusive breastfeeding was being practiced by 39.5% (n=32) of mothers of children less than 6 months of age, while 59.3% (n=48) were predominantly breastfeeding their child less than 6 months of age. Bottle feeding was practiced among just over one-third of mothers of children less than 24 months of age (34.6%, n=107), with a greater proportion of bottle-feeding occurring among children over 6 months as compared to children less than 6 months of age (43.0% [n=98] vs. 11.1% [n=9]; p-value < 0.001).

Table 5. Current breastfeeding practices among mothers of children < 24 months of age

	n	%
Ever breastfed	309	97.4
Currently breastfeeding		
0-5 months	81	98.8
6-11 months	78	97.4
12-17 months	77	96.0
18-23 months	73	88.6
Exclusive breastfeeding ^a	81	39.5
Predominant breastfeeding ¹	81	59.3
Continued breastfeeding at 1 year ²	55	92.7
Continued breastfeeding at 2 years ^c	43	79.1
Bottle feeding,		
0-5 months	81	11.1
6-11 months	78	43.6
12-17 months	77	39.0
18-23 months	73	46.6

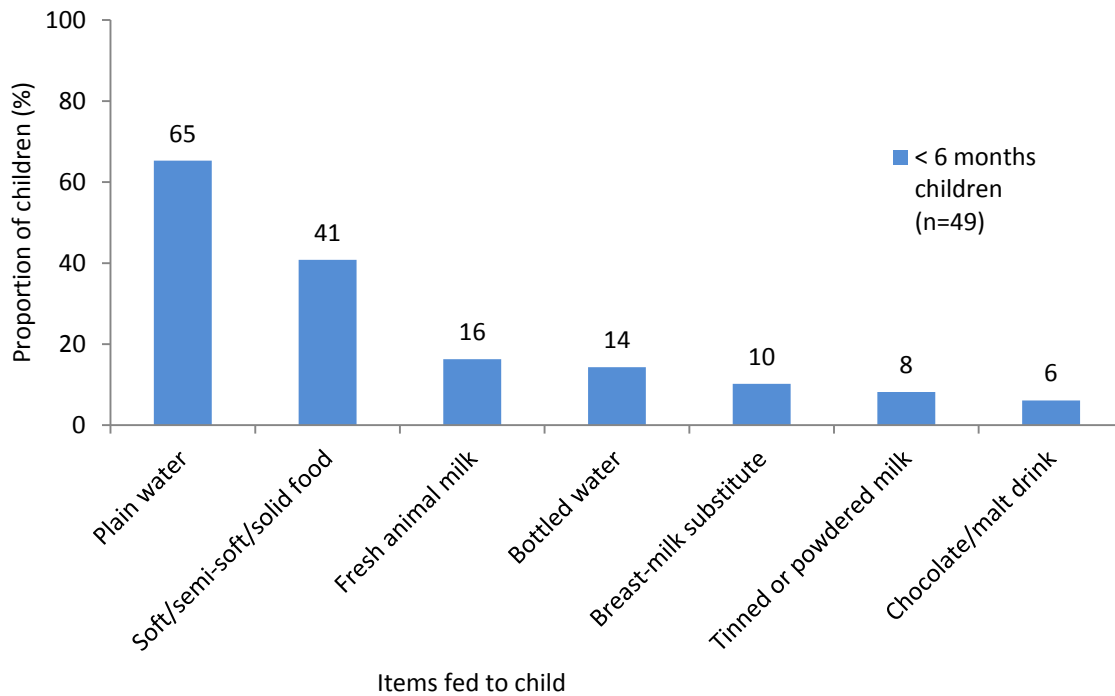
¹ Among children 0-5 months

² Among children 12-15 months

³ Among children 20-23 months

Figure 10 details the items consumed other than breast milk among children less than 6 months of age who were not exclusively breastfed. Almost two-thirds of non-exclusively breastfed children under 6 months were given plain water in the previous day, and 40.8% (n=20) were given a soft, semi-soft, or solid food. Overall, consumption of breast-milk substitutes among children less than 6 months of age was low, reported among only 6.2% of all mothers (n=5).

Figure 10. Items fed other than breast milk among non-exclusively breastfed children



4.4.3 Complementary feeding practices and dietary intake among children 6-23 months

As mentioned above, one-fourth of mothers of children 0-5 months of age (24.7%, n=20) reported that their child consumed soft/semi-soft/semi-solid foods in the previous day. This rate of early introduction of complementary foods increased with the age of the infant: 9.4% at 0-1 months, 23.3% at 2-3 months, and 52.6% at 4-5 months (p=0.002). Rice/cereals were given by all mothers who reported feeding a food to their child less than 6 months of age; almost half had added fat (45.0%, n=9), nearly one-third also fed beans/lentils (30.0%, n=6), and one-fourth (25.0%, n=5) had added sugar or honey to their infant's food. Home-prepared complementary foods were more commonly fed to these children under 6 months of age, as compared to commercially produced complementary foods; half (45.5%, n=9) of children under 6 months of age that were eating foods consumed a commercial complementary food in the day prior to interview, while 70% (n=14) were fed a homemade complementary food dish, most commonly *lito*.

Optimal complementary feeding practices were assessed based on dietary intake information among children 6-23 months of age that were currently consuming soft, semi-soft or solid foods; this included 220 children. Only 3.5% of children 6-23 months (n=8) had not eaten food in the previous day. Infant and young child feeding indicators relating to complementary feeding are shown in **Table 6**. Minimum dietary diversity, defined as a child consuming at least 4 of 7 food categories in the previous day (WHO,

2008), was met by 59.5% (n=131) of children 6-23 months of age. Minimum meal frequency, defined as a child consuming food the minimum number of times in the previous day depending on their age and breastfeeding status (WHO, 2008), was met by 79.1% (n=174) of children 6-23 months of age. A minimum acceptable diet, defined as the combination of these two indicators (WHO, 2008), was achieved by only half (51.8%, n=114) of children 6-23 months of age.

Table 6. Complementary feeding indicators among children 6-23 months of age

N	220
Minimum dietary diversity, % ¹	59.5
Minimum meal frequency, % ²	79.1
Minimum acceptable diet, %	51.8

¹ Calculated based on WHO IYCF indicators; minimum dietary diversity was defined as consumption of at least 4 out of 7 food categories (WHO, 2008)

² Calculated based on WHO IYCF indicators; minimum meal frequency was defined as at least 2 times for breastfed children 6-8 months, at least 3 times for children 9-23 months, and at least 4 times for non-breastfed children 6-23 months (WHO, 2008)

The types of foods consumed by children 6-23 months of age in the day prior to interview are shown in **Table 7**. Cereal-based foods, such as rice, noodles, and breads, were consumed by almost all children 6-23 months, and beans/lentils were consumed by 82.7% (n=182). The third most highly consumed category of foods were sugary snacks, which included cookies/biscuits, candy and chocolate, and was consumed by three-fourths (75.0%, n=165) of children 6-23 months in the day prior to interview. Nutrient-rich foods were less commonly consumed; only one-third (35.9%, n=79) of children 6-23 months of age consumed dark green leafy vegetables in the previous day, 7.7% (n=17) consumed yellow or orange fleshed vegetables and only 1.4% (n=3) consumed yellow or orange fleshed fruits. Savory snacks (including potato chips or crisps) and sugar/honey were each consumed by over one-third of children 6-23 months (33.6%, n=74; 38.6%, n=85, respectively). Rates of consumption for dairy foods, such as cheese and yogurt, were minimal.

Table 7. Types of foods consumed by children 6-23 months of age, %

N ¹	220
Cereal-based foods	98.2
Beans or Lentils	82.7
Sugary snacks	75.0
Butter, oil or fat	49.5
Other fruits and vegetables	48.6
Potatoes	47.7
Sugar or honey	38.6
Dark green leafy vegetables	35.9

Savory snacks	33.6
Eggs	25.0
Meat or poultry	17.3
Nuts	13.6
Dried Fruits	9.5
Yellow/orange fleshed vegetables	7.7
Organ meats	5.9
Peanut butter	1.8
Cheese	1.4
Fish or seafood	1.4
Yellow/orange fleshed fruits	1.4
Yogurt	0.9

¹ Among children who had consumed soft/semi-soft/solid food in the day prior to interview; 8 children 6-23 months of age were not included in analysis for this reason

Liquids consumed by all children 6-23 months of age are shown in **Table 8**. Plain water was most commonly consumed in the day prior to interview, received by 83.8% (n=191), and over half (57.9%, n=132) had consumed broth. Fresh animal milk was consumed by over one-third (36.8%, n=84) and almost one-fourth (22.4%, n=51) had consumed liquid tinned or powdered milk, indicating that milk products are a more common source of dairy as compared to dairy food products detailed above. Rates of breast-milk substitute consumption were low among children over 6 months of age; nine percent of children aged 6-11 months of age (n=7) and 6.7% of children ages 12-23 months (n=10) had consumed a breast-milk substitute in the day prior to interview. The practice of adding a sweetener to liquids, such as sugar or honey, was common, occurring among 46.1% (n=105) of mothers of children 6-23 months. Sweeteners were also commonly added to foods, as 38.6% (n=85) of mothers added sugar or honey to their child's food (see **Table 7**). Over half of mothers (52.2%, n=119) of children 6-23 months of age reported adding such a sweetener to either a food or a liquid consumed by their child in the previous day.

Table 8. Types of liquids consumed by children 6-23 months of age, %

N	228
Plain water	83.8
Broth	57.9
Fresh animal milk	36.8
Tea/coffee	32
Tinned/powdered milk	22.4
Bottled water	19.3
Chocolate/malt drink	16.2
Breast-milk substitute	7.5

Gripe water	5.3
Juice/juice drink	4.8
Sugar water	2.6
Rice/maize water	2.2
ORS	1.3
Lassi	0.9
Soft drink/carbonated beverage	0.4

4.4.4 Consumption of homemade and commercial complementary foods

Mothers were asked about the types of complementary foods fed to their youngest child. Of children 6-23 months of age who had eaten soft/semi-soft/solid foods in the day prior to interview, 76.8% (n=169) had consumed a homemade complementary food. The majority of children 6-23 months of age (86.8%, n=198) had consumed a homemade complementary food in the week prior to interview, and 61.8% (n=141) of mothers reported feeding a homemade complementary food to their child every day in the past week. The most common home prepared complementary foods included *jaulo* (consumed by 59.8% of those who ate homemade complementary foods, n=101), *lito* (37.3%, n=63), mashed rice with lentils (32.5%, n=55), mashed potato/taro/yam (14.2%, n=24), and mashed/boiled egg (5.9%, n=10). Nearly all of these homemade complementary foods contained cereals (94.1%), 66.3% contained lentils, and 43.8% contained a fat source (butter, oil or ghee). Few children 6-23 months were fed *haluwa*⁷ (1.8%, n=3), broth or soup specially made for the child (2.4%, n=4), or *kheer*⁸ (0.6%, n=1) as a homemade complementary food. The majority (84.0%, n=142) of mothers who fed their child a homemade complementary food in the day prior to interview reported that they fed this food because it was ‘healthy’; 7.7% (n=13) of these mothers reported feeding this food because ‘the child likes it’. The rates of feeding homemade complementary foods were similar between working and non-working mothers (76.5% and 76.9%, respectively).

Consumption of commercially produced complementary foods was less common than homemade complementary foods, with 25.5% (n=56) of children 6-23 months age who had eaten soft/semi-soft/solid foods in the day prior to interview consumed a commercially produced complementary food. Three-fourths (76.8%, n=43) of the children consuming a commercially produced complementary food had consumed a commercial infant cereal, most commonly the imported Cerelac brand, and one-third (33.9%, n=19) had consumed locally manufactured commercial *sarbotham pitho*. Only one mother reported feeding her child a commercially produced baby stew/soup/meal and no mothers reported feeding their

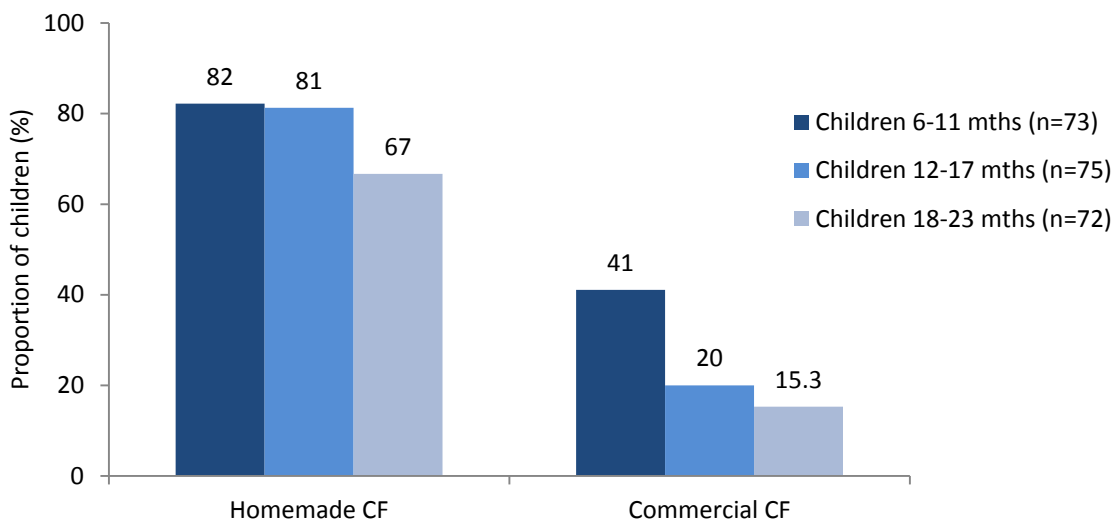
⁷ Sweet pudding

⁸ Sweet rice and milk pudding

children commercially produced baby purees. One-third of working mothers (32.4%, n=11) reported feeding their youngest child a commercially produced complementary food, as compared to one-fourth (24.5%, n=45) of non-working mothers; this difference was not statistically significant (p=0.393).

Consumption of commercially produced and homemade complementary foods by varying age groups is shown in **Figure 11**. Consumption of homemade complementary foods was similar across age groups among children 6-23 months of age (p=0.111). However, a significantly greater proportion (41.1%, n=30) of children 6-11 months of age were consuming commercially produced complementary foods, as compared to children over 12 months of age (17.7% [n=26]; p=0.003).

Figure 11. Proportion of children consuming homemade/commercial complementary food, by age category



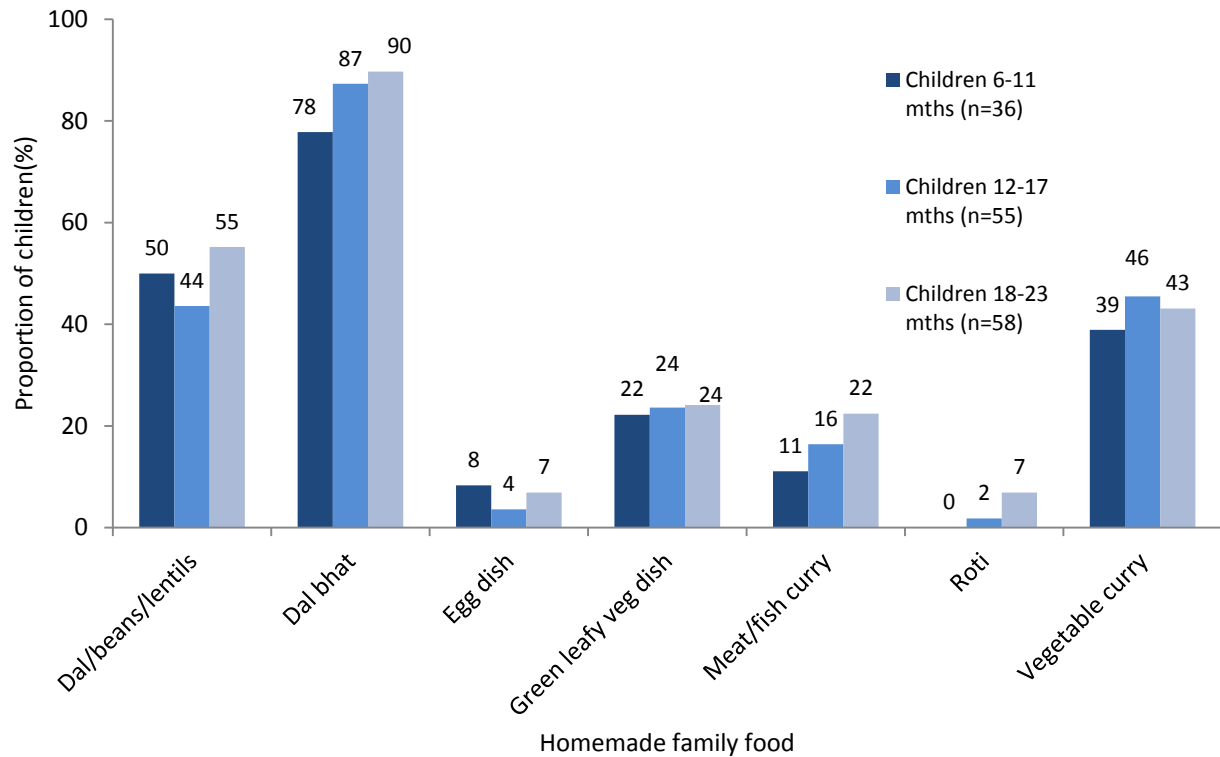
4.4.5 Consumption of family foods

In addition to complementary foods, mothers were asked about their feeding of homemade family foods, which referred to foods made at home for consumption by all members of the household, including adults and children. Among children 6-23 months of age who consumed food in the day prior to interview, consumption of homemade family foods was common, being reported by two-thirds of mothers (67.7%, n=149). The types of homemade family foods being consumed among children 6-23 months of age are shown in **Figure 12**. *Dal bhat*⁹ was the most commonly consumed, having been eaten by 85.9% (n=123) of children 6-23 months. Dishes of dal/beans/lentils and vegetable curry were consumed by almost half of children 6-23 months of age (49.7% and 43.0%, respectively). *Dal bhat* and vegetable curry were more

⁹ Dish of rice and lentil soup

commonly consumed among children over 12 months of age, as compared to children 6-11 months of age.

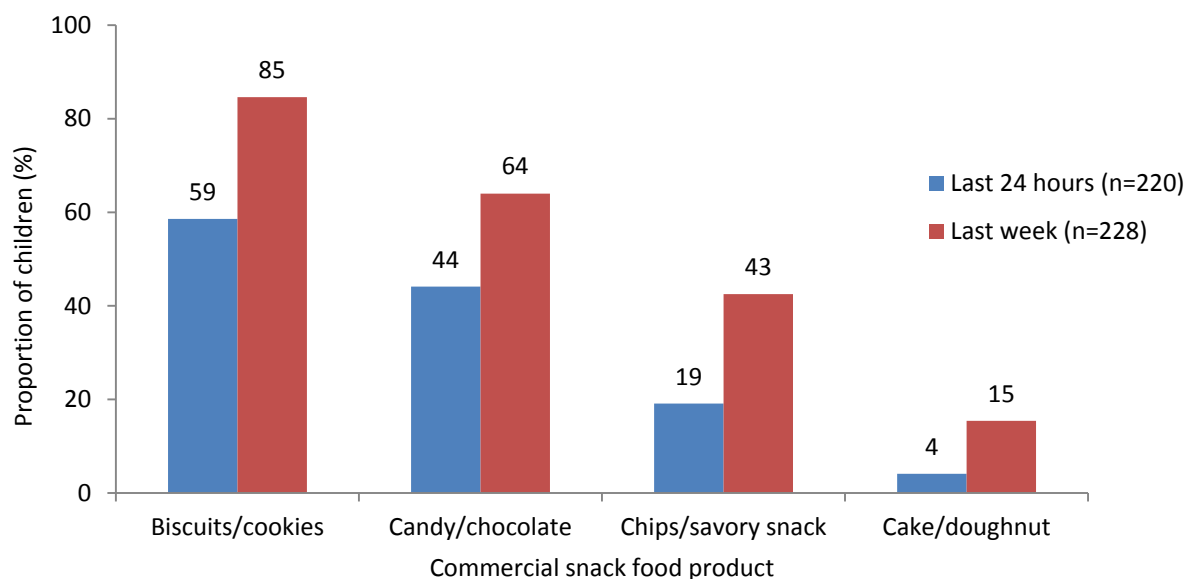
Figure 12. Consumption of homemade family foods among children 6-23 months, by type



4.4.6 Consumption of commercially produced foods for general consumption

Mothers were asked to report on their youngest child’s consumption of commercially produced foods for general consumption that are commonly fed to young children. Consumption of these foods in the day and week prior to interview among children 6-23 months of age is shown in **Figure 13**.

Figure 13. Consumption of commercial foods for general consumption by children 6-23 months



The most highly consumed commercial food products for general consumption were mainly snack products, particularly sweet snacks. Almost two-thirds of children 6-23 months (58.6%, n=129) consumed a biscuit or cookie and nearly half (44.1%, n=97) had consumed a candy, chocolate or sweet in the previous day. For both these food products, consumption rates increased with age. Half of children 6-11 months of age (49.3%) consumed a commercial biscuit or cookie in the previous day, as compared to 58.7% of children 12-17 months and 68.1% of children 18-23 months of age; this difference in consumption by age groups was not significant ($p=0.072$). For consumption of candy or chocolate, 23.3% of children 6-11 months had eaten this in the previous day, as compared to 45.3% of children 12-17 months and 63.9% of children 18-23 months; this difference in consumption of candy and chocolate by age categories was significant ($p<0.001$). Savory snacks were less consumed, 19.1% (n=42) had consumed chips or crisps and 14.5% (n=32) had consumed instant noodles. The rate of consumption of commercially produced dairy products, such as cheese or yogurt, was less than 1%. South Asian-specific commercially produced foods for general consumption, including puffed rice, beaten rice, *bhujia*¹⁰ and *dalmoth*¹¹, were also not commonly consumed among children 6-23 months; each was consumed by less than 5%.

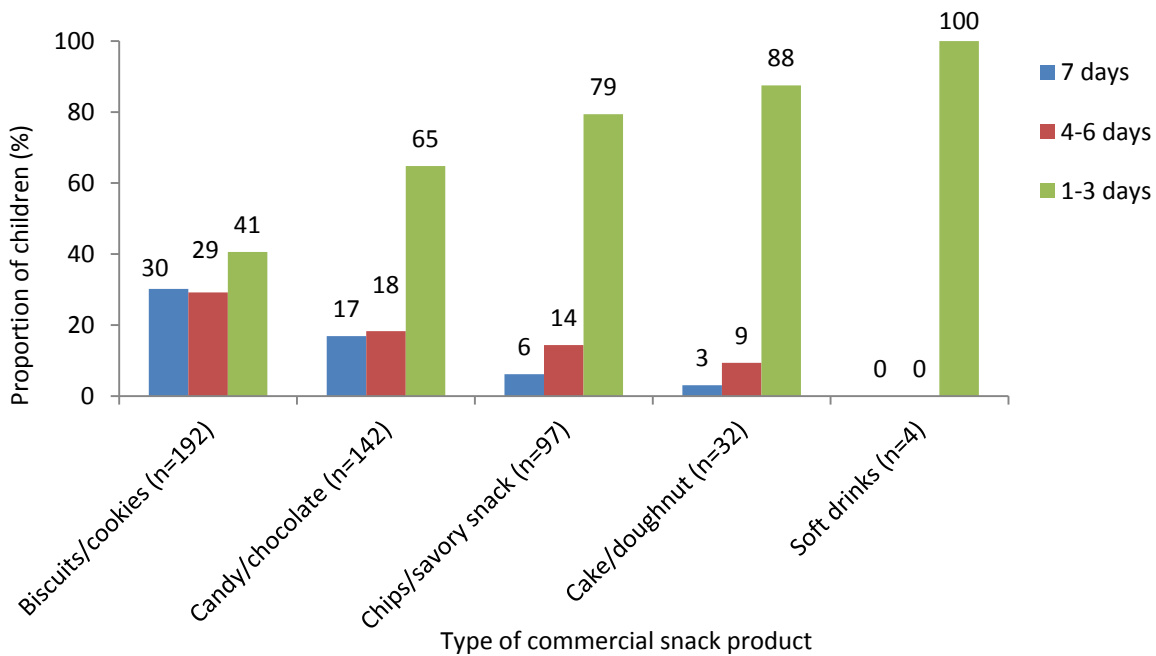
Overall, 76.8% (n=169) of children 6-23 months of age that consumed soft/semi-soft/solid food on the day preceding interview, consumed a commercially produced snack food (including cookies/biscuits,

¹⁰ Deep fried noodles, often made of gram flour

¹¹ Deep fried mixture of lentils, nuts and spices

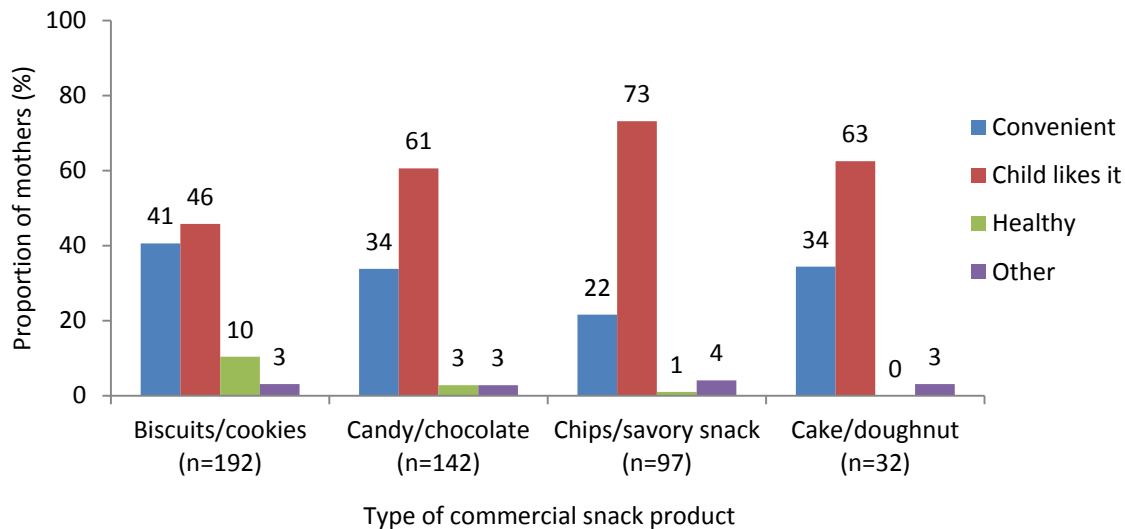
chips/crisps, candy/chocolate, cakes/doughnuts, or soft drinks) on the day prior to interview. Almost all children aged 6-23 months (91.2%, n=208) had consumed one of these commercial snack products in the week prior to interview. The frequency of consumption in the last week is shown in **Figure 14**. Biscuits and cookies were consumed daily by almost one-third of children 6-23 months of age (30.2%, n=58) who ate them in the last week, and candy or chocolate was eaten daily by 16.9% (n=24) of children. Only four children 6-23 months of age consumed soft drinks in the preceding week, and all had only consumed this product 1-3 days in the prior week.

Figure 14. Frequency of consumption in the last week



Mothers who had fed these products in the past week were asked to explain why they fed these foods to their child; these reasons are shown in **Figure 15**. For all commercial snack products, the majority of mothers reported feeding the product to their youngest child because ‘the child likes it’. The second most commonly reported reason for feeding commercial snack products to children was because the mother reported it to be a convenient food to feed, being reported by 40.6% (n=78) of mothers feeding biscuits or cookies and 33.8% (n=48) of mothers feeding candy or chocolate. Few mothers reported feeding any of these snack products because they were healthy, however, 10.4% (n=20) of mothers that fed biscuits or cookies reported this reason. Other reasons mentioned by mothers included affordability of the food product and having received the food product as a gift from a relative or friend.

Figure 15. Reasons mothers of children 6-23 months fed snack products



Mothers who reported purchasing these commercial snack products in the last week reported spending 8.3 NPR (\$.09 USD)¹² per day on cookies/biscuits, 4.7 NPR (\$.05 USD) per day on candy/chocolate, 6.8 NPR (\$.07 USD) per day on chips/savory snacks, and 5.3 NPR (\$.05 USD) on cakes/doughnuts. A recent study looking at these products available in Kathmandu Valley (Pereira et al, 2014) found on average a serving (about 100 kcal) of biscuits cost about 8.1 NPR (\$.08 USD), candy 34.3 NPR (\$.36), savory snacks 14.2 NPR (\$.15), and cakes 37.1 NPR (\$.39).

4.4.7 Food aspirations and taboos

In order to assess mothers' intentions and aspirations to feed foods that may be beyond their current purchasing power, all mothers of children less than 24 months were asked if there were any foods they would like to feed their child if they had more money. Only 6.1% (n=19) of all mothers reported that there were additional foods they would like to feed their child. Half of these mothers specified that they would like to purchase fruit. Three mothers reported wanting to purchase chocolate/malt-based drinks, 2 mothers reported wanting to purchase commercial infant cereal, and no mothers reported wanting to feed a breast-milk substitute if they had additional money.

Data were also collected on attitudes held by mothers of children less than 24 months of age regarding certain foods. Over one-third of mothers (34.3%, n=106) reported they did not feed particular foods because they believe they were not good for their child. Specifically avoided foods mentioned by mothers included: sour foods (reported by 15.2% [n=47] of mothers), spicy foods (14.2%, n=44) and commercially produced snack foods or drinks (12.9%, n=39). The majority of mothers with these food

¹² <http://www.xe.com/currencyconverter/convert/?Amount=1&From=NPR&To=USD>, Friday July 18, 2014, 1 USD = 96.4500 NPR

attitudes stated that they avoided these foods because children get sick or develop a cough after eating them (95.7% of mothers avoiding sour foods, 93.2% of mothers avoiding spicy foods and 89.7% of mothers avoiding commercially produced snack foods or drinks). However, 69.7% (n=27) of mothers who reported avoiding feeding commercially produced snack foods to their children had fed a commercial snack product (such as cookie, crisps, cake, candy or soft drink) to their child in the day prior to interview.

4.5 Associations between promotion and consumption of commercially produced foods

Associations between mothers' exposure to promotion and feeding practices were tested; though the sample size for this survey was calculated with the intent to establish a prevalence rate and not to test associations, several relationships were found.

Recommendations from health workers were found to be influential in some feeding practices. A strong association was found between mothers receiving a recommendation to feed their youngest child a breast-milk substitute and pre-lacteal feeding. Eighty-eight percent (n=127) of discharged mothers who were recommended to use a breast-milk substitute by a health worker practiced pre-lacteal feeding, as compared to 28.1% (n=45) of discharged mothers who did not receive a recommendation to use a breast-milk substitute from a health worker ($p < 0.001$). Among mothers with children less than 24 months of age, 81.1% (n=103) of mothers who received a recommendation from a health worker to feed their youngest child a breast-milk substitute practiced pre-lacteal feeding, as compared to 18.1% (n=33) of mothers who did not receive a recommendation from a health worker to feed breast-milk substitute ($p < 0.001$). Among mothers of children less than 24 months of age, there was no significant difference in the proportion of mothers currently feeding their child breast-milk substitutes and receiving a health worker recommendation to use breast-milk substitutes (8.7% vs. 6.0%, $p = 0.380$). Of mothers of children 6-23 months of age, a slightly greater proportion who had received a health worker's recommendation to feed a commercial complementary food, such as Cerelac or *sarbottham pitho*, reported currently feeding one of these products to their youngest child, as compared to mothers who did not receive a recommendation from a health worker, however, this difference was not statistically significant (30.9% vs. 23.8%, $p = 0.726$).

Exposure to commercial promotion outside the health system was less influential in predicting utilization of breast-milk substitutes, but was found to be borderline significant in utilization of commercial complementary foods. There was no association between mothers having heard, seen or read a promotion for breast-milk substitutes and utilization of these products (7.0% vs. 7.1%, $p = 0.937$). Among mothers of children 6-23 months of age, a greater proportion of those who reported having heard, seen or read a

commercial promotion for a complementary food reported currently feeding one of these products to their child, as compared to those who had not observed a commercial promotion; this difference was borderline significant (40.5% vs. 20.9%, $p=0.059$). This trend was consistent when looking specifically at children 6-11 months and children 12-17 months of age, however, only borderline significant in the latter age category (60.0% vs. 33.9%, $p=0.172$, and 45.5% vs. 16.4%, $p=0.058$, respectively). For mothers of children 18-23 months of age, feeding of commercial complementary food products was similar between mothers who had and had not seen a commercial promotion (18.8% vs. 12.7%, $p=0.182$).

Among mothers of children 6-23 months of age, there was no significant difference in the proportion of those who reported hearing, seeing or reading a promotion for commercially produced snack foods and feeding of these products to their child (87.5% vs. 75.0%, $p=0.121$).

5. Discussion

In 1992, Nepal's *Mother's Milk Substitutes (Control of Sale and Distribution) Act* was passed in order to nationally enact the *International Code of Marketing of Breast-milk Substitutes* (Nepal Government, 1992). Clause 8 and Clause 9.5 of this Act specifically cover restrictions on promotion of breast-milk substitutes and any other foods products marketed to children less than 12 months of age within the health system, while Clause 9 prohibits other commercial promotion outside the health system. This study sought to assess the levels of promotion of commercially produced infant and young child food products both inside and outside the health system of Kathmandu Valley, Nepal, as well as to assess consumption of commercially produced food products by children less than 24 months of age. Interviews with mothers at discharge after delivery allowed for data capture of exposure to promotion during pregnancy and delivery, while interviews with mothers of children less than 24 months attending child health clinics allowed for data capture of exposure to promotion from the birth of the youngest child onwards, as well as consumption information.

Findings from this study indicate that promotion of breast-milk substitutes within the Kathmandu Valley health system occurs mainly through recommendations by health professionals, nurses and doctors, but these products are rarely commercially promoted in facilities through advertisements, distribution of samples or branding of equipment or gifts. Nearly half of mothers with children less than 24 months of age (47.4%, $n=144$) reported receiving a recommendation from a health professional to feed their youngest child a breast-milk substitute; such recommendations were reported among 41.4% ($n=127$) of mothers at discharge after delivery. An assessment of breast-milk substitutes available in Kathmandu Valley, conducted in the same year as this survey, indicated only 3 manufacturers and 5 individual products on the market, with Lactogen being the most widely available (Adhikary et al., 2014). Given this

information, it is not surprising that Lactogen was the most commonly recommended brand among mothers interviewed.

Consumption of breast-milk substitutes was generally low among children less than 24 months of age; only 6.2% of children 0-5 months and 7.5% of children 6-23 months had consumed a breast-milk substitute in the day prior to interview. Additionally, continued breastfeeding was common among mothers interviewed, with high rates of continued breastfeeding at both 1 and 2 years of age. However, pre-lacteal feeding of breast-milk substitutes was highly reported in both study populations; 55.9% of mothers at discharge after delivery and 42.1% of mothers with children less than 24 months of age reported feeding their youngest child a breast-milk substitute in the first 3 days after delivery. Despite increasing rates of early initiation of breastfeeding, the practice of pre-lacteal feeding is prevalent among mothers in Nepal, and has been increasing over the last decade (MOHP, 2011). Other research has confirmed this finding; Khanal et al. found that 39% of mothers in Kapilvastu district in Western Nepal had given a pre-lacteal feed to their newborn (Khanal, 2013d), while the most recent NDHS found that 28% of urban mothers in Nepal gave a pre-lacteal feed to their youngest child (MOHP, 2011). Given that pre-lacteal feeding hinders the practice of exclusive breastfeeding, can reduce the duration of breastfeeding, and carries an increased risk of infection, this finding carries great weight for the protection and promotion of optimal breastfeeding in Kathmandu Valley.

Several factors have been found to be associated with pre-lacteal feeding in Nepal. Early initiation of breastfeeding has been found to have a protective effect against pre-lacteal feeding (Khanal, 2013b), while additional studies have indicated that delivery by caesarean section can delay the initiation of breastfeeding and therefore may be associated with higher rates of pre-lacteal feeding (Khanal, 2013a; Pandey, 2010; Dibley et al., 2010). In both study populations included in this survey, normal deliveries were associated with higher rates of early initiation of breastfeeding (49.3% vs. 20.2% for discharged mothers, $p < 0.001$; 66.2% vs. 21.8%, for mothers of children < 24 months, $p < 0.001$), and mothers who delivered their youngest child by C-section reported higher rates of pre-lacteal feeding, as compared to mothers who delivered vaginally (89.9% vs 42.8% for discharged mothers, $p < 0.001$; 78.2% vs. 30.6% for mothers of children < 24 months, $p < 0.001$). Across both study populations, rates of C-section delivery were high, reaching almost 30% in both, which may be one contributing factor to the high rates of pre-lacteal feeding. Another study found that early post-partum skin-to-skin contact between mothers and newborns had a powerful influence over the duration of exclusive breastfeeding (Vaidya et al., 2005); rates of immediate skin-to-skin contact between mothers and newborns were found to be very low in this survey, approximately 9% in both study populations.

Various studies have also highlighted the important role that health workers' advice and counseling plays in influencing infant and young child feeding practices employed by mothers in Nepal. One study found that information on optimal feeding practices provided by health workers to mothers during child immunization visits was significantly associated with appropriate feeding practices by these mothers (Chapagain, 2013). Several studies have illustrated the association between ANC visits and IYCF practices, whereby exclusive breastfeeding and complementary feeding practices were found to improve with the number of ANC visits received by mothers (Joshi et al., 2012; Karas et al., 2012; Khanal et al., 2013a; Khanal et al., 2013b). A study conducted within Teaching Hospital in Kathmandu Valley assessed newborn care knowledge and practices of 100 post-partum mothers; health personnel, especially nurses, were found to have played a large role in encouraging mothers to initiate breast-feeding within one hour (Shrestha, 2013).

The influential role of health workers' can also result in sub-optimal infant and young child feeding practices if the messages contradict recommendations for optimal practices; specifically, positive breastfeeding counseling and advice can be negated by health workers' encouragement of pre-lacteal feeding. In this survey, a strong association was found between health workers' recommendations of breast-milk substitutes and mothers pre-lacteal feeding. Prior studies have also noted the influential role of pre-lacteal feeding recommendations by health workers in increasing rates of pre-lacteal feeding; one study found that urban Nepali mothers whose births were attended by a health professional had a greater risk of bottle feeding their infants (Pandey et al, 2010; Isenalumhe & Oviawe, 1987; Hossain et al, 1992; Talukder et al, 1997).

Because interviews were conducted with mothers and not health workers, the reason for such high rates of breast-milk substitutes recommendations by health workers, particularly for pre-lacteal feeding, is not entirely clear from the data. One study from Nigeria assessed reasons why health workers encouraged mothers to provide pre-lacteal feeds to their newborns; nurses were found to be most likely to recommend pre-lacteal feeding because of theorized low milk production in the first days after delivery (Akuse & Obinya, 2002). In this survey in Kathmandu Valley, nurses accounted for most of the pre-lacteal feeding recommendations to mothers at discharge after delivery and half of the recommendations to mothers with children less than 24 months of age. Almost all mothers who pre-lacteal fed reported doing so because their milk had not yet come in or because they believed their milk supply was low; the impact of this concern of insufficient milk supply on cessation of exclusive breastfeeding has been noted in other research in Nepal (Ulak et al, 2012). It is plausible that both mothers and health workers shared a

common concern regarding low milk supply soon after delivery, and perhaps also a lack of recognition that colostrum, while produced in small amounts, is sufficient in the first days after delivery, which led to high rates of breast-milk substitute recommendations by health workers and subsequent pre-lacteal feeding by mothers. While this is a common concern among mothers, the milk supply of most mothers is adequate for newborns, particularly if breastfeeding is initiated soon after delivery. Given the importance of early initiation of breastfeeding in stimulating milk production, the encouragement of pre-lacteal feeding by health workers for fear of low milk supply could actually result in decreasing a mother's supply that would otherwise be sufficient (Ahmed, 1996; Yamauchi, 1990; WHO, 1996).

Early introduction of complementary foods also poses a threat to exclusive breastfeeding among infants in Kathmandu Valley; 53% of children 4-5 months of age received soft/semi-soft/solid food in the day prior to interview, a higher rate than the 23% of 4-5 month olds noted in in the 2011 NDHS (MOHP, 2011). Another study of 283 children in Kathmandu found that at the age of 3 months, half of the sample had been introduced to non-breast milk foods. Infants under 6 months of age were fed commercial infant formula, *lito*, and animal milk (Moffat, 2001). In our study, most foods consumed by these young infants were similar to foods eaten by older infants and young children, including mostly grains, with some mothers adding other foods such as beans/lentils, a fat source, and sugar or honey. Approximately one-third (31.6%, n=6) of 4-5 month olds consumed commercially produced infant cereals or *sarbottham pitho*, though most (86%) labels for these foods sold in Kathmandu Valley appropriately recommend introduction from the age of six months (Pereira et al, 2014). Consumption of homemade complementary foods was found to be similar, occurring among 31.6% (n=6) of children 4-5 months of age. However, among younger infants, consumption of home-prepared complementary foods was higher than commercial complementary foods; 16.7% (n=5) of children 2-3 months and 9.4% (n=3) of children 0-1 months had consumed a homemade complementary food in the day prior to interview, while 10.0% (n=3) of children 2-3 months and no children 0-1 months had consumed a commercial complementary food on the day prior to interview.

Though the message to exclusively breastfeed was the most commonly received advice on infant and young child feeding among mothers in this study, new ways to influence this practice are needed in the Kathmandu Valley health system, since early introduction of complementary foods is detrimental to infant health and pre-lacteal feeding can also negatively impact exclusive breastfeeding practices. Findings from this survey also indicate that mothers' exposure to breastfeeding advice before delivery may be low in Kathmandu Valley; while 28.8% (n=88) of mothers of children less than 24 months reported receiving breastfeeding advice during ANC, only 11.6% (n=35) of mothers discharged after

delivery reported receiving such advice during their ANC visits. Reported exposure to breastfeeding information during ANC may have been higher among mothers visiting child health clinics due to recall bias, whereby these mothers may have received breastfeeding information either during ANC, just after delivery, or during postnatal care but have recalled it as occurring solely during ANC. Increasing mothers' exposure to breastfeeding advice during antenatal care could ensure that messages regarding exclusive breastfeeding are heard before a child is born. Additionally, addressing mothers' fears about insufficient milk supply, and health workers' misconceptions about milk production in the first few days after delivery, as well as emphasizing that colostrum is all a newborn needs in the first days of life, may help to reduce the early introduction of other foods or liquids.

Further research into the reasons why health workers recommend pre-lacteal feeds of breast-milk substitutes may help in focusing such efforts. The provision of lactation management training, particularly around encouragement of early initiation of breastfeeding, early skin-to-skin contact, the importance of colostrum, breastfeeding counseling for mothers who have delivered by caesarean section, and introduction of complementary foods at 6 months, may bolster health workers' knowledge and skills and could reduce the high rates of pre-lacteal feeding and increase the duration of exclusive breastfeeding among mothers living in Kathmandu Valley. The reinforcement and expansion of the Baby Friendly Hospital Initiative may also improve breastfeeding counseling by increasing the number of trained hospital staff in Kathmandu Valley; four hospitals in Kathmandu Valley were designated as BFHI in 1997-1998, however, a 2012 assessment showed that none were still fully compliant with the all BFHI criteria (MOHP, 2012).

Promotion for commercially produced complementary foods within the health system was also found to most commonly occur through health professional recommendations, as opposed to commercial advertisement, however at lower rate than recommendations for breast-milk substitutes. Almost one-quarter of mothers of children 6-23 months of age (24.6%, n=56) reported receiving a recommendation from a health worker to feed their child a commercial infant cereal, such as Cerelac. Commercial complementary foods were consumed by 25.5% of all children 6-23 months of age; however, the rate of consumption was significantly higher among children 6-11 months of age. Both internationally manufactured, such as Cerelac, and locally manufactured infant cereals, such as *sarbottham pitho*, were the most commonly consumed commercial complementary food products. Currently, Nepal does not have a national standard for processed fortified complementary foods and these foods do not require compulsory certification. Given the prevalent consumption of these products among children 6-23 months of age, establishment of a strong quality control mechanism with mandatory certification is crucial to

ensure that processed complimentary foods meet food and nutrition safety standards. Codex standards for formulated complementary foods could be used to inform national standards in Nepal, as well as be used in the interim as national legislation is being drafted (Codex Alimentarius, 1991).

Observation of television advertisements for breast-milk substitutes and commercially produced complementary foods were reported by approximately one-fifth of mothers interviewed. However, television advertisements for breast-milk substitutes targeting children less than one year of age are prohibited by Nepal's *Mother's Milk Substitutes (Control of Sale and Distribution) Act* (Nepal Government, 1992). While some cable television channels in Nepal are sourced from India, breast-milk substitute commercial advertisements are also prohibited by India's *Infant Milk Substitutes, Feeding Bottles and Infant Foods Act* (India Government, 1992). It is plausible that mothers may be recalling televised commercials for breast-milk substitutes targeting children over one year of age, or through cross-promotion, are recalling other milk products produced by manufacturers of breast-milk substitutes. Given the prohibition of these televised commercials in Nepal, additional media monitoring research would be beneficial in order to assess the presence, frequency and content of these advertisements.

Consumption of commercially produced snack foods was much higher than either breast-milk substitutes or commercially produced complementary foods. Over three-fourths of children 6-23 months of age had consumed a commercially produced snack food in the day prior to interview, mainly sweetened snacks including biscuits, candy or chocolate; consumption of these foods was significantly higher among children 12-23 months of age, as compared to children 6-11 months ($p=0.001$). This rate is higher than that reported for urban areas (61%) in Nepal in the 2006 NDHS (Huffman et al, 2014). Such high rates of sugary snack consumption are of grave concern due to the relationship with dental caries, the increased risk for childhood overweight and obesity, and later development of chronic disease. A study of 5-6 year olds in Kathmandu Valley found that 69% had dental caries (Subedi et al, 2011). Reducing sugar intake is an important means to reduce such high caries prevalence (Moynihan & Petersen, 2014). Nutritional interventions are also essential to reduce chronic diseases such as diabetes, which are of increasing concern in Nepal (Bhandari et al, 2014). The prevalence of overweight and obesity is increasing in children younger than five years globally, and is a contributor to diabetes and other chronic non-communicable diseases in adulthood (Black et al 2013).

In addition to being commonly fed to young children in Kathmandu Valley, promotions for these commercially produced snack foods, such as biscuits and cookies, are much more highly prevalent than either breast-milk substitutes or commercial complementary foods, with 80% and 87% of mothers in each

study population reporting observation of such a promotion. Addressing the high consumption of sugary snack food products and high rates of promotion should be a national priority. Mothers report they feed these snack products to their children primarily because they are convenient and because children like them, while mothers feed home-made complementary foods because they are deemed healthy. Additionally, some mothers also reported not wanting to feed these commercial snack products to their child, for fear these products would make their child sick. Many of these same mothers did report feeding commercial snacks to their child despite their stated preference not to, which may indicate mothers' struggle to balance convenience and affordability with providing a healthy snack option to their children. Improving the quality of home-made complementary foods to include more animal products and to be more convenient might be an important intervention to improve child nutritional status. It is equally important to attempt to reduce the amount of sugar added to all foods and beverages fed to young children.

There is a need for nutrition interventions in Nepal to encourage replacement of unhealthy snacks with more nutritious, affordable foods, in order to improve infant and young child nutritional status and to prevent increases in childhood overweight and obesity. Overconsumption of unhealthy foods early in life can displace consumption of other important micronutrients, and contribute to not only childhood overnutrition, but also undernutrition (Anderson, 2008). Indicators of quality of diet for children 6-23 months in this study were of concern; only half of children 6-23 months of age in this study achieved a minimum acceptable diet, and approximately 60% consumed the minimum recommendation for dietary diversity in the day prior to interview. A number of studies have shown the association between malnutrition in early life and obesity risk later in life (Black, 2013; Huh, 2011); 26.3% of women living in urban Nepal are overweight or obese (MOHP, 2011). Efforts to ensure adequate nutrition for infants and young children would serve to combat malnutrition during childhood, with the potential to positively impact adult overnutrition and associated non-communicable diseases.

6. Recommendations

- In order to address high rates of pre-lacteal feeding, particularly feeding of breast-milk substitutes, health workers' breastfeeding counseling knowledge and skills should be rejuvenated and expanded through lactation management training
- Reports of televised promotions for breast-milk substitutes and commercially produced complementary foods are prevalent among mothers in Kathmandu Valley. Because these promotions are prohibited by national law, additional media monitoring research is needed to assess the frequency and content of such advertisements.
- Diets during the complementary feeding period among many children 6-23 months in Kathmandu Valley are not adequate, particularly when considering dietary diversity. Consumption of commercial complementary foods, such as infant cereals, is common. If fortified to suit a young child's nutritional needs, these foods could provide needed micronutrients. However, national standards and certification processes should be established in order to ensure quality control for such products.
- Observations of promotions for commercial snack food products were commonly reported by the majority of mothers interviewed in this study. Consumption of these snack products, particularly sugary snacks such as cookies/biscuits and candy/chocolate, is also common among children 6-23 months of age. Overconsumption of such foods can contribute to childhood malnutrition, as well as adult obesity and non-communicable disease. Nutrition interventions in Nepal should encourage replacement of unhealthy snacks with more nutritious and convenient foods for young children.

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