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Postnatal Peer Counseling on Exclusive Breastfeeding of Low-birthweight Filipino Infants

Results of a Randomized Controlled Trial

GRACE V. AGRASADA



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Abstract

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In a Manila hospital, 204 mothers were randomized into three groups: two intervention groups receiving home-based counseling visits, one of them (n=68) by counselors trained to use a locally developed, two-tiered program of breastfeeding counseling, and the other by counselors trained in general childcare (n=67), were compared with a control group of mothers (n=69) who did not receive any counseling. All infants were scheduled for seven visits to the hospital for follow-up. During hospital visits, maternal and infant body measurements were made and an independent interviewer asked the mothers individually to recall how the infant had been fed. One study physician, blind to participant groups, was consulted at all scheduled and unscheduled infant visits.

At six months, 44% of the breastfeeding-counseled mothers, 7% of the childcare-counseled mothers and none of the mothers in the control group were exclusively breastfeeding. Twenty-four mothers breastfed exclusively during the first six months, of whom 22 received breastfeeding counseling and 2 had no breastfeeding counseling. Among 24 infants who were exclusively breastfed from birth to six months there were no episodes of diarrhea. All infants had gained in weight, length and head circumference. Mean maternal weight loss at six months was similar whether her breastfeeding was exclusive or partial.

The reasons why mothers without breastfeeding counseling introduced non-breast milk feeding before six months reflected lack of knowledge and support. Breastfeeding support during the first six months focusing on how to prevent and solve breastfeeding problems, particularly during the first two weeks, will enable mothers to choose to breastfeed exclusively up to six months.

This study has provided fundamental evidence of successful intervention by breastfeeding counseling to achieve six months of exclusive breastfeeding among term, low-birthweight infants. The locally developed training program in breastfeeding counseling, which successfully prepared volunteers to counsel mothers at home, could be incorporated into primary health care in the Philippines. Mothers who received breastfeeding counseling appreciated how this helped them to achieve their breastfeeding goals for the first six months. Improved breastfeeding practices as a result of breastfeeding counseling provided infants with protection from diarrhea and respiratory infections, contributing to their health and development.

Keywords: exclusive breastfeeding, RCT, peer counseling, LBW, Manila

Grace V. Agrasada, Department of Women's and Children's Health, Akademiska sjukhuset, Uppsala University, SE-75185 Uppsala, Sweden

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List of papers

- I Agrasada GV, Gustafsson J, Kylberg E, Ewald, U. Postnatal peer counselling on exclusive breastfeeding of low-birthweight infants: a randomized, controlled trial. *Acta Paediatrica*, 2005; 94:109-1115.
- II Agrasada GV and Kylberg, E. Training peer counselors in supporting mothers of term, low birth weight infants to exclusively breastfeed. *Asia Pacific Family Medicine*. (In press)
- III Agrasada GV and Kylberg E. When and why Filipino mothers of term low birth weight infants stop breastfeeding exclusively. (In manuscript)
- IV Agrasada GV, Ewald U, Kylberg E, Gustafsson J. Exclusive breastfeeding of low birth weight infants for the first six months: infant morbidity and maternal and infant anthropometry. (In manuscript)

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Abbreviations

| | |
|--------|---|
| CDC | Center for Disease Control |
| CED | Chronic energy deficiency |
| DOH | Department of Health |
| FNRI | Food and Nutrition Research Institute |
| GEE | Generalized Estimating Equations |
| IMCI | Integrated management of childhood illnesses |
| LAZ | Length-for-age z-score |
| LBW | Low birthweight |
| MUAC | Mid-upper arm circumference |
| NCBMS | National Code of Breast Milk Substitutes |
| NICU | Neonatal Intensive Care Unit |
| ORS | Oral rehydrating solution |
| PGH | Philippine General Hospital |
| PPS | Philippine Pediatric Society |
| WABA | World Alliance for Breastfeeding Action |
| WAZ | weight-for-age z score |
| WHO | World Health Organization |
| UNICEF | United Nations International Children's Emergency Fund. |

Preface

“A child born in the Philippines is at greater risk of dying than children born in other Southeastern Asian countries (Vietnam, Brunei, Singapore, Thailand, and Malaysia), 29 children of 1000 births will die before their first birthday, and 40 will die before age 5. One of every three births occurs within 2 years of the preceding births. Children born less than 2 years apart are almost twice as likely to die in the first year of life as children born three years apart. Filipino women still bear more children than they desire. Filipino women have, on average, 3.5 births, or exactly one birth more than the number they desire. Twenty percent (20%) of Filipino infants weigh less than 2500 grams; this predisposes to underdevelopment, higher risks for illnesses and deaths.”

Philippine Health and Demographic Survey, 2003

Introduction

Strategies that support breastfeeding among low-birthweight (LBW) infants increase their survival. The World Health Organization recommends exclusive breastfeeding from birth to six months for all infant populations (1), including LBW (< 2500 g) (2) infants. Exclusive breastfeeding confers protection from infection (3), is associated with reduced mortality (4), and has been associated with better mental development (5). Most LBW infants are capable of catch-up growth but some remain poorly nourished, so that the conditions just repeat themselves from one generation to the next. A mother who exclusively breastfeeds her infant not only provides optimal nourishment, but also is able to space childbirth. The poorer the circumstances of the infant, the more important the benefits that breastfeeding affords.

Even with these advantages, LBW infants in many countries (6), including the Philippines (7), have been found to be breastfed less frequently and for a shorter duration, compared with infants born heavier. The infant's small physique and less vigorous suckling associated with LBW (8) are potential barriers to breastfeeding. Mothers' perceptions of infant size and sucking problems in an environment of little or no breastfeeding support are barriers to breastfeeding.

It is proposed that with breastfeeding counseling, mothers of LBW infants could breastfeed exclusively for six months from birth.

Background

Low birthweight

Low birthweight is defined by the World Health Organization as a birthweight less than 2,500 grams (9), since below this value birthweight-specific infant mortality begins to rise rapidly (10). A baby's low weight at birth is the result either of prematurity (born before 37 weeks of gestation), restricted fetal (intrauterine) growth, or a combination of the two. Many factors affect the gestational duration and fetal growth, and thus the birthweight. Such factors relate to the infant, the mother, or the physical environment and play an important role in determining the future health of the infant. Birthweight is influenced to a great extent by the mother's own fetal growth and her diet from birth to pregnancy, and thus by her body composition at conception. Mothers living under deprived socio-economic conditions frequently have low-birthweight infants (11). In such settings the infant's low birthweight stems primarily from poor maternal nutrition and health over a long period of time, including the period of pregnancy, from a high prevalence of infections, or from pregnancy complications, exaggerated by poverty. Physically demanding work during pregnancy also contributes to poor fetal growth. LBW is intergenerational (12, 13) and is associated with the female gender (10). A mother's weight at her own birth is related to the risk of a low birth-weight in her offspring (14).

LBW infants are at increased risk of serious health outcomes and long-term disabilities (15, 16). The mortality rate among these infants has been found to be seven times higher and the rate of hospitalization four times higher than those in infants of appropriate birthweight (17).

More than 20 million infants worldwide have a low birthweight, and 14 % of these are born at term to undernourished women in developing countries (18). The prevalence of low birth weight in the Philippines is steadily increasing. Available data show that low birthweight rose from 14% in 1985 to 18% in 2000 (19). Low birthweight coupled with poor infant feeding is the underlying reason why 35% of Filipino children under five years of age are stunted and wasted (20).

Breastfeeding situation in the Philippines

The Philippines was cited in 1973 as one of the countries with the largest decline in breastfeeding (21). This trend has been attributed to reasons such as aggressive formula marketing, employment of more women in cities, and lack of breastfeeding support (22). Although differences in the duration of breastfeeding are evident from a number of unrelated surveys, the extent and duration of breastfeeding have certainly declined. The mean duration in months of any breastfeeding has been decreasing since the 1960s: from 14.5 in 1963-1967 to 13.7 in 1968-1972, and the median duration in months was 12.4 in 1973, 12.5 in 1983, 12 in 1988 and 9.3 in 2000 (19). Early supplementation and a shorter duration characterized the breastfeeding practice.

The breastfeeding practice in the Philippines first gained serious attention when the country participated in the WHO multinational study (1975-1978) on breastfeeding patterns (6) and subsequently on milk composition. In 1983, the National Movement for Promotion of Breastfeeding, an umbrella organization for both government and non-government organizations, was convened. It is not known how this movement has contributed to promotion of breastfeeding.

UNICEF in the Philippines led varied breastfeeding-promoting activities between 1983 and 1987 and beyond; breastfeeding together with population issues were conference themes in UNICEF-sponsored public policy conferences in Manila. Between 1984 and 1997, Filipino hospital staff started to train people in breastfeeding promotion and support, particularly in implementing the Baby Friendly Hospital Initiative (23) with Wellstart International, USA. To date, 1336 of 1634 (81.8%) Department of Health (DOH) accredited hospitals are considered 'baby-friendly' (24). At about the same time, health professional educators prepared to introduce breastfeeding into the medical and nursing curriculum. No records of this initiative are available, as all records were lost in a fire. In 1985, DOH implemented the rooming-in policy. In October 1986, the National Code of Breast Milk Substitutes (NCBMS) was legislated, for regulation of the marketing of formula. In 1992, the Rooming In and Breastfeeding Act (RA 7600) (25) came into force; this mandates that mothers and infants must stay together during the postpartum hospital stay in order to allow mothers to have unlimited access to their infants for breastfeeding soon after delivery and during the stay in the hospital. Mother-to-mother support groups such as *Bunso* and *Arugaan* provided breastfeeding education and counseling among mothers in Metro Manila. *Arugaan*, together with World Alliance for Breastfeeding Action (WABA) successfully organized an international conference on "Breastfeeding Women and Work: Human Rights and Creative Solutions" in 1988. This conference called for improvement in paid maternity leave in the public sector, the duration of which is 8 weeks, and 11 weeks in the case of Caesarian section. In the year 2000, the Department of Health adapted "The Integrated

Management of Childhood Illnesses”, IMCI (26), which is a strategy for reducing the child mortality and morbidity associated with the major causes of childhood illness. IMCI, developed by WHO and UNICEF, consists in a set of generic guidelines for management of childhood illness at the primary care level. It also has health promoting and preventive elements, including proposals for promotion of breastfeeding.

In the Philippines today, breastfeeding is promoted mainly by the rooming-in policy recommended by the Baby Friendly Hospital Initiative. Antenatal services include recommendations encouraging breastfeeding, but the degree of their influence has not been evaluated. Postnatal services, which are mainly health center-based, are utilized by only 39% of Filipinas (27) and do not provide breastfeeding support. Breastfeeding promotion in the Philippines has been episodic, fragmented and unsustainable.

Exclusive breastfeeding and LBW infants

The World Health Organization recommends exclusive breastfeeding for six months from birth for all infant populations, including LBW infants (1). Exclusive breastfeeding of LBW infants for the first six months reduces diarrhea and respiratory morbidity and mortality (4, 28). Breastfeeding is associated with a positive neurodevelopment, which is essential to LBW infants (29). Complementary feeding before the age of six months has not been shown to be associated with better growth (30, 31)

Furthermore, mothers who breastfeed exclusively benefit from lactation amenorrhea (32) enabling them to space their childbirths. Since they are more likely to be amenorrheic at six months, they conserve nutrients such as iron (33). Even with these advantages, LBW infants in the Philippines are less likely to be breastfed than infants born heavier (7). Even when breastfed, Filipino LBW infants are breastfed less frequently and for a shorter duration, compared with infants born with a normal birth weight. Non-breast milk feeds before the age of 6 months may make the infant susceptible to infection as a result of contamination of the food in combination with poor nutrition. A relationship between supplementation before six months and cessation of breastfeeding has been demonstrated and the authors emphasized the importance of strategies to maintain exclusive breastfeeding for the first six months (34).

Mothers of LBW infants experience unique difficulties in breastfeeding. The early and prolonged separation of the LBW infant from its mother as practiced in most health facilities is one major hurdle. Other obstacles include maternal perceptions of poor infant health (35), inadequate information about the benefits of breastfeeding for LBW infants, and a lack of practical and technical support in breastfeeding a fragile infant and of information on where to get help (36-38).

Breastfeeding support

Face-to-face counseling by peers has been shown to increase initiation (39, 40), duration (41, 42) and exclusivity (43-45) of breastfeeding among low-income women and women for whom perinatal breastfeeding support is limited or absent (46). Breastfeeding peer counselors are women who have had positive personal breastfeeding experiences and who have been trained to support other women to achieve their breastfeeding goals. Successful counseling programs usually involve antenatal contacts between the counsellor and the mother (44, 45). But when such contacts are not regular, counseling may have to commence during the pregnancy and continue through the postpartum period. When mother-infant pairs are discharged within 72 hours, there may be very little chance of promoting breastfeeding. Home-based postnatal visits have been proven to be effective maternal-child health interventions for targets such as prevention of child abuse (47). Home-based support brings to homes services that would otherwise be inaccessible to socially high-risk populations such as low-income mothers, first-time mothers, ethnic groups, and others. Keeping in mind the concerns of Filipino mothers regarding breastfeeding of an LBW infant (unpublished report), we developed a breastfeeding counseling training program aimed to prepare volunteers to provide home-based, postnatal skilled support to help mothers of term, LBW infants to maintain exclusive breastfeeding from birth to 6 months.

Aims

The aims of the different studies were:

1. To test the effects of home-based peer counseling on the exclusivity and duration of breastfeeding in mothers of term LBW infants. (Paper I)
2. To find out when and why the mothers first introduced non-breast milk liquid and solids in relation to breastfeeding counseling. (Paper III)
3. To determine the infant morbidity and analyze anthropometric changes in both infants and mothers during the first six months postnatally in relation to breastfeeding practice. (Paper IV)
4. To develop a breastfeeding counseling training program locally adapted to train volunteers. (Paper II)

Subjects and methods

Definitions

Exclusive breastfeeding is defined as feeding with no other food or drink, not even water, except breast milk, but permitting the infant to receive iron, oral dehydration solution (ORS) and medicine drops.

Partial breastfeeding is any breastfeeding plus other fluids and/or food.

Setting

From January 2001 to February 2002, mother-infant pairs were recruited at the Rooming-in Ward at the Philippine General Hospital (PGH), a university teaching hospital in Manila, the Philippines. The PGH was assessed as being 'baby-friendly' according to the WHO/UNICEF criteria in 1993. Mothers who vaginally delivered term infants with birth weights of 2 kg or more were sent to the rooming-in ward. Infants born at term with weights less than 2 kg were observed at the neonatal intensive care unit (NICU) for 12-24 hours. While separated from its mother, the infant receives, by dropper, fresh breast milk donated by lactating mothers in the ward. As soon as the infant's condition is stable, he or she is united with the mother at the rooming-in ward, and feeding at the breast is initiated. No hospital staff or volunteer has the task of educating or assisting mothers in breastfeeding at the rooming-in ward. Mothers are discharged 24-72 hours postpartum and at that time are breastfeeding exclusively. This study was approved by the ethics committees of the University of the Philippines, Manila, and the Medical Faculty of Uppsala University, Sweden.

Subjects

Mothers were recruited to the study prior to discharge. First-time mothers were eligible if they were 18 years of age or older, intended to breastfeed, and had vaginally delivered an LBW singleton with an Apgar score of eight or higher at 5 minutes. The infant should be born at 37 to 42 weeks of gestation, as computed from the mother's last menstrual date and confirmed by Ballard scoring (48) performed by a trained pediatrician. Excluded were mothers taking medications that could have compromised breastfeeding, and

those who would not be staying together with their infants in the study area until the infant was six months old.

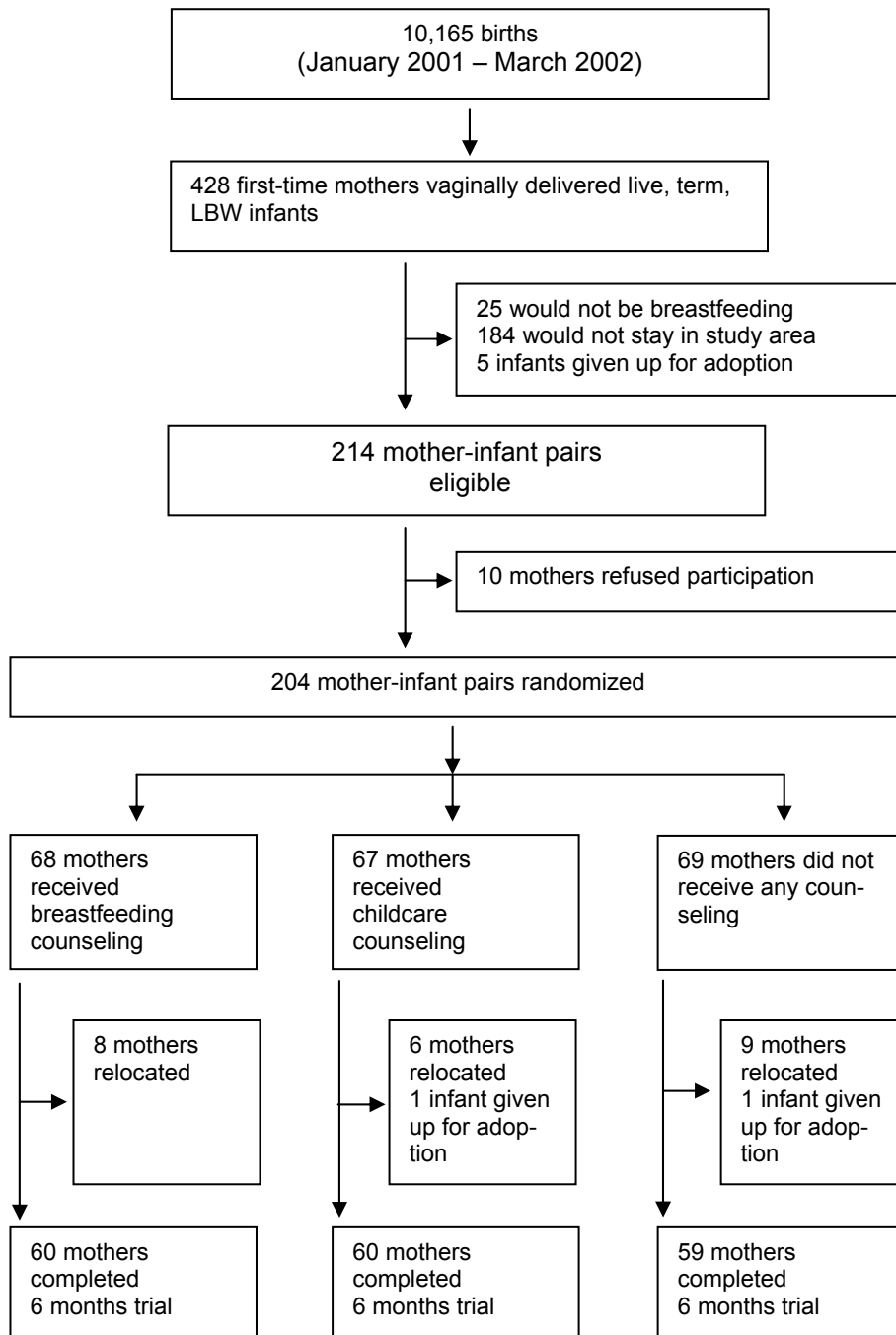


Figure 1. Participants' flowchart

Table 1. Mother and Infant Characteristics at Recruitment According to Group Assignment

| Characteristics | Breastfeeding counseled group (n= 68) | Childcare counseled group (n=67) | Control Group (n=69) |
|---|---------------------------------------|----------------------------------|----------------------|
| Mothers | | | |
| Mean (SD) age, years | 22.7 (4.5) | 23.2 (4.4) | 23.2(4.7) |
| Education | | | |
| Primary school or none | 4 (5.9) | 7 (10.4) | 2 (2.9) |
| Secondary | 41 (60.2) | 36 (53.7) | 33 (47.8) |
| College | 23 (33.8) | 24 (35.8) | 34 (49.3) |
| Prenatal visits | | | |
| 2 or fewer | 7 (10.3) | 19 (28.4) | 11(15.9) |
| 3 or more | 61 (89.7) | 48 (71.6) | 58 (84.1) |
| Living with partner | 48 (70.6) | 47 (70.1) | 48 (69.6) |
| Study/work outside home | 22 (32.4) | 22 (32.8) | 21 (30.4) |
| Mean (SD) annual income, US\$ | 1358 (126) | 1310 (100) | 1325 (126) |
| Infants | | | |
| Mean (SD) birth weight, g | 2341 (166) | 2368 (118) | 2365 (156) |
| Median (range) birth weight, g | 2400 (1700, 2490) | 2400 (2000, 2490) | 2440 (1750, 2490) |
| Mean (SD) birth length, cm | 46.7 (1.9) | 47.2 (1.4) | 47.4 (1.9) |
| Mean (SD) gestational age at birth, w | 39.2 (0.5) | 39.2 (0.6) | 39.4 (0.3) |
| Female | 38 (56.0) | 37 (55.2) | 39 (56.5) |
| Median (range) age at first breastfeed, h | 8 (1,76) | 8 (1,72) | 8 (1,76) |

Numbers are numbers of mothers or infants (%) unless stated otherwise.

Of the 214 mothers invited to participate in the study, 5% (10 of 214) refused and were excluded (Fig. 1). The final number of mothers was thus 204, sixty-eight of whom were assigned to receive peer breastfeeding counseling home visits, 67 to receive childcare home visits and 69 no home visits. Of the 204 mothers, 179 (88%) completed the six-month trial.

Characteristics of the mothers are listed in Table 1. The characteristics of mother-infant pairs who participated and those who refused were similar. At recruitment, one third of the mothers in each group intended to breastfeed their infants for at least 6 months. Additionally, 3% of those who were to receive breastfeeding counseling and 2 % of those who were not to receive any breastfeeding counseling intended to feed their infants with mother's milk alone at least during the first 2 months (Paper III). Eight of 68 mothers (11%) assigned to receive breastfeeding counseling, 9 of 67 (13%) in the childcare group and 9 of 69 (13%) in the control group considered that breast milk alone from birth to 6 months is sufficient to keep the infants healthy (Paper I). Further, all mothers did not know why an LBW infant in particular will benefit from breast milk (Paper III). All the mothers had similar breastfeeding knowledge

Enrolment

A trained research assistant identified mothers through a logbook at the rooming-in ward. If eligible, the mother was informed of the study of follow-up care of LBW infants, which consisted of the usual recommended hospital visits and, if available, home-based counseling by a hospital-trained peer counselor. The mother was given a study information sheet, written both in Filipino and in English. If she agreed to participate, she gave written informed consent and baseline information was recorded. Questions were asked to assess the mother's knowledge of breastfeeding. All mothers were asked about their breastfeeding plans at recruitment. The mother was then provided with a study information pack.

Randomization (Paper I)

The allocation sequence was based on a table of random numbers, which consisted of irregularly sized permuted random blocks prepared by one of the investigators (GVA). This investigator had no access to the randomization schedule. Once informed consent was obtained, the research assistant drew the topmost, opaque, sequentially numbered envelope from the pack. The mother's and infant's names were first written on the envelope, then copied into a tracking logbook. The research assistant then opened the envelope to determine the group assignment of the mother. The mother could belong to one of three groups: one in which she would receive breastfeeding counseling, one in which she would receive childcare counseling, or one control group in which no counseling was given. The mother was not aware of how many groups there were, nor did she know of the group assignments of other mothers. She was informed of her own group assignment only at the time of discharge from hospital. For the two groups receiving home visits, the research assistant identified the counselor living nearest to the mother's residence.

Sample size

Based on the primary hypothesis, the calculated total number of mothers in the study was 159, setting $\alpha=.01$ and a two-sided test of the hypothesis. This sample gave 80% power to detect a 30% absolute difference in exclusive breastfeeding between the mothers in the two intervention groups. There were 64 mothers per group after adjustment for a 20% attrition rate.

Data collection

Eight home visits were scheduled at the following infant ages: Days 3–5, Days 7–10; Day 21; 1.5 months; and then monthly up to 5.5 months. The mothers were asked to come for the hospital-recommended seven infant visits at two and four weeks and then monthly up to the age of 6 months. These visits were timed to occur within two weeks of each counseling session. During hospital visits, a trained interviewer asked the mothers individually to carefully recall when and how the infant had been fed, beginning with the past 24 hours, this week, then weekly for the past weeks until the previous interview. Feeding mode by week was recorded. Exclusive breastfeeding was recorded for the entire week if the infant had received only mother's milk with or without medicines, ORS or iron drops. Exclusive breastfeeding was regarded as being discontinued at the first instance of the infant having received any non-breast milk liquid or solid. If the infant had received anything else than breast milk, the mother was asked when and why such a feed was given to the infant. Partial breastfeeding from birth to 6 months is defined here as any breastfeeding plus other fluids and/or food. At the last hospital visit, the mothers were asked whether, and if so how, their feeding decisions had been influenced during the past 6 months (Paper I). Mothers who were still breastfeeding at six months were asked about their breastfeeding plans beyond 6 months (Paper III). Additionally, mothers who had been assigned home counselors were asked about their experience with the counseling program (Paper II).

The same study physician was consulted at all scheduled and unscheduled infant visits, provided the mothers with infant ferrous sulfate drops, and vaccinated all the infants. Both the study physician and the trained interviewer were unaware of the group assignment of the mother.

Infant anthropometry (Paper IV)

Weight, length, and head circumference measurements of the infants were taken within 30 minutes after birth by a pediatrician on duty. The study physician, blinded to group, made all subsequent measurements. At ages of 2, 4, and 6 months, the infants were weighed undressed using an electronic weighing scale (Nakamura[®], Japan). Body weight was measured to the nearest gram. The average of three weight measurements was recorded as infant weight. The weighing scale was calibrated daily, using standard weights. The study physician and an assistant measured the infant length with an infantometer (Nakamura[®], Japan), and length was recorded as the average of two readings to the nearest centimeter. The infant's head circumference (occipitofrontal) was measured to the nearest 0.1 cm using a non-elastic measuring tape. An average of two readings was recorded.

Maternal anthropometry (Paper IV)

A trained research assistant measured the mid-upper arm circumference (MUAC) and weighed all mothers before discharge at 12 to 72 hours postpartum and then at infant ages of 2, 4, and 6 months. The MUAC was measured with a non-elastic tape, calibrated to the nearest 0.1 cm, at the midpoint of the upper arm between the acromion process and the tip of the olecranon process. For the weight measurements a beam balance weighing scale (Detecto[®], USA) calibrated to 100 grams was used. In addition the mother's height was measured at an infant age of 2 weeks. To compute the body mass index (BMI), the weight (kg) is divided by squared height in meters (kg/m²). A BMI of <20 is regarded as subnormal and <18.5 represents chronic energy deficiency (CED) (49, 50). A BMI between 18.5 and 20 is designated low in this study.

Infant morbidity (Paper IV)

The mothers brought their infants to the study physician when they observed any cough, colds or stool changes in the infants. Diarrhea was diagnosed when the infants had stools that were looser, more watery, and more frequent than usual. All infant health consultations made by the mother outside the study clinic were verified and recorded by the study physician. All infant illnesses in the study were diagnosed and managed by the study physician.

Statistical Analysis

Data were analyzed using the STATA 7.0 statistical software. Associations between categorical variables were tested with χ^2 (Paper I). The effect of intervention on exclusive breastfeeding was analyzed by means of generalized estimating equation (GEE) models that accounted for within-individual correlation of outcomes measured at 24 time points from birth to 6 months (Paper I). Two-sided tests of significance were used to test intervention efficacy. All analyses were by intention-to-treat. A Kaplan-Meier graph was prepared to describe the equality of survival function of the proportion of mothers breastfeeding exclusively through 6 months; a log-rank procedure was used to test differences between groups at the time of the first failure of exclusive breastfeeding (Paper III). Another Kaplan Meier graph described the equality of survival function of the proportion of mothers still breastfeeding through 6 months; a log rank procedure was used to test differences between groups at the time when any breastfeeding was terminated (Paper I). Descriptive analysis included frequencies of non-breast milk feedings introduced and reasons for introducing them (Paper III). Standard scores or z

scores for weight-for-age, length-for-age, and head circumference-for-age were obtained using EPI INFO 2000 (CDC, Atlanta). Student's t-test was used to analyze differences in infant weight, length, and head circumference between groups, and for other analyses Fisher's exact probability test was used. Changes in infant anthropometry and maternal weight, BMI and MUAC over time were tested by repeated measures ANOVA (Paper IV).

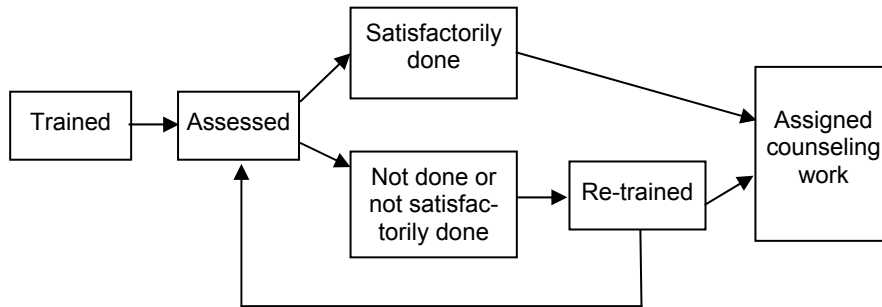


Figure 2. Training framework

Counselor selection and training (Paper II)

A two-tiered program was implemented to select and train the counselors. An invitation to a postpartum care seminar was sent to key Local Health Centers in 13 cities of Metro Manila. Training materials and snacks were provided at no cost to the participants. Figure 2 shows the training framework.

Level-One Training

The hospital staff of the Philippine General Hospital conducted a three-day seminar on postpartum mother-child health. Forty active and inactive *Barangay* (Village) Health Volunteers attended the seminar and 37 of the 40 (92%) completed it. The 30 participants with high post-training test scores were invited to undergo the next level of training. It was explained to the participants that subsequent training required home visitation. Fourteen of the 30 (47%) were interested in undergoing training at the next level. The 14 women were ranked according to the duration of their personal breastfeeding experience. The top eight women who had the longest breastfeeding experience, an average of 39 months, were chosen to undergo the breastfeeding counseling training program. The remaining six women received general counseling training in mother-child postpartum care.

Level-Two Training

This level of training was based on our own program formulated by modifying widely used training programs (51, 52), with our own local data and experience. The training emphasized the mother–infant dyad as a unique unit. It was competency-based (53), utilized adult education principles (54) and drew on the positive breastfeeding experiences of the counselors. A breastfeeding coordinator, a certified lactation consultant (55), was responsible for the basic and continued training and monitoring of the breastfeeding counselors. The training was conducted in Filipino and covered topics such as home visitation skills, active listening (56), verbal and body language (57), and record keeping of home visit transactions. The course consisted of 40 cumulative hours over 14 consecutive days of interactive didactics and role-playing.

Content of Level-Two Training

Didactic interactive sessions

Interactive sessions encouraging participation provided opportunities to practice skills (e.g., role-playing, discussion groups, problem solving). These sessions were intended to facilitate learning of the advantages of exclusive breastfeeding for both infant and mother, assuring the mother that if she decided to breastfeed exclusively, she would be able to do it. Interactive sessions were also used to learn basics of breastfeeding. Particular attention was paid to early feeding cues, handling a physically fragile infant, positioning, and attachment. It was emphasized that mothers need to breastfeed frequently to produce more milk. Milk supply at different lactation stages and infant weight changes over time were thoroughly discussed. How to prevent or manage breastfeeding problems common to Filipino mothers (58) were taken up in detail. Counselors were also taught how to understand and cope with divergent views on breastfeeding held by family or household members. The group developed a semi-structured home visitation guide that they used during visits.

Practical Skill Workshop

By demonstration and return demonstration exercises, the trainees learned to assist mothers to assume a comfortable position while breastfeeding and to facilitate attachment of the infant to the breast. One relevant technique for low-birthweight infants is the “Dancer hold position” (59), where the mother supports the baby’s chin in the sling between her thumb and index finger allowing her a better view and better control of her infant’s head. The counselors learned how to assist mothers to get more skin-to-skin contact with their infants, as this encourages breastfeeding (60). Manual expression of milk, handling expressed milk without refrigeration, and alternative methods

of delivering mother's milk to the infant by dropper or spoon were practiced. Family or household members were taught how to do a back rub or back massage on the mother if the mother wanted to have one. The counselors were taught how to keep home visit records accurate and up-to-date. Each counselor underwent supervised practice in three different settings: at bedside; at the outpatient clinic; and in the home setting. All eight women who started the breastfeeding counseling training were able to complete the program.

The breastfeeding coordinator monitored all counselors. Counselors attended monthly meetings at which topics of breastfeeding counseling training were reviewed and individual counseling experiences with mothers were discussed. Additionally, the counselors completed a semi-structured home visit form for each mother during each visit. This form contained a structured portion asking about health conditions of the mother and her infant, breastfeeding problems, if any, and the current feeding practice. On the unstructured portion, the counselor wrote her personal feedback regarding the visit. The coordinator collected these forms during monthly meetings.

Results

Exclusive breastfeeding

All 204 infants were discharged from the hospital 48-72 hours after birth and at that time were breastfed exclusively. The proportion of mothers breastfeeding exclusively from 2 weeks to 6 months postpartum was significantly higher in the breastfeeding-counseled group than in the childcare and control groups (Figure 3). Using GEE analysis, mothers who received breastfeeding counseling were 6.3 times ($p < 0.001$, 95% CI 3.53, 11.3) more likely to breastfeed exclusively than mothers of other groups. The same analysis showed that the proportion of mothers exclusively breastfeeding in the childcare group did not differ significantly from that in the control group ($p = 0.95$, 95% CI .50, 1.91). Mothers who received breastfeeding counseling had a higher rate of exclusive breastfeeding as early as 2 weeks postpartum. About 70% of the mothers of the childcare and control groups stopped exclusive breastfeeding at 2 weeks. Half of the breastfeeding-counseled mothers did the same at 5 weeks. At 6 months, exclusive breastfeeding had been practiced during the last seven days by 49% (33 of 68) of mothers who received breastfeeding counseling and by 7% (5 of 67) of those in the childcare group, but by none of the control mothers. Thirty-two percent (22 of 68) of the mothers in the breastfeeding-counseled group, 3 % (2 of 67) in the childcare group and none in the control group practiced exclusive breastfeeding from birth to 6 months. Figure 4 (Paper III) shows when exclusive breastfeeding first stopped. The median durations of exclusive breastfeeding in mothers who received breastfeeding counseling and those who did not were 5 weeks and 2 weeks, respectively ($p < 0.001$). Additionally, more mothers in the breastfeeding-counseled group breastfed for 6 months compared to the other two groups (Fig. 5). Using GEE analysis, it was shown that mothers who received breastfeeding counseling were 3.7 times ($p < 0.001$, 95% CI 1.96, 6.8) more likely to continue any breastfeeding compared with childcare-counseled mothers or control mothers. At 6 months, the proportions of mothers who were still breastfeeding in the breastfeeding-counseled group, childcare-counseled group and control group were 43/68 (63.2%), 21/67 (31.3%) and 20/69 (29%), respectively ($p < 0.001$).

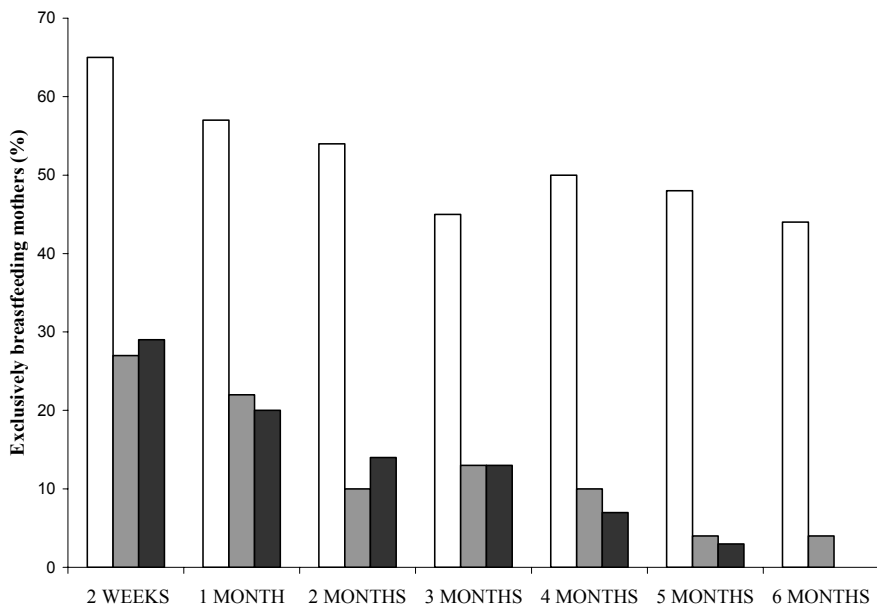


Figure 3. Proportion of mothers who exclusively breastfed their infants by infant age and study group. □ Breastfeeding-counseled group, ■ Childcare-counseled group, ■ Control group.

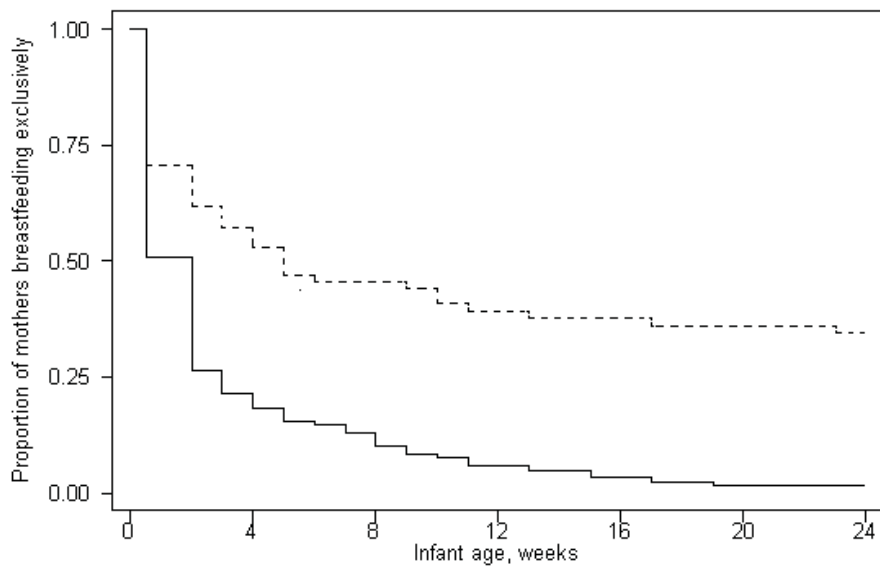
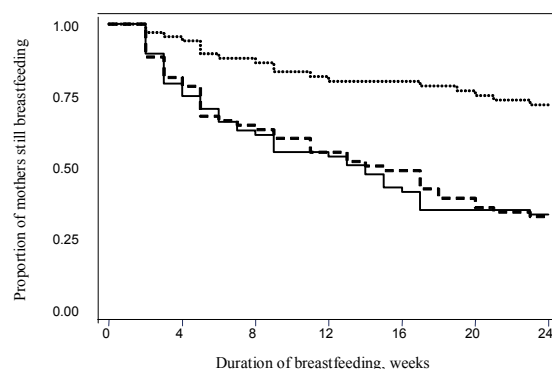


Figure 4. Kaplan Meier estimates of proportions of mothers still breastfeeding exclusively at different ages during the first six months. - - - Mothers who received breastfeeding counseling, — Mothers with no breastfeeding counseling.



| Numbers at risk | | | | | | | |
|--------------------------|----|----|----|----|----|----|----|
| Breastfeeding counselled | 68 | 65 | 55 | 49 | 49 | 46 | 43 |
| Childcare counselled | 67 | 53 | 41 | 36 | 27 | 26 | 21 |
| Control | 69 | 54 | 41 | 37 | 31 | 24 | 20 |

Figure 5. Kaplan Meier estimates of proportions of mothers still breastfeeding (exclusively+partially) at different ages during the first 6 months. ···· Breastfeeding-counselled group, — Childcare-counselled group, - - - Control group.

When and why mothers stopped breastfeeding exclusively

Table 2 shows the first instance at which infants received non-breast milk liquid or solid. All non-breast milk liquids were given in feeding bottles, and all solids were given with a spoon. Solid foods given were mainly prepared at home. None of the infants of the counseled mothers used a pacifier, whereas 10% of the infants of mothers without counseling did. The majority of the mothers introduced non-breast milk feeds themselves; grandmothers introduced about 15%.

Table 2. Ages at introduction of non-breast milk items

| Infant age group at introduction of non-breast milk item | Item introduced | Breastfeeding-counselled group n = 46 n (%) | Non-breastfeeding counseled group n= 134 n (%) |
|--|--|---|--|
| 3 days to 2 weeks n=126 | Formula | 0 (0) | 72 (54) |
| | Water | 13 (28) | 8 (6) |
| | Herbal extract | 13 (28) | 20 (15) |
| 2 weeks to 2 months n=36 | Formula | 7 (15) | 15 (11) |
| | Water | 6 (13) | 6 (4) |
| | Sugared water | 0 (0) | 2 (1) |
| 2 months to 4 months n=14 | Formula | 3 (7) | 7 (5) |
| | Water | 1 (2) | 0 (0) |
| | Instant noodle soup | 0 (0) | 1 (1) |
| | Rice porridge / mashed fruit / vegetable | 1 (2) | 1 (1) |
| 4 months to 6 months n=4 | Water | 2 (5) | 0 (0) |
| | Rice porridge /mashed potato /fruit | 0 (0) | 2 (2) |

The first two weeks after hospital discharge

Table 3 shows the reasons why mothers introduced non-breast milk feeding. During the first two weeks postpartum, 126 mothers stopped breastfeeding exclusively; of these, 26 mothers received breastfeeding counseling and 100 mothers did not receive any counseling. Mothers with breastfeeding counseling first gave water to their infants, whereas mothers without counseling first gave formula. Mothers who gave water thought that water was needed to end a breastfeed; just like ending a meal with a drink. Water was given also because it was believed to ease the digestion, keep the mouth clean, and/or refresh infants in a warm climate. Bottled water, occasionally boiled, was given in amounts ranging from a few drops in a medicine dropper to 2 ounces in a feeding bottle per day. Local herbal extracts such as “oregano” and “ampalaya” were given once or twice to infants upon arrival from the hospital, as these were believed to cleanse the intestines and lessen yellowish skin discoloration. Nursing problems were the most common reasons why mothers introduced formula. Three mothers decided to give formula in order to use feeding bottles or tins of milk that they had received as gifts from friends and relatives, to show their appreciation. One mother from the breastfeeding-counseled group and two mothers with no counseling thought that since their infants were small, the infants needed more than breast milk alone. One mother from each group became ill and stopped breastfeeding exclusively.

Table 3. Reasons why non-breast milk items were introduced, by infant age

| Reason | Hospital discharge to 2 weeks | | 2 weeks to 2 months | |
|---|--|---|--|--|
| | Breastfeeding-counseled group n=26 n (%) | Non-breastfeeding-counseled group n=100 n (%) | Breastfeeding-counseled group n=13 n (%) | Non-breastfeeding-counseled group n=23 n (%) |
| <i>Maternal</i> | | | | |
| Nursing problems | 14 (54) | 51 (51) | 1 (8) | 2 (9) |
| Maternal illness | 1 (4) | 1 (1) | 1 (8) | 1 (4) |
| Work/study | 0 (0) | 0 (0) | 4 (31) | 6 (26) |
| To be able to use formula / feeding bottle given as gifts | 1 (4) | 2 (2) | 0 (0) | 0 (0) |
| Did not wish to breastfeed exclusively | 1 (4) | 2 (2) | 0 (0) | 0 (0) |
| <i>Infant</i> | | | | |
| Poor weight gain | 0 (0) | 0 (0) | 7 (54) | 12 (52) |
| <i>Others</i> | | | | |
| Tradition/community practice | 9 (35) | 44 (44) | 0 (0) | 1 (4) |
| Doctor's advice | 0 (0) | 0 (0) | 0 (0) | 1 (4) |

Two weeks to two months

Thirty-six mothers, 13 with breastfeeding counseling and 23 without counseling stopped breastfeeding exclusively during this period. Seven of 13 breastfeeding-counseled mothers and 12 of 23 non-counseled mothers gave perceived poor infant weight gain as their reason for introducing formula. Formula was first given to infants at this age to “to top up breast milk.” Two non-counseled mothers who aimed to increase their infant’s weight gave sugared water. A non-counseled mother was advised by a physician to give her infant formula because the infant appeared small. Four breastfeeding-counseled mothers and six mothers without counseling started non-breast milk feeding because they planned to find work. One mother from each group became ill and decided to give formula.

Two months to four months

Five breastfeeding-counseled mothers and nine non-counseled mothers introduced non-breast milk liquids and solids during this period “to fatten up the baby”, because “the baby was well and ready for table foods”, or “to prevent me from getting too exhausted if breastfeeding exclusively”, and “...I like a relative to feed the infant...”

Four months to six months

Two mothers who received breastfeeding counseling decided to reduce the number of breastfeeds by giving water. One mother felt exhausted and another felt she was getting very thin. One non-counseled mother started to give her infant solids because some mothers in her neighborhood were giving their infants solids. Another mother without breastfeeding counseling gave solids because her infant was grabbing food.

Breastfeeding problems during the first 14 days

Mothers both with and without breastfeeding counseling said that they had experienced breastfeeding problems (Table 4). Mothers who received counseling reported insufficient milk (n=24), breast engorgement (n=7), flat nipples (n=2), varicella pustules (n=1), sore nipples (n=1) and infant refusal of the breast (n=2). Having learned how to hold and support the infant in a comfortable position and with good attachment at the breast while breastfeeding, 22 of 37 mothers were able to continue breastfeeding exclusively. One mother who had got varicella and some pustules in her breast but none in the areola or nipple; she manually expressed milk and resumed breastfeeding after one week.

Table 4. Nursing problems experienced by mothers during the first two weeks postpartum

| Nursing problems | Breastfeeding-counseled group (n=37) | | Non-breastfeeding counseled group (n=41) | |
|-------------------------------|--|---|---|---|
| | Mothers who continued to breastfeed exclusively despite problem n=22 n (%) | Mothers who stopped breastfeeding exclusively because of problem n=15 n (%) | Mothers who continued to breastfeed exclusively despite problem n=2 n (%) | Mothers who stopped breastfeeding exclusively because of problem n=39 n (%) |
| Insufficient milk | 14 (38) | 10 (27) | 2 (5) | 35 (85) |
| Breast engorgement | 4 (11) | 3 (8) | 0 | 1 (2) |
| Flat nipple | 1 (3) | 1 (3) | 0 | 1 (2) |
| Breast pustules / sore nipple | 1 (3) | 1 (3) | 0 | 0 (0) |
| Infant refused breast | 2 (5) | 0 (0) | 0 | 2 (5) |
| Total | 22 | 15 | 2 | 39 |

Mothers without counseling reported insufficient milk (37), breast engorgement (1), flat nipple (1) and infant refusal to breastfeed (2). Two mothers in this group got help from their own mothers and continued to breastfeed exclusively. Significantly more mothers with breastfeeding counseling (22/37; 59%) than without (2/41; 5%) could continue exclusive breastfeeding in spite of problems (difference =54 %; 95% CI 48% - 60%, $p > 0.0001$).

Infant feeding patterns from birth to six months

Further, all 24 mothers who breastfed exclusively from birth to 6 months expressed a desire to continue breastfeeding indefinitely. Conversely, 60 mothers whose infants were receiving breast milk in combination with non-breast milk feedings were undecided how much longer they would be able to breastfeed. Only those with breast milk intake, 24 exclusively breast fed infants and 134 infants who received breast milk in combination with non-breast milk feedings, are considered in the following (i.e., exclusively and partially breastfed infants as reported in Paper IV).

Health and anthropometry

Infants

All 204 infants were born at term (39 ± 0.5 weeks). There were more female than male infants in both the exclusively and the partially breastfed group (54% and 60%, respectively). The infants had no asphyxia or other medical conditions warranting further stay at the hospital.

None of the 24 exclusively breastfed infants had diarrhea during the study period, whereas 44 (33%) of the 134 partially breastfed infants had a mean of 2.3 days of diarrhea ($p < 0.05$). Eighteen of these latter infants had two or three episodes during the study period. Two of the infants with diarrhea required intravenous fluids. Neither the proportion of infants (92% vs. 89%) nor the mean number of days with respiratory tract infections (11.9 vs. 12.4 days) differed significantly between the two groups. However, significantly more infants, (35; 26%) in the partially breastfed than in the exclusively breastfed group (2; 8%) received antibiotics for respiratory tract infections ($p < 0.001$). None of the exclusively breastfed infants was hospitalized for a respiratory infection, compared to 12 (9%) of the partially breastfed infants ($p < 0.001$). No infant in the study died.

Table 5. Infant anthropometry by age and feeding mode from birth to six months

| | Exclusively breastfed infants (n=24) | Partially breastfed infants (n=134) |
|----------------------------------|--------------------------------------|-------------------------------------|
| Mean weight (SD), g | | |
| Birth weight | 2311 (180) | 2370 (137) |
| 2 months | 4232 (443) | 4242 (469) |
| 4 months | 5625 (653) | 5603 (543) |
| 6 months | 6316 (780) | 6436 (622) |
| Mean body length (SD), cm | | |
| Birth | 46.7 (2.0) | 47.2 (1.7) |
| 6 months | 63.0 (2.5) | 63.3 (2.5) |
| Mean head circumference (SD), cm | | |
| Birth | 31.8 (0.9) | 31.8(1.2) |
| 6 months | 41.3 (1.5) | 41.3(1.1) |

Table 6. Gains in weight, length, and head circumference by infant age and feeding mode

| Gains | Exclusively breastfed infants (n=24) | Partially breastfed infants (n=134) |
|--|--------------------------------------|-------------------------------------|
| Mean weight gain (SD), g | | |
| 0-2 months | 1879 (386) | 1878 (435) |
| 2-4 months | 1363 (407) | 1367 (384) |
| 4-6 months* | 683 (335) | 834 (325) |
| 0-6 months | 3926 (785) | 4080 (602) |
| Mean length gain (SD), cm | | |
| 0-6 months | 16 (3) | 16 (3) |
| Mean gain of head circumference (SD), cm | | |
| 0-6 months | 9.5 (2) | 9.5 (2) |

*p < 0.05

Table 5 (Paper IV) shows the mean infant weight at birth and at 2, 4, and 6 months of age. Body length and head circumference at birth and at 6 months are also shown. The exclusively breastfed infants did not differ from those who were partially breastfed in any of these parameters. The gains in weight, body length and head circumference in the two groups from birth to 6 months are shown in Table 6 (Paper IV). The weight gains were largest between birth and 2 months and smallest between 4 and 6 months. The weight gains in the two groups only differed between 4 and 6 months. During this period the mean weight gain of the partially breastfed infants was significantly larger than that of the infants who were exclusively breastfed ($p < 0.05$). However, the overall weight gain from birth to 6 months did not differ between the groups. Neither did the increases in length or head circumference from birth to 6 months differ. Figure 6 illustrates the develop-

ment of the mean weight-for-age z score (WAZ) during the 6-month study period. Neither mean WAZ, mean length-for-age z score (LAZ), nor mean head circumference-for-age z score at birth or at 2, 4, and 6 months differed between the groups. ANOVA revealed no significant differences between the groups over time. There was no difference in mean weight gain between infants of mothers with normal BMI and those of mothers with low BMI or CED, in either of the groups.

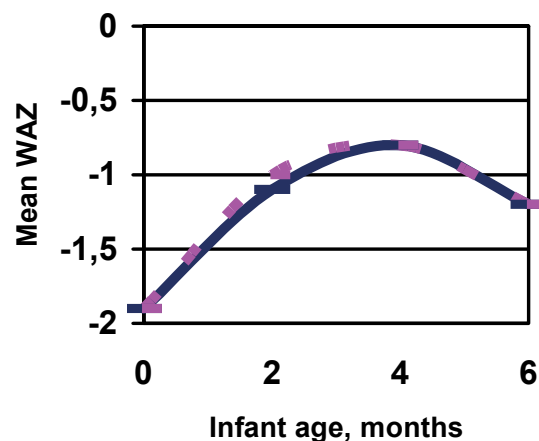


Figure 6. Mean weight-for-age z score (WAZ) at birth and at 2, 4, and 6 months. — Exclusively breastfed infants, --- Partially breastfed infants.

Mothers

The mothers who breastfed exclusively did not differ from those who breastfed partially with respect to age, number of antenatal visits, education, income, or employment outside the home. Table 7 (Paper IV) presents the maternal anthropometric results. Mean height did not differ between the two groups. Mean weight, BMI, and MUAC did not differ significantly between the groups at baseline or at 2, 4 or 6 months. Neither did the groups differ regarding mean weight loss, decrease in BMI or decrease in MUAC during the first six months. Repeated measures ANOVA showed that there were no significant changes in MUAC over time. However, there were significant changes in weight ($p < 0.0001$) as well as in BMI ($p < 0.0001$), but the changes did not differ between the two groups ($p = 0.69$ and $p = 0.54$, respectively). The proportions of mothers with low BMI and CED (Table 8) increased during the first 4 months compared to those at baseline. However, there were no significant differences between the two groups at any time point.

Table 7. Mean maternal weight, BMI, height, and MUAC during the first six months

| Measurement | Mothers who breastfed exclusively n=24 | Mothers who breastfed partially n=134 |
|--|--|---------------------------------------|
| Mean weight (SD), kg | | |
| Baseline | 52.3 (8.0) | 53.3 (6.9) |
| 2 months | 47.4 (7.3) | 47.4 (5.8) |
| 4 months | 45.8 (7.8) | 47.0 (6.1) |
| 6 months | 45.3 (8.0) | 46.8 (6.2) |
| Mean BMI, (SD), kg/m ² | | |
| Baseline | 22.5 (2.7) | 23.0 (3.0) |
| 2 months | 20.7 (2.7) | 20.5 (2.5) |
| 4 months | 20.1 (2.8) | 20.3 (2.6) |
| 6 months | 19.9 (2.6) | 20.2 (2.6) |
| Height (SD), cm (2 weeks after delivery) | 150 (10) | 150 (10) |
| Mean MUAC (SD), cm | | |
| Baseline | 24.3 (2.5) | 24.7 (2.2) |
| 2 months | 23.9 (3.3) | 24.5 (2.2) |
| 4 months | 23.6 (3.0) | 24.6 (2.5) |
| 6 months | 23.4 (3.0) | 24.8 (2.7) |

Table 8. Proportions of mothers with low BMI and CED² during the first six months

| Infant age | Mothers who breastfed exclusively n=24 | | Mothers who breastfed partially n=134 | |
|------------|--|----------------------------|---------------------------------------|----------------------------|
| | 18.5≤BMI<20 ¹ % | BMI<18.5 ² % | 18.5≤BMI<20 ¹ % | BMI<18.5 ² % |
| Birth | 13 | 4 | 4 | 12 |
| 2 | 42 | 17 | 25 | 20 |
| 4 | 38 | 29 | 27 | 23 |
| 6 | 38 | 29 | 22 | 25 |

¹ Low BMI² Chronic energy deficiency

Breastfeeding peer counseling training program

Assessment of training competencies

To assess post-training knowledge, a list of topics (Table 9) was used as a tool. Six counselors were assessed as being satisfactory on all topics. The evaluations of two counselors were not satisfactory regarding three topics, namely: changes in the woman's body immediately after childbirth; the lactation amenorrhea method, and early feeding cues. They were re-trained for two weeks and when they were found satisfactory at re-assessment, they were assigned counseling work. The same tool was used to monitor counselor knowledge on a monthly basis during the entire project.

Table 9. Breastfeeding training topics on which the counselors were evaluated

| |
|--|
| What happens to a woman's body after infant delivery? |
| What happens to a baby immediately after birth? |
| How can a mother breastfeed an LBW infant? |
| How can a mother breastfeed an LBW infant exclusively from birth to 6 months? |
| Why is exclusive breastfeeding good for mothers? |
| Why is exclusive breastfeeding good for infants, particularly for those born with LBW? |
| What are the early feeding readiness cues? |
| What signs show that the infant has good attachment and positioning? |
| What signs show that breastfeeding is going well? |
| How much should a breastfeeding infant weigh? |
| What are the infant voiding/stool patterns when breastfeeding is going well? |
| What advice would you give to mothers when an infant refuses the breast? |
| What advice would you give to mothers when an infant is too sleepy to feed? |
| What are the requirements and benefits of lactation amenorrhoea method (LAM)? |
| How can a mother increase her milk production? |
| How can a mother introduce timely complementary feedings? |

Counselors' feedback regarding the training program

At the end of the program, the breastfeeding coordinator conducted a group meeting and asked the counselors to answer a written training evaluation questionnaire. The evaluation tool had two parts; the first part consisted of a Likert scale, and the second part had open-ended questions. Table 10 shows the feedback given by the counselors. All eight counselors stayed on until the end of the trial. All counselors unanimously agreed that the learning and experience from counseling had built up their self-esteem and increased their self-confidence. All mothers, including those who failed to breastfeed exclusively for 6 months, said that they were satisfied with the counseling they received.

Table 10. Counselor feedback on the training

| Questions | Strongly agree | Agree | Disagree | Strongly disagree |
|---|--|-------|----------|-------------------|
| Were the training objectives met? | 8/8 | | | |
| Were the issues I want to know about addressed? | 7/8 | 1/8 | | |
| Were the training materials helpful, clear? | 8/8 | | | |
| Was the schedule/duration of the training acceptable? | 6/2 | 2/8 | | |
| Was the teaching style clear and organized? | 8/8 | | | |
| Was participation in the discussion encouraged? | 8/8 | | | |
| How would you like to improve the training? | No answers | | | |
| What aspects of the training did you like best? | All of it (2/8) | | | |
| | The training paid considerations to our cultural ways (2/8) | | | |
| | All of it; specifically the chance to re-train those who did not pass the first assessment (2/8) | | | |
| | All of it, including the fact that we were few in our group (1/8) | | | |
| | I liked it when we were able to prepare a home visit guide that we all found useful during home visits (1/8) | | | |
| Additional comment/s? | The training gave me new knowledge and skills – I feel good about the training (8/8) | | | |
| | I enjoyed the training because I found new friends (5/8) | | | |
| | I am proud to have been trained by the hospital staff (8/8) | | | |

Mothers' feedback regarding the counseling services

At the exit interview, all mothers who had received home-based counseling stated that they were satisfied with the counseling they had received. The mothers in the breastfeeding group believed that the counselor influenced their feeding decisions the most. None of the mothers requested counselor replacement. During the infant hospital visit at 6 months, a trained interviewer asked the mothers what they thought about the peer counseling they had received. Table 11 shows the opinions of mothers on how they had been supported by the counseling program.

Table 11. The mothers' feedback concerning the peer-counseling program

| Question | % |
|--|------|
| Who influenced you most regarding feeding decisions in the past six months? | |
| Counselor | 91.7 |
| Counselor and husband | 5.0 |
| Counselor and mother | 3.3 |
| Do you like the peer counseling program? | |
| Yes | 100 |
| No | 0 |
| Why do you like the peer counseling program? | |
| "... I did not have to pay for it ..." | 91.6 |
| "...it helped me look after my own health ..." | 83.3 |
| "...it helped me decide how to feed and care for my baby ..." | 41.7 |
| "The counselor's visit was for everyone in my house, even my neighbors come to listen." | 13.3 |
| "Convenient. I do not have to travel ..." | 11.7 |
| "The counselor discussed with my husband and mother-in-law how they could help me" | 5.0 |
| "... she (counselor) listens to my other (non-breastfeeding) problems" | 3.3 |
| "It was nice to expect someone to come as agreed..." | 3.3 |
| "... she did not force me to breastfeed exclusively. She continued even if I decided to supplement." | 3.3 |
| The number of visits | |
| Too few | 8.3 |
| Just right | 91.7 |
| Too frequent | 0 |
| The duration of the visits | |
| Too short | 16.7 |
| Just right | 83.3 |
| Too long | 0 |

Discussion

This study has established that postnatal peer counseling of first-time Filipino mothers of term LBW infants results in a higher frequency of exclusive breastfeeding and a longer breastfeeding duration during the period from birth to six months. Breastfeeding counseling by trained volunteers thus helped mothers to choose and maintain exclusive breastfeeding. The mean weight loss and decrease in BMI during the six-month period did not differ between mothers who breastfed their infants exclusively and those who breastfed partially. The infants who were exclusively breastfed from birth to six months were protected from diarrhea and had catch-up growth. Thus, exclusive breastfeeding during this period is not disadvantageous to term LBW infants.

Mothers who received breastfeeding counseling were much more likely to breastfeed exclusively than mothers of other groups. This difference was observed as early as two weeks postpartum. Half of the mothers who received breastfeeding counseling stopped exclusive breastfeeding at five weeks, while half of the mothers who did not receive breastfeeding counseling stopped exclusive breastfeeding earlier than two weeks postpartum. This highlights the importance of the first two weeks as the period when mothers need the most support. Mothers with counseling gave their infants small amounts of water and continued to breastfeed. In contrast, mothers without counseling introduced formula during the first two months and subsequently stopped breastfeeding before six months. Counseling helped some mothers who introduced non-breast milk feeding to go back and breastfeed exclusively again. This was evident from the increased proportion of mothers who were breastfeeding exclusively at two and four months compared with the proportion at three months (Fig. 3). Two mothers who completely stopped breastfeeding, one at two weeks and the other at four weeks, both of whom received breastfeeding counseling, were able to re-lactate within two weeks.

The reasons reported by the non-counseled mothers for introducing non-breast milk feeds reflect lack of breastfeeding knowledge and support. Water, which was given to infants as early as at hospital discharge, has been shown to increase the infant's risk of gastrointestinal infection (61) and displaces breast milk intake (62, 63). Supplementation with formula has been associated with a shorter duration of breastfeeding (64). Unsolved breastfeeding problems, primarily insufficient milk, and prevailing community infant care practices were the most common reasons why mothers stopped

exclusive breastfeeding during the period between hospital discharge and two weeks postpartum. From two weeks onwards, reasons given by some mothers for terminating exclusive breastfeeding were that they wanted to work or were not happy with the weight gain of their infants (Paper III). The reasons why mothers in this study introduced non-breast milk liquids and solids were similar to those reported by mothers of infants of various birth weights terminating breastfeeding in a study in Brazil (65). Regardless of birth weight, mothers introduced non-breast milk feeds for similar reasons, reasons which are modifiable by correct information.

Mothers who received counseling reported more problems, possibly because they were more aware of their breastfeeding situation. Likewise, those without counseling may have been less aware of their own breastfeeding experience or did not have the same chance to experience a problem because of early termination of breastfeeding. The mothers stated that most of their breastfeeding problems were prevented or solved by the counseling they received. Problems occurring over the breastfeeding period, such as breast engorgement, a poor milk supply and poor infant weight gain, were recognized both by the breastfeeding counselors and at the interviews at the follow-up visits at the hospital. The counselors worked with the mothers to solve any problems. Having received breastfeeding support, more mothers ended up breastfeeding exclusively than they had initially planned to do. By delaying introduction of non-breast milk feeds, the exclusivity of breastfeeding was sustained and breastfeeding was continued. Mothers in this study who were breastfeeding exclusively at six months wanted to continue breastfeeding indefinitely, while those who were not breastfeeding exclusively were uncertain.

Peer counselors and breastfeeding counseling training

Trained volunteers provided breastfeeding counseling in this study. By combining what was relevant and appropriate in breastfeeding training courses with our own local experiences, we have developed a peer counseling training program that prepares volunteers to successfully support mothers. The women who volunteered to undergo training in this study had the advantage of having positive personal experiences, which may have contributed to their approval of the training. Additionally, the socio-personal characteristics of the counselors and mothers were similar, a fact which facilitated communication and confidence building.

The two-level training enabled us to identify topics that demanded more attention in the breastfeeding counseling program. Our training process prevented attrition by using a training-retraining cycle; hence, all volunteers entered into the counseling work when they were ready, which implied strength in the skill of counseling. Careful selection of counselors and their

continuous, appropriate training generated correct breastfeeding information and provided mothers with skilled, practical support. Repeated information and skills practiced frequently during monthly counselor meetings increased competencies. The motivation to learn had been demonstrated by all counselors who had completed the training. The commitment to counseling work was reinforced by constructive feedback, from the breastfeeding coordinator, co-counselors, and mothers. Six months after the project ended, the peer counselors continued counseling work in their own communities. Selection, training and monitoring of peer counsellors are critical. The prospective counsellors need to be continuously educated and motivated. While many of our volunteers were interested in learning breastfeeding counseling, only half were willing to do home-based counseling, as this is more demanding. The satisfactory outcomes can be attributed to proper training and the counselors' dedication to their training. Mothers appreciated that peers with training and skills helped them on issues that were important to them. Our findings are consistent with results of earlier studies showing that training improved breastfeeding knowledge and skills. Rea and co-workers documented the effectiveness of the WHO/UNICEF 40-hour course among health workers in Brazil (66). The same course was used to train volunteers in a successful breastfeeding peer counseling program in Bangladesh (67). Similar results were found among health workers in Nigeria, who used an 18-hour UNICEF training program (68). While the UNICEF training program provides basic breastfeeding knowledge and skill training to hospital staff and health workers, our program targeted training of peers or volunteers to increase their knowledge and ability with focus on breastfeeding issues encountered by mothers of LBW infants during the first six months postpartum. This training program has increased the knowledge and skills of peer volunteers in breastfeeding counseling. This was evident from the increase in correct breastfeeding information shown at training program assessments and from the appropriate counseling skills observed after the volunteers had completed the training.

Breastfeeding counseling

Home-based counseling that focused on childcare and did not address breastfeeding and lactation contributed little to breastfeeding success. This also proved that success in breastfeeding was not simply due to an increase in attention paid to the mothers, but was rather a result of the skilled support that the mothers received.

We selected first-time mothers in order to exclude the possibility that personal breastfeeding experience might influence the outcome. Urban migration and poverty leave these mothers with little, if any, breastfeeding support from families and social networks. Peer counseling, as an intervention, had

no negative outcome. None of the mother-infant pairs in either of the intervention groups had an adverse health or growth outcome as a consequence of this intervention.

Previous research on peer counseling as a means of increasing breastfeeding has shown varied results. Positive findings were reported from two randomized controlled trials in which the prevalence of breastfeeding at six months had increased, one in Mexico (44) with 3 visits or 6 visits vs. none, and the other, in Bangladesh (45) with 15 visits vs. none. In two controlled studies involving marginalized mothers, one in Baltimore (69) and the other in Glasgow (70), it was found that peer counseling did not make a difference to breastfeeding at 10 days or six weeks, respectively. Unlike our study, those studies comprised infants with higher birth weights, mothers of any parity and an earlier intervention time starting during late pregnancy. In contrast, our intervention began only after hospital discharge and ended at 5.5 months postnatally or earlier if the mother had completely stopped breastfeeding.

Infant morbidity

The infants who were exclusively breastfed from birth to six months did not have any diarrhea during the six-month trial period. Exclusive breastfeeding protects against diarrhea by eliminating exposure to water-borne and food-borne pathogens (71). It also provides protection through several factors such as SIgA, antibodies, lactoferrin, and lysozyme (72).

Our findings are consistent with reports from the Philippines (61), as well as with data from other developing countries (73) showing that breastfeeding confers protection against diarrhea.

Breastfeeding has been reported to lower the frequency and duration of acute respiratory infections in infants (74). We found no difference between the group of infants who were breastfed exclusively and those who were breastfed partially regarding the number of respiratory infections, but the partially breastfed infants had more episodes requiring hospitalization and more severe infections. We lacked information on factors that may increase respiratory infections, such as congested households, smoking, or inadequate house ventilation.

Infant anthropometry

Gains in weight, length, and head circumference during the six-month study period did not differ between the infants who were exclusively and those who were partially breastfed. Further, in both groups the same gains in weight, length, and head circumference were observed among infants of

mothers with low BMI or CED. The mean weight, length, and head circumference of the infants of both groups during the first six months were within the normal range for Filipino infants (75). The average gains in infant weight, length, and head circumference over the six-month period were similar to those observed in other low-income-country studies (76, 77). Despite the smaller weight gain achieved by infants of both groups between 4 and 6 months of age, growth faltering is difficult to evaluate using the NCHS growth chart, which is based predominantly on formula-fed infants (78). The LBW infants in this study who were breastfed exclusively for their first six months had catch-up growth, implying that breast milk alone is sufficient to support growth.

Maternal anthropometry

Mean weight, BMI, and MUAC did not differ significantly between the group of mothers who were breastfeeding exclusively and those who were breastfeeding partially, either at baseline or at 2, 4, and 6 months. Neither did the mean weight loss, decrease in BMI or decrease in MUAC differ during the first six months between these groups.

Studies involving mothers from developed countries have not shown any relationship between postpartum maternal weight loss and breastfeeding (79-82). Our findings confirm reports from other studies (83-86) that the duration and exclusivity of breastfeeding were not associated with increased postpartum maternal weight loss. Thus, exclusive breastfeeding from birth to six months, as recommended by WHO, is not disadvantageous in this respect.

Strength and limitations

The strength of this study is its design, with collection of prospective longitudinal data. This allowed obtainment of accurate feeding data as well as valid information on the reasons why mothers had decided to feed the way they did. We are confident about the reliability of the details on breastfeeding practices in this study as reported by mothers (87) and collected by only one, trained interviewer using a well-organized questionnaire. Although the feeding information was collected by recall, the recall period was short (88) and hence reasonably reliable (89).

The study physician verified infant illnesses, and made all body measurements. Moreover, one and the same researcher made all maternal measurements during the entire study period. These facts strengthen the data quality and the reliability of the careful, repeated measurements made over time.

A limitation of our study is the small size of the sub-sample of mother-infant pairs exclusively breastfeeding through six months.

Methodological considerations

Questions of limitations of a randomized controlled trial as a method of investigating the effectiveness or efficacy of counseling as an intervention have been raised (90). First, an RCT of counseling cannot be double blind. The counselor knows what she is giving to the mother, and the mother knows what she is getting. Second, the interaction during counseling is complex; there really is no “measured dose of counseling”. Third, most RCTs look at short-term outcomes. The cost of long-term follow-ups or determining the long-term effects of counseling may not be feasible. Fourth, there is the question of how much the subjects know about the experiment. It is possible that some individuals will refuse to take part in an RCT, which means that those who do agree to participate may not be representative of the population to be studied. Fifth, factors such as client confidence in the study team, motivation and preference to receive counseling, and individual levels of stress affect counseling outcomes. However, results of RCTs using counseling as an intervention will highly complement results of studies using other methodologies.

Future research must continue to address the impact of exclusive breastfeeding during the first six months postpartum on health outcomes beyond six months, particularly on maternal health outcomes. Breastfeeding promotion and complementary feeding interventions will always require new approaches and sustainability. Further studies on the counseling intensity and duration, and whether it should be given individually or on group basis will be helpful.

This study has provided information on when and why low-income, first-time mothers of LBW infants stop breastfeeding exclusively before the end of six months. Mothers of LBW infants have distinct feeding challenges and expectations; every mother-infant pair has barriers to exclusive breastfeeding and these barriers change over the first six-month period. Breastfeeding counseling by trained volunteers through the first six months postpartum, especially during the first two weeks, enabled mothers to choose to breastfeed exclusively. Mothers in this study who breastfed exclusively through six months expressed a wish to continue breastfeeding and start complementary feeding, thus increasing compliance with the WHO-recommended infant feeding strategies.

Positive breastfeeding experiences in first-time mothers imply that they may choose to breastfeed subsequent children (91).

The study comprised low-income mothers living in a less affluent setting where postnatal support is limited or absent. Individual, face-to-face coun-

seling by a peer may be an important component of any breastfeeding promotion program and be most useful when integrated into the primary health care services. It is important that health professionals and lay volunteers have defined roles and collaborate to achieve common breastfeeding goals. This is efficacious, as we have shown, in targeting high-risk social groups. We believe that the reasons for the success of counseling in this study were that it was undertaken by a peer with breastfeeding counseling training, that it was home-based and that the mothers were satisfied with the program.

Conclusion

This study has provided fundamental evidence of successful intervention aiming to achieve six months of exclusive breastfeeding among term, LBW infants. By improving health outcomes and birth spacing, enhanced breastfeeding may possibly break the nutritional backbone of the intergenerational nature of low birthweight.

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