

Original Article

Father's involvement and its effect on early breastfeeding practices in Viet Nam

Tran Huu Bich*, Dinh Thi Phuong Hoa*, Nguyen Thanh Ha*, Le Thi Vui*,
Dang Thi Nghia*, Mats Målqvist†

*Epidemiology, Hanoi School of Public Health, Ha Noi, Viet Nam, and †International Maternal and Child Health, Department of Women's and Children's Health, Uppsala University, Uppsala, Sweden

Abstract

Fathers have an important but often neglected role in the promotion of healthy breastfeeding practices in developing countries. A community-based education intervention was designed to mobilize fathers' support for early breastfeeding. This study aimed to evaluate an education intervention targeting fathers to increase the proportion of early breastfeeding initiation and to reduce prelacteal feeding. Quasi-experimental study design was used to compare intervention and control areas located in two non-adjacent rural districts that shared similar demographic and health service characteristics in northern Viet Nam. Fathers and expectant fathers with pregnant wives from 7 to 30 weeks gestational age were recruited. Fathers in the intervention area received breastfeeding education materials, counselling services at a commune health centre and household visits. They were also invited to participate in a breastfeeding promotion social event. After intervention, early breastfeeding initiation rate was 81.2% in the intervention area and 39.6% in the control area ($P < 0.001$). Babies in the intervention area were more likely to be breastfed within the first hour after birth [odds ratio (OR) 7.64, 95% confidence interval (CI) 4.81–12.12] and not to receive any prelacteal feeding (OR 4.43, 95% CI 2.88–6.82) compared with those in the control area. Fathers may positively influence the breastfeeding practices of mothers, and as a resource for early childcare, they can be mobilized in programmes aimed at improving the early initiation of breastfeeding.

Keywords: fathers, breastfeeding promotion, prelacteal feeding, breastfeeding, early initiation of breastfeeding, Viet Nam.

Correspondence: Tran Huu Bich, Hanoi School of Public Health, 138 Giang Vo Street, Ba Dinh, Ha Noi, Viet Nam. E-mail: thb@hsph.edu.vn

Introduction

Early initiation of breastfeeding is one of the most effective interventions for improved child survival to potentially save more than one million babies annually (Mullany *et al.* 2008). However, knowledge about the benefits of early and exclusive breastfeeding is not universal, and many mothers do not initiate breastfeeding until hours or even days after delivery (Mullany *et al.* 2008; Qiu *et al.* 2009). It

has previously been shown that early initiation of breastfeeding partly depends on the quality of health staff counselling or birth attendants (Almroth *et al.* 2008), but other determinants such as maternal age (Scott *et al.* 2009), method and duration of delivery and lack of support are also important (Hogan 2001). The practice of discarding colostrum and providing prelacteal feeding and premature complementary foods is strongly related to traditional and cultural practices (Almroth *et al.* 2008; Bandyopadhyay 2009),

misconceptions about colostrum and early breast milk (Bandyopadhyay 2009; Nguyen *et al.* 2013). In Viet Nam prelacteal feeding is common (Hoa *et al.* 1995; Duong *et al.* 2004) and mostly consisting of infant formula and water (Alive & Thrive 2012; Nguyen *et al.* 2013). It has also been demonstrated that the early initiation of breastfeeding has long-term effects associated with the continuation of breastfeeding after 4 months (Nakao *et al.* 2008).

Almost all mothers in Viet Nam breastfeed their babies (97%), but the early initiation rate was reported to be as low as 55% in 2009 and 62% in 2010 (Tuyen *et al.* 2010). The main reasons that approximately 50% of babies are not breastfed within 1 h after delivery are that mothers think they do not have milk, they feel tired after delivery, mother and child are separated after delivery, and formula is available and recommended by families and health staff (Tuyen *et al.* 2010). There have been many recommendations and efforts to improve the proportion of early breastfeeding practices through mother-targeted programmes (Dyson *et al.* 2005; Jana 2009; Nguyen *et al.* 2013). However, studies have recently recognized the significant influence of father-related factors on breastfeeding, infant feeding and nutritional status (Binns *et al.* 2004; Lee *et al.* 2007; Bich *et al.* 2014). Because maternal workload (Dearden *et al.* 2002; Xu *et al.* 2009) and infant–mother separation (Johnston & Esposito 2007) remain the biggest barriers to exclusive and continued breastfeeding, and the majority of women in rural areas are self-employed with farming or trading work, the paternal role is important. Through sharing and allocation of household tasks and responsibilities, fathers can help mothers to take more breaks for breast milk expression and feeding. The influence of fathers on increasing not only the early initiation of breastfeeding but also exclusive

breastfeeding has been seen in two randomized controlled trials (Wolfberg *et al.* 2004; Susin & Giugliani 2008). Further models and approaches to strengthen fathers' involvement are however needed. Therefore, the aim of this study is to evaluate a community-based education intervention targeting fathers and their involvement in supporting good, early breastfeeding practices. We hypothesize that this community-based intervention will have a positive impact on early breastfeeding initiation and result in a lower level of prelacteal feeding.

Methods

Study setting

This study was carried out in two districts in Hai Duong Province in northern Viet Nam. Chi Linh district served as the intervention site and Thanh Ha district served as the control. Thanh Ha district was chosen as the control site as it is not sharing a border with Chi Linh district, thus making contamination of intervention less likely. In Viet Nam, local government consists of three levels including provincial, district and commune/township. In Chi Linh district, a demographic surveillance system, CHILILAB, a member of the INDEPTH network established in 2003, was chosen as the intervention site. Seven communes were selected in both district, each with a functioning commune health centres. In both districts, there is also one district hospital and one district prevention health centre. The two chosen districts had a similar population of about 160 000 in 2010, and their health care systems are similar. They are both part of Hai Duong provincial health system and under the authorization and management of the provincial health department. The provincial health department

Key messages

- Fathers have an important but often neglected role in the promotion of healthy breastfeeding practices.
- By mobilizing fathers' support for breastfeeding through an educational intervention in Viet Nam, we managed to make a positive impact on early initiation and reduce the use of prelacteal feeding.
- To include fathers as key players in the promotion of breastfeeding is a feasible and innovative strategy that should be scaled up and replicated.

provides health finance for the two districts. Prenatal services are provided regularly at antenatal visits in commune health centres, including general health checkups for pregnant women, tetanus vaccination, iron supplementation, breastfeeding and nutrition consultation. According to the provincial and district health reports, Breastfeeding-friendly Hospital initiative was not applied in the two districts, but at least three antenatal care visits were performed by all pregnant women in both districts. Likewise, similar delivery patterns and post-natal care were reported. Based on routine district health reports, in 2010, the proportions of malnutrition as among children under the age of 5 in Thanh Ha and Chi Linh districts were 19.8 and 14.3%, respectively. Breastfeeding practices were not measured or reported adequately in either district.

Study design

Study subjects were married couples residing in the intervention and control areas, with women being 7–30 weeks pregnant by 1 August 2010. Men included had to live with their wives at home or maintain regular communication with them. Thus, they could work far from home but return often to see their wives or communicate via telephone and/or other communication channels. Exclusion criteria were (1) the woman wrongly identified as pregnant or if loss of pregnancy or newborn occurred (miscarriage, stillbirth, neonatal death) during follow-up; (2) the woman had serious medical problems or was unable to answer questions asked in the study; (3) the couple was divorced or separated or migrated out during intervention and assessments (at pre- and post-test). Identification of pregnant women was based on the lists available and managed by commune health centres as a routine duty. In addition, village health workers updated the list through quick surveys of families that potentially planned to give birth around 2010 and 2011. All eligible women in the study areas were included. The total number of couples selected at baseline was 251 in the intervention area and 241 in the control area. The recruitment of study subjects began on 1 June 2010 and was completed on 28 June 2010.

Intervention

We hypothesized that male involvement in breastfeeding practices of their children could have a positive impact. That once the knowledge and attitude of fathers about and towards breastfeeding improved, with the favourable, supportive environment of the local social network and community, fathers would influence the knowledge and motivation of mothers, as well as the beliefs and attitudes of family members towards breastfeeding. To motivate fathers to be involved and take action, intervention activities were designed and implemented to target not only fathers but also the social group and general community, including political health care systems. An intervention package was developed consisting of several components: (1) mass media communication; (2) father's group counselling at monthly antenatal and vaccination activities; (3) home visits by village health workers for individual counselling; and (4) father's role enforcement and community mobilization through public events in collaboration with the Farmers' Association.

The intervention package was integrated within the routine health care services for women and children provided by local health staff within the Chi Linh district health system periphery. Health education campaign and counselling activities targeting fathers were carried out continuously during both antenatal and post-natal periods. The intervention package disseminated key messages on breastfeeding through mass media communication using radio, posters and pamphlets, groups counselling sessions and home visits to fathers. A public event entitled 'Who loves their wives and children more' was also arranged to raise awareness in the community, where teams of fathers competed in front of a live audience answering knowledge questions and performing skits and songs. The intervention programme was implemented in the intervention area from 1 September 2010 to 1 September 2011. This intervention package has been described in detail elsewhere (Bich *et al.* 2014).

Data collection

Baseline data, including individual- and household-level indicators, were gathered through a structured

interview with fathers-to-be by a team of data collectors before the start of the intervention. Variables collected included place of residence, defined as urban vs. rural; number of generations in household, defined as family type; parental age, education and occupation; household economic status in comparison with neighbours; and the economic role of the father (two last variables noted by the father-to-be's self-reporting). Within a period of less than 4 months after delivery, information related to breastfeeding practices and basic characteristics of children including gender, birthweight, type of delivery and birth order of the child was collected. Data were collected from households through structured interviews with mothers as respondents by the trained team of kindergarten teachers. A questionnaire used in a previous survey measuring child-feeding practices in Cambodia (Conkle 2007) was used to evaluate mothers' feeding practices. Mothers were asked if they had put their babies to the breast within 1 h after delivery. Prolactal feeding practices of the mothers were identified by asking the question 'Did you give your baby any food and/or drink before putting him/her to the breast?' All tools were pre-tested in Chi Linh districts not included in the study area to explore the reaction of interviewees, coherence and logic of the tools.

Data analysis

A supervisor checked the questionnaires, and data were entered using EpiData (EpiData Association, Denmark). Any detected/suspected errors/mistakes were rechecked in the field. Data were transferred into SPSS 13 (SPSS Inc., Chicago, IL, USA) for data analysis and cleaned for any abnormal and outlier values and similarities. Pearson's chi-square test and Fisher's exact test were used to detect group differences (project outcomes) between intervention and control. Logistic regression models were used to assess the associations between intervention and early initiation of breastfeeding and prolactal feeding. Variables displaying a significant difference in group comparisons of baseline characteristics including residency, maternal employment and child birth order were included in a multivariate logistic

regression model to adjust for confounding. A P -value of <0.05 was considered significant.

Ethical approval for this study was obtained from Institutional Review Board of the Hanoi School of Public Health. Verbal informed consent was chosen as an appropriate method to obtain consent from study subjects for participation in the study. The process of obtaining the consent was carried out during the subject selection process in the field by the interviewers. During this process, the selected study subjects were informed of all data collection requirements and research activities and also the potential benefit of the study for community health and for individuals who participate in the study.

Results

The total number of husband and wife identified at baseline in the intervention (CHILILAB-Chi Linh) and control (seven communes and township of Thanh Ha) areas was 251 and 241, respectively; however, due to outmigration and spontaneous abortion/stillbirth, 23 mothers (12 from intervention and 11 from control sites) were lost to follow-up, leaving 469 mothers eligible.

Characteristics of study participants

Table 1 indicates that, at baseline, households in the control site were more likely to be located in a rural area (86.5 vs. 63.6%) ($P < 0.001$). The birthweight, gender of newborns and type of delivery were similar between intervention and control, whereas there was a slightly higher proportion of firstborns in the intervention sample (59.8 vs. 50.0) ($P = 0.03$) (Table 2).

Among families lost to follow-up, a significantly higher proportion were farmers compared with the group included in the analysis (25.6 vs. 14.3%) ($P = 0.02$).

Exposure to the intervention

During the intervention period, two feature programmes were radio broadcasted 150 times and all fathers reported being aware of the messages. A total number of 49 group counselling sessions with a total

Table 1. Basic socio-demographic characteristics of study subjects at baseline (June 2010) in Chi Linh district (intervention, $n=239$) and Thanh Ha district (control, $n=230$), Hai Duong Province, Viet Nam

Characteristics	Study sites			<i>P</i> -value
	Total	Intervention <i>n</i> (%)	Control <i>n</i> (%)	
Residency				
Rural	351 (74.8)	152 (63.6)	199 (86.5)	<0.001
Urban	118 (25.2)	87 (36.4)	31 (13.5)	
Family type				
Nuclear	204 (43.5)	103 (43.1)	101 (43.9)	0.86
Extended	265 (56.5)	136 (56.9)	129 (56.1)	
Household economics				
Non-poor	407 (86.8)	208 (87.0)	199 (86.5)	0.93
Poor	65 (13.2)	31 (13.0)	31 (13.5)	
Paternal employment				
Farmer	113 (24.1)	60 (25.1)	53 (23.0)	0.60
Non-farmer	356 (75.9)	179 (74.9)	177 (77.0)	
Paternal education				
Less than high school	236 (50.3)	116 (48.5)	120 (52.2)	0.43
High school and above	233 (49.7)	123 (51.5)	110 (47.8)	
Economic role of father				
Main income producer	341 (72.7)	173 (72.4)	168 (73.0)	0.87
Not a main producer	128 (27.3)	66 (27.6)	62 (27.0)	
Paternal age	469	28.92 ± 5.11	29.41 ± 5.50	0.32
Maternal age	469	25.41 ± 4.39	25.46 ± 5.06	0.89
Maternal employment				
Farmer	115 (24.5)	75 (31.4)	40 (17.4)	<0.001
Non-farmer	354 (75.5)	164 (68.6)	190 (82.6)	
Maternal education				
Less than high school	248 (52.9)	120 (50.2)	128 (55.7)	0.24
High school and above	221 (47.1)	119 (49.8)	102 (44.3)	

Chi-square tests applied to detect differences between intervention and control areas.

Table 2. Characteristics of children (June 2010) in Chi Linh district (intervention, $n=239$) and Thanh Ha district (control, $n=230$), Hai Duong Province, Viet Nam

Child characteristics	Total	Intervention <i>n</i> (%)	Control <i>n</i> (%)	<i>P</i> -value
Birthweight (g)				
>2500	456 (97.2)	234 (97.9)	222 (96.5)	0.36
≤2500	13 (2.8)	5 (2.1)	8 (3.5)	
Child birth order				
First	258 (55.0)	143 (59.8)	115 (50.0)	0.03
Second or higher	211 (45.0)	96 (40.2)	115 (50.0)	
Gender				
Female	229 (48.8)	125 (52.3)	104 (45.2)	0.13
Male	240 (51.2)	114 (47.7)	126 (54.8)	
Type of delivery				
Caesarean section	113 (24.1)	59 (24.7)	54 (23.5)	0.76
Vaginal	356 (75.9)	180 (75.3)	176 (76.5)	

Chi-square tests performed to assess differences between intervention and control areas.

Table 3. Early initiation of breastfeeding and prelacteal feeding in Chi Linh district (intervention, $n=239$) and Thanh Ha district (control, $n=230$), Hai Duong Province, Viet Nam

Breastfeeding practices	Total n (%)	Intervention n (%)	Control n (%)	P -value
Initiated BF within first hour	285 (60.8)	194 (81.2)	91 (39.6)	<0.001
Late or no initiation of breastfeeding	184 (39.2)	45 (18.8)	139 (60.4)	
No prelacteal feeding	194 (42.2)	142 (59.9)	52 (23.3)	<0.001
Prelacteal feeding	266 (57.8)	95 (40.1)	171 (76.7)	
Honey	29 (6.3)	8 (3.4)	21 (9.4)	<0.01
Herbal liquid	26 (5.7)	0 (0.0)	26 (11.7)	<0.001
Formula milk	230 (50.0)	84 (35.4)	146 (65.5)	<0.001

BF, breastfeeding. Chi-square tests performed to assess differences between intervention and control areas.

of 545 participants were carried out in seven townships and communes. In addition to group counselling organized on a fixed day of the month, health counsellors carried out 99 individual counselling sessions. At each group counselling session, participants received a token and breastfeeding education materials. In addition, village health workers completed 862 home visits (individual counselling) for 240 fathers (100% coverage and 3.6 visits on average per father) in the programme. At the *Father Contest* a total of 35 fathers representing different townships and communes in Chi Linh district participated. The audience of the contest was composed of about 200 people and consisted of fathers, health workers and local authorities, social organizations and representatives of related international agencies.

Breastfeeding practices

A considerably larger proportion of mothers living in the intervention area initiated breastfeeding within 1 h after delivery compared with those living in the control area (81.2 vs. 39.6%, $P < 0.001$) (Table 3). Based on the information in Table 3, the crude odds ratio (OR) for association between intervention and early initiation of breastfeeding was 6.59; however, multivariate logistic regression analysis revealed an increased likelihood of newborns in the intervention area being put to the breast within 1 h after delivery, even after controlling for differences at baseline [OR 7.64, 95% confidence interval (CI) 4.81–12.12, adjusted for residency, maternal occupation, child birth order] (Table 4).

Prelacteal feeding practices of mothers in the intervention group were better in comparison with the control group (59.9% infants were not fed prelacteal in the intervention vs. 23.3% of that in the control sites). Mothers in the control area were more likely to give the newborn honey, herbs and formula milk before putting them to the breast (Table 3), and the odds of not receiving any prelacteal feeding were more than fourfold for newborns living in the intervention area compared with those living in the control area (OR 4.43, 95% CI 2.88–6.82, adjusted for residency, maternal occupation, child birth order) (Table 4).

Discussion

We have shown that an intervention directed at fathers might improve early breastfeeding practices of mothers in the period immediately after delivery. Mothers in the intervention area demonstrated better initiation of breastfeeding practices, and fewer babies were fed with prelacteal food. It is well known that maternal and child health programmes have focused more on the role of the mother, and mothers are often used as targets for programmes promoting the early initiation of breastfeeding (Jana 2009). This study demonstrates the feasibility and advantage of involving fathers to improve early breastfeeding practices.

A similar impact of fathers' involvement on the early initiation of breastfeeding was found in another randomized controlled trial testing the role of fathers in supporting breastfeeding initiation (Wolfberg *et al.* 2004). Regarding prelacteal feeding in Viet Nam,

Table 4. Logistic regression analyses displaying crude and adjusted odds ratios (adjusted for residency, maternal employment and child birth order) for early initiation of breastfeeding ($n=469$) and prelacteal feeding ($n=460$)

Early initiation of breastfeeding	Yes <i>n</i> (%)	No <i>n</i> (%)	Crude OR	95% CI	Adjusted OR	95 % CI
Control	91 (39.6)	139 (60.4)	1		1	
Intervention	194 (81.2)	45 (18.8)	6.59***	4.33–10.01	7.64***	4.81–12.12
No prelacteal feeding	Yes <i>n</i> (%)	No <i>n</i> (%)				
Control	52 (34.5)	171 (65.5)	1		1	
Intervention	142 (64.6)	95 (35.4)	4.92***	3.28–7.37	4.43***	2.88–6.82

CI, confidence interval; OR, odds ratio. *** $P < 0.001$.

formula milk is commonly given to babies when breast milk is not yet established (Hoa *et al.* 1995; Alive & Thrive 2012) (Nguyen *et al.* 2013). This practice should be discouraged as it is strongly associated with the delay of breastfeeding (Rashid *et al.* 2006), risk of illness (Hossain *et al.* 1992) and mortality in low birthweight infants (Edmond *et al.* 2008).

Our intervention was designed and implemented based on the principles of continuum of care, and integrated with the primary peripheral health care system with the involvement of health workers at grass root levels, social organizations and communities (Kerber *et al.* 2007), and was highly recommended in Viet Nam to improve early breastfeeding practices (Nguyen *et al.* 2013). This intervention is different from other interventions targeting fathers previously evaluated where fathers were gathered together for intervention activities such as breastfeeding education classes carried out in hospital and clinic settings (Wolfberg *et al.* 2004; Susin & Giugliani 2008; Tohotoa *et al.* 2011), or in the workplace (Cohen *et al.* 2002). In our study, intervention was strongly associated with good, early feeding practices after controlling for potential confounding factors in multivariate analysis.

We acknowledge that the current study design presents some limitations to the interpretation of the results. The lack of information on early breastfeeding practices at the baseline should be taken into account while interpreting the study results. However, information showing large differences between two sites

regarding early breastfeeding practices was not found. The intervention area is part of a demographic surveillance system and might thus have been given more attention by the health system. In our study, most of the mothers (79%) were interviewed about early breastfeeding practices within 1 month period after birth and this proportion in intervention and control was 71 and 88%, respectively. The results of initiation of breastfeeding and prelacteal feeding were nearly the same based on the analyses using data of subset of mothers who were interviewed within 1 month of lactation and data of entire study group. The presence of this potential error did not however change the direction or largely change the strength of the observed associations as it could be considered similar in both sites. Because public part of the intervention might influence mothers and kindergarten teachers, early breastfeeding practices reported by the mothers in the intervention site might be overestimated due to social desirability biases. Although an independent team of data collectors consisting of kindergarten teachers was used to evaluate breastfeeding practices, reporting breastfeeding practices of the mothers in the intervention site might also be overestimated by unintentional influence of health workers who are exposed to the intervention information. It is true that there might have been other pathways for the observed outcome in the intervention area. The intervention package delivered was however targeted fathers and the health staff were instructed to focus their efforts to inform fathers. The

mass media communication was used to reinforce messages and to sensitize the community. This intervention package as a whole, targeting fathers, had a positive effect even if the pathways are complex. For deepened understanding of process data, further qualitative studies with couples and health staff would be needed, but is out of scope for this paper.

The study also shows some slight differences in population characteristics between intervention and control groups, control group being more likely to live in a rural and having a smaller proportion of primipara women. In Viet Nam, the recent proportion of early initiated breastfeeding was about 62%, but it varies widely between provinces and is often higher in rural areas (around 70%) (Tuyen *et al.* 2010), contrary to our findings. Other characteristics including population size, administrative system and loss to follow-up were similar in two areas. We acknowledge the role of grandmother and mother in law in supporting mothers on early child care and feeding. In our study, fathers were not only advised to interact with mothers to support exclusive breastfeeding but also consulted to have an active role in interacting and advising household members (e.g. mother in law, grandmother) to support mothers to breastfeed exclusively. At birth, fathers were advised not to ask relatives to buy formula, and this action was two times more likely to happen in the intervention site (the information regarding father's practice is being reported in another paper). At baseline and post-intervention, knowledge, attitude and practice (KAP) of fathers regarding breastfeeding and involvement in supporting exclusive breastfeeding were conducted, through interviewing fathers of babies who ranged from 2.5 to 4 months old. The changes in fathers' KAP may provide additional information on the pathways by which the intervention had an effect on mothers' early breastfeeding practices. The effect of the intervention on fathers KAP is however not reported in this study. Despite the methodological constraints of the study, given the large differences in breastfeeding practices between the two areas after intervention, we assume it reasonable to attribute at least some of the difference to the implemented intervention, demonstrating the feasibility and potential impact of fathers' involvement in a public health area previously desig-

nated to mothers. In addition, there was no new and specific breastfeeding promotion programme carried out in any province of Hai Duong at the time of our intervention. Selection bias was not presented in our study as all eligible couples, in both the intervention and control sites, were selected by the same sampling procedure. To better demonstrate the impact of the intervention, and before replication of the model in a larger scale, we suggest a future study with stronger designs including three-arm quasi-experimental or cluster randomized controlled trials to compare different approaches of promoting father's involvement and take into account the issues of random subject allocation and breastfeeding practices at the baseline between intervention and control sites.

Conclusion

Fathers might influence the early breastfeeding practices of mothers. With the active, supportive involvement of fathers during pregnancy and at delivery, mothers were less likely to give prelacteal food and more likely to breastfeed infants early. In addition, we have indicated in another papers that fathers who joined health education intervention programme showed better knowledge on exclusive breastfeeding practices (Bich *et al.* 2012) and infants were more likely to be breastfed exclusively at 4 and 6 months (Bich *et al.* 2014). Therefore, fathers, as a resource for supporting early breastfeeding practices in the household, should be encouraged to participate in programmes aimed at improving breastfeeding practices. As the study sites are representative of many national characteristics in terms of rapid economic development and urbanization, a mix of rural and urban/semi-urban communities, geographical diversities (plain and mountain), religions and other cultural issues, this kind of intervention can be replicated in other parts of the country.

Acknowledgements

We would like to thank the fathers, mothers and infants for their time and effort and the district and commune health centers in Chi Linh and Thanh Ha for their collaboration in this study.

Source of funding

This study was supported by the Bill & Melinda Gates Foundation to FHI 360, through the Alive & Thrive Small Grants Program managed by UC Davis.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Contributions

THB acted as principal investigator of the study together with DTPH. THB and NTH developed the study design and supervised fieldwork together with LTV and DTN. THB analysed data together with DTPH. THB and MM produced the first draft of the article. All authors were involved in the writing of the manuscript and have approved the final version for publication.

References

- Alive & Thrive (2012) *Da Nang Baseline Survey Report*. Alive & Thrive: Hanoi, Vietnam.
- Almroth S., Arts M., Quang N.D., Hoa P.T. & Williams C. (2008) Exclusive breastfeeding in Vietnam: an attainable goal. *Acta Paediatrica* **97**, 1066–1069.
- Bandyopadhyay M. (2009) Impact of ritual pollution on lactation and breastfeeding practices in rural West Bengal, India. *International Breastfeeding Journal* **4**, 2.
- Bich T.H., Hoa D.T., Ha N.T., Vui L.T., Tuan D.K. & Cuong N.T. (2012) Changes in knowledge of exclusive breastfeeding for six months among fathers-finding from community intervention study in a rural area of Vietnam. *Special Edition of the Vietnam Journal of Public Health* **1**, 4–11.
- Bich T.H., Hoa D.T. & Malqvist M. (2014) Fathers as supporters for improved exclusive breastfeeding in Viet Nam. *Maternal and Child Health Journal* **18**, 1444–1453.
- Binns C., Gilchrist D., Gracey M., Zhang M., Scott J. & Lee A. (2004) Factors associated with the initiation of breast-feeding by Aboriginal mothers in Perth. *Public Health Nutrition* **7**, 857–861.
- Cohen R., Lange L. & Slusser W. (2002) A description of a male-focused breastfeeding promotion corporate lactation program. *Journal of Human Lactation* **18**, 61–65.
- Conkle J. (2007) *Exclusive Breastfeeding in Cambodia: An Analysis of Improvement from 2000 to 2005*. Unicef: Phnom Penh.
- Dearden K.A., Quan le N., Do M., Marsh D.R., Pachon H., Schroeder D.G. *et al.* (2002) Work outside the home is the primary barrier to exclusive breastfeeding in rural Viet Nam: insights from mothers who exclusively breastfed and worked. *Food and Nutrition Bulletin* **23**, 101–108.
- Duong D.V., Binns C.W. & Lee A.H. (2004) Breast-feeding initiation and exclusive breast-feeding in rural Vietnam. *Public Health Nutrition* **7**, 795–799.
- Dyson L., McCormick F. & Renfrew M.J. (2005) Interventions for promoting the initiation of breastfeeding. *Cochrane Database of Systematic Reviews* (2), CD001688.
- Edmond K.M., Kirkwood B.R., Tawiah C.A. & Owusu Agyei S. (2008) Impact of early infant feeding practices on mortality in low birth weight infants from rural Ghana. *Journal of Perinatology* **28**, 438–444.
- Hoa D.P., Thanh H.T., Hojer B. & Persson L.A. (1995) Young child feeding in a rural area in the Red River delta, Vietnam. *Acta Paediatrica* **84**, 1045–1049.
- Hogan S.E. (2001) Overcoming barriers to breastfeeding: suggested breastfeeding promotion programs for communities in eastern Nova Scotia. *Canadian Journal of Public Health* **92**, 105–108.
- Hossain M.M., Radwan M.M., Arafa S.A., Habib M. & DuPont H.L. (1992) Prolactal infant feeding practices in rural Egypt. *Journal of Tropical Pediatrics* **38**, 317–322.
- Jana A.K. (2009) *Interventions for Promoting the Initiation of Breastfeeding: RHL Commentary*. World Health Organization: Geneva.
- Johnston M.L. & Esposito N. (2007) Barriers and facilitators for breastfeeding among working women in the United States. *Journal of Obstetric, Gynecologic, and Neonatal Nursing* **36**, 9–20.
- Kerber K.J., de Graft-Johnson J.E., Bhutta Z.A., Okong P., Starrs A. & Lawn J.E. (2007) Continuum of care for maternal, newborn, and child health: from slogan to service delivery. *Lancet* **370**, 1358–1369.
- Lee W.T., Wong E., Lui S.S., Chan V. & Lau J. (2007) Decision to breastfeed and early cessation of breastfeeding in infants below 6 months old – a population-based study of 3,204 infants in Hong Kong. *Asia Pacific Journal of Clinical Nutrition* **16**, 163–171.
- Mullany L.C., Katz J., Li Y.M., Khatri S.K., LeClerq S.C., Darmstadt G.L. *et al.* (2008) Breast-feeding patterns, time to initiation, and mortality risk among newborns in southern Nepal. *The Journal of Nutrition* **138**, 599–603.
- Nakao Y., Moji K., Honda S. & Oishi K. (2008) Initiation of breastfeeding within 120 minutes after birth is associated with breastfeeding at four months among Japanese women: a self-administered questionnaire survey. *International Breastfeeding Journal* **3**, 1.
- Nguyen P.H., Keithly S.C., Nguyen N.T., Nguyen T.T., Tran L.M. & Hajeerhoy N. (2013) Prolactal feeding

- practices in Vietnam: challenges and associated factors. *BMC Public Health* **13**, 932.
- Qiu L., Zhao Y., Binns C.W., Lee A.H. & Xie X. (2009) Initiation of breastfeeding and prevalence of exclusive breastfeeding at hospital discharge in urban, suburban and rural areas of Zhejiang China. *International Breastfeeding Journal* **4**, 1.
- Rashid M., Labrique A., Shamim A.A., Klemm R., Christian P. & West K.P. (2006) Prolactal feeding delays breastfeeding initiation in rural Bangladesh. In: *8th Commonwealth Congress on Diarrhoea and Malnutrition (CAPGAN)* (eds M.S.I. Khan, M.A. Rahim & T. Ahmed), p. 134. ICDDRDB: Dhaka.
- Scott J.A., Binns C.W., Graham K.I. & Oddy W.H. (2009) Predictors of the early introduction of solid foods in infants: results of a cohort study. *BMC Pediatrics* **9**, 60.
- Susin L.R. & Giuliani E.R. (2008) Inclusion of fathers in an intervention to promote breastfeeding: impact on breastfeeding rates. *Journal of Human Lactation* **24**, 386–392.
- Tohotoa J., Maycock B., Hauck Y., Howat P., Burns S. & Binns C. (2011) Supporting mothers to breastfeed: the development and process evaluation of a father inclusive perinatal education support program in Perth, Western Australia. *Health Promotion International* **26**, 351–361.
- Tuyen L.D., Hong T.N., Do T.T., Nguyen P. & Hajeerhoy N. (2010) *Viet Nam Nutrition Profile 2010*. NIN, UNICEF and Alive & Thrive: Ha Noi.
- Wolfberg A.J., Michels K.B., Shields W., O'Campo P., Bronner Y. & Bienstock J. (2004) Dads as breastfeeding advocates: results from a randomized controlled trial of an educational intervention. *American Journal of Obstetrics and Gynecology* **191**, 708–712.
- Xu F., Qiu L., Binns C.W. & Liu X. (2009) Breastfeeding in China: a review. *International Breastfeeding Journal* **4**, 6.