

TRENDS AND DETERMINANTS OF EXCLUSIVE BREAST-FEEDING AMONG INFANTS IN THAILAND

Patarapan Odton

Research Institute for Policy Evaluation and Design, University of the Thai Chamber of Commerce, Bangkok, Thailand

Abstract: UNICEF and WHO recommend exclusive breast-feeding for the first six months of life for all children. This study aimed to identify demographic and socio-economic determinants of breastfeeding in Thailand using Thailand Multiple Indicator Cluster Surveys. There is no statistical difference in exclusively breast-fed infants living in urban and rural areas. During 2005-2006, mothers with higher education were more likely to exclusively breast-feed their babies than those without. In the survey of 2012, mothers belonging to the highest income group were least likely to exclusively breast-feed their infants, irrespective of their educational background or wealth index quintile group.

Keywords: breast-feeding, multiple indicator cluster survey, Thailand

INTRODUCTION

Breast-feeding is the gold standard when it comes to infant nutrition, and no commercially-produced infant formula will be able to replace it. In the first years of life, breast milk protects infants from infections by passing on their mothers' antibodies and also helps establish important and life-long physical and emotional bond between mother and infant (UNICEF, 2015). Breast milk is not only the source of essential nutrients that every child needs in order to develop, it is also economical and safe. The exclusive use of infant formula to feed a baby can lead to a falter in growth, micronutrient malnutrition and serious diarrheal illness if the formula is not properly prepared.

Correspondence: Patarapan Odton, Research Institute for Policy Evaluation and Design, University of the Thai Chamber of Commerce, 126/1 Building 21, 7th Floor, Vibhavadi Rangsit Road, Din Daeng, Bangkok 10400, Thailand.
Tel: +66 (0) 2697 6636, +66 (0) 2697 6636
E-mail: podton@riped.utcc.ac.th

UNICEF and WHO recommend exclusive breast-feeding for the first six months of life for all children, with continued breast-feeding for up to two years of age together with complementary food (WHO, 2003). In Thailand, infants exclusively breast-fed for the first six months of life increased from 5.4% in 2005 (Thailand National Statistical Office, 2006) to 12.3% in 2012, with the highest rates in the north (19.6%) and northeast regions (13.8%), and 12.2%, 7.9% and 8.2% in the south, central and Bangkok region, respectively (Thailand National Statistical Office, 2013). However, this is among the lowest exclusive breast-feeding rates in Asia (UNICEF Thailand, 2014). Regional differences were reported with no statistical data on determinants, which might have affected the rates of breast-feeding reported. A thorough understanding of these factors would help in the development of strategies to overcome obstacles to breast-feeding. Studies of determinants of exclusive breastfeeding among Thai women focused on a sub-sample within a

limited area (Kamolkhon and Kamolkhon, 2008; Posawat *et al*, 2009) or sample with a specific problem (Wungkum *et al*, 2011).

There is a lack for empirical study on the effects of exclusive breast-feeding on a child's health and development outcomes among the Thai population based on national representative samples. Such studies need long-term cohort data, which allow for cause and effect measurements in the sample unit. Multiple indicator cluster surveys (MICSs) have only been conducted in national representative surveys on children and women in Thailand (Thailand National Statistical Office, 2006). Even though MICS provides a cross-sectional survey data, the retrospective answers can be used to obtain information on breast-feeding practices and infants' health, allowing linkages to current outcomes. Statistical models allow examinations of relationships between determinants and those outcomes with control of confounding factors.

This study aimed to identify demographic and socio-economic determinants of breast-feeding in Thailand using Thailand MICSs to obtain a comprehensive analysis of differences between two surveys.

MATERIALS AND METHODS

Thailand MICS3 from 2005-2006 and MICS4 in 2012 (<http://mics.unicef.org/surveys>) provided the main sources of data from 26,850-43,440 households. This study was designed to monitor the situations of children (9,444-9,757 aged <5 years old) and (22,256-34,187 mothers 15-49 years of age). Data from questionnaires given to households and women were used as determinants of breast-feeding, and information on breast-feeding practice came from the questionnaire given to

mothers with children < 5 years of age.

Logistic regression models (LRMs) were used to analyze factors associated with breast-feeding as follows (Cameron and Trivedi, 2009):

$$y^* = \alpha + \beta X + \epsilon \dots \dots \dots (1)$$

$$y = \begin{cases} 1 & \text{if } y^* > 0 \\ 0 & \text{otherwise} \end{cases} \dots \dots \dots (2)$$

where in equation (1), y^* is underlying continuous unobserved (or latent) variable, which is the natural log of the odds that y is equal to 1, α is intercept parameter, and β is the vector of slope parameter; and in equation (2), y is observed binary outcome (in this study $y = 1$ if exclusively breastfed and $y = 0$ if not).

A model to investigate determinants for exclusive breast-feeding for infant <6 months old is described by equation (3):

$$\ln \left(\frac{\Pr(\text{ExBF})}{1 - \Pr(\text{ExBF})} \right) = \beta_0 + \beta_1 \text{CAge} + \beta_2 \text{Rural} + \beta_{31} \text{N} + \beta_{32} \text{NE} + \beta_{33} \text{S} + \beta_{41} \text{MEDU_primary} + \beta_{42} \text{MEDU_secondary} + \beta_{43} \text{MEDU_above_secondary} + \beta_{51} \text{WIND_second} + \beta_{52} \text{WIND_middle} + \beta_{53} \text{WIND_Fourth} + \beta_{54} \text{WIND_Richest} + \beta_6 \text{Eth_Thai} + e_1 \dots \dots \dots (3)$$

where $\Pr(\text{ExBF})$ is probability of exclusively breast-fed, CAge is child's age in months, Rural refer to rural location of household (urban is reference), N is north Thailand, NE is northeast Thailand, S is south Thailand (residence regions of households, with Bangkok and central region are reference regions), MEDU_ is mother's education level (none is reference), WIND_ means wealth index quintile (poorest is reference), and Eth_Thai is dummy variable for household with ethnicity of the household head is Thai.

RESULTS

Exclusively breastfed refers to infants who received only breast milk and vitamins, mineral supplements or medicine. For the whole country, percent infants aged <6 months who had been exclusively breast-fed in the 2005-2006 and 2012 survey was 5.35 and 12.26, respectively, with the highest in the north region in both surveys and the lowest in the central region, includ-

ing Bangkok (Table 1). In the first survey percent infants exclusively breastfed living in rural areas was 1.8 times higher than those in urban areas, but his difference was not apparent in the second survey.

In the first survey 77% in urban and 75% in rural areas of the 76 provinces in Thailand had <10% of infants aged 0-5 months exclusively breastfed (Fig 1). Six years later, 36% in urban and 31% in rural

Table 1
Percent exclusive breast-feeding among infants less than six months of age, Thailand, 2005-2006 and 2012.

Determinant	Percent 2005-2006 (<i>n</i> =452,889)	Percent 2012 (<i>n</i> =906)
Whole country	5.35	12.26
Region		
Central (including Bangkok)	2.38	7.99
North	10.93	19.44
Northeast	6.02	13.76
South	5.24	12.21
Area		
Urban	3.46	12.19
Rural	6.16	12.31
Mother's education		
None/Non-standard curriculum	1.63	26.35
Primary	4.00	9.32
Secondary or higher	6.49	12.91
Wealth index quintile		
Poorest	7.31	15.76
Second	5.39	13.38
Middle	4.62	12.21
Fourth	2.63	11.27
Highest	7.27	8.58
Ethnicity of household head		
Thai	5.43	12.04
Non-Thai	0.67	19.99

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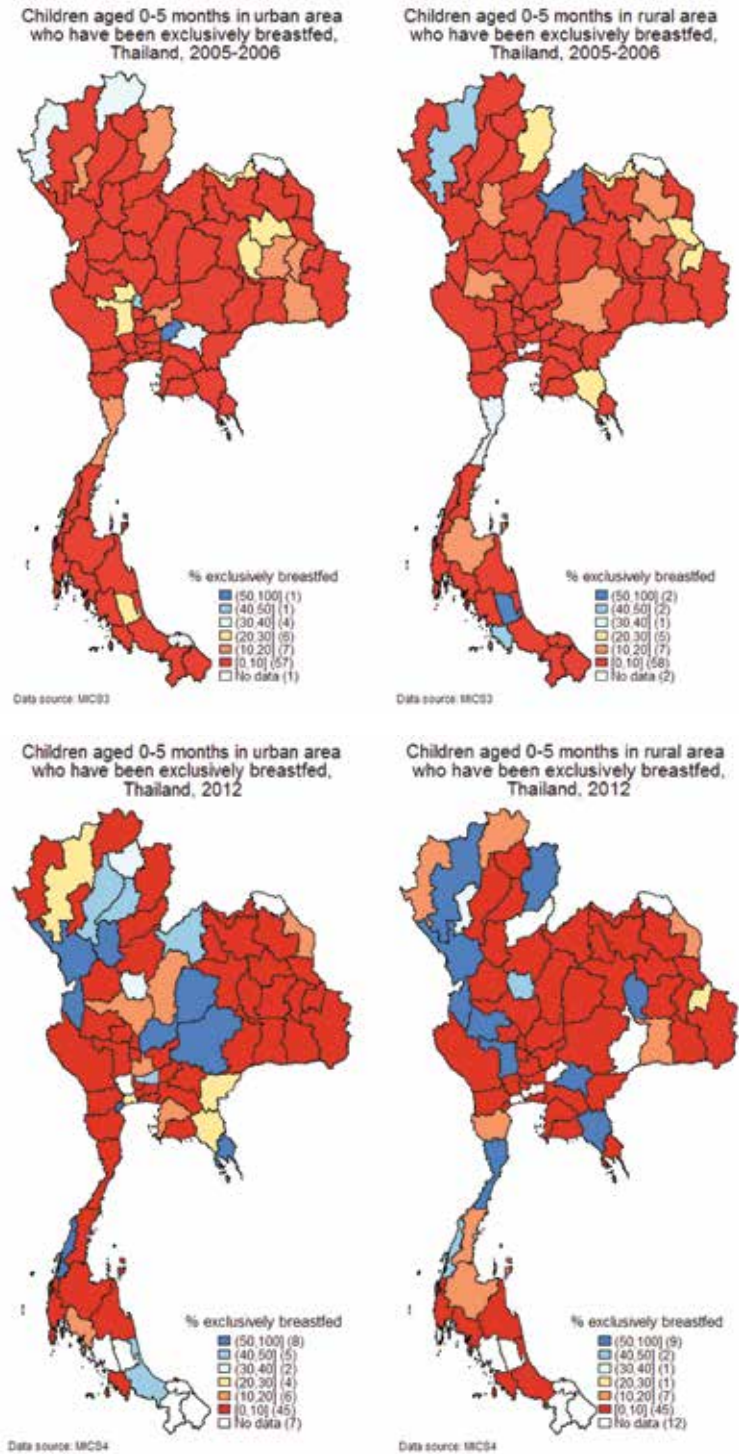
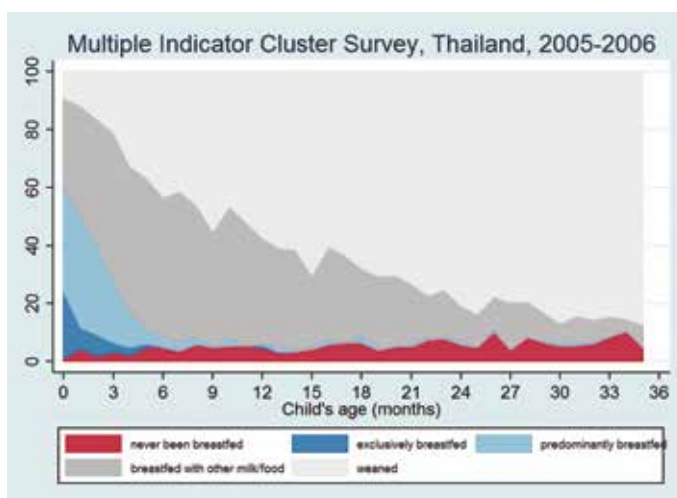


Fig 1 - Percent exclusively breast-fed children less than six months of age in 76 provinces of Thailand, 2005-2006 and 2012.

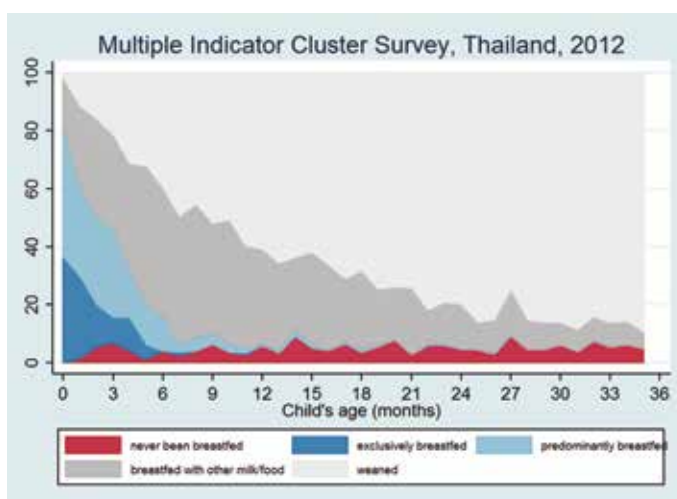
areas had >10% of infants <6 months old exclusively breast-fed. During 2005-2006, exclusive breast-feeding for the first 3 months of birth was low: 20% for the first month, 3% at age of 3 months and 1% for 5-month old infants. About 60% of infant <1 month were predominantly breast-fed (including exclusively breast-fed) and this rate decreased rapidly to 6% for infants aged 5 months. By 2012, 80% of infants <1 month were predominantly breast-fed

(50% exclusively breast-fed), and this decreased to 39% for children aged 3 months and to 12% for children aged 6 months, 2-3 times higher than in 2005-2006.

In both surveys, about 50% infants 6-11 months old were breast-fed supplemented with commercial milk formula or complementary food (Fig 2). For children 12-23 months of age, percent weaned children increased from 60 at age 12 months to 80 at age 24 months.



(a)



(b)

Fig 2—Breast-feeding pattern in children aged 0-35 months, Thailand, 2005-2006 (a) and 2012 (b).

Table 2
 Logistic regression results for determinants of exclusive breast-feeding among children aged <6 months, Thailand 2005-2006 and 2012.

Determinant	LRM coefficient		Marginal effect after LRM	
	2005-2006	2012	2005-2006	2012
Children's age (months)	-0.747***	-0.529***	-0.0341***	-0.0538***
	-0.169	-0.125	(0.00913)	(0.0127)
Area (Urban is reference)				
Rural	0.621	-0.19	0.0254	-0.0196
	-0.576	-0.344	(0.0223)	(0.0355)
Region (Central including Bangkok as reference)				
North	1.815***	1.110**	0.0836**	0.119**
	-0.668	-0.457	(0.0408)	(0.0528)
Northeast	1.176**	0.704	0.0409**	0.0656
	-0.573	-0.454	(0.0202)	(0.0448)
South	1.133**	0.476	0.0386*	0.0409
	-0.563	-0.466	(0.0207)	(0.0412)
Mother's education (none is reference)				
Primary	1.565	-0.781	0.0391**	-0.0876
	-1.17	-1.055	(0.0198)	(0.141)
Secondary and above	1.704	-0.477	0.0456**	-0.0584
	-1.209	-1.024	(0.0198)	(0.141)
Wealth index quintile (poorest is reference)				
Second	-0.422	-0.165	-0.0164	-0.0176
	-0.714	-0.599	(0.0284)	(0.0653)
Middle	0.137	-0.209	0.00656	-0.0220
	-0.579	-0.64	(0.0275)	(0.0688)
Fourth	-0.322	-0.0295	-0.0130	-0.00327
	-0.653	-0.621	(0.0270)	(0.0691)
Highest	0.738	-0.424	0.0437	-0.0417
	-0.946	-0.661	(0.0614)	(0.0665)
Ethnicity of household head (non-Thai is reference)				
Thai	1.72	-0.681	0.0429***	-0.0840
	-1.153	-0.75	(0.0152)	(0.109)
Constant	-6.209***	0.169		
	-1.639	-1.192		
Observation	871	569	871	569

The first two columns show logistic regression (LRM) coefficients for determinants of breast-feeding among infants less than 6 months of age. Standard error is given in parenthesis. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

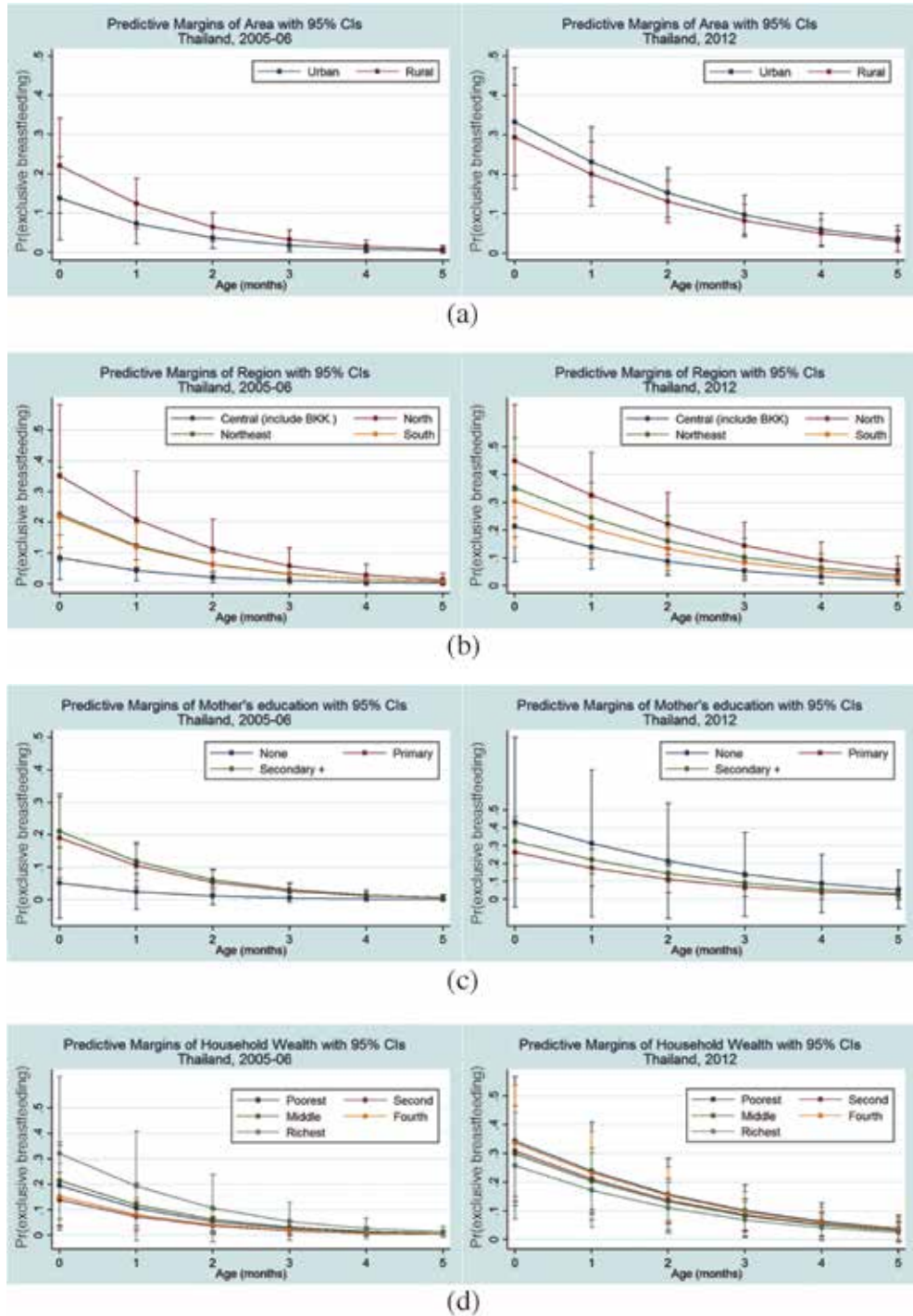


Fig 3-Predicted probability of exclusive breast-feeding of children from 0-6 months according to (a) residential area, (b) region, (c) mother's education, and (d) household wealth index quintile, Thailand, 2005-2006 and 2012.

The logistic models allowed marginal effects to be readily identified and interpreted. In period 2005-2006, the percent infants aged 0-5 months exclusively breast-fed was 3 points higher for rural compared to urban infants (Table 2). An opposite result was observed in 2012 when percent rural infants exclusively breast-fed were about 2 points lower compared to those living in urban areas.

For MICS3, predicted percent infants living in the northern region of the country was 8 points higher than those living in Bangkok or central region, and 4 points higher for infants in northeastern and southern regions (Table 2). However, in MICS4, percent infants exclusively breast-fed living in the northern region was 12 points higher than those in Bangkok and central region and no statistically significant differences in northeastern and southern regions.

The probability of infants <6 months of age being exclusively breast-fed was higher among rural than urban infants in the period 2005-2006 but lower by 2012 (Fig 3a). In the latter period children living in the northern region were most likely having been exclusively breast-fed compared to those in other regions of the country. During 2005-2006 the highest probability of children having been exclusively breast-fed was in the highest quintile of household wealth, but this changed to the lowest quintile group in 2012 (Fig 3d).

DISCUSSION

In Thailand during 2005-2006 the percent infants being exclusively breast-fed were higher in those living in rural than urban areas. These findings are similar to those reported in China (Liqian *et al*, 2008; *ibid*, 2009). However, the opposite

result was observed in 2012, which mirrored findings in Lao PDR during 2011-2012 (Phongsavath, 2014), but in Vietnam during a similar period a higher percent exclusive breast-feeding for three months was reported in the rural than urban areas (Thu *et al*, 2012).

During 2005-2006, mothers with higher education were more likely to exclusively breast-feed their babies than those with a lower level of education, but by 2012 women with higher education were less likely to practice exclusive breast-feeding. Similarly, a cross-sectional study in Malaysia conducted by Adnan and Muniandy (2012) found the percent exclusive breast-feeding for more than six months among mothers with secondary school qualification is 67.1% compared with 37.5% of mothers with diploma- and degree-level education.

In 2005-2006 the highest probability of exclusive breast-feeding was among the highest quintile of household wealth; however in 2012 this group had the lowest probability of exclusive breast-feeding. A similar finding was reported in Lao PDR (Phongsavath, 2014). There are no significant differences in the probabilities of exclusive breast-feeding among children with mothers of different education qualifications and wealth index quintile groups.

ACKNOWLEDGEMENTS

This study is part of a research project supported by the University of the Thai Chamber of Commerce. The author thank Dr Weerachart Kilenthong, Director of the Research Institute for Policy Evaluation and Design, University of the Thai Chamber of Commerce and colleagues for helpful comments and sharing their research results.

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