Pacifier Use and its Association with Breastfeeding and Acute Respiratory Infection (ARI) in Children Below 2 Years Old

Z M Siti, MPH, Joanita S, BSc, Khairun Nisa J, BSc, Balkish M N, BSc(Statistic) and Tahir A, MPH

Institute for Public Health, National Institute of Health, Ministry of Health Malaysia, Jalan Bangsar, 50590 Kuala Lumpur

SUMMARY

Extensive literature reviews showed that pacifier usage is associated with early cessation of breast feeding, as well as respiratory infection. This cross sectional study was a part of the bigger study of The Third National Health Morbidity Survey conducted throughout Malaysia in 2006. Survival and pearson cox regression was done to find association between pacifier user and breast feeding duration. Logistic Regression was done to find association between variables of interest. The prevalence of pacifier use was 32.9%. Chinese children reported significantly higher usage of pacifier (95% CI; 47.5, 58.7) as well as those resided in urban area (95% CI;32.5,37.7). One third of pacifier user had stopped breastfeeding at 6 months of age. Those with pacifier users were significantly shorter in breast feeding duration and significantly associated with non exclusivity in breastfeeding. Those without pacifier user were significantly associated with ever breast fed.(p value=0.001). There was no significant association between pacifier use with acute respiratory infection.

Factors such as ethnicity and residential are non modifiable whereas modifiable factor such as pacifier use is certainly needed to be addressed at maternal and child health care level.

KEY WORDS:
Pacifier, Malaysia, national survey, Breastfeeding

INTRODUCTION

Artificial teats, dummies, soothers or pacifiers are used by babies around the world today and date back to thousands of years[1]. The use of pacifiers has been controversial and is not recommended by breastfeeding policy makers worldwide due to its negative effects on breast milk exclusivity[2,3].

The non-nutritive device is also linked with an increased risk of gastrointestinal infection, acute respiratory infection(ARI), otitis media and malocclusion[4,5]. However, there are clear benefits associated with the use of pacifiers.

Pacifiers provide self soothing properties especially to calm babies during painful procedures[6]. Recent studies have shown their usage of pacifier reduces the risk against Sudden Infant Death Syndromes (SIDS), which leads the American Academy of Pediatric (AAP) to recommend the usage during bedtime[7].

Malaysia has adopted the World Health Organization (WHO) and United Nation Children's Fund (UNICEF) policy on breastfeeding and advises mothers to avoid artificial teats and pacifiers in order to promote for a successful and longer duration of breastfeeding[8].

Fatimah S *et al* have reported that the prevalence of breastfeeding among Malaysians has increased in comparison to the data from a national study a decade ago. This is probably due to the success of the breastfeeding policy implementation[9].

However the association between breastfeeding and pacifier usage and other adverse effects remains unclear especially in a Malaysian context. Therefore, secondary data analysis from The Third National and Morbidity Survey conducted in 2006 was analysed to determine the association of pacifier use with breastfeeding and ARI.

MATERIALS AND METHODS

National Health and Morbidity Survey(NHMS) was a health national survey first initiated in 1986, its aim were to supplement existing data on the health pattern problems and health needs and its only focused in peninsular of Malaysia at that time. It was a ten yearly survey, therefore it was followed by the Second National Health and Morbidity Survey conducted in 1996 and the coverage was expanded to include whole Malaysia.

The Third National Health and Morbidity Survey was conducted in 2006 and its aim was to provide community-based data on health and information for the Ministry of Health to review health priority and strategies. It utilises a sampling frame from the National Census of 2000 which was provided by the Malaysian Department of Statistics.

A two stage stratified sample design was used as a base of this complex survey. The country was divided into contiguous geographical areas called Enumeration Blocks (EBs), the EB was an area of land with identifiable gazetted boundaries by Department of Statistics. Each EBs contained about 80-120 LQs. The first stage sampling unit was the EB and the second stage sampling unit was the Living Quarters (LQ). In this survey, each selected Enumeration Blocks (EB) comprised of 8 sampled Living Quarters (LQ). All eligible households and persons within a selected LQ were included in the survey. A total of 2150 EBs and 17200 LQ were randomly selected and the survey was carried out between the months of April to the end of August 2006. The sample size was selected using a probability proportionate to size (PPS) linear systematic selection scheme based on the latest updated size measures.

The respondents for this part of the survey were mothers or care giver of children below the age of 24 months in the

Table I: Demographic characteristics of all respondents and pacifier users

		Characteristics of all respondents	characteristics of pacifier user		
		N	n	%	95 % CI
Age (months)	0-6	569	191	33.6	[29.8,37.5]
	7 to 12	564	200	35.4	[31.6,39.5]
	13-24	1034	307	29.6	[26.9,32.6]
Gender	Male	1096	357	32	[29.2,34.8]
	Female	1071	341	31.8	[29.1,34.6]
Ethnic	Malay	1316	391	29.7	[27.3,32.2]
	Chinese	301	160	53.2	[47.5,58.7]*
	Indian	137	37	27	[20.2,35.0]
	Other bumis	331	94	28.4	[23.8,33.5]
	Other	82	16	19.5	[12.3,29.4]
Strata	Urban	1292	453	35.1	[32.5,37.7]*
	Rural	875	245	28	[25.1,31.1]
Household Income	Less than RM 1000	745	212	28.5	[25.3,31.8]
	RM 1000- RM 1999	607	189	31.1	[27.6,34.9]
	RM 2000 - RM2999	353	116	32.9	[28.2,37.9]
	RM 3000 - RM 3999	164	64	39	[31.9,46.6]
	RM 4000 - RM 4999	66	29	43.9	[32.6,55.9]
	RM 5000 and above	157	61	38.9	[31.6,46.7]

*Figure of statistical significance

Table II: Associated factors of exclusive breast feed by univariable and multiple logistic regression model

Variable		Simple Logistic regression			Multiple Logistic Regression		
		b	Crude OR (95% CI)	p	b	Adjusted OR (95% CI)	p
Gender	Female	1.00	-				
	Male	-.184	0.8(.529,1.309)	.427	-.160	0.9(.539,1.348)	.494
Race			.093			.401	
	Other	1.00	-				
	Malay	-.417	0.7(.256,1.695)	.387	-.385	0.7(.261,1.774)	.431
	Chinese	-1.573	0.2 (.054,.791)	.021*	-1.013	0.4(.094,1.406)	.143
	Indian	-1.478	0.2(.043,1.204)	.082	-1.370	0.3(.048,1.351)	.108
	Other Bumis	-.463	0.6(.218,1.819)	.393	-.508	0.6(.205,1.768)	.356
Strata	Rural	1.00	-				
	urban	-.727	0.5 (.306,.764)	.002*	-.566	0.6(.354,.912)	.019*
	Using pacifier	1.00	-				
	Not using pacifier	2.220	9.2(3.351,25.275)	<0.001**	2.120	8.3(3.021,22.968)	<0.001**

Enter Method:, HL test=0.7, R square=0.022, Nagelker test=0.084
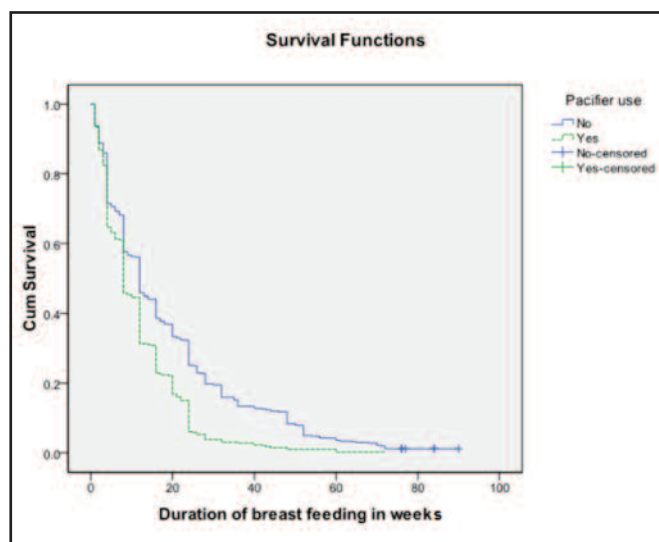*p value significant at 0.05, **p value significant at 0.001

Fig. 1 : Log rank test for duration of breast (in weeks) in pacifier and non pacifier user. Mean duration for breast feeding in non pacifier user was 18 weeks, while mean for breastfeeding duration in pacifier user was 11 weeks. P value is <0.001.

household which amounted to 2167 children. A bi-lingual (Malay and English) structured questionnaire were developed, family members will become a translator or proxy if none of the interviewers able to understand the respondent native language.[27] Data on socio-demographic characteristics were included such as gender, age in month, ethnicity, locality , household monthly income, and pacifier use was included. Specific question pertaining to acute respiratory infection was asked such as dry cough, cough with phlegm, cough and turning blue, cough and chest pain, blocked nose/running nose, sore throat, and hoarseness of voice.

Questions on breastfeeding practices, were based on the World Health Organization (WHO) Sample Questions for Use in Household Surveys which uses a recall of 24 hours of breastfeeding practice (WHO, 1991. A pilot study was conducted on a sample of EBs (not include in NHMS III) about 2 months prior. It was conducted in three different areas in and around Klang Valley(rural, semi urban, urban). Detailed descriptions of the sampling design and operation survey was published in the NHMS technical report [10].

Data was analyzed using SPSS version 15.0. Complex data analysis was done using SPSS ver. 15. Survival and pearson cox regression was done to find association between pacifier use and breast feeding cessation. Multiple Logistic Regression was done to find association between variables of interest. Only completed datasets were used for this study.

RESULTS

There were 2167 respondents for this study. The prevalence for pacifier user in NHMS III was 32.9%.

From Table II, almost one third of all age groups used a pacifier. Those from the age group of 7-12 months had the highest prevalence of pacifier user. There was no significant difference between pacifier user among male and female children. The use of pacifier was significantly higher among Chinese children and those residing in urban area.

No significant difference found in term of household income. The prevalence of those who stopped breastfeeding among pacifier user at 6 months of age is 34% with 95%CI (27.9, 42.0). Those who were pacifier users had a significantly shorter in breast feeding duration(11 weeks) in comparison to those non pacifier(18 weeks)(p value<0.01)(Refer to Fig.1). Non-pacifier users were significantly associated with exclusive breastfeeding with adjusted OR of 8.3(95% CI;3.02,22.97).(p value=.001). Those with pacifier user were significantly associated with non exclusivity in breastfeeding. The Chi square test for association between pacifier use and acute respiratory infection was 0.90, which is not significant.

DISCUSSION

Main findings of this study

PREVALENCE OF PACIFIER USE

The study showed that the prevalence of pacifier user was not significantly different from NHMS II done 10 years ago, 32.6%(95% CI; 30.4-34.7)[10].

This prevalence was lower than the reported prevalence in the Western world, whereby the pacifier usage was reported as high as 59% to 85%[11,12].

Table II showed that 33.6% of those aged 0 to 6 months were pacifier user. On the other hand, 68% of American infants aged 6 weeks and younger were found to use a pacifier[11].
The use of pacifier was significantly higher among Chinese children in comparison to other ethnicity and those resided at urban area.

What is already known about this topic?

PACIFIER USER AND BREASTFEEDING CESSATION

This study revealed that the pacifier usage was significantly associated with cessation of breastfeeding at 6 months. Numerous cohort studies have shown the negative association of pacifier with breastfeeding. This was shown by Do Nascimento *et al*, that pacifier use was associated with early weaning of breastfeeding (P < 0.001)[13]. Other studies have also showed that pacifier had a significant association with early breast feeding cessation[11,14-16].

In a systematic review done by Nina R.O'Connor *et al,* they concluded that most observational studies reported a negative association between pacifier use and breastfeeding[17]. A meta analysis of observational studies also showed negative association between pacifier use and breastfeeding as concluded by Karabulut *et al*[18].

PACIFIER USER AND BREASTFEEDING EXCLUSIVITY

In a study done by Sanchez *et al*, early pacifier use at two month of age was significantly associated with interruption of breast feeding exclusivity[19]. The same finding was reported by Viera *et al*[20].

In a Randomised Control Trial study, it was reported that exclusive breastfeeding at 4 weeks was less likely among infants exposed to pacifiers. Early pacifier usage was associated with the shortening of overall duration of breastfeeding. Pacifier use in the neonatal period was detrimental to exclusive and overall breastfeeding[21].

A systematic review done by Nina R. O'Connor *et al* showed that with different pacifier intervention, there was no difference in breastfeeding outcomes. Therefore, they concluded that the highest level of evidence does not support an adverse relationship between pacifier use and breastfeeding duration or exclusivity. These may be explained by the presence of several other complex factors, such as breastfeeding difficulties or intention to wean[17].

In a systematic review done by Jaafar SH *et al*, they concluded that pacifier use in healthy term breastfeeding infants, started from birth or after lactation is established, did not significantly affect the prevalence or duration of exclusive and partial breastfeeding up to four months of age[22].

PACIFIER USER AND ACUTE RESPIRATORY INFECTION (ARI).

Our findings showed that the Crude Odds Ratio for association between pacifier use and acute respiratory infection (ARI)was 0.99, 95% CI (0.814, 1.214), which was not significant. In a longitudinal study conducted by North, K. *et. al.* of which 6396 children uses pacifiers, no significant association was found between the usage of pacifier and ARI23 .However, it was shown that the constant pacifier users showed slightly higher risk of contracting a cough and wheezing at (P<0.01) OR, 1.16 (95% CI: 1.04, 1.29) and the latter at OR 1.23 (95% CI: 1.08, 1.42)[23] .It was also reported in a separate longitudinal study by North, K. *et. al.* (2000) that wheezing are more likely to occur with the usage of pacifier at OR, 1.03 (95% CI; 0.91, 1.16)[24].

What this study adds

This is the first study to report the prevalence of pacifier usage and its association with breast feeding practices ever been studied in multiracial Malaysian context. This study also shows that Chinese showed the tendency to breastfeed the least in comparison to other ethnic group as well as the adverse effect of pacifier in breastfeeding practice. This might be due to cultural and sociological factors therefore appropriate strategy need to be undertaken[25].

LIMITATION OF THE STUDY

This study has several limitations, for example the number of respondents was affected by the study design. Being a cross sectional study, it lacks the direction of causality. Recall bias among mothers or care givers was also possible. This is a secondary data analysis therefore multiple confounders that may affect the association between pacifier user and breast feeding such as mother's education, mothers awareness on the importance of breastfeeding and absence of breast anomalies was not assessed. The incompleteness of data largely contributed to the former factor.

A prospective larger controlled trials should be done to confirm the association and observation in the future.

CONCLUSION

These findings showed that pacifier was a significant factor for both early breastfeeding cessation and non exclusivity of breastfeeding in the Malaysian context. These data will provide important information to those involved in maternity and child care as well as at public health strategy formulation level.

ACKNOWLEDGEMENT

REFERENCES

1. Levin S. A history of dummies. Nurs RSA 1990; 5(4): 17-20.
2. UNICEF WHO. Protecting, promoting and supporting breastfeeding; the special role of maternity services. International Journal of Gynecology & Obstetrics 1990; 31(1): 171-83.
3. Practitioners RACoG. The Royal Australian College of General Practitioners' (RACGP) position statement on breast feeding. 2000.
4. Brook I, Gober AE. Bacterial colonization of pacifiers of infants with acute otitis media. J Laryngol Otol 1997; 111(7): 614-5.
5. Ollila P, Niemela M, Uhari M et al. Risk factors for colonization of salivary lactobacilli and Candida in children. Acta Odontol Scand 1997; 55(1): 9-13.
6. Jenik AG, Vain N. The pacifier debate. Early Hum Dev 2009; 85(10 Suppl): S89-91.
7. Hunt CE, Hauck FR. Sudden infant death syndrome. CMAJ 2006; 174(13): 1861-9.
8. UNICEF W, WABA, *et al*. Innocenti declaration on infant and young child feeding. 2005.
9. Fatimah S SSH, Tahir A, Hussain Imam MI & Ahmad Faudzi Y. Breastfeeding in Malaysia: Results of the Third National Health and Morbidity Survey (NHMS III) 2006.Mal J Nutr 2010; 16(2): 195-206.
10. Institute For Public Health NIoH, Ministry of Health, Malaysia. The Third National Health and Morbidity Survey 2006: Institute for Public Health, Ministry of Health, Malaysia; 2008.
11. Steven M. Levy SLS, John J. Warren, Barcey T. Levy, Arthur J. Nowak. Associations of pacifier use, digit sucking, and child care attendance with cessation of breastfeeding. The Journal Of Family Practice 2002; 51(5).
12. Degan VV, Puppin-Rontani RM. Prevalence of pacifier-sucking habits and successful methods to eliminate them--a preliminary study. J Dent Child (Chic) 2004; 71(2): 148-51.
13. Do Nascimento MB, Reis MA, Franco SC, *et al*. Exclusive breastfeeding in southern Brazil: prevalence and associated factors. Breastfeed Med 2010; 5(2): 79-85.
14. Soares ME, Giugliani ER, Braun ML, *et al*. Pacifier use and its relationship with early weaning in infants born at a Child-Friendly Hospital. J Pediatr (Rio J) 2003; 79(4): 309-16.
15. Scott JA, Binns CW, Oddy WH, *et al*. Predictors of breastfeeding duration: evidence from a cohort study. Pediatrics 2006; 117(4):e 646-55.
16. Chaves RG, Lamounier JA, Cesar CC. Factors associated with duration of breastfeeding. J Pediatr (Rio J) 2007; 83(3): 241-6.
17. Nina R. O'Connor KOT, Mir S. Siadaty, Fern R. Hauck. Pacifiers and Breastfeeding : A Systematic Review. Arch Pediatr Adolesc Med. 2009; 163(4): 378-82.
18. Karabulut E, Yalcin SS, Ozdemir-Geyik P et al. Effect of pacifier use on exclusive and any breastfeeding: a meta-analysis. Turk J Pediatr 2009; 51(1): 35-43.
19. Sanches MT, Buccini GD, Gimeno SG, *et al*. Factors associated with interruption of exclusive breastfeeding in low birth weight infants receiving primary care. Cad Saude Publica 2011; 27(5): 953-65.
20. Vieira GO, Martins CC, Vieira TO, *et al*. Factors predicting early discontinuation of exclusive breastfeeding in the first month of life. J Pediatr (Rio J) 2010; 86 (5): 441-4.
21. Howard CR, Howard FM, Lanphear B, *et al*. Randomized clinical trial of pacifier use and bottle-feeding or cupfeeding and their effect on breastfeeding. Pediatrics 2003; 111(3): 511-8.
22. Jaafar SH, Jahanfar S, Angolkar M, *et al*. Pacifier use versus no pacifier use in breastfeeding term infants for increasing duration of breastfeeding. Cochrane Database Syst Rev 2011; 3: CD007202.
23. North K, Fleming P, Golding J. Pacifier use and morbidity in the first six months of life. Pediatrics 1999; 103 (3):E34.
24. North Stone K, Fleming P, Golding J. Socio-demographic associations with digit and pacifier sucking at 15 months of age and possible associations with infant infection. The ALSPAC Study Team. Avon Longitudinal Study of Pregnancy and Childhood. Early Hum Dev 2000; 60(2): 137-48.
25. Chua S, Viegas OA, Counsilman JJ, *et al*. Breastfeeding trends in Singapore. Soc Sci Med 1989; 28(3): 271-4.