

Original Article

Early infant feeding practices in Jinan City, Shandong Province, China

Ying Zhao MS¹, Aimin M Niu BS², Guifa F Xu MS³, Matha J Garrett PhD¹ and Ted Greiner PhD¹

¹Department of Women's and Children's Health, Uppsala University, Uppsala, Sweden

²Department of Preventive Medicine, Shandong Province Hospital, Jinan, China

³Department of Nutrition and Food Hygiene, Shandong Medical University, Jinan, China

To investigate early infant feeding practices in Jinan, China, a cross-sectional study was carried out in April-May 2000. Data were collected through structured interviews among nearly all the mother-infant pairs (247) in four communities in the city with infants under seven months of age. All but one was born in a hospital and rooming-in (infant sleeping in same room as mother) was widely practised. Breastfeeding was practiced universally, but first contact with the new-born was delayed one or more hours for 51% of subjects. Colostrum was given to 94% of the infants, yet during the first three days, all but 34% were given water, artificial baby milk, glucose or other prelacteal feeds. Among infants under 4 months of age, 35% were currently exclusively breastfeeding, but at two months only 40% were, and only half that many had received nothing but breast-milk since birth. Exclusive breastfeeding has probably increased in China, but further promotion is still needed in this area.

Key Words: exclusive breastfeeding, prelacteal feeds, perceived breast milk insufficiency, China

Introduction

Exclusive breastfeeding for 6 months is recommended as the ideal method of feeding, providing health benefits to both baby and mother.¹ In China, apparently all infants were breast fed in the 1930s, 50% of them until one year of age.² Influenced by Westernisation, including baby food marketing, the traditional support for breastfeeding has been undermined in recent decades.

In surveys conducted in 101 poor Chinese counties (N = 81,000)³, consistent trends were not found in infant feeding from 1990-95. In 1995, only 30% mothers initiated breastfeeding on the first day of life and 95% gave sweetened water during the first week of life. In a study at 40 sites around the country, only three years later, Fu *et al* state that 54% of urban infants and 77% of rural infants under 4 months of age were currently exclusively breastfeeding.⁴

Since 1992, nationwide promotion of breastfeeding has been carried out in China in connection with the Baby Friendly Hospital Initiative. According to UNICEF, 6312 out of the total of about 13,400 maternity hospitals in the country have been declared 'baby friendly'. However, little is known about rates of exclusive breastfeeding, particularly using strict definitions. The present study was done to elicit such data from an urban area in China.

Subjects and methods

Study area and study population

Jinan, the capital of Shandong Province, has a population 5.6 million. A convenience sample of four urban communities

was chosen, all in the same district, with a population of about 330,000. These areas were the primary catchment areas of four "Baby Friendly" hospitals in the city. All the mother-infant pairs, who delivered between 18 October 1999 and 18 April 2000 and who were present in the study areas at the time of interview, were invited to participate in the survey. This yielded a sample of infants between a few days and seven months old. This sampling technique ensures internal validity by limiting bias, but not external validity because the findings may not hold for other areas in Jinan or elsewhere. An approximate sample size of 250 was chosen in order to be able to detect if the proportion exclusively breastfeeding was within 10 percentage points of the Fu *et al* estimate of 54%, with *alpha* of .05 and 90% power. Of the initial 259 mothers eligible to participate, 2 chose not to do so, 8 could not be traced, and one each of two sets of twins was randomly chosen for inclusion, yielding a final sample size of 247.

Instrument

A 33-item standardized and pre-tested questionnaire was developed, based on a literature review.⁵⁻⁷ It was pre-tested and redrafted twice. The information obtained in face to face

Correspondence address: Dr Ted Greiner, Associate Professor of International Child Health, Department of Women's and Children's Health, Uppsala University Hospital, Entrance 11, 75185 Uppsala, Sweden.

Tel: +46 0 18 611 5937; Fax: +46 0 18 508013.

E-mail: Ted.Greiner@kbh.uu.se

Accepted 29 May 2002

interviews related to the mother's and infant's characteristics, feeding practices, attendance at an antenatal course, post-partum care, intention to breastfeed, and the mother's working situation. Some data were obtained from health care records and physical examination charts.

Feeding practises were measured using two recall methods. The first was a feeding history since birth and second a 24-hour recall (from 6 am the day before the interview to 6 am the same day). Mothers were asked whether they gave the baby each of the following foods or liquids during the previous 24 hours, and if ever given, the age of the infant when it was first given: breast milk, water, sugar water, juice, rice water, artificial baby milk, powder milk, fresh cow milk, solids, and any other food or fluid.

The mothers were asked for their informed consent before the interview was conducted. They were assured that their name would not be put on the questionnaire. They were also told that they had the right not to answer any questions. The study was approved by the Research Ethics Committee at Uppsala University. Each interview lasted for 30-40 minutes.

Qualitative component

Qualitative data were obtained in order to understand more about the results of the interviews. The methods used included unstructured discussion with key informants (midwives, community health workers, and doctors), focus group interviews with mothers and grandmothers, observations made during an antenatal course, and home visits. The mass media were scanned for information about breastfeeding. The qualitative data helped us to better understand some of the responses on the questionnaires and inform the discussion section of the paper, but are not analysed here.

Definitions

The definitions used, modified from the WHO criteria,⁸ were as follows:

Exclusive breastfeeding: The infant received only breast milk, no other food or drink, not even water. Vitamins, minerals and medicine drops or syrups were allowed.

Predominant breastfeeding: The infant's predominant source of nourishment was breast milk. Non-nutritive liquids (water, water-based drinks, juice, ORS) and rice water were allowed.

Full breastfeeding: breastfeeding exclusively or predominantly.

Partial feeding: In addition to breast milk, the infant received solid or semi-solid foods or non-human milk.

Any breastfeeding: full or partial breastfeeding.

Delayed contact: The first skin-to-skin contact between mother and infant took place one or more hours after delivery, according to the mother's recall.

Prelacteal feeds: Any foods or drinks given to the infant before the first breastfeed.

Postlacteal feeds: Any foods or drinks given to the infant during the first three days after the first breastfeed.

Prelacteal feeds: Any foods or drinks given to the infant

Data analysis

All data were coded and analysed using SPSS version 10.0 for Windows. Population background characteristics were compared across communities using the chi-square statistic for categorical and Pearson's correlation for continuous variables. Two-tailed tests were used, and a P value ≤ 0.05 was the criterion for statistical significance. Survival analysis was used to estimate the duration of exclusively breastfeeding and full breastfeeding, based on the dietary history since birth.

Results

Characteristics of the study population

Maternal characteristics, place of delivery, type of delivery, income, and breastfeeding pattern did not differ significantly among the four communities, and therefore data from all four communities were combined. All but 16% of the mothers had attended secondary school, and 30% had attended university. The income of 75% of the sample was US\$50-200/month; 5% were below and 20% above this level.

In line with Chinese family planning policy, this was the first and only child for 96% of the mothers; 85% of the mothers were 25-29 years of age (mean 27). Only 1.6% of the babies were below 2.5 kg at birth and the mean was 3.4 kg; 46% of the sample were boys.

All but one delivery took place in the hospital. Forty-three per cent were delivered by caesarean section, currently typical for urban China. All the neonates, except for two sick ones, had stayed in the same room with their mothers after delivery, but only six of them had slept in the same bed with their mothers. Most of the mothers (58%) had attended an antenatal course offered at the hospitals and 71% had received at least one home visit by a community health worker.

Early feeding practices

Table 1 shows when the first skin-to-skin contact took place after delivery. The main reason (37%) for delayed contact was caesarean section. Feeding of colostrum was well accepted-- 94% of mothers gave it. Breast milk was the first feed for 53% of the infants, but only 34% were exclusively breastfed throughout the first three days.

All the mothers reported feeding on demand. A total of 32% of the mothers perceived that they had insufficient breast milk. The main basis for this was infant crying (77%) but occasionally illness, refusal of the child to breast-feed, twins, or nipple problem were mentioned. Based on survival analysis of ages when various feeds were first introduced, the rates of both exclusive and predominant breastfeeding were low and far from the optimal (Fig.1). Among those who were 120 days old or less, 35% were exclusively breastfed at the time of the survey, significantly fewer than the expected 54%.

Duration of breastfeeding

Breastfeeding was universally initiated in this sample. But one infant stopped after 3 days and five others within one month. Thirteen mothers had stopped breastfeeding by the time of interview. The reasons for stopping were as follows:

7 mothers had insufficient breast milk; 4 had hepatitis B; 1 returned to work; and 1 was worried about her figure.

Mother's intention to continue breastfeeding

Table 2 shows that among the 232 (95%) mothers still breastfeeding at the time of the interview, 50% intended to breastfeed for one year. The main reasons for terminating by one year were as follows: the child will be old enough and

able to eat an adult diet; breast milk becomes bad and diluted; and it is difficult to stop breastfeeding if one continues beyond that age. None intended to continue breastfeeding beyond one and a half years of age. Nearly all the mothers stated that the baby's father agreed with their breastfeeding.

Discussion

Early contact increases breastfeeding both soon after delivery and at 2-3 months.⁹ The main reason for delayed contact was caesarean section (C/S). The C/S rate increased in China after the economic reform and family planning policy.¹⁰ There are many reasons for this. Many mothers or relatives believe a C/S will be easier for them and that the child will be healthier; people also believe it leads to a higher birth weight and greater intelligence. Other factors linked to C/S include higher maternal age at delivery, improved economic and maternal education level, government health insurance, and the physician receiving a higher payment for a C/S delivery.

Table 1. Early feeding practices in Jinan China (N=247)

	N	%
First contact		
Immediately	122	49.4
1-24 hours	106	42.9
>24 hours	19	7.7
Discarded any colostrum		
Yes	15	6.1
No	232	93.9
Feeding pattern through the first 3 days		
Exclusive breastfeeding	85	34.4
Predominant breastfeeding	72	29.1
Mixed feeding	90	36.4
First feeds		
Breast milk	130	52.6
Plain water	67	27.1
Artificial baby milk	23	9.3
Powdered milk	7	2.8
Glucose	19	7.7
Sugar water	1	0.4

Table 2. Mother's stated intention regarding the continuation of breastfeeding

	N	%
< 1 year	36	14.6
1 year	123	49.8
13-18 months	39	15.8
As long as I can	12	4.9
Unknown	24	9.7
No longer breastfeeding	13	5.3

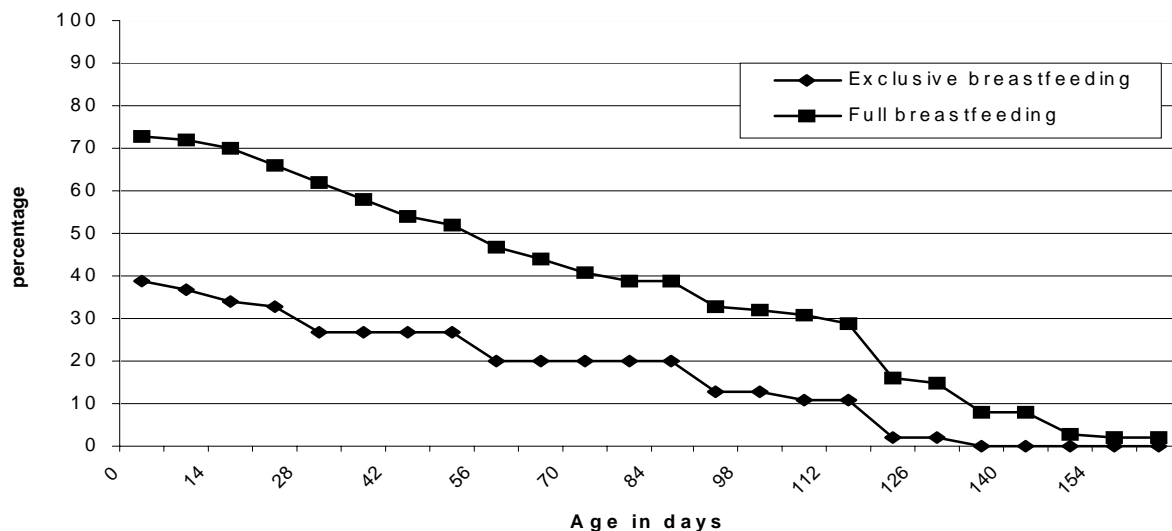


Figure 1. Breastfeeding pattern in Jinan China based on dietary history since birth

Many respondents who had had a C/S said it was very painful for them to move. Thus, it was difficult to give the newborn infant to them immediately after delivery. Some mothers stated that the nurses held the infant to their abdomen and face for a while. Four mothers complained that rooming-in was troublesome. They could not sleep well when they heard the crying all day and night.

Even though more than 90% of mothers reported feeding colostrum, prelacteal and postlacteal feeds were common. Some mothers did not think the infants could survive on the small quantity of colostrum secreted during the first few days after delivery or they thought that crying meant the baby needed additional foods or fluids. Plain water was the main early supplement, though additional water is not required for exclusively breast-fed babies younger than 6 months, even in a hot climate¹¹ or with low birth weight.¹²

In the present study, four mothers stopped breastfeeding when they found out that they were positive for hepatitis B. Currently, it is estimated that 20% of the Chinese population are infected with HB.¹³ WHO and UNICEF recommend breastfeeding even where HBV infection is highly endemic and immunization against HBV is not available.¹⁴ There is no evidence that the risk of mother to child transmission is increased through breastfeeding.^{15,16} In China, vaccinating infants against hepatitis B is routine in most parts of the country, but there is concern that this may not provide sufficient protection if the mother has HBV-DNA in her breast milk. Thus if a blood test shows two (HBeAg and Anti-HBc positive) positive results, the mother is advised not to breastfeed.¹⁷

Nearly all Chinese mothers have only one child and thus no experience of breastfeeding. Perceived breast milk insufficiency is common but may also be a socially acceptable reason for introducing early supplements or stopping breastfeeding early.¹⁸ In our study, mothers gave a variety of reasons for thinking that they did not have enough milk, particularly infant crying. Most said tiredness and stress were the causes of insufficient milk. Others disliked breastfeeding or were worried about their figure. Some worried about the quality of their breast milk.

Many in China,^{19,20} as elsewhere, do not believe that exclusive breastfeeding, for even four months, is possible. Even health workers said they had not practiced it for long with their own babies. Exclusive breastfeeding was less common than expected: over 20 percentage points below Fu *et al*'s urban estimate.⁴ The term 'exclusive breastfeeding' is commonly understood in China to include the feeding of water.²⁰ In the current study, when the mother was asked if she was exclusively breastfeeding her baby, about half of them immediately said, "of course." When asked for details on what else besides breast milk she offered to her baby, she usually replied "water". When asked about the amount, she usually first replied "a little". When more details were requested, she usually reported giving about 30-90 ml per day. Feeding of water may be related to the traditional custom whereby mother and infant stay indoors in closed

houses.²¹ The weather was hot when the present study was conducted.

The low level of exclusive breastfeeding observed in this study has been found in a few other studies from China.^{22,23} However, most studies recently published in Chinese have reported higher rates. For instance, the exclusive breastfeeding rate in Shenzhen was reported to be 67% at one month and 56% at four months.²⁴ In Shanghai, the reported exclusive breastfeeding rate was 89% at discharge and 47% at one month.²⁵

One possible reason for the reporting of such high rates of exclusive breastfeeding may be that in many studies mothers have been interviewed by the same group of health workers who educated them earlier and could benefit from reporting improvements. Secondly, the definition of exclusive breastfeeding used for the data presented in Figure 1 was based on Aarts *et al*'s²⁶ recommended use of dietary history. Those recorded as exclusively breast-fed at each age have never received anything but breast milk up to that age. Most studies record only current exclusive breastfeeding, which does not take into account any shifting of feeding patterns back and forth, especially where prelacteal feeding is common.

Our findings suggest that current breastfeeding promotion efforts, mainly consisting of the Baby Friendly Hospital Initiative, have probably led to a substantial increase in exclusive breastfeeding in China. However, this has been inadequate to achieve optimal feeding practices, especially with respect to the duration of exclusive breastfeeding. As Guldán *et al*²³ point out, mothers in China suffer from a lack of support from their families, places of employment, and the health system.

Acknowledgements

The authors would like to thank the Department of Women's and Children's Health, Uppsala University for financial support. Elisabeth Kylberg and Amal Omer-Salim are thanked for assistance with methodological aspects of the research. We thank our colleagues in China for their help and the participating mothers and children who gave generously of their time.

References

1. World Health Organization. The optimal duration of exclusive breastfeeding, results of a WHO systematic review. WHO Note for the Press No. 7. 2. Geneva, April 2001.
2. Kao Y-E. Breastfeeding in China. *Preventive Pediatrics* 1948; 36: 233-237.
3. Zai F, He Y, Jia F. Nutrition surveillance and improvement project for children, 1990-95. Beijing: Hygiene Inspection Department, Ministry of Health and Institute of Nutrition and Food Hygiene, Chinese Academy of Preventive Medicine. Beijing; 1995.
4. Fu Z, Chang S, He W, Fu Gang. [Exclusive breastfeeding and growth of infants under 4 months in China]. *Wei Sheng Yan Jiu [J Hygiene Research]* 2000; 29 (5): 275-278.

5. Yun YP, Kang ZS, Ling LJ, Xin QC. Breast feeding of infants between 0-6 months old in 20 provinces, municipalities and autonomous regions in the People's Republic of China. National Coordinating Working Group for Breastfeeding Surveillance. *J Trop Pediatr* 1989; 35: 277-80.
6. Perez-Escamilla R, Lutter C, Segall AM, Rivera A, Trevino-Siller S, Sanghvi T. Exclusive breast-feeding duration is associated with attitudinal, socioeconomic and biocultural determinants in three Latin American countries. *J Nutr* 1995; 125: 2972-84.
7. Rogers IS, Emmett PM, Golding J. The incidence and duration of breastfeeding. *Early Hum Dev* 1997; 49 Suppl: S45-74.
8. World Health Organization. Indicators for Assessing Breastfeeding Practices. WHO/ CDD/ SER/ 91.14. Geneva: WHO, 1991.
9. World Health Organization. Evidence for the ten steps to successful breastfeeding. WHO Division of Child Health and Development. Geneva: WHO, 1998.
10. Cai WW, James SM, Chen CHC, Zhuang YX, Morris L, R.Harris J. Increased caesarean section rates and emerging patterns of health insurance in Shanghai, China. *Am J Public Health* 1998; 88: 777-780.
11. Almroth SG. Water requirements of breast-fed infants in a hot climate. *Am J Clin Nutr* 1978; 31: 1154-7.
12. Cohen RJ, Brown KH, Rivera LL, Dewey KG. Exclusively breastfed, low birthweight term infants do not need supplemental water. *Acta Paediatr* 2000; 89: 550-2.
13. Wong F. Hepatitis B in the Chinese Community: Federation of Chinese Canadian Professionals' Summer Newsletter; Mississauga, Ontario (accessed at <http://www.hepnet.com/hepb/wongchin.html> on Feb 22, 2003).
14. World Health Organization. Hepatitis B and breastfeeding. Update No. 22. Geneva: WHO Division of Child Health and Development, 1996.
15. Beasley PR, Shiao IS, Stevens CE, Meng HC. Evidence against breastfeeding as a mechanism for vertical transmission of Hepatitis B. *Lancet* 1975; ii: 740-41.
16. Tseng AKY, Lam CWK, Tam J. Breastfeeding babies of HBsAg-positive mothers. *Lancet* 1988; ii: 1032-5.
17. Huang XH. Summary of the National Conference on Breastfeeding. *Chinese J Obstet Gynecol* 1995; 30: 579-83.
18. Guo M, Yu J, Ye GJ. Factors associated with breastfeeding. *Mat Child Health Care China* 1996; 11:30-32.
19. Hua JZ. Breastfeeding in China. unpublished manuscript Shanghai First Maternity and Infant Health Institute, Jan. 1991.
20. Peng GY. Analysis of multiple factors associated with breastfeeding behavior after discharge. *Mat Child Health Care China* 1995; 10: 275-277.
21. Cheung NF. Chinese Zuo yuezi (sitting in for the first month of the postnatal period) in Scotland. *Midwifery* 1997; 13: 55-65.
22. Ding ZY. Breastfeeding research in 1990s. *Chinese J Paediatr* 1994; 32: 311-312.
23. Guldán GS, Zhang M, Zeng G, Hong J, Yang Y. Breastfeeding practices in Chengdu, Sichuan, China. *J Hum Lact* 1995;11:11-15.
24. Yao QX, Ren JH, Lin LH, Zeng CL. An analysis of the increase in the breast-feeding in the first 4 months after birth. *Chinese J Nursing* 2000; 35 (1): 7-10.
25. Zhu LP, Dong XP, Song SY, Shi YF, Hua JZ. Analysis of factors associated with breastfeeding. *Chinese J Obstet Gynecol* 1995; 30: 618.
26. Aarts C, Kylberg E, Hörnell A, Hofvander Y, Gebre-Medhin M, and Greiner T. How exclusive is exclusive breastfeeding? A comparison of data since birth with current status data. *Int J Epi demiol* 2000; 29: 1041-6.