

Infant feeding practices in Xinjiang Uygur Autonomous Region, People's Republic of China

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Abstract

Aims: To document infant feeding methods in the first six months of life in Xinjiang Uygur Autonomous Region, People's Republic of China, 2003–2004. Some problems with breast-feeding in the area are explained.

Methods: A longitudinal study of infant feeding practices was undertaken. A total of 1219 mothers who delivered babies during 2003 and 2004 were interviewed in five hospitals or institutes, and after discharge were contacted in person or by telephone at approximately monthly intervals to obtain details of infant feeding practices. Multivariate logistic regression analysis was used to explore factors associated with breast-feeding initiation.

Results: 'Any breast-feeding' rates at discharge and at 0.5, 1.5, 2.5, 3.5, 4.5 and 6 months were 92.2, 91.3, 89.9, 88.8, 87.7, 86.0 and 73.0%, respectively. 'Exclusive breast-feeding' rates at discharge and at 0.5, 1.5, 2.5, 3.5, 4.5 and 6 months were 66.2, 47.6, 30.1, 25.8, 22.1, 13.0 and 6.2%, respectively. The main problem of breast-feeding in Xinjiang was the early introduction of formula or water. The average duration of 'exclusive breast-feeding' was 1.8 months (95% confidence interval (CI) 1.7–2.0), of 'full breast-feeding' 2.8 months (95% CI 2.7–2.9) and of 'any breast-feeding' 5.3 months (95% CI 5.2–5.4).

Conclusions: Infant feeding methods in Xinjiang were documented in this study and the main problems with infant feeding in Xinjiang are discussed. Further studies are needed to identify factors associated with 'exclusive breast-feeding' and duration.

Keywords
Breast-feeding
Breast-feeding duration
Survey
Xinjiang Province
China

Breast-feeding is recognised as the most appropriate method for feeding infants and is closely related to health during infancy and to chronic disease prevention in adulthood^{1,2}. 'Exclusive breast-feeding' for the first six months of life and continued breast-feeding up to 2 years of age or beyond are recommended by the World Health Organization (WHO) and other authorities³.

There have been considerable changes in breast-feeding practices in China over the past 40 years. 'Ever breast-fed' rates in both urban and rural areas were over 80% in the 1950s and 1960s. But the rates started to decline considerably during the 1970s, especially in larger cities when the use of breast-milk substitutes became widespread. The 'ever breast-fed' rate in urban areas of China was 42.7% in 1975 and fell further to 33.6% in 1985^{4–6}. A survey from a rural area near Shanghai showed that the breast-feeding rate was 80% in the early 1980s and fell to 44% in the early 1990s⁷. Thus the trends towards declining breast-feeding in urban and rural areas were similar; however, the rates in cities were lower.

To address the decline in breast-feeding, in the 1990s the Children's Development Plan of the Chinese government

set a target to achieve a national 'exclusive breast-feeding' rate at 4 months of 80% by 2000⁸. As a result of the many efforts introduced to promote breast-feeding, including the baby-friendly hospital initiative, women and child health protection legislation, social support programmes and breast-feeding education programmes⁹, the breast-feeding rate in China started to increase in the 1990s¹⁰. A survey undertaken in the Beijing Women's Hospital in 1990 showed that breast-feeding rates at 6 weeks were 79.2% in the rooming-in group and 39.8% in the control group¹¹. In 2002, a cross-sectional study undertaken in Beijing and four provinces (Shandong, Hubei, Zhejiang, Guangdong) showed that the 'ever breast-fed' rate was 90.1% and the 'full breast-feeding' rates at 4 and 6 months were 45.3% and 21.6%, respectively. The survey also documented that average duration of breast-feeding was 8.73 ± 4.21 months (mean ± standard deviation)¹². Another survey in five large cities (Guangzhou, Shanghai, Congqing, Xian and Changchun) in 2002 showed that the average breast-feeding duration was 8 months and the 'any breast-feeding' rates at 0, 4, 6, 12 and 24 months were 94.6, 61.0, 50.1, 5.3 and 0.4%, respectively¹³. From the report of the Third National Health

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Service Investigation in 2005, the breast-feeding initiation rates in urban and rural areas were 94.1 and 98.5%, respectively. The average breast-feeding duration in urban and rural areas was 5 and 6 months, respectively¹⁴. The duration of breast-feeding in this survey was shorter than in the previous two, but the reason for this was not explained.

These studies show that breast-feeding rates in China fell during the 1970s, to reach the lowest point in the 1980s and began to rise in the 1990s. The rates in urban areas were generally lower than in rural areas. However China is a huge country, geographically as well as in population size and ethnic diversity, and breast-feeding rates in different parts of China can vary considerably^{15,16}.

The Xinjiang Uygur Autonomous Region (Xinjiang AR) is located in north-western China. Situated in the hinterland of the Eurasian continent, Xinjiang borders eight countries: Russia, Kazakhstan, Kyrgyzstan, Tajikistan, Pakistan, Mongolia, India and Afghanistan. By the end of 2004, the population of Xinjiang had reached 19.6 million. The region contains more than 13 ethnic groups, the Uygur accounting for 45.73%, the Han for 39.75% and the Kazakh for 7.04%. The birth rate was 16 per thousand and death rate 5.1 per thousand.

A cross-sectional study undertaken in Shihezi, Xinjiang, in 1994–1996 showed that the breast-feeding rate was 34% at 4 months¹⁷, well below Chinese and international targets. This had significant implications for the health of the children of the region. A more detailed study of breast-feeding was needed to provide the data necessary to implement a comprehensive health promotion programme. The aim of the present longitudinal study was to identify the prevalence of breast-feeding up until 6 months of age.

Methodology

A longitudinal cohort study of infant feeding practices was undertaken in Xinjiang AR, People's Republic of China. In this region, all babies are usually delivered in hospitals. Mothers who delivered babies during 2003 and 2004 were contacted while in hospital and were invited to participate in the study. After discharge, mothers were contacted in person or by telephone at approximately monthly intervals (at 0.5, 1.5, 2.5, 3.5, 4.5 and 6 months) using a structured questionnaire to obtain details of infant feeding practices.

A total of 1256 mothers were randomly recruited from five hospitals or institutes. In Shihezi People's Hospital, mothers were recruited every second day due to staffing constraints. In the other hospitals (Shihezi Maternal and Child Health Care Institute and Urumqi Maternal and Child Health Care Institute in urban areas; Chabuchaer Maternal and Child Health Care Institute and Yumin County Hospital in rural areas) all mothers were contacted. Almost all mothers who were contacted (1219 or 97%) agreed to participate. Urumqi is the capital city of Xinjiang where the Uygur ethnic group is in the majority, while Shihezi is a predominantly Han ethnic area. Chabuchaer

and Yumin counties have a larger concentration of Kazakh people and other minorities.

The majority of participants, including the minority groups, could read and speak Chinese (Mandarin). The questionnaire was originally prepared in Mandarin, and was also translated into the Uygur language, which can also be understood by Kazakh mothers. For those who could not read Chinese, trained nurses who were fluent in the ethnic languages were available to help them complete the questionnaires. For all minority mothers, follow-up calls and visits were made in their own ethnic language by nurses from their own ethnic group.

The questionnaire was based on those developed by Scott, Binns and Duong that have been used extensively in breast-feeding cohort studies in Australia, Vietnam and Kenya^{18–23}. The questionnaires were designed to identify the feeding method and to collect information on factors associated with breast-feeding. After translation the questionnaires were tested in focus groups to ensure cultural appropriateness.

The project was approved by Xinjiang local research authorities (Shihezi University, Urumqi Science Research Committee) and the Human Research Ethics Committee of Curtin University, Australia. Mothers who agreed to participate in the study signed the consent page at the front of the questionnaire and were informed of their rights to withdraw from the follow-up process at any time without prejudice. All of the personal data collected were kept confidential.

All data analyses were carried out using the Statistical Package for the Social Sciences, release 12.0 (SPSS Inc.). Descriptive statistics and cross-tabulations were generated for demographic factors, life tables were used for breast-feeding rates and the Kaplan–Meier model was used to calculate mean duration of 'exclusive breast-feeding', 'full breast-feeding' and breast-feeding.

The definitions of breast-feeding used in this paper are as follows^{24–26}.

- *Any breast-feeding*: The infant receives breast milk (direct from the breast or expressed) with or without other drink, formula or other infant food.
- *Exclusive breast-feeding*: Breast-feeding while giving no other food or liquid, not even water, with the exception of drops or syrups consisting of vitamins, mineral supplements or medicine.
- *Almost exclusive breast-feeding*: The infant may receive small amounts of culturally valued supplements – water, water-based drinks, fruit juice and ritualistic fluids.
- *Full breast-feeding*: Includes 'exclusive breast-feeding' and 'almost exclusive breast-feeding'.

Results

The details of the sample and the prevalence of the major demographic variables are shown in Table 1. The sample

Table 1 Demographic factors and breast-feeding percentage before discharge in Xinjiang, People's Republic of China, 2003–2004 (*n* = 1219)

Factor	<i>n</i>	%	Any breast-feeding	No breast-feeding
Ethnicity				
Han	578	47.4	89.3	10.7
Uygur	360	29.5	94.7	5.3
Kazakh	199	16.3	97.5	2.5
Other minorities	82	6.7	97.6	2.4
Residence				
Urban area	909	74.6	91.7	8.3
Rural area	310	25.4	95.8	4.2
Gestational age (weeks)				
< 37	39	4.1	92.3	7.7
≥ 37	917	95.9	96.6	3.4
Birth weight (g)				
< 2500	37	3.2	86.5	13.5
2500–3999	1019	87.2	94.6	5.4
≥ 4000	112	9.6	94.6	5.4
Delivery method				
Vaginal	602	52.9	94.7	5.3
Caesarean	537	47.1	93.9	6.1
Birth order				
1	924	82.3	96.3	3.7
≥ 2	199	17.7	98.5	1.5
Baby's gender				
Male	616	52.3	92.2	7.8
Female	561	47.7	93.6	6.4
Maternal age (years)				
< 25	184	16.7	98.9	1.1
25–29	544	49.4	96.7	3.3
30–34	307	27.9	96.7	3.3
≥ 35	66	6.0	93.9	6.1
Maternal education (years)				
< 9	476	41.9	98.3	1.7
10–12	305	26.8	94.8	5.2
≥ 13	355	31.3	96.6	3.4
Maternal job				
Housewife	500	43.7	95.4	4.6
Sales	155	13.5	89.0	11.0
Worker	119	10.4	95.0	5.0
Farmer	95	8.3	94.7	5.3
Office worker	249	21.8	96.8	3.2
Other	26	2.3	96.2	3.8
Annual family income (RMB)				
< 10 000	309	33.5	98.4	1.6
10 000–19 999	356	38.6	97.5	2.5
≥ 20 000	258	28.0	95.3	4.7

as recruited included 47% Han, 30% Uygur, 16% Kazakh and a small number of other minorities. Almost all of the mothers (1118) in the study were married, eight were separated and one was widowed.

The breast-feeding rates were calculated by life table analysis and are detailed in Table 2. The breast-feeding initiation rate was 92% and by 6 months this had declined to 73%. The median duration of 'exclusive breast-feeding' was less than 1 month, of 'full breast-feeding' was 2.8 months, and of 'any breast-feeding' was greater than 6 months. As follow-up in this study was terminated at 6 months, the maximum duration of breast-feeding could not be determined. The average duration of 'exclusive breast-feeding' was 1.8 months (95% confidence interval (CI) 1.7–2.0) and of 'full breast-feeding' was 2.8 months

(95% CI 2.7–2.9). At 6 months of age, 73% (CI 70.1–75.8) of infants were still receiving some breast milk.

Inevitably in a cohort study, some mothers were lost to follow-up. The percentage of mothers lost to follow-up at 0.5, 1.5, 2.5, 3.5, 4.5 and 6 months was 6, 7, 9, 12, 13 and 21%, respectively.

Mother's perceptions about breast-feeding duration and formula are shown in Table 3. The majority of mothers thought that breast milk was not enough for their baby's nutritional requirements by 6 months of age. Only 33% of mothers thought that breast milk could satisfy a baby's nutritional requirements at 6 months and 31% mothers planned to give their baby supplemental food before 4 months.

The perceptions of the different ethnic groups were compared using binary logistic and multinomial logistic regression analysis, and more minority mothers were found to have incorrect perceptions about 'exclusive breast-feeding' duration and formula. For example, compared with Han mothers, minority mothers were less likely to consider that breast milk could satisfy a baby's nutritional requirements for more than 4 months (odds ratio (OR) = 0.4, 95% CI 0.2–0.5) and were more likely to plan giving their babies supplemental food before 4 months (OR = 14.6, 95% CI 10.2–21.1). Kazakh mothers more likely thought formula was a healthy food (OR = 3.1, 95% CI 1.3–8.1).

A comparison was made of the understanding of infant feeding of mothers from urban and rural areas. More mothers in rural areas (92.7%) thought that breast-feeding could satisfy the baby's requirements for more than 4 months compared with mothers in urban areas (80.4%) ($\chi^2 = 22.7$, $P < 0.01$). Fewer mothers in rural areas (6.8%) planned to start giving supplemental food to their babies before 4 months than mothers in urban areas (41.3%) ($\chi^2 = 90.0$, $P < 0.01$). Overall, 8.5% of mothers who were breast-feeding their babies were recommended to begin using additional infant food by medical staff and a similar percentage by other people, i.e. 17% in total.

Discussion

In Xinjiang AR, 92% of mothers were breast-feeding on discharge from hospital and 73% were still breast-feeding at 6 months. This is a considerable increase in the breast-feeding rate compared with the previous study in Shihezi in 1996, when the rate at 4 months was only 34%¹⁷. The breast-feeding rate in Xinjiang at discharge was similar to that currently reported from Beijing and some inland provinces, and for breast-feeding at 6 months was higher than in those regions¹². The only Chinese province with a higher reported breast-feeding rate over the first six months was Tibet, but the 'exclusive breast-feeding' rate in Xinjiang was a little higher than that in Tibet²⁷. The breast-feeding initiation rate was a similar to that in Australia^{18,28}, which is higher than in Canada and the USA^{29,30}.

However, the 'exclusive breast-feeding' rate in Xinjiang was considerably lower than the target of 80% at 4 months

Table 2 Breast-feeding rates (%) in Xinjiang, People's Republic of China, 2003–2004 (*n* = 1219)

Baby's month	<i>n</i>	Exclusive breast-feeding	Full breast-feeding	Any Breast-feeding
0*	1219	66.2	88.3	92.2
0.5	1147	47.6	66.3	91.3
1.5	1136	30.1	55.6	89.9
2.5	1105	25.8	46.9	88.8
3.5	1075	22.1	36.1	87.7
4.5	1055	13.0	16.8	86.0
6	964	6.2	7.9	73.0

* 0 month refers to the time of discharge from hospital, which was generally one week postpartum.

set by the Chinese government. Many babies were given water, formula or cow's milk too early in their life. The early introduction of complementary foods may shorten breast-feeding duration³¹.

The main reason for the early introduction of water may be an inappropriate understanding of infant feeding by both medical staff and mothers. Feeding water was common in hospitals because many doctors thought that infant jaundice was associated with dehydration. Also, Xinjiang is a province where people live on the edge of desert and traditionally mothers feed baby water to their infants early in life. The early introduction of water is also common in Tibet²⁷. Because the majority of babies there were fed water, the 'exclusive breast-feeding' rate was very small and hence in that study more emphasis was placed on the 'full breast-feeding' rate in the analysis. The 'full breast-feeding' rate at 4–6 months was only 3.0% in urban areas and 12.8% in rural areas in Tibet²⁷. The 'full breast-feeding' rate in Shihezi was slightly higher than this at 7.9%.

The advertising and ready availability of infant formula could be factors in its early introduction to some infants. In this study, most mothers knew about formula and about

one mother in 10 was recommended to use infant foods by the medical staff while she was still in hospital. Only one-third of mothers thought that breast-feeding could satisfy a baby's nutritional requirements until 6 months of age and there would be no need for other supplemental foods. Some Uygur mothers said: 'Breast milk is not thick enough for baby's growth'. The majority of babies (65.1%) were fed formula as a complement to breast-feeding at 6 months of age. The average time for the introduction of solid foods in the Han and minority groups were 4.7 and 5.7 months, respectively³².

The main problem of breast-feeding in Xinjiang was the early introduction of formula or water. The WHO recommends that infants should be fed exclusively on breast milk from birth to 6 months of age, with no water or other liquids or food during this period³³. Education should highlight 'exclusive breast-feeding' and correct some old misconceptions.

There are several limitations that need to be considered when interpreting the results of this study. While the sample included urban and rural areas, logistically it was not possible to include subjects from the very remote or

Table 3 Mother's perceptions about breast-feeding and formula in Xinjiang, People's Republic of China, 2003–2004 (*n* = 1219)

Question	Han		Uygur		Kazakh		Others		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
How long can breast-feeding satisfy all of a baby's nutritional requirements?										
< 4 months	47	9.4	101	29.5	24	13.3	9	12.3	181	16.5
4 months	242	48.2	201	58.8	60	33.3	24	32.9	527	48.0
6 months	201	40.0	40	11.7	87	48.3	33	45.2	361	32.9
> 6 months	12	2.4	0	0.0	9	5.0	7	9.6	28	2.6
Total	502	100.0	342	100.0	180	100.0	73	100.0	1097	100.0
At what age do you plan to start giving your baby supplemental food?										
< 4 months	41	8.0	255	80.4	41	24.0	2	2.7	339	31.4
4–5 months	233	45.2	23	7.3	28	16.4	34	45.3	318	29.5
6 months	171	33.2	27	8.5	57	33.3	15	20.0	270	25.0
> 6 months	41	8.0	4	1.3	23	13.5	10	13.3	78	7.2
Don't know	29	5.6	8	2.5	22	12.9	14	18.7	73	6.8
Total	515	100.0	317	100.0	171	100.0	75	100.0	1078	100.0
What is infant formula?										
Breast-milk substitute	373	72.9	273	80.1	74	41.6	53	68.8	773	69.8
Healthy food	25	4.9	42	12.3	26	14.6	6	7.8	99	8.9
Don't know	114	22.3	26	7.6	78	43.8	18	23.4	236	21.3
Total	512	100.0	341	100.0	178	100.0	77	100.0	1108	100.0
Compared with breast milk, formula is:										
Not so good	429	84.8	296	87.3	136	80.5	67	87.0	928	85.1
The same	77	15.3	43	12.7	33	19.6	10	13	163	14.9
Total	506	100.0	339	100.0	169	100.0	77	100.0	1091	100.0

nomadic areas of the province. However, only a small proportion of the population lives in these areas.

Conclusion

The present study documents infant feeding patterns in Xinjiang and highlights the main ways in which they differ from national and international best practices. 'Any breast-feeding' rates at discharge and at 6 months were 92.2 and 73.0%, respectively. 'Exclusive breast-feeding' rates at discharge and 6 months were 66.2 and 6.2%, respectively. The main problem of breast-feeding in Xinjiang was the early introduction of formula or water. Further studies are needed to identify factors associated with 'exclusive breast-feeding' and duration.

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