

Original Article

Determinants of exclusive breastfeeding duration in Xinjiang, PR China

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Objective: To document 'exclusive breastfeeding' duration and factors associated with duration in Xinjiang, PR China.

Methods: A cohort of 1219 mothers in Xinjiang, PR China was recruited to study their infant feeding practices. The mothers who delivered babies during 2003 and 2004 were contacted in hospital and again at 0.5, 1.5, 2.5, 3.5, 4.5 and 6 months postpartum, or until they ceased to breastfeed. Interviews were conducted using a structured questionnaire. Survival analysis was used to calculate the mean of 'exclusive breastfeeding' and explore factors affecting 'exclusive breastfeeding' duration.

Results: The average 'exclusive breastfeeding' duration in Xinjiang was 1.8 months. Factors negatively associated with 'exclusive breastfeeding' duration were mother's going to work and using pacifier. Factors positively associated with 'exclusive breastfeeding' duration were 'whether the maternal mother breastfed her children' and deciding 'exclusive breastfeeding' before delivery.

Conclusions: 'Exclusive breastfeeding' duration in Xinjiang, PR China was short. The study identified some factors associated with 'exclusive breastfeeding' duration. The results suggested an education program aimed to correct traditional inappropriate breastfeeding perceptions and promote 'exclusive breastfeeding' in Xinjiang.

Key Words: 'exclusive breastfeeding', breastfeeding duration, factors, Xinjiang, China

Introduction

'Exclusive breastfeeding' benefits infants by protection against infection and some chronic diseases and it leads to improved cognitive development.^{1,2} The benefits of exclusive breastfeeding to infants and mothers have been extensively documented and include protection against the transmission of HIV.³⁻⁶ The World Health Organization (WHO) recommended the 'exclusive breastfeeding' for 6 months, with introduction of complementary foods and continued breastfeeding thereafter.⁷ The target of China, in the Chinese Children's Development Plan in 1990s, was to achieve a national 'exclusive breastfeeding' rate at four months of 80% by 2000.⁸

There have been significant changes in breastfeeding practices in China over the past forty years. 'Ever breastfed' rates were over 80% in the 1950s and 1960s. But during the 1970s, the rates started to decline considerably when the use of breastmilk substitutes became widespread.^{9,10} As a result of breastfeeding promotion since late 1980s in China, the breastfeeding rates began to rise in the 1990s.¹¹ But the increasing rate of 'exclusive breastfeeding' was not as significant as 'any breastfeeding'.¹² A survey from Hefei, the capital city of Anhui province, showed that 'Any breastfeeding' rates at four to six months were 92%, but 'full breastfeeding' rates was only 51%.¹³ The 'exclusive breastfeeding' rates at four months were 46% in Nanchang, the capital city of Jiangxi province¹⁴, 37% in Ningxia province¹². The 'exclusive breastfeed-

ing' rates at four months in Shanghai suburbs were 20% in 1994, 36% in 1995 and 70% in 1996.¹⁵ 'Full breastfeeding' rates at four to six months in Tibet were only 3% in urban areas and 13% in rural areas.¹⁶ In 12 cohort studies of breastfeeding conducted between 1994 and 2000 in a number of provinces, the 'exclusive breastfeeding' rates at four months ranged from 36% to 77%.¹⁷⁻¹⁹ All of the provinces had 'exclusive breastfeeding' rates below the Chinese target of 80% 'exclusive breastfeeding to 4 months'.

The Xinjiang Uygur Autonomous Region is located in Western China, with a population of 19.6 million, comprising 45.7% Uygur, 39.7% Han, 7.0% Kazakh and other more than ten ethnic groups. The birth rate was 16 per thousand and death rate 5.1 per thousand in 2004.

A cross-sectional study undertaken in Shihezi, Xinjiang in 1994-1996 showed mean duration of 'any breastfeeding' was 5 months and 'full breastfeeding' only 3 months.²⁰ A more recent national cross sectional survey undertaken in 2000 reported that the 'exclusive breastfeeding' rate in Xinjiang at four months was 19%.¹²

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This was well below Chinese and international targets and had significant implications for the health of the children in the region. A more detailed study of 'exclusive breastfeeding' using a longitudinal study is needed to provide the data necessary to implement a comprehensive health promotion program. The objective of this study was to document 'exclusive breastfeeding' duration and factors associated with the duration in Xinjiang.

Materials and methods

A longitudinal cohort study of infant feeding practices was undertaken in the Xinjiang Uygur Autonomous Region, PR China. 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 respectively) using a structured questionnaire to obtain details of infant feeding practices.

A total of 1256 mothers were randomly recruited in five hospitals or institutes located in urban areas (Shihezi People's Hospital, Shihezi Maternal and Child Health Care Institute, Urumqi Maternal and Child Health Care Institute) and rural areas (Chabuchaer Maternal and Child Health Care Institute and Yumin County Hospital). In Shihezi People's Hospital, mothers were recruited every second day due to staffing constraints. In other hospitals, all mothers were invited to participate in the study and 97% (1219) agree to participate. The response rate was 97%. 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. In 1991, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) jointly launched the Baby Friendly Hospital Initiative (BFHI) and all of the hospitals in the study are accredited according to the international criteria.²¹ The education of nurses is controlled by the Province and all nursing and medical staff are required to attend the same training course on breastfeeding.

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 languages by nurses from their own ethnic group.

The questionnaire was based on one that has been extensively used in breastfeeding cohort studies in Australia, Vietnam and Kenya.²²⁻²⁵ The questionnaires were designed to identify the feeding method and to collect information on factors associated with breastfeeding. 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 in front of the questionnaire and were informed of their rights to withdraw from the follow up process at anytime without prejudice. All of the personal data collected were kept confidential.

All data analyses were carried out using the Statistical Package for Social Science (SPSS), release 12.0 (SPSS Inc., Chicago, IL, USA). Survival analysis was performed on women who were breastfeeding at the time of discharge from hospital. Kaplan-Meier model was used to calculate mean of 'exclusive breastfeeding' and assessed their differences. Cox regression analysis was undertaken to explore factors affecting 'exclusive breastfeeding' duration. HR (hazard risk) refers to the risk of cessation of 'exclusive breastfeeding'.

Definitions of breastfeeding used in this study are:²⁶⁻²⁸

'Any breastfeeding': The child has received breastmilk (direct from the breast or expressed) with or without other drinks, formula or other infant food.

'Exclusive breastfeeding': Breastfeeding 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 breastfeeding': Infant may receive small amounts of culturally valued supplements – water, water-based drinks, fruit juice or ritualistic fluids.

'Full breastfeeding': 'Exclusive breastfeeding' and 'almost breastfeeding'.

Results

Table one lists the demographic factors that might be expected to have an influence on 'exclusive breastfeeding' duration. The average 'exclusive breastfeeding' duration in this study was 1.8 months.

Factors significantly associated with 'exclusive breastfeeding' duration were: living areas, ethnic group, maternal education and employment, family income, gestational age, infant birth weight, maternal age, number of family members, delivery method, when mother returned to work, whether maternal the mother breastfed her children, using a pacifier and the time when the infant feeding method was chosen.

Factors which were not found to be associated with 'exclusive breastfeeding' duration were: parity and baby's gender.

Almost all of the mothers (1118) in the study were married, while eight were separated and one widowed.

The 'exclusive breastfeeding' duration was decreased when a mother returned to paid employment. The earlier the mother returned to work, the less likely she was to continue 'exclusive breastfeeding'. Infants who had been introduced to a pacifier before two weeks of age were less likely to be exclusively breastfed. On the other hand, women whose own mother breastfed her children and who decided feeding method before delivery were more likely to 'exclusive breastfeed' their babies longer.

Discussion

The WHO has recommended that women should exclusively breastfeed their infants for up to around 6 months

Table 1. 'Exclusive Breastfeeding' Duration (Months) by Demographic Factors in Xinjiang, PR China, 2003-2004

Factors	Value	n	Mean (month)	95% CI		<i>p</i>
Living Place	Rural Area	310	3.6	3.3	3.9	<0.01
	Urban Area	909	1.2	1.1	1.3	
Ethnic	Han	578	2.1	1.9	2.2	<0.01
	Uygur	360	0.5	0.4	0.6	
	Kazakh	199	2.6	2.3	3	
	Others	82	4	3.5	4.5	
Maternal Education Year	< 9	476	2.3	2.1	2.5	<0.01
	10-12	305	1.9	1.7	2.1	
	>=13	355	1.3	1.1	1.5	
Maternal Job	House Wife	500	2.1	1.9	2.4	<0.01
	Sales	155	1.9	1.6	2.2	
	Worker	119	1.1	0.8	1.3	
	Farmer	95	2.5	2.0	3.0	
	Office Worker	249	1.4	1.1	1.6	
	Others	26	1.1	0.6	1.7	
Family Annual Income (Renambi)	<10000	309	2.6	2.3	2.8	<0.01
	10000-19999	356	1.8	1.6	2.0	
	>=20000	258	1.4	1.2	1.6	
Gestation Age	< 37	39	1.0	0.4	1.6	<0.01
	>=37	917	2.0	1.9	2.2	
Birth Weight	<2500g	37	0.6	0.1	1.0	<0.01
	2500-3999g	1019	1.9	1.8	2.0	
	4000g+	112	1.6	1.2	2.0	
Parity	Primiparous	924	1.8	1.7	2.0	>0.05
	Multiparous	199	2.0	1.7	2.4	
Baby's Gender	Male	616	1.8	1.6	2.0	>0.05
	Female	561	1.8	1.7	2.0	
Maternal Age	<25	184	1.9	1.6	2.2	<0.01
	25-29	544	2.0	1.8	2.2	
	30-34	307	1.9	1.6	2.1	
	>=35	66	1.1	0.7	1.5	
Family Member	3	732	1.6	1.5	1.8	<0.01
	4	209	1.9	1.6	2.2	
	5	124	3.0	2.6	3.5	
	>=6	47	3.2	2.6	3.9	
Delivery Method	Normal Vaginal	416	2.3	2.1	2.5	<0.01
	Episiotomy	186	1.7	1.4	1.9	
	Caesarean	537	1.5	1.3	1.6	
Age of infant when mother returned to work	< 6 months	179	1.6	1.3	1.8	<0.01
	>= 6 months	356	1.1	0.9	1.2	
Maternal mother breastfed her children	No job	515	2.7	2.5	2.9	<0.01
	Yes	266	2.2	2.1	2.4	
Using pacifier in two weeks	Yes	858	0.8	0.6	1.0	<0.01
	No	281	0.5	0.4	0.6	
Time of deciding feeding method	Yes	186	1.7	1.4	2.0	<0.01
	No	632	2.4	2.2	2.6	
Time of deciding feeding method	Before delivery	632	2.4	2.2	2.6	<0.01
	After delivery	520	1.3	1.1	1.4	

p value <0.05 indicated the mean of 'exclusive breastfeeding' was significantly different estimated by Log Rank statistics. Exchange rate (27 June 2006) 100 Renambi (RMB) is the equivalent of 12.5016 US Dollars

of age and beyond.⁷ and the Chinese national target is for 80% of mothers to 'exclusive breastfeeding' to four months. In our study, few women 'exclusively breastfed' to even four months and the average duration of 'exclusive breastfeeding' in Xinjiang was only 1.8 months.

Early introduction of water, formula or other infant food was common in Xinjiang, China and other countries¹

although 'exclusive breastfeeding' is the best protection against many infectious and chronic diseases. In Vietnam, the 'exclusive breastfeeding' rate at four months was 43.5%²⁹ and in China ranged from 36% to 77%.¹⁷⁻¹⁹ A survey in rural parts of Shihezi found that in 1997 'exclusive breastfeeding' rates in the first week were 41% in Han, 53% in Uygur, 62% in Kazakh and 33% in Hui

Table 2. Factors Associated With the Risk of Discontinuing 'Exclusive Breastfeeding' Before Six Months, Xinjiang, PR China, 2003-2004

Factors	Values	Cox Regression			
		n	HR [§]	95% CI	
Age of infant when mother returned to work	< 6 months	50	1.55	1.07	2.25
	≥ 6 months	164	1.44	1.07	1.93
Using pacifier in two weeks	No job	80	1		
	Yes	193	1.57	1.19	2.08
Maternal mother breastfed her children	No	101	1		
	Yes	154	1		
Time of deciding feeding method	No	140	1.43	1.10	1.86
	Before delivery	87	1		
	After delivery	207	1.46	1.10	1.93

-2 log likelihood (deviance)=2849.953, df=5. [§] HR = hazard ratio. Non-significant variables were maternal age, job, years of education, parity, delivery method, infant's first feed, whether demand fed, initiated breastfeeding within 30 minutes of birth, infant was admitted to special care nursery, the mother attended antenatal classes, father or grand mother support breastfeeding at two weeks, father's feeding preference, maternal grandmother's feeding preference, baby's gender, family annual income. All variables in the final model were variables for which, when excluded, the change in deviance compared with the corresponding chi-square test statistic on the relevant degrees of freedom was significant. At six months, 3% of infants continued to be 'exclusively breastfed'.

ethnic groups.³⁰ However because of the small sample size (n=380) only the difference between Kazakh and Hui groups was significant. The average age for the introduction of solid foods were 4.7 in the Han and 5.7 months in minority groups in Karamay, Xinjiang.³¹

Perceptions about the importance of breastfeeding were significantly associated with 'exclusive breastfeeding' duration. In this study both the maternal mother's breastfeeding had a positive influence to her daughter's feeding method and deciding to 'exclusive breastfeed' before delivery, increased the 'exclusive breastfeeding' duration. There are several inappropriate beliefs about infant feeding that are commonly held in this region. For example, feeding water to newborns is common in hospitals because many doctors thought that infant jaundice was associated with dehydration. Also the climate of Xinjiang is dry and traditionally mothers feed baby water to their infants early in life. Frequently small amounts of sugar are added to water given to infants. More than half of the mothers thought that 'exclusive breastfeeding' could not satisfy a baby's nutritional requirements until six months of age. These incorrect perceptions, often enhanced by advertising and ready availability of infant formulae, make it difficult to achieve the target of 'exclusive breastfeeding' to four or six months.

Mother's return to paid employment negatively influenced 'exclusive breastfeeding', especially in mothers who return to work early. The government guidelines for maternity leave are that a mother should have three months delivery leave and one month lactation leave.⁹ The total of four months leave that is available is not enough to allow for 'exclusive breastfeeding' for six months.^{31,32}

Some studies have shown that pacifier use is negatively associated with the duration of breastfeeding³³ and similar results were found in this study. The introduction of a pacifier in the first two weeks increased the risk for the cessation of 'exclusive breastfeeding'. In our study, 80% Uyghur and 47% Kazakh mothers gave pacifiers to their babies. In the minority groups the use of pacifiers was not related to maternal employment or education and fam-

ily income. Pacifiers were only used by 3% of the Han mothers. Any education programs that include advice on the use of pacifiers should be targeted towards the minority groups.

The results show that programs are needed to promote the importance of exclusive breastfeeding in Xinjiang. Education programs are needed to correct traditional inappropriate breastfeeding perceptions and to encourage parents to make a decision to 'exclusive breastfeeding' either before pregnancy or early in the pregnancy. The extension of mother's delivery leave to six months would make it easier to achieve exclusive breastfeeding to six months.

Several limitations need to be considered when interpreting the results of this study. While the sample included urban and rural areas, it was not logistically possible to include subjects from the very remote areas and isolated nomadic areas of the region. However, only a small proportion of the population live in these areas.

Conclusions

The mean 'exclusive breastfeeding' duration in Xinjiang was only 1.8 months. Factors negatively associated with 'exclusive breastfeeding' duration were 'mother's return to paid employment' and the 'use of a pacifier'. Factors positively associated with 'exclusive breastfeeding' duration were the 'maternal mother breastfed her children' and 'deciding to 'exclusively breastfeed' before delivery. Increasing the length of maternity leave available to mothers and programs to further promote exclusive breastfeeding would be of benefit in this region.

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中国新疆纯母乳喂养时间的影响因素

目的: 调查中国新疆的纯母乳喂养时间及其影响因素。

方法: 队列研究。于 2003 至 2004 年, 随机抽取在新疆乌鲁木齐市、石河子市、察布查尔县和裕民县分娩的 1219 名产妇。调查孩子出生时的喂养状况, 并于产后 0.5, 1.5, 2.5, 3.5, 4.5 和 6 个月随访婴儿的喂养状况。6 个月前断奶的孩子随访到断奶为止。调查工具为测试合格的问卷。统计方法为生存分析。

结果: 新疆纯母乳喂养时间为 1.8 个月。不利于维持纯母乳喂养时间的因素为母亲上班和给孩子含空奶嘴, 有利因素为姥姥有母乳喂养经历、产前决定纯母乳喂养。

结论: 中国新疆的纯母乳喂养时间比较短。根据本次研究筛检出的影响纯母乳喂养的因素, 建议开展有关的健康教育, 更正传统上不合理的喂养观念, 从而延长该区的纯母乳喂养时间。

关键词: 纯母乳喂养、母乳喂养时间、因素、新疆、中国。