

Original Article

A population-based survey on infant feeding practice (0-2 years) in Hong Kong: breastfeeding rate and patterns among 3,161 infants below 6 months old

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The prevalence of breastfeeding for the first 6 months in infants has been low in Hong Kong since the 1970s. In order to develop effective breastfeeding policies and promotion programs, an appraisal of feeding practices and factors related to initiation and early cessation of breastfeeding is necessary. A survey with a *population-based representative* sample was conducted to determine social-demographic, personal and cultural factors that influenced decision, duration and practice of infant feeding among infants 0-24 months old. This paper focuses on infants below 6 months old to study factors related to decision, duration and practice of breastfeeding. In 1993, 7,298 healthy infants were recruited from 46 Maternal-and-Child-Health-Clinics (MCHC) throughout Hong Kong, of whom 3161 were below 6 months old. The mother reported her feeding decision, duration and practice in a questionnaire. Breastfeeding rate was found to be very low (8.4%) for infants below 6 months old. Only 50.9% infants were breastfed. Infant formulae were widely given among *partially* breastfed infants. 45% mothers were full-time employed. Most mothers were aware of the benefits of breastfeeding to the infants and themselves. Husbands (43.3%) were regarded the most influential on initiation and duration on breastfeeding. Restricted food varieties (54%), sore nipple and breast engorgement (67%), perceived home confinement (41.5%) and perceived inadequate milk supply (31.7%) were major concerns upon breastfeeding. Furthermore, 76.9% mothers turned to MCHC staff for advice when they encountered difficulties during breastfeeding. In conclusion, the survey collected population-based representative data on factors determining initiation and early cessation of breastfeeding in Hong Kong in 1993. The findings will serve as a cornerstone in understanding the evolution of breastfeeding practice in Hong Kong. It merits further study to investigate how the confounders interplay to modulate initiation, duration and patterns of breastfeeding.

Key Words: breastfeeding, breastmilk, infant formulae, infants, Hong Kong.

Introduction

Breastmilk is an ideal natural food for infants. Exclusive breastfeeding up to 6 months is recommended by World Health Organization (WHO) and that breastfeeding can be extended to 2 years of age or beyond provided that there are appropriate complementary foods.¹ Over the last 4 decades, both the initiation and duration of breastfeeding (BF) in Hong Kong has been low which coincides with rapid urbanisation and economic development. According to the official figures, the rate of ever breastfeeding among newborns in Hong Kong was 68% in 1932 and this gradually declined to 45%, 11% and 5% in 1962, 1972 and 1977 respectively, the rate increased to 10% in 1982 and then plateaued off in 1984-1992 (~23-24%).² Sporadic studies in the last three decades indicated that breastfeeding attempt was as high as 44% in 1967, and dropped to 5% by 1978,³ then increased

to 28% in 1983.⁴ Leung *et al.*, 2002⁵ compared ever breastfeeding rates of two large cohorts of infants born in 1987 and 1997 and found that the rate increased from 26.8% to 33.5% over a decade.

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Although the resurgence of the initiation of breastfeeding since early 1980's seemed promising, the breastfeeding rate in Hong Kong in the 1990s was still remarkably lower than those Western developed countries namely, Norway, Denmark, Australia and New Zealand where breastfeeding rates are as high as 75-97%.^{6-10, 31} In these countries there are well established health and social policies as well as infrastructure to promote, facilitate and protect breastfeeding.

In Hong Kong, there has been limited large-scale *population-based* survey on factors determining feeding practice of infants and children below 24 months of age. Information on factors associated with initiation, duration and decision process of breastfeeding based on a population-based representative sample of infants will serve as a cornerstone to understand the evolution of breastfeeding practice in Hong Kong. The findings will also be useful for the government to devise appropriate public health policies and breastfeeding promotion programs in Hong Kong. Some earlier breastfeeding figures in Hong Kong were merely ever breastfeeding rates, the duration of breastfeeding is unknown, and that the small sample size in some of these studies limits generalization of these findings. In 1993, Hong Kong Nutrition Association in collaboration with Family Health Service (FHS), Department of Health of Hong Kong government jointly conducted a *territory-wide* survey to study the feeding practice of infants and young children from birth to 24 months of age. The survey aimed to determine social-demographic, personal and cultural factors that may influence decision, duration and practice of infant feeding. The present paper considers the study design, recruitment process; and provides a descriptive report on the parental and infant characteristics, socio-demographic, personal and cultural factors that might influence decisions, durations and practices of breast-feeding among infants aged from birth to 5 months of age.

Subjects and methods

Maternal and Child Health Clinics (MCHC) under FHS of the Department of Health provide free public health service to monitor growth, to detect developmental abnormalities and to administer a universal immunization program to children from birth to 5-years of age in Hong Kong. Seven to eight scheduled visits to the MCHC are arranged for each infant ever since birth. In 1993, the official statistical figures showed that 92% of newborn infants and young children aged under 6-year in Hong Kong visited the MCHC.¹¹ Therefore, recruitment of subjects for a few weeks at all 46 MCHC should have provided a representative sample of infants and young children for the survey. In 1993, there were 71,799 live births in Hong Kong,¹¹ given the MCHC attendance rate being 92%, the anticipated sample size in any 2-week period in 1993 was about 19,600. The breakdown of sample size for the age groups as follows: 0-5 months, 6-12 months and >12 months were 7350, 9800 and 2450 respectively.

The cross-sectional survey was conducted for two weeks between March 22 and April 4, 1993. Healthy infants aged 0-24 months were investigated during the survey period when attending one of the 46 MCHC throughout Hong Kong. Infants were interviewed and

selected by doctors at each of the 46 MCHC if they fulfilled the inclusion criteria that they were Chinese descendants; full-term at birth and healthy, i.e., without any history of congenital or acquired serious illness. Infants who had suffered from acute or chronic diseases that required extended hospitalisation for over one week or requiring any long-term medication would be excluded from the study.

Three age-specific questionnaires were developed for the survey in accordance with the age of the infants, i.e., 0-5 months, 6-12 months and >12 months because growth and development and feeding patterns of infants vary a great deal from birth to 24 months of age. The questionnaires were designed to collect information on variables known or suspected to be associated with infant feeding decision, duration and practice. Each questionnaire was broadly divided into three parts: Part I: Demographic information of the infants and parents. Blanks and spaces were provided for filling in information. Part II: Mode of feeding practice and problems of feeding practice ever encountered. Part III: The mother's decision process on feeding choice. Blanks are provided for writing down feeding practices while options were listed in Parts II and III of the questionnaires to report feeding problems encountered by the mothers as well as factors determining initiation and early cessation of breastfeeding. Spaces are also provided in Parts II and III of the questionnaires for respondents to provide further information not listed in the options. Three sets of questionnaires were colour-coded for ease of distribution. Mothers or principal caretakers of the suitable infants were invited to complete a *self-administered* questionnaire. Furthermore, a "survey corner" was also set up at each of the MCHC to facilitate enrolment, where tables, chairs, stationery, a poster with pictorial instructions and a sealed self-deposit collection box were provided to facilitate on site completion of the questionnaire. Nonetheless, some infants were brought to the clinic by grandparents or domestic helpers who might not have known the details as required in the questionnaire. Some mothers might also have found it difficult to complete the questionnaire on-site while managing the infant. Hence, stamped and self-addressed envelopes were also provided to the respondents for mailing back the questionnaires when necessary. An anonymous telephone hotline was made available to the respondents during the survey period. Staff at MCHC were instructed not to give any comments to the answers of the questionnaire but only to give instructions for completing the questionnaire. Body weight of infants was measured to the nearest 0.1 Kg by the MCHC nurses on Seca infant digital weighing scale (Schmidt & Co. (H.K.) Ltd.).

Infants aged 0-5 months old were further categorized into 5 age sub-groups for reporting results: Group 1: from birth to 40-day old, i.e. from birth to one month old plus 10 extra days. In 1990s, working women in Hong Kong were entitled to 10 weeks statutory maternity leave, i.e. 4 weeks before and 6 weeks after giving birth. Some mothers would utilize the 6 weeks (42-days) post-delivery maternity leave period to breastfeed their infants. Towards the end of the maternity leave, the working mothers would attempt to wean off the infants from breastmilk with a gradual introduction of infant formulae. This is to

prepare for resumption of her full time job. Hence, extending 10 more days following the first month (30 day) of age to a 40 day period would reveal more information relating to the duration and practice of breast-feeding at the peri-maternity leave period. As a result, infants below 5 month old were categorised into the following 5 age sub-groups for reporting results: Group 1: 0-40 days (~ 1 month) old, Group 2: 41-70 days (~2 months) old, Group 3: 71-100 days (~3 months) old, Group 4: 101-130 days (~4 months) old, Group 5: 131-160 days (~5 months) old. Breastfeeding in the survey was defined as over 70% of the feeds given per day coming from breastmilk and the infant was thus regarded as breastfed. Clearance of ethical approval was obtained from the Ethics Committee, Department of Health, Hong Kong Government before subject recruitment.

Statistics

Descriptive statistics was used for data analysis. Group comparisons were tested by two-tailed student's t test. Data were summarized as mean ± SD. The level of significance was set at *P*<0.05. SPSS Version 11 (SPSS, Chicago, IL, U.S.A.) was used for statistical analysis.

Results

14,366 infants and young children aged 0-24 months fulfilling the selection criteria were invited to enter the survey. The number of subjects selected per age group were 7303, 3652 and 3411 for age 0-5 months, 6-12 months and age >12 months respectively. The response rate to the survey was slightly higher than 50%, i.e., 0-5 months age (50.9%, *N* = 3717), 6-12 months age (50.8%, *N* = 1855) and age >12 months (50.6%, *N* = 1726). Consequently, a total of 7,298 infants and young children were finally included for data analysis in the present survey. Data of 556 infants out of 3717 aged 0-5 months were subsequently rejected due to missing key information such as date of birth, sex or current mode of feeding. Hence, results of data analysis in the present study were based on 3161 infants under 6 months of age.

Parental information

Mean age of fathers and mothers were 33.2 ± 5.0 years and 29.6 ± 4.3 years respectively. Mean weight of fathers and mothers were 65.6 ± 9.5kg and 55.5 ± 8.3kg respectively. Height of fathers and mothers were 170 ± 6.8 cm and 158 ± 6.2 cm respectively. The length of stay in Hong Kong was 27.6 ± 9.2 years for fathers and 24.4 ± 10.2 years for mothers. All the parents were Chinese descents, and their places of origin in China were mainly from Guangdong Province (fathers 92% and mothers 88.2%) and provinces other than Guangdong (fathers: 4.6%, mothers: 7.9%), South China. The remaining parents came from other parts of China. Regarding parental education level, over 80% parents had educational attainment at secondary school or above (Table 1). A higher proportion of fathers (20.9%) than mothers (12.8%) had vocational training or tertiary education, especially university education (10.2% vs. 4.9%). The figures are in line with the results of 1991 Population Census in Hong Kong.¹² The unemployment rate was very low among the parents (Table 2), only 0.4% fathers

were unemployed, whereas over 50% of mothers were full-time housewives, 43.1% mothers had full time employment. The figures are in comparable to the findings of the 1991 Population Census in Hong Kong.¹³ Parents were predominantly primary care-takers 62.2% (*N* = 1710), grandparents ranked second in providing primary care to the infants (21.2%). while domestic maids ranked third (7.4%) (Fig. 1). It was common that primary care takers sought for secondary support from grandparents, relatives or domestic maids to help look after their infants. However, the utility rate of baby-care service provided in the community was extremely low (Fig. 1).

Table 1. Educational attainment of parents among infants at 0-5 months old

Category	Father		Mother		1991 Census %
	<i>N</i>	%	<i>N</i>	%	
No school	12	(0.4)	18	(0.6)	12.8
Primary school	423	(13.9)	475	(15.5)	25.2
Secondary school	1974	(64.8)	2173	(71.1)	50.7
Technical/vocational	327	(10.7)	243	(7.9)	5.4
University	312	(10.2)	149	(4.9)	5.9
Total	3048	(100)	3058	(100)	100

Table 2. Employment status of parents among infants at 0-5 months old

Employment Status	Father		Mother		1991 Census %
	<i>N</i>	%	<i>N</i>	%	
Own proprietor	521	(18.5)	90	(3.2)	
Fully employed	1962	(70.0)	1215	(43.1)	(78.3% for male)
Part-time employed	75	(2.7)	57	(2.0)	(49.5% for female)
Causal worker	233	(8.3)	29	(1.0)	
Unemployed/housewife	10	(0.4)	1425	(50.6)	(1.9% for male)
Total	2801	(100)	2816	(100)	

Characteristics of infants under 6 months old

Mean birth weight for males and females were 3.25 ± 0.41 kg and 3.16 ± 0.42 kg respectively. The mean birth weight of the studied infants was similar to those of the full-term infants in the 1982-86 and 1998-2000 territory-wide cohort study in Hong Kong.¹⁴ The breakdown of body weight of males and females aged 0-5 months old as determined during clinic visits is depicted in Table 3.

Mode of feeding Practice

Figure 2 depicts the rates of breastfeeding and formula feeding among infants across the first 5 months of life. The average rate of breastfeeding and partial breastfeeding was extremely low among infants in the first 5 months of age (8.4%, *N*=265). In fact, formula feeding was the predominant mode of feeding (91.6%, *N*=2896). The rate of breastfeeding in the first 40-day of life, i.e. before the end of the maternity leave was only 18.4%. By

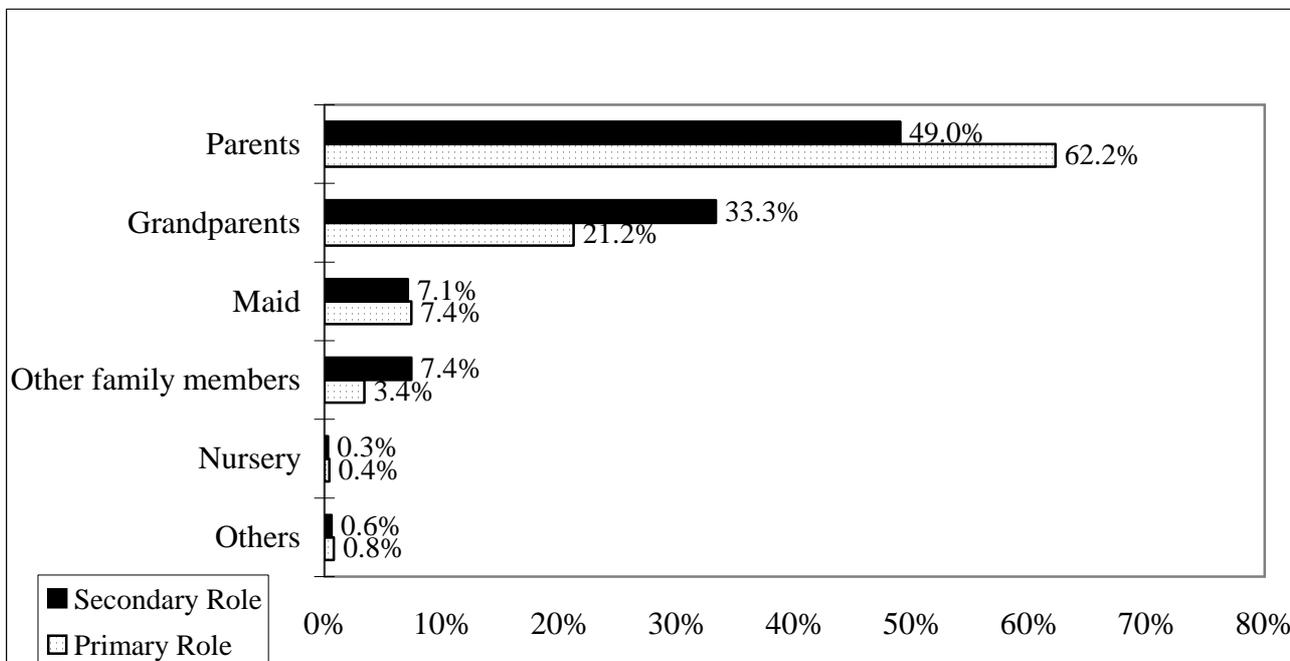


Figure 1. Care-takers profile of infants at 0-5 months old

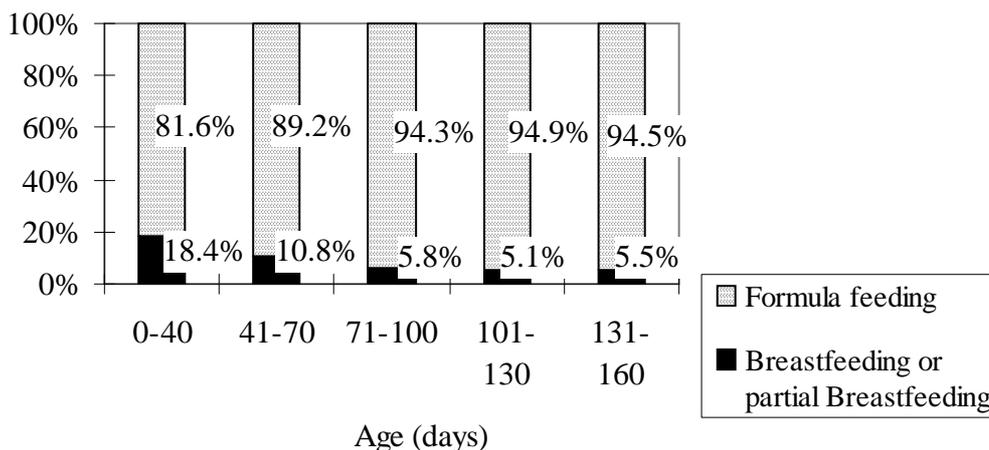


Figure 2. Modes of feeding (breastfeeding or formula feeding) for infants at 0-5 months old

Table 3. Body weight measured at clinic visit of infants aged 0-5 months old

Age (days)	Weight (Kg) (mean ± SD)	
	Males	Females
0-40	3.75 ± 0.79 ¹	3.59 ± 0.55 ²
41-70	4.54 ± 0.70 ³	4.36 ± 0.67 ⁴
71-100	5.75 ± 0.69 ⁵	5.33 ± 0.66 ⁶
101-130	6.51 ± 0.71 ⁷	6.02 ± 0.76 ⁸
131-160	7.12 ± 0.92 ⁹	6.63 ± 0.86 ¹⁰

¹N=203, ²N=174, ³N=234, ⁴N=226, ⁵N=284, ⁶N=262, ⁷N=336, ⁸N=310, ⁹N=245, ¹⁰N=239

the 2nd month, the rate dropped dramatically to 10.8%. However, the rate further declined to 5.8% by 3 months of life and then plateau off through to 5 months of age. Thus, giving up the already established breastfeeding practice might not be attributable to resumption of

employment *per se*. Within the breastfeeding group (N=265), slightly over a half were reported to be breastfed (50.9%, N=135), the remaining 49.1% were *partially* fed with infant formula to supplement breast feed (Fig.3). In the present study, partial breastfeeding is defined as less than 70% of daily nourishment was obtained from breastmilk. There was no significant difference in the percentages of breastfeeding and partial breastfeeding in the first 4 months of age except for the fifth month old children (P<0.05). Furthermore, the average number of daily supplemental feeds in the partially breastfed infants was on average 2.7 ± 1.8 feeds per day (Table 4), while one or two formula feeds per day was very common. In fact, among these infants. The volume of infant formulae per feed seemed to be given as a meal replacement rather than a milk supplement (Table 4).

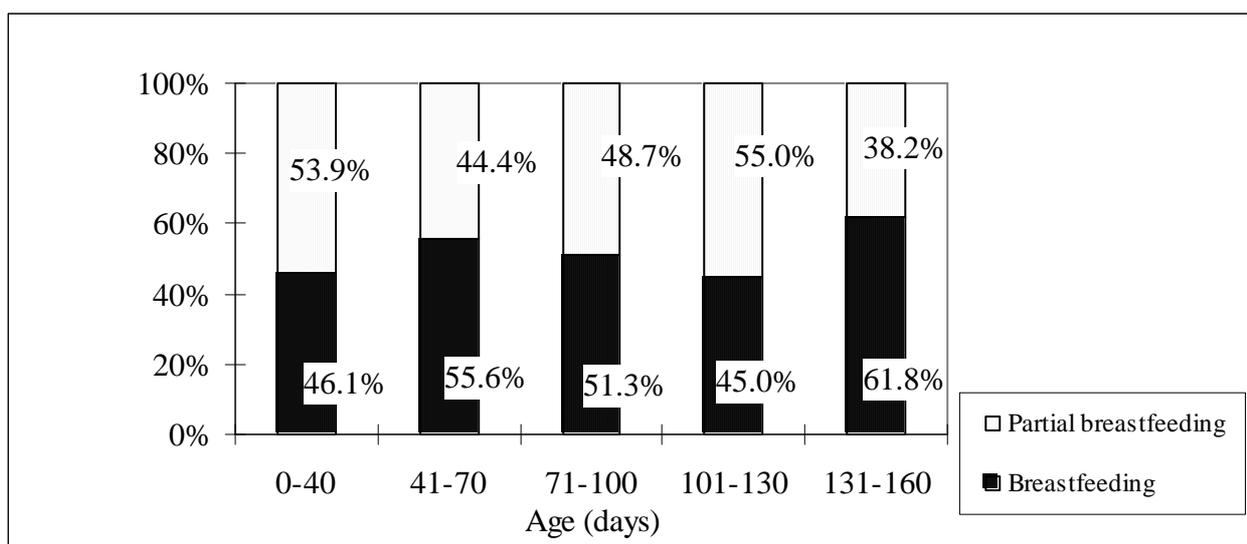


Figure 3. Percentage of breastfeeding and partial breastfeeding within the breastfeeding group of infants at 0-5 months old (N=265)

Table 4. Use of supplemental infant formulae among partially breastfed Infants

Age (days)	N	Feeds/d		Volume per feed (ml)	
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
0 - 40	41	3.1 ± 2.01	96.5 ± 47.1		
41 - 70	25	2.3 ± 1.6	107.4 ± 32.7		
71 - 100	18	3.2 ± 1.8	127.5 ± 26.9		
101 - 130	16	2.1 ± 1.1	118.7 ± 47.5		
131 - 160	10	2.4 ± 1.7	136.7 ± 50.3		
Overall	110	2.7 ± 1.8	110.6 ± 43.2		

Influential persons on the mother’s decision on breastfeeding

The husband was found to be the most influential person towards the decision on breastfeeding (43.3%) (Fig. 4). The husband’s support was more remarkable for breastfeeding at the fifth month of age when 52% mothers attributed the persistence of the practice to the support from their husbands. Furthermore, 25.2% mothers claimed that their choice of breastfeeding was influenced by health care professionals. However, the influence from health care professionals gradually declined for those who had successfully breast fed through to 3 months. Besides, 17.6% mothers attributed their breastfeeding decision to the influence from senior family members, friends and

peers. On the other hand, approximately 20% of mothers claimed that the decision of breastfeeding came from their own determination. Hence, the mother’s own determination was also a crucial factor for making up the decision of breastfeeding.

Perceived benefits of breast feeding

When the mother reported her perception on the benefits of breastfeeding, infant-oriented health benefits, namely, enhanced immunity (85.2%) and an ideal nourishment for infants (81.6%) were the two prime factors. Strengthening parent-child bondage was ranked third (62.3%) (Fig. 5). About 49% of mothers believed breast-feeding would expedite post-delivery recovery whilst 31.1% considered the practice was convenient and economical. The tendency of perceived benefits of breast-feeding was uniform across the ages for the first 5 months of life.

Mothers’ concerns over breast feeding

Mother-oriented rather than child-oriented difficulties and concerns were the major factors giving rise to anxiety and frustration encountered during breastfeeding (Fig. 6). Fifty-four percent of mothers were frustrated with the avoidance of certain foods and such a feeling accentuated as breast-feeding prolonged (46.9% from 1-month raised to 70.6% at 4 months). About 42% found breastfeeding

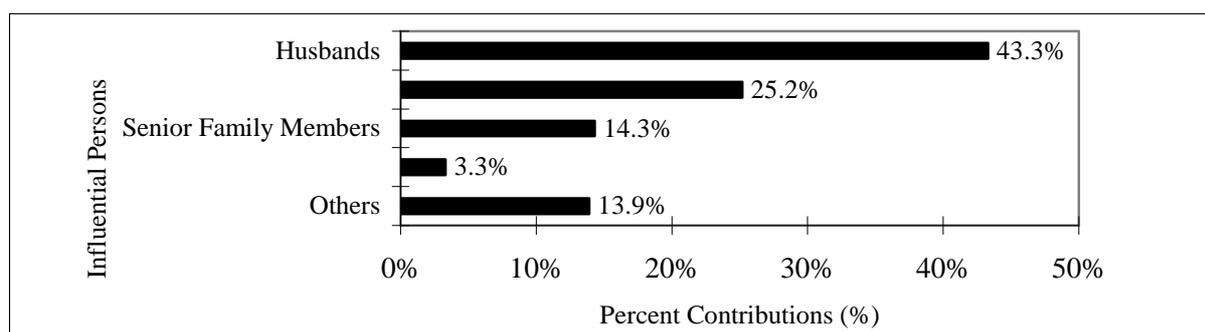


Figure 4. Influential persons on the mothers’ decision on breastfeeding (N=210)

inconvenient because of being confined at home. Breast engorgement and leakage caused nuisance and embarrassment were found in 44.2% mothers, and the complaints were consistent between babies aged 0-5 months old. About 23% reported painful and cracked nipple which was however improved gradually when the mother gained more experience (32.1% at 1-month declined to 11.5% at 4 months old). However, 42.3% women still experienced engorgement while only 11.5% had actual pain when the infant reached 5 months of age. 10.3% considered their poor health a concern that deterred them from continued breastfeeding. Yet, those mothers who successfully maintained the practice by the fifth month (11.5%) were still worried about their personal health when breast-feeding their infants.

health (3.1%) (Fig. 6). However, both conditions seemed to be resolved and disappeared by the third month of age: difficulty in nipple sucking (13.6%-0%) and infant's ill health (6.2%-0%) from the first to third month of age.

Sources of assistance sought when encountered breast-feeding problems

When the mothers encountered difficulties during breast-feeding, the sources of information, in order of priority, are depicted in Figure 7. About 77% considered MCHC medical and nursing staff as the prime source of assistance. Other doctors and health care professionals, as well as health educational materials, were also significant sources that mothers could utilise.

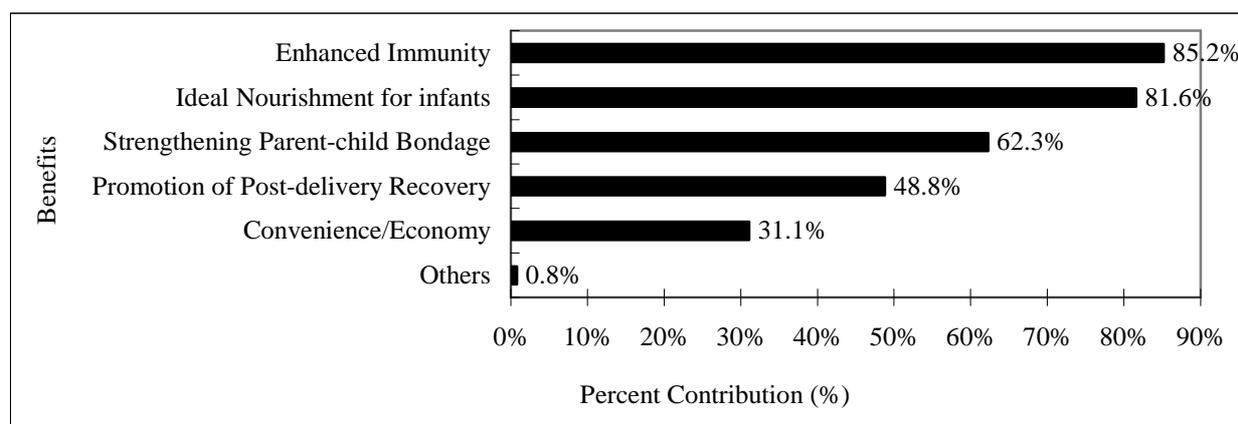


Figure 5. The mothers' perceived benefits of breastfeeding ($N = 244$)

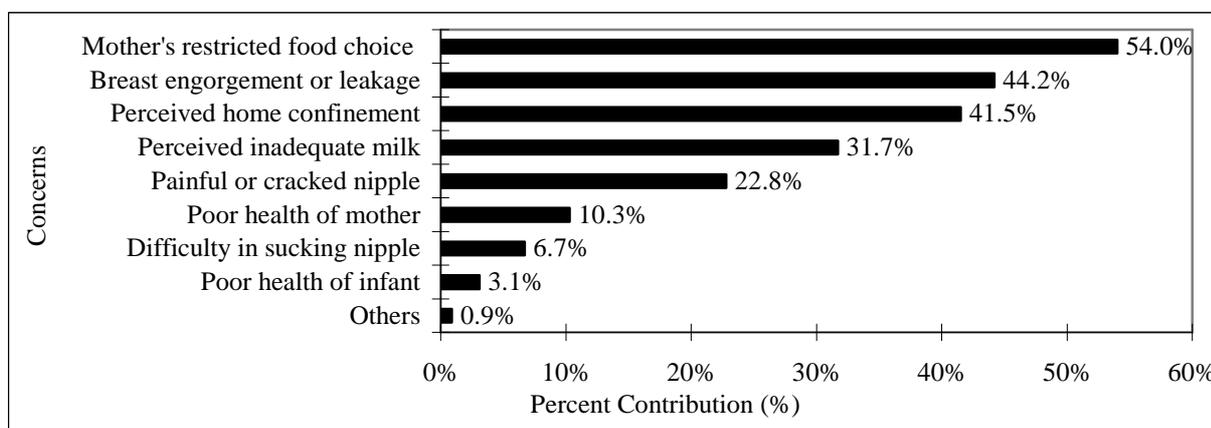


Figure 6. The mothers' perceived concerns over breastfeeding practice ($N = 224$)

A concern for perceived inadequate milk output during breastfeeding was expressed by 31.7% mothers (Fig. 6). A closer look at the data suggested such a concern among most mothers is presumptuous because a similar percentage of mothers in the first month (35.8%) as well as mothers of 4 months old breast fed infants (30.8%) shared the same worry. This worry was further substantiated by the fact that though supplemental infant formulae was given to over 50% of infants (Fig. 3), it was taken as a meal replacement (Table 4). This indicated that the infant might be generally satisfied with the quantity of breast-milk. The remaining two minor factors associated with discontinuation of breastfeeding were difficulty for the infant to find or suck the nipple (6.7%) or the infant's ill

Another 18.5% pointed out that a breastfeeding telephone enquiry hotline operated by the FHS was important. Only 11.3% would resort to friends, relatives or family members for assistance. Dietitians were the least consulted health care professionals even though they were in fact directly involved in nutrition education and counselling for feeding.

Discussion

This descriptive report is the first of its kind to report a large-scale territory-wide survey based on a representative sample of infant population in Hong Kong to study demographic, personal, social and cultural factors that influenced decision, duration and feeding practice in

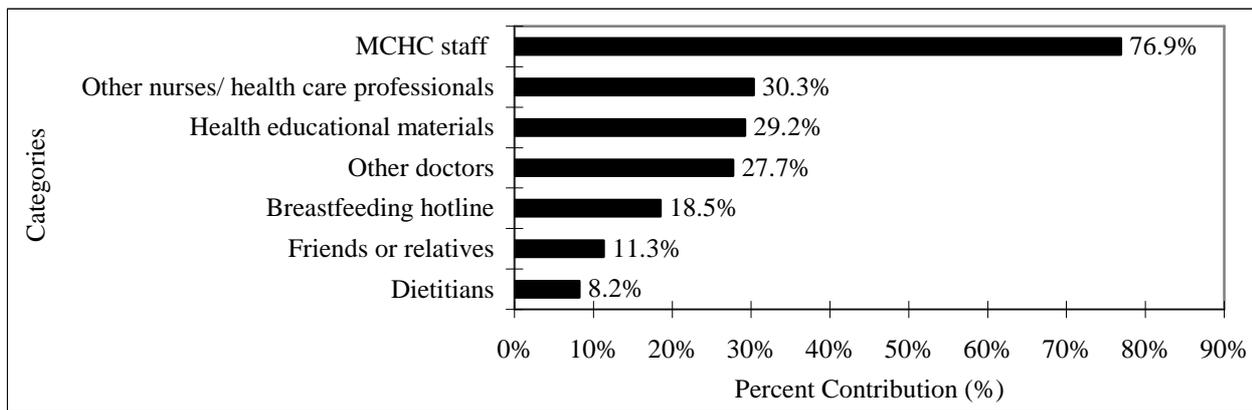


Figure 7. Sources of assistance sought when the mothers encountered problems of breastfeeding ($N=195$)

0-24 months old infants in Hong Kong. Demographic data of the surveyed parents were in general comparable to those of the Population Census in 1991¹³ while the mean birth weight of both males and females were similar to the population reference figures¹⁴ indicating that the study sample was representative of the infant population in Hong Kong.

Results based on the first batch of questionnaires (0-5 months of age) comprising 3161 infants revealed a very low breastfeeding rate for the first month of age (or 40 days), i.e. before the end of maternity leave. Nonetheless, the rate reached the lowest by the fourth and fifth month of age. Contrary to common belief, resumption of employment did not seem to be the factor *per se* contributing to early cessation of breastfeeding in this group of infants. Personal, social and cultural factors found important in the present study for the initiation and duration of breastfeeding will need a closer look in order to investigate how these factors interplayed to explain for the duration and patterns of breastfeeding.

The evidence on the benefits of exclusive breastfeeding is unequivocal. A large fraction of the surveyed mothers were aware of these benefits. Breastfeeding up-to 6 months has been shown to prevent allergy¹⁵⁻¹⁷ and to improve cognitive development and academic performance during childhood.¹⁸ In 2001, WHO based on a systemic review of scientific evidence¹⁹ recommends exclusive breastfeeding to newborns through to 6 months of age.¹ Despite its health benefits on the mother and child, breastfeeding rate and its duration in Hong Kong has been very low over the last four decades.

Thanks to the efforts of the government, Hospital Authority and non-government organizations in Hong Kong, the ever breastfeeding rate has shown a gradual improvement ever since mid 1990s. The rate increased to 40% in 1996 and 60% in 2001.²⁰ Chee & Horstmanhof (1995) also reported that the ever breastfeeding rate was 48% in 1996.²¹ Furthermore, official figures showed that the rate of breastfeeding up to 1 month remained steady between 30-35% from 1997 to 2000, breastfeeding rates up to 2 months, 4 months, 6 months were 20-25%, 15-18% and 10% respectively between 1997 and 2000.²⁰ However, the rates were still far from satisfactory when compared to those of developed countries with higher breastfeeding rates.⁶⁻¹⁰ Certainly, more efforts have to be made to boost the initiation and duration of breastfeeding in Hong Kong.

A lower incidence and shorter duration of breastfeeding has been found to coincide with increased urbanization and modernization of a society.^{22,23,25} The society of Hong Kong has witnessed a rapid economic growth and modernization over the last four decades. Transition to a modern society inevitable leads to abandonment of traditional customary habits such as lifestyle and food habits,²⁶ adoption of contemporary health service and use of commercial foods for infants and children such as infant formulae and complementary foods.²⁵ The use of formula feeding is regarded as trendy, sophisticated and convenient, especially for working mothers.²⁵

With the resurgence of nuclear families in many metropolitan cities, senior family members such as mothers and mothers-in-law who have experience in breastfeeding no longer live together under one roof with younger generations; this poses a negative impact on the support and advice to the inexperienced mothers on breastfeeding.^{27,28} Alternatively, some of these mothers and mothers-in-law in the late 50's and early 60's might have also formula fed their children and had little experience on breastfeeding; thus, they might not give any practical breastfeeding suggestions to their daughters with newborn infants. As a result, there are fewer breastfeeding role models for the new generation nursing mothers to model from. These could be some of the reasons leading to an early cessation of breastfeeding. In the present study, when the nursing mothers encountered difficulties in breastfeeding, their mothers or mothers-in-law were seldom named as a source of advice.

The early nineties was an era of blooming economy in Hong Kong, most married couples were employed in the work force, the unemployment rate was only 1.8% in 1991.¹³ This also reflected in the present survey in that 50% and over 99% of the surveyed mothers and fathers were employed in the work force. In recent decades, it is customary for the young working couples to bring their infants to their grandparents for day-care or even week-care, during weekends the infants return homes and are cared by their parents. Alternatively, a live-in domestic maid is employed to look after the baby and household chore. That might explain why grandparents and domestic maids had important roles either as primary or secondary care takers for the surveyed infants. This is a compromise to fulfil an intention to raise children by trustworthy carers in a safe and familiar environment, and at the same time earn a better living in an economically active society

where the traditional supportive network from an extended family has weakened.

Among the breastfed infants in the present study, only half of them were in fact breastfed. Ironically, another half of the breastfed infants partially fed with infant formulae were a prevailing practice in the present study. The findings implied that the addition of formula feeds might not necessary reflect an inadequacy of breastmilk output as indicated by over 30% of mothers in relation to their concerns over breastfeeding. The reasons as to why infant formulae was added as a meal replacement merits further investigation. However, previous studies have shown that an early introduction of milk supplements was associated with early cessation of breastfeeding.^{25,29-31} Each month's delay in introduction to infant formulae to the breastfed infants, the risk of early cessation of breastfeeding reduced by 3%.²⁵ Risk factors that have been reported to be associated with lower rate and early cessation of breastfeeding were returning to work,^{10,25,31} perceived insufficient milk supply,^{10,31,32} sore nipples and breast infection,^{10,31-32} being too tired³² and early introduction of food supplements.^{25,29-31} In fact, most of these risk factors and concerns were also frequently encountered by mothers in the present survey. If these difficulties and concerns were left unattended, it would lead to early stoppage of breastfeeding. In the present survey, although a majority of the mothers were aware of the benefits of breastfeeding, barriers such as social-demographic background, will-power, family and social support, resumption of employment and concerns over breastfeeding, etc. might have counterbalanced the awareness of breastfeeding benefits.

Breastfeeding can be practiced anywhere in some other cultures. However, this practice may not be culturally acceptable to the Chinese in Hong Kong. Women wholly or partially expose their breasts for breastfeeding at work or public places have not been culturally acceptable in the 1990s and even today! A detailed survey in 2004 investigated this issue among 230 first-time mothers in Hong Kong.³⁵ The authors found that even though breastfeeding was regarded as a natural human behavior by 80% women, 75% were embarrassed or considered it unacceptable to breastfeed in public. 79% and 74% mothers viewed that the workplace and public facilities respectively were not supportive for breastfeeding. 55% of mothers reported that their overcrowded living environment in Hong Kong was a barrier for breastfeeding. Most importantly, they felt that a lack of privacy (64%) was also a barrier for breastfeeding their infants. Findings from this very recent study echoed our observations conducted more than 10 years back. Hence, if the mothers in the present study wish to breastfeed their infants, they were obliged to practise at home. This is why the women in the present study perceived 'home confinement' as one of their major concerns for breastfeeding.

The practice of expressing breastmilk into a bottle was common among nursing mothers as a method to feed their infants, and this contributed to a higher success rate of breastfeeding in some Western countries in the early 1990s.^{6-10,31} However, such a practice was neither common nor even heard of by nursing mothers in Hong

Kong at the time of the survey. It was not until 2002, that the Department of Health had the first official written departmental breastfeeding policy in which the WHO Ten steps to successful breastfeeding and the International code of marketing of breastmilk substitutes were incorporated. Furthermore, the guidelines on supporting working employees to express breastmilk and to breastfeed at work places only appeared for the first time in this government policy statement.²⁰ Hence, in early 1990s, most working mothers in Hong Kong would only think of using an infant formula as a substitute after weaning off their infants from breast milk.

The decline in global breastfeeding rate has many causes, not the least of which is the aggressive marketing and promotion of infant formulae by multinational companies. The government of Hong Kong has been voluntarily complying to the 1981 World health Assembly (WHA) and has adopted the "International Code of Marketing of Breastmilk Substitutes" but has not incorporated the Code into its legislation. Infant formulae on a rotational basis have been freely supplied to all hospitals in Hong Kong. Complimentary samples of infant formulas or gifts have been directly or indirectly distributed by sales representatives to mothers or their relatives in hospitals and antenatal clinics. Although starting infant formulae for infants under 4 months old were prohibited by law to be advertised in the mass media, there have been aggressive marketing campaigns to push for follow-on infant formulae for infants aged 4 months to 3 years of age. Some infant formula companies even organised Mothers' Clubs to run activities for mothers, expectant mothers and young children to promote their products directly or indirectly. These aggressive marketing strategies had a significant impact on the decline in breastfeeding rate and early cessation of breastfeeding in Hong Kong over the last 3 decades.

An increased effort played by the health care system and increased media promotion of breastfeeding is necessary to balance and counteract the aggressive commercial programs for marketing infant formula in Hong Kong. In the late 1990s, the strength of breast-feeding promotion has increased. In 1994, United Nations Children Funds (UNICEF)'s Hong Kong Committee set up the Baby Friendly Hospital Initiative (BFHI) - Hong Kong Association to promote breastfeeding in Hong Kong. BFHI organizes training for health care workers to facilitate mothers to breastfeed, a breastfeeding certificate course is also run by the BFHI. Furthermore, a Baby-friendly Hotline has been set up and a survey on ever breastfeeding is being conducted every year. In conjunction with the 'World Breastfeeding Week' the BFHI organizes Breastfeeding promotional activities in the community during August every year. At the same time, the Department of Health also actively promoted breast-feeding in MCHC through educational activities and improvement of the MCHC environment to facilitate mothers to breastfeed. The Department of Health has also banned any direct or indirect marketing activities in all the clinics including distribution of complimentary infant formula samples to the staff and clients. Many hospitals in Hong Kong began to adopt the Ten Steps to Successful Breastfeeding as guidelines for breastfeeding promotion.³⁹ Moving towards

the mid 2000s, The Hospital Authority in Hong Kong has decided not to receive free supply of infant formulae for hospitals and clinics. The Department of Health has incorporated the Ten Steps to Successful Breastfeeding and adopted the International Code of Marketing of Breastmilk Substitutes as guidelines for breastfeeding promotion.²⁰ All these concerted efforts have been made to promote, support and protect breast-feeding to safeguard the health of our children and mothers in the new millennium.

The husbands in the present survey were rated the most important factor in influencing the decision of whether or not to breastfeed. Numerous studies have also indicated that the husband's positive attitude, emotional and practical support towards breastfeeding was favorably associated with initiation and duration of breastfeeding.^{8,9,33,34} Recently, in a survey comprising 230 first-time Hong Kong mothers, 73% also agreed that the husband's support and encouragement was important towards breastfeeding.³⁵ Therefore, public education on breastfeeding promotion should also target men in addition to women. Another study has shown that an infant feeding decision made before conception has been shown to be associated with initiation and longer duration of breastfeeding.⁹ Expectant fathers should also be invited to join prenatal classes to learn about breastfeeding and to consider their role in breastfeeding success in terms of initiation, facilitation and prolonged duration of breastfeeding. Furthermore, classes can be organized for working mothers and for those who have a concern of home confinement for breastfeeding. Classes may be structured to teach about different options to formula feeding when they return to work. For example breastmilk can be expressed into an infant bottle by using a pump and stored in the refrigerator. This could be an option for allowing the mother to leave the home with an appropriate caretaker to give the expressed breastmilk to the infant. On the other hand, knowledge and skills provided by the health care professionals seemed to be important in the initial 3 months of breastfeeding. Thereafter, mental determination with support from the husband, family members and friends was more important to sustain the practice.

There might be a potential response bias in the present study because only 50% of eligible mothers participated in the survey. However, this seemed to be acceptable in a large-scale population based epidemiological study. The design of the survey has attempted to avoid potential bias as found in other studies that often rely on respondents mailing in questionnaires. The respondents in the present survey were first approached and invited by the medical doctors at the MCHC. The clinic nurses were responsible for weighing and recording down the infant's current weight and a survey corner was set up to facilitate completion of the questionnaires. In addition, a telephone hot line was also set up to entertain problems encountered by the respondents when filling out the questionnaire at home. A total of over 300 phone calls were received with enquiries mainly concentrated on conversion of measurement units and portion size information. All efforts were made to minimise the burdens on the nursing mothers in completing the questionnaire so as to achieve a higher

response rate. On the other hand, the present survey was a cross-sectional study; a longitudinal study may be a better design to monitor the duration and changes in breastfeeding practice with time, as well as the confounding factors. Despite the limitations, results from the present study corroborate findings from subsequent studies in the literature undertaken to investigate the low breastfeeding rate, factors predisposing to low breastfeeding rate and early termination of breastfeeding in Hong Kong.^{5,20,28,35-38} The results also contribute to the understanding of the determinants of the decision and duration of breastfeeding in early 1990s, and the history of evolution of infant feeding practice in Hong Kong.

Acknowledging of the factors contributing to low breastfeeding rate and early cessation of breastfeeding is useful to formulate appropriate health and social policies and education programs to promote breastfeeding. This will pose a significant impact on the health and well being of the next generation.

Conclusion

A population-based survey with representative samples reported by 3161 respondents has successfully revealed a low breastfeeding rate among infants below 6 months old in Hong Kong in 1993. Social-demographic, personal and cultural factors that might have influenced the initiation, practice and early cessation of breastfeeding were evaluated. A further study is merited to understand how these factors might lead to low initiation and early cessation of breastfeeding. Findings from the survey serve as a cornerstone to understand the evolution of breastfeeding practice in Hong Kong.

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Original Article

A population-based survey on infant feeding practice (0-2 years) in Hong Kong: breastfeeding rate and patterns among 3,161 infants below 6 months old

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对于选自人群的香港婴儿(0-2岁)的哺育方式调查:3161名6月龄以下婴儿的母乳喂养率及哺乳方式

在香港,从19世纪70年代以来对于初生6月龄期间婴儿的母乳喂养的比率一直较低。为了制定有效的人乳哺育政策和实施方案,对于开始母乳喂养及早期断奶相关的行为和因素进行评估是很必要的。为此,进行了一项针对选自代表性人群的样本普查,旨在确定影响对0-24月龄婴儿的哺乳行为、哺乳期的社会人口因素、个人因素及文化因素。本次研究通过选取6月龄以下婴儿为研究对象,以研究与是否哺乳、哺乳期及哺乳行为相关的因素。1993年,从全香港46所妇幼保健诊所(MCHC)中召集7298名健康婴儿,其中3161名在6月龄以下。婴儿母亲在问卷调查中填写了她们的哺乳决定、哺乳期及哺乳行为。结果发现6月龄以下婴儿的哺乳率极低(8.4%),只有50.9%的婴儿接受过哺乳行为。在接受部分母乳喂养的婴儿中,婴儿处方被广泛使用。调查对象的母亲中45%为全职工作人员,大多数母亲都意识到接受母乳喂养对婴儿和她们自身的益处,43.3%的丈夫被看作是关于进行和持续母乳喂养的最主要的决定因素。在母乳喂养过程中,主要的考虑因素为单调的食物种类(54%)、中心乳头和乳房肿胀(67%)、可察觉的家庭限制(41.5%)和不充足的牛奶供应(31.7%)。而且,在哺乳过程中遇到困难时,76.9%的母亲会咨询MCHC工作人员以获得建议。总之,此次调查收集了来自人群的代表性数据,以反映1993年香港地区影响开始哺乳和早期断奶行为的各因素,这一研究结果将作为更好分析香港地区哺乳行为的重要材料。今后研究中值得进一步探讨各因素间如何相互作用以调整哺乳行为的开始、持续时间和哺乳方式。

关键词: 哺乳、母乳、婴儿处方、婴儿、香港。