

Original Article

Decision to breastfeed and early cessation of breastfeeding in infants below 6 months old – a population-based study of 3,204 infants in Hong Kong

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Breastfeeding rate has been low in Hong Kong over the last three decades. This has happened with concomitant rapid economic development and improved living standards. A population-based survey was conducted to evaluate factors influencing decision, duration and early cessation of breastfeeding in 3,204 full-term healthy infants under 6 months throughout Hong Kong in 1993. A self-administered questionnaire was used. The overall percentage of breastfed infants was particularly low (9.6%), 36.1% had already given up breastfeeding and were being formula-fed (FFBF), 54.3% have been exclusively formula-fed since birth. The proportion of breastfed infants in the 5th month was even lower than in the 1st month (4.2% vs. 14.7%). Mothers who sustained breastfeeding tended to have parity ≥ 2 , were less educated, housewives and residing in Hong Kong <5 years when compared to FFBF mothers ($p < 0.009$). Husbands had a decisive role on wives initiating breastfeeding while health-professionals had an influence on early switching to FFBF ($p < 0.003$). More breastfeeding mothers perceived breastfeeding benefits than FFBF mothers ($p < 0.03$). The Cox proportional hazard model showed that mother's residency status ≥ 5 -year (HR=2.4), working mothers (HR=1.5) and health-professionals' opinions (HR=1.5) were associated with an early cessation of breastfeeding ($p < 0.001$). However, strengthening immunity (HR=0.67) and parity ≥ 2 (HR=0.72) helped sustain breastfeeding ($p < 0.001$). To conclude, the proportion of breastfed infants was low in Hong Kong in the early 1990s. Major factors associated with the decision to breastfeed and early cessation of breastfeeding were identified which would help formulate an interdisciplinary approach for promotion of breastfeeding up-to 6 months and beyond.

Key Words: breastfeeding, formula feeding, cessation of breastfeeding, infants, Hong Kong

Introduction

Promotion of breastfeeding is a global priority to ensure food security and good health for infants in the first 6 months of life.^{1,2} Evidence for the benefits of breastfeeding is unequivocal. Infants who have been breastfed for 6 months or more are more protected against the risks of allergy,³⁻⁵ cancers,⁶ obesity,⁷ and gut inflammation during childhood and adolescence.⁸ Breastfed infants have been shown to have better intellectual development, cognitive function and academic performance during childhood and adolescence.⁹⁻¹¹ In 2002, The World Health Organization (WHO) based on a systemic review of scientific evidence² recommended exclusive breastfeeding to newborns from birth through to 6 months of age and that breastfeeding should be extended to 2 years of age along with appropriate complementary foods.¹² Hong Kong has undergone rapid economic development and, there has been a concomitant decline in the rate of breastfeeding. Sporadic studies have shown that initiation of women to breastfeed was as high as 44% in 1967 but dropped to 5% by 1978,¹³

and then increased to 28% in 1983.¹⁴ Recently, a comparison of 'ever breastfeeding' (change in every case) between two infant cohorts born in 1987 and 1997 found that the rate increased from 26.8% to 33.5% in 10-year's time.¹⁵ Although the ever breastfeeding rate has been rising steadily since early 1980's, the breastfeeding rate in Hong Kong has been remarkably lower than those of Western industrial countries such as Norway, Denmark, Australia and New Zealand where breastfeeding rates are as high as 75-97%.¹⁶⁻²¹

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Factors determining the initiation, duration and decision process of breastfeeding are diversified. Mothers who breastfeed are usually relatively older in age,^{11,18,21} better educated,^{18,22} coming from a higher socioeconomic background with above average income and living standard, coming from a two-parent family and non-smokers.¹¹ Additionally, breastfeeding rate increases with increasing birth weight of the infant whereas first-born children are more likely to be breast fed.¹¹ Nonetheless, the potential risk factors leading to lower breastfeeding rate and early cessation of breastfeeding were found to increase with rapid urbanization and modernization of a society²³⁻²⁵, women having full time employment^{20,21,25} and lacking a role model from mothers or mothers-in-law.²⁶⁻²⁷

Yet, there has been a lack of population-based study to examine factors contributing to the initiation and decision process of breastfeeding, as well as determinants on early cessation of breastfeeding among infants below 6 months old in Hong Kong. In 1993, the 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 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.²⁸ The present study was a part of the territory-wide survey on infant feeding practices in Hong Kong (28). The current paper focuses on factors pertaining to initiation and the decision process of breastfeeding, as well as factors contributory to early cessation of breastfeeding in infants below 6-month old. Results from the study serve to fill the gap of information in relation to determinants on decision and duration of breastfeeding in early 1990s. Identification of these factors at regular time interval based on a representative population sample helps to serve as a cornerstone for tracking the development of breastfeeding practice in Hong Kong. The findings will also be useful to devise appropriate public health policies and breastfeeding promotion programs in the community.

Subjects & Methods

According to the Government statistics, 92% of newborn infants and young children aged under 6-year old in Hong Kong visited the Maternal and Child Health Clinics (MCHC) in 1993.²⁹ MCHC under FHS of the Department of Health in Hong Kong provides public health service to monitor children's growth and development, as well as to provide a universal immunization program for children under 6 years old in Hong Kong. Routine visits to the MCHC are arranged for each infant after birth. Therefore, recruitment of subjects for a few weeks at all the 46 MCHC would provide a representative sample of infants and young children for the study. In 1993, the total live births were 71,799. 29), given the MCHC attendance rate was 92%, the anticipated number of infants recruited in any two consecutive weeks would be about 19,600. The breakdown of sample size for specific age groups were estimated to be: 0-5 months (n=7350), 6-12 months (n=9800) and >12 months (n=2450). This survey was conducted for two weeks between March 22 and April 4,

1993. Healthy infants below 24 months old were selected when they visited one of the 46 MCHC throughout Hong Kong. Infants were interviewed and selected by doctors at the MCHC. The inclusion criteria were: both parents being ethnic Chinese, 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 accord with age of the infants, i.e., 0-5 months, 6-12 months and >12 months because growth, development and feeding patterns of infants vary a great deal from birth to 24 months of age. The self-administered questionnaires were designed to let parents report information on variables known to or suspected to be associated with infant feeding decision, duration and practice. Each questionnaire was comprised of questions on demographic information of the infants and parents, mode of feeding, and factors affecting mother's decision on feeding choice. The three sets of questionnaires were colour-coded for ease of distribution. Mothers or principal care-takers were invited to participate in the study by filling in the 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 know the details as required in the questionnaire. It would also be difficult for mothers to complete the questionnaire on-site while carrying the infant. Therefore, stamped and self-addressed envelopes were provided to the respondents for mailing back the questionnaires when necessary.²⁸ An anonymous telephone hotline was made available to the respondents during the survey period. Staff at MCHC were briefed not to give any comments to the answers of the questionnaire but only to provide instructions for completing the questionnaire. Weight of infants to the nearest 0.1 Kg was measured on Seca infant digital weighing scale (Schmidt & Co. (H.K.) Ltd.) by nurses in the MCHC.²⁸

Infants aged below 6-month old were further categorized into 5 age sub-groups to summarize the research findings: Group 1: from birth to 40-day old, i.e. from birth to one month old plus 10 extra days. In 1990s, pregnant women at work 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. There was a tendency for nursing mothers towards the end of the maternity leave attempting to wean off infants from the breasts by a gradual introduction of infant formula. This was for preparing mothers to resume full time job. Hence, extending 10 more days following the first month (30-day) of age to a 40-d period would reveal more information relating to the duration and practice of breastfeeding at the perimaternity 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-month) old, Group 3: 71-100 days (~3-month) old, Group 4: 101-130 days (~4-month) old, Group 5: 131-160 days (~5-month) old. Breastfeeding in the present survey is defined as over 70% of the feeds that the infant received came from breast milk.

In the current study, breastfed infants are those who have been breastfed ever since birth while formula fed infants are those who have been exclusively formula fed ever since birth. For infants whose mothers had attempted to breastfeed but the practice was given up and were *currently* being fed with infant formulae are termed FFBF. A detailed description of the study design, structure of the questionnaire, characteristics of parents and infants, socio-demographic information is given in a recent report.²⁸ Ethical consideration of the project was obtained from the Ethics Committee, Department of Health, Hong Kong Government prior to recruitment of infants. Consent was also obtained from the parents to participate in the survey, on the understanding that the data collected would be solely used for research purposes.

Statistics

Chi-square test was used to compare group differences with categorical variables. For continuous variables, group differences were compared by two-tailed student's *t* test with data are summarized as mean \pm SD. Univariate analysis with the Kaplan-Meier log rank test was initially used to identify variables that might predict the duration of breastfeeding, the variables are socio-demographic data, influential persons on the decision of breastfeeding and the perceived benefits of breastfeeding by the mothers. The significant variables associated with the duration of breastfeeding as found in the univariate analysis were then entered into a Cox proportional hazards model to determine the significant determinants associated with early cessation of breastfeeding. 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 meeting the inclusion criteria were invited to participate in the survey, of whom 7303 children were below 6-month old. A total of 3717 sets of questionnaires were completed giving a response rate of 50.9%. However, 513 out of 3717 questionnaires from infants below 6-month were subsequently rejected due to missing key information on birth date, gender or current type of feeding. As a

result, the current study was based on data obtained from 3204 infants below 6-month of age. Since not all the questions in the questionnaire were completed by the respondents, it made the totals on the variables given in Tables 1-3 different.

Characteristics of infants and parents

Mean birth weight for boys and girls were 3.25 ± 0.41 kg and 3.16 ± 0.42 kg respectively. The average birth weights of boys and girls in the present study were comparable to those of full-term Chinese infants in two population-based cohorts in Hong Kong (1982-86 and 1998-2000) (30).

The average age of fathers and mothers were 33.2 ± 5.0 years and 29.6 ± 4.3 years respectively. The length of residency for fathers and mothers in Hong Kong was 27.6 ± 9.2 years and 24.4 ± 10.2 years respectively. All the infants were Chinese. Regarding parental education level, more than 80% parents had educational attainment at secondary school or above. 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 results were consistent with the 1991 Hong Kong Population Census report.³⁰ The unemployment rate was very extremely low among parents, 0.4% fathers were unemployed whereas over 50% of mothers were full-time housewives, 43.1% mothers had full time employment. The figures were also comparable to those of Hong Kong Population Census in 1991.³¹

Infant feeding Practices

Table 1 depicts modes of feeding among the studied infants below 6 months old. Only 308 infants (9.61%) were breastfed since birth, 1156 infants (36.08%) were currently formula-fed, whose mothers had attempted breastfeeding but gave up breastfeeding practice at some stage (FFBF), the remaining 1740 infants (54.31%) have been formula fed (BF) all along since birth. The percentage of breastfed infants was getting less with increasing age: 14.7% by the first month down to 4.2% by the fifth month. However, there was a concomitant increase in the percentage of FFBF infants from the first month (28.8%) to the fifth month (41.3%) (Table 1). Thus, mothers giving up the earlier *established* breastfeeding practice in the FFBF group could not have been solely attributable to resumption of employment. On the other hand, the percentage of formula fed infants was stable across the five age groups (Table 1).

Table 1 ¹Changes in feeding modes of 3,204 infants at different ages from birth to about 5 months old in Hong Kong

Mode of Infant Feeding No. (%)	Age, in days					Total
	0-40 [~1 month]	41-70 [~2 months]	71-100 [~3 months]	101-130 [~4 months]	131-160 [~5 months]	
Breastfeeding	132 (14.7)	63 (8.1)	39 (5.2)	40 (5.6)	34 (4.2)	308
¹ FFBF	259 (28.8)	201 (36.1)	259 (38.5)	299 (42.7)	138 (41.3)	1156
Formula Feeding	507 (56.5)	311 (55.8)	378 (56.3)	362 (57.1)	182 (54.5)	1740
Total	898 (100)	575 (100)	676 (100)	701 (100)	354 (100)	3204

¹Data were collected from self-administered questionnaires provided to mothers visiting the Maternal and Child Health Clinics in Hong Kong for routine follow-ups from March 22 to April 4, 1993; ²FFBF: Infants currently formula-fed, whose mothers had attempted breastfeeding but gave up breastfeeding practice at some stage.

Table 2 ^{1,2}Comparisons of social demographic information of the surveyed infants and parents between the breastfeeding group and ¹FFBF group in Hong Kong

Variables		Breastfeeding Group Number (%)	FFBF Group Number (%) ²	<i>p</i> ²
Gender	Females	129 (48.7)	552 (47.7)	0.776
	Males	136 (51.3)	605 (52.3)	
Parity	1	116 (44.6)	722 (64.7)	<0.001
	≥2	144 (55.4)	394 (35.3)	
Mother's age (years)	Mean (SD)	29.7 (4.6)	29.8 (4.2)	³ 0.853
Father's age (years)	Mean (SD)	33.9 (5.4)	33.3 (4.8)	³ 0.106
Mother's education	Secondary or above	210 (82.7)	1006 (88.6)	0.009
	Primary or below	44 (17.3)	129 (11.4)	
Father's education	Secondary or above	216 (85)	1006 (89.2)	0.062
	Primary or below	38 (15)	122 (10.8)	
Housewife or working Mother	Housewife	164 (72.9)	467 (43.5)	<0.001
	Working mother	61 (27.1)	607 (56.5)	
Years of stay in Hong Kong (Years)	Under 5 years	49 (25.9)	63 (7.1)	<0.001
	5 years or above	140 (74.1)	822 (92.9)	

¹Data were collected from self-administered questionnaires provided to mothers visiting the Maternal and Child Health Clinics in Hong Kong for routine follow-ups from March 22 to April 4, 1993; ²The respondents did not provide answer to every variable; hence, the total number of each variable is different; ³FFBF: Infants currently formula-fed, whose mothers had attempted breastfeeding but gave up breastfeeding practice at some stage. ² Chi-square test or otherwise stated; ³Student's T-test.

FFBF infants comprised as much as 36% surveyed infants in the present survey. Hence, identifying factors contributing to early cessation of breastfeeding would be helpful to prolong the duration of breastfeeding such that less BF infants will switch to the FFBF group. In the subsequent analysis we attempted to examine factors attributable to the decision of breastfeeding and early cessation of breastfeeding by comparing FFBF infants with continued breastfed infants. Table 2 compares demographic and social factors between the breastfeeding and FFBF groups. There were no significant differences in infant's gender, age of mothers and fathers between the breastfed and FFBF infants ($p > 0.05$). The practice of breastfeeding was significantly higher in mothers with two or more children (parity ≥ 2) when compared to those with only one child (parity=1) ($p < 0.001$). The percentage of mothers breastfed was significantly higher in mothers with a lower education level (Primary school or below) whereas a higher education level (secondary school or above) of mothers was associated with a higher rate of FFBF practice ($p = 0.009$). Similar to the observation in mothers, education level of fathers also determines the choice of feeding practice: fathers of breastfed infants were found to have a lower education level; nonetheless, fathers of FFBF infants were found to have a higher education level (secondary school or above) although the difference was only marginally significant ($p = 0.062$). Besides, a higher percentage of breastfeeding mothers were housewives while more FFBF mothers were working mothers ($p < 0.001$). In addition, a significantly higher percentage of mothers adopted breastfeeding who have resided in Hong Kong (from Mainland China) for less than 5 years while a higher proportion of mothers practiced FFBF who have been living in Hong Kong for more than 5 years. The respondents did not necessary to provide an answer to every variable; hence, the total number of each variable is different in Table 2.

Table 3 summarises responses of mothers to two major questions related to initiation and sustainability of breastfeeding, i.e. influential persons on mother's decision of breastfeeding initiation, and mothers' perceived benefits of breastfeeding between the breastfeeding and FFBF groups. Results show that the husbands and medical professionals were ranked top of the list to influence the decision of breastfeeding. A significantly higher percentage of husbands in the breastfeeding group ($p < 0.001$) were found to have influenced their wives' decision on breastfeeding than those in the FFBF group ($p < 0.001$). Senior members of the family, namely the mother and mother-in-law were also important in influencing breastfeeding decision in the breastfeeding group than in the FFBF group ($p = 0.003$). In contrast, medical professionals ($p = 0.038$) had more influence on switching to formula milk in the FFBF group (Table 3). With regard to the knowledge of breastfeeding in terms of perception on the benefits of breastfeeding, a higher proportion of mothers were aware of the perceived benefits of breastfeeding than those in the FFBF group including breast milk is an ideal food ($p = 0.002$), enhancement of immunity ($p = 0.023$), strengthening parent-child bond ($p = 0.022$) and a convenient and economical mode of feeding ($p < 0.001$).

The median (inter-quartile range) durations of breastfeeding in the breastfeeding group and FFBF groups were 41.1 (20.4 – 92.1) days and 13.2 (3-30) days respectively. Univariate Kaplan-Meier log rank test was employed to evaluate factors associated with the duration of breastfeeding between the breastfeeding and FFBF groups. Factors included for analysis were gender of infants, age and education level of fathers and mothers, parity, mother's years of stay in Hong Kong, working mother/ housewife (Table 2); the influential persons on infant feeding decision and the perceived benefits of breastfeeding (Table 3). Results showed that parity ≥ 2 , mother's education level,

Table 3 ¹Influential persons on the mother's decision of breastfeeding and the perceived benefits of breastfeeding by the mothers in the breastfeeding group and ²FFBF group in Hong Kong.

Factors affecting breastfeeding	Breastfed Group N (%)	FFBF Group N (%) ²	<i>p</i> ²
<i>Influential persons on the decision of breastfeeding</i>			
Husbands	93 (35.1)	263 (22.7)	<0.001
Senior family members	31 (11.7)	74 (6.4)	0.003
Friends and relatives of similar age	7 (2.6)	61 (5.3)	0.070
Medical and nursing professionals	54 (20.4)	307 (26.5)	0.038
<i>Perceived benefits of breastfeeding</i>			
Ideal food for infants	202 (76.2)	756 (65.3)	0.002
Convenient/ Economical	80 (30.2)	203 (17.5)	<0.001
Enhanced immunity	216 (81.5)	867 (74.9)	0.023
Strengthening parent-child bondage	156 (58.9)	591 (51.1)	0.022
Promotion of post-delivery recovery	123(46.4)	536 (46.3)	0.979

¹Data were collected from self-administered questionnaires provided to mothers visiting the Maternal and Child Health Clinics in Hong Kong for routine follow-ups from March 22 to April 4, 1993; ²FFBF: Infants currently formula-fed, whose mothers had attempted breastfeeding but gave up breastfeeding practice at some stage; ²Chi-square test

Table 4 ¹Factors associated with early *cessation* of breastfeeding among infants below 6-month old in Hong Kong using Cox proportional hazard model

Major Factors	B	SE	Hazard Ratio	95% C.I.	<i>p</i>
Mother's years of stay in Hong Kong ≥ 5 -year	0.893	0.185	2.4	1.7-3.5	<0.001
Working mothers	0.394	0.085	1.5	1.3-1.8	<0.001
Opinions from medical & nursing professionals	0.268	0.083	1.3	1.1-1.5	0.001
Strengthening infant's immunity	-0.409	0.118	0.67	0.53-0.84	0.001
Parity ≥ 2	-0.325	0.084	0.72	0.61-0.85	<0.001

¹Data were collected from self-administered questionnaires provided to mothers visiting the Maternal and Child Health Clinics in Hong Kong for routine follow-ups from March 22 to April 4, 1993.

working mother, years of mother's stay in Hong Kong, influential persons on breastfeeding (i.e., husbands, senior family members, friends/ relatives of similar age, and medical & nursing professionals), and the perception of breastfeeding benefits (strengthening immunity and a convenient and economical feeding mode) were significantly associated with the duration of BF ($p < 0.05$). Survival analysis by using Cox proportional hazards model was attempted to determine factors contributing to early cessation of breastfeeding in the FFBF group (Table 4). Early cessation of breastfeeding in infants below 6-month old was positively associated with mother's settlement in Hong Kong for ≥ 5 years (HR 2.4, 95% CI: 1.7-3.5, $p < 0.001$) which suggested that the longer the mothers lived in Hong Kong or for those mothers who were born and brought up in Hong Kong tended to terminate breastfeeding much earlier; a working mother (HR 1.5, 95% CI: 1.3-1.8, $p < 0.001$); advice sought from medical and nursing professionals (HR 1.3, 95% CI: 1.3-1.5, $p = 0.001$) which implied that opinion or advice from medical and nursing professionals had a negative impact on sustaining the duration of breastfeeding. However, early cessation of breastfeeding was inversely associated with strengthening immunity (a perceived benefit of breastfeeding) (HR 0.67, 95% CI: 0.53-0.84, $p = 0.001$) and parity ≥ 2 (HR 0.72, 95% CI: 0.61-0.85, $p < 0.001$) which implied that if a woman had one or more children she were more likely to sustain breastfeeding.

Discussion

This large-scale population-based survey in 1993 examined factors determining decision of breastfeeding and early cessation of breastfeeding among infants under 6 months old. Parental demographic profile and mean birth weight of the infants were comparable to the population references indicating the infants selected were representative of the study population.

Although a better approach to determine breastfeeding rate is by means of longitudinal study, the present cross-sectional survey provides some useful data on the percentage of breastfeeding in infants below 6 months old in Hong Kong. In the present study, the number of breast fed infants dropped considerably in the first 6 months especially in the fifth month, and there was a concomitant increase in the number of infants being fed with formula milk. In 1990s, Infant formulae were very popular and affordable by most families in Hong Kong due to the successful marketing strategies of infant formula companies. It was a common practice that when a mother chose not to breastfeed her infant, she would immediately switch to using a 'infant formula' for her infant but not other breast milk substitutes, namely condensed milk, cow's milk or evaporated milk, etc. because in her mind infant formula was the only alternative for breast milk.²⁸

The percentage of *ever* breastfeeding among infants under 6 months old in the present study was 44.69% which was comparable to the government figure in

1996.³³ According to official figures, the ever breastfeeding rate increased from about 40% in 1996 to 60% in 2001 (33). Chee & Horstmannshof (1995) also reported that the ever breastfeeding rate was 48% in 1996.³⁴ When comparing government figures on breastfeeding rates for the first 6 months in 1997-2000³³ versus results from the present study, the percentage of breastfeeding has increased to 30-35% (vs. 14.7%) in the first month, 20-25% (vs. 8.1%) in the second month, 15-18% (vs. 5.6%) in the fourth month and 10% (vs. 4.2%) in the sixth month. Nonetheless, the breastfeeding rate in Hong Kong from 1997 to 2000 was still significantly lower than some Western industrialized countries where there are well established health and social policies as well as infrastructure to promote and facilitate breastfeeding.¹⁶⁻²¹

Factors contributing to the initiation of breastfeeding and its sustainability are diversified, these may be conceptually classified into several categories, namely knowledge, cultural, personal, social, economic and environmental.³⁵ Mothers who have resided in Hong Kong for less than 5-year tended to breastfeed more. Whereas those resided in Hong Kong for more than 5 years tended to give up breastfeeding earlier. Since 1980's, there has been a constant influx of immigrants to Hong Kong from Mainland China. The average breastfeeding rate in China has been higher than that of Hong Kong. Hence, women immigrated to Hong Kong from China for less than 5 years might have still maintained their traditional infant feeding practice. In early 1990s, Hong Kong was one of the major powerhouses for driving economic growth in South East Asia, and that Hong Kong was also economically more advanced and modernized than Mainland China. There is evidence to suggest that modernization and urbanization of a society is associated with a declined incidence and a shorter duration of breastfeeding.²³⁻²⁵ In contrast to other reports that mothers who had better education.¹⁸⁻²² and brought up in higher socioeconomic background.^{11,36} were likely to breast feed. In the present study, however, mothers with a lower education level tended to breastfeed more, and *vice versa*. This may be attributable to the fact that in metropolitan areas, the use of infant formula is regarded as elite, sophisticated, affordable and convenient.^{25,36} A recent local qualitative research also echoed findings from the present survey that women brought up in Hong Kong had a perception that only new immigrants of lower social class would breastfeed.³⁷ This is a misconception of breastfeeding. Massive commercial promotion and advertisement on infant formulae in 1990s also had a significant impact on low breastfeeding rate in the 1990s.²⁸

Furthermore, it has been shown that the first-born child was more likely to receive breastfeeding.¹¹ However, a reverse scenario was found in the present study, i.e., mothers who already had one or more children were more likely to breastfeed than the primiparous mothers. This may be due to the fact that, if the mother had experienced breastfeeding her first child, she would be more confident and skillful to initiate breastfeeding or to prolong the duration of breastfeeding for her next child. On the other hand, the number of children in most contemporary Hong Kong families are small, usually between one to three. Hence, the mother could manage to breastfeed the young

one while looking after the older toddlers. In the present study, both the husbands and senior family members had more influence on the decision of breastfeeding in the breastfeeding group. There is numerous evidence to document that father's positive attitude and support towards breastfeeding has been associated with initiation and prolonged duration of breastfeeding.^{18,19,35,38-40} In a recent survey of over 200 primiparous mothers in Hong Kong, 73% indicated that that their husband's support was important in sustaining breastfeeding.³⁵ Hence, public education on breastfeeding promotion should also target on men in addition to women. Expectant fathers should also be invited to join prenatal classes to learn about breastfeeding and to reckon their decisive role in breastfeeding success in terms of initiation and facilitation of breastfeeding. Besides, the grandmother's positive attitude, experience, skills and trouble-shooting advice on breastfeeding also plays a significant role in the decision and prolonged duration of breastfeeding.^{19,26,37} Knowledge on breastfeeding in terms of the perception on its benefits in particular strengthening infant's immunity was associated with sustained breastfeeding. This was in line with a previous study that the most significant factors contributing to the mother's decision on initiation of breastfeeding were for the benefits of the infant's health, naturalness, and emotional bonding.⁴⁰

It is not new that health professionals such as general practitioners, paediatricians or nurses are not supportive of breastfeeding.^{37,41-42} Even nowadays, a few general practitioners and paediatricians believe that infant formulae can be used as a breast milk substitute because in their practice they seldom encounter any inferior health conditions or poor growth among formula fed infants as compared to those of breastfed infants. In an interview with 17 local primiparous mothers using a qualitative descriptive design to recall their experience of breastfeeding for the first 6 months postpartum, 12 out of 17 mothers experienced anti-breastfeeding advice from their family doctors who suggested that breastfeeding for 2-3 months was sufficient and that any prolonged duration of breastfeeding would confer no extra benefits to the infants. Furthermore, after giving birth in the hospital, hospital doctors and nurses would not discourage mothers who were determined and insisted on breastfeeding. However, for those who were less confident and lack of experience in initiating breastfeeding, use of infant formula was often suggested by hospital nurses. Furthermore, if the newborn required extended hospital stay for further medical investigation, the hospital procedures and health professionals therein usually made it difficult for the mother to continue breastfeeding.³⁷

Results from the present study that mother who had full time employment were likely not to initiate breastfeeding or to give up breastfeeding earlier agreed with findings from studies elsewhere.^{20,21,25} In the early nineties, Hong Kong was at the peak of her economic growth, unemployment rate was only 1.8% in 1991,³² most married couples were employed in the work force, this may explain why approximately 50% of the mothers had full-time employment in the present study. Most working mothers considered early termination of breastfeeding after maternal leave because it would be inconvenient for

her to breastfeed after resumption of full-time employment. Although the practice of expressing breast milk into a bottle was common among nursing mothers to feed their infants that contributed to a higher success rate of breastfeeding in some Western countries in the early 1990s,¹⁶⁻²¹ in fact, such a practice was neither common nor even heard of by nursing mothers in Hong Kong at the time of the survey. Not until 2002, the Hong Kong SAR 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 in the policy. Furthermore, the guidelines on supporting working employees to express breastmilk and to breastfeed at work place only appeared for the first time in this government policy statement.³³ Most major public hospitals in Hong Kong under The Hospital Authority observe the WHO Ten steps to successful breastfeeding and also adopt the concepts of Baby Friendly Hospital. However, these hospitals still accept infant formula donation from major milk companies. At present, The Hospital Authority is reviewing its policy not to accept any infant formula donation to hospitals.

Having identified potential risk factors contributing to low breastfeeding rate, short duration and early cessation of breastfeeding is useful to formulate appropriate health policy, community campaigns and education programs to promote breastfeeding. This will pose a significant impact on the health and well being of the next generation. Health education on the benefits of breastfeeding should focus to both men and women, as well as health care workers. Experience shared by those who have breastfed successfully on the practical breastfeeding skills (e.g. use of milk-pump and appropriate storage of the expressed breast milk) and trouble-shooting when encountering breastfeeding problems are practical for the nursing mothers. Train the trainers to gain moral support from the family and even healthcare workers on initiation and prolonged duration of breastfeeding is also important; government legislation, e.g. prolonged paid maternity leave if breastfeed; society support, such as to provide infant nursing facilities at work and public place will be desirable to promote breastfeeding for up-to 6 months and beyond.

To conclude, a population-based survey with representative samples revealed that the percentage of breastfed infant in Hong Kong under 6 months old was very low in the early 1990s. Major demographic, socio-economic and knowledge factors were associated with breastfeeding initiation and early cessation of breastfeeding among infants below 6-month old. Identification of these factors is important to formulate inter-disciplinary approach to promote the rate and duration of breastfeeding, and to empower mothers to breastfeed up-to 6 months and beyond.

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Original Article

Decision to breastfeed and early cessation of breastfeeding in infants below 6 months old – a population-based study of 3,204 infants in Hong Kong

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六個月以下的嬰兒哺餵母乳及早期斷奶之決定-香港 3204名嬰兒母群研究

香港的哺餵母乳率在過去三十年持續的低。這個現象伴隨著經濟快速發展及生活水準改善。1993年進行一個以香港3204名六個月以下的足月產的健康嬰兒為母群的調查，評估影響哺餵母乳決定、哺餵期間及提早斷奶的因素。採用自填式問卷。哺餵母乳的嬰兒整體百分比非常低(9.6%)，36.1%已經放棄哺餵母乳並已經使用配方奶餵食(FFBF)，54.3%從出生即餵食配方奶。第五個月比起第一個月哺餵母乳的百分比更低(4.2% vs. 14.7%)。會持續哺餵母乳的母親比起哺餵配方奶的母親，傾向於生育 ≥ 2 次、教育程度較低、家庭主婦及定居香港少於五年($p < 0.009$)。丈夫在妻子開始哺餵母乳扮演決定性的角色，而醫療人員則對早期轉換至FFBF有影響($p < 0.003$)。較多的哺餵母乳母親比FFBF母親覺查到哺餵母乳的好處($p < 0.03$)。Cox等比例危害模式顯示母親居留狀態 ≥ 5 -年(HR=2.4)、有職業的母親(HR=1.5)及醫療人員的意見(HR=0.67)與早期斷奶具有相關性($p < 0.001$)。然而，增強免疫力(HR=0.67)及生育次數 ≥ 2 (HR=0.72)有助於持續哺餵母乳($p < 0.001$)。總結，在香港1990年代初期以母乳哺餵嬰兒的比率是低的。已找到決定哺餵母乳及早期斷奶的主要相關因素，有助於規劃推廣哺餵母乳直到6個月之科際整合方法。

關鍵字：母乳哺餵、配方哺餵、中斷母乳哺餵、嬰兒、香港。