ABSTRACT

This study describes factors influencing infant feeding choices of 434 mothers with 9-month-old infants in Vancouver. Consistent with Social Cognitive Theory, both internal personal and socio-environmental factors influence infant feeding choices. Mothers attributed the choice to breastfeed primarily to personal choice, whereas the choice to formula feed was attributed to socio-environmental factors. Among mothers who breastfed <3 months, the choice to wean was primarily attributed to concern for baby's nutrition; compared to returning to work, concern about milk supply and concern for baby's nutrition among those who breastfed ≥3 to <6 months; and returning to work and personal choice among those who breastfed ≥6 months. Among Caucasian mothers, the choice to wean was primarily attributed to returning to work, compared to concern for baby's nutrition among non-Caucasian mothers. Initiatives to facilitate further advances in breastfeeding promotion could address three areas: 1) prenatal intentions, 2) early postpartum concerns, and 3) later issues surrounding returning to work and infant nutrition.

ABRÉGÉ

Cette étude décrit les facteurs influant sur les choix en matière d'alimentation faits par 434 mères de nourissons âgés de 9 mois. Conformément à la théorie cognitive sociale, des facteurs personnels et socio-environnementaux influent sur les choix en matière d'alimentation des nourissons. Les mères attribuent principalement le fait d'allaiter à un choix personnel tandis que l'alimentation au moyen de préparations est attribué à des facteurs socio-environnementaux. La principale raison motivant le sevrage était le souci de l'alimentation du bébé, comparativement au retour au travail, chez les mères ayant allaité durant moins de 3 mois; le souci par rapport à la qualité du lait et l'alimentation du bébé chez celles ayant allaité pendant une période de 3 à 6 mois; et le retour au travail et un choix personnel parmi celles qui avaient allaité pendant 6 mois ou plus. Parmi les mères de race blanche, le retour au travail était la principale motivation comparativement au souci de l'alimentation du bébé chez les mères des autres races. Des initiatives visant à faciliter la promotion de l'allaitement au sein pourraient répondre aux trois questions suivantes : les intentions des mères avant l'accouchement, les problèmes survenant lors des premiers jours du post-partum et finalement les questions relatives au retour en milieu de travail et à l'alimentation des enfants.

Factors Influencing Infant Feeding Practices of Mothers in Vancouver

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Despite the increases in breastfeeding rates in Canada throughout the 1970s and early 1980s,¹⁻⁴ rates have plateaued in more recent years.⁵⁻⁸ Compared to national rates of 73%, initiation rates are strikingly lower among women who are younger, from non-Caucasian ancestries,^{2,5} lower socioeconomic backgrounds,^{2,5-7} or from Eastern Canada.⁸ In addition, early termination of breastfeeding continues to be reported.^{2,5-8} Low initiation rates and short duration, in general, persist^{2,5-8} despite recommendations to promote, protect and support breastfeeding for at least 9 to 12 months.⁹⁻¹³

Numerous studies have examined factors that influence a mother's infant feeding practices. Maternal age,¹⁴⁻¹⁷ education,^{5,14-16,18,19} income,^{4,5,17,18} marital status,^{5,15} ethnicity^{5,14,16} and the way the mother herself was fed²⁰ are correlated with breastfeeding initiation and duration. Although demographic factors are strong predictors, complex psychosocial variables such as knowledge, attitudes and beliefs are more important and modifiable determinants of infant feeding practices.^{21,22} Further advances in improving breastfeeding rates might come from a better understanding of the influencing factors surrounding breastfeeding and early weaning. This study describes factors which mothers reported to influ-

ence their choice to: 1) breastfeed or formula-feed, and 2) wean to an infant formula or cow's milk.

METHODS

Descriptive information was collected as part of a cross-sectional study on the prevalence of iron deficiency anaemia among 9-month-old infants.²³ Study participants were identified from birth lists provided by the Vancouver Health Department. Initial contact was made by letter to parents of all term (37-42 weeks gestation) infants, birthweight 2500-4500g, born between January 1st and March 2nd, or June 4th and August 7th, 1993, resident in the City of Vancouver (n=1,813). Subsequent telephone contact was used to describe the study protocol and arrange appointments for those parents interested in participating. All infants were 39±1 week of age when they attended the research clinic, during which the study information was collected. Written informed consent was obtained from all parents. The study protocol and procedures were approved by the University of British Columbia Screening Committee for Research Involving Human Subjects.

Two standardized, self-completion questionnaires were used: a confidential demographic questionnaire consisting of 6 items, and a questionnaire consisting of 17 items on infant feeding practices from birth to nine months of age. The infant feeding questionnaire contained items on duration of breast- or formula-feeding, age of introduction of formula and cow's milk and factors influencing infant feeding choices. A list of potential factors influencing feeding choices was compiled from literature review, expert consultation, and pilot testing with mothers. Mothers were

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asked to check the factors they felt influenced their infant feeding decisions. An open box allowed additional factors to be added. Questionnaires were available in English and Chinese. Completed infant feeding questionnaires were reviewed with the mother by a research nutritionist.

To identify factors influencing infant feeding practices, mothers were grouped by duration of breastfeeding as <3 months, ≥ 3 to <6 months, and ≥ 6 months, and by ethnic background as Caucasian and non-Caucasian. For the purposes of this study, an infant was considered exclusively breastfed as long as formula-feeding did not exceed 250 mL per week. Solid foods and juice were not considered in this study classification. Frequencies of responses were compared for categorical variables, i.e., factors influencing infant feeding choices among groups, by the chi square statistics and Fisher exact tests using the Statistical Packages for the Social Sciences, release 7.0 (SPSS, Inc., Chicago, IL). The risk of an inflated type I error due to the number of comparisons being made needs to be considered. Therefore, for the purpose of discussion in this study, a p value of 0.001 was considered significant.

RESULTS

Study population

This study involved 434 mothers, representing 24% of the 1,813 to whom letters describing the study were sent. One mother who breastfed and six who used formula did not answer the questions concerning the factors influencing their infant feeding practices. Over half the mothers were 30 years of age or older, and 90% were married. Thirty-four percent had family incomes of \$50,000 or more and 73% had either a college or university education. Data on the iron status²³ and the infant feeding practices⁵ in this group of infants have been previously published.

Factors influencing mothers' choice to breastfeed or formula-feed

Of the 434 mothers in the study, 360 (83%) breastfed, 332 breastfed exclusively (77%), 7% both breastfed and formula-fed and 74 (17%) gave formula with no breastfeeding from birth. The factor cited most frequently for influencing the choice

Figure 1. The percentage of all mothers who breastfed (n=359) or fed formula (n=68) who reported the given factor influenced their feeding choice.

Figure 2. The percentage of breastfeeding mothers who are of Caucasian (n=230) and Non-Caucasian (n=81) ancestries, respectively, who reported the given factor influenced their choice to breastfeed.

to breastfeed was personal choice (cited by 70%), compared to physician (49%) and in-hospital support (37%) among mothers who fed formula (Figure 1).

The frequency with which different factors were cited to influence the choice to breastfeed varied significantly between Caucasian and non-Caucasian mothers (Figure 2). Of the 332 mothers who breastfed from birth, 230 (69%) were Caucasian and 81 (24%) were

non-Caucasian. Although personal choice was the factor cited most frequently among both Caucasian and non-Caucasian mothers, it was more frequent among Caucasian mothers. Among the latter, cost, books, and availability were cited more frequently as influencing the choice to breastfeed; compared to non-Caucasian mothers for whom, after personal choice, physician was the factor most frequently cited to influence the choice to breast-

Figure 3. The percentage of breastfeeding mothers who breastfed <3 months (n=51), 3 to <8 months (n=108), and >8 months (n=200), respectively, who reported the given factor influenced their choice to breastfeed

Figure 4. The percentage of breastfeeding mothers who breastfed <3 months (n=48), 3 to <6 months (n=63), and >6 months (n=167), respectively, who reported the given factor influenced their choice to wean to infant formula or cow's milk.

feed, although this was not significantly different from Caucasian mothers.

The frequency with which the different factors were cited as influencing the choice to breastfeed also varied among mothers who breastfed for different durations (Figure 3). Personal choice, books and availability were reported with increasing frequency as duration

of breastfeeding increased. For women who breastfed <8 months, physician was the most frequently cited factor after personal choice.

Factors influencing mothers' choice to wean to an infant formula or cow's milk

The factors cited most frequently as influencing the choice to wean to an infant for-

mula or cow's milk were: returning to work and concern for baby's nutrition (Figure 4). The frequency with which several factors were cited as influencing the choice to wean to infant formula or cow's milk also varied among mothers who breastfed for different durations. Among mothers who breastfed <3 months, concern for baby's nutrition and uncomfortable with breastfeeding were the main factors, cited by 58% and 23% of mothers, respectively. In contrast, returning to work, concern about milk supply and concern for baby's nutrition, were the most important factors, and cited as important by 29-35% of mothers who breastfed ≥3 to <6 months. Returning to work and personal choice, on the other hand, were most frequently cited factors for those who breastfed ≥6 months. Concern for baby's nutrition and uncomfortable with breastfeeding were reported with decreasing frequency as the duration of breastfeeding increased.

The factor cited most frequently to influence the choice to wean was returning to work, cited by 42% and 23% of Caucasian and non-Caucasian mothers, respectively (Figure 5). Of note, the factor cited most frequently by non-Caucasian mothers was concern for baby's nutrition, cited by 38% and 7% of non-Caucasian and Caucasian mothers, respectively. However, concern about milk supply was cited as a factor influencing weaning by 28% of Caucasian mothers, and only 4% of non-Caucasian mothers.

DISCUSSION

Infant feeding practices are influenced by a multitude of factors that, according to Social Cognitive Theory,²⁴ can be broadly classified into two categories: internal personal and socio-environmental. Figure 6 provides a framework for understanding how infant feeding choices are reciprocally determined by internal personal and socio-environmental factors. Internal personal factors which influence the decision to breast- or formula-feed may include; cognitive/affective (e.g., knowledge, attitudes, beliefs), outcome expectations (e.g., best for baby), self-efficacy (e.g., confidence, previous experience), biological (e.g., age), or psychosocial (e.g., comfort with breastfeeding in public).²⁵ Socio-environmental factors such as institutional (e.g., health

care practices, policy), social (e.g., family support/dynamics), socio-demographic (e.g., education, income, ethnicity), physical (e.g., fatigue, nipple pain) and others (e.g., cost, availability) may also play important roles in infant feeding choices.

Factors influencing the choice to breast-feed or formula-feed

This study found significant differences in factors reported by mothers to have influenced their decision to breastfeed or formula-feed. Similar to findings of the National Population Health Survey (NPHS),⁸ internal personal, i.e., personal choice, was the primary factor for the decision to breastfeed. In contrast to findings of the NPHS,⁸ but consistent with Bloom et al.,¹⁷ mothers in the current study attributed their decision to formula-feed primarily to health care, i.e., physician and in-hospital support. Consistent with other studies,²⁶⁻³⁰ but in contrast to Reif et al.,³¹ this study suggests that positive reinforcement from physicians and other health care practitioners may have a significant impact on the choice to breastfeed, or to use a breastmilk substitute. Of importance also, health care practices that promote infant formula have been found to have a stronger impact on mothers' infant feeding practices than hospital breastfeeding support programs and counselling.³²

Similar to findings of the NPHS,⁸ socio-environmental factors such as family advice, friends'/other mothers' advice and prenatal class were reported more frequently by mothers who breastfed than by mothers who fed formula. The self-reporting format used may have been limited by social-desirability bias, resulting in the decision to use formula being attributed to external sources rather than to personal choice. Similarly, it is possible that socio-environmental factors facilitated the expression of the personal choice factor as important among mothers who breastfed.

Factors influencing duration of breast-feeding

Personal choice was cited with increasing frequency as the duration of breastfeeding increased, i.e., by 53% of mothers who breastfed <3 months, 62% of those who breastfed ≥3 to <8 months, and 79% of mothers who breastfed ≥8 months. Again, personal choice

Figure 5. The percentage of breastfeeding mothers who are of Caucasian (n=167) and Non-Caucasian (n=77) ancestries, respectively, who reported a given factor influenced their choice to wean to infant formula or cow's milk.

represents a combination of underlying internal personal and socio-environmental factors. In this regard, important predisposing, enabling and reinforcing factors³³ in the mother's environment can influence internal personal factors such as self-efficacy, attitudes, beliefs, knowledge and skills. The internal personal factors, represented by personal choice, may be shaped by many factors such as a shift in socio-environmental conditions which facilitate, enable, and increase acceptance of breastfeeding. Thus, more aggressive breastfeeding promotion,^{10,13,34-39} and supportive environments⁴⁰⁻⁴⁴ are likely to have enabled more mothers to make the personal choice to breastfeed. It is disconcerting that breastfeeding was substantially lower among those women in this study⁵ who are non-Caucasian, have lower income or education, or who are single. Possibly, economic and socio-environmental factors may pose barriers to breastfeeding for these groups of mothers. Indeed, lack of social support^{15,19,45} and financial resources^{14,26} have been shown to be important predisposing factors in the decision to use formula.

Factors influencing choice to wean to infant formula or cow's milk

As reported by others,^{26,46} a combination of internal personal and socio-environmental factors influence the choice to wean to

infant formula or cow's milk. Also, consistent with other reports,^{8,46} internal personal factors, categorized in this study as concern for baby's nutrition and uncomfortable with breastfeeding, were the most frequently cited factors influencing the choice to wean among mothers who breastfed <3 months. As suggested by MacLean,⁸ the decision to wean may be too complex to be captured by a simple listing of reasons. Thus, any single response factor, e.g., concern for baby's nutrition, may simply be a proxy for a complex set of interactions which may be interpreted differently by different mothers, or at different stages of breastfeeding.

Previous studies have reported^{8,14,26} medical problems as a primary reason for weaning in the first 3-4 months. Factors such as painful breastfeeding, and illness of mother were reported as factors influencing weaning in the first 3 months by a relatively high number of mothers (about 15% for each factor). Previous studies have also shown that breastfeeding often is discontinued early due to insufficient milk in the first few weeks.^{8,15,17,26} The current study found that concern about milk supply was more frequently cited among mothers who weaned at ≥3 to <6 months, rather than <3 or ≥6 months. It is possible that concern about milk supply at ≥3 to <6 months may

reflect mothers' perceptions of infant hunger cues and the need to introduce solid foods, discontinuation of night feedings, and/or some day-time feeds due to return to work. In this regard, Schwartz and Evers⁴⁷ recently reported that the introduction of solids among breastfed infants is primarily related to mothers' perception that their infant is hungry. However, it is important to note in this study that returning to work was the most frequently cited factor in the choice to wean by mothers who breastfed longer than 3 months.

CONCLUSION

Consistent with Social Cognitive Theory,²⁴ the results of this study suggest that both internal personal and socio-environmental factors can influence infant feeding choices.

The relative importance of each, however, seems to be different between mothers who breastfeed and those who formula feed. Primarily, the decision to breastfeed was attributed to personal choice, whereas the decision to formula feed was attributed to advice from health professionals.

It should be noted that the present study involved mothers who had higher levels of education and income, with little participation of single or young mothers. Because of this, factors which influenced the early discontinuation of breastfeeding by the mothers in this study may not be representative of other socio-demographic groups. Participation of younger, less educated women in future studies might be facilitated by using recruitment methods that do not require parents to have their own address and telephone to enable contact, or

by working with community groups. An important, but inherent problem in survey methodology is the potential variability in the respondent's interpretation of the question. It is not known if, or to what extent, the mothers in this study may have interpreted questions differently.

The results of the present study also indicate that reasons for discontinuing breastfeeding differ with the time after birth. This suggests that future breastfeeding initiatives could be divided to address three broad areas: 1) prenatal intentions, 2) early postpartum concerns, and 3) later issues surrounding returning to work and infant nutrition. Thus, further studies could be directed to the promotion, protection and support of breastfeeding mothers, specifically addressing barriers to initiation, concerns over early milk supply and infant nutrition, and later issues surrounding the demands of infant feeding and family and work commitments.

Studies consistently show that infant feeding decisions are made early in or even before pregnancy.^{15,18-21,46,48-53} Further, prenatal intentions are the strongest predictor of actual practices.^{20,48,54} Thus, the education and support that physicians and health professionals provide can both help mothers make the choice to breastfeed, and as this study suggests, support their breastfeeding successfully. Strategies that encourage mothers to breastfeed longer are equally important. Unfortunately, a recent study in Vancouver⁵⁵ suggested that current medical training, and physician self-efficacy with regards to breastfeeding support is inadequate.

The present study clearly suggests that factors influencing the choice to wean differ between the early and later postpartum periods. This suggests training of health care professionals and breastfeeding support programs should be tailored to these important concerns. For example, increasing knowledge, skills and exposure to mothers who breastfeed successfully is important for new mothers and can facilitate breastfeeding self-efficacy. Likewise, providing workplace environments sensitive to and supportive of breastfeeding mothers, as well as providing information on how to expand the infant milk diet to include solid foods while enabling breastfeeding to con-

tinue is important later on. Consideration of these findings by health practitioners, employers and policy makers may be useful in facilitating further advances in breast-feeding promotion strategies and more specific targeting of resources.

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