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Infant Feeding Knowledge, Attitudes, and Beliefs Predict Antenatal Intention Among First-Time Mothers in Queensland

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Abstract

Aim: This study assessed infant feeding knowledge, attitudes, and beliefs among women from Queensland, Australia, in their first pregnancy. Antenatal feeding intention in this group was described, and the hypothesis was tested that antenatal knowledge, attitudes, and beliefs about infant feeding are associated with antenatal intention for the duration and exclusivity of breastfeeding for the infant's first year.

Subjects and Methods: The Feeding Queensland Babies Study is a prospective survey of infant feeding attitudes and behaviors among first-time mothers in Queensland, Australia. Data on infant feeding knowledge, attitudes, beliefs, and intention were collected antenatally, and an Infant Feeding Attitudes Score was calculated.

Results: Although 85% of respondents endorsed breastfeeding as most appropriate for infants, 11% valued formula feeding equally. Intention to give any breastmilk during the first weeks was 98%, but it fell to 18% during the second year. More than one-quarter of women reported intention to introduce foods other than breastmilk before 5 months of infant age. The infant feeding attitudes and beliefs score correlated positively with feeding intention for breastfeeding and the introduction of complementary solids.

Conclusions: Enhancing women's knowledge of recommendations and their understanding of breastfeeding's specific benefits and the reasons for recommended scheduling of feeding transitions may positively impact breastfeeding exclusivity and duration and the age-appropriate introduction of complementary solids. Communication of detailed feeding recommendations for the infant's first year and specific information about the health benefits of breastfeeding should be a goal of healthcare providers working with pregnant women.

Introduction

Nutrition during the first year of life forms an important foundation for lifetime health. Diseases thought to be amenable to prevention by optimal early infant feeding practice include ear and respiratory infections, diarrhea, asthma, and later overweight and obesity.[1–5] Australia's National Health and Medical Research Council has recently released updated Australian Dietary Guidelines that recommend exclusive breastfeeding for around 6 months, with the introduction of appropriate complementary foods and continued breastfeeding through the first year of life and beyond.[6] A 2009 Australian Government survey, however, showed that few Australian women were aware of specific recommendations regarding the duration of exclusive breastfeeding or of its specific benefits.[7]

Women enter motherhood with beliefs and attitudes toward infant feeding that they have developed passively through life as part of their broad social, cultural, and information environment,[8] concepts that may be augmented during pregnancy by targeted antenatal information delivered by healthcare providers.[9] Infant feeding knowledge, attitudes, and beliefs may also be acquired through proactive personal information-seeking during pregnancy and early infancy,[10] particularly for well-educated women. Acquired knowledge, attitudes, and beliefs are likely to inform their infant feeding practice and so influence their own well-being and the well-being of their infants.[11]

Intention is known to be highly predictive of behavior in various health domains, including infant feeding, and has indeed been called its ''primary driver.''[12] Kronborg et al.[13] and Ajzen and Fishbein[14] have argued that intention may be

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described by systematically related primary variables, which include attitudes and beliefs. Investigators using the theory of planned behavior as a theoretical scaffold have confirmed its concepts of belief, attitude, self-efficacy, and perceived social norm to be relevant and applicable to infant feeding.[15–20] Between infant feeding intention and its implementation, however, numerous highly individual factors are known to intervene during the first year of life,[21] many of which are the subject of research and program development. Infant feeding intention and its antecedents are thus the primary opportunity for antenatal intervention in improving rates of breastfeeding duration and exclusivity.

Whether there is a link between infant feeding knowledge, beliefs, and attitudes and the intention for the exclusivity and duration of breastfeeding among pregnant women is not clear from research, and little evidence exists regarding the relationship between beliefs and attitudes about the benefits of breastfeeding and intention for the introduction of other foods and fluids. The aim of this study is to describe primiparous Australian women's knowledge, attitudes, and beliefs around infant feeding and to investigate the extent to which they predict intention for breastfeeding duration and exclusivity.

Subjects and Methods

This report presents cross-sectional antenatal data from the Feeding Queensland Babies Study, a prospective questionnaire-based birth cohort study of infant feeding attitudes and behaviors among first-time mothers in Queensland, Australia. Data were collected between June 2010 and March 2012. Participants were healthy, primiparous women 18 years of age and older and resident in Queensland. Recruitment was by convenience sampling at a public event for expecting mothers, by word of mouth and social and traditional media.

Measures

A prenatal questionnaire was posted to participants from 5 months of pregnancy with an information sheet, consent form, and reply-paid envelope. E-mail reminders were sent to women and included a link to request a replacement questionnaire. Completed questionnaires were entered into Checkbox software (Checkbox Survey Solutions, Inc., Watertown, MA).

A demographic questionnaire was sent to all participants through Checkbox software between November 2010 and April 2011. Reminders were sent to nonresponders on three occasions. The study was approved by the Behavioral and Social Sciences Ethical Review Committee of The University of Queensland (protocol number 2009001237).

Survey construction

Questionnaires used for this research are from the Infant Feeding Practices Study II (IFPSII)[22] developed in the United States by the Food and Drug Administration in collaboration with the Centers for Disease Control and Prevention and were minimally adapted for use with an Australian population. The prenatal questionnaire gathered data on women's antenatal knowledge of Australian infant feeding recommendations and women's infant feeding intentions through the first year and contained demographic, attitudinal, and behavioral items. This article reports data from the prenatal and demographic questionnaires.

Survey content

We used seven questions to investigate women's prenatal infant feeding knowledge, attitudes, and beliefs. All questions are listed in Table 1. One question addressed opinion on the best way to feed a baby, and six used a 5-point Likert Scale to record agreement with statements about the value of breastfeeding. ''Infant formula is as good as breastmilk'' was reverse-scored so that in common with other items the most correct response elicited the highest score. Scores for Likert questions were summed and divided by 6 to create an IF Attitudes Score for each participant.

Maternal infant feeding intention was elicited by three questions dealing with intended duration and exclusivity of breastfeeding (listed in Table 1). Data for infant age at which any breastfeeding was expected to cease were recoded as <13 months/13–24 months, to reflect adherence with recommendations.[23] Feeding method variables were dichotomized to reflect adherence/nonadherence with recommendations and recoded as follows: intended feeding method in the first weeks (breastmilk only/other), infant age at introduction of foods and fluids other than breastmilk (<5/5+ months), and ''The best way to feed a baby'' (breastfeeding only/other).

Maternal age was dichotomized to 18–24 years and 25–40 years, to allow investigation of reported trends for younger mothers to introduce non-milk foods earlier than older mothers.[24,25] Other characteristics investigated were maternal education level (less than a bachelor's degree/bachelor's degree or higher) and socioeconomic status (SES). To measure SES, postcode of residence was converted to a Socio-Economic Indexes for Areas (SEIFA) score.[26] SEIFA is an index developed by the Australian Bureau of Statistics that ranks areas in Australia according to relative socioeconomic advantage and disadvantage. We dichotomized SEIFA at the median.

Data analysis

Summary statistics are reported as frequencies and percentages. Cronbach's alpha was calculated from the six Likert-style questions investigating knowledge, attitudes, and beliefs about breastfeeding to develop the infant feeding knowledge, attitudes, and beliefs score. We have for brevity called this the ''IF (infant feeding) Attitudes Score,'' although it represents aspects of infant feeding knowledge, attitudes, and beliefs. Responses to these questions, and the IF Attitudes Score, are reported as mean (SD) values. Logistic regression was used to compare a mother's knowledge, attitudes, and beliefs about infant feeding with her intended feeding method during the infant's first weeks, duration of any breastfeeding, and the intended timing of introduction of foods other than breastmilk. Results are reported as odds ratios (ORs) and 95% confidence intervals (CIs). Logistic regression was also used to compare IF Attitudes Score with intention for duration of exclusive and any breastfeeding. Linear regression was used to compare mean IF Attitudes Score across demographic groupings. Analyses were performed using SPSS version 15.0 software (SPSS Inc., Chicago, IL).

Table 1. Infant Feeding Knowledge, Attitudes, Beliefs, and Intentions

Questions that measure					
Antenatal infant feeding attitudes and beliefs					
Which of the following statements is closest to your opinion? The best way to feed a baby is ($n=274$):					
Breastfeeding	233 (85.0)				
A mix of both breastfeeding and formula feeding	12 (4.4)				
Formula feeding	0 (0.0)				
Breastfeeding and formula feeding are equally good ways to feed a baby.	29 (10.6)				
	Likert scale 1–5				
	1	*2*	*3*	*4*	*5*
IF Beliefs score: How strongly do you agree or disagree with the following statements?					
1. Infant formula is as good as breastmilk. (Reverse scored.)	1	13	16	31	38
2. If a baby is fed breastmilk only, he or she will be less likely to become obese.	5	8	48	25	14
3. If a baby is fed breastmilk only, he or she will be less likely to get ear infections.	4	5	47	29	15
4. If a baby is breastfed, he or she will be less likely to get a respiratory illness.	3	4	39	36	18
5. If a baby is fed breastmilk only, he or she will be less likely to get diarrhea.	3	8	48	29	12
6. Babies should be exclusively breastfed for the first 6 months.	7	10	22	35	26
Antenatal infant feeding intention					
What method do you plan to use to feed your new baby in the first few weeks? (n = 276)					
Breastmilk only (baby will not be given formula)	260 (94.2)				
Formula feed only	1 (0.4)				
Both breastfeed and formula feed	13 (4.7)				
Don't know yet	2 (0.7)				
How old do you think your baby will be when you first feed him/her any food other than breastmilk? ($n=271$)					
Less than 1 month	3 (1.1)				
1–2 months	5 (1.8)				
3–4 months	65 (24.0)				
5–6 months	161 (59.4)				
7–9 months	32 (11.9)				
More than 9 months	5 (1.8)				
How old do you think the baby will be (in months) when you completely stop breastfeeding? Select 1 to 24. (Results in Fig. 1)					

Data are frequency (%) or percent for Likert scale answers. The Likert scale is scored from 1 (strongly disagree) to 5 (strongly agree).
IF, infant feeding.

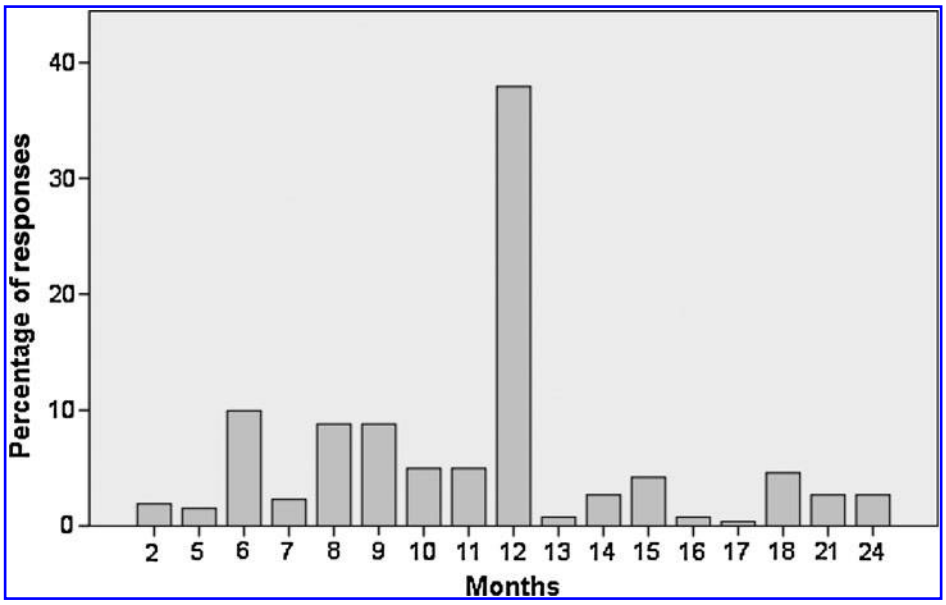

FIG 1. Maternal intention for duration (in months) of any breastfeeding for this infant ($n=261$).

Table 2. Maternal Demographic Profile

Demographic	n	*Percentage*
Age ($n=277$)		
Younger than 25 years	43	15.5
25 years or older	234	84.5
SEIFA score ($n=277$)		
Lower	60	23.3
Higher	198	76.7
Country of birth ($n=181$)		
Australia	142	78.5
Other	39	21.5
Language at home ($n=181$)		
English	160	88.4
Other	21	11.6
Marital status ($n=181$)		
Partnered	124	68.5
Other	57	31.5
Maternal education ($n=181$)		
Less than bachelor's degree	68	37.6
Bachelor's degree or higher	113	62.4
Family income per year ($n=182$)		
Less than $69,999	28	15.4
$70,000 or more	154	84.6

SEIFA, Socio-Economic Indexes for Areas.

Results

In total, 277 women completed the prenatal survey, of whom 182 (66%) also completed the demographic survey. Participants had a mean age of 29.3 years, 78.9% were born in Australia, and 56.2% had a bachelor's degree or higher (Table 2).

Attitudes and beliefs about infant feeding

Most women (85%) reported that breastfeeding is the best way to feed a baby. Prenatal infant feeding knowledge, attitudes, and beliefs of women in this sample are presented in Table 1. Cronbach's alpha for this set of questions was 0.80, and mean IF Attitudes Score for this sample of women was 3.10 (SD = 2.05). Table 3 reports IF Attitudes Score as a function of maternal demographic grouping. The IF Attitudes Score was significantly higher for women 25–40 years old than for those 18–24 years old and for those educated to the bachelor's degree level or higher. It was not found to differ significantly according to maternal body mass index, marital status, family income, SEIFA decile, or language spoken at home.

Feeding intention for this infant

Almost all (98.9%) respondents stated their intention to breastfeed their infant during its first weeks of life, 94.2% of them exclusively. Intention to give any breastmilk fell to 84.3% of women after 6 completed months and to 18.0% after 12 completed months. More than one-quarter of women reported intending to introduce foods other than breastmilk before 5 months of infant age (Table 1).

Relationship between infant feeding attitudes and beliefs and feeding intention

Women who chose breastfeeding as the best way to feed a baby had nearly five times the odds of intending to breastfeed their infant (OR = 4.90; 95% CI, 2.34–10.23; $p<0.01$) compared with other mothers. After adjusting for SES, the odds increased to almost seven times (OR = 6.75; 95% CI, 2.23–20.48; $p<0.01$). These mothers also had more than

Table 3. Antenatal Infant Feeding Attitudes Score by Maternal Demographic Profile

		Linear regression		
Category	*Mean IF Attitudes Score (SD)*	*Mean difference*	p	*95% CI*
Maternal age (years)				
18–24 ($n=43$)	2.15 (2.01)	Reference		
25–40 ($n=234$)	3.27 (2.01)	1.12	<0.01	0.45–1.80
Maternal BMI (kg/m^2)				
≤29 ($n=215$)	3.23 (2.05)	Reference		
≥30 ($n=43$)	2.66 (2.00)	−0.55	0.12	−1.23 to 0.14
SEIFA				
Lower ($n=60$)	2.63 (2.07)	Reference		
Higher ($n=198$)	3.19 (2.02)	0.56	0.31	−0.52 to 0.16
Maternal education				
Less than bachelor's ($n=68$)	2.41 (2.02)	Reference		
Bachelor's or higher ($n=113$)	3.49 (3.66)	1.08	<0.01	0.48–1.68
Marital status				
Partnered ($n=124$)	3.13 (1.94)	Reference		
Not partnered ($n=57$)	2.90 (2.25)	−0.23	0.54	−0.87 to 0.46
Family income				
<$70,000 ($n=28$)	3.58 (2.04)	Reference		
$70,000 or more ($n=154$)	2.97 (2.01)	−0.61	0.16	−1.45 to 0.24
Language spoken at home				
English ($n=160$)	3.60 (2.21)	Reference		
Language other than English ($n=21$)	3.00 (2.00)	−0.6	0.21	−1.56 to 0.34

BMI, body mass index; CI, confidence interval; IF, Infant Feeding; SEIFA, Socio-Economic Indexes for Areas.

four times higher odds of not introducing foods other than breastmilk until at least 5 months (OR = 4.92; 95% CI, 2.34–10.23; $p < 0.01$) and for intending to breastfeed their infant beyond 12 months of age (OR = 4.24; 95% CI, 1.97–9.16; $p < 0.01$).

There was a correlation between IF Attitudes Score and intended breastfeeding duration, with participants 1.36 times more likely to intend to breastfeed their infant to 12 months for each unit of IF Attitudes Score increase (95% CI, 1.02–1.80; $p < 0.01$). Intention to introduce foods other than breastmilk after 4 completed months of infant age (OR = 3.52; 95% CI, 3.36–3.68; $p < 0.01$) and intended breastfeeding duration (OR = 0.62; 95% CI, 0.38–0.86; $p < 0.01$) were significantly associated with IF Attitudes Score.

Discussion

In this sample of well-educated Australian women, knowledge of recommendations and recognition of the specific benefits to infants of breastfeeding are low. Although largely well informed of generalities, women were less aware of the specific underlying evidence relating to optimal infant feeding practice. Their knowledge, attitudes, and beliefs were associated with their infant feeding intention for both feeding method and breastfeeding duration and were predictive of the duration of exclusive and of any breastfeeding.

The message conveyed by infant feeding guidelines is that human infants need human milk for around the first 6 months of life. The 59% of women who planned to introduce other foods besides breastmilk at 5–6 months of age may consider themselves to be acting in line with the guidelines. However, for the one in four women planning to introduce foods other than breastmilk prior to 4 completed months of infant age, their response reflects either a lack of knowledge of infant feeding recommendations or the intention to disregard them.

Attitudes and beliefs are measurable and modifiable and have been shown to influence behavior through intention.[27] This study confirms the relationship of knowledge, attitudes, and beliefs with intention for infant feeding—a relationship that has been established for several health-related behaviors[28] and has specifically been articulated for infant feeding by several studies.[29,30] Bartok et al.[31] found education, marital status, breastfeeding intention, and a rating of maternal antenatal breastfeeding importance to be the principal factors associated with breastfeeding duration in a sample of women from the United States. It is noteworthy that for some health-related behaviors, the addition of perceived behavioral control (self-efficacy) to this model has been found to improve its predictive ability by as much as 34%.[32]

Attitudes and beliefs

We investigated women's knowledge, attitudes, and beliefs about infant feeding. The six Likert-style questions applied to mothers in this sample contain two questions that measure beliefs about infant feeding and a further four that measure outcome expectancy—a component of attitude toward infant feeding. Likert-style response questions in this survey were all ''gain-framed'' statements about the benefits of breastfeeding (which emphasize potential gains through the target behavior) and so represent a coherent set of statements, a finding confirmed by the Cronbach's alpha value of 0.8.

When coupled with subjective norms and perceived behavioral control, attitudes are thought to be good predictors of intention, whereas intention is known to be a good predictor of behavior.[28] Participants in this sample population underestimated the protective value of breastfeeding for their infant in relation to ear infections, respiratory illness, diarrhea, and obesity. Indeed, research among Australian women in 2009[7] identified that knowledge of the protection that breastfeeding offers their infants against diarrhea and respiratory infection, although limited, was particularly motivating because of the tangible, short-term benefits it is seen to provide. Response profiles in this sample cluster around the ''unsure/somewhat agree or disagree'' area in spite of firm published evidence in support of each statement's underlying scientific premise.[1–3,20] Delivering credible information to fill this knowledge gap may be of value in increasing intention for 6 months of exclusive breastfeeding. Population-based research suggests maternal intention to breastfeed is a strong predictor of breastfeeding behavior for both its initiation and duration.[33]

These Australian data may be compared with those of IFPSII (2005–2007) whose population of U.S. women were of any parity.[34] Our primiparous Australian women in 2010 were more likely than IFPSII participants to strongly disagree that infant formula is as good as breastmilk. Australian women were less convinced than U.S. women about the protection that breastfeeding offers against diarrhea, respiratory illness, ear infections, and obesity and were less likely to strongly agree with those statements. Australian women were more likely to agree that babies should be exclusively breastfed for 6 months.

Intention

Health behaviors—specifically, exclusive breastfeeding for the first 6 months of life—are unlikely to occur in the absence of intention to achieve them, although intention is itself several steps removed from action. Intention is of particular importance in its role in predicting infant feeding behavior because of its value as a point of intervention during pregnancy. Breastfeeding knowledge is known to be highly correlated with breastfeeding confidence and actual lactational duration, and daily feeding of breastmilk substitutes is known to be associated with poorer breastfeeding outcomes and shorter breastfeeding duration.[35] Prenatal intention to breastfeed has been shown to influence both initiation and duration of breastfeeding[36] and to be higher in primiparous women than in subsequent pregnancies. The finding that almost 95% of women in this sample intend to breastfeed their infant in his or her first weeks concurs with the findings of the Australian National Infant Feeding Survey,[37] which had a similar data collection period. However, in spite of these intentions, more than 26% of infants in that study less than 1 month old had already received foods other than breastmilk.

The relationship between attitudes and beliefs and intention

Primiparous women's knowledge, attitudes, and beliefs around infant feeding may be modifiable constructs given appropriate and timely antenatal education. Identifying the

association between infant feeding knowledge, attitudes, and beliefs with intention suggests that establishing the nature of specific infant feeding fallacies and misunderstandings and seeking to address them might provide an opportunity to enhance intention by influencing knowledge, attitudes, and beliefs. This research has demonstrated that evidence of the benefits of breastfeeding and of the risks of formula feeding is not being adequately conveyed to pregnant women. In addition, because breastfeeding intention affects not only breastfeeding initiation but its duration and exclusivity, these goals may have a ''knock on'' effect on plans for the introduction of infant formula and complementary solids. Such evidence is valuable in identifying knowledge gaps and the population groups where they occur and in creating targeted antenatal learning management interventions intended to enhance adherence with infant feeding recommendations.

Strengths and limitations of the study

The nature of recruitment by convenience sampling is a limitation of this research as participants may not be representative of the population of Queensland or of Australian women as a whole. Women from lower socioeconomic groups are underrepresented because of the nature of the recruitment process and the literacy requirements intrinsic to survey completion; however, the lack of association between SES and IF Attitudes Score found in this study shows this may not overly affect the results. The data are also limited by the nature of maternal self-reporting. As a self-reported survey, response bias cannot be discounted. In addition, although decisions about breastfeeding are often formed during early pregnancy, or even prior to pregnancy, for some primiparous women the conceptualization of feeding behaviors around introducing non-milk foods for their infants may be weeks or months in the future and may be under the influence of interactions and learning experiences yet to occur.

Conclusions

Confidence in the specific benefits of breastfeeding for women and their infants is low in this sample of well-educated Australian women. Maternal attitudes and beliefs around infant feeding, knowledge of infant feeding recommendations, and confidence in the health benefits of breastfeeding predict feeding intention during the infant's first weeks. They are also predictive of the duration of exclusive and of any breastfeeding. Although the path between intention and behavioral outcomes may be rocky, infant feeding knowledge, attitudes, and beliefs are amenable to change and may be enhanced by targeted antenatal education. Communication of detailed feeding recommendations for the infant's first year and specific information about the health benefits of breastfeeding may positively impact breastfeeding exclusivity and duration and the age-appropriate introduction of complementary solids.

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