

ASSOCIATIONS BETWEEN PARENTAL ENGAGEMENT WITH HEALTH PROFESSIONALS AND CHILD HEALTH BEHAVIOURS

Abstract

Background: Health professionals are an important source of infant feeding advice in the first year of life. However, little is known about the impact of such advice provided as part of routine child health services on feeding practices and other child health behaviours. This study aimed to examine the association between parental engagement with health professionals for breast and formula feeding advice during the first six months of life and child health behaviours at 6-, 12- and 24-months of the child's age.

Methods: Cross-sectional and longitudinal analyses of survey data from a randomised controlled trial in Australia were conducted. At 6-months, parents were asked what sources of information regarding breast and formula feeding they used; at 6-, 12- and 24-months they were asked about their child's nutrition, feeding and movement behaviours. Cross-sectional and longitudinal multiple logistic regression models examined the association between engagement with health professionals in the first six months of life and child health behaviours at 6-, 12- and 24-months of age.

Results: A total of 1,155 mothers completed the baseline survey, 947 (82%), 920 (80%) and 797 (69%) completed the 6-, 12- and 24-month surveys. Longitudinal modelling indicated that seeking health professional advice regarding infant feeding was associated with a lower likelihood of current breastfeeding (Adjusted Odds Ratio=0.54, 95% Confidence Interval=0.41-0.71, $p<0.001$). After adjustment for confounders, engagement with health professionals in the first six months of life was not associated with any other child health behaviours based on cross-sectional analyses.

Conclusions: These findings suggest that parental engagement with health professionals for infant feeding support may be a response to significant breastfeeding challenges or transitions in infant feeding, pointing to an opportunity to support more routine health promotion in child healthcare settings before such challenges arise.

Introduction

In the first years of life, parents should be supported to establish healthy feeding practices and promote child health behaviours for healthy growth and positive long-term health outcomes^{1,2}. Parental decisions regarding feeding practices and child nutrition are influenced by the perspectives of their support system, including health professionals³. Mothers who establish breastfeeding successfully have identified that receiving support before birth, and then in the early weeks following is critical to breastfeeding establishment⁴, and there is evidence that interventions providing early support for breastfeeding increase the likelihood of sustained breastfeeding up to 6-months⁵. However, in the absence of structured interventions, it is unclear what level of support mothers seek out for infant feeding. Health professionals are a respected source of information regarding infant feeding for parents, however, they can also be perceived as sources of pressure and judgement regarding feeding decisions⁶.

In Australia, guidelines for primary health professionals who provide care to children in early childhood outline the promotion of breastfeeding as an important component of their role. Child and Family Health Nurses (CFHNs) provide growth and developmental checks to children from birth to school entry. The Professional Practice Framework for CFHNs highlights the promotion of breastfeeding, knowledge of and the ability to provide parents with advice regarding infant and child feeding, nutrition, and child health behaviours as core skills of this workforce⁷. General practitioners, who have frequent clinical contact with young children for routine immunisations, have comprehensive preventive care guidelines. In these guidelines, recommended preventive activities in early childhood include providing parents with education regarding the benefits of breastfeeding, as well as ongoing promotion of nutrition and physical activity, and conducting growth monitoring throughout early childhood⁸.

A previous secondary analysis of data from the Communicating Healthy Beginnings Advice by Telephone (CHAT) study identified health professionals as an important source of child nutrition advice for parents, particularly when they had questions about breast and formula feeding in the first six months of life, with more than half of parents viewing their advice as very helpful⁹. This previous analysis found that first-time mothers and those who were married or in a de facto relationship were most likely to engage with health professionals for breast and formula feeding advice in the first six months of life⁹. There is inconsistent evidence regarding the impact of health professionals delivering child feeding interventions in the early years¹⁰, and previous research has not examined the impact of health professional feeding and nutritional support provided within routine care. In the current study, we sought to examine whether

engagement with health professionals for breast and formula feeding advice in the first six months of life was associated with child health behaviours over the first two years of life.

Methods

Study Design

Secondary data analysis, including both cross-sectional and longitudinal analyses, was conducted using data extracted from a three-arm randomised controlled trial carried out in Australia from 2017 to 2019, the CHAT study¹¹⁻¹³. In brief, the trial began in the third trimester of pregnancy and involved telephone and SMS interventions delivered until the child was 24 months of age and compared to usual care¹¹⁻¹³. The intervention materials were adapted from the Healthy Beginnings home visiting early childhood obesity prevention program¹⁴⁻¹⁶, with program messaging designed to align with the child's developmental stage.

Participants

Participating mothers were recruited during the third trimester of pregnancy from antenatal clinics of eight hospitals across four Local Health Districts in New South Wales, Australia. To be eligible to participate, mothers had to be 16 years of age or older, own a mobile phone, be able to communicate in English and live within the catchment area of the hospitals where recruitment took place. Mothers with severe medical conditions, known to be expecting multiple births or births affected by foetal abnormalities were not eligible for the trial. In total, 1,155 pregnant mothers were enrolled.

Data collection

Data included in this analysis were collected in surveys using a computer-assisted telephone interviewing system. Survey data collection was conducted by a marketing survey company, with data collected during the third trimester, and at 6-, 12-, and 24-months of the child's age (see Table S1 for a full list of included survey questions and their coding for this analysis).

Demographic information

Demographic information was collected during the third trimester of pregnancy, after enrolment, when the baseline survey was conducted. Data collected included household income; language spoken at home; mothers' country of birth, marital status, parity, education level and employment status; and fathers' education level and employment status. Mothers' date of birth was recorded during recruitment and used to calculate baseline age. Demographic variables were dichotomised for analysis¹².

Sources of breastfeeding or formula feeding advice

During the six-month survey, mothers were asked to report which sources of information (from a pre-specified list) they had used when they had questions regarding breast or formula feeding. This survey question was adapted from the baseline survey¹² and a previous study¹⁷. Among the sources of information were CFHNs and 'Other' Health Professionals. This analysis examined engagement with 'any health professional' i.e. CFHNs and/or 'Other Health Professionals'.

Child health behaviours

During the 6-, 12- and 24-month surveys parents were asked to report on their child's health behaviours. Questions regarding health behaviours were adapted from surveys used in the Healthy Beginnings trial¹⁴. Health behaviours included current breastfeeding, age of introduction of solids, whether the child was drinking from a cup, age at which tummy time was commenced, and sleep duration at 6-months. At 12- and 24-months, surveyed behaviours included current breastfeeding, time spent in physical activity, daily screen time, nocturnal sleep duration, dietary intake (including fruit, vegetable, and discretionary foods) and feeding behaviours. Dietary intake and feeding behaviour variables were combined into three outcomes: number of core foods, discretionary foods, and feeding behaviour recommendations met. Behavioural variables were dichotomised for analysis, with the grouping of categories based on adherence to recommended health behaviours as described in national infant feeding^{18,19}, dietary²⁰ and movement guidelines²¹.

Statistical analysis

Statistical analysis was conducted in IBM SPSS Statistics Version 29.0 (Chicago, IL). Descriptive analysis was used to examine the demographic characteristics of participants completing each survey, engagement with any health professional reported at 6-months and child health behaviours at 6-, 12- and 24-months. Chi-squared tests were used to compare the demographic characteristics of survey completers and non-completers at each time point of interest.

Cross-sectional multiple logistic regression models were built to examine whether engagement with any health professional reported at 6-months of age, was associated with child health behaviours at 6-, 12- and 24-months of age. Cross-sectional modelling was used due to differences in measurement of many of the child health behaviours examined over time. First, unadjusted models were developed, where these were significant, models adjusted for group allocation and demographic factors were developed. To select demographic factors for

inclusion in the adjusted models, associations between child health behaviours and baseline demographic characteristics were explored using Pearson Chi-squared tests. All demographic characteristics with $p < 0.10$ in the Chi-squared tests were entered into the model, and then non-significant demographic predictors were sequentially removed (beginning with the factor with the highest p-value) until only demographic predictors with $p < 0.05$ remained. Then, each demographic characteristic was re-added to the model one by one to check for confounding and confirm the final model.

Where a significant association between child health behaviours and health professional engagement was identified for a behaviour measured consistently across the three time points, a longitudinal multi-level mixed effects logistic regression model was developed, adjusted for time, group allocation and demographic factors. For the longitudinal model, demographic factors for inclusion were selected using a backwards elimination approach. All demographic factors were included in the initial model and then sequentially removed (beginning with the factor with the highest p-value) until only those with $p < 0.05$ remained. Then, each demographic variable was re-added to the model one by one to check for confounding and confirm the final model. Two-sided p-values were used in all analyses, with $p < 0.05$ considered significant.

Ethics approval

The trial from which this data was drawn was approved by the Ethics Review Committee of Sydney Local Health District (Protocol No. X16-0360 & LNR/16/RPAH/495). All participating mothers provided written informed consent.

Results

Participants

A total of 1,155 mothers completed the baseline survey, with 947 (82%), 920 (80%) and 797 (69%) completing the 6-, 12- and 24-month surveys respectively. The demographic characteristics of participating mothers have been reported previously^{12,13} and are shown in Table 1. Mothers who completed the 6-, 12- and 24-month surveys were more likely to have household income $\geq \$80,000$ /year, be aged ≥ 30 years, be employed, have a university education, and their child's father was also more likely to have a university education than those who were lost to follow-up. Mothers who completed the 6-month survey were also more likely to speak English at home and be born in Australia, while mothers who completed the 12- and 24-month surveys were more likely to be married or in a de facto relationship.

Cross-sectional associations between seeking health professional support and child health behaviours

Table 2 shows the number and proportion of mothers seeking health professional advice regarding breast and formula feeding and their child's health behaviours. When their child was 6 months of age, 86.5% of mothers reported having sought advice regarding breast or formula feeding from a health professional. At this time, most mothers were currently breastfeeding, their child was not drinking from a cup and met sleep recommendations. More than half of mothers had commenced tummy time at <4 weeks of their child's age and less than half had introduced solids between 6 and 7 months. At 12 months, approximately half of mothers were currently breastfeeding, this dropped to 17% at 24 months. At 12- and 24-months, more than half of children were meeting recommendations for sleep, core food intake, and at least half of the recommendations for feeding behaviours. At 12 months, the majority were also meeting at least half of the discretionary food intake recommendations and meeting physical activity guidelines, this dropped to less than half meeting these recommendations at 24 months. At 12- and 24-months, less than half were meeting screen time guidelines. Table 2 also shows the results of unadjusted logistic regression modelling examining the association between seeking health professional support for breast and formula feeding in the first six months of life and child health behaviours at 6-, 12- and 24-months. The results indicate there was no association between seeking health professional advice and timing of introduction of solids, drinking from a cup at 6-months, age of commencing tummy time, meeting sleep recommendations at 6- 12- or 24-months, meeting core food, feeding behaviour, physical activity or screen time recommendations at 12- and 24-months, or meeting discretionary food recommendations at 24-months. Modelling revealed parents who had engaged with a health professional were less likely to be currently breastfeeding at 6-months (Odds Ratio(OR)=0.51, 95% Confidence Interval(CI)=0.32-0.83, p=0.007) and 12-months (OR=0.49, 95% CI=0.32-0.74, p<0.001), and more likely to be meeting 3 or more discretionary food intake recommendations at 12-months (OR=1.56, 95% CI=1.04-2.34, p=0.034). After adjustment for group allocation and demographic factors, the relationship between seeking health professional advice and lower likelihood of current breastfeeding at 6- (Adjusted Odds Ratio(AOR)=0.42, 95% CI=0.25-0.70, p<0.001) and 12-months (AOR=0.43, 95% CI=0.28-0.66, p<0.001) remained significant, however, the association with meeting discretionary food recommendations was no longer significant (AOR=1.36, 95% CI=0.87-2.13, p=0.177) (Table 3).

Longitudinal association between seeking health professional support and current breastfeeding

Table 4 shows the results of longitudinal modelling of the association between seeking health professional advice regarding breast and formula feeding and current breastfeeding. Consistent with cross-sectional modelling, after adjustment for group allocation, and demographic factors, seeking feeding advice from a health professional in the first six months of life was associated with a lower likelihood of current breastfeeding (AOR=0.54, 95% CI=0.41-0.71, $p<0.001$).

Discussion

The results of this secondary analysis indicate that most participating mothers engaged with health professionals during the first six months of life if they had questions regarding breast or formula feeding. Parental engagement with health professionals for breast and formula feeding advice was associated with a lower likelihood of currently breastfeeding, a relationship that remained significant after adjustment for group allocation in the RCT and demographic factors. Engagement with health professionals for breast and formula feeding advice was not associated with other child health behaviours in the first two years of life.

The association we have found between engaging with health professionals for advice regarding breast or formula feeding and lower likelihood of breastfeeding could have multiple explanations. If parents were seeking advice regarding breastfeeding, our results suggest that advice may have been sought too late to support sustained breastfeeding and that parents may have delayed seeking health professional support until they were experiencing significant challenges. This is consistent with the broader literature, indicating that advice from family and friends is sought more frequently than that of health professionals, despite health professionals often being viewed as a more valuable source of information^{9, 22, 23}. In the context of the demands of raising an infant, parents may gravitate towards more convenient sources of information, such as that from peers or online sources, before resorting to engaging with health professionals for support²². Our findings may point to parents seeking health professional advice only when they are already having breastfeeding difficulties. Alternatively, our results may indicate that parents' who seek out infant feeding advice from health professionals do so to support the transition to formula feeding. Parents may have sought advice as their child approached six months of age due to a return to the workforce, as Australian data indicates that most mothers access government provided paid parental leave before their child is six months

old, and that the proportion returning to work gradually increases from 5 months²⁴. It is possible that mother's sought advice having already made the decision to cease breastfeeding upon return to work, this would align with the findings of a previous Australian study, which found that health professionals are an important source of formula feeding advice, but that most parents only sought such advice after they had already commenced formula²⁵. Taken together, our findings suggest that parent engagement with health professionals for infant feeding support in the first six months of life may occur in reaction to challenges or due to significant transitions in infant feeding, rather than to improve breastfeeding practices and prevent challenges from occurring.

The lack of association between help-seeking for infant feeding and other child health behaviours suggests that engagement with health professionals in the early months did not have co-benefits for other child health behaviours. This is in contrast to the findings of the study from which this data was drawn, which indicated that sustained support from CFHNs via telephone and SMS resulted in improvements in a range of child health behaviours at 12- and 24-months^{12, 13}. Without an understanding of parents' ongoing engagement with health professionals as part of routine child healthcare throughout the first two years of life, it is difficult to ascertain the reasons for this differential effect of support. On one hand, this may point to a reactive approach to nutritional support in healthcare settings, rather than a health promotion approach as was the focus of the trial, whereby health professional focus is directed towards addressing the presenting issue but without a holistic focus on promoting positive child health behaviours in future. Such an approach would be inconsistent with clinical practice guidelines for primary health professionals^{7, 8} but would be consistent with the organisational barriers reported by primary health professionals in some settings, which lead to limited time with families to address health behaviours beyond the presenting concern²⁶. On the other hand, the lack of long-term benefits of help-seeking may reflect a lack of ongoing engagement with child health services, particularly child and family health nursing, as children get older, which can reduce ongoing opportunities for reinforcement of health promotion messages^{27, 28}. Either of these interpretations suggests there is an opportunity to strengthen child health promotion in child healthcare settings.

The current study offers insights into the cross sectional and longitudinal associations between parental engagement with health professionals for support with breast and formula feeding and child health behaviours in a large and diverse group of mothers from across Greater Sydney, Australia. However, the study has some limitations. This was a secondary analysis and relied on

data from self-report surveys, thus responses may be influenced by social desirability bias. There were also significant differences between mothers who completed and withdrew from the study which may influence the generalisability of the results. Furthermore, the framing of the question regarding help-seeking used in this study may have been more likely to elicit recall of parent-initiated discussion of child health behaviours, and thus it is unclear whether other parents received infant feeding advice from health professionals during clinician-initiated discussions of these behaviours which may have occurred during routine visits, such as immunisation visits at 4 and 6 months and the 6-month health and development check set out in the Personal Health Record for children in New South Wales^{29, 30}. Finally, parents in the current study were not asked at what point in the first six months of life they engaged with health professionals or about their subsequent engagement with health professionals at later time points (12- and 24-months), making it more difficult to interpret the longitudinal associations examined. Future research should seek to explore, in greater detail, the impact of both parent- and clinician-initiated discussion of child health behaviours over time and long-term child health outcomes.

Conclusion

Overall, the results of the current study indicate that health professionals are an important source of advice for parents regarding infant feeding. However, engagement with health professionals may occur too late to support sustained breastfeeding and does not appear to have benefits for other child health behaviours. These findings point to opportunities to strengthen child health promotion within routine health services where families seek care in the early years.

Key Messages

- Most parents sought health professional advice regarding breast or formula feeding in the first six months of life
- Engagement with health professionals for infant feeding advice was associated with a lower likelihood of current breastfeeding
- Engagement with health professionals for infant feeding advice was not associated with other child health behaviours up to 2 years of age

- Parents may have sought health professional advice due to breastfeeding challenges or after deciding to transition to infant formula, limiting opportunities for breastfeeding promotion
- There may be scope to more strongly embed key nutrition, feeding, and movement messages in routine child healthcare

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399 **Table Legends**

400 **Table 1:** Demographic characteristics of mothers participating in the baseline, 6-, 12-, and 24-
401 month surveys and the differences between survey completers and non-completers at each
402 timepoint.

403 **Table 2:** Parental engagement with health professionals, child health behaviours at 6-, 12- and
404 24-months of age and the association between these.

405 **Table 3:** Cross-sectional multiple logistic regression models of the association between
406 engagement with health professionals and child health behaviours, adjusted for group
407 allocation and demographic factors

408 **Table 4:** Longitudinal multilevel mixed effects logistic regression model of the association
409 between engagement with health professionals and current breastfeeding, adjusted for group
410 allocation and demographic characteristics

411 **Table S1:** Summary of survey questions and their coding for the current secondary analysis of
412 data from baseline, 6-, 12- and 24-month surveys

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