Characteristics of responders and non-responders in an infant feeding study

C. K. Shepherd, K. G. Power and Harden Carter

Abstract

Background Few studies have fully investigated and described the characteristics of non-responders in infant breast feeding studies. Examination of the characteristics of non-responders enhances this understanding and provides information on the representativeness of the sample actually investigated.

Methods As part of a larger local longitudinal study, couples whose babies were due to be born during the three months of the study in the autumn of 1995, at two local maternity hospitals, were approached by midwives to participate in the study of infant feeding patterns and determinants, including interviews, questionnaires and postal survey. From the 648 eligible mothers, 91 (14 per cent) were not approached, 233 (35.9 per cent) consented but were not interviewed, 256 (39.5 per cent) consented and were interviewed and 68 (10.5 per cent) refused to participate (non-responders) in the longitudinal study. To make a comparison between the 'responders' (i.e. the 233 who consented but were not interviewed and the 256 who consented and were interviewed) and non-responders (the 68 who refused to consent), appropriate data were collected on their socio-demographic characteristics, their feeding intentions and their feeding behaviour.

Results Univariate analysis revealed a number of significant differences between responders and non-responders. However, log-linear analysis of these differences indicated that the main factors that differentiated between responders and non-responders were social class, smoking habit and actual feeding behaviour. When comparing the feeding intention at the time of 'booking', the non-responders compared with the responders were less likely to intend to breastfeed and more likely to be uncertain about their feeding intentions. Following delivery non-responders compared with responders were more likely to bottle feed their babies. By the time of discharge, of the non-responders, 83.6 per cent were bottle feeding in comparison with 47.3 per cent of responders who were also bottle feeding.

Conclusions In this study non-responders were found to be more similar to bottle-feeding responders than to breastfeeding responders. Furthermore, non-responders were more likely to be smokers, from lower social class and to bottle feed. This study also showed that the non-responders were more undecided about their feeding intention at the time of the booking visit. Invariably a higher percentage of mothers who were undecided at the booking visit chose to bottle feed their babies at discharge. These results highlight the impact of failing to include information from non-responders when conducting research which examines patterns of infant breastfeeding and attitudes towards it.

Keywords: infant feeding, responders, non-responders

Introduction

The incidence and prevalence of breastfeeding varies throughout the United Kingdom. Breastfeeding rates are much higher in England and Wales than in Scotland. Sixty-four per cent of mothers in England and Wales choose to breastfeed at birth compared with a 50 per cent breastfeeding rate in Scotland.\(^1\) The Scottish Office has announced a national target for improving the rate of breastfeeding. This target is for more than 50 per cent of women to be breastfeeding their babies at six weeks by 2005.\(^2\) Encouraging breastfeeding among mothers requires an understanding of the factors involved in a woman's decision to breastfeed, as well as gaining insight into the factors which can discourage a woman from continuing to breastfeed after the newborn period.\(^3\)

There is growing interest in the correlates of infant feeding, and numerous studies have examined the determinants of infant feeding. However, studies of infant feeding have failed to include data on non-responders' characteristics, feeding intentions and feeding behaviour.\(^4\)\(^-\)\(^6\) None of these studies mentioned the issue of non-responders, for example, the percentage and characteristics of non-responders or the method of feeding adopted by non-responders.

Other studies comparing breast and bottle feeders have indicated that non-responders may account for 1-36 per cent of sample size.\(^7\)\(^-\)\(^11\) Unfortunately, these studies gave no indication on the feeding intentions or behaviour of the non-responders. Only one study has reported the difference between responders and non-responders. This particular study was carried by Hally...
et al.\textsuperscript{12} and surveyed 680 primiparae from late pregnancy until six months after delivery to examine factors influencing the feeding choice of first-born infants. From the 680 women, 592 were eligible and 507 (86 per cent) of them were interviewed. In that study, it was stated: 'Data collected from the hospital case-notes suggested that, although there were higher breastfeeding rates among these 507 responders, differences between them and the 173 non-responders have not affected our findings on the factors that influence choice' (p. 33). Ninety per cent of the 507 interviewed mothers were again interviewed at six weeks after delivery. Seventy-one per cent of the mothers seen postnatally responded to a postal questionnaire sent three months after delivery and 86 per cent of these respondents returned a second questionnaire sent six months after delivery. Although this is the only study that has highlighted the characteristics and feeding behaviour of non-responders there is no indication of the precise difference in the breastfeeding rate between the responders and the non-responders.

To accurately assess the breast and bottle feeding rates and the characteristics associated with these two feeding patterns, studies of infant feeding should at least include some basic data on non-responders. Non-responders may account for a substantial proportion of the study sample and are therefore highly likely to have a significant impact on study findings and thereby influence the conclusions that follow. As shown, there is no study of infant feeding that has provided information on both the characteristics and the actual feeding rate of non-responders. These salient features are vital to provide a more accurate assessment of the infant feeding rate and the characteristics of the overall population. This study therefore aimed to provide information on the characteristics, feeding intentions and feeding behaviour of both responders and non-responders so that the impact of the failure to include non-responders might be more accurately assessed.

Method

Sample

Potential subjects were couples whose babies were due to be born during the three months of this study in autumn 1995, at two local maternity hospitals within the Forth Valley Health Board area. Information was collected from all mothers; this included maternal age, occupation, marital status, parity, smoking history, paternal age and occupation, and feeding intention at 'booking' visit (that is, when the expectant mother attended the antenatal clinic in the hospital for the first time). Additional information such as maternal complications during and after delivery, method of delivery, baby’s gestation at birth, baby’s weight and any surgical or medical treatment baby needed after birth was also obtained.

Procedure

The data reported here are part of a longitudinal study investigating the determinants of infant feeding from pregnancy to four months post delivery of mothers and their partners. The expectant couples were invited to participate in this infant feeding study by the midwives at the two local maternity hospitals when they attended the antenatal clinics from 34 weeks gestation, or after delivery at the labour suites or postnatal wards if they were missed at antenatal clinics, using prepared consent forms. Women who were approached to participate in the longitudinal study were identified and their responses noted by a sticker on the front of their maternity notes. All the completed consent forms were then collected. From the total of 648 births, 489 mothers (75.5 per cent) and their partners consented to participate in the longitudinal study, and 68 mothers (10.5 per cent) declined to participate (non-responders). In addition, 91 (14 per cent) mothers were not approached (not-approached) by the midwives to participate at antenatal clinics, labour suites or at postnatal wards. The reasons why some of the mothers were not approached by the midwives to participate include being missed by the midwives, complications of childbirth, and early discharge from hospital. From the sample of 489 (75.5 per cent) consenting mothers, 256 (39.5 per cent) mothers and their partners were interviewed at the first stage of the longitudinal study. As the researcher was not available during their period of hospital confinement 233 (35.9 per cent) mothers who consented to take part in the longitudinal study were not interviewed (missed). A semi-structured interview was carried out on the 256 mothers on the day or within four days of birth, at the postnatal wards in the two maternity units by the researcher (C.K.S.). Partners or husbands were also given questionnaires to complete separately from their wives or partners soon after their babies’ birth. This paper will concentrate on the comparison of the demographic characteristics, feeding intentions and feeding behaviour between couples who agreed (responders), and those who refused to participate (non-responders) in the initial interview of the longitudinal study, which occurred soon after the delivery.

Data analysis

The data were analysed by $\chi^2$-tests to compare the differences between responders and non-responders. Variables that were found to be significantly different between responders and non-responders by $\chi^2$ analysis were further investigated using log-linear analyses.

Breastfeeding was defined as exclusive breastfeeding without formula supplementation. Bottle feeding was defined as exclusive formula feeding with no breastfeeding. Those who breastfed but occasionally gave their babies formula milk were defined as combined feeders. There was a small amount of missing data on some variables and therefore in some cases sample sizes of responders ($n = 489$) and non-responders ($n = 68$) may be slightly smaller.
Results

From the total eligible sample of 648 women, there were 276 (43.9 per cent) primiparous mothers and 353 (56.1 per cent) multigravida (with 20 mothers parity not recorded). There were 439 (68.6 per cent) married mothers, 145 (22.4 per cent) cohabiting, 52 (8 per cent) single and four (0.6 per cent) separated. There were 543 (83.9 per cent) vaginal deliveries as compared with 103 (15.9 per cent) caesarean deliveries, and 338 (52.2 per cent) male and 310 (47.8 per cent) female babies were born. The total percentage of breastfeeding on discharge from the entire study sample was 306 (47.5 per cent).

Before commenting on the differences between the responders and the non-responders, cross-sectional analysis was carried out on the interviewed mothers (n = 256) and the missed mothers (n = 233) using $\chi^2$ analysis. There were no significant differences between interviewed and missed mothers on any of the variables tested, which were marital status, maternal age, social class, parity, feeding intention, method of feeding after delivery and Apgar score at one minute and at five minutes after birth, maternal complication at delivery and sex of the baby.

Description of the responders and non-responders

There were no significant differences between the responders' and non-responders' maternal age. The mean age of the mothers who responded was 28.0 years (SD 5.2) and that of the mothers who did not respond was 27.3 years (SD 4.8) ($t = 1.1, df = 551, p = ns$).

Table 1 shows the association of factors such as marital status, maternal social class, parity, smoking, type of delivery, maternal complications during delivery, feeding intention, feeding intention of 'deciders' and the 'undecided', and the method of feeding at discharge of the responders and non-responders. There were no statistically significant differences between responders and non-responders in marital status, parity, type of delivery, maternal complications during delivery, gestation of baby, baby's weight, Apgar score at one minute or at five minutes. However, four factors differed significantly between the responders and the non-responders. These were maternal social class, smoking, feeding intention, and method of feeding at discharge. The occupations of the mothers and partners were converted to social class according to the Office of Population Censuses and Surveys, Standard Occupation Classification, Volume 3.13 When comparing social class, a higher percentage of responders (265, 54.2 per cent) were of higher social class (social class 1–3 non-manual) compared with non-responders (14, 20.6 per cent). Results showed that more of the non-responders group of mothers (37.7 per cent) smoked compared with the responders group of mothers (26.0 per cent).

Feeding intention at 'booking'

Feeding intention at 'booking' of responders was compared with that of non-responders at this time. There was a lower percentage of non-responders (25 per cent) intending to breastfeed their newborns compared with the responders group of mothers (56.4 per cent). The 557 eligible expectant women were further divided into 'deciders' (i.e. 453 of responders and 51 of non-responders) and 'undeciders' (i.e. 36 of responders and 17 of non-responders). These two groups of women were tested for any association between feeding intention of responders and non-responders. There was a significant difference between responders and non-responders, with a higher percentage of undecided in the non-responders (17, 25.0 per cent) compared with responders (36, 7.4 per cent).

Actual feeding behaviour at time of discharge

The differences between responders and non-responders were further demonstrated in this study as more of the responders (261, 53.5 per cent) breastfed their babies than the non-responders (11, 16.4 per cent). Comparison between feeding intention at 'booking' and actual feeding method at discharge was also investigated. When comparing the responders' feeding intention with actual feeding method, 219 (79.3 per cent) of responders who intended to breastfeed actually breastfed their babies, and 149 (88.2 per cent) who intended to bottle feed actually bottle fed their babies at discharge. However, when comparing the non-responders' feeding intention with actual feeding method, only 8 (47.1 per cent) of non-responders who intended to breastfeed actually breastfed their babies, and 34 (100 per cent) who intended to bottle feed actually bottle fed their babies at discharge.

There was a significant difference when comparing the direction of change from the feeding intentions to actual feeding methods after delivery, between the responders and non-responders ($\chi^2 = 3.8, df = 1, p < 0.05$). It was found that the non-responders group of mothers had a greater shift towards bottle feeding than the responders group of mothers. Among the non-responders, there was a +32.4 per cent ($n = 22$) gain of mothers bottle feeding their babies from time of 'booking' to time of discharge, compared with a smaller +11.9 per cent ($n = 58$) increase over the same period among the responders. The reduction in breastfeeding from intention at time of 'booking' to actual feeding method at discharge was −3.1 per cent ($n = 15$) among responders and −8.8 per cent ($n = 6$) among non-responders. Of the 36 responders who were undecided on their feeding method at 'booking', 14 (38.9 per cent) of them actually breastfed, and 22 (61.1 per cent) of them bottle fed their babies at discharge. Of the 17 undecided non-responders at 'booking', three (17.6 per cent) of them breastfed and 14 (82.4 per cent) of them bottle fed their babies at discharge. From this result, it is also apparent that a very high proportion of mothers who were undecided at 'booking' chose to bottle feed their babies after birth, and this is especially so amongst the non-responders.

It is possible that the four significant factors for responders versus non-responders (mothers' smoking habits, feeding
intention, feeding intention of 'deciders' and 'undeciders' and actual feeding) may be explained primarily by social class. To establish the relative contribution of each of these variables, all significant factors were fitted into a log-linear analysis. Only two factors beside social class showed significant effects. The three-way effects were: social class–smoke–category (responders and non-responders), with a likelihood ratio of $\chi^2 = 4.9$, df = 1, $p < 0.027$, and social class–feeding method at discharge–category, with a likelihood ratio of $\chi^2$ of 5.3, df = 1, $p < 0.032$. Therefore mothers who smoke, who are from a lower social class and who bottle feed their babies after birth would be more likely to be non-responders in the infant feeding studies.

**Discussion**

This study aims to compare responders and non-responders, to

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<tr>
<th>Table 1 Comparison of the characteristics of the responders and non-responders, using $\chi^2$ (numbers, with percentages given in parentheses)</th>
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<tr>
<td>Marital status</td>
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<td>Married or cohabiting</td>
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<td>Maternal occupation</td>
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<td>Total</td>
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<td>Mother's feeding intention*</td>
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*Combined feeding was removed before analysis because of the small numbers involved.
provide a more complete understanding of the determinants of mothers’ choice in infant feeding. The results illustrate a non-response rate of 10.5 per cent at the first phase, when the couples were interviewed soon after the birth of their babies. Because of varying reasons of non-compliance, other longitudinal studies\textsuperscript{4,5-12,14} have different non-response rates at different stages of their studies. In some cases, the non-response rates are as high as 36 per cent. This could certainly jeopardize the reliability and validity of the conclusions, in particular for assessing the breast and bottle feeding rates.

Although the present paper adopts a somewhat novel method of assessing the characteristics of non-responders, there are a number of methodological limitations that restrict the collection of comprehensive data on this subgroup. For example, information could only be collected from the mothers’ maternity notes. This obviously limits the range of available information, and checking the reliability of information collection by a variety of different health personnel was not possible. However, in one of the hospitals in this study, all the mothers’ maternity notes were computerized and relevant data on the mothers were recorded in a sequential manner, thus ensuring a standardized procedure for information collection. Another limitation is that vital information on mothers’ and fathers’ attitudes towards the benefits and drawbacks of certain types of infant feeding are not recorded and therefore not accessible.

The issue highlighted in this paper is that the non-responders were more likely to be undecided in their intention of feeding at ‘booking’. The non-responders are more similar to bottle-feeding respondents than to breastfeeding respondents in terms of their socio-demographic characteristics, smoking habit, feeding intentions and feeding behaviour. This is supported by a study carried out by Bond and Greigson\textsuperscript{14} in which they developed and validated an instrument to predict infant feeding. This study was carried out in two phases in two districts in Newcastle upon Tyne. The first phase involved studying 983 women, and in the second phase another 538 women were interviewed. In the first phase, the study involved the development of an assessment measure, the Infant Feeding Index, for use at antenatal ‘booking’ visit, to predict the feeding methods a pregnant mother will choose. The second phase tested the accuracy of the Infant Feeding Index in predicting feeding methods, and its acceptability to midwives and pregnant women. As stated in that study, ‘Central to our study is the belief that providing the midwives with a tool which differentiates between those women who have strong convictions and those who are undecided or whose prior convictions are weak, would allow midwives to give positive support and encouragement to those women who are most likely to be responsive. In other words, focus their efforts on pregnant women undecided about which feeding to use’ (p. 6). The Infant Feeding Index constructed was able to successfully predict the feeding method a mother will use by 85.1 per cent. The ‘Index’ was found to be acceptable to midwives and pregnant women. It operated on the basis that the higher the score attained by the mother (above 60) the more likely she was to breastfeed, and the lower the score (below 30) the more likely she was to bottle feed. Using the ‘Index’, the health professionals would be able to focus their efforts and limited resources on this group of ‘uncertain’ mothers, to ensure that they chose the most appropriate feeding method. Bond and Greigson showed that 83 per cent of those who breastfed and 77 per cent of those who bottle fed had indicated their preference for that method during pregnancy. The ‘uncertain’ group of women (who scored between 30 and 60 inclusive) formed 27 per cent of the study sample. From the 27 per cent of ‘uncertain’ group of mothers, 35 per cent breastfed their babies. Thirty-one per cent of the ‘uncertain’ mothers who started breastfeeding stopped at 10 days. In contrast to this, only 17 per cent of the women who scored above 60 stopped breastfeeding over the same period of time. The above study found that women who were undecided at ‘booking’ were less inclined to breastfeed and, even if they were to initiate breastfeeding after birth, they were more likely to stop soon after birth as compared with the mothers who were committed to breastfeeding at ‘booking’.

The present study clearly shows that a higher proportion of non-responders have a tendency to be undecided about the feeding method at ‘booking’ and are also more inclined to bottle feed their babies. The non-responders in this study were also shown to be more inclined to smoke, compared with the responders. The non-responders were more similar to bottle-feeding respondents than to breastfeeding respondents in terms of their socio-demographic characteristics, smoking habit, feeding intentions and feeding behaviour. This therefore suggests that this subgroup of mothers (non-responders) will need extra understanding and an additional input of resources to promote breastfeeding among them and to support them in maintaining breastfeeding. However, to be able to identify these non-responders and undecided mothers for extra support, health professionals need to possess and use an appropriate instrument which predicts and identifies these mothers, as illustrated by Bond and Greigson\textsuperscript{14} and by Alexy and Carter Martin.\textsuperscript{5}

One of the main findings of this study is that, for most of the women who had decided on their feeding method at booking, their feeding intention is reflected in their actual feeding behaviour. The health professionals involved in the care of expectant and nursing mothers need access to reliable and relevant information to promote breastfeeding, especially amongst those who are ‘undecided’ and possibly even among those mothers who are not motivated to breastfeed. It is argued that ‘Breast is best’ not only for infants, but also for their mothers’ health, and that health gains from breastfeeding will reduce the cost of health care. It is therefore vital to be aware of who the ‘undecided’ non-responders are, so that the limited health service resources can be focused on educating and supporting this subgroup of mothers who ultimately tend not to breastfeed their babies and who might not be aware of the benefits of breastfeeding.
This study also revealed that in addition to social class, other factors differentiate between responders and non-responders, such as 'smoking habit of the expectant women' and 'the feeding behaviour at discharge'. In so doing, these results illustrate the complexity of the factors that differentiate between responders and non-responders as regards infant feeding patterns.

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