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Use of interactive telephone technology for longitudinal data collection in a large trial

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ABSTRACT

We report here on the use of interactive telephone technology for collecting longitudinal data in a large randomized non-blinded parallel trial.

Data were primarily collected via an automated interactive telephone system which enabled data to be downloaded by researchers periodically via a secure website. Alternative methods were used by some participants to provide data; here we analyze the demographic profiles of groups by preferred data provision, and consider the cost-effectiveness and efficiency of such a system.

The automated telephone system was used to provide the majority of data obtained (75.7%), however the group preferring to use this system to provide the majority of their data was on the whole older, more likely to be married, university educated, higher income and white compared to participants preferring to submit their data via personal phone call or post.

We conclude that interactive telephone technology provides a means by which large quantities of longitudinal data may be collected efficiently. Depending on the target population, however, considerable staff time may be required to manage attrition and consequent data loss, and alternative strategies should be considered to minimize this.

1. Introduction

Longitudinal research methods enable clinicians and academics to conduct health surveillance programs, study behavior and the on-going effects of health-promoting interventions. When participants are asked to report events on a daily or weekly basis over a number of months, the data collection method needs to maximize accuracy and response rates while minimizing costs and the burden on participants.

Unfortunately these are often mutually contradictory aims. Potential methods include home or telephone interviews, postal or web-based questionnaires at varying intervals, or diaries collected at the end of a given period.

Where the data required are restricted to a limited number of closed questions, an automated interactive telephone-to-web data collection system may be efficient and cost-effective. We designed and tested such a system for collecting follow-up data in a large randomized trial in the North East of England. We report here on usability and practicality of the system, the characteristics of the respondents, and the quality of data obtained when we implemented this system having previously assessed its feasibility [1].

The primary outcome measures for the North-East Cot Trial (NECOT) required us to obtain prospective data on infant feeding and sleeping practices each week for 26 consecutive weeks. With 1071 trial participants this potentially involved the administration of almost 28,000 infant care questionnaires with each participant answering up to 11 questions

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per questionnaire. We required a low-cost and efficient method to capture and organize this large amount of data.

It is becoming increasingly common to offer alternative ways of collecting data. Mixed-mode surveys [2] offer alternatives either initially or after non-response. Although mixed mode surveys typically result in a higher overall response rate, there are potential limitations if participants respond differently to different survey modes [3]. Although we aimed to get the majority of responses via the interactive telephone system, we offered participants alternative ways of providing follow-up data. We have compared the characteristics of participants using each method.

2. Methods

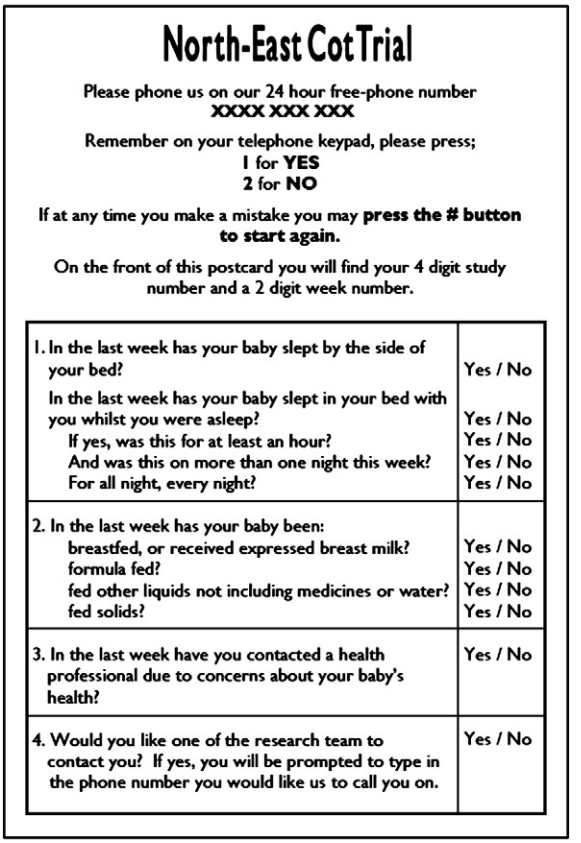
NECOT participants were recruited at routine antenatal clinics at the Royal Victoria Infirmary, Newcastle. Women were approached in person by trial staff recruiting at the clinic between the hours of 9.30 am and 4.30 pm Monday to Friday. As far as possible all women were approached; recruiters introduced themselves and the NECOT trial and provided women attending their routine 12 week scan with a patient information leaflet. Women were approached again at the time of their 20 week routine scan and asked if they would be willing to participate in the trial. If they had been missed by recruiters previously, or had not previously attended an appointment at the clinic, women at this stage were provided with an enrollment pack containing the PIL, enrollment form and consent form along with a freepost envelope enabling them to return the forms if they wished to participate.

Between January 2008 and March 2009, 3453 women were assessed for eligibility; 2221 were excluded between this stage and randomization based on failure to meet inclusion criteria (sufficient English comprehension to understand patient information materials; singleton pregnancy; intention to deliver at the RVI and not decided against breastfeeding); declining to participate; non-return of enrollment forms and withdrawal before randomization. Further checks took place just prior to randomization at 32–34 weeks gestation, to check if the participant was still in the area, and that the pregnancy was ongoing.

Participants were randomized into intervention and control groups prior to delivery and received standard care or the intervention condition on the postnatal ward [4]. The intervention condition in this trial involved provision of a 'side-car', or 'clip-on' crib [bassinet] upon arrival on the postnatal ward following delivery, for use until discharge from the postnatal ward. The control condition was provision of a standalone cot [bassinet], as per standard care at the RVI.

Following hospital discharge participants received weekly postal delivery of a question-card to their home address (Fig. 1) prompting them to call the automated telephone service. Printed on the card was the free-phone number for the service, an individual study ID number and week number (1–26), and the study questions which included the option to request that a member of research staff contact them.

Upon calling the free-phone number, participants were guided through data provision by an automated pre-recorded voice response system, and responses (all yes/no) were entered via the telephone keypad. Our previous pilot [1] and testing of the system indicated that calls took approximately one minute to complete.



North-East Cot Trial

Please phone us on our 24 hour free-phone number
XXXX XXX XXX

Remember on your telephone keypad, please press;
1 for **YES**
2 for **NO**

If at any time you make a mistake you may **press the # button to start again.**

On the front of this postcard you will find your 4 digit study number and a 2 digit week number.

1. In the last week has your baby slept by the side of your bed?	Yes / No
In the last week has your baby slept in your bed with you whilst you were asleep?	Yes / No
If yes, was this for at least an hour?	Yes / No
And was this on more than one night this week?	Yes / No
For all night, every night?	Yes / No
2. In the last week has your baby been:	
breastfed, or received expressed breast milk?	Yes / No
formula fed?	Yes / No
fed other liquids not including medicines or water?	Yes / No
fed solids?	Yes / No
3. In the last week have you contacted a health professional due to concerns about your baby's health?	Yes / No
4. Would you like one of the research team to contact you? If yes, you will be prompted to type in the phone number you would like us to call you on.	Yes / No

Fig. 1. Question postcard.

Postcards were mailed weekly by research staff, divided into two mailings per week, timed so that all participants would receive the card just prior to the target day for data provision.

Calls (responses) made to the system were automatically sorted into daily databases by the service provider and made available to research staff via a secure website. Staff were free to download data at any time; in practice data were downloaded weekly and copied into a master spreadsheet database. Downloaded data were scrutinized by staff in order to identify missing weeks of data for individual participants. If a participant failed to provide data for two or more weeks, efforts were made by telephone or postal contact to re-engage them in the follow-up. If these efforts failed, and four or more consecutive weeks of data were missing, participants were deemed to have dropped out of the study and no further attempts were made to contact them.

Changes made subsequent to our pilot study [1] included removal of two questions from the questionnaire — about contact with a health professional and return to work. Additionally, one part of a question was added (baby slept at side of bed) at the request of the ethics committee. We also provided alternate methods for submitting data as described below.

2.1. Use of alternative methods for reporting data

In designing the data collection system it was recognized that not all participants would have access to a landline