Women in an infertility survey responded more by mail but preferred a choice: randomised controlled trial

Running title:

Response mode preference in an infertility survey

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Abstract

Objectives

To evaluate three modes of questionnaire completion (online, mail, telephone) and a choice group) for a questionnaire survey with a sensitive topic.

Study Design and Setting

A randomised trial of alternative completion methods (online, paper (mail), telephone interview, choice of the three modes) for a survey about fertility problems embedded within a population-based cross-sectional survey of reproduction among women living in England and Wales.

Results

From an initial cohort of 21,036 women who were sent a screening questionnaire, 4559 responded. 699 women reported fertility problems of whom 593 (85%) agreed to participate. 521 (75%) of the 699 women then completed the survey. Compared to the “mail” arm, those allocated to telephone interview were less likely to agree to participate initially (OR 0.41, 95%CI 0.22-0.74) but were ultimately more likely to complete the questionnaire (OR 2.20, 95%CI 1.01-4.80). Overall, those allocated to the choice arm were most likely to go through to completion (80% vs. 77% mail, 72% telephone and 68% online groups). In the choice arm, women showed a clear preference for mail (59% vs. 37% choosing online and 3% telephone response).

Conclusions

Online surveys are a viable alternative to mailed questionnaires but were not as popular as mail in this study population. Response can possibly be increased by offering women a choice of response modes.

Key words:

Infertility, response, randomised controlled trial, UK, online, survey

What's new?

- Good evidence is available on methods to increase response to postal and electronic questionnaires; however there is less evidence about which modes of response are preferred when answering sensitive questions

- Women allocated to a "choice arm" and therefore allowed to choose how they would like to respond to a survey about their experiences of fertility problems, were most likely to go through and complete the survey, with most women in this arm choosing a mailed response

- When offered a single mode (online, mail or telephone), mail produced the greatest proportion of responses, although differences were not large, indicating that online response is acceptable alternative

- As the differences in completion rates by different modes were not large, but implications for resource allocation can vary markedly, this study shows that use of a range of response modes is viable. It is likely however, that response to surveys can be increased by offering participants a choice of response modes where this is feasible.

Introduction

Maximising response by participants to requests for data in order to obtain a representative sample with adequate power is a perennial problem for epidemiological studies. This is particularly true in general population samples and on the highly sensitive issue of infertility.[1, 2]

The response to questionnaire-based infertility studies varies and, as expected, this often stems from the study design or the source of the sample population. High responses have been reported in the past among women recruited as part of a study on a different health outcome, such as cancer (e.g. 83%[3]), or who had taken part in a previous study of infertility and/or pregnancy failure (e.g. 87%[4]). However, other studies have had a lower response, particularly when population-based (47% to 50%).[5-7] General (as opposed to clinical) population-based infertility surveys are rarer because routine data collection on reproductive events such as pregnancy attempts, pregnancy failure and infertility is generally not possible. In a UK-population-based study investigating miscarriage and infertility, a questionnaire sent to a random sample of the general UK population was completed by only 46% of women, although this was largely to identify and recruit women who had ever been, or attempted to get, pregnant for participation in a more focused second-stage, which subsequently achieved a 76% response.[1] Response to infertility studies also varies by country, as in a population-based study conducted in five European countries where the response varied from 54% to 88%,[8] and has also tended to decline over time.[6, 9, 10]

Population-based cross-sectional surveys of infertility have tended to be mailed, with some also using telephone or face-to-face interviews, and a great deal of work has been done to try to understand how to improve response to mailed questionnaires in general.[11, 12] Different modes of contact appear to have an effect on response, as well as on the logistics and budget needed for the research. For example, in a Danish study[4] evaluating a questionnaire on fecundity, researchers tested three different response modes to which women were allocated randomly. The greatest response was to the mailed questionnaire

(95%), followed by telephone interview (85%) and face-to-face interview (77%). However, it is not known which response mode women in the UK would prefer when being asked about a personal topic such as fertility problems.

In more recent times, online surveys and email questionnaires have become common market research tools in the commercial sector, although there is limited literature describing their use in epidemiological settings and none could be found that had investigated fertility problems. Most of the studies have not been population-based, but rather have taken place in the workplace among healthcare workers or in universities. Despite differing methods of contact, e.g. number or method of reminders, all these studies have found that the response was lower in those given email invitations to the survey compared to those sent a mailed questionnaire.[13-17] They did find, however, that email or internet responses were made more quickly than mailed ones, and that the costs per response were lower, making the internet an important new possibility for health surveys.[13, 16]

The current study aimed to investigate ways of improving response to surveys on a sensitive topic such as infertility by allocating participants in a UK population-based survey to different modes of questionnaire completion (and a choice group). Response to each of the four options was compared, and any differences relating to choice of response mode were examined.

Methods

Overall design

A randomised controlled trial of different ways to complete a survey (online, mail, telephone or a choice of these) was embedded within a two-stage population-based cross-sectional survey of reproduction among women living in England and Wales. The trial population consisted of women who had reported problems conceiving on the one-page Stage 1 (screening) questionnaire, who were invited to participate in the second stage. The latter comprised a detailed questionnaire (44 questions, over 16 pages) asking about their

experiences of fertility problems and their management in primary care, as well as socio-demographic questions (e.g. ethnicity, and occupation and family income at the time of having problems). The first stage of the survey commenced in March 2009.

Participants

A sample of 21,036 women estimated to be aged between 25-50 was selected for the survey from the England & Wales electoral register, using stratified random sampling to ensure that they were representative of all women in the population. The data were supplied by a government-approved supplier of census data, Eurodirect (now Call Credit Marketing),[18] who also provided ecological estimates, based on postcode, of socio-economic band, educational status and internet use for each woman.

Four versions of the screening questionnaire were developed: each version had identical questions but contained a different invitation to Stage 2 corresponding to each arm of the Response Trial (Figure 1). The one-page screening questionnaire asked women for their age and a brief reproductive history, and was mailed to women enclosing a reply-paid envelope to respond.

All 21,036 women were randomly assigned to one of the four Response Trial arms before the first stage commenced using a randomly-generated unique ID number consisting of a letter and five digits, the last of which represented their allocated study arm (1, 2, 3 or 4). This would later allow identification of the response mode to which women in the Response Trial were initially allocated, irrespective of how they eventually chose to respond. Allocation of codes to women was done by an external mail out company.

This design allowed us to assess whether agreement to participate was affected by the method by which the subject was asked to participate.

Response Trial

The Response Trial population consisted of all women responding to Stage 1 who reported that they had experienced problems conceiving. This was a self-determined identification in answer to the question: "**Have you *ever* had any trouble *falling* pregnant (not including miscarriages)?** (i.e. you tried for a baby and either didn't succeed in getting pregnant or took a long time to get pregnant)".

Trial arms

Only women who answered "yes" to the question above were directed to the back page of the questionnaire, where they were shown the next step i.e. how to take part in the more detailed questionnaire. The questionnaire said: "The final stage of our study is ONLY for women who have had trouble *getting* pregnant, even if you went on to have a baby later. Please turn over to indicate if you are willing to take part." In this way, only eligible women were given the invitation to participate in Stage 2 and these were the women who formed the population for the intention to treat analysis performed. Depending on the version of questionnaire they received (Figure 1), they could go online, be mailed a paper questionnaire, or be interviewed over the telephone. The fourth arm (invitation) offered the choice of any of those three modes.

Figure 1: The four versions of the Stage 1 questionnaire

Online

Women in the online arm (and those in the choice arm who chose this option) were invited to go to the website address provided and enter the ID number given to them on the first stage questionnaire to access the online Stage 2 questionnaire. Responses were entered directly into the secure online database.

Mail

Women in the mail arm who agreed to participate in Stage 2 (and those in the choice arm who chose this option) were mailed the questionnaire, together with a reply-paid return envelope. Their responses were entered by experienced data entry clerks and collated with the online responses.

Telephone

For those in the telephone arm (and those in the choice arm who chose this option), a specialist company, Nunwood,* carried out interviews using experienced female interviewers. Internal quality control procedures ensured consistency between interviewers and 5% of interviews were monitored by the study's researchers. Women's responses were entered directly into the website database.

In order to maximise response to the infertility survey, the questionnaire indicated to women in the non-choice arms that alternative methods of response were available if they preferred (mail/phone, internet/phone and internet/mail for internet, mail and telephone arms respectively). Details of these alternatives were not given on the questionnaire, but women were asked to contact the study team if they wished to request an alternative.

Reminders

Due to the numbers involved, and therefore associated costs, only one reminder was sent out for the Stage 1 screening questionnaire, three weeks after the initial mail out. Up to three Stage 2 reminders were sent out, at three-weekly intervals after the woman had returned her Stage 1 questionnaire, each of which was a pink postcard prompting them to reply in the mode to which they had originally been allocated. Finally, the last women who had not responded to Stage 2 (n=60) were all sent a paper version of the questionnaire and asked to send that back or go online to complete the survey. Twenty-three women did so, all by post, 14 from postal group, 8 from online group, 1 from telephone group.

* Nunwood is a market research company that undertakes research and analysis mainly for commercial companies, including the health industry. They run large telephone interview panels as one of their services. www.nunwood.com

Statistical analysis

The survey response and characteristics of the study subjects were summarized as proportions, with tests for heterogeneity between arms of the trial being performed using chi-squared tests. Logistic regression models were also used to examine outcomes in different groups, relative response being estimated by odds ratios (OR) and 95% confidence intervals (CI), and statistical significance being tested using likelihood ratio tests. To ensure scientific validity for the Stage 2 infertility study (and trial population), the Stage 1 data were checked to assess whether responders were a representative sample of women of a similar age in England and Wales. Prior to sending out the screening survey, women's unique identifiers were tagged with their estimated socio-economic band, educational status and internet use. These markers were then compared between responders and non-responders, and tested using the chi-squared test. Reported maternal age at first live birth, and stillbirth and multiple birth rates among responders were then checked against nationally collected statistics for England and Wales[19] to assess comparability with the general population: For age, means and standard deviations were calculated and compared; for still- and multiple births, observed-to-expected ratios with 95% confidence intervals were calculated using indirect standardisation methods.[20] Although our study was originally powered for a higher overall response, our trial had good power to detect a 10% difference in response between groups responding at around 70% response per group.

Ethical Approval

This study was approved by the Ethics Committee at the London School of Hygiene and Tropical Medicine.

Results

Stage 1 and representativeness

After excluding undelivered letters (n=871), those who had died before the study (n=2) and those ineligible by age (n=81) or gender (n=1), response from the general population to the screening questionnaire was 4559/20081 (23%).

When socio-economic markers were compared between responders and non-responders, responders tended to be from higher socio-economic bands with associated higher estimated qualifications and use of the internet (Appendix Web Table 1). Responders did, however, appear typical with respect to reproductive markers: comparing reported stillbirth and multiple birth rates with those in the general population, there was little evidence of a difference from the population figures. After standardising for maternal age and year of the baby's birth, the observed-to-expected ratio was 0.89 (95% CI=0.70 to 1.13) for stillbirths and 1.02 (95%CI = 0.81 to 1.29) for multiple delivery rates (Appendix Web Table 2a). Average maternal age at first live birth among responders was within two standard deviations of that in the population for all but a small number of pre-1980 births, where it was younger (most probably because the oldest women at survey (aged 50) would only have been 21 in 1980, so only very young pre-1980 first-time mothers would have been captured) (Appendix Web Table 2b).

Overall, there was no evidence to suggest that the trial arm allocation had a bearing on whether women decided to return the screening questionnaire ($\chi^2_{(3df)}$=0.38, p=0.94) (Table 1).

Table 1: Stage 1 response by allocated (Stage 2) study arm

Response Trial

Of the 4559 women responding to the screening questionnaire, 717 reported fertility problems. Eighteen women left blank the section asking whether or not they agreed to participate in Stage 2, and so were excluded. The Response Trial population thus consisted of 699 women.

Eighty-five percent (593/699) women agreed to participate in Stage 2, 88% of whom (521/593 women) completed the survey (75% of the total trial population) (Figure 2). Among these were 17 women (5 in the online arm, 12 in the choice arm) who completed Stage 2 online without returning the screening questionnaire.

Characteristics of Stage 2 responders

The characteristics of the women who completed the Stage 2 questionnaire are shown in Table 2. Reflecting the characteristics of those who answered the screening questionnaire (Appendix Web Table 1), those who completed Stage 2 (who had all experienced problems conceiving) tended to be from the high SES groups (45% in the highest group), in households earning over £40,000 (41%), and with a qualification beyond secondary school (43%). Average age at survey was 41.7 (SD 6.1) years, with only 15% aged under 35.

Table 2: Demographic characteristics of women who responded to Stage 2

When women were asked if they would mind being contacted again in the future for further studies, 434 (83%) women agreed: 348 (80%) gave their email address, 312 (72%) gave their phone number and 247 (57%) gave their home address.

Response to Stage 2

The response to Stage 2 is summarised in Figure 2 and Table 3 by allocated study arm. A slightly higher proportion of women agreed to take part from the mail (90%) and choice (88%) arms than from the online (83%) and telephone (78%) arms. Compared to the mail arm, those allocated a telephone interview were significantly less likely to agree to participate (OR=0.41, 95% CIs 0.22 – 0.74) (Table 3), but it is notable that, once recruited, women in that group achieved the highest completion (93%) which was significantly higher than that

achieved from the mail group (OR=2.20, 95% CIs 1.01 – 4.80). Response was also high for the choice group (91%), with mail (85%) and online (81%) groups slightly lower (Figure 2).

Overall, of the total trial population of 699 women, those in the choice and mail arms were most likely to go through to completion of the study (80% and 77% respectively), with telephone (72%) and online arms (68%) less likely. These differences were only marginally statistically significant, however (p=0.048) (Figure 1, Table 3).

Figure 2: Distribution of response to trial, by allocated response mode

Table 3: Response trial outcomes, by study arm

Response mode preferences

Most women adhered to their allocation when completing the Stage 2 questionnaire (bold type in Table 4). Adherence was highest in the online group, where 95% of women responded online, compared to 88% of mail-arm women responding by mail and 87% of telephone-arm women responding by telephone.

Table 4: Comparison of the arm allocated to respondents and the method by which they actually completed the Stage 2 questionnaire

Choice Arm

In the choice arm women showed a clear preference for mail, with 59% choosing to respond by mailed questionnaire, compared to 37% who responded online. Only 3% of women in this group chose a telephone interview.

The characteristics of responders in the choice arm are presented in Table 5 by method of response. Those who chose to complete the questionnaire online were similar in age to those who chose the mailed questionnaire (or telephone interview). However, although choice of response mode appeared unrelated to educational or general socio-economic level, women from higher income households were much more likely to choose the online than the mail (or telephone) option: 71% of those choosing to respond online were in the £40,000+ income bracket, versus 28% of those choosing the mailed questionnaire (£20-40k: OR=0.19, 95% CIs 0.07 – 0.50; <£20k OR=0.08, 95% CIs 0.02 – 0.39). There was no evidence of an interaction between income and age (p=0.37) or educational level (p=0.18).

Table 5: Characteristics of responders in the choice arm, by method of response

Discussion

In this randomised controlled trial of response mode for a questionnaire on a sensitive subject, women who were offered a choice of response modes were most likely to complete the study while those who were originally assigned to the online group were least likely. Overall, mail was most popular response mode and telephone interview was the least popular. However, once women had agreed to participate, women in the telephone interview arm produced the highest response, possibly because it is probably the method requiring the least effort from the woman herself.

There was a general adherence to the study arm to which women were originally assigned, it required some effort to request an alternative, and so women in the choice arm might give the clearest indication of women's preferences: the majority of these women chose mail, with

online the next popular and telephone interview only chosen by a tiny minority (3%) of this group.

The study found that the mode to which women were allocated did not affect whether they initially responded: there was an even spread of response to Stage 1 from women in all study arms. Almost all responses were by the mode initially used, i.e. mail in Stage 1, suggesting that women tend to respond as approached: a mailed questionnaire is likely to get a mailed response.

In this study choosing to respond online was strongly, and only, related to household income. This could be related to having a computer in the home and paying for internet access as people are unlikely to fill in a sensitive questionnaire on a computer at work.

Strengths and Weaknesses

The initial study population was a large representative sample drawn from all socio-economic strata of the population. Despite all efforts, response to the screening questionnaire was low and so the response trial findings should be interpreted in the light of two caveats: firstly, that the results reflect the preferences of a specific subset of women – those who have self-reported fertility problems; and secondly, that the study sample tended to be of higher SES, family income and educational level than the general population.

Many health studies have found that responders tend to be of higher SES than the general population,[1, 5, 21-24] as was the case in this study. The finding that mail is preferred to online responses may in fact be an underestimate of the picture in the general population, as those of lower SES are less likely to have internet access, or to use it as much as those of higher SES, as indeed was shown in this study, with the lower income group choosing mail over internet. Recent data from the ONS[25] show that those with no qualifications are far less likely to have internet access at home (52%) compared to those with a degree or higher qualification (95%). In this study population, higher internet use would have been expected,

so if anything, there could be even less take up of an internet mode for response in the general population.

We must be cautious in generalising the results to other populations, as there may be some impact of a woman's fertility status on how comfortable she feels using different modes of response. However, fertility problems are relatively common in the population, with a prevalence of around a fifth of women,[6] and these women were checked against nationally collected statistics for their representativeness in terms of reproduction. It is likely that they are typical in their experiences of fertility problems of many women of similar ages. One main difference from women in the general population, however, apart from their fertility status, is that they may be more likely to still be in the workforce than women with no fertility problems. That would tend to give them more access than women at home with children to email and the internet – a difference that did not seem to be reflected in these results.

A particular strength of this study is that one arm gave women a choice of different response modes, rather than just allocating participants to three trial arms. This meant that we could gain insight into women's true preferences as well as looking at how well they adhere to the mode allocated. The tendency to stick to the mode assigned is not surprising: it is likely that to change from the one given, even though other response modes were possible, would show a strong preference for another method or strong dislike of the allocated one. This was clearly the case for some women, but it was rare among these responders.

Online vs post vs telephone

Other studies have also found a preference for mail over email,[13, 14, 16] and also that telephone interviews are less popular.[26] Few have looked at the use of mail to prompt the use of an online survey, however.[24] The approach by mail, rather than by email for instance, may explain the lowered use of the online mode in this study: women could not just click through to the survey from an email. To do the survey by phone or post, the women had simply to return the screening questionnaire they had just filled in and wait: they were

then either sent a Stage 2 form by post or they were telephoned for their interview, thus being prompted to complete Stage 2. The women in the online group had to be more active: they had themselves to remember to go online to complete Stage 2. The form did ask for email addresses from those in the online arm if they wanted to be sent the link to the survey, but no women took that up.

An online questionnaire ostensibly has several advantages over other methods. Firstly for the women: filling it in is a “one-step” process, in that they do not have to remember to post it back as they would after filling in a paper questionnaire. Like a paper questionnaire, they can complete it in one go, or save their progress and come back to it later. In addition, women are automatically skipped to questions that are relevant to them based on their answers. Secondly for researchers: the responses are entered straight into the database, rather than transcribed or operator-entered, which is time-consuming and can lead to errors. The online programme also carries out consistency checks and reminds women when they have missed out a question, meaning that data quality can be maximised. Lastly, it should be a cost-effective method as it avoids the printing and postage costs associated with paper copies. However, despite the costs to researchers, people may feel more comfortable with the more familiar medium of paper and mail, and some trust the security of their answers more than when doing it online.

Telephone was the least popular means of response, though once they had agreed to participate few changed their minds. Other studies have also found a mailed response greater than that for a telephone interview.[4, 26] Women may feel more awkward answering personal questions to someone on the telephone rather than completing a survey themselves, a feeling echoed by some women in qualitative work that preceded this study.[27] An interviewer can lead a participant through a questionnaire ensuring it is completed as fully and accurately as possible. However, there have been some studies which found more positive responses were given to an interviewer than when the questionnaire was self-completed.[28, 29]

It is interesting to note, however, that when asked if they would take part in future studies, women tended to give their email address most frequently, followed by their telephone number and then their home address. This suggests that email is now generally seen as the easiest method of initial contact, at least in this population.

Conclusions

Online surveys are a viable and practical alternative to mailed questionnaires but were not as popular as mail in this study population. Overall, when offered a single mode of response, mail followed by telephone then internet produced the greatest proportion of responses from the original sample, but the differences were not large. This is an important finding, as there are large differences in terms of resources – and hence number of women who can be reached – for the different methods.

Women who were offered a choice of response modes were most likely to complete the study suggesting that offering women a variety of response modes can encourage participation in a survey of a sensitive topic, as they respond positively to being given a choice. However, when offered a choice of response modes, the majority of women chose to complete the study by mail. It should be noted that those women choosing to fill the survey in online were much more likely to be from higher income families, which has implications for planning studies to minimise inequality of access.

Further studies exploring reasons for choice and streamlining the process of offering choices would shed more light on how researchers can best approach participants to maximise response and cost-efficiency while minimising bias towards higher income participants.

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