

**USE OF AN ONLINE QUESTIONNAIRE FOR FOLLOW UP OF YOUNG FEMALE STUDENTS
RECRUITED TO A RANDOMISED CONTROLLED TRIAL OF CHLAMYDIA SCREENING.**

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ABSTRACT

Background

Randomised controlled trials often rely on questionnaires for follow up.

Objective

To compare response rates to an online and postal 12 month follow up questionnaire on sexual health in female students who took part in a chlamydia screening trial.

Methods

1329 sexually active female students aged 16-27 were recruited from 12 universities and further education (FE) colleges. The 299 participants recruited between September 2004 and February 2005 were sent a postal questionnaire after 12 months. The 1030 participants recruited between March and December 2005 were contacted by email after 12 months and given a weblink to an online questionnaire..

Results

The response rates to the 12 months questionnaire in the online and postal groups were 51% and 29% 4 weeks after follow up commenced (relative risk RR 1.78 (1.47 to 2.14)) and 72% and 59% after 3 months. After adjusting for ethnicity, smoking, type of educational institution (university or FE college) and subject studied (health related or not), the RR at 4 weeks was 1.88 (1.42 to 2.50). However, a prior telephone call to confirm contact details increased response rate at 3 months in the postal group. In the online group, university students, those of white ethnicity and non-smokers had higher response rates at 4 weeks.

Conclusions

In this young student population, an online questionnaire was quicker, cheaper and more efficient than a postal questionnaire. However some FE college students did not have an email address. Telephone prompts and postal questionnaires were essential in obtaining a good response rate.

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INTRODUCTION

Many randomised controlled trials and epidemiological cohort studies rely on questionnaires for follow up. High response rates are important to maintain the effective sample size and reduce the possibility of bias, but this can be difficult to achieve. [1] Postal questionnaires are often used as they are relatively inexpensive and easy to distribute.[2] They may be supported by telephone reminders and repeat postal questionnaires which have been shown to increase follow up rates. [2] However, postal questionnaires where sensitive information is collected elicit lower response rates. [1, 3] and attempts at gaining questionnaire responses to sensitive questions over the telephone can lead to a response bias. [4] For such issues web based surveys offer an increasingly popular alternative. [5] They may also be useful in younger populations. In 2008 93% of people in the UK aged 16-24 had used the internet within the last three months, compared with 63% of people aged 55-64. [6]. Disadvantages of web based surveys include variable access to the internet, and issues relating to computer literacy or web security. [6, 7]

The Prevention of Pelvic Infection (POPI) trial aimed to see if screening young female students for chlamydia using self-taken vaginal swabs reduced the incidence of pelvic inflammatory disease over one year. [8] Twelve months after participation women were sent a follow up questionnaire asking about possible symptoms of pelvic inflammatory disease. Here we describe the response rates for two different follow up strategies. In the first, participants were initially sent the questionnaire via post. In the second participants were initially contacted by email and asked to complete an online questionnaire.

METHODS

Between September 2004 and December 2005 1329 sexually active female students aged between 16 and 27 were recruited from 12 universities and colleges across London. At recruitment participants were informed that they would be contacted 12 months later and asked to complete a follow up questionnaire. They were asked to provide the following contact details; term time address, home address, email address, mobile telephone number, landline telephone number, General Practitioner (GP) details, college and course. Not all participants were able or willing to provide all of these details but all were required to provide at least one method of contact which was usually a mobile phone number.

After 12 months, the first 299 participants, who were recruited between September 2004 and February 2005 and provided a valid postal address, were sent a postal follow up questionnaire with freepost envelope. The questionnaire asked about development of possible symptoms of pelvic infection, testing for sexually transmitted infections and numbers of sexual partners in the previous year. As response rates were poor at this early stage, from January 2006 researchers started contacting participants by mobile phone to confirm addresses before sending out postal questionnaires. Nine participants did not want to be contacted at home so were followed up by mobile phone or email.

In February 2006 we developed a web-based questionnaire using an online survey company. A link to the questionnaire was emailed to participants, who clicked it to gain access to the questionnaire. Password protected results were collected via the online survey company's website. The questionnaires were downloaded into a Microsoft Excel spreadsheet and also printed directly from the website.

The 1030 participants recruited between March and December 2005 formed the 'online group'. Participants in this group providing an email address (n=806) were sent a link to the online questionnaire. Those without an email address were followed up with an initial attempt to call the student to confirm their contact details followed by a postal questionnaire, unless the student provided an email address over the phone.

Non-responders for both methods were followed up with calls to their mobile phones and repeat postal questionnaires and emails with a link to the online questionnaire (after it was set up in February 2006). Phone calls were limited to 3 per participant, as were mailings and emails.

Statistical analysis

Relative risk was used to compare response rates to the 12 month questionnaire at 2 weeks; 4 weeks and 3 months after follow up commenced. Primary analysis compared response rates in the online group compared to the post group. A secondary analysis compared three groups, dividing the post group into those who were followed up in the first 4 months when the initial contact was by post (n=167), and those followed up in the subsequent 2 months where we tried to telephone to confirm contact details before posting the questionnaire (n=132). The third group was the online group (n=1030).

Binomial regression was used to adjust the relative risk for age, ethnicity and type of educational institution (university or FE college), subject studied (health and social care or not), number of partners (more than 2) age of sexual debut (under 16, 16-17 and over 18), smoking and time of year recruited (2 month bands). We investigated the effect of these variables on response rates at 4 weeks and on whether or not participants responded electronically in the online group.

A stepwise approach was used adding variables into the model which were significant at the 5% level until no more variables would have significantly improved the fit or until the model failed to converge. All analyses were carried out in Stata 10. [9] Results are presented as relative risks adjusted for all other significant variables.

RESULTS

Table 1. Characteristics and methods of contact for the postal and online follow up groups.

Of the 1329 participants recruited, 972 (73%) were from universities and 357 from further education colleges. Although the age distribution of the participants were similar for the two methods of follow up, the postal group were less likely to be at university or to describe their ethnicity as white and more likely to smoke (Table 1). Table 1 also shows how many participants required single or repeated postal mailings in each group. In the post group only 32% of participants responded to a single mailing, while in the online group 43% responded electronically without the need for a follow up postal questionnaire. In the 12 months since participation 31% of participants changed their postal address, 14% their email address and 12% their mobile phone number. Fifty eight (4%) participants either did not provide a postal address or requested we did not use it.

Table 2 Response rates to postal or online questionnaire.

Participants in the online group responded faster than those in the post group and this difference persisted to 3 months (RR =1.21 (1.09 to 1.34)) (Table 2). **Even after adjusting for other variables (age, ethnicity, educational institution, studying a health and social care course, smoking, sexual debut and time of year) where they fitted the model, the online group had significantly higher response rates at all time points**

Table 3 Response rates to the postal questionnaire (n=299), with and without a prior telephone call to confirm contact details, compared to the online group (n=1030).

Participants in the post group who received a prior phone call to confirm contact details were significantly more likely than those who did not, to respond to the questionnaire by three months

after adjusting for confounding factors. However the online group responded more quickly than either of the post groups (Table 3).

Table 4. Response rates within four weeks by any method (online, post, telephone) for the 1030 participants in the online group, related to demographic and behavioural characteristics.

In the online group, participants over 21, those of white ethnicity, non-smokers, university students, those studying health and social care and those followed up in March-May had higher response rates at 4 weeks (Table 4). After adjustment age was no longer related to response rates but all other factors remained significant.

Table 5. Participants who responded electronically compared to post or telephone for the 526 in the online group who replied within 4 weeks

Among the 526 students in the online group who responded within 4 weeks, 429 (82%) responded electronically. University students were more likely to respond electronically but age and ethnicity were unrelated to use of the internet to return questionnaires.

Practical observations from the follow-up phase are outlined in Box 1.

DISCUSSION

Principle findings

The response rates to the 12 months questionnaire in the online and postal groups were 51% and 29% 4 weeks after follow up commenced (relative risk RR 1.78 (1.47 to 2.14)) and 72% and 59% after 3 months (RR 1.21 (1.09 to 1.34)). The difference remained significant after adjusting for ethnicity, smoking, type of educational institution (university or FE college) and whether or not the student was studying health and social care. However, a prior telephone call to confirm contact details increased response rate in the postal group. In the online group, university students, those of white ethnicity and non-smokers had higher response rates.

Strengths and weaknesses

This is the first community based study of response rates to a follow up questionnaire on sexual health comparing postal and online questionnaires. It included young, sexually active women students, with over 40% from ethnic minorities, recruited outside healthcare facilities. Many of the educational institutions were located in Lambeth and Southwark, two of the most deprived boroughs in England. [10] Such participants might be expected to be very difficult to locate and follow up 12 months after recruitment.

We considered using the Index of Multiple Deprivation to assess socio-economic status. However, the majority of participants at Universities provided only a term-time address, which would not have provided a true representation of socio-economic status. Instead we controlled for other factors that are linked with socioeconomic status; cigarette smoking. [11] and age at sexual debut. [12] Cigarette smoking was found to significantly affect response rates at 4 weeks.

The main weakness is that this is a descriptive study and participants were not randomised to different follow up strategies. Recruitment took place in different institutions at different times resulting in the online group including more participants at university and fewer from ethnic minorities. These participants might be expected to have higher response rates. However after adjustment for these factors the online group still had higher response rates. These preliminary results need to be confirmed in a randomised trial.

The other main limitation is that the findings may only apply to a young, female student population who had already had contact with the researchers a year previously. They may not apply to different populations such as men, non-students, older people, or those with no previous contact with researchers.

We found that 30% of participants had changed their postal address during the year and this is likely to be an underestimate. In the follow up questionnaire we asked if they would be willing to provide a further postal sample and requested contact details. We also contacted participants by phone if they did not provide an email address or they did not reply to an email, and asked them to confirm all contact details. It is likely that some participants' change of details may have been missed.

Comparison with other studies

Much of what is reported about response to questionnaires concerns population groups who have not already been actively involved in a trial or have not already been consented to enter a trial, for example one off surveys or baseline recruitment.

Having prior contact with participants has been shown to increase response rates in postal questionnaires. [3] We found that a prior phone call improved response rates in the post group

at 4 weeks and 3 months. It is likely that no effect was seen at 2 weeks because of the length of time taken for postal questionnaire delivery and return.

Previously, where online methods have been used for follow up in large trials this has involved sending a participant information in the post containing the web address of the online questionnaire, which is administered via a website. [7] Participants have to sign into the website using specific details. We used a simpler approach sending an email with a link to the questionnaire embedded.

Participants at university were more likely than those at FE colleges to respond to the questionnaire in any format. In addition a recent UK study showed that those with educational qualifications were more likely to use the internet than those who do not. [13] Access to the internet would be generally available for those in higher education but institutional access is less likely to be available for under 18s. **Finally, participants studying courses in health & social care were more likely to respond than participants on other courses. It has been shown that a highly salient questionnaire (containing questions particularly relevant to the study participants) will increase the odds of gaining a response in both postal and electronic questionnaires. [1]**

Implications

Although this was a descriptive study it suggests that using an initial online questionnaire may be quicker, more efficient and cheaper than initial postal follow up in a young, mobile, student population. However electronic follow up still needs to be backed up by telephone prompts and postal questionnaires.

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Competing interests

The authors declare that they have no competing interests.

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Ethical approval: Ethical approval was granted by Wandsworth Local Research Ethics Committee.

Table 1. Characteristics and methods of contact for the postal and online follow up groups.

	Online group n=1030 %(n)	Post group n=299 %(n)	P-value*
Age at recruitment			
<18	11 (114)	11 (32)	0.89
18-21	42 (433)	41 (122)	
>21	47 (483)	48 (145)	
Self assigned ethnicity			
White	58 (595)	51 (151)	0.014
Black	32 (332)	33 (98)	
Other	10 (100)	16 (45)	
University student	77 (791)	61 (181)	<0.001
Study health & social care	40 (410)	23 (70)	<0.001
Cigarette smoking ¹	29 (300)	41 (121)	<0.001
Age first sexual intercourse ²			
< 16	26 (265)	23 (66)	0.099
16- 17	46 (458)	52 (153)	
18 +	28 (285)	25 (72)	
Two or more partners in previous year ³	41 (419)	44 (132)	0.298
Time of year			
Sept/Oct	34 (347)	13 (39)	0.000
Nov/Dec	25 (257)	43 (128)	
Jan/Feb	0	44 (132)	
Mar/Apr/May	41 (426)	0	
Method of contacting students			
Mobile phone only	0 (5)	1 (2)	
Electronic, no post	43 (439)	2 (7)	
One postal	6 (59)	32 (96)	
Electronic + 1 postal	21 (218)	15 (46)	
2 postal	13 (130)	30 (89)	
Electronic + 2 or 3 postal	17 (179)	20 (59)	
Known⁴ changes to contact details			
Postal address ⁵	33(338)	25 (75)	
Email address ⁵	13 (134)	18 (55)	
Mobile phone number ⁵	10 (108)	15 (46)	

* Chi-squared test

1. Online group=1024, Post group=298

2. Online group=1008, Post group=291

3. Online group=1024, Post group=298

4. Postal changes may be underreported for students who replied electronically and vice versa. Participants who replied electronically within a few days were not telephoned.

5. This includes students where the letter was returned to sender, the email bounced back or the phone was not working

Table 2 Response rates to postal or online questionnaire.

Time since posting to return of questionnaire	Online group n=1030 % (n)	Post group n=299 % (n)	Relative risk (95% CI)	P-value	Adjusted relative risk (95% CI)	P-value
2 weeks	41 (419)	22 (67)	1.82 (1.45 to 2.27)	P<0.001	1.64 (1.31 to 2.06) ¹	P<0.001
4 weeks	51 (526)	29 (86)	1.78 (1.47 to 2.14)	P<0.001	1.88 (1.42 to 2.50) ²	P<0.001
3 months	72 (739)	59 (177)	1.21 (1.09 to 1.34)	P<0.001	1.29 (1.11 to 1.51) ³	P=0.001

¹ adjusted for ethnicity, educational institution, whether or not study health and social care, smoking and age at sexual debut

² adjusted for ethnicity, educational institution, whether or not study health and social care, smoking and time of year

³ adjusted for ethnicity, educational institution and time of year. Model did not converge when studying health and social care was fitted to the adjusted model.

Table 3. Response rates to the postal questionnaire (n=299), with and without a prior telephone call to confirm contact details, compared to the online group (n=1030).

Time since posting to return of questionnaire	Group	Response rate % (n)	Relative risk (95% CI)	P-value	Adjusted relative risk* (95% CI)	
2 weeks	Post group without prior phone call (n=167)	21 (35)	1.00	P<0.0001	1.00 ¹	P=0.0001
	Post group with prior phone call (n=132)	24(32)	1.16 (0.76 to 1.76)		1.46 (0.96 to 2.22)	
	Online group (n=1030)	41 (419)	1.94 (1.43 to 2.63)		1.93 (1.42 to 2.63)	
4 weeks	Post group without prior phone call (n=167)	25 (42)	1.00	P<0.0001	1.00 ²	P=0.0001
	Post group with prior phone call (n=132)	33 (44)	1.33 (0.93 to 1.89)		1.62 (1.13 to 2.31)	
	Online group (n=1030)	51 (526)	2.03 (1.55 to 2.66)		1.85 (1.40 to 2.44)	
3 months	Post group without prior phone call (n=167)	53 (88)	1.00	P<0.0001	1.00 ³	P=0.001
	Post group with prior phone call (n=132)	67 (89)	1.27 (1.06 to 1.54)		1.39 (1.17 to 1.66)	
	Online group (n=1030)	72 (739)	1.36 (1.17 to 1.58)		1.27 (1.09 to 1.48)	

¹ adjusted for ethnicity, educational institution, whether or not study health and social care, smoking and age at sexual debut

² adjusted for ethnicity, educational institution, whether or not study health and social care, smoking and summer (April-Jun)

³ adjusted for ethnicity, educational institution and whether or not studying health and social care and summer (April-Jun). Model failed to converge with more variables in the model.

It was not possible to fit time of year as defined in Table 3 because of complete confounding with follow up group

Table 4. Response rates within four weeks by any method (online, post, telephone) for the 1030 participants in the online group related to demographic and behavioural characteristics.

	Total number in group	% (n) responding	Relative risk	P-value	Adjusted relative risk ¹	P-value
Age						
<18	114	34 (39)	0.59 (0.45 to 0.78)	P<0.001	1.09 (0.78 to 1.53)	P=0.10
18-20	433	48 (209)	0.84 (0.74 to 0.95)		0.89 (0.79 to 1.00)	
21 and over	485	57 (278)	1.00		1.00	
Ethnicity						
White	595	59 (351)	1.00	P<0.001	1.00	P=0.004
Black	332	39 (131)	0.67 (0.58 to 0.78)		0.78 (0.67 to 0.91)	
Other	100	44 (44)	0.75 (0.59 to 0.94)		0.83 (0.66 to 1.04)	
University	791	57 (450)	1.79 (1.47 to 2.17)	P<0.001	1.62 (1.31 to 1.99)	P<0.001
Studying health and social care	410	56 (230)	1.18 (1.04 to 1.32)	P=0.008	1.20 (1.07 to 1.34)	P=0.001
Cigarette smoking	300	46 (137)	0.85 (0.74 to 0.98)	P=0.024	0.82 (0.72 to 0.93)	P=0.003
Age first sexual intercourse						
<16	265	47 (124)	1.00	P=0.15	1.00	P=0.36
16-17	458	52 (238)	1.11 (0.95 to 1.30)		1.09 (0.94 to 1.25)	
18 and over	285	55 (157)	1.18 (0.99 to 1.39)		1.11 (0.96 to 1.30)	
Two or more partners in previous year	419	48 (204)	0.92 (0.81 to 1.04)	P=0.17	0.94 (0.83 to 1.05)	P=0.27
Time of year						
Sept/Oct	347	47 (164)	1.00	P=0.014	1.00	P=0.002
Nov/Dec ²	257	47 (122)	1.00 (0.85 to 1.19)		1.04 (0.89 to 1.23)	
Mar/Apr/May*	426	56 (240)	1.19 (1.04 to 1.39)		1.23 (1.08 to 1.40)	

¹ Adjusted for ethnicity, educational institution, studying health and social care, smoking, time of year.

² Only 67 participants were recruited in May and so these were added to the Mar/Apr group for the purposes of analysis.

Table 5. Participants who responded electronically compared to post or telephone for the 526 in the online group who replied within 4 weeks.

	Number of responders in online group	% (n) responding electronically	Relative risk	P value	Adjusted relative risk ¹	P value
Age						
<18	39	54 (21)	0.64 (0.48 to 0.86)		0.70 (0.50 to 0.98)	
18-20	209	83 (174)	0.99 (0.91 to 1.07)		0.98 (0.91 to 1.06)	
21 and over	278	84 (234)	1.00	P=0.12	1.00	P=0.11
Ethnicity						
White	351	83 (293)	1.00	P=0.18	1.00	P=0.99
Black	131	76 (99)	0.90 (0.81 to 1.01)		1.00 (0.90 to 1.10)	
Other	44	84 (37)	1.01 (0.88 to 1.15)		1.01 (0.88 to 1.15)	
University	450	84 (379)	1.26 (1.07 to 1.48)	P=0.004	1.28 (1.09 to 1.52)	P=0.004
Studying health and social care	230	82(188)	1.00 (0.93 to 1.09)	P=0.93	1.02 (0.95 to 1.10)	P=0.55
Cigarette smoking	137	80 (110)	0.98 (0.89 to 1.08)	P=0.66	0.95 (0.87 to 1.04)	P=0.24
Age first sexual intercourse						
<16	124	75 (93)	1.00	P=0.14	1.00	P=0.36
16-17	238	84 (200)	1.12 (1.00 to 1.26)		1.08 (0.97 to 1.20)	
18 and over	157	83 (131)	1.11 (0.98 to 1.26)		1.07 (0.95 to 1.20)	
Two or more partners	204	79 (161)	0.95 (0.87 to 1.03)	P=0.23	0.95 (0.88 to 1.03)	P=0.24
Time of year						
Sept/Oct	164	87 (142)	1.00	P=0.08	1.00	P=0.045
Nov/Dec ²	122	77 (94)	0.89 (0.79 to 1.00)		0.90 (0.81 to 1.00)	
Mar/Apr/May	240	80 (193)	0.93 (0.85 to 1.01)		0.92 (0.84 to 0.99)	

¹ Adjusted for educational institution and time of year

² Jan/Feb group were not in the online group and received only postal questionnaires.

Box 1. Advantages and disadvantages of electronic follow up

Advantages

- Requires less administration and incurs no postal costs.
- Most replies are received within a week of sending.
- Replies do not tend to get lost or delayed as they do in the postal service.
- Emails can be sent en-masse using the blind carbon copy function.
- Greater confidentiality than postal questionnaires for participants still living at home who do not want parents to know they are sexually active.
- Replies can be downloaded from the website into an excel spreadsheet.

Disadvantages

- Not all of the participants may have an email address or access to email facilities.
- Email may go straight into a junk mail folder when sent using the blind carbon copy function.
- Email may not be recognised by the participant and thus ignored.
- The online questionnaire can have sporadic technical problems.
- Email addresses can be incorrect, often because they are illegible e.g.
eye2sw1@hotmail.com is actually eyezsw1@hotmail.com but handwriting can make distinction between the two impossible.

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