Effect of a Monetary Incentive on Response to a Mail Survey

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ABSTRACT

We assessed the effect of a $1 incentive on response to a two-page questionnaire which was sent to 8356 female cosmetologists between 22 and 36 years old. The study popoulation was randomly assigned to one of three groups in which a $1 incentive was enclosed with either the first or second mailing, or with none of the mailings. Ten percent of questionnaires were returned by the postal service because of an incorrect address or death of the addressee and were omitted from response calculations. Of the remaining questionnaires, 79% were completed and returned after up to three mailings. The cumulative response was highest among cosmetologists who received a $1 incentive with the first mailing, (81%; 95% confidence interval (CI), 80 to 82), intermediate among those who received $1 with the second mailing (78%, 95% CI, 77 to 79), and lowest among cosmetologists who received no incentive (74%; 95% CI, 70 to 78). Characteristics of cosmetologists who responded after having received a $1 incentive were similar to those who responded without having received an incentive. The higher costs per response incurred by the use of an incentive must be weighed against the benefit of higher response. Ann Epidemiol 1994;4:231–235.

KEY WORDS: Data collection, health survey, questionnaires, response rates.

INTRODUCTION

Self-administered mail questionnaires are commonly used for the collection of epidemiologic data. Compared to telephone and personal interviews, mail questionnaires may be more time- and cost-efficient to administer and are particularly well suited for large or geographically dispersed study populations. The response rate to mail surveys, however, is typically lower than that to telephone or personal interviews (1, 2). Differences between respondents and nonrespondents to mail surveys have been reported (3–7). Increased potential for selection bias in mail surveys is therefore of concern since nonresponse may bias measures of association (8, 9).

Various strategies for increasing response to mail surveys have included personalization of mailings, follow-up of nonrespondents using different mailing strategies, and use of incentives (1, 10–17). In some health studies (18–21), but not all (13, 22, 23), an increase in response rate was associated with the use of various types of monetary incentives (e.g., enclosure or promise of various cash amounts, enclosure or promise of lottery tickets for various prizes). Little is known, however, about potential differences between people who respond to mail surveys after having received

an incentive and those who respond without having received an incentive (23).

In the pilot test for a mail survey of adverse pregnancy outcomes among cosmetologists, the enclosure of a $1 incentive increased the survey response rate. To assess the effect of a monetary incentive in a larger population, we randomly assigned the population of the main study to one of three groups to which a $1 incentive was enclosed with either the first or second questionnaire mailing, or with none of the mailings. This report describes the effect of a monetary incentive provided at two stages of follow-up on mail survey response and on average costs per response. We also compare characteristics of cosmetologists who responded after having received a $1 incentive to those who responded without having received an incentive.

MATERIALS AND METHODS

We sent a two-page screening questionnaire to female cosmetologists between 22 and 36 years old who were licensed in North Carolina in April 1988, in order to identify women with a recent pregnancy (24). The questionnaire inquired about demographic background, recent health problems, reproductive history, and outcome of the most recent pregnancy. Each survey packet contained a cover letter, a survey fact sheet with commonly asked questions about the study and answers, a two-page questionnaire, a stamped return envelope, and a $1 incentive, if applicable.

We mailed the 8356 screening questionnaires in four mailing batches over a period of 3 months. Ten percent of the questionnaires sent were returned due to incorrect

addresses ($n = 799$) or death of addressees ($n = 8$). We based the response calculations on the remaining 7549 subjects who presumably received the questionnaire.

We applied several techniques to enhance response. To minimize nonresponse by cosmetologists who had never been pregnant, we introduced the survey as a general health study of cosmetologists, and the questions applicable to all respondents appeared before the pregnancy-related questions. We assured confidentiality, and offered a summary of the study results to participants. Survey packets were personalized with hand-signed cover letters and hand-stamped rather than metered envelopes. Return envelopes were also hand-stamped. To distinguish the survey from advertisement mail, we hand-addressed all envelopes. One week after the first questionnaires were mailed, we sent postcards to the entire study population thanking respondents for returning the questionnaire and reminding nonrespondents to do so. Replacement questionnaires were sent to nonrespondents 3 and 6 weeks after the initial questionnaire was sent.

To enhance response, we enclosed a $1 incentive at two stages of follow-up, which allowed us to assess the effect of a monetary incentive on survey response. Among the 7549 subjects who presumably received the questionnaire, the distribution by incentive group in each of the four mailing batches was as follows: Mailing batch 1 ($n = 1971$) contained 443 cosmetologists randomly chosen to receive no incentive and 1371 screenees who received a $1 incentive with the first mailing. Mailing batch 2 ($n = 2862$) contained 1420 cosmetologists who received a $1 incentive with the first mailing and 1442 screenees who received a $1 incentive with the second mailing sent to nonrespondents. Cosmetologists in mailing batch 3 ($n = 2030$) and batch 4 ($n = 843$) received a $1 incentive with the second mailing sent to nonrespondents. Thus, the three incentive groups included 2791 cosmetologists who received a $1 incentive with the first mailing (group 1), 4315 cosmetologists who received a $1 incentive with the second mailing (group 2), and 443 cosme-

tologists who received no incentive (group 3). Response proportions and 95% confidence intervals (CIs) were computed for each of the three groups (25).

RESULTS

Of the 7549 cosmetologists who presumably received the questionnaire, 1% ($n = 93$) indicated their refusal to participate, 20% ($n = 1487$) did not respond after up to three mailings, and 79% ($n = 5969$) completed and returned the questionnaire.

Response proportions to each mailing indicate that the $1 incentive was effective in increasing the response to both the first and second questionnaire mailings (Table 1). For cosmetologists in group 1 who received a $1 incentive with the first mailing, the response was notably higher (59%; 95% CI, 57 to 61) than for those in groups 2 and 3 combined, who received no incentive with the first mailing (43%; 95% CI, 42 to 44). Among nonrespondents to the first mailing, response to the second mailing was also higher among those who received a $1 incentive: 51% (95% CI, 49 to 53) for group 2 compared to 35% (95% CI, 29 to 41) for the "no incentive" group and 39% (95% CI, 36 to 42) for group 1. Response to the third mailing was identical (25%) in all three groups.

The cumulative response after up to three mailings was highest for group 1 at 81% (95% CI, 80 to 82), intermediate for group 2 at 78% (95% CI, 77 to 79), and lowest for the "no incentive" group at 74% (95% CI, 70 to 78) (see Table 1).

To assess cost-effectiveness, dollar costs per response were compared among the three groups (Table 2). Incentive costs were $1.22 per response for group 1, compared with $0.72 for group 2, in which the $1 incentive was sent only to nonrespondents to the first mailing. Costs in 1988 for postage, printing, and clerical staff were estimated at $1 per mailing. At $3.23 per response, costs were highest in group 1, in which everyone received a $1 incentive with the first

TABLE 1. Response proportions by questionnaire mailing, North Carolina Cosmetology Health Study, 1988

| Mailing | Group 1: $1 enclosed with first mailing | | | Group 2: $1 enclosed with second mailing | | | Group 3: No monetary incentive enclosed | | |
	n	R (95% CI)	CR (95% CI)	n	R (95% CI)	CR (95% CI)	n	R (95% CI)	CR (95% CI)
1st mailing	2791			4315			443		
Completed	1653	59 (57-61)	59 (57-61)	1829	42 (41-43)	42 (41-43)	209	47 (42-52)	47 (42-52)
Refused	14			23			3		
2nd mailing[a]	1124			2463			231		
Completed	435	39 (36-42)	75 (73-77)	1253	51 (49-53)	71 (70-72)	80	35 (29-41)	65 (61-69)
Refused	13			16			1		
3rd mailing[b]	676			1194			150		
Completed	169	25 (22-28)	81 (80-82)	303	25 (23-27)	78 (77-79)	38	25 (18-32)	74 (70-78)
Refused	12			11			0		

[a] Questionnaires sent to nonrespondents 3 wk after initial questionnaires.
[b] Questionnaires sent to nonrespondents 6 wk after initial questionnaires.
R = response proportion to each mailing, with 95% confidence interval (CI); CR = cumulative response proportion, with 95% CI.

TABLE 2. Costs per response, North Carolina Cosmetology Health Study, 1988

	Group 1: $1 enclosed with first mailing (n = 2791)	Group 2: $1 enclosed with second mailing (n = 4315)	Group 3: No monetary incentive enclosed (n = 443)
Cumulative response after up to three mailings	81%	78%	74%
No. of questionnaires sent/response	2.0	2.3	2.4
Cost for incentive/response	$1.22	$0.72	
Total cost/response	$3.23	$3.04	$2.44

mailing, intermediate in group 2 ($3.04), and lowest in the "no incentive" group ($2.44).

Table 3 presents characteristics of cosmetologists who responded after having received a $1 incentive compared with characteristics of cosmetologists who responded after not having received an incentive. For both the first and second mailings, respondents in the two incentive groups varied only slightly by age, education, race, current work status, gravidity, and outcome and year of the most recent pregnancy. Compared with respondents to the first mailing (who received no incentive), those who responded to the third mailing tended to be younger, less educated, nonwhite, employed outside cosmetology (all statistically significant), and nulligravid (not statistically significant).

DISCUSSION

In this study, response to a mail questionnaire after up to three mailings was higher among cosmetologists who received a monetary incentive with the first mailing (81%) than among those who received no incentive (74%). The monetary incentive was more effective in increasing the overall survey response if it was provided with the first mailing (81%) than with the second mailing (78%), although cost considerations alone would favor the latter strategy.

Financial constraints ultimately limit the ability to achieve a desired response level and must be considered in comparing strategies. In our study, estimated total costs per response were highest for the group in which everyone

TABLE 3. Characteristics of respondents (%)[a] by questionnaire mailing and incentive, North Carolina Cosmetology Health Study, 1988

	Respondents to first mailing		Respondents to second mailing		Respondents to third mailing:
	With incentive (n = 1653)	Without incentive (n = 2038)	With incentive (n = 1253)	Without incentive (n = 515)	Without incentive (n = 510)
Age (y)					
< 24	18.4	19.5	19.1	19.2	23.3
25–29	31.3	29.6	30.0	31.0	33.2
30–36	50.3	50.9	50.9	49.8	43.5
Education (y)					
< 12	8.7	6.8	10.4	8.8	11.0
12+	91.3	93.2	89.6	91.2	89.0
Race					
White	86.4	86.8	80.3	82.9	79.3
Black	12.3	11.5	16.6	14.7	17.1
Other	1.3	1.7	3.1	2.4	3.6
Current work					
Cosmetology	65.9	66.9	61.3	62.3	59.3
Other job	23.8	22.3	27.0	26.8	31.1
Homemaker	10.3	10.7	11.7	10.9	9.6
Gravidity					
Nulligravid	35.8	33.8	33.5	31.5	38.3
Gravid	64.2	66.2	66.5	68.5	61.7
Outcome of last pregnancy					
Live birth	83.6	84.5	85.7	86.0	84.9
Miscarriage	6.4	6.8	6.4	6.1	9.0
Other	9.9	8.7	7.9	7.9	6.1
Year of last pregnancy					
1984–88	44.7	47.6	42.6	46.5	43.1
1979–83	32.7	28.6	29.1	28.5	32.8
< 1979	22.6	23.8	28.2	25.0	24.1

[a] Percentages do not total 100.0 because of rounding.

received a $1 incentive with the first questionnaire. Response proportions, on the other hand, were also highest in this incentive group. Potentially higher costs per response, therefore, must be weighed in each study against the benefit of greater precision and reduced potential for bias due to higher response proportions. If a more expensive questionnaire had been used, total costs per response obviously would have increased in all three groups. The absolute costs of incentives would be similar, but the relative differences in total costs per response between the three groups would diminish, as the $1 incentive would account for a smaller proportion of the total costs.

We had to rely on repeat mailings in the follow-up of nonrespondents since telephone numbers were not available in the cosmetology license registry. After up to three mailings, no response was obtained for 20% of subjects who presumably received the questionnaire. It is possible, however, that not all of the nonrespondents actually received our survey (26). For two subgroups of nonrespondents (n = 503), we obtained telephone numbers from directory assistance for 172 women (34%) of whom 148 participated in a brief screening interview by telephone. Nonrespondent follow-up by telephone raised the cumulative response by 6% in these two groups.

Follow-up of nonrespondents by telephone has also been effective in increasing response in other studies (16, 27), albeit at considerable cost (16). Other strategies of nonrespondent follow-up, such as certified mail, that have been effective in increasing mail survey response (1, 14) were not used in this survey. Nevertheless, our survey achieved a relatively high response in the "no incentive" group (74%). Besides the rigorous follow-up of nonrespondents, all survey packets were personalized with hand-addressed and hand-stamped envelopes. Both methods have been reported to increase survey response in other study populations, such as health professionals (12, 14-16).

We found only small differences between cosmetologists who responded after having received a $1 incentive and those who responded without having received an incentive. Early and late respondents, however, differed with regard to age, education, and race. This finding stresses the importance of achieving high response rates in order to minimize the potential for selection bias due to nonresponse. We used the same follow-up procedures of nonrespondents in all three incentive groups. We could therefore not assess whether it is more cost-effective to offer a $1 incentive with the first mailing or to continue follow-up of nonrespondents (by mail or telephone) until the same response rates are achieved.

In conclusion, a $1 incentive provided with the first questionnaire was found to be effective in increasing the overall survey response, thus reducing the potential of selection bias due to nonresponse. This finding, however, may not be applicable to other studies, as various aspects of survey

and questionnaire design and population characteristics affect participation in mail surveys. A pilot test may be helpful in assessing the effectiveness of a monetary incentive in increasing survey response for a specific study population.

REFERENCES

1. Dillman D. Mail and Telephone Surveys: The Total Design Method. New York: John Wiley and Sons; 1978.

2. Moser CA, Kalton G, Survey Methods in Social Investigation. 3rd ed. London: Heineman Educational; 1979.

3. Dunn JP, Hawkes R. Comparison of respondents and nonrespondents in a periodic health examination program to a mailed questionnaire, Am J Public Health. 1966;56:230-6.

4. Comstock GW, Helsing KJ. Characteristics of respondents and nonrespondents to a questionnaire for estimating community mood, Am J Epidemiol. 1973;97:233-9.

5. Sheikh K, Mattingly S. Investigating non-response bias in mail surveys, J Epidemiol Community Health. 1981;35:293-6.

6. Cartwright A. Who responds to postal questionnaires?, J Epidemiol Community Health. 1986;40:267-73.

7. Macera CA, Jackson KL, Davis DR, et al. Patterns of non-response to a mail survey, J Clin Epidemiol. 1990;43:1427-30.

8. Criqui MH. Response bias and risk ratios in epidemiologic studies, Am J Epidemiol. 1979;109:394-9.

9. Lyngbye T, Hansen ON, Grandjean P. Bias from non-participation: A study of low-level lead exposure in children, Scand J Soc Med. 1988; 16:209-15.

10. Kanuk L, Berenson C. Mail surveys and response rates: A literature review, J Marketing Res. 1975;12:440-53.

11. Linsky AS. Stimulating responses to mailed questionnaires: A review, Public Opin Q. 1975;39:82-101.

12. Maheux B, Legault C, Lambert J. Increasing response rates in physicians' mail surveys: An experimental study, Am J Public Health. 1989; 79:638-9.

13. Spry VM, Hovell MF, Sallis JG, et al. Recruiting survey respondents to mailed surveys: Controlled trials of incentives and prompts, Am J Epidemiol. 1989;130:166-72.

14. Rimm EB, Stampfer MJ, Colditz GA, et al. Effectiveness of various mailing strategies among nonrespondents in a prospective cohort study, Am J Epidemiol. 1990;131:1068-71.

15. Choi BCK, Pak AWP, Purdham JT. Effects of mailing strategies on response rate, response time, and cost in a questionnaire study among nurses, Epidemiology. 1990;1:72-4.

16. Shiono PH, Klebanoff MA. The effect of two mailing strategies on the response to a survey of physicians, Am J Epidemiol. 1991;134: 539-42.

17. Armstrong JS. Monetary incentives in mail surveys, Public Opin Q. 1975;39:111-6.

18. Minor MJ, Van Dort B. Prevention research on the teratogenic effects of alcohol, Prev Med. 1982;11:346-59.

19. Little RE, Davis AK. Effectiveness of various methods of contact and reimbursement of response rates of pregnant women to a mail questionnaire, Am J Epidemiol. 1984;120:161-3.

20. Mizes JS, Fleece EL, Roos C. Incentives for increasing return rates:

Magnitude levels, response bias, and format, Public Opin Q. 1984; 48:794–800.

21. Woodard A, Douglas B, Miles H. Chance of free dinner increases response to mail questionnaire, Int J Epidemiol. 1985;14:641–2.

22. Mortagy AK, Howell JBL, Waters WE. A useless raffle, J Epidemiol Community Health. 1985;39:183–4.

23. Marrett LD, Kreiger N, Dodds L, et al. The effect on response rates of offering a small incentive with a mailed questionnaire, Ann Epidemiol. 1992;2:745–53.

24. John EM, Savitz DA, Shy CM. Spontaneous abortions among cosmetologists, Epidemiology. (in press.)

25. Snedecor GW, Cochran WG. Statistical methods. 6th ed. Ames, IA: Iowa State University Press; 1976.

26. Sandler RS, Holland KL. Fate of incorrectly addressed mailed questionnaires, J Clin Epidemiol. 1990;43:45–7.

27. Brambilla DJ, McKinlay SM. A comparison of responses to mailed questionnaires and telephone interviews in a mixed mode health survey, Am J Epidemiol. 1987;126:962–71.