Published in final edited form as:

J Epidemiol Community Health. 2019 February ; 73(2): 156–161. doi:10.1136/jech-2018-211166.

Randomized controlled trial of incentives to improve online survey completion among internet-using men who have sex with men

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Abstract

Background: HIV prevention research often involves the use of online surveys as data collection instruments. Incomplete responses to these surveys can introduce bias. We aimed to develop and assess innovative methods to incentivize respondents to complete surveys.

Methods: Adult men who have sex with men (MSM) living in the United States were recruited through banner advertisements on Facebook from April 27th, 2015 to May 6th, 2015 to participate in an online survey about HIV prevention and risk behaviors. Participants were randomized to one of four conditions: a monetary incentive; a series of altruistic messages highlighting the importance of participating in research; access to a dashboard comparing their responses to statistics from other participants after completion; and no incentive. Kaplan-Meier survival methods and univariate Cox proportional hazard models were used to evaluate survey dropout by incentive group and demographic variables of interest.

Results: There were 1178 total participants randomized to the four treatment groups. The rate of survey dropout among participants in the altruistic (HR=0.68, 95%CI: 0.49-0.93), monetary

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Contributorship

EWL led the statistical analysis and drafted the manuscript. THS and PSS contributed to study conception, study design, coordination of study procedures and reviewed the manuscript. RS and ADS contributed to study conception, study design and reviewed the manuscript. RCS contributed to study design, led study implementation and contributed to the statistical analysis. MZ contributed to results interpretation and reviewed the manuscript. All authors read and approved the final manuscript.

Competing Interests

None declared.

Ethics Statement

This study was reviewed and approved by the Institutional Review Board at Emory University.

(HR=0.44, 95%CI: 0.32-0.61) and dashboard group (HR=0.78, 95%CI: 0.58-1.06) was lower than the non-incentivized control group. Regardless of condition, survey drop out was also lower among MSM aged 28-34 (HR=0.67, 95%CI: 0.50-0.90) compared to 18-22 year olds and MSM who were white (HR=0.78, 95%CI: 0.60-1.02) compared to non-white participants.

Conclusions: Monetary incentives and altruistic messaging can improve survey completion in online behavioral HIV prevention research among MSM.

Keywords

HIV; study design; health behavior

Introduction

HIV disproportionately impacts men who have sex with men (MSM)¹. In 2014, MSM accounted for 70% of all new HIV infections in the U.S.². In many countries, including the U.S., HIV incidence rates among MSM have been increasing since the 1990s³⁻⁴. Although this increase is likely due to a variety of reasons, one hypothesized contributing factor is the increase of use of the internet to meet sexual partners⁵⁻⁷. A 2006 meta-analysis of studies that recruited participants offline found that 40% of MSM had sought a sex partner online⁷. That proportion is likely to be much higher now, given the recent popularity of partner-seeking websites and applications (e.g. Grindr).

The internet also provides researchers with an opportunity to reach and recruit MSM who may not typically be included in HIV prevention research conducted with venue-based recruitment^{5,8,9}. A 2011 study found that 77% of MSM in the United States use the internet daily and 94% use it at least once a week¹⁰. Researchers can use the internet to anonymously recruit men who might otherwise be stigmatized in their community if their participation was known¹¹. Online surveys can collect large amounts of data in less time than in-person interviews^{12,13}. Researchers can use targeted advertising to recruit specific demographic or risk groups. Further, participants recruited into online research may be at higher risk for HIV infection compared to participants recruited at traditional venues¹⁴⁻¹⁶. Because of their scalability, online surveys are increasingly being used in HIV prevention research and intervention programs⁵.

However, there is potential for online surveys to introduce bias. People who access the internet and online surveys may be from different demographic groups and have different behaviors compared to people who do not¹⁷. Respondents' willingness to click on advertisements, provide consent and begin an online survey varies by race, education and sexual identity¹⁸. In a previous online HIV prevention survey of MSM, only 69% of participants who began the survey actually completed the survey¹⁸. The same study found that MSM who dropped out before survey completion were more likely to be men of color, younger or less educated than participants who completed the survey.

There is indication that monetary incentives may result in improved retention in online studies^{13,19}. However, providing a monetary incentive has the potential to increase fraudulent activity that leads to data that are not useful²⁰⁻²². Individuals may try to enroll in

the study multiple times or falsely answer the eligibility questions to be eligible to participate. While there are now methods for detecting fraudulent responses, they take time to implement. Ideally, alternative incentive methods that lead to increased participation without generating fraudulent responses would be preferred. Besides providing money or gift cards to participants, there have not been many alternative means of incentivizing MSM to participate in HIV prevention research. One recent study provided song downloads from iTunes (cost less than \$1.50 per person recruited) ²³ but did not report on survey retention. We sought to develop and assess innovative methods and test their impact on the completion of an online survey focused on HIV prevention research.

Methods

Participant Recruitment

This research was conducted in the context of a study to improve online survey methods in HIV prevention research ²⁴. Data were collected through an online survey on [SurveyGizmo.com](https://www.surveymz.com/) (Boulder, CO). Participants were recruited through banner advertisements on Facebook from April 27th, 2015 to May 6th, 2015. Recruitment advertisements were shown to Facebook users who indicated that they are male, over 18 years of age and interested in men. Advertisements included a title that read, “Men’s Health Study” and encouraged participants to take a few minutes to see if they were eligible for an Emory University study for men. None of the advertisements contained information about potential incentives. Participants who clicked on the advertisements completed a short screener to determine eligibility and were directed to one of four consent modules. Eligible men lived in the United States, reported being male at birth, reported being between 18-34 years old and reported having anal or oral sex with one or more men in the past year.

Men were randomized to one of four conditions: no incentive, monetary incentive, altruistic incentive, or dashboard incentive. In order to include adequate information about incentives for participation on the consent form, we randomized participants before they saw the consent module. Participants who were randomized to the monetary incentive group were offered a \$20 gift code to [Amazon.com](https://www.amazon.com/) at the completion of the survey. Participants who were randomized to the altruistic messaging group saw 8 banner messages throughout the survey. The messages included both facts related to HIV transmission (e.g. “Every 10.5 minutes, someone is infected with HIV in the United States”) and statements that aimed to highlight the importance of the individual’s participation (e.g. “By taking this survey, you are making your voice heard to help stop the HIV epidemic”) (Supplementary File 1). Men in the dashboard group were shown a selection of participant responses from the survey (Supplementary File 2) and were offered a dashboard of their own data compared to responses by other men upon survey completion. The content of altruistic and dashboard incentive groups were developed through online focus group discussions with MSM in the US.

Each eligible participant then was referred to an online, 15-minute survey that included demographic information and information about sexual history, current sexual practices and history of HIV testing. CAPTCHA codes and verification of email addresses were used to prevent fraudulent responses from hacking programs. If an IP address submitted more than

one survey response, email addresses were examined to determine the uniqueness of each response. This study was reviewed and approved by the Institutional Review Board at Emory University.

Data Analysis

All analyses were conducted using SAS v9.4 (SAS Institute Inc., Cary, NC, USA). We used an intent to treat approach, in which participants were analyzed according to the original incentive group randomization. The primary outcome was survey completion, defined as advancing past the last page of the online survey to the completion screen, without skipping more than two consecutive questions on any page. Survey completion and demographic variables of interest (race/ethnicity, highest level of education, age and urbanicity) were summarized with frequencies and percentages. Participants who lived in a zip code with a population density of 1000 per square mile (according to 2010 census data) were categorized as urban. To describe completion and factors associated with completion we used log-binomial regression models to estimate risk ratios (RRs) and 95% confidence intervals (CIs) for survey completion by incentive group and each demographic variable of interest²⁵. Observations that were missing data for demographic variables of interest were not included in the respective models.

To further investigate the relationship between failure to complete the survey and incentive group, we used univariate proportional hazards models to estimate the hazard rate of dropping out of the survey by incentive condition and demographic groups of interest²⁶. To satisfy assumptions necessary for survival analysis, age was collapsed into 3 categories (18-22, 23-27 and 28-34 years old), education was collapsed to 2 levels (post-high school (HS) education and HS education) and race was collapsed into two categories (white vs. non-white). The survey was divided into 19 time points (each page being considered one time point) and each page was considered complete if the participant did not skip more than two consecutive sections on that page²⁷. Failure (drop out from survey) was defined as failing to complete a survey page.

Kaplan-Meier survival methods and log-rank tests were used to evaluate survey dropout by incentive group and demographic variables of interest. The proportional hazard (PH) assumption was assessed visually and statistically, and univariate Cox proportional hazards models were fit to report hazard ratios (HRs) and 95% CIs for variables that did not violate the PH assumption. Because the randomization process should result in the same distribution of age, race, education and urbanicity across groups, if no failure of randomization occurred, these demographic variables were considered to not confound the relationship between incentive group and survey completion.

Results

A total of 3973 people clicked on the banner advertisements, were randomized, and were directed to the eligibility screener. Of those who proceeded to the screener, 2164 (54.4%) were deemed ineligible for the full survey : 35 were not male at birth, 84 were not between 18-34 years old, 234 did not report having oral or anal sex with men in the past year and 1,811 did not answer the eligibility questions. Of 1809 eligible respondents, 631 (34.8%) did

not provide consent to participate in the study. Among eligible respondents, the consent rate was 62% for the no incentive group, 71% for the monetary group, 64% for the altruistic group and 63% for the dashboard group. There were 1178 eligible participants in the analysis dataset (Figure 1).

The randomization and consent rates resulted in 285 (24.2%) participants in the no incentive group, 271 (23.0%) in the altruistic group, 267 (22.7%) in the dashboard group and 355 (30.1%) in the monetary group (Table 1, Supplementary File 3). Most participants were white (n=783, 69%) and lived in an urban area (n=841, 75%). Only 96 (8%) of participants did not have some level of education past high school. The median age of all participants was 24 years old (IQR: 21-29).

Overall, 886 participants (75%) completed their survey. The monetary incentive group had the highest proportion of participants complete the survey (84%, n=297), followed by the altruistic group (76%, n=206), the dashboard group (73%, n=194) and the no incentive group (66%, n=189). Survey completion among participants in the altruistic group (RR=1.15, 95%CI: 1.03-1.27) and the monetary incentive group (RR=1.26, 95%CI: 1.15-1.39) was higher than survey completion in the group without any incentives (Table 1). Survey completion in the dashboard group was similar to the group without incentives (RR=1.10, 95%CI: 0.98, 1.22). Participants aged 18-22 were less likely to complete the survey than participants aged 28-34 (RR=0.89, 95%CI: 0.82-0.97). However, because age was not associated with incentive group, it was not considered as a confounder in the relationship between incentive group and survey completion.

The unadjusted Kaplan-Meier survival curves for incentive group, age, race and education are shown in Figure 2. The instantaneous rate of survey dropout among participants in the altruistic (HR=0.68, 95%CI: 0.49-0.93), monetary (HR=0.44, 95%CI: 0.32-0.61) and dashboard (HR=0.78, 95%CI: 0.58-1.06) group was lower than the group that did not receive any incentive (Table 2). Participants that had some education past high school (HR=0.63, 95%CI: 0.44-0.91) and were white (HR=0.78, 95%CI: 0.61-1.00) were less likely to drop out than participants who did not have education past high school and participants who were not white, respectively (Supplementary File 4).

Discussion

These results indicate that both monetary and non-monetary incentives can be used to improve survey completion. Overall, 75% of participants who passed the eligibility screen, were randomized to a treatment group and provided consent completed the survey, which is slightly higher than a previous similar study that did not offer any incentives¹⁸. However, completion in our group without incentives was the same as that previous study. In this trial, participants who received a monetary incentive or saw altruistic messaging had higher completion rates compared to the group that did not received any incentive, with the highest completion rate was seen in the monetary incentive group. For studies that prioritize complete questionnaire data from a maximum number of participants, providing monetary or gift card incentives to participants could be a useful strategy to ensure survey completion.

Additionally, these data show a difference in consent rates by type of incentive, indicating that offering an incentive could lead to an increase in initial survey uptake, which would have implications on external validity. However, some studies might not have a large enough budget or ability to directly pay an incentive to all respondents. Our study also suggests survey completion can also be improved somewhat by implementing altruistic messages that highlight the importance of participating in research throughout the survey. This type of motivation requires a one-time investment to develop messages to be implemented during the initial survey programming. For this survey, 8 banner messages were developed.

Additionally, this analysis identified specific demographic groups that are more likely to drop out of the survey. Younger (18-22 years old) participants, respondents with a high school degree or less or non-white participants all had higher failure hazard rates than their counterparts. These findings are consistent with previous results that indicated less educated MSM and black or Hispanic MSM are more likely to drop out before online survey completion¹⁸. We did not identify any significant interaction terms between type of incentive and demographic group during our model selection process, indicating the effect of incentive type on survey completion did not differ by demographic group. Recruitment in online HIV prevention research is often targeted to these demographic groups and differential survey completion can introduce bias. Implementing incentives to improve survey completion across all groups can help reduce the potential for that bias.

Limitations

The interpretation of these results should be considered within their limitations. First, we randomized respondents before they provided consent. This resulted in slightly different consent rates across incentive groups, with the highest rate being in the monetary group. However, consent rates were comparable for the three other incentive groups which further bolsters the support for using altruistic messages to improve survey completion. Additionally, this could suggest that monetary incentives can also motivate respondents to start a survey as well as enhancing survey completion. Second, this study used a convenience sample of MSM in the United States recruited through social media and may not represent all MSM or other groups of online research participants. Our results are therefore not generalizable to all MSM in the United States. It is possible that some of these incentives (in particular, altruistic messaging) may not have the same impact on survey completion in other populations. Furthermore, these results and research methods may not be applicable in other countries or communities affected by the HIV epidemic²⁸.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Funding

This work was funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (R21HD074502) and the Emory University Center for AIDS Research (P30AI050409).

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What is already known on this subject?

Internet surveys provide an opportunity for researchers to quickly collect large amounts of data related to HIV prevention research. However, differences in internet survey access and completion may introduce bias. Previous internet research among men who have sex with men indicate that participants who fail to complete online surveys are more likely to be men of color, younger or less educated than participants who completed the survey.

What this study adds?

This study provides a formal comparison of innovative incentive methods that aim to increase online survey completion in HIV prevention research. It demonstrates the use of monetary incentives; a series of altruistic messages highlighting the importance of participating in research; and a dashboard comparing participant responses to statistics of the general study population. The analytic results indicate that monetary incentives or altruistic messaging can be used to increase survey completion.

Public Health Implications

Our study highlights the need to develop new methods to increase survey completion seen among non-white MSM, MSM with lower education and young MSM. It provides a framework for multiple types of incentive strategies that can be used to increase survey completion in HIV prevention research. It is possible that, even if monetary incentives are necessary to support MSM to complete online surveys, the costs of providing such incentives could be offset by gains in the robustness of data and increased inclusion of data of younger, non-white and less educated men. In any case, providing altruistic messages is very low cost, and should be considered as a standard approach to improve completion of online sexual health surveys for MSM recruited through social media.

Figure 1.

Study scheme for participant enrolment of men who have sex with men in a randomised trial of incentive methods, USA 2015.

Figure 2. Unadjusted Kaplan-Meier curves stratified by incentive group for failure to complete an online survey among men who have sex with men, USA 2015.

Table 1.

Completion of an online survey among MSM, United States, 2015

Factor	N	Fail	%	Complete	%	RR	95% CI	Type 3 LR p-value
Race/Ethnicity								0.16
Black	57	15	26.3	42	73.7	0.95	0.81 1.11	
Hispanic	190	50	26.2	140	73.7	0.95	0.86 1.04	
Other	113	35	31.0	78	69.0	0.89	0.78 1.01	
White	783	173	22.1	610	77.9		reference	
Education								0.05
<= High School	96	33	34.4	63	65.6	0.87	0.75 1.02	
Some college	341	85	24.9	256	75.1		Reference	
Bachelor's degree	395	92	23.3	303	76.7	1.02	0.94 1.11	
Graduate/professional	332	68	20.5	264	79.5	1.06	0.98 1.15	
Age, in years								0.02
18-22	403	119	29.5	284	70.5	0.89	0.82 0.97	
23-27	422	100	23.7	322	76.3	0.96	0.89 1.04	
28-34	353	73	20.7	280	79.3		reference	
Urbanicity								0.97
Rural	275	65	23.6	210	76.4	1.00	0.93 1.08	
Urban ^I	841	198	23.5	643	76.5		reference	
Incentive Group								<0.001
Altruistic	271	65	24.0	206	76.0	1.15	1.03 1.27	
Dashboard	267	73	27.3	194	72.7	1.10	0.98 1.22	
Monetary	355	58	16.3	297	83.7	1.26	1.15 1.39	
None	285	96	33.7	189	66.3		reference	

Abbreviations: *MSM*, men who have sex with men; *RR*, risk ratio^ILives in a zip code with a population density >=1000/square mile, according to 2010 US Census

Table 2.

Unadjusted Cox proportional hazard models for failing to complete an online survey among MSM, United States, 2015

Model/Factor	N		HR	95% CI	
Incentive Group	1178	Altruistic vs None	0.68	0.49	0.93
		Dashboard vs None	0.78	0.58	1.06
		Monetary vs None	0.44	0.32	0.61
Age, in years	1178	23-27 vs 18-22	0.78	0.60	1.02
		28-34 vs 18-22	0.67	0.50	0.90
Education	1164	>HS vs <=HS	0.63	0.44	0.91
Race	1143	White vs non-white	0.78	0.61	1.00
Urbanicity	1116	Rural vs Urban ^I	0.99	0.75	1.31

Abbreviations: MSM, men who have sex with men; HR, hazard ratio; CI, confidence interval; HS, high school.

^ILives in a zip code with a population density >=1000/square mile, according to 2010 US Census