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Manuscript Title

Paying women to quit smoking during pregnancy?

Acceptability among pregnant women

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ABSTRACT

Introduction: There is growing international interest in the use of financial incentives in smoking cessation, yet little research on public opinion of the scheme. This paper reports on the acceptability of incentives for reducing smoking in pregnant women and the perceived size of incentive that would encourage smoking cessation during pregnancy.

Methods: A cross-sectional survey was conducted on a convenience sample of 213 women attending the antenatal clinic of a large public hospital in Australia. Participants completed a questionnaire on their views on the use of incentives with responses measured on a 5-point Likert scale.

Results: The majority of participants (60%) did not agree that paying pregnant smokers to quit is a good idea. Opinions regarding the likely effectiveness were mixed with 30% of respondents in agreement and 22% undecided. Most (62%) were not willing to pay smokers any amount to quit. Smokers were more likely to have more favourable views about incentives than non-smokers ($p<0.0001$), and considered payments of between \$100 - >\$1,000 acceptable as reward for quitting smoking.

Conclusions: Acceptability for the use of financial incentives in reducing antenatal smoking is low among pregnant women. Future research should explore views of a wider audience and continue to gather stronger evidence of the efficacy of rewards for reducing smoking in pregnancy.

Key words: financial incentives, antenatal smoking, rewards, smoking cessation, patient opinion

INTRODUCTION

Smoking during pregnancy is a serious public health problem. Between 6 - 22% of women in high-income countries smoke during pregnancy (Nichter, Greaves, Bloch & et al, 2010), though true prevalence is likely to be higher with recent research confirming that self-reported smoking status during pregnancy is underestimated by 25%.(Tong, Dietz & England, 2010) Women who smoke during pregnancy have been persistently resistant to traditional smoking cessation initiatives, particularly women of low socioeconomic status.(Donatelle et al., 2004) The harmful effects of smoking during pregnancy to the foetus are well documented. New research has revealed that children are 5 times more likely to develop cancers if their mothers smoked during pregnancy ([Cancer Institute NSW, 2009](#))

It is estimated that 26-47% of women who smoke will quit spontaneously when they fall pregnant,(Schneider, Huy, Schutz & Diehl, 2010) indicating that the majority of smokers require assistance in quitting during pregnancy. Though prenatal smoking cessation interventions have produced modest effects,(Lumley et al., 2009) there remain questions around their translation into practice and widespread uptake (National Institute of Clinical Studies, 2003) with reports of only 57% of pregnant smokers being counselled to quit.(Tong, England, Dietz & Asare, 2008) Interventions which are most likely to be adopted are those which are acceptable and practical to both patients and health care providers.(Buchanan, 2002) Time constraints and chaotic clinic environments are often cited as barriers to the implementation of complex interventions. (Buchanan, 2002) Compliance with self-directed interventions such as booklets, video viewing (Cinciripini, McClure, Wetter, Perry & et al, 2000) or calls to electronic telephone counselling has been reported to be as low as 20%.(Ershoff, Quinn, Boyd, Stern & et al, 1999) A key challenge is to identify effective interventions for pregnant women that do not represent a time and

resource burden for service providers, and hence may be more readily adopted into routine practice.

Early success with the use of incentives for behaviour change were first reported with substance users undergoing in-patient withdrawal programs using vouchers as rewards or the removal of privileges to encourage abstinence. (Petry, 2000; Prendergast, Podus, Finney, Greenwell & Roll, 2007) Outside of the clinical setting, the approach has been utilised in a number of countries to encourage individuals to engage in health promoting behaviours, such as exercise or screening programs.(Department of Finance Canada, 2006; Fernald, Gertler & Neufeld, 2008; Gray, Qu & Weston, 2006; Sutherland, Leatherman & Christianson, 2008; The Royal Australian College of General Practitioners (RACGP), 2003) The most recent Cochrane review (Lumley et al., 2009) on interventions for promoting smoking cessation during pregnancy concluded that the most effective are those which include incentives. Incentive-based interventions were successful in helping approximately 24% of pregnant smokers to quit (as found in 4 studies) in comparison to an overall effectiveness rate of all 72 interventions of 6%. (Lumley et al., 2009) These findings support the results of earlier studies demonstrating that financial incentives are effective in encouraging women to quit smoking during pregnancy. In the first of these, a \$50(USD) voucher per month for smoking abstinence resulted in a cessation rate of 32% at 8-months of pregnancy compared with 9% in controls among low-income women.(Donatelle, Prows, Champeau, & Hudson, 2000a) A follow-up RCT (Donatelle, Prows, Champeau & Hudson, 2000b) achieved a quit rate of 19% versus 12% for controls when the incentive was reduced to a lower amount (\$25USD per month. In a more recent trial, women who earned vouchers contingent upon smoking abstinence were more likely to have quit in late-pregnancy (34%) compared to women who received vouchers independent of smoking status (7.4%). (Higgins et al., 2010) The study further found that the voucher-based

intervention lead to improved birth outcomes with greater mean birth weight and lower percentage of low birth weight infants born to mothers in the contingency group.(Higgins et al., 2010) These trials conducted in the United States recruited women attending Women, Infants and Children (WIC) clinics that service very disadvantaged women and suggest that disadvantaged populations are particularly receptive to extrinsic and/or monetary rewards.

The use of financial incentives to reduce smoking in pregnancy would appear to offer a number of advantages over more traditional, intensive cessation approaches. First, the research outlined above clearly shows that it has the potential to reduce smoking and smoking related harm. Mass media and educational efforts seem not to be effective in pregnant smokers. It is imperative that we consider and test novel, innovative methods which have a sound basis in the psychology of behaviour modification. (Petry, 2000) Second, this approach is more likely to be perceived by health care providers as more practical, acceptable and less time-consuming than traditional methods due to a reduction in time needed for counselling and follow-up, and therefore more likely to be adopted into practice. (Petry, 2000) Third, the use of financial incentives may be more cost-effective than current smoking cessation methods, particularly if higher quit rates are achieved. Cost-effectiveness analyses of other smoking cessation methods estimate that even the most cost effective interventions equate to \$1,047AUD per quitter for telephone counselling while brief physician advice costs \$1,910AUD per quitter. (Shearer & Shanahan, 2006) Finally, there are direct benefits for the consumer group (in the form of financial incentives) that are supplementary to the health benefits from quitting smoking. This is particularly relevant to smokers from lower SES groups given the significant financial hardships caused by smoking.(Siahpush, Spittal & Singh 2007)

Despite growing interest and considerable moral debate, there is a paucity of rigorous research on the effectiveness of financial-based interventions to reduce smoking among pregnant women in the public health setting. A number of important questions remain unanswered. These include: is behaviour change sustained after rewards are withdrawn? Are incentive-based programs a feasible and cost-effective approach? Which population groups are most amenable to their use? What magnitude or size of incentive is optimally effective? These uncertainties together with ideological concerns have perhaps also contributed to reluctance by granting bodies to invest funds in large-scale efficacy and effectiveness trials. A further source of this cautiousness may lie in a perceived low acceptability among patients of the use of rewards to encourage quitting. Research has shown that public reaction to health interventions can have a significant effect on their success and long-term maintenance, (Fong, Hyland, Borland & et al., 2006) yet little is known about the opinions of patients regarding incentives. To date only one study has been conducted involving patients attending primary care clinics in the US. (Long, Helwig-Larsen & Volpp, 2008) Results of this study indicated mixed support for incentives, with patient groups equivocal about the use of rewards to encourage people to engage in a range of health behaviours including quitting smoking, losing weight, and improving control of hypertension and blood sugar levels. More favourable endorsement of incentives was reported among smokers and people who were obese. (Long et al., 2008)

Though these findings offer some insight into public perceptions regarding incentives in health, the acceptability of using financial rewards specifically to encourage pregnant smokers to quit is unknown. With concerns raised about 'fairness' and questions over whether public funds should be spent on rewarding some for quitting when others manage to do so without any financial payment, (Marteau, Ashcroft & Oliver, 2009; Volpp, Pauly, Loewenstein & Bangsberg, 2009) it is important to gauge the opinions of both smokers

(who would receive the incentive) and non-smokers (who may perceive an inequity). As the authors are planning to conduct a clinical trial evaluating the efficacy of incentives in reducing smoking in pregnancy, with rewards provided only to smokers for chemically validated smoking abstinence, there is a need to establish the acceptability and feasibility of a trial. Hence, this study aims to determine 1) the acceptability of financial incentives for reducing smoking in pregnant women among antenatal care outpatients; and 2) the size of incentive perceived to be acceptable and effective in reducing smoking in pregnant women.

METHODS

Study design and procedure

A cross-sectional survey of pregnant women attending the outpatient antenatal clinic of a public hospital in New South Wales, Australia was conducted in March 2010. In 2008, the hospital provided services for 3,718 deliveries with all of these women seen in the hospital antenatal clinic. The antenatal clinic operates each weekday with most women presenting for an average of 6 to 8 clinic visits over the course of their pregnancy. Women were eligible to participate if they were: i) aged 18 years or older; ii) presented for a scheduled outpatient antenatal care appointment; and iii) had sufficient English to complete the survey. All women were between 16 and 42 weeks gestation. Women were excluded from the study if they were: i) considered by clinic staff to have a severe cognitive or psychiatric disorder; and ii) currently being treated as a 'high risk' pregnancy which may involve chemical dependency on a drug other than tobacco or alcohol.

Participants were initially invited to participate in the research by clinic reception staff when they attended for their scheduled monthly appointment. Posters were also displayed in the clinic reception area to promote the study and pre-notify women that they may be approached. Those who consented to participate were then asked to complete a brief anonymous survey by a research assistant in the clinic waiting room while waiting to see the clinic midwife or obstetrician. Patients returning for a second scheduled appointment within the data collection period and who indicated that they had previously completed a survey were not invited to complete another survey. A secure return box conveniently located in the clinic waiting room allowed participants to return their surveys anonymously. The study was approved by the Hunter New England Human Research Ethics Committee.

Survey

The survey was a 2-sided, single page questionnaire adapted from an existing published instrument of the acceptability of financial incentives to primary care patients in the US, (Long et al., 2008) with additional relevant items. All participants were asked to indicate their 'agreement' or 'disagreement' with 3 statements (*'Paying pregnant women who smoke to quit smoking is a good idea'*; *'Paying pregnant smokers to quit smoking would be an effective way to reduce the rates of smoking in pregnancy'*; and *'Paying pregnant smokers to quit smoking will help reduce rates of premature birth and low birth weight babies'*) to assess about the use of incentives in smoking cessation. Responses were measured using a 5-point Likert scale response option from 'strongly disagree' to 'strongly agree'. Two items were used to measure what level of financial incentive participants believed should be used (*'How much money should we pay pregnant smokers to quit smoking?'*) and would be effective (*'How much money do you think would be effective in encouraging pregnant women to quit smoking?'*) over the entire pregnancy period in

motivating pregnant smokers to quit. Responses to these 2 items were measured using 7 response options of varying Australian dollar amounts - \$0, \$50, \$100, \$250, \$500, \$1,000 or >\$1,000. An open-ended question: *Do you have any comments about paying women to quit smoking?* – allowed participants to expand on their views and provide qualitative data on acceptability. Age, highest level of education, marital status, whether Aboriginal or Torres Strait Islander and current smoking status were also measured. Completion of the survey took approximately 2-4 minutes.

Analyses

In the first instance, categorical data are presented as proportions and continuous variables are presented descriptively as means and standard deviations (SD). Chi-square analyses (for proportions) were used to compare mean responses between smokers and non-smokers to all items. Missing responses were excluded from all analyses. A series of ordinal (ordered categorical) logistic regression analyses were then conducted to determine which socio-demographic variables were most strongly associated with positive views about financial incentives. The outcome variable was dichotomised into a favourable view or higher response category (*Strongly agree / agree*) versus a non-favourable view of lower response category (*Strongly disagree / disagree / undecided*). Independent variables entered into the models of response included: education, smoking status and age. Qualitative responses to open-ended items were entered into a database to identify common themes and responses. Data was analysed independently by two members of the research team to reach agreement on common themes.

RESULTS

Out of 236 women invited to participate, 213 completed the survey giving a response rate of 90%. The mean age was 30 years (SD=6.2), 53% had a high school education or lower, 24% had undertaken vocational (trade) training and 26% had completed a university or college degree. The majority of participants (86%) were married or in a de-facto relationship, 10% were single and 4% divorced or separated from their partner. Five percent (n=8) of women identified as being Aboriginal or Torres Strait Islander. Seventeen percent of the sample (n = 30) were current smokers with a mean smoking history period of 11 years (SD = 7). There were no significant differences between smokers and non-smokers in regard to any of the socio-demographic characteristics measured.

Most participants (60%) *'disagreed' or 'strongly disagreed'* that paying women to quit smoking during pregnancy is a good idea. Twenty-five percent *'agreed / strongly agreed' with this statement, while the remaining 15% were 'undecided'*. Views were more mixed in regard to whether they believed the approach would work with just over half of all participants either in agreement (30%) or undecided (22%) about its likely effectiveness in reducing smoking rates. Similarly, opinions were divided over the perceived impact of incentives in reducing low birth weight and premature babies with 34% of respondents *'disagreeing'* and 37% in *'agreement'* with this statement.

Comparisons of views by smoking status (see Table 1) revealed that smokers were significantly more likely than non-smokers to think that paying women to quit smoking is a good idea (43% versus 23%, $\chi^2 = 70.5$, $df=4$, $p<0.0001$), and have favourable opinions about the effectiveness of incentives in reducing smoking (52% versus 29%, $\chi^2 = 15.83$, $df=4$, $p<0.003$). Though a higher proportion of smokers compared to non-smokers agreed with a likely impact on reducing rates of poor birth outcomes (52% versus 37%), this

difference was not significant. Results of ordinal logistic regression analyses showed that the only variable to be associated with an increased odds of having a higher response category ('Strongly agree/ agree') versus a lower response category ('Strongly disagree / disagree / undecided') towards paying pregnant women to quit smoking was being a current smoker (OR = 3.40; 1.61, 7.18) given all other variables (education, marital status) are held constant and adjusting for age. (See Table 2) Similarly, being a smoker was the only variable to be associated with an increased odds of agreeing that paying pregnant women would be effective in reducing smoking rates (OR = 3.47; 1.68, 7.28), while no variables were significantly associated with holding a favourable opinion about the impact of incentives in reducing rates of poor birth outcomes.

In response to the question of how much money should we pay pregnant smokers to quit smoking, the majority (62%) of participants indicated that they were not willing to pay any amount, with the remaining 38% divided in their opinion of an acceptable monetary reward ranging from \$50AUD (6%) up to greater than \$1,000AUD (5%) When asked how much money would be effective in encouraging pregnant smokers to quit, just over half responded \$0 (52%) and approximately 3 in 10 considered that payment of either \$500AUD (12%), \$1,000AUD (9%) or > \$1,000AUD (11%) would work.

Though smokers held a more favourable view of paying pregnant women to quit smoking, 23% still indicated that women should receive no money (\$0) to quit in comparison to 69% of non-smokers. Significantly greater proportions of smokers were willing to pay women amounts of \$100AUD (23% vs 5%), \$500AUD (15% vs 6%), \$1,000AUD (19% vs 3%) and >\$1,000AUD (15% vs 4%) compared to non-smokers ($\chi^2= 34.63$, df=6) (see Figure 1). Similarly, greater proportions of smokers versus non-smokers believed that an incentive of between \$100AUD (19% vs 2%) and \$1,000AUD (15% vs 6%) would be

effective in encouraging women to quit smoking, with the greatest proportion of smokers (23%) supportive of a reward greater than \$1,000AUD ($\chi^2 = 26.74$, df=6).

One hundred and thirty-nine participants (65%) opted to complete the open-ended item regarding their views on the proposal, comprising 12 out of 30 smokers (40%) and 88% of non-smokers. Several common themes emerged from these qualitative responses. Many expressed an opinion that the motivation for quitting smoking should be intrinsic rather than extrinsic.

“Payment for quitting perpetuates the idea that the government should pay people for having common sense.” (37 year old non-smoker)

In particular, women felt that the focus of motivation for quitting should be on the health of the unborn child.

“...pregnant women who smoke should want to quit for themselves and their babies, not for the money” (28 year old smoker)

A number of women felt so strongly about ensuring the best health outcomes for babies by suggesting that financial incentives be used as ‘sticks’ rather than ‘carrots’ through the introduction of penalties and/or the removal of financial privileges for smoking during pregnancy.

“Mothers who smoke when pregnant should be fined not paid” (23 year old non-smoker)

“Any parent who smokes should be ineligible for government parenting payments”
(31 year old non-smoker)

The issue of fairness and perceived inequality in relation to non-smoking women who would not receive the incentive emerged in views expressed by several non-smokers.

"I don't think a cash incentive is right. Do I get paid for never smoking?" (25 year old non-smoker)

"Non-smokers may see this as a 'penalty' for being healthy and looking after themselves." (33 year old non-smoker)

Despite low overall support for the idea of paying women to quit smoking, there was some acceptance of its likely effectiveness in reducing smoking rates and improved birth outcomes.

"Anything...to help increase the health of babies is a good idea" (27 year old non-smoker)

"I think money is a good motivational tool" (34 year old smoker)

Concerns about how such a scheme would be implemented, policed and smoking abstinence validated were also raised by respondents,

"It is impossible to think how this would be monitored and controlled" (26 year old smoker)

"How could you guarantee that the person would actually stop and not just say they have to get the money?" (29 year old non-smoker)

DISCUSSION

This study found low endorsement among pregnant women for the idea of paying women to quit smoking with only 1 in 4 (25%) responding positively to the scheme. This concurs with previous research which reported that only 38.6% of respondents thought that paying smokers to quit smoking was a 'good / excellent' idea. (Long et al., 2008) Differences in cultural attitudes and societal experiences of incentives, with financial rewards being more

commonly utilised in the US in the context of reduced health insurance premiums and other schemes in comparison to Australia, may account for the slightly higher rates of agreement in the US study. Additionally, participants in the Long et al (2008) were patients attending two primary care clinics and did not include pregnant women. The low level of acceptability may be due to concerns raised by women in this study including: a perceived inequality with non-smokers being unfairly 'penalised' for "*doing the right thing*"; scepticism over the capacity to closely monitor the scheme and detect women who might engage in deception or gaming; and a sense of unease associated with focussing on extrinsic rewards driven by the belief that the main motivation for women to quit smoking should be the health of their unborn child. Further, participants in the present study were only asked about the use of monetary rewards. Other forms of incentives, such as vouchers or baby-care items (eg. diapers, clothing etc), may be more favourably looked upon by both pregnant women and the general public. These alternatives should be explored in future research.

Despite low acceptance of the scheme, and as found in a previous study, (Long et al., 2008) results showed mixed support for its likely effectiveness in being able to reduce rates of smoking and subsequently poor birth outcomes, with participants fairly evenly divided in their opinions. Interestingly, sizeable proportions were undecided in their views over whether they thought paying women to quit smoking would reduce smoking rates (22%) and improve birth outcomes (29%). This uncertainty among some respondents may reflect a low level of awareness or poor understanding about smoking cessation interventions in general and about birth outcomes associated with smoking during pregnancy. Providing patients with information addressing these issues may lead to more favourable views regarding the likely success of the scheme.

Results showed that smokers were more positive in their views about paying pregnant smokers to quit and its likely effectiveness. This is supported by previous research indicating that acceptability is greatest among those who engage in health risk behaviours (Long et al., 2008) and in disadvantaged populations.(Bonevski, Bryant & Paul, 2009) It has been suggested that this may be due to a greater understanding of the difficulty in modifying an entrenched behaviour by those who have made previous efforts to change,(Long et al., 2008) but may also reflect a better appreciation of the need to overcome financial barriers associated with behaviour change (eg. Nicotine Replacement products). Alternatively, the findings may be explained by smokers (and people who engage in other health risk behaviours) being more extrinsically motivated while non-smokers (and those who lead a healthy lifestyle) are driven more by intrinsic factors. The association between risk behaviour and level of motivation requires further exploration.

Given the low approval for the idea of paying pregnant smokers to quit, it was not surprising that the majority of respondents indicated that they were not willing to pay any amount of incentive. What was interesting was that even among smokers who were more favourable in their views, participants were quite evenly divided in their views on how much women should be paid to quit with similar proportions willing to pay amounts of \$0, \$100, \$500, \$1,000 and more than \$1,000AUD. There was not the expected trend towards selecting the greatest amount (ie. >\$1,000AUD) available and is supported by previous research in which participants considered it appropriate to pay an incentive between \$50 and \$500USD. (Long et al., 2008) This suggests that women may be taking into account a range of factors, both costs and benefits, when considering what is a reasonable and appropriate amount of financial reward to encourage smokers to quit.

The main limitation of this study lies with the restricted study population, that is, we only surveyed the views of pregnant women and are not able to draw any conclusions about the views or opinions of the general population. The exclusion of women who were under 18 years of age and/or considered a 'high risk' pregnancy may have also influenced the study findings. Though a high response rate was achieved, the results are based on a convenience sample of women attending only one public hospital antenatal clinic, perhaps further affecting the generalizability, though it would be reasonable to assume that this population should be no different from women attending public antenatal clinics in other parts of Australia.

Despite a growing need for effective interventions that can readily be adopted into clinical practice, the findings from this study indicate low public support for financial incentives in reducing antenatal smoking, but mixed views regarding its likely effectiveness. Given the promising evidence to-date from efficacy trials on incentives, this raises the question – how important is public opinion? Some argue that public opinion, or more formally 'public deliberation', is vital to inform ethically challenging public health interventions and policies as it allows people to become more fully informed about health issues and creates trust in public health organisations. (Abelson, 2009) The use of financial incentives in health behaviour undeniably raises a number of ethical and moral concerns and may therefore be seen as an appropriate topic for further public engagement. Further research is required on opinions and acceptability among a wider audience, including health care providers, midwives and obstetricians. At the same time, history has shown us that public opinion and social beliefs regarding tobacco control legislation, in particular restrictions on smoking in public places, does change following the implementation of anti-smoking legislation. (Green, Courage & Rushton, 2003; Walsh, Tzelepis, Paul & McKenzie, 2002) For instance in 2005, after Ireland became the first country in the world to introduce

comprehensive smoke-free legislation across all public venues, support for total bans among Irish smokers rose dramatically. (Fong et al, 2006) The findings from Ireland, repeated in other countries such as the UK (Brown et al, 2009) and the US (Seo, 2005), indicate the introduction of smoking bans played a pivotal role in redefining social attitudes toward smoking. (Joseph et al, 2004) Though somewhat dissimilar to public policy, incentive-based smoking interventions may need to follow a similar pathway in terms of gaining higher acceptability. Public forums and attention from the media may be beneficial by creating opportunities for people to consider the approach and become more informed. Lessons from Ireland suggest that having a credible political ‘champion’ and sustained commitment from health, medical and political sectors contribute to the success of public health initiatives. (Currie & Clancy, 2010) While it is important that we consider ways for creating more favourable attitudes towards the use of incentives, current low public acceptability should not deter future efforts to invest in large-scale trials for gathering stronger evidence on the effectiveness of financial incentives in reducing smoking rates in pregnancy.

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Declaration of interests

None.

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Table 1. Views of smokers versus non-smokers regarding the use of incentives

	Strongly Agree/ Agree			
	Non-smoker (n = 144)	Smoker (n = 30)	Adjusted OR (95% CI)	P value
Paying pregnant women who smoke to quit smoking is a good idea	23%	43%	3.40 (1.61, 7.18)	0.0013
Paying pregnant women to quit smoking would be an effective way to reduce the rates of smoking in pregnancy	29%	52%	3.47 (1.68, 7.28)	0.0010
Paying pregnant smokers to quit smoking will help reduce rates of premature birth and low birth weight babies	37%	52%	1.86 (0.09, 3.85)	0.0927

Table 2. Results of ordinal logistic regression analysis on predictors of responses to ‘Paying women who smoke to quit smoking is a good idea.’

Variable	Sub-group	Outcome Variable		Odds Ratio (95% CI)			
		Strongly Disagree/ Disagree/ Undecided	Strongly Agree / Agree	Crude	P-value	Adjusted	P-value
Education	School only	72 (74.2%)	25 (25.8%)	1.00			
	Trade/ vocational/ other	34 (77.3%)	10 (22.7%)	0.74 (0.39, 1.41)	0.3602		
	University	36 (78.3%)	10 (21.8%)	0.79 (0.42, 1.49)	0.4655		
Smoker	No	105 (77.2%)	31 (22.8%)	1.00		1.00	
	Yes	16 (57.1%)	12 (42.8%)	3.44 (1.64, 7.21)	0.0011	3.40 (1.61, 7.18)	0.0013
Age	Mean (stderr)	30.01 (0.88)	30.08 (1.23)	1.00 (0.96, 1.05)	0.8285	1.00 (0.96, 1.05)	0.9991

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