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Who enrolled in a randomized controlled trial of quitline support? comparison of participants versus non-participants

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ABSTRACT

Introduction: Understanding the characteristics of smokers who enrol in a trial of quitline support and those who decline could guide recruitment approaches and service delivery to better engage smokers and increase successful quitting. However, it is unknown whether factors such as smokers' perceptions of the effectiveness of using quitting aids or holding self-exempting beliefs are associated with quitline uptake. We compared the socio-demographic characteristics, smoking behaviours, perceived effectiveness of using quitting aids and self-exempting beliefs of participants and non-participants who were actively telephoned and offered quitline support as part of a randomized controlled trial.

Methods: Overall, 48,014 telephone numbers were randomly selected from the electronic telephone directory and contacted. A total of 3,008 eligible smokers were identified and invited to participate in a trial of quitline support. Consenting trial participants (n=1,562) and non-participants (n=500) completed a baseline interview.

Results: Multivariate analyses showed that the following factors were associated with trial participation: consumption of 21 or more cigarettes per day (OR=1.45(1.07-1.99)); readiness to quit within 30 days (OR=4.45(3.20-6.19)) or 6 months (OR=3.22(2.46-4.23)); perceiving that calling the quitline was definitely (OR=2.34(1.62-3.39)) or partly effective (OR=2.15(1.63-2.83)); believing that using self-help materials (OR=1.50(1.16-1.94)) was partly effective; thinking that nicotine replacement therapy (OR=1.38(1.04-1.84)) was partly effective; perceiving that using willpower alone was partly (OR=1.99(1.48-2.67)) or not effective (OR=2.60(1.95-3.46)); and not holding a self-exempting belief (OR=1.45(1.11-1.89)).

Conclusions: Increasing smokers' utilization of quitlines is likely to require changing their perceptions of the effectiveness of quitting strategies compared with using willpower alone and addressing self-exempting beliefs.

INTRODUCTION

Proactive telephone counseling increases smokers' chances of quitting successfully (Tzelepis, Paul, Walsh, McElduff, & Knight, 2011) and is offered to smokers who directly contact quitlines after their initial call or as a result of a fax-referral from a healthcare professional (Centers for Disease Control and Prevention, 2004). However, only 1-7% of smokers use quitlines annually (Cummins, Bailey, Campbell, Koon-Kirby, & Zhu, 2007; Swartz Woods & Haskins, 2007). Understanding the characteristics of smokers who enrol in quitline support and those who do not could guide recruitment approaches and service delivery to better engage smokers and increase quitting success. Given most smokers quit unassisted (Chapman, 2009), it is important to examine whether smokers' views about the effectiveness of quitting aids versus willpower alone influences quitline utilization.

Self-exempting beliefs occur when smokers rationalize their smoking to alleviate the cognitive discomfort of knowing the health effects of smoking but continuing to smoke (Oakes, Chapman, Borland, Balmford, & Trotter, 2004). Oakes and colleagues proposed four categories of self-exempting beliefs: bulletproof; skeptic; jungle; and worth it. Bulletproof beliefs refer to smokers thinking they are personally immune to the health effects of smoking. Skeptic beliefs are when smokers question the scientific evidence about smoking and disease. Jungle beliefs normalize the dangers of smoking because of all the risks in life. Worth it beliefs relate to smokers' personal costbenefit appraisal, which takes into account the harms and benefits of smoking. Worth it beliefs are associated with not planning to quit smoking (Oakes, et al., 2004), and may therefore influence uptake of quitline services.

Few randomized controlled trials have actively recruited smokers (i.e. recruiter-initiated contact with smokers) and examined the characteristics of those who agreed to participate in programs offering proactive telephone counseling, compared to those who declined (Graham, Bock, Cobb, Niaura, & Abrams, 2006; Graham, et al., 2008; Mak, Loke, Lam, & Abdullah, 2006; Velicer, et al.,

2005). Only one trial used proactive telephone counseling as the primary intervention (Mak, et al., 2006) rather than as an adjunct to other cessation supports (Graham, et al., 2006; Graham, et al., 2008; Velicer, et al., 2005). In this study, participants were more likely than non-participants to have a middle income, be employed, to perceive quitting as important and be more motivated to quit (Mak, et al., 2006). However this trial recruited smoking parents with young children (Mak, et al., 2006) and therefore generalizability to the general smoking population may be limited. Furthermore, whether smokers' perceived effectiveness of quitting aids and their self-exempting beliefs are associated with quitline uptake remains unexplored.

This study compared the characteristics, perceived effectiveness of quitting aids and self-exempting beliefs of participants and non-participants offered quitline support as part of a randomized controlled trial (Tzelepis, Paul, Wiggers, et al., 2011).

METHODS

Sample

Eligibility criteria were daily tobacco use, aged 18 years or older, New South Wales (NSW) resident, Australia and English-speaking. Smokers were eligible regardless of their quitting intention.

Procedure

Overall, 48,014 telephone numbers were randomly selected from the NSW Electronic White Pages telephone directory. Households were mailed an information letter and an interviewer telephoned. If two or more eligible smokers were residents, a computerized age grid randomly selected one smoker, who was invited into a randomized controlled trial. If the smoker gave verbal consent, he/she completed a baseline CATI. Participants were randomly allocated to NSW Quitline proactive telephone counseling or written materials. Proactive counseling group smokers willing to quit

within a month were offered six counseling calls while those not ready to quit within a month were offered four counseling calls. Control group participants were mailed a quit kit. Further details are available elsewhere (Tzelepis, Paul, Wiggers, et al., 2011). Smokers who declined to participate in the randomized controlled trial (i.e. non-participants) were invited to complete a baseline CATI.

The University of Newcastle Human Research Ethics Committee and Hunter New England Human Research Ethics Committee granted ethics approval.

Measures

Given non-participants were not interested in the trial, they completed a short interview. Items common to participants and non-participants were:

Demographics: Gender and age.

Smoking behaviours and intentions: Respondents indicated time to first cigarette after waking, cigarettes smoked per day (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991), whether had ever quit, quit in the past 12 months and quitting intentions (Gilpin, Pierce, Berry, & White, 2000). *Perceived effectiveness of quitting aids:* Smokers nominated how effective they thought the following strategies would be in helping them quit: calling the quitline; self-help materials; nicotine replacement therapy (NRT); and willpower alone. Response options were *not at all effective, partly effective, definitely effective* and *don't know*.

Self-exempting beliefs: Respondents rated the "worth it" self-exempting belief statements: *I would* rather live a shorter life and enjoy it than a longer one where I will be deprived of the pleasure of smoking; and You have got to die of something so why not enjoy yourself and smoke (Oakes, et al., 2004). "Worth it" beliefs were examined because they are associated with not planning to quit smoking (Oakes, et al., 2004), and thus may influence quitline utilization. A 5-point response scale of *totally disagree, disagree, neither agree nor disagree, agree, and totally agree* was used.

Response options that were collapsed were totally disagree/disagree and totally agree/agree as per

prior research (Oakes, et al., 2004).

Statistical analysis

Statistical analysis was completed using SAS software. Chi-square tests assessed whether participants' characteristics, perceived effectiveness of quitting aids, and self-exempting beliefs differed significantly from their non-participant counterparts (univariate analyses). Tests of significance were performed at α =0.05.

To determine characteristics associated with trial participation, variables significant at p<0.25 in the univariate analyses were included in a backward stepwise logistic regression model (multivariate analysis). Non-significant characteristics were removed until variables were significant at p<0.05. Odds ratios and 95% confidence intervals assessed the odds of participation. The Hosmer and Lemeshow Goodness-of-Fit test determined whether the model fitted the data well.

RESULTS

Of 48,014 telephone numbers, 4,304 were unreachable. Of 43,710 households reached, 40,702 were ineligible (29,428 no adult daily smoker, 9,372 disconnected number, 698 fax line, 657 business number, 323 insufficient English, 224 unsuitable (too ill, hearing loss)). Of 3,008 eligible households, 1,562 (51.9%) smokers participated in the trial (Tzelepis, et al., 2009). From 1,446 remaining households, 500 (34.6%) smokers completed the non-participant interview, 439 smokers refused to complete the survey, 502 household members refused on behalf of the smoker invited to complete the survey or ended the call before eligibility could be assessed, and 5 smokers withdrew.

Univariate analysis of characteristics associated with trial participation

Table 1 outlines univariate comparisons between trial participants and non-participants. In relation to smoking behaviours and intentions, participants were significantly more likely than non-

participants to smoke more cigarettes per day ($\chi^2(2)=7.6$, p=0.02), have ever quit ($\chi^2(1)=7.3$, p=0.007), have quit in the past 12 months ($\chi^2(1)=24.2$, p<0.0001) and intend to quit within 30 days or 6 months ($\chi^2(2)=186.6$, p<0.0001). With regards to effectiveness of quitting aids, participants were significantly more likely to consider calling the quitline as definitely or partly effective or unknown rather than not effective ($\chi^2(3)=98.8$, p<0.0001), perceive self-help materials ($\chi^2(3)=48.8$, p<0.0001) or NRT ($\chi^2(3)=30.7$, p<0.0001) as partly effective and willpower alone as not effective ($\chi^2(3)=77.5$, p<0.0001). Participants were significantly more likely than non-participants to totally disagree/disagree with the self-exempting beliefs "*I would rather live a shorter life and enjoy it than a longer one where I will be deprived of the pleasure of smoking*" ($\chi^2(2)=21.0$, p<0.0001) and "You have got to die of something so why not enjoy yourself and smoke" ($\chi^2(2)=42.0$, p<0.0001).

Multivariate analysis of characteristics associated with trial participation

Table 2 outlines the results of the multivariate analysis of the characteristics of smokers significantly associated with trial participation. With regards to smoking behaviours and intentions, smokers who consumed 21 or more cigarettes per day (OR=1.45(1.07-1.99)) or were ready to quit within 30 days (OR=4.45(3.20-6.19)) or within 6 months (OR=3.22(2.46-4.23)) had greater odds of trial participation. In relation to effectiveness of quitting aids, smokers who perceived that calling the quitline was definitely effective (OR=2.34(1.62-3.39)), partly effective (OR=2.15(1.63-2.83)) or didn't know (OR=2.41(1.65-3.50)), had larger odds of trial participation as did smokers who considered that using self-help materials (OR=1.50(1.16-1.94)) or NRT (OR=1.38(1.04-1.84)) was partly effective (OR=1.99(1.48-2.67)) had greater odds of trial participation. With regards to self-exempting beliefs, smokers who totally disagreed/disagreed (OR=1.45(1.11-1.89)) or neither agreed nor disagreed (OR=1.56(1.05-2.33)) with "You have got to die of something so why not enjoy yourself and smoke" had larger odds of trial participation.

DISCUSSION

This study compared previously unexplored characteristics of smokers who participated in a proactive telephone counseling trial with those who declined. In contrast to a previous study (Mak, et al., 2006), smokers who consumed more cigarettes had significantly greater odds of trial participation. Greater nicotine dependence has been associated with using behavioural aids and medications (Cokkinides, Ward, Jemal, & Thun, 2005) such as NRT and bupropion (Hughes, Marcy, & Naud, 2009; Shiffman, Brockwell, Pillitteri, & Gitchell, 2008a, 2008b). Quitline providers should encourage uptake among less addicted smokers, who are more likely to benefit from quitline support (Tzelepis, et al., 2013). Consistent with previous research (Mak, et al., 2006), our findings indicated that intention to quit sooner was associated with trial participation. Training recruiters to increase smokers' motivation might increase smokers' quitline use.

This is the first study to report that, smokers' perceived effectiveness of quitting aids and selfexempting beliefs were associated with participation in a trial of quitline support. Despite evidence that proactive telephone counseling (Tzelepis, Paul, Walsh, et al., 2011), self-help materials (Lancaster & Stead, 2005) and NRT (Stead, Perera, Bullen, Mant, & Lancaster, 2008) increase quitting success, most smokers quit unassisted (Chapman, 2009). Media campaigns and quitline providers should further educate smokers about the effectiveness of quitting strategies to encourage use. Media campaigns could highlight that compared to quitting unassisted, using behavioural strategies and medications during a quit attempt significantly increases quitting success. To address smokers' "worth it" self-exempting beliefs, campaigns could emphasise the drawbacks of smoking, including reduced quality of life, years of life lost and lives lost each year due to smoking. These negative consequences should be compared with the benefits of quitting, which include reduced risk of coronary heart disease and stroke. Quitlines offer reactive telephone counseling (i.e. immediate counseling to smoker-initiated calls) in addition to proactive telephone counseling (i.e. quitline-initiated counseling calls to smokers) (Zhu, Anderson, Johnson, Tedeschi, & Roeseler, 2000). Quitlines use passive recruitment (e.g. mass media (Farrelly, Hussin, & Bauer, 2007)) that requires smokers to call quitlines, or active recruitment (e.g. fax-referrals from healthcare professionals (Perry, Keller, Fraser, & Fiore, 2005)) that involves recruiter-initiated enrolment of smokers. Given we used recruiter-initiated contact to enrol participants, our findings may be more generalizable to smokers recruited to quitlines via fax-referrals, rather than smokers who call quitlines. However compared to the general smoking population, smokers who call quitlines themselves are more likely to be more addicted (Abdullah, Lam, Chan, & Hedley, 2004; Prout, et al., 2002) and ready to quit within 30 days (Prout, et al., 2002), which is consistent with factors we found associated with quitline uptake among actively-recruited smokers. Our findings about perceived effectiveness of quitting aids and self-exempting beliefs may also apply to quitline callers given they seek out assistance themselves, which suggests they believe quitting is worthwhile and cessation aids can help them quit.

Study limitations included that telephone directory sampling might have introduced some bias, as unlisted telephone numbers and those without landlines were excluded. Only 34.6% of nonparticipants completed the interview, however it is likely that some refusals from household members were ineligible because no smokers lived in the household, and that non-participant response was higher. Other reasons such as not wishing to complete surveys may have contributed to trial non-participation.

Quitlines should consider adopting innovative recruitment strategies and program features that appeal to a broader range of smokers. Quitline providers should strive to develop interventions that minimize barriers to using quitlines and that encourage smokers to make assisted quit attempts which increase their chances of quitting successfully.

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DECLARATION OF INTERESTS

The authors have no competing interests.

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Characteristic	Participants	Non-participants	<i>p</i> -value
	(<i>n</i> =1562) ^a	(<i>n</i>=500) ^b	
	%	%	
Gender			
Male	49.4	53.8	0.08
Female	50.6	46.2	
Age (years)			
18-30	14.7	18.7	0.08
31-50	51.2	47.2	
51+	34.1	34.1	
Time to first cigarette (minutes)			o -
1-30	70.1	67.4	0.5
31-60	15.7	16.4	
61+	14.2	16.2	
Cigarettes per day	21.0	27.0	0.00*
1-10	21.8	27.8	0.02*
11-20	43.8	40.0	
21+	34.4	32.3	
Ever quit for 24+ hours	00.4	050	0.007*
Yes	89.4	85.0	0.00/*
	10.6	15.0	
Quit attempt in past 12 months	17 5	24.0	<0.0001*
i es	47.5	54.8	<0.0001**
	52.5	03.2	
Will quit within 20 days	20.2	12.0	<0.0001*
Will quit within 6 months	29.2 41.6	12.9	<0.0001**
Will not guit within 6 months	41.0	23.3 63.8	
Banagived offectiveness of:	29.2	03.8	
Calling Quitling			
Not at all effective	26.0	/0.8	<0.0001*
Partly effective	20.0 /1 /	49.0 28.1	<0.0001
Definitely effective	16.6	11.2	
Don't know	16.0	10.8	
Perceived effectiveness of	10.1	10.0	
Self-heln manual			
Not at all effective	42.4	60.2	<0.0001*
Partly effective	43.5	29.1	(0.0001
Definitely effective	7.1	5.6	
Don't know	7.0	5.0	
Perceived effectiveness of:			
Nicotine replacement therapy			
Not at all effective	25.3	38.0	< 0.0001*
Partly effective	38.9	30.3	
Definitely effective	22.3	19.3	
Don't know	13.5	12.4	

 Table 1: Comparison of trial participants with non-participants who completed the baseline interview (univariate analyses)

Characteristic	Participants	Non-participants $(n-500)^{b}$	<i>p</i> -value
	(n-1302)	(<i>n</i> -300) %	
Perceived effectiveness of:	/0	/0	
Willpower alone			
Not at all effective	459	32.1	<0.0001*
Partly effective	32.9	27.9	(0.0001
Definitely effective	19.9	39.2	
Don't know	1.3	0.8	
Self-exempting belief:			
I would rather live a shorter life			
and enjoy it than a longer one			
where I will be deprived of the			
pleasure of smoking			
Totally disagree/disagree	78.9	69.1	< 0.0001*
Neither agree nor disagree	8.9	11.8	
Totally agree/agree	12.1	19.2	
Self-exempting belief:			
You have got to die of			
something so why not enjoy			
yourself and smoke			
Totally disagree/disagree	67.2	53.4	< 0.0001*
Neither agree nor disagree	11.3	10.7	
Totally agree/agree	21.5	35.8	
^a number of missing cases ranges from () to 12		

 Table 1 (continued): Comparison of trial participants with non-participants who completed the baseline interview (univariate analyses)

^b number of missing cases ranges from 0 to 12° * p < 0.05

Characteristic	Parameter	Standard	Odds ratio	<i>p</i> -value
Cigarattas par day	estimate	error	95 % CI	
1-10			Referent	
11_20	0.27	0.15	1.30(0.98-1.74)	0.07
21+	0.27	0.15	1.30(0.96-1.74) 1.45(1.07-1.99)	0.07
Ouitting intentions	0.57	0.10	1.45 (1.07 1.55)	0.02
Will quit within 30 days	1 49	0.17	4 45 (3 20-6 19)	<0.0001*
Will quit within 6 months	1.12	0.14	3 22 (2 46-4 23)	<0.0001*
Will not quit within 6 months	111,	0.11	Referent	(010001
Perceived effectiveness of				
calling guitline				
Not at all effective			Referent	
Partly effective	0.77	0.14	2.15 (1.63-2.83)	< 0.0001*
Definitely effective	0.85	0.19	2.34 (1.62-3.39)	< 0.0001*
Don't know	0.88	0.19	2.41 (1.65-3.50)	< 0.0001*
Perceived effectiveness of self-				
help manual				
Not at all effective			Referent	
Partly effective	0.41	0.13	1.50 (1.16-1.94)	0.002*
Definitely effective	0.30	0.25	1.35 (0.82-2.22)	0.24
Don't know	0.13	0.27	1.14 (0.68-1.91)	0.63
Perceived effectiveness of				
nicotine replacement therapy				
Not at all effective			Referent	
Partly effective	0.32	0.15	1.38 (1.04-1.84)	0.03*
Definitely effective	0.02	0.17	1.02 (0.73-1.43)	0.89
Don't know	0.26	0.20	1.30 (0.89-1.91)	0.18
Perceived effectiveness of				
willpower alone				
Not at all effective	0.95	0.15	2.60 (1.95-3.46)	< 0.0001*
Partly effective	0.69	0.15	1.99 (1.48-2.67)	< 0.0001*
Definitely effective			Referent	
Don't know	1.00	0.68	2.73 (0.72-10.3)	0.14
Self-exempting belief:				
You have got to die of				
something so why not enjoy				
yourself and smoke	0.07	0.14	1 45 (1 11 1 00)	
Totally disagree/disagree	0.37	0.14	1.45 (1.11-1.89)	0.006*
Neither agree nor disagree	0.44	0.20	1.56 (1.05-2.33)	0.03*
Totally agree/agree			Reterent	

 Table 2: Characteristics significantly associated with trial participation (multivariate analyses)

According to the Hosmer and Lemeshow Goodness-of-Fit test the model fitted the data well. p<0.05