ORIGINAL INVESTIGATION

Utilization of Cessation Resources Among HIV-Positive and HIV-Negative Men Who Smoke and Who Have Sex With Men in Chengdu, China

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ABSTRACT

Introduction: Given the implications for smoking among individuals living with HIV and the high rates of smoking and HIV among men who have sex with men (MSM) in China, we examined differences in prior use of and future interest in various cessation resources among MSM smokers with or without HIV.

Methods: We conducted a cross-sectional survey of 381 MSM; HIV status was provided by 350 MSM, and complete data was provided by a total of 344 (188 HIV-positive and 156 HIV-negative) current smokers (past 30 days) recruited by a nongovernmental organization in Chengdu in 2012–2013. Participants reported tobacco and alcohol use; psychosocial factors; past-year quit attempts; health care provider interactions on smoking; and prior use of and interest in cessation resources.

Results: Smokers living with HIV were more likely to have used behavioral interventions ($p < .001$) and pharmacotherapy ($p = .033$). Those who were HIV-positive were also more interested in behavioral interventions ($p = .002$) and pharmacotherapy ($p = .008$). Correlates of interest in behavioral interventions in the regression model included lower cigarette consumption ($p = .011$), higher confidence in quitting ($p = .035$), greater likelihood of attempting to quit in the past year ($p = .026$), and being HIV-positive ($p = .008$). Correlates of interest in pharmacotherapy included greater depressive symptoms ($p = .047$) and being HIV-positive ($p = .015$).

Conclusions: Smokers living with HIV were more likely to have ever attempted to quit smoking, to have used cessation resources, and to be interested in using cessation aids. These findings indicate the promise of greater dissemination of cessation resources, particularly if Chinese clinical practices are strengthened to offer cessation support.

INTRODUCTION

China is the world's leading tobacco producer and consumer (Milenkovich, 2004; US Department of Agriculture, 2004). Smoking prevalence in China is high (Yang, 2008); roughly, 56% of men and 6% of women are current smokers (Lee et al., 2009). Men who have sex with men (MSM) are at high risk for smoking (Greenwood et al., 2005; Lampinen, Bonner, Rusch, & Hogg, 2006; McKirnan, Tolou-Shams, Turner, Dyslin, & Hope, 2006; Tang et al., 2004), but limited research has examined smoking among MSM in developing countries. One study of MSM in Shanghai, China documented a 66% smoking prevalence (Berg et al., 2011). Reasons for these elevated risks might include higher stress or depression, discrimination, and lack of social support (Choi et al., 2003; Liu & Choi, 2006;

Pilcher, 2003). In addition, behaviors associated with smoking, such as alcohol use (Shiffman & Wills, 1985), may be higher among MSM (Greenwood et al., 2001; Stall, Greenwood, Acree, Paul, & Coates, 1999; Wong et al., 2008).

MSM are at increased risk for HIV/AIDS (Centers for Disease Control and Prevention [CDC], 2009). Smoking rates are high among individuals living with HIV (Mamary, Bahrs, & Martinez, 2002; Niaura, Shadel, Morrow, Flanigan, & Abrams, 1999). Smoking is related to reduced health-related quality of life in HIV-positive individuals and increased incidence of AIDS-defining illnesses, malignancies, mortality (Crothers et al., 2005; Kirk et al., 2007; Kohli et al., 2006; Miguez-Burbano, Ashkin, & Rodriguez, 2005), and disease progression (Abbud, Finegan, Guay, & Rich, 1995; Nieman, Fleming, Coker, Harris, & Mitchell, 1993). Unfortunately, smokers living

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with HIV may be less likely to quit and less motivated to quit (Gritz, Vidrine, Lazev, Amick, & Arduino, 2004; Niaura et al., 1999). Thus, it is critical to promote smoking cessation among MSM, particularly those already infected with HIV.

The Clinical Practice Guidelines for Smoking Cessation in the United States (Fiore, Jaen, & Baker, 2008) indicate that pharmacotherapy and behavioral counseling are effective treatments for nicotine dependence and the combination of both is more effective than either alone, which has also been shown in China (Kim et al., 2012). The guidelines for China were recently developed based on guidelines in other countries; however, there continues to be limited use of cessation resources (Jiang, Elton-Marshall, Fong, & Li, 2010). The use of behavioral interventions is also still in its infancy in China. In 2000, Hong Kong established the first quitline in Asia, which has been found to be a useful and acceptable smoking cessation tool for the Chinese (Abdullah, Lam, Chan, & Hedley, 2006). Thus, research regarding use of and interest in cessation resources in China is timely.

Smoking cessation is critical, particularly among MSM and individuals living with HIV, and the use of cessation resources increases the odds of successful smoking cessation. Thus, we conducted the first study examining prior utilization of and interest in future use of cessation resources among MSM smokers in Chengdu, China.

METHODS

Procedures

Using a cross-sectional design, we recruited a convenience sample from a nongovernmental organization in Chengdu that serves MSM. Participants completed a 15-min self-administered paper-and-pencil survey between November 2012 and March 2013. Eligible participants were ≥ 18 years old, able to provide consent in Mandarin Chinese, had sex with men (oral, anal, both) in their lifetime, had smoked ≥ 100 cigarettes in their lifetime (Doria-Rose et al., 2012), and had smoked ≥ 1 cigarette in the past 30 days. The sample consisted of 381 MSM, of whom 350 disclosed their HIV status and 344 (188 HIV-positive and 156 HIV-negative) submitted complete surveys. This study was approved by the institutional review board at Fudan University.

Measures

All measures were translated and back-translated using previously published procedures yielding valid measures (He et al., 2007; Wong et al., 2008). Participants reported sociodemographics; smoking-related factors (days of smoking in the past 30 days, average cigarettes smoked per day [CPD] (CDC, 2012), smoking within 30 min of waking (Heatherton, Kozlowski, Frecker, & Fagerström, 1991)); days of alcohol consumption in the past 30 (US Department of Health and Human Services, & US Department of Agriculture, 2005); depressive symptomatology per the Center for Epidemiological Studies Depression Scale (Poulin, Hand, & Boudreau, 2005) (Cronbach's $\alpha = .94$); importance and confidence in quitting on a 10-point scale (Biener & Abrams, 1991); readiness to quit in the next 30 days (Prochaska & DiClemente, 1984); and past-year quit attempts (Fava, Velicer, & Prochaska, 1995).

Participants reported if they had ever been tested for HIV and, if they had, the result of the test. Participants were asked if any health care provider had ever assessed their smoking status, advised them to quit, or provided resources for cessation. We created a variable indicating the presence or absence of at least one of these interventions.

Participants indicated which resources they had ever used to help them quit smoking (see Table 2 for resources listed). They were also asked, "If you were going to try to quit smoking, how interested would you be in the following ways of getting help in quitting?" (see Table 2 for resources listed). Response options included "not at all interested; somewhat interested; or quite interested." Responses were categorized as somewhat or quite interested versus not at all interested and categorized as indicated in Table 2.

Data Analyses

Bivariate analyses were conducted examining differences between participants who were HIV-positive versus HIV-negative and between those interested in behavioral interventions or pharmacotherapy versus not, respectively. We then conducted binary logistic regression models predicting interest in behavioral interventions or pharmacotherapy, respectively. Factors significantly associated with the respective outcomes in the bivariate analyses at $p < .10$ were entered using backwards stepwise entry. SPSS 21.0 (IBM) was used for all data analysis. Statistical significance was set at $\alpha = .05$ for all tests.

RESULTS

The sample was an average of 30.86 ($SD = 8.41$) years old, with 63.9% having more than a high school education, the majority (59.5%) earning more than Y3,000 per month, and 76.3% never being married. They smoked an average of 21.88 ($SD = 10.35$; Table 1) days of the past 30. Half (50.0%) reported at least one quit attempt in their lifetime, and 30.5% reported a quit attempt in the past year. The majority (59.4%) reported that a health care provider had intervened regarding smoking, most commonly by assessing smoking status (50.0%). Participants who were HIV-positive drank alcohol on fewer days of the past 30 ($p = .005$) and were more likely to have had a provider intervene regarding smoking ($p < .001$).

HIV-positive participants were more likely to report ever attempting to quit ($p = .011$; Table 2). They were also more likely to have used behavioral interventions ($p < .001$), including traditional, in-person interventions ($p < .001$), and technology-assisted behavioral interventions ($p = .033$), and to have used pharmacotherapy ($p = .034$).

Those HIV-positive were more interested in behavioral interventions than those who were HIV-negative ($p = .002$), particularly in technology-assisted behavioral interventions ($p = .009$) and pharmacotherapy ($p = .008$). Table 1 displays the bivariate results examining differences between individuals interested versus not in behavioral interventions and pharmacotherapy. Sociodemographic variables were not associated with interest in either type of intervention (not shown).

Factors associated with interest in behavioral interventions (Table 1) included fewer days smoked of the past 30 ($p = .040$), fewer CPD ($p = .003$), lower likelihood of smoking within 30 min of waking ($p = .041$), less frequent alcohol consumption

Table 1. Participant Characteristics and Bivariate Analyses Examining Correlates of Being HIV-Positive

Variable	HIV status				Behavioral interventions				Pharmacotherapy interventions			
	Total N = 344	Negative N = 156 (45.3%)		Positive N = 188 (54.7%)	Not interested M (SD) or n (%)	Interested M (SD) or n (%)	p value	Not interested M (SD) or n (%)	Interested M (SD) or n (%)	Not interested M (SD) or n (%)	Interested M (SD) or n (%)	p value
		M (SD) or n (%)	M (SD) or n (%)									
Smoking characteristics												
Days smoked, past 30 (SD)	21.88 (10.35)	21.58 (10.41)	21.31 (10.44)		23.43 (9.88)	21.07 (10.30)	.811	21.52 (10.60)	21.62 (10.08)	21.52 (10.60)	21.62 (10.08)	.933
Average CPD (SD)	11.97 (9.73)	12.52 (10.36)	10.85 (8.82)		14.20 (10.62)	10.88 (8.97)	.111	10.88 (9.95)	12.62 (9.47)	10.88 (9.95)	12.62 (9.47)	.087
Smoke within 30 min of waking (%)	171 (50.3)	75 (48.7)	96 (51.6)		63 (57.3)	115 (47.1)	.343	79 (54.5)	107 (48.4)	79 (54.5)	107 (48.4)	.150
Psychosocial factors												
Number of days drank (SD)	5.61 (7.09)	8.69 (0.84)	4.67 (0.40)		6.96 (7.89)	5.02 (6.79)	.005	5.59 (7.99)	5.67 (6.48)	5.59 (7.99)	5.67 (6.48)	.931
CESD-12 score (SD)	12.89 (8.53)	12.81 (9.39)	13.28 (7.69)		12.14 (9.31)	13.33 (8.15)	.622	11.64 (8.84)	13.87 (8.06)	11.64 (8.84)	13.87 (8.06)	.020
Importance of quitting (SD) ^a	6.92 (3.11)	6.86 (3.46)	7.18 (2.69)		6.05 (3.51)	7.31 (2.86)	.342	6.69 (3.33)	7.03 (3.01)	6.69 (3.33)	7.03 (3.01)	.321
Confidence in quitting (SD) ^a	5.70 (3.29)	6.05 (3.52)	5.41 (3.04)		4.46 (3.49)	6.16 (3.07)	.070	5.53 (3.54)	5.70 (3.13)	5.53 (3.54)	5.70 (3.13)	.632
Ready to quit, next 30 days (%)	48 (14.1)	20 (13.0)	28 (15.1)		9 (8.2)	38 (15.6)	.350	20 (13.8)	32 (14.5)	20 (13.8)	32 (14.5)	.483
Past-year quit attempts (%)	105 (30.5)	43 (27.6)	62 (33.0)		21 (19.1)	87 (35.2)	.173	34 (23.4)	78 (34.8)	34 (23.4)	78 (34.8)	.010
Any provider intervention (%)	189 (59.4)	59 (42.8)	130 (72.2)		52 (51.0)	142 (62.6)	<.001	71 (50.4)	133 (66.2)	71 (50.4)	133 (66.2)	.002
HIV-positive (%)	188 (54.7)	—	—		41 (43.2)	143 (61.6)	—	62 (47.3)	125 (61.3)	62 (47.3)	125 (61.3)	.008

Note. CPD = cigarettes smoked per day; CES-D = Center for Epidemiological Studies Depression Scale. Chi-square tests used for bivariate analyses of categorical variables; *t*-tests used for bivariate analyses of continuous variables.

^aOn a scale of 0 to 10, with higher numbers indicating greater importance or confidence.

Table 2. Bivariate Analyses of Types of Cessation Strategies Used by and of Interest to HIV-Negative and HIV-Positive Men Who Smoke and Who Have Sex With Men in Chengdu, China

Cessation strategy	Ever-used strategy			Interest in strategy		
	HIV-negative <i>n</i> (%)	HIV-positive <i>n</i> (%)	<i>p</i> value	HIV-negative <i>n</i> (%)	HIV-positive <i>n</i> (%)	<i>p</i> value
Never tried to quit	89 (57.1)	83 (44.1)	.011	—	—	—
Quit without assistance	52 (33.3)	58 (30.9)	.350	—	—	—
Behavioral interventions	7 (4.5)	38 (11.0)	<.001	89 (62.2)	143 (77.7)	.002
Traditional behavioral interventions	6 (3.8)	34 (18.1)	<.001	77 (52.0)	111 (59.4)	.103
Group counseling/class	0 (0.00)	1 (0.5)	.551	59 (39.1)	89 (47.3)	.070
Individual counselor	4 (2.6)	28 (14.9)	<.001	72 (48.0)	100 (53.5)	.190
Talk to health care provider	2 (1.3)	7 (3.7)	.141	—	—	—
Technology-assisted behavioral interventions	1 (0.06)	8 (4.3)	.033	82 (56.6)	129 (69.7)	.009
Quitline/telephone counseling	1 (0.6)	5 (2.7)	.162	43 (28.5)	70 (37.2)	.050
Internet or online program	0 (0.0)	4 (2.1)	.083	57 (38.0)	82 (43.6)	.183
E-mail	—	—	—	50 (33.8)	64 (34.0)	.533
Instant messaging	—	—	—	53 (35.3)	86 (46.0)	.032
Social networking	—	—	—	61 (40.4)	102 (54.5)	.007
Text messaging	—	—	—	59 (39.3)	64 (34.2)	.204
Pharmacotherapy	11 (7.1)	26 (13.8)	.034	79 (53.4)	125 (66.8)	.008
Nicotine replacement therapy	11 (7.1)	23 (12.2)	.071	79 (53.0)	120 (64.2)	.024
Patch	0 (0.0)	9 (2.6)	.004	69 (45.4)	88 (47.1)	.420
Gum	9 (5.8)	16 (8.5)	.221	69 (45.1)	115 (61.2)	.002
Lozenges	4 (2.6)	3 (1.6)	.403	64 (42.7)	102 (54.3)	.021
Other	0 (0.0)	7 (0.0)	.011	56 (37.3)	94 (50.0)	.010
Zyban/bupropion	0 (0.0)	0 (0.0)	—	46 (30.7)	87 (46.3)	.002
Champix/varenicline	0 (0.0)	7 (3.7)	.010	52 (34.2)	90 (47.9)	.007

Note. Chi-square tests used for bivariate analyses.

($p = .050$), greater importance ($p < .001$) and confidence in quitting ($p < .001$), greater likelihood of readiness to quit in the next 30 days ($p = .044$) and of having made a quit attempt in the past year ($p = .001$), having had a health care provider intervene on smoking ($p = .032$), and being HIV-positive ($p = .002$). The binary logistic regression indicating correlates of interest in behavioral interventions included lower cigarette consumption (days smoked multiplied by CPD; $OR = 0.99$, 95% confidence interval [CI] = 0.98, 0.99, $p = .011$), higher confidence in quitting smoking ($OR = 1.10$, 95% CI = 1.01, 1.20, $p = .035$), greater likelihood of having made a quit attempt in the past year ($OR = 2.10$, 95% CI = 1.09, 4.03, $p = .026$), and being HIV-positive ($OR = 2.07$, 95% CI = 1.21, 3.57, $p = .008$; Nagelkerke $R^2 = 0.135$).

Factors associated with interest in pharmacotherapy (Table 1) included greater depressive symptoms ($p = .020$), greater likelihood of having made a quit attempt in the past year ($p = .010$), having had a health care provider intervene on smoking ($p = .002$), and being HIV-positive ($p = .008$). The binary logistic regression indicating correlates of interest in pharmacotherapy included greater depressive symptoms ($OR = 1.81$, 95% CI = 1.12, 2.93, $p = .047$) and being HIV-positive ($OR = 1.81$, 95% CI = 1.12, 2.93, $p = .015$; Nagelkerke $R^2 = 0.081$).

DISCUSSION

This study yielded novel and important information regarding differences among MSM smokers who were HIV-positive and HIV-negative in relation to their prior utilization of and future interest in using cessation resources. Roughly half of the

sample had never tried to quit smoking, and very few had ever used any of the cessation resources. However, there was high interest in using the broad range of cessation aids in the future.

We found that those HIV-positive were more likely to have tried to quit previously and to have had a health care provider intervene on their smoking. The former finding is in contrast to prior literature indicating that smokers living with HIV are less likely to quit (Gritz et al., 2004) and less likely to consider quitting in the near future (Niaura et al., 1999). Our data also indicated that only 40% of MSM smokers had ever had a health care provider intervene in anyway on their smoking, suggesting an opportunity for more clinicians to intervene on smoking.

Additionally, those HIV-positive were more likely to have used behavioral interventions, including both traditional, in-person interventions, and technology-assisted behavioral interventions. They were also more likely to have used pharmacotherapy; however, there were low rates of pharmacotherapy use overall. The most commonly used pharmacotherapy option was nicotine gum, which is consistent with prior literature (Jiang et al., 2010). These findings may suggest that because MSM living with HIV were more likely to have attempted to quit previously, they had more experience with the diversity of cessation resources.

MSM living with HIV were also more interested in future use of cessation resources, possibly indicating that these individuals are aware of their vulnerability to disease. Other factors associated with interest in behavioral interventions included lower cigarette consumption, higher confidence in quitting, greater likelihood of attempting to quit, and being HIV-positive. Correlates of interest in pharmacotherapy included

greater depressive symptoms, which is inconsistent with literature indicating that depression is correlated with decreased likelihood of quit attempts (Glassman et al., 1990; Haukkala, Uutela, Vartiainen, McAlister, & Knekt, 2000; Niaura et al., 2001). However, it is possible that depressive symptoms may reduce one's confidence in their ability to quit and increase their perceived need to use pharmacotherapy.

Future research should qualitatively examine the reasons for greater likelihood of quit attempts among Chinese MSM smokers living with HIV than those who are HIV-negative. Moreover, further examination is warranted to explore how health care providers interact differently with these subgroups of smokers in relation to smoking and cessation. In practice, efforts should be made to train health care providers to systematically assess smoking status and provide behavioral and pharmacotherapy interventions as indicated.

Limitations

Because this was a convenience sample of MSM smokers recruited through a nonprofit organization in Chengdu and persons living with HIV were over-represented, this study has limited generalizability. Additionally, we did not ask participants about whether they had ever visited a health care provider or the last time they went to a doctor; thus, whether a health care provider intervened on smoking may be related to whether there was an opportunity for such intervention rather than a missed opportunity by a health care provider. We also did not include former smokers in our sample, who may have provided important insights regarding use of cessation resources. Finally, the cross-sectional nature of the data does not allow us to detect directionality of the relationships documented.

CONCLUSIONS

MSM smokers living with HIV were more likely to have ever attempted to quit smoking and to have used a range of cessation resources; however, very few individuals in either group had used any cessation resource. Those HIV-positive were also more likely to be interested in using cessation aids. These findings indicate that greater dissemination of cessation resources may be useful, particularly if clinical practices in China are strengthened to offer cessation support and resources.

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DECLARATION OF INTERESTS

None declared.

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