Short Communication

Cigarette smoking risk-reducing beliefs: Findings from the United States Health Information National Trends Survey

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ABSTRACT

Cigarette smoking risk-reducing beliefs are ideas that certain health promoting behaviors (e.g., exercise) may mitigate the risks associated with smoking. The objective of this study was to describe smoking risk-reducing beliefs and the belief that quitting can reduce the harmful effects of smoking among the U.S. adult population and the associations between these beliefs, current smoking status, and sociodemographics. Data were from the Health Information National Trends Survey 4 (HINTS 4) Cycles 3 and 4 (2013–2014; N = 6862). Descriptive analyses were conducted to examine bivariate associations among the quit smoking belief, smoking risk-reducing beliefs, and covariates. Weighted ordinal logistic regression models examined the adjusted associations between smoking status and sociodemographics, with quit smoking belief and risk-reducing beliefs. Eighty-two percent of the population reported that quitting cigarette smoking can help reduce the harmful effects of smoking a lot: former smokers and individuals with higher educational attainment were more likely to endorse this belief than never smokers and those with lower educational attainment. Many people endorsed smoking risk-reducing beliefs about exercise (79.3%), fruits and vegetables (71.8%), vitamins (67.2%), and sleep (68.5%). Former smokers were less likely to subscribe to these beliefs than never smokers. Vulnerable populations who may be most at risk of smoking attributable morbidity and mortality were more likely to endorse risk-reducing beliefs. Future studies are needed to better understand how risk-reducing beliefs are formed and if modifying these beliefs may help to reduce cigarette smoking in the U.S.

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1. Introduction

It is essential to understand the underlying factors and beliefs that influence individuals' smoking behavior and these beliefs may be multi-faceted (Fiore et al., 2008; Waters et al., 2014; Nguyen et al., 2015). Research has shown that health promotion behaviors (Altekruse et al., 1995) and risk-taking behaviors tend to be related (Jessor and Jessor, 1977). Risk-reducing beliefs describe ideas that certain behaviors, such as exercise or diet, may lessen the risks associated with unhealthy behaviors (Haddock et al., 2004). Tobacco risk-reducing beliefs have existed and changed over time (e.g., those related to menthol cigarettes (Castro, 2004; Henningfield et al., 2003; Gardiner, 2004)) Research has shown that such beliefs have been propagated by the tobacco industry through communications including advertising and product features (Pollay and Dewhirst, 2002; Cummings et al., 2002).

Although domain-specific beliefs (e.g., those related to one specific health behavior) are important predictors of behavior (El-Shahawy et

al., 2015), it may be that individuals' beliefs about behaviors are more complex and cross-over from one behavior to another. In particular, people may believe that engaging in health promoting behaviors reduces the risks associated with risk-taking behaviors. The purpose of this study was to describe both smoking risk-reducing beliefs as well as the belief that quitting smoking reduces the harmful effects of smoking in the U.S. non-institutionalized adult (18 and over) population.

2. Methods

Data were from the Health Information National Trends Survey (HINTS) 4 Cycle 3 (September–November 2013) and Cycle 4 (July–November 2014) (N = 6862). HINTS 4 was approved by Westat IRB in an expedited review and deemed exempt from IRB review by the National Institutes of Health Office of Human Subjects Research Protections. Items were tested through cognitive interviewing before the surveys were fielded. The survey response rate was 35.2% for Cycle 3 and 34.4% for Cycle 4. Additional sampling, design and weighting strategies for HINTS 4 have been published elsewhere (Westat, 2014, 2015).

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Table 1

Weighted unadjusted prevalence (unweighted N) of belief about quitting smoking and risk reducing beliefs: Health Information National Trends Survey, United States, 2013–2014 (N = 6862).

	How much do you think quitting cigarette smoking can help reduce the harmful effects of smoking? weighted % (unweighted N)					How much do you think each of the following helps a current smoker reduce the harmful effects of smoking if the person continues to smoke? weighted % (unweighted N)			
	Total	Not at all	A little	Somewhat	A lot	Exercise			
						Not at all	A little	Somewhat	A lot
Total		1.7 (133)	4.1 (254)	12.6 (844)	81.6 (5350)	20.8 (1456)	21.3 (1313)	28.5 (1664)	29.5 (1985)
Age									
18–29	18.5 (499)	18.0 (10)	26.6 (24)	21.7 (64)	18.1 (393)	16.1 (85)	21.7 (111)	33.9 (146)	28.3 (148)
30–49	39.0 (1849)	34.5 (28)	34.9 (69)	35.6 (221)	40.1 (1490)	17.7 (324)	22.3 (393)	27.5 (470)	32.4 (609)
50–69	30.5 (2984)	34.7 (57)	30.5 (126)	31.7 (378)	30.0 (2330)	23.4 (647)	21.6 (575)	27.1 (737)	27.9 (867)
70+	11.9 (1245)	12.9 (27)	8.0 (28)	11.0 (152)	11.9 (966)	29.5 (345)	17.7 (206)	27.8 (265)	25.0 (293)
Gender									
Male	48.3 (2621)	45.3 (44)	46.5 (100)	43.4 (279)	50.3 (2018)	19.5 (519)	20.8 (486)	29.6 (664)	30.1 (732)
Female	51.8 (4090)	54.7 (69)	53.5 (134)	56.6 (508)	49.7 (2924)	21.7 (837)	22.3 (748)	27.9 (882)	28.1 (1082)
Education									
Less than HS	10.6 (605)	27.5 (31)	10.8 (28)	10.5 (66)	9.9 (433)	22.9 (141)	16.2 (81)	24.0 (111)	37.0 (195)
HS graduate	21.3 (1369)	30.5 (34)	30.4 (80)	22.8 (194)	20.3 (1001)	22.8 (331)	18.3 (243)	30.1 (316)	28.9 (377)
Some college	31.4 (2023)	26.6 (38)	38.9 (86)	34.5 (254)	30.6 (1591)	21.5 (436)	24.0 (391)	27.1 (484)	27.5 (611)
College graduate or more	36.7 (2627)	15.4 (21)	20.0 (53)	32.2 (307)	39.2 (2195)	17.9 (509)	22.3 (572)	30.2 (714)	29.5 (748)
Marital status									
Married/ living as married	57.6 (3412)	49.7 (49)	49.7 (120)	57.6 (399)	57.9 (2739)	21.9 (724)	21.8 (685)	28.2 (889)	28.1 (957)
Single	26.6 (1127)	30.8 (29)	36.1 (56)	25.0 (147)	26.7 (863)	16.5 (218)	21.4 (230)	30.8 (269)	31.2 (358)
Divorced/ separated/ widowed	15.8 (2051)	19.5 (46)	14.2 (68)	17.4 (267)	15.4 (1592)	23.6 (471)	18.5 (363)	26.3 (461)	31.6 (606)
Income									
$0 to $14,999	13.9 (1089)	34.8 (47)	22.9 (51)	13.4 (135)	12.6 (748)	21.1 (221)	16.1 (168)	27.8 (210)	35.0 (341)
$15,000 to $34,999	19.8 (1384)	29.2 (31)	27.5 (65)	23.3 (173)	18.2 (1004)	21.0 (293)	22.7 (249)	27.1 (300)	29.2 (397)
$35,000 to $74,999	32.2 (1967)	31.1 (30)	26.6 (68)	31.5 (234)	32.9 (1502)	20.7 (402)	22.2 (384)	28.2 (471)	28.8 (553)
$75,000 or more	34.2 (1861)	5.0 (7)	23.0 (42)	31.9 (202)	36.4 (1503)	20.0 (362)	22.0 (398)	30.8 (510)	27.2 (476)
Race/ethnicity									
White	66.8 (3544)	46.2 (35)	62.0 (113)	74.3 (488)	66.6 (2845)	21.0 (799)	23.3 (806)	30.6 (964)	25.1 (857)
Black	10.9 (955)	22.1 (25)	9.8 (42)	9.7 (107)	10.9 (752)	20.1 (193)	20.2 (187)	24.1 (203)	35.7 (320)
Hispanic	15.3 (1051)	27.4 (24)	22.5 (54)	11.0 (115)	14.9 (803)	19.1 (203)	18.0 (141)	23.4 (219)	39.5 (2.7)
Other	7.1 (448)	4.3 (9)	5.7 (15)	5.1 (50)	7.6 (365)	13.8 (80)	20.2 (87)	30.3 (109)	35.7 (157)
Smoking status									
Never	58.4 (3967)	61.9 (83)	52.9 (129)	58.9 (491)	58.0 (3092)	19.9 (823)	20.7 (364)	30.3 (390)	29.1 (1151)
Former	24.4 (1817)	6.3 (13)	14.6 (40)	19.0 (171)	26.4 (1557)	26.0 (456)	20.8 (364)	23.6 (390)	29.7 (523)
Current	17.3 (984)	31.7 (36)	32.5 (82)	22.2 (177)	15.7 (673)	16.4 (169)	23.8 (194)	30.0 (288)	29.9 (293)

Covariates included age, gender, education, marital status, imputed annual household income, and race/ethnicity. Participants' smoking status was defined as never, former, and current (everyday and some days) based on responses to two items: 1) Have you smoked at least 100 cigarettes in your entire life? (*yes/no*) and 2) Do you now smoke cigarettes every day, some days or not at all? The quit-smoking belief, was assessed with the item, "How much do you think quitting cigarette smoking can help reduce the harmful effects of smoking." Risk-reducing beliefs were assessed with four items, "How much do you think each of the following helps a current smoker reduce the harmful effects of smoking if the person continues to smoke?: Exercising, Eating fruits and vegetables, Taking vitamins, and Sleeping at least 8 hours per night." Response options for these questions were *not at all, a little, somewhat, and a lot.*

Cross-tabulations analyses were utilized to examine the bivariate associations among demographic covariates, the quit smoking belief, and smoking risk-reducing beliefs. Variables that were significantly ($p < 0.05$) associated with the quit smoking belief and risk-reducing beliefs were selected as independent variables in weighted ordinal logistic regression models, in which the quit smoking belief and risk-reducing beliefs served as the dependent variables. Smoking status was included in all models regardless of significance at the bivariate level. All analyses were conducted using SAS 9.3 and SAS-callable SUDAAN 10.0 statistical software which allows for the incorporation of the jackknife replicate weights to estimate accurate variance estimates for statistical modeling and analyses were weighted to adjust for demographic oversampling and survey non-responsiveness, and to provide representative estimates of the adult U.S. population (Westat, 2014, 2015).

3. Results

Table 1 displays descriptive statistics for all covariates by the quit smoking belief and smoking risk-reducing beliefs. Approximately 82% of the population reported that quitting cigarette smoking can help reduce the harmful effects of smoking 'a lot,' followed by 12.6% reporting 'somewhat,' 4.1% 'a little,' and 1.7% 'not at all.' For the belief that exercise reduces the harmful effects of smoking: 29.5% of respondents reported 'a lot,' 28.5% reported 'somewhat,' 21.3% reported 'a little,' and 20.8% reported 'not at all.' For eating fruits and vegetables, 23.3% reported 'a lot,' 25.7% reported 'somewhat,' 22.9% reported 'a little,' and 28.0% reported 'not at all.' For vitamins undoing the harmful effects of smoking: 19.5% reported 'a lot,' 23.4% reported 'somewhat,' 24.3% reported 'a little,' and 32.7% reported 'not at all.' For sleep undoing the harmful effects of smoking 23.1% reported 'a lot,' 23.5% reported 'somewhat,' 21.9% reported 'a little,' and 31.4% reported 'not at all.'

3.1. Quit smoking belief

In an ordinal logistic regression analysis (Table 2), former smokers were significantly more likely to endorse the quit smoking belief (OR = 1.68, 95% CI = 1.35–2.10) than never smokers and current smokers (OR: 2.13, 95% CI: 1.51, 3.01; data not shown). Belief that quitting smoking reduces the harmful effects of smoking was associated with education, such that those with high school/GED education (OR = 0.65, 95% CI = 0.47–0.89) and some college (OR = 0.69, 95% CI = 0.51–0.93) were less likely to endorse this belief