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Do Health Care Providers Differentiate between Daily and Nondaily Smokers when Counseling for Smoking Cessation? Analysis by Race/Ethnicity

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Abstract

Objective: Nondaily smokers (NDS) may not receive cessation counseling due to perceptions that nondaily smoking is less hazardous and that NDS can quit unassisted. We investigated differences in provision of guideline-based cessation services -- i.e., ask, advise, assist, arrange follow-up ("4 A's")– by smoker type (NDS and DS) and race/ethnicity as well as the interaction between race and smoker type.

Methods: Participants were NDS (smoked 4-24 days in the last 30) and DS (smoked >25 days in the past month) recruited using an online panel. An online questionnaire gathered self-reported data from smokers regarding health care professional-provided tobacco treatment over the last 12 months. The 1587 participants who had at least one doctor visit in the past 12 month included native NDS, converted NDS, light DS, and heavy DS.

Results: Multivariable analysis showed that, there were no statistically significant differences on the odds of being asked about smoking between different types of smokers. However, compared to native nondaily smokers, Latino and White converted nondaily smokers (Latinos, AOR = 2.02, 95% CI 1.09, 3.74 and Whites, AOR= 2.33, 95% CI 1.27, 4.29), light daily smokers (AOR = 2.82, 95% CI 1.41, 5.63, and AOR= 3.72, 95% CI, 1.92, 7.22, respectively) and heavy daily smokers (AOR = 4.11, 95% CI 2.01, 8.43 and AOR = 6.85, 95% CI 3.39, 13.81, respectively) had increasing odds of reporting being advised to quit by their health care providers. Among African American smokers, converted nondaily smokers (AOR = 2.11, 95% CI 1.01, 4.44) and heavy daily smokers (AOR = 2.92, 95% CI 1.35, 6.28) were more likely to receive assistance in quitting than native nondaily smokers.

Among African Americans, heavy daily smokers' had greater odds of having follow-up arranged compared to native nondaily smokers (AOR=3.06, 95% CI 1.08, 8.70) and among Latinos, these rates were only statistically significant for converted nondaily smokers compared to native nondaily smokers (AOR= 2.80, 95% CI 1.25, 6.26). Among Whites, light daily smokers had the greatest odds of having their health care provider arrange follow-up (AOR= 10.81, 95% CI 1.37, 85.12) compared to native nondaily smokers.

Conclusions: Daily smokers report greater engagement by health care providers compared to NDS with regard to smoking cessation. These findings such suggest the primary care providers are ascribing less risk to NDS than DS. Educational efforts are needed to change this tendency among primary care providers. In addition, the patterns identified were similar across the three ethnic groups studied here.

Keywords: Nondaily smoking; Tobacco use; Counseling; Smoking cessation

Introduction

Cigarette smoking continues to be the leading cause of preventable disease and death in the U.S., accounting for over 480,000 preventable deaths per year [1]. Approximately 42 million Americans currently smoke regularly [2]. Anti-smoking legislation and public health efforts have led to lower overall rates of cigarette use and changes in the way that smokers use cigarettes. These shifts in tobacco consumption include an increase over the last 20 years in the prevalence of nondaily smoking (smoking on some days but not every day) among current smokers [2], such that roughly 23% of smoking adults now report nondaily smoking. Despite lower-levels of cigarette use relative to daily smokers, nondaily smokers are, on average, exposed to significant levels of nicotine and carcinogenic nitrosamines [3,4]. Nondaily smoking occurs at greater rates among Hispanics (30% of current smokers) and African Americans (19% of

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current smokers) compared to Caucasians (14% of current smokers) [5].

Clinical Practice Guidelines for the Treatment of Tobacco Dependence recommend that clinicians approach tobacco users through a brief intervention in the primary care setting. This includes asking about tobacco use, advising them to quit, assessing their willingness to quit, assisting with quit attempts and arranging for follow-up regarding tobacco cessation ("5 A's") [6]. Despite literature urging healthcare providers to advise nondaily smokers to quit [7], it is possible that this growing subgroup may not experience health care provider-led smoking interventions due to misperceptions that nondaily smoking is not associated with significant health risks [8], and beliefs that nondaily smokers are not addicted/ can quit on their own [9]. Prior data suggests that health care providers may be less aggressive in counseling nondaily smokers to quit [7]. Further review of the literature suggests that nondaily smokers engage in cessation at rates that are similar or slightly higher than their daily smoking counterparts [10-12].

Racial and ethnic disparities in the delivery of tobacco cessation services further complicate this issue. Specifically, tobacco screening and counseling are less common for Hispanic compared to non-Hispanic White smokers [13] and this difference does not appear to be related to proficiency in English [14]. Similar findings have been reported for African-American smokers even after controlling for social, economic, and healthcare-related factors [15]. These findings are problematic because light smoking and nondaily smoking are common practices in ethnic minorities [16-18]. Provision of the 5A's to smokers across the smoking spectrum (i.e., nondaily, light daily, heavy daily) has not been studied, despite the fact that physician advice to quit is known to be effective in promoting smoking cessation [19]. Therefore, we conducted a study of nondaily and daily smokers to determine their experience with healthcare providers and the components of guidelines-based tobacco treatment received. Our goal was to understand how commonly health care providers addressed the issue of smoking across the full range of smoking spectrum. We examined differences in provision of 4 of the 5 A's – i.e., ask, advise, assist, arrange follow-up – by smoker type (NDS and DS) and race/ethnicity (African American, Latino, White).Clinician assessment of readiness to quit was not queried but we included participants' readiness to quit as a covariate in our analyses. We further categorized nondaily smokers by whether or not they had a previous history of daily smoking. Lastly, we examined interaction between smoker type and race/ethnicity to determine the presence or absence of any significance. We feel the latter consideration is an important one because, given the higher rate of nondaily smoking among minorities, there is a possibility that nondaily smoking minorities may be subject to greater bias (and resulting disparities in counseling) than nondaily smoking Caucasians. We hypothesized that the likelihood of being asked, advised, assisted, and having follow-up arranged would be greatest for daily heavy smokers and non-Hispanic Whites and lowest for native nondaily smokers (i.e., nondaily smokers who never smoked daily), African Americans, and Latinos.

Methods

Participants

Participants completed a cross-sectional survey administered through an online panel survey service. Eligible participants self-identified as African American, White, or Latino (of any race), were at least 25 years old, and were English-speaking. These participants were current smokers (i.e., smoked at least one cigarette in the past 30 days), had smoked at least 100 cigarettes in their lifetime, smoked for at least one year, smoked at their current rate (i.e., daily or nondaily) for at least 6 months, and had not participated in any smoking cessation treatment in the past 30 days. Women who were currently pregnant or breast-feeding were excluded from the study.

The sample was stratified to obtain equal samples of each of the three race/ethnicity groups and for daily vs. nondaily smoking frequency levels (daily smokers were evenly divided between light daily and moderate to heavy daily smokers). Nondaily smokers smoked at least one cigarette on 4 to 24 days in the past 30 days; consistent with previous studies nondaily smokers who smoked fewer than 4 days were excluded in order to recruit individuals smoking the equivalent of at least once a week [20]. Daily smokers smoked 25 to 30 days in the past 30 days and were further stratified into light daily smokers (< 10 cigarettes per day; CPD) [21] and moderate to heavy daily smokers (> 10 CPD). Out of 2,376 total respondents, 1,587 had visited a health care provider in the last 12 months and were included in the study.

Procedures

All study materials and procedures were approved by the University of Minnesota Institutional Review Board. The online panel survey company, SSI, provides access to a panel of 1.5 million participants in the United States; panelists are recruited through a variety of non-probability sampling strategies including websites and social networks [22]. SSI directed members of their panel to the survey using preliminary screening questions (e.g., smoking frequency) and participant profile information (e.g., race/ethnicity, age). Potential participants reviewed an informed consent page before proceeding to the eligibility screening questions. Quotas were set for nine subgroups (three race/ethnicity groups and three smoking levels based on our sampling stratification), and once respective quotas were met, no further participants were recruited. All participants who completed the survey received SSI's standard incentives, which included entry into a quarterly drawing for $12,500 (available to the entire panel of 1.5 million active SSI panelists) and points redeemable for cash. A more detailed description of the survey procedures is available elsewhere [23].

Measures

Social demographics: Social demographic questions assessed participants' age, race and ethnicity, gender, income, and education.

Cigarette use: Participants reported the number of days they smoked in the past month, average number of cigarettes smoked per day (CPD) on the days smoked in the past 7 days, and whether they had ever smoked daily for six months or longer (response options: yes or no). These items were used to classify smokers into the smoker types. Participants who smoked on 24 or fewer days in the past 30 days were categorized as nondaily smokers [24-26]. Nondaily smokers who reported that they had not smoked daily for at least 6 months were classified as native nondaily smokers and those who indicated that they had were classified as converted nondaily smokers [11].

Table 1: Subject Characteristics, Mean (SD) or N (%).

		Total	Native Non-Daily Smoker (*N* = 186)	Converted Non-Daily Smoker (*N* = 616)	Light Smoker (*N* = 378)	Mod/ Heavy Smoker (*N* = 407)	*p*-value for comparing smoker groups
N	Total	1587	186	616	378	407	-
	AA	536	59	201	133	143	-
	Latino	508	64	202	116	126	-
	White	543	63	213	129	138	-
Age, *M* (*SD*)	Total	44 (13)	40 (13)	43 (13)	45 (13)	47 (12)	<0.0001
	AA	45 (12)	44 (13)	45 (12)	46 (12)	47 (12)	0.36
	Latino	40 (11)	35 (9)	38 (9)	41 (12)	44 (12)	<0.0001
	White	47 (14)	42 (14)	47 (14)	47 (14)	50 (12)	<0.01
	p-value for race difference	<0.0001	<0.001	<0.0001	<0.001	<0.001	-
Gender, frequency (%) of Female	Total	930 (59%)	106 (57%)	339 (55%)	246 (65%)	239 (59%)	0.02
	AA	333 (62%)	38 (64%)	128 (64%)	85 (64%)	82 (57%)	0.59
	Latino	258 (51%)	28 (44%)	80 (40%)	76 (66%)	74 (59%)	<0.0001
	White	339 (62%)	40 (64%)	131 (62%)	85 (66%)	83 (60%)	0.78
	p-value for race difference	<0.0001	0.03	<0.0001	0.94	0.89	-
Education, frequency (%) of college graduate or more	Total	590(37%)	78 (42%)	270 (44%)	115 (30%)	127 (32%)	<0.0001
	AA	152(28%)	18 (31%)	58 (29%)	37 (28%)	39 (27%)	0.97
	Latino	244 (48%)	34 (53%)	125 (62%)	36 (31%)	49 (39%)	<0.0001
	White	194 (36%)	26 (41%)	87 (41%)	42 (33%)	39 (28%)	0.07
	p-value for race difference	<0.0001	0.04	<0.0001	0.70	0.08	-
Income, frequency (%) of <$1,800 per month	Total	527 (35%)	58 (33%)	190 (33%)	147 (40%)	132 (33%)	0.07
	AA	225 (44%)	25 (44%)	83 (44%)	66 (52%)	51 (36%)	0.08
	Latino	134 (28%)	18 (30%)	42 (22%)	42 (38%)	32 (27%)	0.03
	White	168 (32%)	15 (25%)	65 (33%)	39 (31%)	49 (36%)	0.48
	p-value for race difference	<0.0001	0.07	<0.0001	<0.01	0.20	-
# of years smoked, *M* (*SD*)	Total	20 (14)	13 (11)	17 (13)	21 (14)	25 (13)	<0.0001
	AA	20 (12)	14 (11)	17 (11)	22 (13)	24 (12)	<0.0001
	Latino	15 (12)	9 (9)	12 (11)	18 (12)	22 (13)	<0.0001
	White	24 (14)	15 (12)	23 (14)	24 (15)	30 (13)	<0.0001
	p-value for race difference	<0.0001	<0.01	<0.0001	<0.01	<0.0001	-
# of cigarettes per day, *M* (*SD*)	Total	10 (9)	4 (3)	6 (5)	7 (3)	21 (9)	<0.0001
	AA	10 (8)	4 (3)	6 (5)	8 (3)	20 (8)	<0.0001
	Latino	9 (9)	3 (2)	5 (5)	7 (3)	21 (9)	<0.0001
	White	10 (9)	5 (4)	6 (6)	8 (3)	22 (9)	<0.0001
	p-value for race difference	0.09	<0.001	0.13	0.06	0.14	-
# of days smoked per month, *M* (*SD*)	Total	22 (9)	13 (6)	15 (6)	29 (2)	30 (1)	<0.0001
	AA	22 (9)	14 (6)	15 (6)	30 (1)	30 (1)	<0.0001
	Latino	22 (8)	13 (6)	16 (6)	29 (2)	30 (1)	<0.0001
	White	22 (9)	13 (6)	14 (6)	29 (2)	30 (1)	<0.0001
	p-value for race difference	0.40	0.31	0.07	<0.01	0.06	-

Smoking with 30 minutes of waking, frequency (%)	Total	926 (58%)	41 (22%)	285 (46%)	243 (64%)	357 (88%)	<0.0001
	AA	350 (65%)	19 (32%)	101 (50%)	100 (75%)	130 (91%)	<0.0001
	Latino	302 (60%)	12 (19%)	120 (59%)	67 (58%)	103 (82%)	<0.0001
	White	274 (51%)	10 (16%)	64 (30%)	76 (59%)	124 (90%)	<0.0001
	p-value for race difference	<0.0001	0.07	<0.0001	<0.01	0.05	-
Intention to quit, frequency (%) of will quit in the next 6 months	Total	584 (37%)	75 (40%)	255 (41%)	127 (34%)	127 (31%)	<0.01
	AA	245 (46%)	38 (64%)	105 (52%)	46 (35%)	56 (39%)	<0.001
	Latino	151 (30%)	16 (25%)	69 (34%)	34 (29%)	32 (25%)	0.29
	White	188 (35%)	21 (33%)	81 (38%)	47 (36%)	39 (28%)	0.28
	p-value for race difference	<0.0001	<0.0001	<0.001	0.48	0.03	-
Health status, frequency (%) of excellent to good	Total	1154 (73%)	147 (79%)	462 (75%)	283 (75%)	262 (64%)	<0.001
	AA	372 (69%)	43 (73%)	146 (73%)	94 (71%)	89 (62%)	0.18
	Latino	391 (77%)	53 (83%)	161 (80%)	90 (78%)	87 (69%)	0.09
	White	391 (72%)	51 (81%)	155 (73%)	99 (77%)	86 (62%)	0.02
	p-value for race difference	0.02	0.36	0.17	0.38	0.42	-
Doctor office visits, frequency (%) of more than 1 visit during the past 12 months	Total	1155 (73%)	106 (57%)	463 (75%)	274 (72%)	312 (77%)	<0.0001
	AA	408 (76%)	39 (66%)	154 (77%)	103 (77%)	112 (78%)	0.28
	Latino	351 (69%)	36 (56%)	150 (74%)	75 (65%)	90 (71%)	0.03
	White	396 (73%)	31(49%)	159 (75%)	96 (74%)	110 (80%)	<0.0001
	p-value for race difference	0.04	0.17	0.84	0.07	0.24	-

Nicotine dependence: Time to first cigarette, an item from the Fagerström Test for Nicotine Dependence [27], was used as an indicator of nicotine dependence. Time to first cigarette was dichotomized (smoking <30 minutes after waking and smoking > 30 minutes); smoking within 30 minutes of waking denotes nicotine dependence [28].

Health status: Perceived health status was assessed using a single item from the 36-Item Short Form Health , Survey (SF-36), "In general, would you say your health is…" with response options "Excellent", "Very Good", "Good", "Fair", and "Poor" [29].

Intention to quit: Intention to quit was assessed using a single-item measure that asked participants "What describes your intention to stop smoking completely, not even a puff? Would you say you…" response options were "Never expect to quit", "may quit in the future, but not in the next 6 months," "will quit in the next 6 months," "will quit in the next 30 days" [30].

Health care visits and quitting assistance: Participants were asked to report their number of doctor's office visits in the past 12 months. Those who reported no visits during the last 12 months were excluded from this analysis. We asked a series of four questions relating to health care providers' assessment of smoking and provision of quit assistance (response options were yes or no): "In the last 12 months, did a doctor or other health professional ask if you smoked cigarettes?"; "In the last 12 months, did a doctor or other health professional advise you to stop smoking cigarettes?"; "In the last 12 months, did a doctor or other health professional give you assistance in quitting smoking, such as give you specific advice on how to quit smoking or prescribe medication?"; and "In the last 12 months, did a doctor or other health professional arrange follow-up with their office about quitting smoking or refer you to a smoking cessation program?" Items were adapted from the 2008 California Tobacco Survey [31].

Data analysis

Participants' demographic and smoking-related variables were summarized, stratified by smoker type and race, the two sampling stratification factors of the study. Continuous variables were summarized using mean and standard deviation (SD). Categorical variables were summarized using frequencies and percentages. For comparisons between smoker type groups and comparisons between race/ethnicity groups, *t*-test test and Chi-square test were used for continuous and categorical variables, respectively. We examined the association between participants' receipt of each of 4 A's (ask, advise, assist, arrange follow-up) from their health care providers with smoker type (native nondaily, converted nondaily, light daily, and moderate to heavy daily) within each race/ethnicity group. We conducted multivariable logistic regressions for each race/ethnicity group with each of the 4 A's as the dependent variable and smoker type as the primary covariate, adjusting for social-demographic variables (age, gender, education, and income), intention to quit, health status (excellent/very good/good vs. fair/poor) and the frequency a person visited doctors' offices during the past 12 months (1 visit vs. ≥2 visits). The interaction of smoker type and race/ethnicity was formally tested in multivariable regressions adjusting for the same covariates as above with a likelihood ratio test (LRT) and the Chi-square statistic and *p*-value were reported. All tests were two-sided. *P*-values < 0.05 were considered statistically significant. All analyses were performed in SAS 9.4 (SAS Institute Inc., Cary, NC).

Table 2: Stratified multivariable logistic regression model result for participants' response to the question "In the last 12 months, did a doctor or other health professional ask if you smoked cigarettes?"(n=1,587).

In the last 12 months, did a doctor or other health professional ask if you smoked cigarettes?	AA OR (95% CI)	Latino OR (95% CI)	White OR (95% CI)
†Smoker type (reference: native nondaily smoker)			
Converted Nondaily Smoker	0.91 (0.36, 2.25)	1.60 (0.76, 3.36)	0.98 (0.46, 2.10)
Light daily smoker	0.99 (0.37, 2.64)	1.14 (0.50, 2.56)	1.05 (0.46, 2.37)
Heavy daily smoker	1.27 (0.48, 3.40)	1.88 (0.79, 4.49)	1.86 (0.78,4.44)
Age	0.98 (0.96, 1.01)	1.01 (0.99, 1.04)	0.99 (0.97,1.01)
Gender (female vs. male)	2.16** (1.26, 3.72)	1.09 (0.63, 1.87)	1.30 (0.79,2.13)
Education (College graduate or more vs. some college or less)	1.24 (0.66, 2.32)	0.83 (0.47, 1.45)	0.87 (0.52, 1.44)
Income (<$1,800 vs. ≥$1,800 per month)	1.20 (0.67, 2.16)	1.54 (0.80, 2.97)	1.35 (0.78, 2.34)
Intention to quit (will quit vs. will not quit in the next 6 months)	0.89 (0.52, 1.55)	1.13 (0.63, 2.03)	1.35 (0.80, 2.29)
Health status (fair/poor vs. excellent/very good/good)	1.54 (0.82, 2.91)	3.06** (1.34, 6.97)	0.61 (0.35, 1.06)
Frequency of doctor office visit (more than 1 visit vs. 1 visit)	0.81 (0.42, 1.60)	0.90 (0.52, 1.55)	2.06** (1.21, 3.53)

AA: African-American; OR: odds ratio; CI: confidence interval; †The interaction of smoker type and race/ethnicity was not statistically significant (LRT χ^2 (df = 6) = 1.99, p = 0.92); * p<0.05; ** p<0.01.

Results

The 1587 subjects in this study included native nondaily smokers (N=186) and converted nondaily smokers (N=616), in addition to daily smokers that were categorized as light (N=378) or moderate to heavy (N=407). Subject demographics are described in Table 1. The average age of the sample was 44 years (standard deviation [SD] = 13), among Latinos and Whites heavier smokers were older and Latinos were younger than African Americans and Whites overall. Thirty-seven percent of participants had completed a college degree or higher; African Americans had the lowest percentage of college graduates and Latinos had the highest. Among Latinos and Whites, nondaily smokers were more likely to report completing at least a college degree than daily smokers. Approximately one-third of the sample had household incomes below $1,800 per month with Latinos being the least to report this income level and African Americans being most likely.

The average number of years smoked was 20 (SD=14) with Whites and heavier daily smokers reporting the longest smoking histories and Latinos and native nondaily smokers reporting the shortest. The average cigarettes per day (CPD) for the sample was 10 (SD = 9) and the number of days smoked in the past month was 22 (SD = 9). Fifty-eight percent of the sample smoked with 30 minutes of waking, indicating nicotine dependence, with increasing proportions for heavier smokers. Thirty-seven percent of the sample intended to quit in the next 6 months, and African Americans were most likely to intend to quit and Latinos least likely. Differences by smoker type on intention to quit were observed only among African Americans, with higher proportions of nondaily smokers intending to quit compared to daily smokers. The majority of the sample rated their health as being "excellent" "very good" or "good" (73%). Latinos were more likely to report being in good health and statistically significant differences in health were only observed among Whites, with only 62% of moderate to heavy smokers reporting good health. The majority of the sample made more than one physician visit in the past year (73%) with native nondaily smokers being least likely to report more than one visit among Latino and White smokers.

Ask

After adjusting for covariates, multivariable analysis showed that, there were no statistically significant differences on the likelihood of being asked about smoking (Table 2). Different covariates emerged as statistically significant for the three racial and ethnic groups; African American women were more than twice as likely to be asked about their smoking compared to African American men (adjusted odds ratio [AOR] = 2.16, 95% confidence interval [CI] 1.26. 3.27). Latinos reporting fair or poor health were three times as likely to be asked about their smoking (AOR = 3.06, 95% CI 1.34, 6.97) than those reporting good health. White smokers who visited a physician's office more than once in the past year were twice as likely to be asked about their smoking (AOR = 2.06, 95% CI 1.21, 3.53).

Advise

The multivariate analysis showed that, compared to native nondaily smokers, Latino and White converted nondaily smokers (Latinos, AOR 2.02, 95% CI 1.09, 3.74 and Whites, AOR= 2.33, 95% CI1.27, 4.29), light daily smokers (AOR = 2.82, 95% CI 1.41, 5.63, and AOR=3.72, 95% CI, 1.92, 7.22, respectively) and heavy daily smokers (AOR = 4.11, 95% CI 2.01, 8.43 and AOR = 6.85, 95% CI 3.39, 13.81, respectively) had increasing odds of reporting being advised to quit by their health care providers (Table 3). Among African Americans smokers, the only statistically significant difference was an increased likelihood of being advised to quit among light daily smokers (AOR = 2.18, 95% CI 1.06, 4.46). Intention to quit was a statistically significant covariate among Latinos (AOR 1.72, 95% CI1.07, 2.75) and Whites (AOR = 1.79, 95% CI 1.18, 2.71), and Latinos who reported being in poor health had greater odds of being advised to quit (AOR = 2.44, 95% CI 1.39, 4.28) compared to those reporting good health.

Assist

Among African American smokers, converted nondaily smokers

Table 3: Stratified multivariable logistic regression model result for participants' response to the question "In the last 12 months, did a doctor or other health professional advise you to stop smoking cigarettes?"(n=1,587).

In the last 12 months, did a doctor or other health professional advise you to stop smoking cigarettes?	AA OR (95% CI)	Latino OR (95% CI)	White OR (95% CI)
†Smoker type (reference: native nondaily smoker)			
Converted Nondaily Smoker	1.76 (0.91, 3.37)	2.02* (1.09, 3.74)	2.33** (1.27, 4.29)
Light daily smoker	2.18* (1.06, 4.46)	2.82** (1.41, 5.63)	3.72*** (1.92, 7.22)
Heavy daily smoker	1.97 (0.98, 3.96)	4.11*** (2.01, 8.43)	6.85*** (3.39, 13.81)
Age	1.01 (0.99, 1.03)	1.00 (0.98, 1.02)	1.01 (0.99, 1.02)
Gender (female vs. male)	1.35 (0.88, 2.08)	1.05 (0.68, 1.62)	0.91 (0.61, 1.37)
Education (College graduate or more vs. some college or less)	1.07 (0.66, 1.73)	1.41 (0.89, 2.22)	0.87 (0.58, 1.32)
Income (<$1,800 vs. ≥$1,800 per month)	1.20 (0.76, 1.89)	1.37 (0.83, 2.26)	1.31 (0.85, 2.00)
Intention to quit (will quit vs. will not quit in the next 6 months)	1.11 (0.72, 1.71)	1.72* (1.07, 2.75)	1.79** (1.18, 2.71)
Health status (fair/poor vs. excellent/very good/good)	1.64 (0.99, 2.70)	2.44** (1.39, 4.28)	1.28 (0.81, 2.02)
Frequency of doctor office visit (more than 1 visit vs. 1 visit)	1.48 (0.92, 2.38)	1.30 (0.84, 2.00)	1.05 (0.67, 1.64)

AA: African-American; OR: odds ratio; CI: confidence interval; †The interaction of smoker type and race/ethnicity was not statistically significant (LRT χ^2 (df = 6) = 7.45, p = 0.28);* p<0.05; ** p<0.01; *** p<0.001.

Table 4: Stratified multivariable logistic regression model result for participants' response to the question "In the last 12 months, did a doctor or other health professional give you assistance in quitting smoking, such as give you specific advice on how to quit smoking or prescribe medication?"(n=1,587).

In the last 12 months, did a doctor or other health professional give you assistance in quitting smoking, such as give you specific advice on how to quit smoking or prescribe medication?	AA OR (95% CI)	Latino OR (95% CI)	White OR (95% CI)
†Smoker type (reference: native nondaily smoker)			
Converted Nondaily Smoker	2.11* (1.01, 4.44)	1.71 (0.88, 3.34)	1.39 (0.59, 3.25)
Light daily smoker	1.97 (0.90, 4.33)	1.77 (0.85, 3.66)	2.52* (1.06, 6.00)
Heavy daily smoker	2.92** (1.35, 6.28)	2.24* (1.09,4.64)	2.60* (1.09, 6.22)
Age	0.99 (0.97, 1.00)	0.98 (0.96, 1.00)	0.98** (0.96, 0.99)
Gender (female vs. male)	0.72 (0.49,1.07)	0.73 (0.49, 1.11)	1.08 (0.69, 1.70)
Education (College graduate or more vs. some college or less)	1.08 (0.69, 1.68)	1.27 (0.83, 1.96)	1.21 (0.76, 1.93)
Income (<$1,800 vs. ≥$1,800 per month)	0.92 (0.60, 1.39)	0.95 (0.59, 1.52)	0.92 (0.57, 1.47)
Intention to quit (will quit vs. will not quit in the next 6 months)	1.50* (1.01, 2.22)	1.08 (0.71, 1.66)	1.82** (1.18, 2.82)
Health status (fair/poor vs. excellent/very good/good)	0.78 (0.51, 1.20)	1.60* (1.02, 2.53)	0.88 (0.54, 1.45)
Frequency of doctor office visit (more than 1 visit vs. 1 visit)	2.25** (1.37, 3.71)	1.49 (0.96, 2.29)	2.02* (1.16, 3.51)

AA: African-American; OR: odds ratio; CI: confidence interval; †The interaction of smoker type and race/ethnicity was not statistically significant (LRT χ^2 (df = 6) = 3.92, p = 0.69);* p<0.05; ** p<0.01.

(AOR 2.11, 95% CI 1.01, 4.44) and heavy daily smokers (AOR 2.92, 95% CI 1.35, 6.28) were more likely to receive assistance in quitting than native nondaily smokers and no differences were found between native and converted nondaily smokers (see Table 4). Among Latinos, heavy daily smokers (AOR =2.24, 95% CI 1.09, 4.64) were the only smoker type with statistically significant differences from native nondaily smokers. White light daily (AOR =2.52, 95% CI 1.06, 6.00) and heavy daily smokers (AOR = 2.60, 95% CI 1.09, 6.22) had greater odds of receiving assistance compared to native nondaily smokers. African American and White smokers who intended to quit in the next six months (AOR = 1.50, 95% CI 1.01, 2.22 and AOR =1.82, 95% CI 1.18, 2.82, respectively) and who visited a doctor's office visit in the past year (AOR = 2.25, 95% CI 1.37, 3.71 and AOR = 2.02, 95% CI 1.16, 3.51) had greater odds of receiving quit assistance. In addition younger White smokers (AOR = 0.98 for 1-year increase in age, 95% CI 0.96, 0.99) and Latinos reporting fair to poor health (AOR =1.60, 95% CI 1.02, 2.53) were more likely to have been assisted with quitting.

Arrange

Among African Americans, heavy daily smokers' had greater odds of having follow-up arranged compared to native nondaily smokers (AOR=3.06, 95% CI 1.08, 8.70) and among Latinos these rates were only statistically significant for converted nondaily smokers compared to native nondaily smokers (AOR= 2.80, 95%

Table 5: Stratified multivariable logistic regression model result for participants' response to the question "In the last 12 months, did a doctor or other health professional arrange follow-up with their office about quitting smoking or refer you to a smoking cessation program?"(n=1,587).

In the last 12 months did a doctor or other health professional arrange follow-up with their office about quitting smoking or refer you to a smoking cessation program?	AA OR (95% CI)	Latino OR (95% CI)	White OR (95% CI)
†Smoker type (reference: native nondaily smoker)			
Converted Nondaily Smoker	2.21 (0.79, 6.16)	2.80* (1.25, 6.26)	4.66 (0.59, 36.70)
Light daily smoker	1.62 (0.53, 4.92)	2.35 (0.96, 5.71)	10.81* (1.37, 85.12)
Heavy daily smoker	3.06* (1.08, 8.70)	2.17 (0.89, 5.28)	6.80 (0.84, 55.0)
Age	0.96*** (0.94, 0.98)	0.98* (0.96, 1.00)	0.97* (0.95, 0.99)
Gender (female vs. male)	0.57* (0.34, 0.94)	0.48** (0.30, 0.76)	0.51* (0.28, 0.96)
Education (College graduate or more vs. some college or less)	1.12 (0.64, 1.96)	2.24** (1.35, 3.72)	1.86 (0.97, 3.56)
Income (<$1,800 vs. ≥$1,800 per month)	0.51* (0.29, 0.91)	1.14 (0.65, 2.00)	1.16 (0.59, 2.30)
Intention to quit (will quit vs. will not quit in the next 6 months)	1.61 (0.96, 2.70)	0.84 (0.51, 1.38)	2.43** (1.31, 4.50)
Health status (fair/poor vs. excellent/very good/good)	1.35 (0.77, 2.35)	1.27 (0.75, 2.14)	0.83 (0.39, 1.74)
Frequency of doctor office visit (more than 1 visit vs. 1 visit)	1.50 (0.81, 2.80)	3.15*** (1.81, 5.49)	3.03* (1.26, 7.30)

AA: African-American; OR: odds ratio; CI: confidence interval; †The interaction of smoker type and race/ethnicity was not statistically significant (LRT $\chi 2$ (df = 6) = 10.96, p = 0.09); * p<0.05; ** p<0.01; *** p<0.001.

CI 1.25, 6.26). Among Whites, light daily smokers had the greatest odds of having their health care provider arrange follow-up (AOR= 10.81, 95% CI 1.37, 85.12) compared to native nondaily smokers (Table 5). There were no differences in smokers reporting their health care providers arranging follow-up for African American converted nondaily and light smokers, Latino light and heavy smokers, or White converted nondaily smokers, and heavy daily smokers compared to native nondaily smokers. Among all three racial and ethnic groups, younger smokers (AORs ranged from 0.96 to 0.98)were more likely to have follow up arranged and women were less likely (AOR ranged 0.48 – 0.57) compared to men. The analyses showed that intention to quit was significantly associated with the likelihood of being arranged a follow up among Whites (OR=2.43, 95% CI 1.31, 4.50). Having more than one physician visit in the past year was associated with increased odds of follow-up being arranged among Latinos (AOR = 3.15, 95% CI 1.81, 5.49) and Whites (AOR = 3.03, 95% CI 1.26, 7.30).

Ask, Advise, Assist, and Arrange across Race/Ethnicity

In the multivariate analysis for the full sample adjusting for covariates, there were no differences in whether or not participants were asked about smoking by their physicians on either smoker type or race and ethnicity. The race/ethnicity by smoker type interactions were not statistically significant (LRT $\chi 2$ (df = 6) = 1.99, p = 0.92) and only gender was a statistically significant covariate with women having 51% greater odds of being asked about smoking (AOR 1.51, 95% CI 1.12, 2.03). After adjusting for covariates, converted nondaily , light daily, and heavy daily smokers had greater odds of being advised to quit (AOR 2.23, 95% CI 1.22, 4.07; AOR 2.23, 95% CI 1.22, 4.07; and AOR 6.44, 95% CI 3.23, 12.84, respectively). African-Americans were more likely to report being advised to quit compared to Whites (OR= 2.45, 95% CI 1.14, 5.27). The interaction between race/ethnicity and smoker type was not significant for advice to quit (LRT $\chi 2$ (df = 6) = 7.45, p = 0.28). Participants who intended to quit in the next six months (AOR 1.51, 95% CI 1.18, 1.94) and who reported being in fair or poor health had greater odds of reporting being advised to quit (AOR 1.66, 95% CI1.25, 2.21). Light daily (AOR = 2.50, 95% CI 1.07, 5.88) and heavy daily smokers (AOR = 2.42, 95% CI 1.03, 5.67) had greater odds of being provided with quit assistance compared to native nondaily smokers, there was no statistically significant difference for converted nondaily smokers. There were no statistically significant differences in receiving assistance by race/ethnicity and race/ethnicity *smoker type interaction terms were nonsignificant (LRT $\chi 2$ (df = 6) = 3.92, p = 0.69). People of younger age (AOR = 0.98 for 1-year increase in age, 95% CI 0.97, 0.99), intending to quit in the next six months (OR= 1.45, 95% CI1.14, 1.84), and reporting fair or poor health (AOR =1.88, 95% CI 1.42, 2.48) were more likely to receive assistance in quitting. In the multivariate analysis with arrange follow-up as the dependent variable, compared to native nondaily smokers, the only statistically significant smoker type was light daily (AOR = 11.38, 95% CI 1.47, 88.34). There were no differences by race and ethnicity and race/ethnicity *smoker type interaction terms were nonsignificant (LRT $\chi 2$ (df = 6) = 10.96, p= 0.09) (Table 5). People of younger age (AOR = 0.97 for 1-year increase in age, 95% CI 0.96, 0.98) and participants with at least a college degree (OR= 1.70, 95% CI 1.24, 2.34), had greater odds of a physician arranging for follow-up tobacco treatment. Women had lower odds of a physician arranging for follow-up compared to men (OR= 0.51, 95% CI 0.38, 0.68).

Discussion and Conclusion

This study is among the first to examine differences in the provision of guideline-based tobacco cessation counseling by smoker type (non-daily, daily light, daily moderate to heavy) and race/ethnicity (African American, Latino, and White). Given that health care providers have been recommended to advise nondaily smokers to quit in prior literature [7], we sought to better understand the experience of nondaily smokers when meeting healthcare professionals. Consistent with our hypothesis, our data suggests that daily (including former daily) smokers were more likely to report questioning and counseling about cessation by health care providers compared to native nondaily smokers. While this result is notable, the results for the second A

("Advise") is much more striking. Daily smokers reported 2-4 times higher odds of receiving advice to quit compared to native nondaily smokers. Even former (i.e., converted) nondaily smokers were more likely to report being advised to quit with an odds ratio of 2.19 when compared to native nondaily smokers. These results may be explained by prevailing misperceptions regarding risk of daily and nondaily tobacco use or lack of recognition that the patient is a smoker, albeit nondaily. Alternatively, nondaily smokers may not self-identify as smokers thus not allowing health care professionals an opportunity to counsel them. Despite, as stated above, recent data suggesting nondaily users are exposed to dangerous nitrosamine levels [3] and recommendations that physicians advise nondaily smokers to quit [7], our study subjects reported that their health care providers took a less aggressive approach when discussing smoking cessation with nondaily smokers. As nondaily smoking continues to increase in prevalence, it is expected that data (such as that provided here) and education provided to primary care providers will alter their approach to this subgroup.

While tobacco treatment has been emphasized in physician guidelines, only half of smokers receive smoking cessation assistance from their providers [32]. Therefore, understanding gaps in tobacco treatment delivery for smokers will have important implications for tobacco control efforts. When assessing the likelihood of smokers being offered assistance with quitting, results demonstrate that daily (heavy and light) and converted nondaily smokers were twice as likely to be offered assistance compared to nondaily smokers. Smokers who had an intention to quit were more likely to be offered assistance compared to those not intending to quit, suggesting that physicians adopt a more intensive approach when smokers indicate motivation to quit. This is consistent with current tobacco treatment guidelines [33] and given the constraints on time per office visit in today's outpatient clinics, it is perhaps not surprising that health care providers are reluctant to spend time and effort on an issue that the patient is unlikely to support. Similar results were obtained from the National Health Interview Survey in which receiving cessation advice was strongly related to the desire to stop smoking [34]. However, only offering cessation assistance to smokers who are ready to quit results in significant missed opportunities to effectively promote cessation among current smokers [35]. Finally, subjects were more likely to report their health care providers arranging for follow up if they were heavy or light daily or converted nondaily smokers to further discuss smoking cessation. This finding again points to a distinction among health care providers in how the dangers of daily smoking are viewed compared to nondaily smoking.

In addition to making comparisons between different types of smokers, our study also allowed for analysis by race and ethnicity in the tobacco treatment of daily and nondaily smokers. Prior work has demonstrated that there are disparities in the counseling of Black and Hispanic smokers when compared to Whites [14,15] even after controlling for social economic and healthcare related factors [13]. Still, the literature does contain some conflicting data suggesting that physicians advise smokers in a uniform way across racial and ethnic groups [17]. In the latter study, with regard to the "advise" portion of the 5 A's, no difference in counseling was identified along racial/ethnic lines. Thus, racial disparities are not necessarily prominent in this aspect of the physician-patient interaction. Given the context of prior publications, our data contradicts some prior work and is in agreement with others. This sample (obtained from an online panel) appears systematically different that the general population with higher education and income levels but these potential confounders has been adjusted for in analysis. While our sample does not exactly mirror proportions of minorities in the general US population, we feel there is value in our attempt to increase the power of our sample through higher representation of some groups. Thus, we feel that the results presented her exhibit external validity due to the characteristics represented by the study subjects which are representative of characteristics found in the general population Further, sample size considerations are less likely to explain difference as our sample size is fairly large at nearly 1,600 subjects and the prior published works contain 4,000-5,000 respondents [15]. It is hoped that this finding represents a change over time with healthcare providers attempting to remedy the previously identified disparity in counseling different ethnicities.

Limitations of the study are mainly related to potential inaccuracies related to subject recall of their recent experiences when meeting health care professionals. The questions posed to the subjects were intentionally made to be simple and non-overlapping. As the subject were only queried over the last 12 months, we sought to gain useful data while not forcing subjects to attempt to recall events very far in the past. Another important limitation is that this is a cross-sectional survey and participants' reported their current intention to quit at the time of the survey; therefore, this may have changed since their provider visit. Since receiving tobacco treatment was positively associated with intending to quit, provider assistance may have effectively increased these smokers motivation to quit. Finally, the online sample included in this study may not be representative of the United States population of smokers.

Summary

In summary, smokers report that their health care providers are not querying native and converted nondaily smokers regarding their smoking as consistently as they do current daily smokers. Moving forward, primary care providers should be aware that nondaily smoking is a hazard and results in meaningful carcinogen exposure. This leads to decreased discussions about quitting and offering of assistance with quitting for nondaily smokers as well. To remedy this problem, primary care providers must be further educated regarding the dangers of nondaily smoking and that all smokers must be counseled to quit and referred for smoking cessation programs to assist with quitting. In addition, changing the nature of questioning from "Are you a smoker?" to "How many days per month do you smoke?" may allow more nondaily smokers to be correctly classified. In this way, the steadily increasing prevalence of nondaily smokers can be met with an equal response pushing cessation by the healthcare community.

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