



Associations between smoking behaviors and financial stress among low-income smokers

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ABSTRACT

Objective. Many American households struggle to bring in sufficient income to meet basic needs related to nutrition, housing, and healthcare. Nicotine addiction and consequent expenditures on cigarettes may impose extra financial strain on low-income households. We examine how cigarette use behaviors relate to self-reported financial stress/strain among low-income smokers. **Methods.** At baseline in 2011/12, OPT-IN recruited adult smokers age 18–64 from the administrative databases of the state-subsidized Minnesota Health Care Programs (N = 2406). We tested whether nicotine dependency, type of cigarettes used, and smoking intensity were associated with self-reported difficulty affording food, healthcare, housing, and living within one's income. All regression models were adjusted for race, education, income, age, and gender. **Results.** Difficulty living on one's income (77.4%), paying for healthcare (33.6%), paying for housing (38.4%), and paying for food (40.8%) were common conditions in this population. Time to first cigarette and cigarettes smoked per day predicted financial stress related to affording food, housing, and living within one's income (all $p < 0.05$). For instance, those whose time to first cigarette was greater than 60 minutes had about half the odds of reporting difficulty paying for housing compared to those who had their first cigarette within five minutes of waking (adjusted odds ratio = 0.55 [95% CI: 0.41, 0.73]). Type of cigarette used was not associated with any type of financial stress/strain. **Conclusions.** Smoking and particularly heavy smoking may contribute in an important way to the struggles that low-income households with smokers face in paying for necessities.

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Introduction

The burden of smoking's harms tend to disproportionately threaten those in society with fewer resources and advantages (U.S. Department of Health and Human Services, 2014). In 2013, the prevalence of smoking among US adults living at or below the US Census poverty threshold was 80% greater than that of those living above the poverty line (33.8% compared to 18.7%) (Jamal et al., 2014). This elevated prevalence is in part due to the reality that compared to more advantaged smokers, over time disadvantaged smokers have a lesser likelihood of quitting (Kotz and West, 2009; Kendzor et al., 2010). Given this, low-income smokers are a priority population for whom tobacco cessation efforts require further development, adaptation, and innovation.

In addition to dramatic adverse health effects, cigarette use is also an expensive behavior that may have a broader impact on the wellbeing of smokers with limited financial resources. In December 2014, the average price per pack of cigarettes in the US was \$6.18 (Boonn, 2014), which means that a household consuming a pack of cigarettes per day would be paying just over \$2,250 per year for cigarettes – or approximately 10% of the annual income for a two-adult, two-child household living at the US Census poverty threshold (DIS US Census Bureau, n.d.). In many low-income households the portion of a household's budget devoted to purchasing cigarettes is even greater. For instance, Farrelly and colleague estimated that in New York state, a market where cigarette prices are relatively high, low-income households (< \$30,000 per year) with smokers spend approximately 24% of their annual household income on cigarettes (Farrelly et al., 2012). As such, a low-income household that includes even one smoker could see a substantial proportion of its disposable income consumed by cigarette purchases.

Low-income households often struggle to access necessities such as food, housing, and healthcare; if resources are being diverted from these

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needs to purchase cigarettes, these households will likely experience even more intensified financial strain as tobacco spending supplants other expenditures (Busch et al., 2004). Due to a variety of structural factors, financial strain for low-income household is typically not transient and can be a long-term stressor. Indeed, both individuals and households that spend more on tobacco are more likely to report financial stress and strain (Siahpush et al., 2003, 2012; Pyle et al., 2007). Households with smokers have been shown to accumulate less wealth over time. An analysis that examined four waves of the National Longitudinal Survey of Youth 1979 Youth Cohort revealed that each year an adult spent as a smoker resulted in a 4% wealth reduction compared to non-smokers in the sample (Zagorsky, 2004). There is cross-sectional evidence that tobacco use is associated with food insecurity or difficulties in accessing adequate food (Cutler-Triggs et al., 2008; Armour et al., 2008; McIntyre et al., 2000; Widome et al., 2014; Bocquier et al., 2015; Tolzman et al., 2014; Iglesias-Rios et al., 2013; Hood et al., 2013). Further, smoking households spend less on housing than non-smoking households (Busch et al., 2004) and households with smokers are more likely to have insufficient emergency funds (Grafova, 2011). Quitting smoking has been shown to reduce financial stress (Siahpush et al., 2007a,b). Of note, the purchase price of cigarettes is not the only excess costs that smokers, compared to non-smokers, incur throughout their lives. Smoking is also related to financial strain through smoking-caused diseases (Brook and Zhang, 2013) which often have very high healthcare costs and can curtail the sufferer's income-earning years (Yelin et al., 2006; Tinkelman et al., 2005). The result of households not accessing adequate necessities could include poorer diet, delayed treatment for health issues, and other negative consequences that have additional important health implications beyond the direct harm that cigarette smoking does to active and passive smokers.

The causal relationships between financial strain and smoking are likely not entirely unidirectional. Smoking can be used by smokers as a way to cope with life's stressors. Some have viewed financial strain as a stressor and risk factor for smoking (Advani et al., 2014). Evidence for this includes an observational examination of increases in financial strain over time which corresponded with greater odds of smoking in some populations (Shaw et al., 2011). Additionally there is evidence that smokers experiencing financial strain have more difficulty quitting, likely due to increased day-to-day stress (Kendzor et al., 2010; Siahpush and Carlin, 2006). Furthermore, the onset of financial strain increases the probability that a former smoker will relapse (Grafova, 2011).

Use of menthol products also may relate to financial strain. Menthol cigarettes have been traditionally and successfully marketed at disadvantaged populations including low-income neighborhoods (Laws et al., 2002; Seidenberg et al., 2010; Widome et al., 2013) and are much more commonly used by Blacks and lower-income individuals (Caraballo and Asman, 2011). Given this demographic pattern of menthol use it is possible that those who use menthol cigarettes are among those who experience the most financial stress.

The objective of this analysis was to describe how various smoking behaviors were related to different types of financial stress in a low-income population. The cross-sectional analysis used baseline data from a smoking cessation trial in low-income smokers covered by government insurance. We hypothesized that more frequent smoking, greater cigarette consumption, greater nicotine dependency, and being a menthol smoker would all be associated with 1) greater financial strain, 2) greater financial stress in the domains of housing and food, and 3) similar financial stress around healthcare, a stressor which we posited would be uncommon due to this population's participation in government insurance. Specifically we aimed to add to the existing literature on smoking and financial stress/strain by simultaneously examining different realms of stress/strain and testing whether menthol users were at greater risk. Our sample, composed exclusively of low-income smokers was uniquely suited to this question. Our goal was to replicate previous findings with more fine-grained detail.

Methods

Design

OPT-IN is a randomized controlled trial investigating whether proactive tobacco cessation outreach can increase tobacco abstinence and tobacco treatment utilization among low-income smokers (Fu et al., 2014). The study recruited English-proficient adult (age 18–64) smokers (smoked in past 30 days) enrolled in the Minnesota Health Care Programs (MHCP), a set of state-subsidized insurance program for low-income Minnesotans. (Income and asset eligibility guidelines for the MHCP can be found here: <https://edocs.dhs.state.mn.us/lfserver/Public/DHS-3461A-ENG>) OPT-IN baseline survey data, which was used for this present analysis, was collected prior to randomization using a modified-Dillman (Dillman, 2000) procedure to maximize response. Potential participants were first mailed an invitation and introduction letter. A second letter contained consent materials, questionnaire, a \$2 cash incentive, and business-reply envelope. A reminder/thank you letter was mailed one week later. Two weeks after the initial survey mailing, a second survey was mailed to non-responders. Among the 21,181 individuals initially mailed surveys, 9,362 returned a survey and from these 6,826 did not meet OPT-IN inclusion criteria and 130 expressed they did not want to participate. This resulted in 2,406 individuals who were randomized and which were included in this present analysis. All procedures were approved by the University of Minnesota institutional review board prior to the start of the study.

Measures

Three OPT-IN baseline survey items addressed financial stress in specific areas: Participants were asked to report how often in the past 12 months they were worried or stressed about having enough money to: 1) "...get the health care you or your family needed," 2) "...pay your rent or mortgage," and 3) "...buy healthy food." For these three items participants selected from the following options, which we then grouped into the following two levels, 1) "Frequently experiencing strain" which included those who responded with "almost always," or "usually," or 2) "Infrequently experiencing strain" which included those who responded, "sometimes," "rarely," or "never." There was a fourth item on overall financial strain, "How difficult is it for you to live on your total household income right now?" These response options were dichotomized into 1) "Difficult" which included, "very difficult," and "difficult," and 2) "Not difficult," which included the options, "not difficult," "easy," or "very easy."

Smoking behavior survey measures included frequency and type of cigarette use as well as level of nicotine dependence. Participants were asked if they usually smoked menthol, non-menthol, or both types of cigarettes. They were also asked to report the number of the past 30 days on which they smoked cigarettes, how many cigarettes they smoked per day on average and how soon after waking up they typically smoke their first cigarette. The potential confounders of race/ethnicity, gender, age, education level and income were also assessed on the OPT-IN questionnaire.

Analysis. We summarized demographics, smoking behavior measures, and proportion of participants who reported financial strain in each category. We used logistic regression to model the associations between smoking behaviors and financial strain adjusted for the demographic and socio-economic status measures discussed above. We calculated adjusted odds ratio and 95% confidence intervals (95% CI) for the predictor-outcome relationships of interest from these models. All analyses were performed with SAS 9.2 (SAS Institute Inc., Cary, NC).

Results

Difficulty living on one's income (77.4%), paying for healthcare (33.6%), paying for housing (38.4%), and paying for food (40.8%) were

commonly reported in this population. Table 1 shows unadjusted bivariable associations where those at lower incomes were more likely to report these issues (all $p < 0.01$). Those who had more frequent concern about living on their income tended to be older ($p = 0.006$). Women and non-whites were more often concerned about paying for food. Blacks reported more concern about paying for healthcare ($p = 0.027$).

Nicotine dependence (measured by time to first cigarette and the number of cigarettes smoked per day) was associated with concerns about paying for housing and paying for food (Table 2). For instance the odds of reporting frequent concern about paying for housing and food were 22.1% and 19.0% greater respectively per 10 additional cigarettes per day. While the number of day sin the past 30 days that a participant smoked did not predict financial stress in any of the three specific areas, it was significantly associated with the overall measure of financial strain that asked participants to report difficulty in living on total household income. No predictor behaviors showed significant association with affording healthcare and cigarette type was not associated with any specific measure of financial stress or overall financial strain.

In the multivariable models reported in Table 2, income and employment were consistently significantly associated with reporting financial strain, income was consistently associated with stress about paying for housing, and income and gender were both consistently associated with stress about paying for food (no covariates were associated with stress about paying for healthcare).

Discussion

We found that those smokers who reported greater nicotine dependence and those who reported smoking more cigarettes per day were more likely to report both difficulty living within their household's income restraints and greater concern about affording food and housing. Contrary to our hypothesis, cigarette type (menthol vs. non-menthol) was not associated with any measure of financial stress.

We expected that menthol smokers might experience more economic struggles than non-menthol smokers. We had postulated that even in this low-income sample, menthol smokers may have even fewer resources, due to the tobacco industry's practice of targeting menthol product marketing in low-income neighborhoods (Laws et al., 2002; Seidenberg et al., 2010; Widome et al., 2013). Perhaps we might have observed that menthol smokers experienced more financial stress in a sample where income levels varied more. But given that all of the participants in this study qualified for subsidized health insurance, there may have been a relatively even reception of types of tobacco marketing across the income levels, although this was not measured.

None of the cigarette consumption behaviors were associated with concern about affording healthcare. This contrasts with other findings of struggling in other domains. Interestingly, paying for healthcare actually was endorsed by about a third of the sample as a source of stress in this sample even though the entire sample was drawn from MHCP and was thus insured. We had assumed that stress around paying for

Table 1
Demographics of OPT-IN sample by financial concern category, unadjusted. OPT-IN 2011/12; n = 2406.

	DIFFICULTY LIVING ON HOUSEHOLD INCOME					CONCERN ABOUT AFFORDING HEALTHCARE					CONCERN ABOUT PAYING FOR HOUSING					CONCERN ABOUT PAYING FOR FOOD				
	Frequently		Infrequently		p	Frequently		Infrequently		p	Frequently		Infrequently		p	Frequently		Infrequently		p
	n	%	n	%		n	%	n	%		n	%	n	%		n	%	n	%	
Education																				
< High school grad	256	14%	62	12%	0.063	111	14%	206	13%	0.905	131	15%	186	13%	0.471	134	14%	184	13%	0.549
High school or GED	584	32%	182	35%		251	32%	514	33%		291	32%	483	34%		287	30%	483	35%	
Some college	769	43%	200	38%		324	42%	646	42%		379	42%	591	41%		429	45%	542	39%	
College grad	110	6%	50	10%		51	7%	109	7%		48	5%	113	8%		54	6%	107	8%	
Grad or prof. degree	80	4%	31	6%		39	5%	70	5%		47	5%	63	4%		48	5%	62	4%	
Total	1799		525			776		1545			896		1436			952		1378		
Income																				
<10,000	720	41%	125	25%	<0.001	301	39%	543	36%	0.008	360	41%	485	35%	<0.001	381	40%	464	35%	<0.001
\$10,001-20,000	581	33%	136	27%		250	32%	467	31%		300	34%	417	30%		326	35%	389	29%	
\$20,001-40,000	357	20%	128	26%		162	21%	322	22%		180	20%	310	22%		188	20%	302	23%	
\$40,001-60,000	86	5%	69	14%		46	6%	107	7%		37	4%	119	9%		39	4%	118	9%	
\$60,000-80,000	17	1%	30	6%		11	1%	36	2%		8	1%	40	3%		7	1%	41	3%	
> \$80,000	10	1%	12	2%		2	0%	20	1%		3	0%	19	1%		2	0%	20	1%	
Total	1771		500			772		1495			888		1390			943		1334		
Employed for wages																				
Yes	730	40.4	294	55.8	<0.001	351	44.9	671	43.4	0.496	386	43.0	642	44.5	0.490	400	41.9	631	45.6	0.076
No	1075	59.6	233	44.2		431	55.2	875	56.6		511	57.0	801	55.5		555	58.1	753	54.4	
Total	1805		527			782		1546			897		1443			955		1384		
Sex																				
Male	507	28%	177	34%	0.009	219	28%	461	30%	0.447	241	27%	442	31%	0.058	227	24%	455	33%	<0.001
Female	1297	72%	343	66%		555	72%	1085	70%		651	73%	998	69%		722	76%	927	67%	
Total	1804		520			774		1546			892		1440			949		1382		
Race/ethnicity																				
White	1511	84%	449	85%	0.384	641	82%	1316	85%	0.059	750	83%	1216	84%	0.440	783	82%	1184	86%	0.021
Non-white	296	16%	78	15%		141	18%	232	15%		151	17%	224	16%		172	18%	200	14%	
Total	1807		527			782		1548			901		1440			955		1384		
Black	199	11%	45	9%	0.103	97	12%	146	9%	0.027	95	11%	148	10%	0.837	109	11%	131	9%	0.127
Non-Black	1608	89%	482	91%		685	88%	1402	91%		806	89%	1292	90%		846	89%	1253	91%	
Total	1807		527			782		1548			901		1440			955		1384		
American Indian or Alaska Native (AI/AK)	141	8%	42	8%	0.900	50	6%	132	9%	0.070	64	7%	119	8%	0.309	77	8%	105	8%	0.673
Non-AI/AK	1666	92%	485	92%		732	94%	1416	91%		837	93%	1321	92%		878	92%	1279	92%	
Total	1807		527			782		1548			901		1440			955		1384		
Other race/ethnicity	94	5%	32	6%	0.440	52	7%	74	5%	0.060	53	6%	72	5%	0.340	51	5%	74	5%	1.000
No other race/ethnicity	1735	95%	502	94%		740	93%	1493	95%		851	94%	1381	95%		909	95%	1320	95%	
Total	1829		534			792		1567			904		1453			960		1394		
Age (mean)	37.1		35.4		0.006	37.4		36.4		0.071	36.2		37.2		0.065	37.1		36.6		0.351

Note: Category totals less than 2,406 due to missing values.

Table 2

Associations between cigarette use behavior and self-reported financial strain. All models adjusted for race, gender, age, education, employment status, and income. OPT-IN 2011/12; n = 2406.

	AOR	95% CI	
DIFFICULTY LIVING ON HOUSEHOLD INCOME			
Cigarette type			
Both	ref		
Menthol	0.827	0.527	1.297
Non-menthol	0.774	0.507	1.180
Number of past 30 days smoked*	1.026	1.073	1.048
Time to first cigarette*			
<5 min	ref		
6–15 min	0.881	0.649	1.197
16–30 min	0.812	0.561	1.177
31–60 min	0.759	0.518	1.113
>60 min	0.494	0.353	0.692
Cigarettes per day (unit = 10 cigs)*	1.407	1.216	1.629
CONCERN ABOUT AFFORDING HEALTHCARE			
Cigarette type			
Both	ref		
Menthol	1.000	0.693	1.443
Non-menthol	0.927	0.657	1.308
Number of past 30 days smoked	1.004	0.989	1.020
Time to first cigarette*			
<5 min	ref		
6–15 min	0.995	0.782	1.265
16–30 min	1.089	0.828	1.460
31–60 min	0.766	0.573	1.064
>60 min	0.940	0.736	1.256
Cigarettes per day (unit = 10 cigs)	1.087	0.997	1.211
CONCERN ABOUT PAYING FOR HOUSING			
Cigarette type			
Both	ref		
Menthol	1.092	0.765	1.558
Non-menthol	0.931	0.667	1.299
Number of past 30 days smoked	1.006	0.992	1.022
Time to first cigarette*			
<5 min	ref		
6–15 min	0.872	0.691	1.100
16–30 min	0.853	0.641	1.137
31–60 min	0.670	0.489	0.917
>60 min	0.550	0.412	0.733
Cigarettes per day (unit = 10 cigs)*	1.221	1.098	1.358
CONCERN ABOUT PAYING FOR FOOD			
Cigarette type			
Both	ref		
Menthol	1.016	0.711	1.452
Non-menthol	0.961	0.688	1.344
Number of past 30 days smoked	0.999	0.984	1.013
Time to first cigarette*			
<5 min	ref		
6–15 min	0.898	0.711	1.133
16–30 min	0.741	0.555	0.990
31–60 min	0.736	0.538	1.006
>60 min	0.670	0.505	0.890
Cigarettes per day (unit = 10 cigs)*	1.190	1.070	1.323

* Indicates significant differences at the $p < 0.05$ level.

healthcare in this particular population would be lower than stress related to paying for other necessities, but instead nearly similar percentages reported stress about paying for food (40.8%) and housing (38.4%). Given this, it is unclear why stress around paying for healthcare would not be higher in households that have greater expenditures on cigarettes in the same way that stress about paying for food and housing was elevated. One explanation may be that households have very few out-of-pocket healthcare expenses while they are enrolled in a MHCP program and high spending on cigarettes might not impact ability to pay these expenses. Instead, stress about paying for healthcare may come from concern about becoming ineligible for the program which would not be a direct consequence of consuming a greater number of cigarettes.

The issue of the cost of tobacco in households with smokers crowding out spending on necessities is highly relevant and will likely

become even more pressing as the price of tobacco products climbs. In recent years, due to a steady trend of increasing federal and local tobacco excise taxes and tobacco industry price increases, cigarette pack prices have been increasing. On one hand more expensive cigarettes has been a positive for public health as the evidence is clear that higher tobacco prices both encourage users to quit tobacco use and reduce tobacco initiation in young people (Chaloupka et al., 2011). But there are data suggesting that price increases on packs of cigarettes have not been effective at reducing income-based disparities in smoking prevalence (Farrelly et al., 2012; Franks et al., 2007). Further, while there is a long history of economic disparity and inequality in the US which has serious impacts on health, in recent years in the US, more Americans have been experiencing financial stress and strain due to the impact of the Great Recession. If low-income individuals are not able to reduce their tobacco spending as prices rise, there may be negative, unintended consequences including poor diet or living in substandard housing, which has health implications, potentially further widening chronic disease disparities.

This study has several notable limitations. First, since we used cross-sectional data we were not able to determine if a change in cigarette consumption preceded a change in financial stress or if the reverse was occurring. There are compelling arguments for the direction of causality to run both directions. Additionally, the questionnaire had just one item measuring each domain of financial stress. We were not able to delve further to determine how much strain was present in individuals' households; for instance, we do not know if the reported stress around affording food is actually connected to food insecurity. All measures were self-report and as such they may be measured with error. Finally a limitation is that we did not collect information on how much participants actually spent on their cigarettes.

Despite the limitations of this study, we do feel it adds to the body of evidence linking smoking to financial stress and strain. It is critically important to develop policy approaches that can encourage smokers to quit and policies that can help strengthen financial security for economically fragile households. Potentially, policy approaches, such as those that increase the reach of effective tobacco cessation programs, could achieve both goals which would in turn benefit health in many ways.

Nicotine dependence is very difficult to overcome and even though cigarettes are expensive products, smoking remains stubbornly prevalent among low-income individuals who are subsisting on minimal resources. Given this, it is important to understand how tobacco spending impacts household abilities to obtain necessities. Interventions and policy approaches that can effectively mitigate the negative effects of tobacco spending while successfully promoting tobacco cessation are a needed solution for households whose resources are being syphoned away by tobacco.

Conflict of interest statement

The authors declare there is no conflict of interest.

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