Brief report

Predictors of Smoking Cessation in Old–Old Age

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Abstract

Introduction: There is a dearth of knowledge on smoking cessation in older adults. This study examined predictors of smoking cessation in persons over age 75.

Methods: This study is a secondary analysis of a prospective longitudinal study. A sample of 619 older persons aged 75–94 was drawn from a representative cohort of older persons in Israel and was examined longitudinally. By means of interviews, we assessed smoking, health, Activities of Daily Living (ADL), Instrumental ADL, cognitive dysfunction, and well-being.

Results: Continuing smokers tended to be lonelier. Participants who quit smoking took more medications and had greater cognitive dysfunction compared to those who continued smoking.

Conclusions: Greater cognitive dysfunction and high medication use or the physical causes for high medication use may precipitate smoking cessation in persons aged 75–94, potentially through a greater influence of caregivers on one's lifestyle.

Implications: Cognitive dysfunction and high medication use predicted smoking cessation. Smoking cessation for long time smokers may be influenced by greater ill health. Influence of caregivers may augment smoking cessation. Given these findings, for persistent smokers into old age, smoking cessation may occur at the time of physical and functional decline during the end of life period.

Introduction

Tobacco use reduces life-expectancy by 15 years on average,[1] while smoking cessation positively impacts one's current and future health.[2] Estimates of smoking prevalence in the United States revealed that smoking is less prevalent amongst individuals aged 65 and older (9.3%) compared to persons between the ages of 45–64 (22.6%).[3] Nevertheless, smoking cessation was found to be associated with life expectancy benefits in older adults. Smokers who quit around age 60 gained about 3 years of life expectancy compared to continuing smokers.[4]

Older persons face many challenges to successful smoking cessation. They underestimate the harms of smoking and overestimate its benefits, compared to younger counterparts.[5] Other characteristics of older smokers which may hinder smoking cessation include long smoking history, likelihood of social isolation, low activity levels, lower income and education, and residence in deprived socioeconomic areas.[6–8] Nonetheless, older persons have cessation rates similar to those of younger smokers.[9] Predictors of successful smoking cessation over age 60 included living with others, abstinence from alcohol, shorter smoking history, a history of smoking more cigarettes daily than those who do not quit,[10] as well as unimpaired executive cognitive function.[11] The proportion of smokers provided with smoking cessation advice may decline with age.[12,13] Having a new chronic condition was a significant predictor of smoking cessation in those ages 61–75 but not among people age 50–60.[14]

There is a dearth of knowledge on smoking cessation in persons over 75 years of age, and information concerning smoking initiation or relapse patterns in old age is also scant.[15] This article aims to examine smoking cessation and smoking initiation or relapse patterns in persons 75 years of age or older, by examining a longitudinal dataset. We hypothesize that:

1. Given cohort comparison findings,[16] when examined longitudinally, the proportion of current smokers will decrease from wave 1 to wave 2.
2. Smoking cessation will be predicted by cognitive dysfunction and health measures indicative of poor health, as measured in each wave. This is in line with Cicirelli's[17] transition model of death fears and death acceptance, which suggests that cognitive and health declines in old age lead to increased awareness of one's limited lifespan and consequently to increased fear of death. The reality of impending death may increase the will to stop smoking.

Methods

Participants and Procedure

The sample was part of the Cross-Sectional and Longitudinal Aging Study (CALAS) which conducted a multidimensional assessment of a random sample of the older Jewish population in Israel, stratified by age group (75–79, 80–84, 85–89, 90–94), gender, and place of birth (Asia–Africa, Europe–America, Israel). This study examines two waves of longitudinal data (wave 1: 1989–1992; wave 2: 1993–1994) with an average gap of 3.5 years between the waves. More information regarding the CALAS can be found elsewhere.[18–22]

The present analysis includes only self-respondent participants interviewed in person in wave 2 for whom smoking status data were available (*n* = 619). Interviews were conducted in the participant's home after the participant had signed an informed consent form.

The CALAS was approved for ethical treatment of human participants by the Institutional Review Board of the Chaim Sheba Medical Center in Israel.

Measures

Background

Sociodemographics include gender, age, place of birth, marital status, having children, education, and financial situation.

Smoking

Based on the Established Populations for Epidemiological Studies of the Elderly (EPESE) questionnaire,[23] "Current smoking status" was determined by the item: "do you smoke? (yes, no)," and "Former smoker status" was determined by the item: "did you smoke in the past? (yes, no)" in combination with a currently nonsmoking status. Participants who were classified as a smoker in wave 1 and as a former smoker in wave 2 were considered as participants who had quit smoking.

Health

Number of medications refers to all medications taken by participants as inspected and counted by the interviewer (range 0–8). Comorbidity was assessed by the number of positive diagnoses from a list of 18 chronic diseases (eg, diabetes mellitus, Parkinson's disease; range: 0–18).

Activities of Daily Living

Activities of Daily Living (ADL)[24] was assessed by asking respondents to rate their difficulty in performing seven different vital activities (eg, crossing a small room, washing) on a scale from "no difficulty" (0) to "complete disability" (3). The sum score ranged from 0 to 21. Cronbach's alpha coefficient of this measure was 0.88 in the CALAS. Instrumental Activities of Daily Living (IADL)[25] is a scale consisting of seven items, each rating the difficulty of performing different activities (eg, preparing meals, daily shopping) on a scale similar to that used for ADL (range: 0–21). Cronbach's alpha coefficient of this measure was 0.87.

"Cognitive dysfunction" was measured by the Orientation-Memory-Concentration Test (OMCT).[26] Seven items tested basic cognitive functions such as knowing the current date and time, and counting backwards. The final score has a range of 0–28 (no dysfunction (0–8), some dysfunction (9–19), full dysfunction (20–28).[27] Alpha coefficient was 0.73.

Well-being

Depressed affect was measured by the Center for Epidemiological Studies Depression Scale (CESD).[28] The score was the respondents' mean rating after reversing four positive items (range: 0–3). Alpha coefficient was 0.88. Item 10 was removed from the analysis and was treated as a separate variable to measure "loneliness." This item asked whether the respondent had felt lonely in the last month. The score ranged from 0 to 3 (no, sometimes, most of the time, or almost every day). This approach had been used in previous work,[29] as this item is equivalent to other one-item measures of loneliness.[30]

Results

The Longitudinal Change From Wave 1 to Wave 2

Out of the 619 participants who reported on their smoking in both waves of the study, 62 (10%) reported smoking at wave 1. These participants were predominantly male (72.6%) and had a mean (*SD*) age of 82.29 (4.89). Their mean (*SD*) number of medications was 1.98 (1.98), and the means of cognitive dysfunction 6.67 (6.50). Of these 62 participants, 44 (71%) reported still smoking in wave 2, while 18 (29%) reported no longer smoking in wave 2. The characteristics of these two groups of former and continuing smokers are shown in Table 1.

Of the 619 participants for whom smoking data were available for both waves, over half had never smoked, and 221 (36%) reported quitting after smoking in the past. Six participants (1%) reported quitting in wave 1 but smoking again in wave 2.

Predictors of Smoking Cessation From Wave 1 to Wave 2

Participants who quit smoking had greater cognitive dysfunction and were taking significantly more medications in both wave 1 and wave 2 than those who continued smoking (Table 1). Those who continued smoking reported a greater degree of loneliness than those who quit smoking, but the difference reached significance only for loneliness levels in wave 2. No significant differences were seen for comorbidity, ADL, IADL, and depressed affect.

Cognitive dysfunction and number of medications were significant predictors of smoking cessation in logistic regression analyses based on wave 1 predictors, as well as on wave 2 predictors (Table 2). Loneliness in wave 2 approached significance (*P* = .06) as a predictor. Given the lack of significant bivariate correlations, comorbidity, ADL, IADL, and depressive affect were not entered in the regression analysis.

Smoking Relapse From Wave 1 to Wave 2

No nonsmokers in wave 1 reported smoking in wave 2. However, six participants who had reported being former smokers in wave 1 reported smoking again in wave 2. These participants were all male,

Table 1. Comparison of Demographics, Health, Cognitive Dysfunction, and Well-being of Smokers in Wave 1 by Smoking Status in Wave 2

	Smokers in wave 1—CALAS)*n* = 62)					
	Measures of wave 1 *M(SD)*/ %			Measures of wave 2 *M(SD)*		
	Former smokers in wave 2 (*n* = 18)	Continuing smokers in wave 2 (*n* = 44)	$t_{(df)}$/ $\chi^2_{(df)}$	Former smokers in wave 2 (*n* = 18)	Continuing smokers in wave 2 (*n* = 44)	$t_{(df)}$
Age	82.83 (4.76)	82.07 (4.98)	$t_{(60)}$ = 0.56			
Gender: males	77.80	70.50	$\chi^2_{(1)}$ = 0.34			
Years of smoking	59.40 (10.78)	56.34 (16.65)	$t_{(54)}$ = 0.66	61.40 (10.95)	59.54 (15.62)	$t_{(54)}$ = 0.42
Depressed affect	0.69 (0.38)	0.67 (0.39)	$t_{(59)}$ = 0.26	0.66 (0.36)	0.83 (0.48)	$t_{(59)}$ = 1.36
Number of medications	2.94 (2.46)	1.59 (1.62)	$t_{(60)}$ = 2.55*	4.11 (2.35)	2.18 (1.81)	$t_{(26)}$ = 3.13**
Cognitive dysfunction	10.28 (8.06)	5.16 (5.11)	$t_{(23)}$ = 2.49**	12.44 (7.80)	8.20 (6.48)	$t_{(60)}$ = 2.20*
Loneliness	0.50 (0.92)	0.72 (1.08)	$t_{(59)}$ = 0.76	0.44 (0.70)	0.98 (1.10)	$t_{(49)}$ = 2.25*

CALAS = = Cross-Sectional and Longitudinal Aging Study. Other comparisons of demographic and health variables did not yield statistically significant results (in both waves): comorbidity, activities of daily living, and instrumental activities of daily living.
*$P_{\text{two-tailed}}$ < .05; **$P_{\text{two-tailed}}$ < .01.

Table 2. Logistic Regression Analysis: Prediction of Smoking Cessation From Wave 1 to Wave 2 Based on Wave 1 and Wave 2 Data (*n* = 62)

	Wave 1 predictors		Wave 2 predictors	
Independent variables	Exp(b)	95% confidence interval	Exp(b)	95% confidence interval
Demographics				
Age	1.04	0.91–1.20	1.02	0.89–1.18
Gender (female/ male)				
Male	2.01	0.36–11.13	2.22	0.38–13.13
Origin (Israel/ East/ West)				
East	0.23	0.02–2.18	0.64	0.09–4.84
West	0.80	0.09–5.99	0.83	0.10–6.97
Health and cognitive dysfunction				
Number of medications	1.45*	1.09–2.20	1.51*	1.09–2.09
Cognitive dysfunction	1.22*	1.04–1.44	1.16*	1.02–1.32
Well-being				
Loneliness	0.58	0.26–1.26	0.42; *P* = .06	0.17- 1.03

Dependent variable: quit smoking from wave 1 to wave 2. Comorbidity, activities of daily living, instrumental activities daily living, and depressed affect were not included in the regression due to the lack of significant bivariate correlations.
*$P_{\text{two-tailed}}$ < .05.

with an average age in wave 1 of 82. The small sample size did not allow for statistical analysis to compare this group to others.

Discussion

Our findings show that persons over 75 years of age who quit smoking took more medications and had a lower cognitive performance than those who continued smoking. In addition, we found that continuing smokers tended to be lonelier than those who quit smoking.

Our finding that cognitive dysfunction was significantly predictive of a successful smoking cessation disagreed with a previous study of older persons, where a different measure of cognitive status, that is, the Mini Mental State Examination,[31] did not predict smoking cessation, while Executive Cognitive Function (ECF) as measured by the Behavioral Dyscontrol Scale[32] did.[11] The findings of our study and that with the ECF are in opposite directions, in that the ECF study found that more intact people were better able to stop smoking, while the findings here indicate that more dysfunction is associated with smoking cessation. This discrepancy may be due to differences in study samples: the ECF study included mostly younger participants with an age range between 60 and 99 and a mean of 74 years (compared to 75–99 in this study) and 58% of

the participants were Hispanic (compared to a more diverse ethnic background in this study). Also differences in measures of cognitive functioning might explain the discrepancy.

Evidence from studies of older inpatients regarding the correlation between Mini Mental State Examination and measures of ECF is inconclusive. While some findings suggest the Mini Mental State Examination is a poor indicator of ECF,[33] others report a very high correlation between Mini Mental State Examination and Behavioral Dyscontrol Scale scores.[34] Considering that current findings suggest that cognitive dysfunction may play a significant role in promoting smoking cessation in older persons, future studies should examine the role of different cognitive functions in smoking cessation.

The findings are consonant with Haas et al.[35] who describe a cross-sectional sample of disabled community older persons (ages 55–104) who entered On Lok Senior Health Services. They found that current smokers (mean age 74.5) were more independent on ADL tasks that are instrumental in procuring cigarettes in comparison to former (mean age 77.8) and never (mean age 80.8) smokers. Although our results did not detect significant differences in ADL or IADL, they point to the same general finding, that is, those who quit manifest deficiencies that may prevent them from procuring

cigarettes. Our study adds to Haas et al's by providing longitudinal rather than cross-sectional results, by focusing on a somewhat older population (75–94), and by basing the results on a representative sample rather than that of frail persons entering a program for those at risk for institutionalization.

Older persons who quit smoking experienced less loneliness than their currently-smoking counterparts, in line with prior findings that social isolation is more often experienced by older smokers compared to nonsmokers.[6] Finally, those who quit smoking used more medications compared to those who continued to smoke, which may indicate poorer health in the former group. This finding is in line with earlier studies describing smoking cessation in 40% of those diagnosed with heart disease.[36] Taken together, these findings indicate that cognitive dysfunction and medication use, as well as social support, were associated with smoking cessation.

Our findings regarding increases in cognitive dysfunction and medication use and decrease in loneliness among quitters suggest that they may have more daily care support, which may be associated with greater social pressure to quit smoking or more external control over cigarette use, as well as with more social contact.

Participants were a select subgroup of older persons in that they survived to age 75 and over, that is, probably many of the smokers in their original cohort have already passed away due to causes related to smoking because of higher mortality among those who smoke more,[37,38] as well as the impact of smoking on multiple disease systems which may have rendered smokers unable to self-report in wave 2 or to be institutionalized.

The current study is, to our knowledge, the first study to examine longitudinal changes in the smoking habits in a representative sample of older persons between the ages of 75–94 years. Findings raise the possibility that greater cognitive dysfunction and high medication use or the physical causes for high medication use may precipitate smoking cessation in persons aged 75–94, through a greater influence of caregivers on one's lifestyle and a decrease in the ability to procure cigarettes. This hypothesis should be examined in future research utilizing a larger sample. The fact that these older smokers seem not to quit smoking until they are forced to do so poses questions about the potential utility of smoking cessation in this population, as well as its cost benefit given the long term exposure to smoking.[37] Programs that try to induce these long-term smokers to quit may do well to utilize these findings and emphasize the potential for postponement of disability through earlier smoking cessation. The study also contributes to the limited evidence on smoking relapse in old age. Given the high prevalence of cognitive dysfunction in old age, future studies are needed in order to elucidate both cognitive and social mechanisms that facilitate smoking cessation in older persons.

Funding

Declaration of Interests

None declared.

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