

Depression, Quality of Life and Smoking in Late Adulthood

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Abstract

Objectives: To examine whether depression and quality of life among adults aged 50 and older measured at Time 1 predicts smoking measured at Time 2, adjusting for several confounders.

Methods: Data were drawn from the first two waves of the Survey of Health, Ageing and Retirement in Europe (SHARE). The survey included 19,761 individuals who participated in both waves from 11 European countries and Israel. EURO-D 12-item scale measured depression. Quality of life was measured by 12 items originating from the CASP-19.

Results: At Time 1, 18.6% of participants smoked, and 17.3% smoked at Time 2. More than eighty percent of the smokers at Time 1 were also smokers at Time 2, and 2.9 % who did not smoke at Time 1 became smokers at Time 2. At Time 1 and Time 2, 25.1% and 23.5%, respectively, were depressed. Depressed individuals at Time 1 were 1.26 (95% CI = 1.07 - 1.49) more likely to smoke at Time 2. Lower levels of quality of life at Time 1 moderately predicted smoking at Time 2 (OR = .98; 95% CI = .96 - .99). High financial distress was a robust predictor of smoking at Time 2 (OR=1.18; 95% CI = 1.14 - 1.23).

Conclusions: Depression is a risk factor for smoking throughout the lifecycle and not only in emerging adulthood. Smoking cessation interventions in late adulthood should target depressed and low-income individuals.

Keywords: Depression; Quality of Life; Smoking; Adulthood

Introduction

Depression in adulthood is a commonly occurring, serious disorder associated with diminished functioning, reduced quality of life, physical illness and mortality [1]. Rates of depression disorder in late adulthood range from 10% to 20% [2]. Recent nationally representative data from US adults aged 55 years and older revealed that 13.8% of older adults met the criteria for subsyndromal depression, and 13.7% met the criteria for major depressive disorder [3]. Smoking is a hazard to individual and public health, and is associated with greater likelihood of mortality compared to non-smoking [4,5]. The prevalence of daily smoking among adults in European countries ranges from 11% in Sweden to 44% in Austria [6]. Depression is considered to be a risk factor for smoking [7,8]. For example, a large-scale cross-sectional study among adults based on the US National Survey on Drug Use and Health dataset showed that 29% of current cigarette smokers reported lifetime anxiety and/or depression. One in three individuals with depression and/or anxiety reported current smoking, and depressed individuals were more likely (than non-depressed or anxious individuals) to report heavy smoking and nicotine dependence [9]. Yet studies conducted among adolescents and young adults have found inconsistent results. While cross-sectional studies among college students have reported that higher rates of depressive symptoms significantly predicted higher rates of cigarette smoking [10] longitudinal studies have found mixed results, ranging from comorbidity of smoking and depression without clear direction

of causality [11] to evidence that smoking precedes depression and not vice versa [12] through no association, or even reverse associations, between depression and smoking. For example, a large-scale, birth-cohort longitudinal study in Australia found that depression and anxiety disorders at age 5 and 14 predicted lower rates of smoking at age 21, although the effect was small [13]. Longitudinal studies addressing this link in mid- and late adulthood are rare [9]. Thus, the link between depression and smoking, especially in late adulthood, is far from clear.

Quality of life

Health-related (physical and mental) quality of life (HRQOL) has been found to be inversely associated with smoking [14,15]. A large-scale longitudinal study based on the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) in the US found that regular nicotine use was associated with greater risk for lower HRQOL in the cross-sectional analyses, and that regular nicotine use was predictive of decline in HRQOL in the prospective analyses [16]. Similarly, a large-scale cross-sectional study among adults aged 25-64 years in France found that daily smokers, in general, reported lower HRQOL than non-smokers, but after adjustment for depression and alcohol dependence, the associations between smoking and HRQOL was markedly reduced [17]. Thus, previous studies found evidence of associations between poorer quality of life (QOL) and smoking, but prospective studies mostly investigated whether smoking predicts QOL and not vice versa. Moreover, they focused on health-related quality of life rather than quality of life in general.

Confounding Factors

Using the first two waves of the Survey of Health, Ageing and Retirement in Europe (SHARE), the present study investigated whether depression and QOL among adults aged 50 and older measured at Time 1 predicts smoking measured at Time 2. Previous studies found that low socioeconomic status is associated with poor mental health, especially depression and low levels of life satisfaction, in later stages of life [18,19]. Studies using SHARE data found that it is specifically subjective perception of financial concerns that is associated with poor health outcomes, rather than poverty as objectively measured [20].

Consequently, we adjusted for income using a subjective measure for financial distress. Moreover, depression in later stages of life varies across gender, age, marital status and physical health, as reported in previous SHARE studies [21-24]. Smoking is also associated with background variables such as gender, age, and financial distress [16,25]. Physical health and functional impairment are also associated with depression and QOL, with high rates of functional impairment and poor physical health associated with higher rates of depression and lower QOL [26]. In addition, prior smoking predicts later smoking [27,28].

We therefore adjusted for background variables- gender, age, marital status and financial distress- physical health and smoking at Time 1 when examining the associations between depression and QOL at Time 1 and smoking at Time 2.

Hypotheses

- Depression at Time 1 will predict smoking at Time 2 adjusting for background variables, physical health indicators and smoking at Time 1.
- Lower levels of QOL at Time 1 will predict smoking at Time 2 adjusting for background variables, physical health indicators and smoking at Time 1.

Methods

Sample

Data were drawn from the first two waves of SHARE release 2.6.0 as of November 29th 2013. The SHARE survey queries individuals aged 50 years and older, and their spouses regardless of age, from 11 European countries: Austria, Germany, Sweden, Netherland, Spain,

Italy, France, Denmark, Switzerland, Greece, Belgium and Israel. Based on probability samples of households in each participating country, the SHARE database provides a representative picture of the community-dwelling older population [29]. Participants were interviewed in 2004 - 2005 (Wave 1: T1) and again in 2006 - 2007 (Wave 2: T2). Informed consent was obtained from all respondents prior to the interview. SHARE questions addressed the physical, mental and social functioning of participants [30]. In this study, we included data on 19,761 individuals who participated in both waves and who were age 50 or older in Wave 1.

Measures

Dependent Variable

Smoking was measured at T1 by two questions. "Have you ever smoked cigarettes, cigars, cigarillos or a pipe daily for a period of at least one year? Yes/No"; those who answered "yes" were asked "Do you smoke at the present time? Yes/No". We combined the information from the two questions in such a way that those who responded "no" on the first questions were scored "no" on the second question of current smoking. Smoking at T2 was measured by one question: "Do you smoke at the present time? Yes/No".

Independent variables measured at T1

Depression was measured by the EURO-D 12-item scale [31,32] which was developed and validated for European studies to measure late-life depressive symptoms across different European countries. The 12 questions query feelings of depressed mood, pessimism, wishing death, guilt, irritability, tearfulness, fatigue, sleeping troubles, loss of interest, loss of appetite, reduction in concentration, and loss of enjoyment over the last month. Answers of participants were coded as 1 = 'present' or 0 = 'absent' and were summed to form a score ranging from 0 to 12, with a higher score indicating higher levels of depression [21]. Inter-item reliability (Alpha Cronbach) = 0.71, similar to other SHARE studies [33]. Scores of 4 and above indicate depression [21,34]. For the multivariate analyses, we grouped categories 0 to 3 together as "non-depressed" and categories 4 to 12 as "depressed".

Quality of Life

Quality of life was measured by 12 items originating from the CASP-19 (CASP-12); [35-37]. This measure defines QOL in terms of need satisfaction in four domains: sense of control, autonomy, self-realization and pleasure. Respondents were asked how often they experience certain feelings and situations on a 4-point scale ranging from 'never' to 'often'. The total score of CASP-12 values range from 12 to 48, with higher scores indicating better QOL. A second-order factor analysis confirmed quality of life as a single latent factor. The CASP-12 correlated highly with the CASP-19. [30,34]. Inter-item reliability (Alpha Cronbach) = 0.82, which is similar to the reliability found in previous SHARE studies [38,34].

Control variables measured in T1

Physical health was measured by 4 different scales. Physical symptoms were measured by 11 items presenting physical conditions in the previous six months: back pain, knee, hip or other joint pain; heart trouble or angina, chest pain during exercise, breathlessness, persistent cough, swollen legs, sleeping problems, falling down, fear of falling down, dizziness, fainting or blackouts, stomach or intestinal problems and bowel or urine incontinence [39].

Chronic diseases were assessed by self-reported physicians' diagnosis on a list of diseases; e.g., a heart attack or heart problem including congestive heart failure; high blood pressure or hypertension; diabetes or high blood sugar; osteoporosis, cancer or malignant tumor, Parkinson's disease [21]. Functional impairment due to health reasons were measured through the number of limitations in activities of daily living (ADL), and the number of limitations in instrumental activities of daily living (IADLs). ADLs include among others: bathing, dressing, toilet use, and eating. IADLs include among others: use of the telephone; food or clothes shopping, meal preparation, housework, and money management [21,30,39].

Financial distress was measured in terms of perceived income adequacy. Respondents were asked: “Thinking of your household’s total monthly income, would you say that your household is able to make ends meet: 1. With great difficulty; 2. With some difficulty; 3. Fairly easily; 4. Easily” [20,40].

We also included age, gender and marital status. Concerning marital status, we asked “What is your marital status? 1. Married and living together with spouse; 2. Registered partnership; 3. Married, living separated from spouse; 4. Never married; 5. Divorced; 6. Widowed”. For the multivariate analyses, we grouped Categories 1 and 2 together as “live with a partner” and Categories 3 to 6 as “no partner”.

Data Analysis

Analyses were conducted using SPSS version 21. Prevalence rates for smoking and depression were calculated, and comparisons between smokers and non-smokers at Time 2 using one-way analysis of variance (ANOVA) or chi square were made. A series of logistic regression models were run to test research hypotheses; i.e., whether smoking at Time 2 can be predicted by depression or low QOL at Time 1, controlling for background, physical health indicators and smoking at Time 1. At Step 1, background variables of gender, age, marital status and financial distress measured at Time 1 were included as predictors of smoking at Time 2. At Step 2 we added to the background variables physical health indicators measured at Time 1. Step 3 added smoking at Time 1. Step 4 included the complete model in which depression (Time 1) or QOL (Time 1) are the major predictors of smoking at Time 2, and background variables, with physical health indicators and smoking at Time 1 serving as control variables.

Results

Sample Characteristics

Table 1 presents the characteristics of the sample. Of the 19,761 individuals who took part in both waves 10,823 (54.8%) were female. Participants’ mean age was 64.40 (SD = 9.71) at Time 1 and 67.02 (SD = 9.72) at Time 2. More than two-thirds of the participants were married (72.6% at Time 1 and 70.9% at Time 2).

Variable	Range	Total sample (n = 19,761)*	Smokers (T2) (n = 3397)	Non-Smokers (T2) (n = 16,276)	P values
		Mean (SD) or %			
Age	50-102				
T1		64.40 (9.71)	60.28 (7.93)	65.23 (9.81)	< .001
T2		67.02 (9.72)	62.88 (7.94)	67.85 (9.80)	< .001
Gender (females)					
T1		54.8%	44%	57%	< .001
Family status (married)					
T1		72.6%	71.5%	73.1%	= .053
T2		70.9%	70.2%	71.2%	= .213
Financial distress	1-4				
T1		2.22 (.98)	2.31 (1.00)	2.15 (0.96)	< .001
T2		2.17 (.97)	2.30 (.99)	2.14 (.97)	< .001
Physical symptoms	0-12				
T1		1.49 (1.61)	1.30 (1.58)	1.52 (1.64)	< .001
T2		1.79 (1.89)	1.61 (1.77)	1.82 (1.91)	< .001
Chronic diseases	0-12				
T1		1.55 (1.43)	1.30 (1.37)	1.60 (1.44)	< .001
T2		1.65 (1.52)	1.39 (1.42)	1.70 (1.53)	< .001
Functional impairment					
ADL	0-6				
T1		0.18 (.70)	0.12 (.55)	0.18 (.72)	< .001
T2		0.24 (.88)	0.14 (.61)	0.26 (.91)	< .001
IADL	0-7				
T1		0.30 (.92)	0.18 (.65)	0.31 (.95)	< .001
T2		0.44 (1.20)	0.25 (0.82)	0.47 (1.24)	< .001
Depressive symptoms	0-12				
T1		2.30 (2.22)	2.28 (2.20)	2.31 (2.22)	= .540
T2		2.23 (2.24)	2.12 (2.23)	2.25 (2.24)	= .002
Depression EURO-D ≥ 4**					
T1		25.1%	25.2%	25.0%	= .069
T2		23.5%	22.2%	23.7%	= .060
Quality of life	12-48				
T1		37.17 (6.11)	36.92 (6.11)	37.24 (6.11)	= .026
T2		37.07 (6.31)	37.01 (6.21)	37.09 (6.32)	= .501

Table 1: Demographic Characteristics and Descriptive Statistics of the Study’s Variables.

* 88 cases were missing in the response for smoking. Therefore, the number of smokers and nonsmokers does not summed- up to the total sample.

At Time 1 and Time 2, 74.6% and 75.5%, respectively, reported between 1 to 8 chronic diseases (median = 1 in Time 1 and Time 2). At Time 1 and Time 2, 9.0% and 10.7%, respectively, reported at least one limitation in ADL. At Time 1 and Time 2, 15.0% and 19.1%, respectively, reported at least one limitation in IADL. At Time 1 and Time 2, 25.1% and 23.5% respectively reported symptoms indicating the likelihood of clinical depression (EURO-D \geq 4). Depressive symptoms are negatively associated with QOL both at Time 1 ($r = -.46$, $p < .001$) and Time 2 ($r = -.52$, $p < .001$). Financial distress is moderately associated with depression ($r = .23$, $p < .001$ between financial distress at Time 1 and depressive symptoms at Time 1; $r = .18$, $p < .001$ between financial distress at Time 1 and depressive symptoms at Time 2). Financial distress is strongly negatively correlated with QOL ($r = -.40$, $p < .001$ between financial distress at Time 1 and QOL at Time 1 and Time 2).

Differences between smokers and non-smokers

At Time 1, 18.6% of participants smoked, compared to 17.3% at Time 2; 80.7% of smokers at Time 1 were also smokers at Time 2. Four hundred fifty-eight participants (2.9% of the total sample) who did not smoke at Time 1 reported smoking at Time 2. Participants who smoked at Time 2 were younger ($F(1,19,670) = 760.587$, $p < .001$ at Time 1; $F(1,19,671) = 768.423$, $p < .001$ at Time 2) and had better health and functioning than non-smokers. They had fewer physical symptoms ($F(1,19,643) = 54.734$, $p < .001$ at Time 1; $F(1,19,639) = 33.642$, $p < .001$ AT Time 2), fewer chronic diseases ($F(1,19,635) = 120.226$, $p < .001$ at Time 1; $F(1,19,627) = 122.048$, $p < .001$ at Time 2), reported fewer limitations in ADL; $F(1,19,640) = 23.236$, $p < .001$ at Time 1; $F(1,19,637) = 52.387$, $p < .001$ at Time 2) and in IADL; $F(1,19,640) = 57.963$, $p < .001$ at Time 1; $F(1,19,637) = 95.922$, $p < .001$ at Time 2). Smokers at Time 2 reported greater financial distress ($F(1,17,918) = 74.693$, $p < .001$ at Time 1; $F(1,19,627) = 76.347$, $p < .001$ at Time 2). Smokers at T2 reported lower levels of QOL at Time 1 than non-smokers at Time 2 $F(1,13,262) = 4.977$, $p = .026$). Results are presented in Table 1.

Predictors of smoking at Time 2

Tables 2 and 3 present the results of logistic regression analyses with depression or QOL at Time 1 as the predictors, and smoking at Time 2 as the dependent variable. For each predictor, we tested four models.

Depression

The first model included four background variables: age, gender, family status and financial distress. They were all significant predictors of smoking at Time 2. Being a female, older and married predicted a lower likelihood of smoking at Time 2. Individuals with financial distress were 1.18 (95%CI = 1.14 - 1.23) more likely to smoke at Time 2 than individuals with less financial distress. Model 2 added physical health and functional impairment. While background variables remained significant, of all health indicators only chronic disease was a significant predictor of smoking at Time 2. Individuals with chronic disease were less likely (OR = .95 95% CI = .92 - .99) to smoke at Time 2 than individuals without chronic disease. Model 3 added smoking at Time 1. As expected, smokers at Time 1 were much more likely to continue smoking at Time 2 (OR = 127.39; 95% CI = 112.20 - 144.64). Chronic disease was no longer a significant predictor for smoking. Model 4 tested whether depression ((EURO-D \geq 4 versus EURO-D $<$ 4) at Time 1 predicts smoking at Time 2 while background and health variables, as well as smoking in Time 1 are included in the model.

We found that depression is a significant predictor of smoking while all other variables are controlled. Specifically, depressed individuals were 1.26 (95%CI = 1.07 - 1.49) more likely to smoke at Time 2, confirming Hypothesis 1. Results are presented on Table 2.

Predictors at Time1	Model 1				Model 2			Model 3			Model 4					
	OR	95% CI (lower to upper)		p	OR	95% CI (lower to upper)		p	OR	95% CI (lower to upper)		p				
Age	.94	.93	.94	.00	.94	.93	.94	.00	.97	.96	.98	.00	.97	.96	.98	.00
Gender (Female)	.53	.49	.58	.00	.54	.50	.58	.00	.72	.63	.82	.00	.70	.62	.80	.00
Family status (married)	.64	.58	.70	.00	.63	.58	.69	.00	.82	.70	.95	.01	.82	.71	.95	.01
Financial distress	1.18	1.14	1.23	.00	1.20	1.15	1.24	.00	1.14	1.07	1.22	.00	1.13	1.06	1.21	.00
Chronic diseases					.95	.92	.99	.01	1.01	.95	1.06	.97	1.00	.94	1.06	.96
Physical Symptoms					1.00	.97	1.03	.95	.98	.92	1.03	.34	.96	.91	1.01	.11
Number of limitations in activities of daily living (ADL)					1.04	.95	1.13	.38	1.05	.91	1.21	.49	1.05	.91	1.20	.53
Number of limitations in the instrumental activities (IADL)					.98	.91	1.05	.56	1.01	.90	1.13	.91	1.00	.89	1.12	.93
Smoking (Time1)									127.39	112.20	144.64	.00	127.84	112.57	145.18	.00
Depression (EURO-D ≥ 4)													1.26	1.07	1.49	.01

Table 2: Results from Logistic Regression Analyses with Smoking at Time2 as the Dependent Variable and Depression as the Predictor (N = 19,257).

Quality of life

The first three models were identical to those we tested with depression as the predictor variables and therefore yielded very similar results (see Table 3). Model 4 tested whether lower levels of QOL at Time 1 predicts smoking at Time 2, while background and health variables, as well as smoking at Time 1 are included in the model. We found that lower levels of QOL at Time 1 moderately predicted smoking at Time 2 while all other variables are controlled (OR = .98; 95% CI = .96 - .99) confirming Hypothesis 2. Results are presented in Table 3.

Predictors at Time1	Model 1				Model 2			Model 3			Model 4					
	OR	95% CI (lower to upper)		p	OR	95% CI (lower to upper)		p	OR	95% CI (lower to upper)		p				
Age	.94	.93	.94	.00	.94	.93	.94	.00	.97	.96	.98	.00	.97	.96	.98	.00
Gender (Female)	.55	.50	.60	.00	.56	.51	.61	.00	.71	.60	.83	.00	.71	.61	.83	.00
Family status (married)	.66	.59	.74	.00	.66	.59	.73	.00	.82	.68	.98	.03	.81	.68	.97	.02
Financial distress	1.19	1.14	1.25	.00	1.20	1.15	1.26	.00	1.13	1.05	1.23	.00	1.08	.99	1.17	.08
Chronic diseases					.95	.91	.99	.02	.99	.93	1.06	.79	.98	.92	1.05	.64
Physical Symptoms					.99	.95	1.03	.68	.98	.92	1.05	.58	.96	.90	1.03	.28
Number of limitations in activities of daily living (ADL)					1.07	.97	1.19	.18	1.08	.92	1.28	.35	1.07	.91	1.27	.41
Number of limitations in the instrumental activities (IADL)					.97	.89	1.07	.57	.93	.80	1.08	.33	.91	.78	1.05	.20
Smoking (Time1)									123.28	105.89	143.52	.00	124.06	106.51	144.50	.00
Quality of life (QOL)													.98	.96	.99	.00

Table 3: Results from Logistic Regression Analyses with Smoking at Time2 as the Dependent Variable and Quality of Life as the Predictor (N = 13,210).

Discussion

Tobacco use continues to be the world’s leading cause of preventable disease and premature death [41]. As such, there is an urgent call for identifying predictors for nicotine smoking. Yet, large-scale longitudinal studies on predictors of smoking in late adulthood are scarce [42]. The present study begins to close the gap in the literature by investigating the roles of depression and quality of life in predicting smoking, while adjusting for background and physical health indicators. We used SHARE Wave 1 and Wave 2 datasets, which are based on 11 European countries and Israel.

Depression and smoking findings

Prevalence of depression in the current study was 25.1% and 23.5% at T1 and T2 respectively, which is similar to the prevalence found in the US among similar age groups [3]. Our research design enabled us to tackle the topic of causality with respect to depression and smoking [12]. We examined whether depression measured at Time 1 predicts smoking at Time 2, adjusting for smoking at Time 1 and other background and physical health indicators. The results show that depressed individuals are at greater risk for smoking than non-depressed individuals, even after controlling for previous smoking. Hence, our first research hypothesis was confirmed. The results of the present study reveal that depression is a risk factor for smoking throughout the lifecycle, and not only in emerging adulthood [43].

Quality of life and smoking findings

Lower levels of QOL at Time 1 were a significant predictor of smoking at Time 2, confirming the second research hypothesis. However, it is to be noted that the effect was modest. Previous studies examined associations between smoking and QOL among adolescents and young adults [44], or were more focused on HRQOL [16]. It is possible that our conceptualization of QOL might be less related to future smoking in late adulthood, or that the association might be confounded by other variables not included in the present study such as stressful life events. The latter has been found to be a strong predictor of smoking in adulthood [42].

Financial distress and smoking findings

In line with previous studies conducted in the US [45-47] financial distress was a robust predictor of smoking at Time 2. A desire to relieve negative affect associated with financial constraints has been put forward as an explanation for these findings [47]. The association between financial distress and depression was low. Thus, as shown in previous SHARE studies, we found that subjective perception of financial concerns [20] is a key factor for poor health outcomes and health risk behaviour, including prolonged smoking in late adulthood.

Physical health and smoking findings

As for physical health indicators, chronic disease was associated with a lower likelihood of smoking, but only in the model that included background and physical indicators. Chronic disease and smoking cessation have been linked in previous studies [48] including a recent study conducted in the USA that revealed that chronic disease was a motivator for quitting smoking [49]. Nevertheless, impaired functioning was not associated at the multivariate analyses with smoking at T2. These results are in line with a recent longitudinal study conducted in the US, which reported that the prevalence of smoking was significantly higher among people aged 45 to 64 years who have impaired mobility, compared with individuals with no mobility impairment [50]. Thus, impaired functioning is not necessarily an inhibiting factor for smoking.

Limitations

The present study is limited by the fact that we did not test a conceptual framework that may have explained the associations between depression, quality of life and smoking in late adulthood. Currently, we have revealed that depression is a major risk factor for smoking in late adulthood. One leading theory being offered to explain the link between depression and smoking is affect management, or affect regulation. In this view, individuals attempt to reduce or monitor negative affect through smoking [51-53]. These attempts are fuelled partially by individuals' expectations or beliefs that smoking will relieve depressive symptoms [10,54]. However, we did not examine participants' affect-regulation capabilities, or any expectation that smoking will relieve depressive symptoms. A promising line of research, then, would examine the link between depression and smoking in late adulthood using as a theoretical base the theory affect management. Moreover, future studies would do well to include health-related quality of life and daily life stressors as additional potential predictors of smoking.

Conclusion

Despite major health risks associated with smoking, 80.7% of smokers at Time 1 continued to smoke at Time 2, and 2.9 % who did not smoke at Time 1 became smokers at Time 2. Thus, we suggest that efforts be made to engage individuals in late adulthood in smoking

cessation interventions. Smoking cessation is less successful among depressed adults and individuals experiencing financial distress [9,47]. Hence, smoking cessation interventions should target two vulnerable populations: depressed and low-income individuals.

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