



Trends in smoking and obesity among US adults before, during, and after the great recession and Affordable Care Act roll-out



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ARTICLE INFO

Article history:

Received 3 December 2016

Received in revised form 29 June 2017

Accepted 5 July 2017

Available online 8 July 2017

Keywords:

Obesity
Smoking
Smoking cessation
Exercise
Risk factors
Socioeconomic factors
Health care access
Health care providers
Affordable Care Act
Epidemiology

ABSTRACT

This study examined trends in smoking and overweight/obesity rates among United States (US) adults ages 40 years and older by race and socio-economic status (SES) across three study periods; pre-recession (2003–2005), recession (2007–2009), and post-recession/Affordable Care Act (2010–2012). Data was obtained from the Behavioral Risk Factor Surveillance System (BRFSS), and multivariable regression analysis was used to examine changes in overweight/obesity, smoking, physical activity and smoking cessation rates over the study periods. There were 2,805,957 adults included in the analysis; 65.5% of the study population was overweight/obese, and 33.3% were current smokers. Smoking prevalence increased marginally among those with lower SES (income < \$10,000) from pre-recession (52.5%) to post-recession (52.9%), but declined in other socio-demographic groups. The odds of overweight/obesity increased in the post-recession (OR: 1.22, 95% CI: 1.21–1.23) and recession (OR: 1.11, 95% CI: 1.11–1.12) periods compared with pre-recession, but odds of smoking overall decreased in the post-recession (OR: 0.93, 95% CI: 0.92–0.94) and recession (OR: 0.95, 95% CI: 0.94–0.97) periods. Overweight/obesity increased over the study periods, regardless of race, SES or healthcare access, while smoking rates showed significant declines post-recession compared with pre-recession, except in low SES groups. These findings suggest that strategies focused on reducing overweight/obesity and increasing access to smoking cessation services, especially among low-income adults, are needed. Prospective studies are needed to better evaluate the influence of the economic recession and Affordable Care Act on behavioral risk factors.

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1. Introduction

The Great Recession was a difficult economic period for most United States (US) adults. At the start of the recession in December 2007, the unemployment rate was 5.0%, but had risen to 9.5% by June 2009 (Statistics BoL, 2012). The exact mechanisms linking poor economic environments with health-related risk factors have been examined in several studies. First, unemployment may lead to a lack of expendable income necessary for healthy lifestyle choices such as purchase of fresh fruits and vegetables or access to resources for recreational physical activity (Dave and Kelly, 1982). Second, increased stress from financial instability may lead to initiation of adverse health behaviors such as cigarette smoking and alcohol use as a means of coping, leading to, or influenced by, worsening mental health status (Boen and Yang, 2016; Reeves et al., 2012; Ayers et al., 2012; Catalano, 2009). Third, unemployment often results in the loss of health insurance, leading to poor access to preventive care such as blood pressure monitoring, smoking

cessation services, as well as health provider recommendations about weight loss (Mortensen and Chen, 2013). These economic and health related changes pose a significant public health crisis, the effect of which is likely unevenly distributed and mirrors well documented social-inequalities in health. Adults of lower socioeconomic status are more likely to have poorer health conditions to begin with (Pampel et al., 2010), are often the first to be negatively affected by economic downturn (Hajat et al., 1982), and have a more difficult time recovering financially even after the economy has improved (Irons, 2009). Therefore, the effect of economic crises on health outcomes will likely be more severe and sustained among lower socioeconomic status (SES) adults, racial minorities and older adults, further compromising their health status.

Given the negative financial impact of the economic recession on a large proportion of US adults, there is considerable interest in examining trends in health related risk factors that may increase the risk of chronic diseases in the future. For instance, Golden et al. observed that smoking rates were significantly higher among adults those who experienced recent job loss, and observed that unemployed adults were less likely to quit smoking compared with those currently employed (Golden and Perreira, 1982). Gallus et al. also observed higher smoking rates

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among the unemployed during the recession (Gallus et al., 2015). In another recent study, Nandi et al. observed that individual level unemployment was associated with higher levels of alcohol consumption, smoking and diabetes (Nandi et al., 2013). These studies suggest that changes in socio-economic status may influence individual health behavior, although few studies have directly examined trends in the overweight/obesity and smoking rates among various socio-demographic groups before, during and after the US economic recession.

Other studies conducted after the recession (Ayers et al., 2012; Althouse et al., 2014) examining changes in health status utilized google search queries, and observed that during the recession, searches for terms associated with stress-related conditions increased drastically. These provided ecological information on the potential influence of the recession on public health, and highlighted the need for individual level

studies to examine trends in specific risk factors. The rollout of the Affordable Care Act (ACA) in the post-recession period provides a unique opportunity to preliminarily assess whether there were any changes in obesity and smoking rates due to increased availability of health insurance coverage, specifically among low income adults. While it may be too early currently to directly estimate the influence of the ACA on specific health outcomes, estimating the prevalence of important chronic disease risk factors such as obesity and smoking during this period will serve as a baseline for future studies examining trends in health behavior among Americans.

The purpose of this study is to assess the prevalence and trends in smoking and obesity rates among US adults before, during and after the 2007–2008 economic recession and ACA period and to determine whether overall trends vary by race and SES.

Table 1
Baseline characteristics of study population by study period, BRFSS 2003–2012 (unweighted)^a.

Sample characteristics	Study period				p value ^b
	Total (2003–2012) N = 2,805,957	Pre-recession (2003–2005) N = 650,323	Recession (2007–2009) N = 1,013,551	Post-recession (2010–2012) N = 1,142,083	
Age					
40–50	707,200(23.31)	208,774(31.12)	252,394(24.68)	246,032(21.59)	<0.0001
51–60	756,901(26.95)	174,497(26.99)	277,850(27.38)	304,554(26.69)	
61–70	659,300(24.55)	130,211(20.4)	235,538(23.39)	293,551(25.71)	
≥ 71	682,556(24.55)	136,841(21.49)	247,769(24.56)	297,946(26.01)	
Sex					
Male	1,072,697(38.30)	250,938(38.34)	381,724(37.70)	440,035(38.66)	<0.0001
Female	1,733,260(61.70)	399,385(61.66)	631,827(62.30)	702,048(61.34)	
Race					
NH White ^d	2,269,180(81.47)	530,574(82.26)	823,554(82.04)	915,052(81.04)	<0.0001
NH Black ^d	208,659(7.65)	46,674(7.29)	74,085(7.41)	87,900(7.83)	
Hispanic	159,793(5.87)	35,917(5.65)	56,480(5.65)	67,396(6.02)	
NH Multiracial ^d	43,344(1.58)	9933(1.60)	15,289(1.52)	18,122(1.61)	
NH Other ^d	94,041(3.43)	21,019(3.19)	33,782(3.37)	39,240(3.49)	
Education					
<High school	285,968(9.79)	75,486(11.42)	103,216(10.12)	107,266(9.40)	<0.0001
High school grad	867,481(30.77)	205,396(31.72)	314,962(31.10)	347,123(30.47)	
Some college	728,661(26.18)	166,322(25.60)	263,217(26.10)	299,122(26.29)	
≥College	915,480(33.26)	201,546(31.25)	329,218(32.68)	384,716(33.84)	
Income level					
<10,000	140,934(5.73)	36,547(5.44)	47,651(5.44)	56,736(5.81)	<0.0001
10,000–<20,000	358,471(14.81)	86,013(15.46)	125,457(14.36)	147,001(15.01)	
20,000–<50,000	924,330(37.64)	226,363(40.32)	334,415(38.15)	363,552(37.03)	
≥50,000	985,997(41.82)	207,166(37.80)	367,169(42.05)	411,662(42.14)	
Employment					
Employed	1,070,263(37.25)	271,487(41.56)	389,613(38.44)	409,163(36.05)	<0.0001
Self-employed	248,596(8.69)	62,054(9.33)	90,362(8.92)	96,180(8.47)	
Unemployed	119,660(4.57)	23,331(3.48)	38,968(4.02)	57,361(5.03)	
Student/retired/home	1,141,573(41.52)	246,867(38.57)	414,792(41.10)	479,914(42.12)	
Unable to work	215,278(7.96)	44,963(7.06)	76,177(7.53)	94,138(8.36)	
Marital status					
Married	1,559,100(55.49)	364,941(56.06)	568,641(56.33)	625,518(54.93)	<0.0001
Div/Wid/Sep	981,116(35.16)	226,826(35.10)	351,975(34.77)	402,315(35.39)	
Never married	215,557(7.8914)	47,419(7.41)	75,732(7.52)	92,406(8.17)	
Unmarried couple	40,137(1.46)	9209(1.43)	13,882(1.38)	17,046(1.51)	
Health insurance coverage					
Yes	2,549,442(91.16)	586,323(90.23)	924,318(91.26)	1,038,801(90.90)	<0.0001
No	251,125(8.84)	62,851(9.59)	87,456(8.57)	100,818(8.88)	
Healthcare providers					
At least one	2,252,708(89.76)	509,017(79.13)	817,639(80.97)	926,052(81.24)	<0.001
None	293,204(10.24)	74,268(11.26)	104,716(10.27)	114,220(10.10)	
Mean comorbidities ^c		1.04(0.0016*)	1.15(0.0012*)	0.95(0.0010*)	0.93

(^d)Denotes row percentage.

* Denotes mean and standard deviation [mean (SD)].

^a Population studied in BRFSS includes US adults 40 years old and older.

^b Estimated using Chi-Square test on data.

^c Comorbidities studied: cardiovascular disease (angina, coronary artery disease, heart attack, stroke), diabetes, high blood pressure, high cholesterol, asthma, arthritis.

^d Non-Hispanic.

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