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The relationships among physical activity, sedentary behaviour, obesity and quitting behaviours within a cohort of smokers in California

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ABSTRACT

Background: Smoking, insufficient physical activity (PA), sedentary behaviour (SB) and obesity are leading risk factors for morbidity and premature mortality. Few studies examining the relationship between these behavioural risk factors and quitting behaviours among cohorts of smokers have been published.

Purpose: The goals of this study are to examine the cross-sectional relationships among behavioural health risk factors (insufficient PA, SB and obesity) and past year quitting behaviours within a sample of smokers.

Methods: The California Smokers Cohort, conducted from 2011 through 2013, is a population-based survey of adult smokers in California. Using follow-up data ($n = 1050$), participants' self-reported health behaviours and past year quitting behaviours were examined in univariate analyses and multivariate logistic regression analyses controlling for demographic covariates.

Results: In univariate analyses examining health behaviours among smokers, all three health behaviours examined (PA, SB and obesity) were related, and significantly more obese smokers with high PA and low SB reported a ≥20% smoking rate reduction than smokers with other combinations of health behaviours (48.8%, Chi-squared = 4.765, $P = 0.045$). In multivariate models adjusted for sociodemographic characteristics, obese smokers (odds ratio [OR] = 1.450, 95% confidence interval [CI]: 1.088–1.932, $P = 0.011$) and smokers with higher levels of PA (OR = 1.448, 95% CI: 1.111–1.887, $P = 0.006$) were more likely to report a past year ≥24-hour quit attempt regardless of SB, and obese smokers (OR = 1.760, 95% CI: 1.095–2.828, $P = 0.019$) were more likely to report being quit for ≥30 days regardless of PA and SB.

Conclusions: Overall, the results demonstrated that more physically active and obese smokers were more likely to report positive strides towards quitting. These findings support the potential positive effect of addressing multiple health behaviours along with smoking.

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Introduction

A concept labelled '3-4-50' indicates that three health behaviours (tobacco use, insufficient physical activity [PA] and poor diet) lead to four chronic diseases (cardiovascular diseases/stroke, cancer, type 2 diabetes and respiratory conditions) that cause ≥50% of deaths worldwide.[1] Similarly, the leading behavioural causes of preventable death in the US are tobacco use, insufficient PA and poor diet.[2] The risk of morbidity and premature mortality increases with each additional one of these unhealthy lifestyle behaviours,[3–14] which tend to cluster together.[15–18] The combination of insufficient PA and poor diet results in overweight/obesity, which is also a risk factor for multiple chronic diseases (e.g., cardiovascular diseases, diabetes, certain types of cancer)[19] is also associated with smoking.[20] Many smoking cessation interventions have incorporated PA and/or weight control components,[21–23] and a number of studies have evaluated weight changes over time among former smokers.[24,25] However, few studies of the relationship between these behavioural risk factors and recent quitting behaviours among smokers have been published.[26,27]

Physical activity

The 2008 federal Physical Activity Guidelines for Americans and the American College of Sports Medicine recommend that adults engage in moderate PA for ≥150 min per week, vigorous PA for ≥110 min per week, or any combination of these two intensities and lengths of time.[28,29] They also recommend that adults engage in moderate to vigorous PA in ≥10-minute bouts on most days of the week.[28,29] Despite the well-known benefits of regular PA, national surveys have found that approximately 24% of the adults reportedly engaged in no leisure time PA in 2010,[30] and less than half of the adults in the US met the recommended PA guidelines in 2011.[31] Evidence suggests that smokers are even less likely to engage in leisure time PA and meet PA guidelines,[32] further increasing their risk of developing chronic diseases.

Sedentary behaviour

Sedentary behaviour (SB) is a risk factor for cardiovascular disease and other chronic health conditions, independent of and beyond the risk associated with insufficient PA.[33–35] The dose of SB that constitutes increased health risks is still under investigation; although no specific guidelines have been set forth in the US, researchers recommend minimizing SB during leisure time as much as possible, given that many jobs now require large doses of sitting.[35] Researchers are also trying to determine the best methods to measure SB.[36] One approach frequently taken by risk factor surveillance is enquiring about daily total or leisure time 'screen time', which is comprised of television viewing and computer use. Surveillance of associated health risks is growing in relevance and importance as trends across the US suggest increases in SB during work and leisure time.[37] Smokers report more SB than non-smokers, placing them at even greater risk for chronic diseases.[38]

Overweight/obesity

Overweight and obesity, typically defined by a body mass index (BMI) of 25–29.9 kg/m^2 (overweight) and ≥30 kg/m^2 (obesity), result when calories consumed outnumber calories burned. Obesity is a well-established risk factor for chronic diseases, and the American Medical Association recently classified it as a medical disease itself.[39] Obesity rates have traditionally been lower among smokers than non-smokers.[40,41] However, this relationship has changed in recent years, such that heavy smokers in developed countries have higher BMIs than their non-smoking counterparts.[42] In addition, quitting smoking has been associated with weight gain in numerous studies, and the fear of this weight gain has discouraged many smokers from quitting.[25,43]

Healthy lifestyle and smoking cessation

Numerous factors have been associated with the likelihood of smoking reduction, quit attempts and long-term cessation.[26] Although some health behaviours, such as alcohol and other drug use, have been examined frequently as correlates of these smoking behaviours,[44,45] others, such as PA and SB, are often overlooked despite research indicating that they may be associated.[23,38] Similarly, despite the abundance of research demonstrating that post-cessation weight gain and weight concerns are related to a lower likelihood of future quit attempts and long-term cessation,[46,47] the relationship between overweight/obesity and smokers' recent quitting behaviours have rarely been examined.[26,27]

Purpose

Learning more about the relationship between behavioural health risk factors and quitting behaviours may help researchers and clinicians tailor smoking cessation treatment approaches to best meet individual smokers' needs. The goals of this study are to examine the cross-sectional relationships among self-reported behavioural health risk factors (obesity and insufficient PA and SB) and recent quitting behaviours within a sample of smokers participating in a longitudinal cohort study. We hypothesized that smokers who reported one or more of these behavioural health risk factors would be less likely to report a recent serious quit attempt (≥24 h) in the past year, sustained cessation (no smoking in the previous ≥30 days) and/or a ≥20% reduction in average cigarettes per day in the past year than those who did not report these risk factors.

Methods

Data source

California Smokers Cohort (CSC)

The data for the present study are from the California Smokers Cohort (CSC), conducted from 2011 through 2013. The CSC is a population-based survey of a sample of adults in California who reported smoking ≥100 cigarettes in their