

Softening Among U.S. Smokers With Psychological Distress: More Quit Attempts and Lower Consumption as Smoking Drops

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Introduction: It has been argued that as smoking prevalence declines, the remaining smokers represent a “hard core” who are unwilling or unable to quit, a process known as hardening. However, as recently shown, the general smoking population is softening not hardening (i.e., as prevalence falls, more quit attempts and lower consumption among continuing smokers). People with psychological distress smoke more, so they may represent hard-core smokers.

Methods: Using cross-sectional time series analysis, in 2016–2017 changes in quit attempts and cigarette consumption were evaluated over 19 years among smokers with serious psychological distress (Kessler-6 score ≥ 13) based on the National Health Interview Survey (1997–2015), controlling for sociodemographic variables.

Results: People with psychological distress had higher smoking prevalence and consumed more cigarettes/day than people without distress. The percentage of those with at least one quit attempt was higher among those with psychological distress. The increase in quit attempts over time was similar among smokers in each of the distress levels. For every 10 years, the OR of a quit attempt increased by a factor of 1.13 (95% CI=1.02, 1.24, $p < 0.05$). Consumption declined by 3.35 (95% CI= -3.94, -2.75, $p < 0.01$) cigarettes/day for those with serious psychological distress.

Conclusions: Although smoking more heavily than the general population, smokers with psychological distress, like the general population, are softening over time. To improve health outcomes and increase health equity, tobacco control policies should continue moving all subgroups of smokers down these softening curves, while simultaneously incorporating appropriately tailored quitting help into mental health settings.

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INTRODUCTION

The concept of hardening of the smoking population has been described as the smoking population, on average, becoming less willing to or less capable of quitting as smoking prevalence declines, implying that hard-core smokers would increasingly comprise the smoking population.^{1–5} However, several studies from around the world have found that softening, not hardening, is occurring.^{6–8} Over time, as smoking prevalence fell, continuing smokers were making more quit attempts and consumed fewer cigarettes.

Because those with psychological distress smoke more,^{9,10} some have identified them as hard-core smokers.^{11,12}

Nineteen years of data from the U.S. National Health Interview Survey (NHIS) are used to examine smoking prevalence levels and the associations between (1) the proportion of smokers who made at least one quit attempt in the past 12 months and (2) the number of cigarettes

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smoked per day (CPD) among the remaining smokers as dependent variables, and time (as smoking prevalence decreased) as the independent variable among people with different levels of psychological distress as measured by the Kessler Psychological Distress Scale (K6).^{13,14} As with the general population and people without psychological distress, smoking patterns are softening among people with mental distress, albeit from a higher baseline than among people without distress.

METHODS

Study Sample

Annual individual level data from 19 waves of the NHIS were used, the principal survey collecting health information on the U.S. civilian and non-institutionalized population¹⁵ for 1997 through 2015 (Appendix Table 1, available online).

Measures

A current smoker was defined as someone who has smoked ≥ 100 cigarettes in his or her lifetime and currently smokes every day or some days, a total of 118,604 in the 19 waves. Current smokers were asked how many cigarettes they smoked per day, allowing for an answer between 1 and ≥ 95 . These smokers were asked if they had tried quitting smoking for a day or longer in the past 12 months. Those answering *yes* were characterized as having made a quit attempt.

The K6^{13,14} questions included in the NHIS were used to measure psychological distress among the smokers in the survey. The K6 consists of six questions asking about the respondent's level of feeling sad, nervous, restless, hopeless, worthless, and whether everything felt like an effort in the past 30 days. Possible answers range from *none of the time*, to *a little*, to *some*, to *most*, to *all of the time*. The *none of the time* was scored to be 0 and *all of the time* to be 4; the points were then summed for all six questions to obtain an aggregate score between 0 and 24. Following Prochaska et al.,¹⁶ respondents were assigned to three categories: no distress (total score 0–4); moderate distress (5–12); and serious psychological distress (13–24). Out of the total of 586,509 respondents, 11,819 (2%) had missing information for at least one K6 question, which resulted in 574,690 persons for analysis (Appendix Table 1, available online).

The sociodemographic variables in the adjusted models were sex (male/female); age (continuous variable in years 18 to ≥ 85); marital status (married/living with partner, never married, widowed/divorced/separated); alcohol use (current drinker [one or more drinks in past year], former drinker [no drinks in past year], lifetime abstainer [< 12 drinks in lifetime]); educational level (0–11 years of education/12 years without diploma, high school diploma/GED or equivalent, some college/associate's degree, bachelor's degree and higher); and race and ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, non-Hispanic all other race groups).

Statistical Analysis

All data from the annual adult samples of the NHIS between 1997 and 2015 were pooled, accounting for the complex survey data design of the NHIS, including Primary Sampling Unit and

strata^{17,18} for smokers in each of the three K6 categories and computed smoking prevalence, the percentage of smokers with at least one quit attempt in the past 12 months, and the number of cigarettes smoked (Figure 1).

Logistic regression was used to assess changes in quit attempts and linear regression for CPD over time in unadjusted and adjusted models controlling for all sociodemographic variables. Because of collinearity between time (in 10-year increments, centered on the mean [2006]) and smoking prevalence (prevalence dropped over time, Figure 1), time was used as the independent variable in the final analysis. Analyses were run for each of the K6 categories, as well as for all smokers combined, controlling for K6 category. To assess whether time trends in quit attempts and cigarette consumption were the same in each of the distress subgroups, additional analyses were carried out for all smokers combined including interactions for decade \times K6 category (Appendix Table 3, available online).

Analysis was done with Stata, version 14, in 2016–2017.

RESULTS

Smoking prevalence declined between 1997 and 2015 for the general population and all three psychological

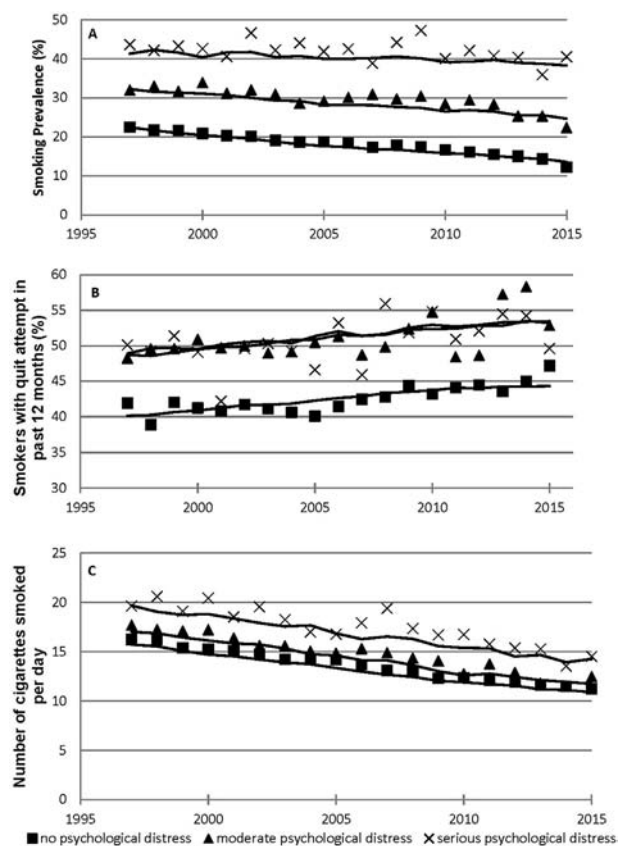


Figure 1. Smoking prevalence declines over time, quit attempts increase, and cigarettes smoked per day decrease in those with and without psychological distress, 1997–2015. Note: Lines based on fitted values from adjusted regressions (details of regressions are in Appendix Table 2, available online).

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