Depression and psychological distress in tobacco smokers and people with cannabis dependence in the National Survey of Mental Health and Wellbeing

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ABSTRACT

Objective: To examine changes in the prevalence of affective disorders and psychological distress among smokers and people with cannabis dependence between 1997 and 2007.

Design, participants and setting: Cross-sectional analysis of the 1997 and 2007 National Survey of Mental Health and Wellbeing.

Main outcome measures: The Composite International Diagnostic Interview generated diagnoses of cannabis dependence and affective disorders based on criteria of the *Diagnostic and statistical manual of mental disorders*, fourth edition. Psychological distress was measured using the Kessler Psychological Distress Scale. Logistic regressions examined the relationship between affective disorders, psychological distress and (i) smoking status (current, former and never-smoker) and (ii) cannabis dependence.

Results: Affective disorders and psychological distress were more common among smokers than non-smokers and among cannabis-dependent participants in both years. The prevalence of affective disorders and psychological distress among smokers, ex-smokers and non-smokers did not change between 1997 and 2007. Psychological distress and affective disorders were more common in cannabis-dependent participants in 2007 than in 1997.

Conclusion: Affective disorders were more common in current than never-smokers and in people with cannabis dependence than without. We did not find strong evidence that the prevalence of these disorders changed in smokers between 1997 and 2007, but we did find such evidence in cannabis-dependent people.

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Comorbidity between smoking and affective disorders is common in surveys of clinical populations[1,2] and the general population in Australia and other developed countries.[3-5] Longitudinal studies[6,7] suggest that people who are depressed are more likely to smoke, and smokers with psychiatric disorders find it more difficult to quit.[8-10] The higher rates and heavier levels of smoking among people with mental illness[2] increases their risk of tobacco-related diseases.[10]

Australian[3] and international epidemiological surveys[11] have also reported higher rates of depression in frequent or heavy users of cannabis compared with infrequent users or non-users. The direction of and reasons for this association are unclear. Many longitudinal studies demonstrate a modest association between early-onset cannabis use and subsequent depression, suggesting that cannabis use may be a cause of these disorders.[12-14] Common social risk factors such as unemployment, unpartnered marital status, low socioeconomic status and substance use may also explain the association between cannabis use and depression because the relationship disappears when they are controlled for.[3]

From 1998 to 2007, the prevalence of smoking among Australians declined by about 5% and the prevalence of cannabis use declined by about a third.[15] The "hardening hypothesis" suggests that as the prevalence of smoking decreases, the proportion of smokers who are severely nicotine dependent and have comorbid mental disorders such as depression will increase, because smokers without these disorders, who find it easiest to quit, will have already quit.[16] It is unclear whether the same hypothesis may apply to changes over time in the prevalence of mental disorders in cannabis-dependent people.

We examined evidence for the hardening hypothesis by comparing the prevalence of affective disorders and psychological distress in Australian smokers and cannabis-dependent people using the 1997 and 2007 National Survey of Mental Health and Wellbeing (NSMHW). These surveys examined the prevalence of common mental disorders (eg, anxiety and depression), substance use and risk factors such as smoking in a representative sample of the Australian population. Ideally, we would have formally tested for significant differences between survey years in the prevalence of affective disorders according to smoking and cannabis dependence. However, changes in the time frame for reporting of the symptoms of affective disorder (past 12 months v lifetime) between 1997 and 2007 precluded such formal comparisons. Ideally, we would have also examined differences in the prevalence of anxiety disorders as a function of smoking and cannabis use over this period. However, a greater number of anxiety disorders were assessed in 2007 than in 1997, so we have not included these analyses here.

METHOD

Sample

Both surveys interviewed multistage probability samples of English-speaking Australians aged 18 to 85 years living in private dwellings. There were 10 600 participants in the 1997 sample and 8463 in the 2007 sample. The response rate was lower in 2007 (60%) than in 1997 (78%). A non-response follow-up study of participants in the 2007 survey concluded that it may have underestimated the prevalence of mental disorders in men, youth and the Perth population but that the difference in prevalence was likely to be small in aggregate.[17] Information on the sampling design and methods for the 1997 and 2007 NSMHW is provided elsewhere.[17-19]

Measures

Smoking status: participants were asked whether they formerly or currently smoked tobacco. Current smokers included those who smoked daily, weekly, or less than weekly.

Cannabis abuse or dependence and affective disorders: symptoms of cannabis abuse or dependence and affective disorders based on

criteria of the *Diagnostic and statistical manual of mental disorders*, fourth edition (DSM-IV) were assessed using the World Health Organization Composite International Diagnostic Interview (CIDI) (version 2.1 in 1997 and version 3 in 2007). There were minor differences in the sequence of questions between the surveys. The CIDI has undergone rigorous methodological evaluation and demonstrated strong reliability and validity.[17] Each interview took an average of 90 minutes.

Participants who used cannabis at least five times in the past 12 months were assessed for symptoms of cannabis abuse or dependence. The diagnostic algorithm prevented participants from meeting criteria for dependence if they had already met criteria for abuse (and vice versa). Respondents who did not use cannabis at least five times in the past 12 months were coded as not meeting criteria for abuse or dependence. We refer to cannabis abuse/dependence as cannabis dependence for the remainder of this article.

The CIDI also generated diagnoses of affective disorders including major depressive disorder, dysthymia, and bipolar I or II disorder. Different time frames were used for reporting symptoms of DSM-IV disorders in the two surveys. The 1997 NSMHW based DSM-IV diagnoses on symptoms in the past 12 months. In 2007, DSM-IV diagnoses were based on lifetime symptoms and additional questions about symptoms in the past 12 months. To provide the most comparable measure of 12-month prevalence in the 2007 NSMHW, respondents were only coded as disordered if they met the criteria for a lifetime disorder and had reported symptoms in the past 12 months.

Psychological distress was measured using the Kessler Psychological Distress Scale. This is a 10-item scale that assesses symptoms of nervousness, restlessness and depressed affect in the past 4 weeks (1997) or 30 days (2007), and on which higher scores indicate higher psychological distress.[20] Respondents who scored 10 to 15 were coded as having low distress, those between 16 and 29 had medium distress, and those between 30 and 50 had high distress.[21] In logistic regression, we compared respondents who had medium or high distress with those with low distress.

Data analysis

Statistical analysis was performed using SAS, version 9.2 (SAS Institute Inc, Cary, NC, USA). Prevalence estimates of current, former and never-smokers and their demographic and mental health correlates were calculated for all respondents after application of replicate weights to adjust for demographic strata and clusters in the representative samples. The demographic and mental health correlates of cannabis-dependent and non-dependent participants were estimated in the same way.

Pearson's χ^2 test was used to test associations between smoking status and cannabis dependence and a range of covariates including sex, age, marital status, employment status, education level, Socio-Economic Indexes for Areas (SEIFA) quintiles, and substance use (sedative, stimulant and/or opiates) at least five times in the past 12 months.

Sequential logistic regressions were used to test for differences in the odds of having a DSM-IV affective disorder or elevated psychological distress according to smoking status and cannabis dependence. All analyses adjusted for gender, marital status, employment status, education level, SEIFA quintiles, part of state, and substance use in the past 12 months. Substance use included having a DSM-IV alcohol use disorder, and using sedatives, stimulants and/or opiates at least five times. Analyses using smoking status as an independent variable also adjusted for cannabis use. Analyses for cannabis dependence adjusted for smoking.

All regression analyses used unweighted data. Never-smokers were the reference group in analyses of smoking status. Those who did not meet criteria for cannabis dependence were the reference group for analyses of cannabis dependence.

RESULTS

Demographic correlates of tobacco smoking

In the 2007 NSMHW, 22.9% of participants were current tobacco smokers, 27.9% were former smokers, and about half (49.2%) said that they had never smoked. The prevalence of smoking was about 2% lower in 2007 than in 1997, and there were about 1% more ex-smokers in 2007 than in 1997. In both years, males were more likely than females to be current or former smokers. Smoking was most common in 18–24 year olds in 1997 and in 25–29 year olds in 2007. It was least common in people aged 75 years and older in both years. In both surveys, smoking was more prevalent among those with lower levels of education, those who were unemployed, and those from socioeconomically disadvantaged households. Smoking was also substantially more common among those who reported using sedatives, stimulants and/or opiates in the past 12 months than those who did not.

Affective disorders and psychological distress in tobacco smokers

Affective disorders and elevated psychological distress were more common in current smokers than never-smokers in both surveys (Box 1). Affective disorders were more prevalent in smokers in 2007 and 1997, less prevalent in former smokers and of equal prevalence in never-smokers. Psychological distress was less prevalent in 2007 than in 1997, irrespective of smoking status.

1 Weighted prevalence, multivariate odds ratios and 95% confidence intervals for affective disorders and psychological distress, by smoking status, 1997 and 2007

	1997			2007		
	Prevalence (SE)	OR*	95% CI	Prevalence (SE)	OR*	95% CI
Affective disorder						
Never-smokers	4.6% (0.3)	1.00		4.6% (0.3)	1.00	
Former smokers	5.7% (0.5)	1.06	0.86–1.31	4.5% (0.5)	1.08	0.85–1.38
Current smokers	10.7% (0.8)	1.37	1.13–1.67	11.3% (1.1)	1.77†	1.41–2.22
Psychological distress‡						
Never-smokers	29.5% (1.3)	1.00		26.5% (1.0)	1.00	
Former smokers	32.1% (1.8)	1.14§	1.01–1.29	27.9% (1.8)	1.15§	1.02–1.30
Current smokers	41.2% (2.4)	1.33†	1.17–1.50	38.0% (1.8)	1.46†	1.28–1.66

* Adjusted for age, sex, education level, marital status, employment status, Socio-Economic Indexes for Areas quintile, neuroticism (1997 only), and substance use (DSM-IV alcohol disorder, cannabis and other drug use at least five times in the past 12 months). † $P < 0.001$. ‡ Scored between 16 and 50 (medium to high psychological distress) on the Kessler Psychological Distress Scale. § $P < 0.05$. ◆

2 Weighted prevalence, multivariate odds ratios and 95% confidence intervals for affective disorders and psychological distress, by cannabis dependence, 1997 and 2007

	1997					2007				
	Prevalence (SE)	OR*	95% CI	OR†	95% CI	Prevalence (SE)	OR*	95% CI	OR†	95% CI
Affective disorder										
No cannabis dependence	6.3% (0.2)	1.00		1.00		6.3% (0.2)	1.00		1.00	
Cannabis dependence	16.9% (2.7)	2.14‡	1.46–3.11	0.78	0.51–1.20	32.9% (9.1)	5.59‡	3.23–9.66	2.57‡	1.43–4.68
Psychological distress§										
No cannabis dependence	32.5% (1.0)	1.00		1.00		28.5% (0.7)	1.00		1.00	
Cannabis dependence	54.0% (4.6)	1.93‡	1.43–2.61	1.09	0.77–1.55	68.5% (7.3)	4.05‡	2.38–6.91	1.97¶	1.12–3.46

* Adjusted for sex, part of state, Socio-Economic Indexes for Areas (SEIFA) quintile, employment status and marital status. † Adjusted for sex, part of state, SEIFA quintile, employment status, education level, marital status, alcohol dependence, smoking, and use of sedatives, stimulants or opiates at least five times in past 12 months. ‡ $P < 0.001$. § Scored between 16 and 50 (medium to high psychological distress) on the Kessler Psychological Distress Scale. ¶ $P < 0.05$. ◆

Demographic correlates of cannabis dependence

In 2007, just under 1% of participants met the DSM-IV criteria for cannabis abuse/dependence; 1.4% less than in 1997. In both years, men were more likely than women to be cannabis dependent. Cannabis dependence was most common in 20–29 year olds in both surveys and least common in 60–69 year olds. In both surveys, it was more prevalent in the unemployed and those who had never been married, compared with people who were married, widowed, or divorced or separated. In 1997, cannabis dependence was more common among people with lower levels of education and from more socioeconomically disadvantaged households, but these trends were not statistically significant in 2007. In 2007, cannabis dependence was also more common among participants who used sedatives, stimulants or opiates at least five times in the past 12 months compared with those who did not.

Affective disorders and psychological distress in cannabis-dependent participants

In 2007, affective disorders and elevated psychological distress were more common in participants who met criteria for cannabis abuse or dependence than in those who did not, after adjusting for confounders (Box 2). In 2007, participants who met these criteria had two-and-a-half times higher odds of affective disorder and almost two times higher odds of elevated psychological distress than those who did not (after adjusting for demographics, smoking, alcohol and other drug use). In 1997, they had around two times higher odds of both affective disorder and psychological distress after adjusting for both sets of confounders.

Affective disorders and elevated psychological distress were more prevalent in cannabis-dependent participants in the 2007 than in the 1997 survey. Participants without cannabis dependence had similar prevalence of affective disorder in both years and slightly less psychological distress in 2007 than in 1997 (Box 2).

DISCUSSION

Affective disorders and elevated psychological distress were more common among current tobacco smokers than never-smokers in both 1997 and 2007 surveys; a finding consistent with that of other epidemiological surveys.[1,4,22]

Our findings did not support the notion that hardening is occurring in tobacco smokers because the differences between survey years in the prevalence of affective disorders among current and former smokers did not appear to be significantly different. Psychological distress (which was measured in the same way in both surveys) was less common in 2007 than in 1997, irrespective of smoking status.

Cannabis-dependent participants reported a higher prevalence of affective disorders and elevated psychological distress in 2007 than in 1997. This suggests some hardening among cannabis-dependent participants. Among participants without cannabis dependence, psychological distress and affective disorders were slightly less prevalent in 2007 than in 1997.

Different time frames were used in the assessment of affective disorders in the two surveys, but the number of symptoms assessed was the same, so the prevalence of affective disorders may have been slightly elevated in 2007 relative to 1997. The measure of distress and the time frame for self-reported symptoms was the same in the two surveys, suggesting no underlying change in the prevalence of symptoms of depression.

Cross-sectional survey data do not permit us to determine whether tobacco smoking and cannabis dependence are causes or consequences of affective disorders. Longitudinal studies would provide stronger evidence of the relationships between tobacco smoking and cannabis dependence and affective disorders. It is also possible that the differences between survey years in the prevalence of affective disorders among smokers and cannabis-dependent participants may reflect changes in survey methods and age, birth cohort or period effects.

We did not find strong evidence that the prevalence of affective disorders in tobacco smokers changed significantly between 1997 and 2007. However, we did find evidence to suggest the prevalence of affective disorders and psychological distress in cannabis-dependent people increased over this period, pointing to the possibility of a hardening effect.

In both surveys, smokers had higher rates of depressive disorders than non-smokers. The same was true of people with cannabis dependence compared with those without in 2007. Given evidence that smokers with depressive disorders are less likely to quit, our findings reinforce the importance of

addressing these disorders in smokers. The same is likely to be true for people with cannabis dependence. Our findings also highlight the importance of preventing tobacco smoking and cannabis dependence in reducing the burden caused by depression.

COMPETING INTERESTS

None relevant to this article declared (ICJME disclosure forms completed).

AUTHOR DETAILS

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