Heavy cannabis use and depressive symptoms in three Aboriginal communities in Arnhem Land, Northern Territory

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ABSTRACT

Objective: To determine the extent to which depressive symptoms are associated with heavy cannabis use in an Aboriginal population in Arnhem Land, Northern Territory.

Design, participants and setting: Cross-sectional study involving interviews with 106 Indigenous participants (57 males, 49 females) aged 13–42 years in three remote Aboriginal communities in Arnhem Land, NT, Australia.

Main outcome measures: Measures of depressive symptoms (a raw score of ⩾ 6 out of a possible 18 on a modified version of the Patient Health Questionnaire-9) and self-reported heavy cannabis use (six or more cones daily).

Results: After adjusting for other substance use (tobacco, alcohol and lifetime petrol sniffing), age and sex, heavy cannabis users were four times more likely than the remainder of the sample to report moderate to severe depressive symptoms (odds ratio, 4.1; 95% CI, 1.3–13.4).

Conclusions: Given its high prevalence in Indigenous populations, the development of clinical and prevention strategies for cannabis misuse are warranted.

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Mental health problems appear to be common in Australia's Indigenous population.[1-3] Compared with their non-Indigenous counterparts, suicide rates among Indigenous people aged up to 24 years are five times higher for females and three times higher for males.[2] High levels of violence, incarceration and physical illness may be contributors to poor mental health and suicide in Indigenous Australians.[1,2,4] In 2002, nearly a quarter (24%) of Indigenous people aged 15 years or more reported being victims of actual or threatened violence in the previous 12 months.[2] Moreover, marginalisation, loss of control and challenges to cultural continuity are also likely to play a role.[5]

Heavy substance misuse is a further potentially modifiable contributor to high levels of mental disorder in Indigenous populations.[1,6] Indigenous people are 4–5 times more likely than other Australians to be hospitalised for mental or behavioural disorders as a result of psychoactive substance misuse.[7] Despite growing links between cannabis and mental disorders, including psychotic illness[8] and depression,[9,10] its contribution to mental disorders in Indigenous people has, until now, been little studied.

A small proportion of the general Australian population uses cannabis regularly for extended periods.[11] However, in the Arnhem Land Aboriginal communities that are the subject of this study, a high prevalence of cannabis use has persisted from 2001, with 61% of males and 58% of females aged 13–36 years in a random sample of 162 people reporting using cannabis at least weekly in 2005–2006.[12] In comparison, of current Australian cannabis users, only 24% of males and 21% of females aged 14 years or older used cannabis weekly or more frequently.[13] In this study we explored the association between depressive symptoms and heavy cannabis use among Aboriginal people in Arnhem Land.

METHODS

We studied three Northern Territory Aboriginal communities and smaller single-family "outstation" settlements with a combined population of around 1700 in a location about 630 km east of Darwin. Although near a mining town with 1000 non-Indigenous residents, these Aboriginal people generally live within their traditional cultural paradigm with cultural concepts largely intact. A single Indigenous language is spoken across these communities. English is a second language and the people's skills in English vary.

This study was part of the third wave of a 5-year longitudinal study outlined below.

- In 2001, 162 people were randomly selected from patient lists compiled in the three communities' health clinics. Only 50 (31%) were interviewed in the study because of high population mobility. To supplement the interview group, an additional 60 respondents, comprising clinic attendees and general community members, were opportunistically recruited by Aboriginal health workers. All 60 were interviewed, bringing the total number of participants to 110.
- In 2004, 27 participants from the original random sample and 26 from the opportunistic sample were interviewed. An additional 20 people were opportunistically recruited, all of whom were interviewed.[14]
- Data for this study were collected from 17 October 2005 to 30 June 2006, by which time four of the original 110 participants had died and one duplicate record had been removed (leaving 105 possible participants from 2001, and another 20 from 2004). There were 106 participants interviewed in total. They comprised 89 of the 105 possible participants from 2001 (85%; 43 males, 46 females) and 17 of the additional 20 recruits from 2004 (85%; 14 males, three females).

The 106 participants in this study were aged 13–42 years, and represented 12% of the population in that age group in the three communities. The mean age of the 57 males was 27.0 years (SD, 7.5 years) and of the 49 females was 25.6 years (SD, 6.5 years). Characteristics of the study participants are shown in Box 1.

Ethical approval was granted by the Human Research Ethics Committees of Menzies School of Health Research, the NT Health Department and James Cook University.

Interviews

Interviews in the local Indigenous language and plain English were conducted by KSKL, MJJ and other local Indigenous research staff. A private outdoor space was usually available with interviews typically conducted in close proximity to routine family activity. Alternatively, interview locations such as an air-conditioned vehicle or health clinic consulting room were used. The duration of interviews was 15–50 minutes.

Cannabis use

We assessed the self-reported frequency and quantity of cannabis use in interviews.

Smoking six or more cones per day was defined as heavy use, a level corresponding to local community leaders' perceptions of heavy use. Participants were also classified as heavy users if they reported: being up all night smoking, spending a lot of time either looking for more cannabis or money to purchase it, compulsion to use in the morning or difficulties stopping use.

Four cannabis use categories were defined: lifetime abstainers; former users (quit 3 or more months prior); lighter users (less than six cones 2–3 times weekly); and heavy users (six or more cones daily). To compare the occurrence of depressive symptoms in the heaviest cannabis users with that in other respondents, a dichotomous measure distinguished those with the highest levels of cannabis use (six or more cones daily) from the remainder of the sample who were never, former and lighter users. We made this comparison because of literature linking heavy use with psychopathological disorder.[9]

1 Characteristics of 106 study participants from three remote Aboriginal communities in Arnhem Land, Northern Territory

Characteristic	No. (%)
Male	57 (54%)
Female	49 (46%)
Age group (years)	
13–19	23 (22%)
20–29	53 (50%)
30–42	30 (28%)
Employment	
Full time*	33 (31%)
Part time†	12 (11%)
Unemployed	61 (58%)
Having income support‡	60 (57%)
Currently attending school or training	18 (17%)
Substance use	
Heavy cannabis use§	52 (49%)
Tobacco use¶	95 (90%)
Petrol sniffing¶	3 (3%)
Alcohol use¶	22 (21%)
Kava use¶	10 (9%)

* Including full-time involvement in Community Development Employment Projects. † Involvement in regular Community Development Employment Projects. ‡ Pension, unemployment benefits, Youth Allowance. § Six or more cones daily. ¶ Current user at the time of interview (2005–2006). ◆

Other substance use and demographic factors

Self-reported current and lifetime substance use status (tobacco, alcohol, kava and petrol) were assessed, and data for demographic characteristics including involvement in school or training and current employment status were compiled. Age was verified using clinic patient lists. Amounts of alcohol, kava and petrol used could not be assessed accurately because alcohol access is tightly restricted and kava and petrol availability varies, so their use tends to be opportunistic and episodic. As further quantification was not feasible, participants were classified as users or non-users. Tobacco smokers were classified as smokers or non-smokers because the common behaviour of cigarette sharing makes quantification challenging.

Depressive symptoms

A modified Patient Health Questionnaire-9 (PHQ-9)[15] was administered by the interviewer to assess depressive symptoms in the fortnight prior to the interview. Modifications for local use were made in consultation with local Aboriginal health and mental health workers. Original response categories (never, several days, more than half the days, nearly every day) were simplified (never, a little, a lot). Scores of zero, one or two were allocated to the amended response categories. Cronbach's α coefficient was used to assess internal validity of the modified questionnaire (α, 0.73; 95% CI, 0.47–0.98). Particular efforts were made to clarify whether self-reported depressive symptoms occurred outside usual daily experience (eg, lethargy versus tiredness after physical exertion). In the original PHQ-9, raw scores of ≥ 10 (out of a possible 27) indicate moderate–severe depression.[15] This equates to ≥ 6.6 (out of a possible 18) in the modified PHQ-9 we used. Accordingly, raw scores of ≥ 6 were used to indicate a moderate–severe threshold of depressive symptoms.

Statistical analysis

The association between moderate–severe depressive symptoms and heavy cannabis use was estimated by logistic regression, controlling for influence of confounding factors (age, sex and other substance use).

RESULTS

Baseline comparisons of the randomly selected and opportunistically recruited interview samples showed no differences in sex, age, or heavy cannabis use (each $P > 0.1$). A greater proportion of males were lost to follow-up interview in 2005–2006 than females ($P = 0.02$), but there were no differences in baseline prevalence of heavy cannabis use ($P = 0.77$) or age ($P = 0.21$).

Concurrent substance use was common among heavy cannabis users who reported moderate–severe depressive symptoms, with 100% smoking tobacco, 47% (8/17) current alcohol drinkers and 6% (1/17) sniffing petrol. Among respondents without moderate–severe symptoms, concurrent substance use was also common, with 88%

2 Association between patterns of cannabis use and moderate–severe depressive symptoms* in 106 participants aged 13–42 years from three remote Aboriginal communities in Arnhem Land, Northern Territory

Variables	No. of participants	Unadjusted odds ratio (95% CI)	Adjusted odds ratio† (95% CI)
Male	57	0.5 (0.2–1.2)	0.3 (0.1–0.9)
Age	106	1.0 (0.9–1.0)	0.9 (0.9–1.0)
Cannabis use			
Never, former and lighter users	54	1.0	1.0
Heavy users	52	2.8 (1.1–7.2)	4.1 (1.3–13.4)
Current alcohol use	35	0.4 (0.1–1.7)	1.3 (0.4–4.1)
Current tobacco use	95	3.4 (0.4–27.8)	2.2 (0.2–21.2)
Lifetime petrol use	45	1.3 (0.5–3.3)	1.0 (0.3–2.8)

* Raw score of ≥ 6 out of a possible 18 on the modified Patient Health Questionnaire-9 (PHQ-9).[15] † Independent variables were age, sex, cannabis use, current tobacco and alcohol use and lifetime petrol use. The contribution of each in predicting depressive symptoms is shown, controlling for the effects of the others. ◆

(71/81) smoking tobacco and a third (33%, 27/81) drinking alcohol.

Cannabis and depression

Just under a quarter of the sample (24%, 25/106; 31% of females [15/49]; and 18% of males [10/57]) reported symptoms indicative of moderate–severe depression (raw score on the modified PHQ-9 of ≥ 6).

One in seven (15%, 8/54) of the never, former and lighter users reported moderate–severe symptoms, compared with one in three heavy users (33%, 17/52).

Box 2 shows that heavy cannabis users were nearly three times more likely to report moderate–severe depressive symptoms than the remainder of the sample (OR, 2.8; 95% CI, 1.1–7.2). The association was similar in females (OR, 4.9; 95% CI, 1.3–17.9) and males (OR, 4.2; 95% CI, 0.8–21.7). After controlling for potential confounders (age, sex, current alcohol and tobacco use, and lifetime petrol sniffing), the association strengthened (OR, 4.1; 95% CI, 1.3–13.4). No significant interactions were found with sex or other substance use.

Restricting the analysis to symptoms that are associated with depression, but unlikely to be associated with cannabis intoxication (ie, anhedonia, depression, worthlessness and suicidal ideation), mean total scores for heavy users were significantly higher than those of the never, former and lighter users ($P = 0.02$).

DISCUSSION

We found a strong association between heavy cannabis use and moderate–severe depressive symptoms in this Indigenous Arnhem Land community sample. Rates of depression were high, with nearly a third of females and one in six males reporting moderate–severe symptoms. There are no similar data published reporting the prevalence of depressive symptoms and their associations with cannabis use in any Indigenous sample worldwide. Consistent with studies in non-Indigenous populations, the association between cannabis and depressive symptoms was clearest in heavy cannabis users,[16,17] and remained after controlling for potential confounders including other substance use.

Several limitations of this study should be noted. A combined sampling strategy was necessary in these remote Indigenous communities where populations are small and highly mobile. Although those interviewed comprised 12% of all males and females in the 13–42 years age group, only part of the sample was randomly selected with the remainder being opportunistically recruited. It is therefore possible that the presence of depressive symptoms may have influenced participant recruitment in some way. We adapted the PHQ-9 (a widely validated measure of depressive symptoms)[15] with the assistance of local Aboriginal health and mental health workers to ensure the instrument's suitability in the local context and across age groups. A specific validation study was not undertaken after modifications were made, although the internal consistency of the instrument suggests reliability. It nevertheless remains possible that the construct assessed does not fully correspond with the Western concept of depression, warranting further investigation.

We cannot exclude the influence of confounding factors not measured, such as stress, violence and trauma which are widespread in Australian Aboriginal populations.[2,6] In a study context such as this, where research conducted across language and cultural barriers faces considerable challenges, lengthy interviews with detailed examination of concurrent mental disorders, physical health, trauma, health service contact and other factors that may impact on the severity of depressive symptoms were not possible. For most individuals, a 25-minute interview was the maximum feasible. Depression might theoretically cause the levels of cannabis use we found through a process of self-medication. However, to date there has been little support for a "self-medication" hypothesis.[9,17,18]

The possibility that heavy cannabis use caused the depressive symptoms observed deserves consideration. The relationship observed elsewhere between daily use of cannabis and a higher frequency of diagnoses of depression[16,17] is consistent with this view, but longitudinal studies in Indigenous samples would be needed to test this further.

The damaging effects of alcohol on Australian Indigenous communities are well recognised, and have led to community-driven policies restricting supply.[3] These policies have been successful in reducing some social and health burdens associated with alcohol misuse. The high prevalence of cannabis use and emerging evidence of an association with mental disorders suggests a need for clinical interventions and preventive programs aimed at cannabis misuse in Indigenous communities, along with continued support for measures to reduce supply.[19,20]

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COMPETING INTERESTS

None identified.

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