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Research Letter

The Frequency of Psychotic Disorders Since the Legalization of Cannabis in Germany

A Before-and-After Analysis

On 1 April 2024, the possession and use of cannabis for recreational purpose was legalized for adults. With cannabis being considered one of the strongest risk factors for the development of psychotic disorders, there was concern that the incidence of cannabis-induced psychosis would increase (1). Findings from international studies on the effects of cannabis legalization on psychiatric hospitalizations are conflicting (2, 3). No data from Germany has yet become available.

The aim of this pilot study was to comprehensively assess the development of hospitalization rates for cannabis-induced psychosis in one region in Germany during the period preceding and following cannabis legalization, and to provide a quantitative assessment of potential changes.

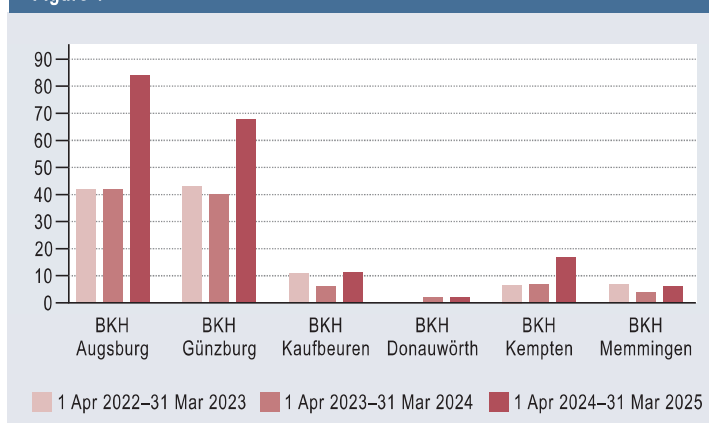
Methods

These anonymous retrospective analyses of routine data are based on inpatient cases treated in hospitals of Bezirkskliniken Schwaben (BKS, 6 district hospitals with 1024 planned beds which are responsible for providing all inpatient psychiatric care in the Swabia administrative district in Bavaria) during a period of three years (24 months before and 12 months after the legalization as of 1 April 2024). To ensure that the primary cause of treatment was assigned unambiguously, only main diagnoses according to ICD-10 in patients aged 18 or older were included in the analyses: cannabis-induced psychosis (F12.5), cannabis-related disorders overall (F12.0–F12.9) and non-organic psychotic disorders in the schizophrenia spectrum (F20–F29). Hospitalization rates were calculated as the number of cases per 100 000 population per quarter, based on the proportion of the adult population (1 893 005 persons) in the district of Swabia according to the 2022 census of the Bavarian State Office for Statistics (www.statistik.bayern.de). The statistical software IBM SPSS Statistics Version 30.0.0.0 (IBM, 2024) was used to calculate the odds-ratios (OR) with 95% confidence intervals (CI) for the comparison of the periods before (from second quarter 2022 to first quarter 2024) and after (from second quarter 2024 to first quarter 2025) the legalization of cannabis. The manuscript was linguistically enhanced using ChatGPT-4o (OpenAI) and Claude 4.0 Sonnet (Anthropic); all suggestions were carefully reviewed by the authors.

Results

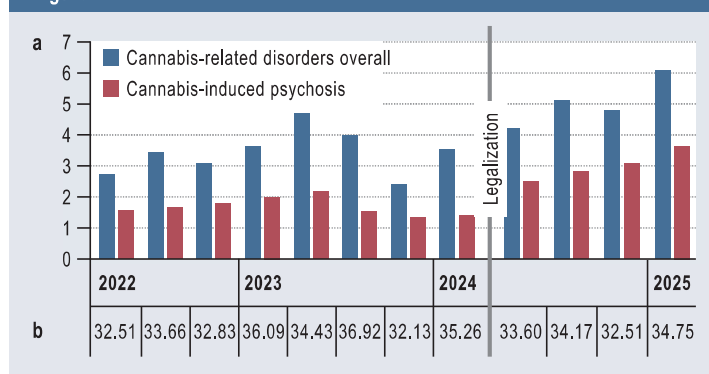
The number of inpatient treatment cases in the Swabia district remained stable during the observation period. The absolute number of cases of cannabis-induced psychosis increased after the legalization of cannabis (Figure 1). The hospitalization rate for patients with cannabis-induced psychosis increased (mean ± standard deviation) from 1.68 ± 0.28 per 100 000 population per quarter before the legalization to 3.00 ± 0.49 after the legalization. The hospitalization rate for patients with cannabis-related disorders overall (ICD-10 F12.0–F12.9) increased (mean ± standard deviation) from 3.45 ± 0.73 before the legalization to 5.05 ± 0.78 per 100 000 population per quarter after the legalization (Figure 2a).

Figure 1



Number of cases of cannabis-induced psychosis: Number of patients who were admitted for inpatient treatment of cannabis-induced psychosis (y-axis) to any of the six district hospitals (BKH) of Bezirkskliniken Schwaben (x-axis) between 1 April 2022 and 31 March 2025.

Figure 2



Hospitalization rates in the Swabia district, 1 April 2022 to 31 March 2025

- a) Cannabis-related disorders by ICD diagnostic groups cannabis-related disorders overall (ICD-10: F12.0–F12.9) and cannabis-induced psychosis (ICD-10: F12.5), per 100 000 population per quarter (y-axis) during the period 2022 to 2025 (x-axis).
b) Non-organic schizophrenia spectrum disorders (ICD-10 F20–F29), per 100 000 population per quarter (y-axis) during the period 2022 to 2025 (x-axis).

Analysis of the quarterly data found that the likelihood of cannabis-induced psychosis (OR = 1.78; 95% CI [1.46; 2.17]) and cannabis-related disorders overall (OR = 1.46 [1.27; 1.69]) was higher after legalization compared to the period before legalization. The number of hospitalizations of patients with other psychotic disorders (ICD-10: F20–29) decreased slightly (mean $\pm$ standard deviation; before: 34.23 ± 1.75 per 100 000 population per quarter; after: 33.76 ± 0.95 per 100 000 population per quarter; OR = 0.99 [0.94; 1.04]) (Figure 2b). The proportion of cases with cannabis-induced psychosis among psychotic disorders in the schizophrenia spectrum rose from 4.7% before legalization to 8.2% after legalization.

Discussion

In the region studied, the available data show an increase in cases diagnosed with cannabis-induced psychosis after cannabis legalization, while the overall rate of cases with schizophrenia spectrum disorders fell slightly, resulting in only a marginal increase in the total for both groups. Thus, the proportional share of cannabis-induced psychosis in patients with non-organic psychosis has nearly doubled after legalization. The number of cases of cannabis-induced psychosis increased 1.8 times, thus exceeding the increase in cannabis-related hospitalizations overall (1.5 times).

Possible explanations for the observed increase

Since our analyses presented here are descriptive, they cannot be used to explain the underlying mechanisms. When interpreting the findings, it is important to distinguish between an actual increase in incidence and a change in the practice of diagnosing cannabis-induced psychosis. The decrease in cases of non-organic psychosis corresponds to approximately one-third of the increase in cases of cannabis-induced psychosis, suggesting, in part, a shift in diagnosis. Increased diagnostic attention and greater honesty regarding cannabis use due to decreased stigma may have introduced detection bias. In addition, a confirmation bias may have been introduced as a result of an expected increase in the number of cases of cannabis-induced psychosis and, consequently, the number of cases diagnosed with the condition.

Implications for prevention and research

The possible increase in cases of cannabis-induced psychosis could be an argument in favor of more targeted preventive measures. In addition to general awareness campaigns about the risks associated with cannabis use, vulnerable groups in particular should be educated about the risk of developing psychosis. Future studies should investigate nationwide in Germany whether the incidence of cannabis-induced psychosis is actually increasing. This research should be designed to collect detailed data on consumption patterns, availability of cannabis products and conversion rates of cannabis-induced psychosis to schizophrenia or bipolar disorder. Danish registry studies, analyzing a period of 20 years, found conversion rates of 47% (4).

Limitations and outlook

Relevant limitations apply to our data: Only cannabis-induced psychosis and non-organic psychosis was taken into account, whereas other substance-induced psychosis and organic psychosis were not. In addition, no distinction was made between an incidental diagnosis and a repeat diagnosis. Confounding factors, such as social composition of the population, were not part of our analyses. For a reliable assessment of the conversion rates from cannabis-induced psychosis to psychotic disorders, longer observation periods would be needed. Our analyses are limited to the catchment area of the BKS hospitals. However, since these six hospitals are responsible for all psychiatric admissions in the Bavarian Swabia region, completeness and representativeness of the data collection for this region can be assumed. No statements can be made about admissions of persons younger than 18 years of age or admissions to non-psychiatric hospitals. Longer-term observations from other regions as well as causal analyses are needed to assess how stable these trends are and to implement appropriate measures.

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Conflict of interest statement

SKG is a scientific advisor to the GOLDKIND Foundation. She received reimbursement of travel expenses related to a presentation at the 24th Bayerisches Forum Suchtprävention from the Free State of Bavaria.

VS received lecture fees for a presentation from the Aichach-Friedberg district office.

KF received support for conference travel from Janssen and fees for participation in a BPTK workshop. He is deputy spokesperson for ackpa and a member of the DGPPN Executive Committee.

AH is the editor of the S3-level clinical practice guideline "Schizophrenia" (DGPPN) and first author of the WFSBP guidelines "Guidelines for Biological Treatment of Schizophrenia". Furthermore, he was a member of advisory boards at AbbVie (only lecture fees), Advanz (only lecture fees), Janssen-Cilag, Lundbeck, Recordati, Rovi, and Otsuka and received lecture fees from these companies.

The remaining authors declare that no conflict of interest exists.

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