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Prevalence and determinants of depression and anxiety measured by the PHQ-4 among homeless individuals during the COVID-19 pandemic. Evidence from the Hamburg survey of homeless individuals

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In 2018, about 6600 homeless individuals lived in Hamburg (second largest city in Germany with about 1.8 million inhabitants). During the COVID-19 pandemic, homeless individuals reflect a group of particular interest. This can be explained by the fact that they may have an increased risk of being infected with SARS-CoV-2 because of poor hygienic conditions – which could have severe health consequences because of their vulnerability.

In this study, we were interested in probable depression and probable anxiety among the homeless individuals during the COVID-19 pandemic. Increased prevalence rates are plausible as they may be afraid of getting infected and may fear the consequences for their health. To the best of our knowledge there is a lack of studies concentrating on probable depression and probable anxiety among homeless individuals during the pandemic. We only identified one study based on a small sample of 27 homeless people in a hostel for confined homeless individuals assessed from late March until late May 2020 in Salamanca, Spain (Martin et al., 2021). According to the DSM-5 criteria, 63% of these individuals had mental disorders. Moreover, 29.4% had anxiety disorders, 11.7% had affective disorders and 17.6% had a psychotic disorder. Due to this limited knowledge, our aim was to identify the prevalence and correlates of probable depression and probable anxiety among homeless during the COVID-19 pandemic. For instance, this knowledge is important because depression and anxiety may result in suicide during the pandemic.

Data were used from the Hamburg survey of homeless individuals. This study was performed from 25th May to 3rd June 2020. The Hamburg survey of homeless individuals focused on homeless adults in Hamburg, Germany. They were interviewed in specialized medical practices, shelters for the night and lodging houses. In total, 151 individuals participated in the Hamburg survey of homeless individuals

(response rate: 98%). Individuals were offered an incentive of 5 € per 30 min. While it was possible for the participants to fill out the questionnaire independently, most individuals were interviewed face-to-face since they had problems with reading and understanding the questions. Two medical students carried out the interviews. Written informed consent was provided by all individuals prior to their participation. An ethical statement was received from the medical council of Hamburg (application number: PV7333).

To quantify our outcome measures, we used the Patient Health Questionnaire-4 (PHQ-4). The PHQ-4 (Kroenke et al., 2009) includes self-reported questionnaires as follows: the 2-item Patient Health Questionnaire (PHQ-2) and the 2-item Generalized Anxiety Disorder screening tool (GAD-2). The PHQ-2 includes the two DSM-V diagnostic main criteria for depressive disorders. Furthermore, the GAD-2 covers the two main criteria for GAD. These have been shown to be effective screening tools for social anxiety (specificity: 0.81; sensitivity: 0.70), panic disorder (specificity: 0.81; sensitivity: 0.76) and post-traumatic stress disorder (specificity: 0.81; sensitivity: 0.59). These two-item measures combined results into the PHQ-4.

For both (PHQ-2 and GAD-2), sum scores of three and higher were recommended as cut-off points for probable depression or anxiety, respectively (Kroenke et al., 2009). In the current study, Cronbach's alpha for PHQ-4 equaled 0.85, indicating a good internal consistency of this instrument.

In regression analysis, various independent variables were included: sex (women; men), age in years, marital status (single, divorced; widowed; married), education (according to the CASMIN classification: primary, secondary and tertiary education, country of origin (Germany; neighboring country; other country) and chronic alcohol consumption according to the carbohydrate-deficient transferrin (CDT > 2.5 refers to

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elevated). Furthermore, the perceived risk of contracting COVID-19 one day (from 1 = very low to 5 = high) was used as independent variable.

Based on the PHQ-4 cut-off values, 22.5% of the individuals had probable depression and 19.7% of the individuals had probable anxiety. The average age equaled 44.2 years (SD: 12.9; from 22 to 71 years) and most of the individuals were male (77.4%).

Our study showed that while neither the likelihood of depression nor the likelihood of anxiety was positively associated with sociodemographic variables (sex, age, family status, education, and country of origin) or chronic alcohol consume, both outcomes were associated with the perceived risk of contracting COVID-19 one day (probable depression [OR: 1.78, 95% CI: 1.10–2.87] and probable anxiety (OR: 1.93, 95% CI: 1.17–3.18)).

In sum, the prevalence rates for homeless individuals are, for example, similar compared to the general population in Germany (Petzold et al., 2020). While it has been found in former studies that depression and anxiety were associated with younger age, being female and morbidity during this pandemic (Xiong et al., 2020), we did not identify comparable associations in our study. In contrast, we identified a link between perceived risk of contracting COVID-19 and both probable depression and anxiety. During this pandemic, such a positive association between perceived risk of contracting COVID-19 and both anxiety and depression has repeatedly been shown in various groups (e. g., university students in China (Feng et al., 2020)).

Some strengths and limitations of this study are worth noting. Data were taken from a vulnerable population which is often difficult to access, i.e. homeless individuals. Furthermore, interviews were conducted in times of COVID-19 pandemic. It should be acknowledged that a short screening tool was used to quantify our outcome measures. While future research is required based on more sophisticated tools such as the GAD-7 or PHQ-9, it should be emphasized that interviewing homeless individuals about this sensitive topic usually makes it necessary to concentrate on very short tools (e.g., to avoid drop-out during the interview, or misunderstandings). Thus, we decided to use the PHQ-4 instead of more sophisticated tools in our current study.

In conclusion, the magnitude of depression and anxiety among homeless individuals during the COVID-19 pandemic was highlighted. Identifying the correlates (i. e. perceived risk of contracting COVID-19) of depression and anxiety may assist in determining homeless individuals at risk.

Funding

The study was made financially possible by uncommitted private

donations to the University Medical centre Hamburg-Eppendorf. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Ethics statement

The study was conducted in accordance with the Declaration of Helsinki and the ethical statement was obtained from the medical council of Hamburg (application number: PV7333).

Prior to investigation, all individuals gave their written informed consent.

CRediT authorship contribution statement

André Hajek: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Fabian Heinrich:** Conceptualization, Writing – review & editing, Funding acquisition. **Victoria van R uth:** Writing – review & editing. **Benedikt Kretzler:** Writing – review & editing. **Felicia Langenwalder:** Writing – review & editing. **Klaus P uschel:** Conceptualization, Writing – review & editing. **Franziska Bertram:** Conceptualization, Writing – review & editing. **Hans-Helmut K nig:** Conceptualization, Writing – review & editing, Supervision.

Declarations of Competing Interest

None.

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