

Co-occurring mental and substance use disorders in South African men: A Community survey



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Background: The co-occurrence of mental and substance use disorders (SUDs) poses major public health challenges. Understanding their prevalence and risk factors is critical for developing targeted interventions.

Aim: To estimate the prevalence of substance use and risk of co-occurring common mental disorders in three South African provinces (Western Cape, Eastern Cape [EC] and North West [NW]).

Setting: The study was conducted in three provinces in South Africa (Madibeng district in NW province, King Sabata Dalindyebo [KSD] in the EC and Khayelitsha in the Western Cape).

Methods: A stratified multistage random household survey was conducted using the 9-item Patient Health Questionnaire (PHQ-9), 7-item Generalised Anxiety Disorder Assessment (GAD-7) and Primary Care PTSD Screen (PC-PTSD-5) to assess mental disorders. Alcohol and substance use were measured with the Alcohol Use Disorders Identification Test (AUDIT) and Drug Use Disorders Identification Test (DUDIT). Weighted prevalence estimates were calculated, and Rao–Scott adjusted Chi-square tests accounted for the complex survey design. Unweighted Chi-square tests explored demographic associations.

Results: Of 1597 participants, 64.9% screened positive for at least one mental disorder. The prevalence of alcohol use disorder (AUD) was 31.9% and SUD 7.4%. Co-occurrence of AUD and SUD was 6.3%. Alcohol use disorder was significantly associated with depression, anxiety and posttraumatic stress disorder (PTSD), whereas SUD (excluding alcohol) showed no significant associations.

Conclusion: Psychiatric comorbidity was partly associated with substance use. The findings highlight a substantial burden of co-occurring alcohol use and mental disorders among South African men, underscoring the need for integrated, trauma-informed primary healthcare services.

Contribution: The study provides population-based evidence to inform service delivery and policy for under-resourced settings.

Keywords: alcohol use; substance use; mental disorder; depression; anxiety; post-traumatic stress disorder; men.

Introduction

The co-occurrence of mental disorders in people who use substances is common.^{1,2,3,4,5} Up to 37.9% of people with a substance use disorder (SUD) have a co-occurring mental disorder, and conversely up to 18.2% of people living with mental illness have an underlying SUD. Commonly described co-occurring conditions are mood disorders and anxiety disorders, which tend to co-occur with substance use.² Reasons for this are multifactorial: shared risk factors, substance use causing mental disorders and mental illness predisposing to substance use. Common risk factors for some mental disorders and substance use may include genetic vulnerability, impulsivity traits, environmental factors and social determinants.^{2,3,4}

Several studies report a high prevalence of substance use among individuals with mental illness compared to the general population.^{6,7,8,9,10,11,12,13,14,15,16,17,18,19} In a study in the Eastern Cape (EC), South Africa (SA), 83% of 125 participants with first-episode psychosis had a current or lifetime history of substance use.⁵ Post-traumatic stress symptoms have also been shown to be significantly associated with SUDs, especially alcohol use disorder (AUD) in SA.¹³ Other SA studies showed that 47.3% of people with bipolar disorder (BD) and 41.4% of those with schizophrenia had comorbid SUD.¹⁰ Another EC study found that 33.3% of individuals living with mental illness reported past-year alcohol use, while 18.5% reported risky alcohol use.⁹ In a study in East Africa,

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40.6% of respondents had major depressive disorder (MDD), with 17% also using tobacco and 30% using alcohol daily.²⁰ Depression and anxiety increase the risk of substance misuse.^{20,21,22,23,24,25} In the United States (US), co-occurrence of SUDs with serious mental illnesses such as schizophrenia, BD and MDD has been shown in people with SUD.^{15,26} A Finnish study reported that 45% of patients with excessive substance use had more severe psychiatric disorders than the general population, particularly schizophrenia and BD.²⁷ Youths in Sweden showed a greater severity of substance in association with anxiety, aggression, concentration difficulties, hallucinations and trauma-related mental stress.¹⁵

Co-occurrence of SUDs with depression has also been reported in the United States, with conditions such as schizophrenia, BD and MDD frequently identified in people with SUD.^{15,26} A Finnish study described 45% of patients with excessive substance use who had more severe psychiatric disorders than the general population, particularly schizophrenia and BD.²⁷ In SA, post-traumatic stress symptoms have been significantly associated with SUDs, especially AUD.¹⁴ Numerous studies also highlight the link between depression and substance use.^{15,28,29,30} One study found that individuals with SUD experienced elevated levels of anxiety and depression.¹⁵ In Spain, people with SUD reported high depressive symptoms, particularly when social support was low.⁶

Although mental and SUDs are prevalent among men, they may be underreported because of lower help-seeking rates compared to women.³¹ This gap is particularly pronounced in low- and middle-income countries (LMICs), where stigma and masculine norms discourage help-seeking and emotional expression.³¹ Substance use disorders are more prevalent in men,^{32,33,34} who are also more likely to engage in heavy and binge drinking.³⁵ Gendered patterns of substance use are further shaped by societal and cultural expectations.³⁶ A Gauteng-based study found that 67% of psychiatric inpatients, especially younger men, had SUD.³⁷ Overall, SUDs are more common in men and in those with lower educational attainment.⁶

In 2019, alcohol use contributed to 2.07 million male and 374 000 female deaths globally.³⁸ Risky alcohol use often co-occurs with other psychoactive substance use, particularly among younger males in rural SA.⁹ Cannabis was the most frequently used substance among 39.7% of respondents, while cigarette smoking in men aged 15 years and older was significantly associated with depression.³² Globally, SUDs are a major cause of morbidity and mortality, yet the majority of individuals with SUDs do not receive treatment, especially in LMICs.³³ In SA, 37.9% of patients with co-occurring mental and SUDs face treatment access challenges, and 28.8% receive substandard care.¹⁵

Problem statement

Understanding the extent of co-occurrence of SUDs and common mental disorders in the South African context is crucial to inform public health strategies and to develop accessible, effective interventions tailored to this population, and there are limited studies focusing on this aspect.

Hypothesis

Our hypothesis was that the prevalence of substance use in men with co-occurring mental disorders is higher than in men who do not have co-occurring mental disorders.

Research methods and design

Study design

We used a cross-sectional household survey incorporated as part of a wider study to assess and describe the problem site of SUDs and explore obstacles to treatment among men. Initially, we conducted a qualitative exploratory survey to examine the barriers to accessing treatment for substance abuse in men followed by a quantitative cross-sectional household survey. This article shall focus on the quantitative aspects of the study.

Setting

The study was conducted in sites in three provinces (Madibeng district in North West [NW] province, King Sabata Dalindyebo [KSD] in the EC and Khayelitsha in the Western Cape). This

study was a continuation of a research study on treatment seeking by men with AUDs in Khayelitsha (an urban area) in the Western Cape province. Given the study's focus on migration (among other factors), the EC was selected as another study site as the majority of people who migrate to Khayelitsha originally hail from the EC province. Madibeng encompasses the Brits and Hartbeespoort areas, with a mixture of urban and rural communities, which could provide insights into both urban and peri-urban patterns of substance use.

The overall study comprised several different sub-studies, some of which were specific to site. The sub-studies included surveys that examined the prevalence and severity of SUDs and common comorbid psychiatric disorders (CCPDs) and associated risk factors to determine (among others) the need for treatment and the extent of unmet need in the study communities. Prior to the commencement of the research, a community advisory group (Community Advisory Board [CAB]) was formed composed of community members in each of the study sites. Community Advisory Board members were drawn from health professionals, treatment centre personnel, members of non-governmental organisations (NGOs) serving people with SUDs, homeless people's shelters (assisting people who use substances) and community members, some with lived experience of using substances.

Study population

The profile of the sites and target population at each site are described next. King Sabata Dalindyebo is a sub-district of OR Tambo district in the EC. OR Tambo district is the largest and most populated of the province's six districts. King Sabata Dalindyebo sub-district has approximately 500 000 people and is one of the province's poorest sub-districts with an unemployment rate of approximately 33%.¹⁶ It is considered an admixture of peri-urban and rural settlements. The Madibeng district is in NW and covers an area of 3839 km², with a population of 477 381 and a density of 120 /km². The population comprises a majority of black African people (89.3%). The unemployment rate in NW is 23.9%.¹⁷ Khayelitsha has a population of approximately 500 000 people, the majority of whom are black African (90.5%). Approximately 62% of its residents are originally from the EC province. The unemployment rate of Khayelitsha is 38%.¹⁸

Inclusion and exclusion criteria

All respondents who identified as male, were older than 18 years and were willing to take part were included.

Sampling and bias

Random sampling was employed during the household survey. We applied a stratified multistage probability sampling method based on study site location, rural or urban. A sampling frame of all Enumeration Areas (EAs) in the three sites – Khayelitsha, KSD Municipality and Madibeng Municipality – was obtained from Statistics South Africa, which provides annual updates on EA data for SA. Multistage sampling was

further conducted to select EAs (level 1), households (level 2 units) and respondents within households (level 3 units). Up to 135 EAs across sites – 45 EAs in each site – were selected through applying probability proportional to size using the measure of size estimates (population and number of households) contained in Statistics South Africa's EA frame to select sites. Household points were selected systematically in the second stage from a random starting point in each EA. The respondent to be selected for the interview was picked using a programmed mobile app if more than one eligible respondent was available at the selected household.

Sample size calculations were based on the following assumptions: a refusal or non-response rate of around 30% and a prevalence range of AUD, ranging from 10% to 30%. Based on the sample size calculations, we aimed to approach adult respondents at coordinates determined a priori to reach a target of 547 male adult respondents who were 18 years and older at each site. This sample size would allow for at least a 3% precision around an AUD prevalence of $\leq 10\%$.

Data collection

Trained male fieldworkers visited the selected households and, after receiving permission to enter the household, explained the study to the contact household member. They inquired about the ages and gender of all members of the household to determine the number of people who were eligible to take part in the study. Next, they randomly selected one eligible man (aged 18 years and above) from each household using a programmed mobile app. Those who were eligible and willing to participate underwent an informed consent process and were then interviewed by the fieldworker using structured interview questions via a tablet, conducted in a private location within or around the participants' homes. The interviews were face to face, with responses entered directly onto a tablet device.

Fieldworker training

Each study site had two teams per site. Each team composed of one field supervisor and four fieldworkers. Training was conducted with all the sites over 10 days. The main training venue was the South African Medical Research Council in Pretoria, where most of the trainers were. The team from NW (which is geographically near Pretoria) congregated at the training venue, while teams from KSD and Khayelitsha joined the training virtually. Training covered the following topics: overview of the project, including the project's background, rationale, aim and methods, ethics in research, research materials (consent forms, questionnaire), use of the mobile app to complete study procedures (selecting participants, completing questionnaire), standard operating procedures and role play of anticipated study activities. Trainers were trained first, and then they trained the field workers with support from Geospace on the use of the mobile app. The latter training focused on the mobile app, standard operating procedures and role play of study procedures to ensure uniformity and standardisation.

Assessment tools

We assessed alcohol use with the Alcohol Use Disorders Identification Test (AUDIT) and drug use with the Drug Use Disorders Identification Test (DUDIT). We also screened participants for common mental disorders using validated instruments, including the 9-item Patient Health Questionnaire (PHQ-9) for depressive disorders (Cronbach's $\alpha = 0.89$), the 7-item Generalised Anxiety Disorder Assessment (GAD-7) for anxiety ($\alpha = 0.92$) and the 5-item Primary Care PTSD Screen for DSM-V (PC-PTSD-5) ($\alpha = 0.86$). We also made use of the SF-8, an eight-item measure of health and well-being, assessing domains such as physical functioning, bodily pain, general health, vitality, social functioning, limitations because of emotional health and mental health. The SF-8 has been well validated across diverse samples, including in SA, and demonstrated good internal consistency (Cronbach's $\alpha = 0.85$).

Variables

We collected data on the use of substances, including the type of substance. We analysed the data to assess for relationships between these variables and factors like age, the PHQ-9, GAD-7 and PTSD individual items and total scores.

The AUDIT tool interpretation was based on guidance ranges provided in the tool out of a total score of 40: a score of 8 equated to hazardous or harmful alcohol, which is also the threshold for screening positive for possible AUD in the general population. For the DUDIT, the guidance was a score of 6 or more, which indicated a likely drug-related problem, which is also the threshold for screening positive for possible SUD (as measured by the DUDIT). For clarity, the terms AUD and SUD – as measured by the DUDIT in this article – are used to denote a positive screen that reached the threshold of hazardous or harmful use.

Data analysis

Multivariate logistic regression was conducted using dependent and independent variables. Where applicable, weighted data were used, and odds ratios with confidence intervals were computed using methods appropriate for the survey design.

Ethical considerations

Ethical clearance to conduct this study was obtained from Walter Sisulu University and Faculty of Health Sciences Postgraduate Education, Training and Research Ethics Unit (No. [023/2019]). Only consenting adults older than 18 years were included, and all participants were informed of their right to withdraw from the study at any point should they wish.

Results

Up to 1597 participants were surveyed. The majority were black African males, with ages ranging from 34 years in the more urban site (Khayelitsha) to 39 years in the rural sites (KSD and Madibeng). Most participants (81% – 84%) reported living with

others although these cohabiting relationships were often undefined. Only about half had ever been married. The mean age was 37.69 years (standard deviation [SD] = 14.23), with a median of 35 years and an interquartile range (IQR) of 26–47 years. Associations between AUD, SUD, PTSD and demographic characteristics such as marital status, education and employment were examined using unweighted chi-square tests because of design complexity. These results are interpreted as exploratory.

Marital status was significantly associated with AUD ($\chi^2[6] = 60.82, p < 0.001$) and SUD ($\chi^2[6] = 23.78, p = 0.001$). Educational attainment was marginally associated with AUD ($\chi^2[16] = 26.00, p = 0.053$) but not with SUD ($\chi^2[16] = 18.70, p = 0.285$). Employment status was not significantly associated with PTSD ($\chi^2[11] = 5.95, p = 0.877$).

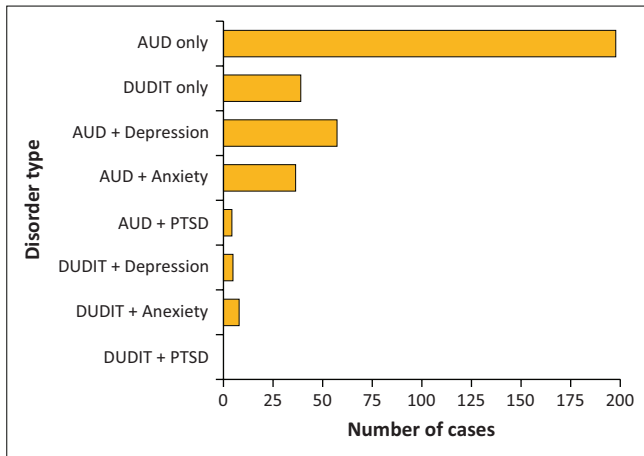
Weighted analysis indicated that 64.9% (1037/1597) screened positive for one or more mental disorder. The prevalence of AUD was 31.97% (511/1597) and SUD was 7.38% (118/1597). Co-occurrence of AUD and SUD was observed in 6.3% (101/1597). Only 43 (2.7%) participants screened negative for all the mental disorders assessed. Co-occurrence of AUD and a mental disorder was observed in 272 participants (17.0%), while 36 (2.3%) participants with a positive DUDIT score also screened positive for a mental disorder.

The Rao–Scott adjusted Chi-square analysis showed a statistically significant association between AUD and SUD ($\chi^2 = 56.98, p < 0.001$), confirming a strong relationship between alcohol and other substance use in this population. Unweighted chi-square tests were conducted for exploratory associations between demographics and AUD, SUD and PTSD. Marital status was significantly associated with AUD ($\chi^2[6] = 60.82, p < 0.001$) and SUD ($\chi^2[6] = 23.78, p = 0.001$). Educational attainment was marginally associated with AUD ($\chi^2[16] = 26.00, p = 0.053$) but not with SUD ($\chi^2[16] = 18.70, p = 0.285$). Employment status was not significantly associated with PTSD ($\chi^2[11] = 5.95, p = 0.877$).

Multivariate logistic regression models indicated that the co-occurrence of anxiety, depression and PTSD significantly increased the odds of having AUD (OR = 1.94, 95% CI: 1.28–2.92, $p = 0.0017$) but was not significantly associated with SUD (OR = 1.21, 95% CI: 0.63–2.34, $p = 0.5664$). Age was protective in both models, while education and employment status showed variable associations. Regression models included depression, anxiety and PTSD as binary covariates. Figure 1, Figure 2 and Figure 3 provide further detail on the overlap between substance use and mental disorders.

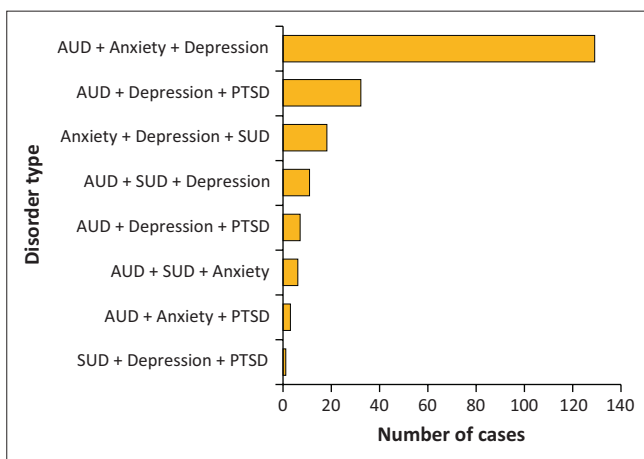
Discussion

The key findings in this study are that co-occurrence of anxiety, depression and PTSD significantly increased the odds of having an AUD, nearly doubling the risk in affected participants. No significant association was observed between the triple co-occurrence of these mental disorders and SUD. Age was consistently found to be a protective factor, while education and employment showed varying associations.



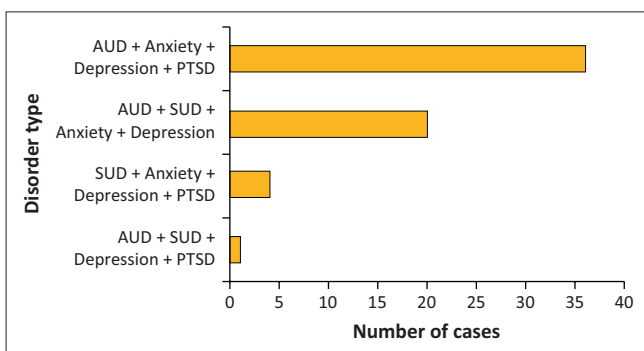
AUD, alcohol use disorder; DUDIT, drug use disorders identification test; PTSD, post-traumatic stress disorder.

FIGURE 1: Alcohol use disorder, drug use disorders identification test and mental disorders.



AUD, alcohol use disorder; SUD, substance use disorder; PTSD, post-traumatic stress disorder.

FIGURE 2: Participants with three disorders.



AUD, alcohol use disorder; SUD, substance use disorder; PTSD, post-traumatic stress disorder.

FIGURE 3: Participants with four disorders.

Weighted analysis confirmed the high prevalence of AUD and SUD. Although slightly lower than unweighted estimates, the findings showed a significant association between alcohol and other substance use as this persisted under Rao–Scott adjustment. It should be noted, however, that demographic associations, based on unweighted chi-square tests, are reported as exploratory and require cautious interpretation. These findings therefore partially

supported our hypothesis: psychiatric comorbidity was found to significantly predict risk for AUD but not for SUD.

Age emerged as a consistent protective factor, while education and employment showed varying associations depending on the outcome. Reasons for this are unclear. The prevalence of AUD (31.97%) was higher than that of SUD (7.38%) in this cohort, which is consistent with prior South African data showing alcohol use, binge drinking and alcohol misuse as major public health concerns.^{39,40} The weighted prevalence estimates were slightly lower than the unweighted figures, but the association between alcohol use and co-occurring mental health conditions remained statistically significant. The co-occurrence of AUD and SUD (affecting 6.3% of the sample) remained statistically significant on the Rao–Scott adjusted chi-square testing, confirming a strong relationship between alcohol and other substance use in this population.

Psychiatric comorbidity was common, with 64.9% screening positive for one or more mental disorders. Alcohol use disorder showed robust associations with positive screens for depression, anxiety and PTSD. The relatively lower prevalence of SUD limited statistical power to detect similar patterns. The absence of a significant relationship between triple psychiatric comorbidity and SUD may reflect contextual factors such as stigma, patterns of availability or differing social norms around illicit drug use in SA.^{6,15,41,42} Some studies have implied that alcohol is more socially accepted, which may account in part for the association of AUD with underlying mental health symptoms.^{37,38,39,42}

Marital status was significantly associated with both AUD and SUD in exploratory analyses using unweighted chi-square tests. Educational attainment showed a marginal association with AUD, with no association observed between education and SUD, and no significant association of PTSD with employment status. These findings should be interpreted with some caution, as unweighted methods may not entirely capture the nuances of the survey's complex design.

The adjusted regression model confirms that a positive screen for co-occurring depression, anxiety and PTSD significantly increased the likelihood of AUD, underscoring the need for integrated mental health and alcohol interventions. Men with psychiatric comorbidities may represent a vulnerable subgroup requiring trauma-informed and culturally responsive care. These findings suggest that screening for mental health conditions among men with alcohol misuse should become routine in primary care and substance use settings. Overall, this study confirms the enduring significance of co-occurring mental and SUDs in men, with the weighted estimates and Rao–Scott analyses enhancing the precision of our findings without altering the core message.

Although PTSD was less prevalent than other disorders, its presence remains clinically significant. This may be partly because of under-detection by the brief PC-PTSD-5 screen or underreporting because of stigma surrounding trauma disclosure among men. Prior population-based surveys in SA suggest PTSD prevalence of just over 2%,^{43,44} similar to our weighted findings, but the high-risk context in urban informal settlements, including poverty and violence, warrants targeted research and intervention.^{44,45,46} The potential for stigma-related underreporting, especially among men, may have further reduced the sensitivity of screening tools, particularly for SUD. Future studies should consider using clinician-administered or culturally adapted screening instruments to enhance disclosure and diagnostic accuracy.

The study findings underscore the need for integrated, community-informed mental health and substance use services to reduce the long-term burden on individuals, families and health systems.

Limitations of the study

While associations between SUD (as measured by the DUDIT) and mental health conditions were examined, it is not possible to determine the directionality (i.e. whether SUDs led to mental disorders or vice versa) because of the cross-sectional design. The study relied on screening instruments, which are useful for identifying probable cases but do not provide definitive clinical diagnoses. Self-report data may have been influenced by stigma or underreporting. Demographic associations were examined using unweighted chi-square analyses, which are exploratory in nature and should be interpreted with caution. The specific focus on men has implications for generalisability of findings.

Strengths of the study

The strengths include the study's multisite design and a large sample size of 1597 participants. By using validated screening tools and applying survey weights and Rao-Scott adjustments, the study provides rigorous and context-sensitive insights. The use of stratified multistage sampling and formal EAs from Statistics SA improved the representativeness of the sample. Involvement of a CAB throughout study planning and implementation enhanced cultural relevance and ethical rigour. Training and standardisation of fieldworker procedures supported consistency and reliability in data collection across all sites.

Conclusion

This study highlights the high prevalence and complex interplay of co-occurring mental health and SUDs among South African men. The significant association between triple psychiatric comorbidity and AUD underscores the importance of integrated approaches. The absence of significant associations with SUD may reflect patterns of substance availability, stigma and underreporting.

Routine screening for co-occurring disorders in primary healthcare and substance misuse services, coupled with trauma-informed care, may enhance early detection and intervention outcomes. Screening protocols should address multiple conditions simultaneously, especially given the co-occurrence patterns observed.

Recommendations for future research

Future studies should adopt longitudinal designs to explore causal pathways between mental health disorders and substance use and to assess the progression and remission of co-occurring conditions over time. Qualitative research is also needed to understand the lived experiences of men facing these challenges, particularly their barriers to care and help-seeking behaviour. Further inquiry into social and structural determinants such as poverty, unemployment and community violence, as well as resilience-promoting factors, could enhance the design of preventative strategies. Finally, studies examining functional impairment and recovery in those with co-occurring disorders could guide the development of integrated mental health and substance use rehabilitation services tailored to the needs of underserved male populations.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

All authors, Z.Z., P.A., N.H., S.K., L.L., K.M., N.K.M., J.N. and A.S., contributed equally to study conceptualisation, protocol development, project administration, methodology, investigation and data analysis. Z.Z. wrote the original draft manuscript, and all authors contributed equally to the writing, review and editing of the manuscript.

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Data availability

The data that support the findings of this study are available from the corresponding author, Z.Z., upon reasonable request.

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