

Individuals with ultra high-risk for psychosis experience impaired coping styles compared with healthy controls

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Abstract

Background: The study was designed to assess the role of coping style and self-esteem in the context of different phases of schizophrenia. **Methods:** Recurrent Schizophrenia (ReSch), **first**-episode schizophrenia patients (FEP), ultra-high risk for psychosis (UHR) patients, and healthy controls (HC) (40 per group) were subjected to in-person clinical interviews. The results of these interviews were then used to gauge coping style and self-esteem using the Coping Styles Questionnaire (CSQ) and the Rosenberg's Self-Esteem Scale (RSES). Data were analyzed through ANCOVAs and logistic regression analyses. **Results:** The results found that positive coping style (CSQ problem-solving and CSQ seeking for help) generally decline with progression through the HC, UHR, and FEP groups, while negative coping style (CSQ fantasy, CSQ repression and CSQ self-blame) generally increase with progression through the HC, UHR, and FEP groups (except that UHR group was slightly lower than HC group in CSQ self-blame). Results for members of ReSch group were in line with those of members of the FEP group in coping style. At the level of self-esteem, the UHR group was similar to the HC group and significantly higher than the FEP group and the ReSch group. Logistic regression analyses indicated that UHR group patients exhibited increased negative coping styles (CSQ fantasy) relative to members of the HC group, but had greater Positive coping style (CSQ problem-solving) than did members of the FEP group. **Conclusion:** These findings suggest that both UHR individuals experience impaired negative coping styles which expands the understanding of the psychological characteristics of the prodromal group. Further explorations are warranted to develop optimal psychosocial interventions.

Title Page

Individuals with ultra high-risk for psychosis experience impaired coping styles compared with healthy controls

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Keywords: coping style, schizophrenia, self-esteem, ultra-high risk for psychosis

1. Introduction

Significant cognitive impairment and functional decline characterize the prodromal phase of schizophrenia, which is referred to as ultra-high risk (UHR), also known as psychosis risk syndrome (PRS) or clinical high risk (CHR) (Modinos & McGuire, 2015). UHR will be used for consistency in this study. A recent meta-study showed a conversion rate of UHR to psychosis was 19% in 2 years (Salazar de Pablo et al., 2021). Timely intervention in UHR is therefore extremely important. Prior research has demonstrated that CBT-based therapies can lessen the symptoms of UHR, hence preventing the development of psychotic illnesses (Addington et al., 2011; Formica et al., 2022; Mei et al., 2021). However, not all UHR patients benefit from therapy (Stain et al., 2016).

In order to enhance the effectiveness of psychological therapies for UHR, it may be helpful to establish predictors of treatment response. According to the vulnerable stress coping model (VSCM) of schizophrenia, managing stress is a linked component that influences the start and progression of the disease (Corcoran et al., 2003; Pruessner, Cullen, Aas, & Walker, 2017). Lazarus identified two differing coping mechanisms: problem-centric coping and emotion-centric coping (Lazarus, 1998). Problem-centric coping refers to changing the person-relationship with the environment by changing the situation, while the latter refers to wishful thinking and tension reduction. In general, problem-centric coping is thought to be more mature and effective than emotion-centric coping (Lazarus and Folkman, 1984; Wiedl and Schöttner, 1991). Maladaptive coping mechanisms, such as self-blame and denial, have been linked to worse symptoms and worse functional outcomes in both patients with first-episode (FEP) and chronic schizophrenia patients (Phillips, Francey, Edwards, & McMurray, 2009) (Phillips et al., 2009; Yanos and Moos, 2007). Furthermore, the VSCM raises the issue of coping strategy consistency: whether coping strategies vary across psychosis stages or are maintained as a personal factor that is stable across all illness stages, thereby contributing to psychosis vulnerability. Pruessner and colleagues (Pruessner, Iyer, Faridi, Joobar, & Malla, 2011) discovered that UHR individuals used fewer active coping strategies than FEP and health controls (HC); Lee et al (Lee et al., 2011) reported that UHR and FEP used coping strategies in similar patterns and Masillo et al (Masillo et al., 2012) claimed that UHR used more avoidant coping than FEP and HC. Taken together, there are numerous contentious conclusions about the UHR's coping styles.

Thereinto, self-esteem, one of the important features in the self-system, is considered as a resource for coping with stress, making it an important determinant to psychological health (Taylor & Stanton, 2007) (Silverstone and Salsali, 2003; Taylor and Stanton, 2007). The levels of self-esteem influence an individual's selection of coping style in stressful situations. Compared with elevated self-esteem individuals, those with reduced self-esteem were less inclined for adopting positive coping styles in response to stress, which incurs secondary

psychological maladaptions (Dai BR et al., 2014). There are clear evidences indicating reduced self-esteem to be linked to many psychopathology facets, including etiology, evolution, treatment, and particularly with some specific symptoms in psychotic patients, such as hallucinations and delusions (Blairy et al., 2004; Romm et al., 2010). Self-esteem could influence quality-of-life and functional outcomes of patients with schizophrenia (Staring, Van der Gaag, Van den Berge, Duivenvoorden, & Mulder, 2009; Vracotas, Iyer, Joober, & Malla, 2012). Furthermore, the improvement in coping strategies and alleviation of patients' symptoms attributing to psychological interventions on self-esteem is another provident of the important role of self-esteem (Gumley et al., 2006; Sonmez et al., 2020). However, at which stage of mental illness the level of self-esteem starts to change has not been thoroughly studied. A recent meta-analysis including 6 articles reported lower self-esteem in the UHR population relative to HC, but there was large heterogeneity among different literatures (Bemrose, Akande, & Cullen, 2021).

As a result, the importance of coping styles together with self-esteem serving to predict morbidity risk within UHR population warrants further investigation. Furthermore, UHR population research is primarily hospital-based, with few community-based studies. Previous studies demonstrated individuals with psychiatric family-histories, have increased susceptibility for such mental conditions (Pepper & G Cardno, 2014)

Therefore, this investigation was designed for addressing aforementioned issues due to their clinical importance in at several points of the psychosis continuum of schizophrenia pathogenesis. Consequently, comparative analyses for coping styles together with self-esteem in patients with schizophrenia at various stages, including recurrent schizophrenia patients (ReSch), FEP, UHR individuals who were all from first-degree relatives of schizophrenia patients, and therefore also referred to as genetically high-risk population, together with HC, having the long-reaching aim of defining efficacious treatment options for UHR individuals.

2 Methods

2.1. Ethical considerations

Guangdong Provincial Mental Health Center together with Luoding Psychiatric Hospital in China conducted the study, and ethical approval was from Guangdong Provincial Mental Health Center. All participants and their guardians (those with fewer than 18 years) provided written informed consent.

2.2. Study participants

40 subjects were enrolled in each of the four s including.

The UHR group was made up of people who satisfied at least one of the following three Structured Inventory of Prodromal Syndrome (SIPS) diagnostic criteria but did not actively seek out clinical assistance, (1) Attenuated positive symptom states (APS), including sub threshold delusional abnormalities; (2) Brief intermittent psychotic states (BIPS); and (3) Genetic risk together with exacerbation status (GRDS). The specific operation process is as follows. Patients with schizophrenia were identified in outpatient clinics, wards, or in the community according to ICD-10 criteria, and if any first-degree relatives (parents, children, siblings) of the patient were between the ages of 15 and 45, they were contacted by the investigator, and if the family members of these patients with schizophrenia agreed to participate in the study, the investigator interviewed these family members and made assessment for them. All enrollees were evaluated at the first meeting using the SIPS to determine if they met the criteria for prodromal syndrome (COPS). Those who met COPS as assessed by the SIPS were defined as having a psychiatric risk syndrome for inclusion in the study. In short, 38 subjects satisfied the SIPS criterion for APS, 2 subjects met the SIPS GRDS requirements, and no subjects met the BIPS criteria. Patients in the UHR group were all drug naive.

The recruitment process for the FEP is as follows. Patients with a first-time diagnosis of schizophrenia on the basis of ICD-10 in the community, outpatient or inpatient units were reported to our researchers by their treating physicians, and our study proceeded to further confirm that such patients were in their first episode, that the duration of the illness was within one year, and that the family was willing to enroll the patient in our FEP.

The enrollment procedure for the ReSch group is similar to that for the FEP, except that the ReSch has two or more episodes and the disease duration is greater than 1 year.

HC group was recruited by posting advertisements in the community, and the diagnosis by the psychiatrist ruled out a history of diagnosis or treatment history of psychiatric disorders and had no positive psychiatric family history.

All participants were aged 15-45 years, able to sign an informed consent form, were compliant with the study arrangements, were able to understand the content of the questionnaire and could cooperate to complete all the test examinations. Participants were excluded from this study if (1) patients with severe or unstable physical diseases, (2) patients with previous epilepsy, cerebrovascular disease, or other central nervous system organic diseases; (3) persons who are or have been dependent on or abused substances or drugs.

2.3 Evaluations

Datasets concerning socio-demographic parameters, such as gender, age, marital status, educational and employment details were evaluated through a questionnaire developed by two psychiatrists having a minimum of three years' clinical and research background.

UHR individuals were enrolled using SIPS(McGlashan, Walsh, & Woods, 2010). SIPS contains five components: Scale of Prodromal Symptoms (SOPS), Presence of psychosis scale (POPS), COPS, Global assessment for functioning of a modified scale (GAF-M), and the schizotypal personality disorder diagnostic criteria. Among them, SOPS assesses the type and severity of at-risk symptoms. The SOPS contains 19 entries and consists of four subscales: positive symptoms (5 bars), negative symptoms (6 bars), disintegration symptoms (4 bars), and general symptoms (4 bars). A diagnosis of psychiatric risk syndrome was made, which was mainly adjudicated according to the positive symptom scale (P1: unusual thought content/delusions; P2: doubtful/harmful ideas; P3: exaggerated thoughts; P4: perceptual abnormalities/hallucinations; P5: disordered speech) scores in SOPS. The criteria of judgment were graded on a scale of 0 to 6, with 0: none, 1 to 5 representing that the positive symptoms were non psychotic, and 6 indicating that the positive symptoms reached the level of psychotic. The SIPS/SOPS scale has good reliability and can be widely used in clinical setting (Woods, Walsh, Powers, & McGlashan, 2019).

Symptomatology was evaluated through Chinese version of positive and negative syndrome scale (PAN-SS)(Kay, Opler, & Lindenmayer, 1988). The primary aim of the PANSS was to rank abundance in psychiatric symptom manifestation/s together with individual symptom severity, consisting in 30 items, which are scored on a 1-7 scale segregated across three sub-scales: positive (7 items), negative (7 items), together with a scale for general psychopathology (16 items). A higher score reflects more severe symptoms.

Depressive symptoms were defined through the Chinese version for Montgomery-Åsberg Depression Rating Scale (MADRS) (Liu et al., 2009; Montgomery & Asberg, 1979). This scale had 10 items, with individual items graded (0-6). A total score of 12 is used as a cut-off, with a score greater than or equal to 12 indicating depressive symptoms. Raised scorings reflected increased severity of depressive symptoms.

Overall function was evaluated through global assessment for functioning scale (GAF)(Hall, 1995). This scale is based on the assessment tool of Axis II in DSM-III-R, which mainly rates three dimensions of social function, psychological symptoms, and occupational/learning function. The total score is divided into nine grades, ranging from 1-100 points, with higher scores indicating better function.

Coping styles have been extensively studied in the 1970s, but have resulted in a diversity of choice of coping style assessment tools due to differences in research perspectives. Internationally, there is no uniform regulation of coping styles, so there are also a variety of assessment tools. Coping Style Questionnaire (CSQ), commonly used in China, was employed for this investigation. CSQ was developed by Xiao and Xu in 1996 referring to theories and questionnaires used in studies on coping and defense in other countries (Xiao and Xu, 1996). The tool has 62 entries, each with two responses with 1 "yes" and 2 "no". It consists of 6 subscales, which are problem-solving, self-blame, help seeking, fantasy, repression, and rationalization. Problem-solving as well as help seeking were positive coping styles, whereas self-blame, fantasy together with repression

were the negative coping styles, rationalized to be the mixed type of coping styles. This questionnaire has satisfactory robustness and relevance and is widely used in China with regard to the evaluation of coping styles.

Self-esteem was performed through self-esteem scale by Rosenberg (Rosenberg, 1978), which was translated into a Chinese version in 1993 and has been tested for extensive validity. The scale contains 10 items across a 4-point Likert scale (1=very strongly disagreement, 4=very strongly agreement). Total scores reflect overall individual self-esteem, increased scorings reflected increased self-esteem.

2.4 Statistical analyses

IBM SPSS version 22.0 software was used. Clinical case profiles, coping styles, together with self-esteem were assessed through Pearson chi-square analyses or one-way analyses of variance (ANOVAs) as deemed fit, having least-significant difference (LSD) or Tamhane's T2 corrections for multiple comparisons. Analyses of covariance (ANCOVAs) additionally evaluated coping style together with self-esteem interactions across all study groups, controlling for demographic variables. In addition, the correlations of SIPS, MADRS, PANSS, and GAF scores with coping styles together with self-esteem within UHR, ReSch together with FEP groups were examined using Spearman's correlation analysis.

Moreover, binary logistic regression assessments probed risk parameters linked to prodromal psychosis or psychiatric conditions, through ReSch, FEP, UHR, and HC status as dependent variable and highly varying socio-demographic profiles (such as marital status, age, education level and employment status) as independent variables for univariate assessments. Meanwhile MADRS was divided into the presence or absence of depression as an independent variable into the model with a cut-off score of 12. Furthermore, coping styles and self-esteem were also incorporated within such assessments, irrespective of influence upon revealing major associations during univariate assessment, due to being deemed vital parameters for this investigation. A two-tailed $P < 0.05$ conferred statistical significance.

3 Results

3.1 Sample Demographic together with Clinical Profiles

There were no variations among the 4 groups with respect to gender or smoking status. We found major variations for age, marital status, employment status, as well as educational level. The results showed that the ReSch group had more positive symptoms and negative symptoms as well as general psychiatric symptoms than the FEP group, while the FEP group also had more positive symptoms and negative symptoms than the UHR group. In addition, the GAF results of the HC, UHR FEP and ReSch groups decreased gradually, whereas the MADRS total scores of the HC, UHR, FEP and ReSch groups increased gradually.

3.2 Assessment of Coping styles and self-esteem across groups

ANOVAs identified major variations across CSQ problem-solving ($F=11.08$, $P < 0.001$), CSQ seeking for help ($F=13.26$, $P < 0.001$), CSQ fantasy ($F=3.82$, $P = 0.01$) and CSQ repression ($F=4.30$, $P = 0.006$) across all groups. Following pairwise comparative evaluations using LSD correction or Tamhane's T2 corrections revealed that UHR group subjects and HC group subjects often adopted a problem-solving, help seeking coping style relative to those of the ReSch group subjects and FEP groups. UHR group than the HC group more adopted the fantasy coping style.

This investigation also identified major variations concerning self-esteem across all groups, with intensely raised overall SES scorings within UHR and HC groups in comparison to FEP and ReSch groups. Post-hoc evaluations through LSD or Tamhane's T2 corrections highlighted significantly higher self-esteem in the UHR group in comparison to FEP and ReSch groups, with nil major variations to HC group.

Following examination of confounding influence by individual age, marital status, employment status, and education level, major variations were still observed within CSQ problem-solving ($F=9.70$, $P < 0.001$), CSQ seeking for help ($F=11.76$, $P < 0.001$), CSQ repression ($F=3.54$, $P = 0.02$) and Self-esteem ($F=3.47$, $P = 0.02$) across all groups (Table 2).

3.3 Associations across Coping styles and self-esteem parameters together with other relevant clinical domains

In UHR group, CSQ problem-solving and CSQ repression demonstrated negative correlation to SIPS total ($P < 0.05$) and CSQ seeking for help demonstrated positive correlation to SIPS total ($P < 0.05$). In addition, CSQ self-blame showed negative correlation with GAF, self-esteem demonstrated negative correlation to MARDS. Within FEP group, CSQ rationalization demonstrated negative correlation to PANSS total. CSQ problem-solving showed positive correlation with MARDS. In ReSch group, dataset outcomes demonstrated nil major variations across groups.

3.4 socio-demographic, clinical and psychological risk variables for progressing into FEP and UHR groups (two binary logistic regression analyses)

Since PANSS was assessed within FEP, ReSch and UHR groups, multiple absent values were observed upon performing linear multivariate regression evaluations including such factors. Consequently, this investigation conducted three separate binary logistic regression evaluations, incorporating marital status, education level, age, employment status, state of depression (according to MARDS score) CSQ problem-solving, CSQ seeking for help, CSQ fantasy, CSQ repression, CSQ rationalization and Self-esteem, as deemed necessary. Such evaluations highlighted UHR group patients exhibited increased negative coping styles (CSQ fantasy) in comparison to HC group counterparts, though obtained increased positive coping style (CSQ problem-solving) in comparison to FEP group counterparts. Findings in the FEP group were similar to those in the ReSch group. (Table4)

4. Discussion

This study assessed the role of coping style and self-esteem in the context of four points of the schizophrenia continuum including HC, UHR, FEP and ReSch and got some main findings. Firstly, the subscales of coping strategies such as problem-solving, requesting assistance, imagination and repression had significant differences between the four groups. In contrast to the FEP and ReSch groups, post hoc analyses showed that the UHR group had more positive coping strategies including the use of problem solving and aid seeking, but more negative coping strategies such as dreaming than the HC group. Three binary logic regression models and ANCOVA analyses both supported this conclusion. These findings showed that in comparison with HC group, UHR group used more harmful coping mechanisms. This is in line with the similar findings in previous studies.

Lee et al (Lee et al., 2011) found that the UHR population used more emotion-focused coping styles than the HC population, and Masillo et al (Masillo et al., 2012) also found that the UHR population used maladaptive, avoidant coping styles more frequently than the HC population. Individuals with UHR used avoidant coping styles such as social withdrawal, habits or adaptation to illness, substance abuse or alcohol abuse, among others. Phillips et al (Phillips et al., 2009) also found that UHR group employed more emotional coping styles and less task coping styles compared to HC group, though without discernible variation within avoidant coping style implementation.

The current study also found that there was no discernible impairment and that the UHR in active coping strategies was essentially the same as that of the HC group. This was further supported by a previous study by Jalbrzikowski et al (Jalbrzikowski et al., 2014), which found that while the adaptive coping style score remained stable, the type of maladaptive coping was more likely to change over time in the UHR population.

Jalbrzikowski et al (Jalbrzikowski et al., 2014) simultaneously stated a similar result that adopting an adaptive coping strategy improved social functioning while reducing negative symptoms. This was also verified by the present study that positive correlation across positive coping methods and SIPS total scores with UHR group together with negative association across negative coping strategies and SIPS total scores.

We also identified UHR group had resembling negative coping styles with FEP group, but had more positive coping styles than the FEP group. Previous findings on the comparison of coping styles between FEP and UHR were inconclusive. A study has shown that UHR has fewer positive coping strategies than FEP (Masillo

et al., 2012), and it has also been reported that UHR and FEP had similar patterns in the use of coping strategies (Pruessner et al., 2011). Schmidt et al (Schmidt, Grunert, Schimmelmann, Schultze-Lutter, & Michel, 2014) thought that UHR individuals used fewer active coping strategies such as distraction, positive self-guidance, situational control, social support, and minimization than FEP. Positive coping style was also found to be positively correlated with function in the current study's FEP Group; that is, the more positive coping style, the better the function. This is consistent with previous study (Phillips et al., 2009).

More importantly, Kendler et al (Kenneth et al., 1991) suggested that in some disorders, coping may be an endophenotype that marks a pathway through which genetics influences the etiology of psychopathology, interacting with stress. Previous studies have shown some coping styles, which have been found to be moderately heritable in the general population, may be considered as candidate endophenotypes of mental disorders (Fortgang, Hultman, & Cannon, 2016). In this study, the UHR group was non-help-seeking actively, all derived from first-degree relatives of schizophrenic patients through researcher's contact, and enrolled at an older age, thus may be more in line with presenting cognitive disease endophenotypes. This also illustrated that negative coping styles may be an endophenotype of schizophrenia continuum. However, a recent study showed that coping styles were endophenotypes of bipolar disorder and depression, but not of schizophrenia (Fortgang et al., 2016). Similarly, another article showed that individuals at familial high risk of psychosis had coping styles similar to the normal population (Piotrowski et al., 2020). Therefore, more studies may be needed in the future to explore the relationship between coping styles and endophenotypes.

In the present study depression scores were found to be significantly higher in the ReSch and FEP groups than in the UHR, and also showed an effect of depressed mood on coping style, as reflected inside the ANOVA and logistic regression. This is consistent with previous studies which showed that patients with schizophrenia were more depressed and took more negative coping styles and less positive coping styles (Allott et al., 2015) (Egbe et al., 2014). Emotion-centered coping and avoidance were also associated with the diagnosis of major depression (Rodgers et al., 2017). Therefore, it may be possible to develop effective coping modalities by improving depressive symptoms, thereby reducing positive symptoms in schizophrenia as well as in UHR.

In terms of coping methods, no major variations were observed across FEP and ReSch groups which showed that coping mechanisms may already be severely compromised in FEP patients and do not worsen with time or as the condition worsens. This gave us suggestions that early identification and intervention of the impact of coping styles on schizophrenia patients should be carried out, even in the UHR stage or even earlier.

On the other hand, this study found that UHR group had extremely higher self-esteem compared to FEP or ResSch groups, though without significant differences between UHR and HC groups. This finding contradicted previous research in some ways. Previous studies (Bemrose et al., 2021; Park, Bang, Kim, Lee, & An, 2018) found that UHR group demonstrated severely reduced self-esteem compared to HC group, which was confirmed by a 2021 meta-analysis (Bemrose et al., 2021).

There could be a number of causes for the contradiction. The UHR population in this study may not have had enough symptoms to prompt them to seek help or, as family members of patients with schizophrenia, may have had a higher tolerance for these unusual psychiatric symptoms because they were screened from family members of patients with schizophrenia without seeking help for themselves. Second, given that the names "ultra-high-risk psychosis" or "attenuated psychotic syndrome" may have stigmatizing effects on individuals (Yang, Wonpat-Borja, Opler, & Corcoran, 2010), possibly indicating UHR subjects within this investigation experienced stigmatization of labeling for service use, resulting in lower self-esteem. Third, the UHR population in the current study was older, and earlier research has demonstrated that self-esteem and age were strongly correlated. Self-esteem increases during childhood and stabilizes (or even declines) in adolescence. It then gradually rises throughout adulthood before finally declining in later life, according to previous studies' finding (Orth, Erol, & Luciano, 2018; Robins & Trzesniewski, 2005).

A negative correlation between self-esteem and depressive symptoms was also found in UHR group, with higher self-esteem being linked with fewer symptoms, which was consistent with earlier research. Pruessner and colleagues (Pruessner et al., 2011) hypothesized that lower self-esteem was linked to more severe

depressive symptoms. However, it is unclear whether self-esteem changes at several points of the psychosis continuum of mental illness, and whether self-esteem can predict UHR individuals' transformation into psychosis. Future large-scale longitudinal studies are necessary for assessing relationships across self-esteem and UHR transformation into psychosis.

5. Limitations and strength

The present study has some limitations. First, because this study was cross-sectional design, we were unable to determine the rate of Ultra high-risk individuals transformed into diagnosed schizophrenia. As a result, this investigation could not probe potential predictive value for coping mechanisms and self-esteem for UHR transformation. This study's relatively reduced group size also limited the ability of this investigation's logistic regression analysis to identify weaker influences, highlighting the significance of performing further research using larger group sizes.

This study has some notable strength. First, the population enrolled in this study was more homogeneous and better able to focus on the role of possible endophenotypes in psychopathogenesis. Second, the finding in this study was that negative coping was impaired in the UHR individuals, with clearer guidance for future interventions

6. Conclusion

In summary, our findings show that UHR individuals have impaired coping styles, but no significant change in self-esteem in UHR individuals who were not clinically help seeking, which adds to our knowledge on psychological profiles of the individuals at several points of the schizophrenia continuum. Future longitudinal studies will be required to fully understand the relationship between these two variables and the onset of schizophrenia in at-risk populations. Furthermore, more research on the interaction between coping styles and self-esteem is needed to better understand the effects of coping styles and self-esteem on transformation of the Ultra high-risk population, guiding interventional approaches to reduce disease incidence in UHR populations.

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Contributors

Hou CL and He XY analyzed and interpreted the patient data. He XY was major contributors in writing the manuscript. Hou CL and Jia FJ designed this study. He XY, Huang ZZ, and Wang F were responsible for sample collection. He XY, and Huang ZZ participated in statistical analysis of data and prepared the tables. All authors read and approved the final manuscript.

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