# Depression severity mediates stigma and quality of life in clinically stable people with schizophrenia in rural China

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## Abstract

**Background**  Depressive symptoms associated with schizophrenia are closely related to stigma and quality of life(QOL). There is, however, no thorough research on the connection between the three. This study sought to investigate the possible factors influencing depressive symptoms in people with schizophrenia (PWS) in rural Chaohu, China, and to further explore the role of depression severity in stigma and lifestyle quality.

**Methods**  Eight hundred twenty-one schizophrenia patients accomplished the entire scale, including the 9-item Patient Health Questionnaire (PHQ-9), the Social Impact Scale (SIS), and the World Health Organization on Quality of Life Brief Scale(WHOQOL—BREF). A straightforward mediation model was employed to determine if the intensity of the depression could act as a mediator between stigma and QOL.

**Results**  Two hundred seventy-nine schizophrenia patients (34%) had depressive symptoms (PHQ ≥ 10), and 542 patients (66%) did not (PHQ < 10). Logistic regression showed that marital status, job status, physical exercise, standard of living, and stigma contributed to the depressed symptoms of schizophrenia. Depression severity partially mediated the effect between stigma and QOL, with a mediating effect of 48.3%.

**Conclusions**  This study discovered a significant incidence of depressed symptoms associated with schizophrenia, with depression severity serving as a mediator variable connecting stigma and QOL and partially moderating the association.

**Keywords**  Schizophrenia, Stigma, Depressive symptoms, Quality of life, Influencing factors

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## Introduction

Anomalies in cognition, thought, emotion, and behaviour characterize a collection of extreme mental illnesses known as schizophrenia. It is one of the most debilitating disorders and can often cause extensive disability in daily functioning and cognition [1]. Many clinical studies in the past have focused on the pathological symptoms of schizophrenia [2]. However, with the improvement of patients' psychiatric symptoms, their daily life problems are gradually exposed, including employment, housing, social function, and social relations [3]. Therefore, to provide more comprehensive services for people with

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schizophrenia (PWS) and help them return to the community as soon as possible, an increasing number of studies are focusing on their quality of life(QOL) [4, 5].

QOL is defined by whether an individual can meet their essential needs and social obligations while utilizing their skills to exploit the opportunities provided by society [6]. QOL is an outcome indicator for evaluating the treatment of PWS [7, 8]. A previous meta-analysis of 18 case–control studies found that the QOL of PWS was significantly lower than that of healthy controls [9]. Additionally, it was discovered in another study that QOL can predict the return of symptoms in schizophrenia patients. According to the study, the likelihood of relapsing after two years of follow-up increases with a decreased QOL [10].

The QOL of PWS is affected by numerous factors, and cross-sectional and longitudinal studies have identified several determinants of QOL in patients with severe mental disorders, such as symptom severity, the presence of depression and anxiety, medication side effects, and treatment adherence [11, 12]. In PWS, lower QOL is associated with the presence of a secondary diagnosis, such as depression [13, 14] or anxiety [15]. PWS frequently experience depressive symptoms (7–65%).Those symptom can be seen in almost all onset stages [16] and are associated with the use of multiple medications, poor psychosocial functioning, low QOL, etc. [17, 18]. Numerous studies have revealed a link between depressive symptoms and poor QOL in PWS [19, 20]. Higher rates of recurrence and readmission have been reported in PWS with depressive symptoms than in non-depressed controls [21]. Furthermore, depression is also a prevalent warning indicator for suicidal thoughts and actions, and many prospective studies have found that depression poses a significant risk of suicidal ideation, conduct, and fatalities [22, 23]. However, because depressive symptoms and the adverse symptoms of schizophrenia frequently coexist, depressive symptoms in schizophrenia are frequently under-recognized and under-diagnosed, which prevents patients from receiving appropriate treatment [24].

Stigma is an internal experience of shame that patients experience as a result of their illness [25]. It can be divided into 'social stigma', which refers to the experience of discriminatory attitudes and unfair treatment by the public, and 'self-stigma', which alludes to the shame that prevents patients from sharing their experiences, asking for help from others, and experiencing the anticipated sentiments of discrimination [26, 27]. In a 2018 cross-sectional study survey, it was found that a significant proportion of PWS are stigmatized, with greater hopelessness, depression and suicidal risk all being linked to stigma [28].

First, many studies have shown that both internal and social stigma significantly affect the QOL of PWS [29, 30]. For example, it can lead to social exclusion, preventing patients from engaging in meaningful life activities [31, 32] and reducing their self-esteem and self-efficacy [33], which are important components of self-concept, and the deterioration of this self-concept may produce a number of negative outcomes that may affect their recovery outcomes. In addition, stigmatization can hinder early treatment and recovery of people with mental illness, leading to prolonged recovery time, which further reduces QOL [34–36]. Second, stigma can limit the ability of PWS to express their distress and seek help, thereby impairing their social interactions and increasing their risk of depression [37, 38]. The issue of stigma was also found in a longitudinal study to significantly affect PWS, who feared disclosure of their illness, and the results of that study suggested that the more stigmatized the patient was, the more depressed he or she felt [39]. Although the results of the association remain contradictory, according to a meta-analysis of these studies, stigma still has nearly a one-in-three chance of predicting depression [40].Third, many studies have shown that depressive symptoms in PWS can affect social function to varying degrees, reducing the QOL [41]. Yoshimune et al. studied the relationship between QOL and clinical factors in hospitalized schizophrenic patients and found that depressive symptoms significantly affected the QOL of the patients, whereas other symptoms such as positive, negative and pharmacogenetic extrapyramidal symptoms did not have a significant effect on their QOL [42]. Two other studies that included 174 and 67 outpatients with schizophrenia, respectively, reported a significant correlation between QOL and depressed mood but no significant correlation with positive and negative symptoms and extrapyramidal side effects [43, 44].

In summary, we can see that stigma can reduce the QOL of PWS and that stigma can lead to a greater likelihood of depression, and depressive symptoms can further reduce QOL. Therefore, we hypothesized that the severity of depression might be a potential factor for stigma to reduce the QOL of PWS; that is, the severity of depression plays a mediating role between stigma and QOL.

Although depressive symptoms and stigma associated with schizophrenia can affect the QOL, no prior research has studied the connection between the three in this group. The objectives of this study were 1) to assess the demographic and clinical correlates of depressive symptoms associated with schizophrenia; 2) to develop a mediation model to investigate how the severity of depression impacts stigma and living conditions.

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## Methods

### Participants

PASS 15.0 was used to calculate the sample size for this study. Based on previous literature estimating that the probability of schizophrenic patients experiencing depressed mood is approximately 40% [45], with a specified tolerance error of 4% and a confidence level of $1-\alpha=0.95$, the above software was used to calculate the sample size to be surveyed as $N=599$; assuming a non-response rate of 20% among the study population, a sample size of $N=749$ would be needed.

In this multicentre cross-sectional study, researchers visited 6 streets and 12 townships in the Chaohu area from September to October 2022; all participants were from the rural area of Chaohu City, Hefei City, Anhui Province, and all were enrolled in the database system for the management of severe mental disorders in Chaohu City, Anhui Province, which has more than 3,000 registered users. A total of 1205 questionnaires were sent out and 821 were validly returned, according to 3:1 random stratified sampling. The inclusion criteria were as follows: 1) diagnosis of schizophrenia according to ICD-10 review of medical records; 2) diagnosis as clinically stable by a psychiatrist, which according to previous studies [46, 47] can be defined as less than 50% change in dose of any primary psychotropic medication in the last three months; 3) age 18–75 years; 4) no other psychiatric disorders; 5) informed consent signed by the patient or her legal guardian. The exclusion criteria were as follows: 1) history of neurological disorders or substance abuse; 2) severe physical illness; 3) unwillingness or inability to participate in the assessment.

Our work received approval from the Chaohu Hospital Affiliated with Anhui Medical University Ethics Committee with the ethics number 202212-kyxm-13. All research procedures were strictly in line with the principles of the Helsinki Declaration. Additionally, all participants willingly completed informed consent forms, along with their legal representatives.

### Measures

#### General details and clinical characteristics

We utilized a broad questionnaire we created ourselves to collect all participants' age, gender, religion, marital status, grade (junior high school and below; high school/secondary; undergraduate/college), job status, average income, medication use, times of hospitalizations, age at onset, and duration of illness.

#### Depressive symptoms

We used the Patient Health Questionnaire (PHQ-9) to assess depressive symptoms in PWS. The PHQ-9 scale was compiled by Spitzer et al. [48], and was formulated according to the 9 symptoms of DSM-IV depressive disorder. It is widely used in scientific research and clinical practice because of its simplicity and easy operation. The total PHQ-9 score ranged from 0 to 27 points, and the standard cut-off value of possible major depression was 10 points or more [49, 50], established in the first study on the PHQ-9 [51]. In addition, Bian in China translated the scale into Chinese, which had good reliability and validity in applying it to general outpatients in public hospitals. The internal consistency coefficient was 0.857, and the sensitivity was 91% when the cut-off value was 10 [52]. Considering that when the cut-off value is 10, the specificity and sensitivity of the scale are higher, we defined < 10 as clinically free of depressive symptoms and ≥ 10 as clinically depressed. The current investigation used the scale as both a continuous and a categorical variable. The Cronbach's alpha coefficient for the scale in this study was 0.818, with good internal consistency.

#### Stigma

To measure the severity of patient stigma, Fife et al. [53] created the Social Impact Scale (SIS), which Pan et al. [54] translated into Chinese in 2007. The scale contains 24 items in 4 dimensions: social rejection (9 questions), financial insecurity (3 questions), internalized shame (5 questions), and social isolation (7 questions). A 4-point Likert scale is used to grade each entry: 1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = strongly agree. The total score for the scale is the sum of the 4-dimensional scores, with a total score from 24 to 96, with higher scores indicating more significant perceived stigma. The Cronbach's alpha coefficient for this scale in this study was 0.927. The scale and its four dimensions were used in this investigation as continuous variables.

#### Quality of life(QOL)

We used the World Health Organization on Quality of Life Brief Scale ( WHOQOL-BREF) to assess the QOL of the subjects [55]. The scale was developed by the WHOQOL team in 1998 and is a reliable tool for evaluating QOL (Cronbach's $\alpha=0.78$) [55, 56]. The scale consisted of a total of 26 items, of which the first two primarily examined the respondents' overall subjective feelings about their QOL and health status. The other 24 items are divided into four categories: physiology, psychology, social interactions, and environment. According to how heavy an object was, it was given a score between 1 and 5 points. The initial scores for the four fields and subjective sensations were added to obtain WHOQOL-BREF's overall score. The overall QOL improves as the score increases [57]. This study only used the first two separate items of the scale: 1)"How do you evaluate your quality of life ?"; 2) "How

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satisfied are you with your health ?". However, previous studies have shown that these two individual items have good consistency with the other four fields [58, 59]. Therefore, we selected these two separate items to evaluate the QOL of the overall sample and used them as continuous variables in this study. The Cronbach's alpha coefficient for this scale in this study was 0.759.

## Statistical analysis
First, we compared schizophrenic patients with and without depressive symptoms. Independent samples t-tests or Mann–Whitney U-tests were used for continuous variables, and chi-square tests were used for categorical variables. Second, we examined variables affecting QOL and depressive symptoms in PWS using linear regression and forward logistic regression. In addition to general demographic characteristics, the entire stigma score and its four dimensions were included in the analyses. Finally, a bootstrap sample size of 5000 in Hayes' (2018) PROCESS SPSS (Model 4) was used to determine the mediating effect of depression severity on the stigma-QOL relationship.

## Results
### Demographic and clinical characteristics
Table 1 shows that 279 PWS were depressed, with a mean age of $50.64 \pm 12.48$ years and a greater number of females than males. Most of the participants had no religious beliefs and their education level was junior high school or below. Most of the participants were married, and most of the patients were unemployed, had low per capita family income, and were on psychiatric medication year-round. The majority of the patients had bad lifestyle habits, such as smoking and drinking. There were no significant differences between the two groups in terms of religion, education, duration of illness, medication use, or age of onset. In addition, there were significant differences between the two groups in terms of age, gender, marital status, work status, physical activity, average income, smoking, drinking, QOL, and total stigma scores (all $P < 0.05$), and the mean QOL scores were lower in patients with depressive symptoms than in those in the group without depressive symptoms ($5.31 \pm 1.15$ vs. $6.33 \pm 1.22$, $P < 0.05$). The mean score of the SIS scale was higher in the group with depressive symptoms than in the other group ($65.18 \pm 9.20$ vs. $58.82 \pm 9.26$, $P < 0.05$). In addition, some of the participants in this study had difficulty in recalling the duration of illness($n = 803$), times of hospitalization ($n = 795$), and age at onset of illness ($n = 804$).

### Risk factors for QOL in schizophrenia
Table 2 lists the factors associated with QOL in PWS. A linear regression model was used to incorporate factors that may affect QOL into the independent variables. Model 1, which included the total SIS score as a dependent variable, found that patients' QOL was associated with average family income (OR=0.167, 95% CI=0.035–0.300, $P < 0.05$), total depression score(OR=-0.083, 95% CI=-0.098-(-0.068), $P < 0.001$), and total SIS score(OR=-0.021, 95% CI=-0.030-(-0.012), $P < 0.001$) and that patients' lower average family income, more severe depressive symptoms, and greater feelings of stigma led to a further decline in their QOL. The four dimensions of the SIS were included as independent variables in Model 2, and it was found that, in addition to average family income(OR=0.173, 95% CI=0.040–0.306, $P < 0.05$) and depressive mood(OR=-0.081, 95% CI=-0.096-(-0.066), $P < 0.001$), the more severe the social isolation (OR=-0.051, 95% CI=-0.092-(-0.010), $P < 0.05$) in the SIS scale, the worse the QOL of patients with schizophrenia.

### Depression risk factors in PWS
Table 3 lists the elements linked to depression symptoms in PWS. Factors associated with depressive symptoms in Table 1 were put into covariates to control for them, and conditional forward stepwise regressions were chosen. Controlling for confounders (including age, gender, smoking, alcohol consumption, and average income) revealed a strong relationship between patients' depressive symptoms and their marital status(OR=0.552,95% CI=0.392–0.777, $P < 0.01$), job status(OR=4.486,95% CI=2.478–8.122, $P < 0.001$), physical exercise (OR=2.126,95% CI=1.463–3.089, $P < 0.001$), quality of life (OR=0.568,95% CI=0.490–0.659, $P < 0.001$) and two dimensions of social rejection (OR=1.078,95% CI=1.009–1.151, $P < 0.05$) and social isolation (OR=1.123,95% CI=1.033–1.222, $P < 0.05$) on the SIS scale. According to these findings, depressive symptoms were more common in PWS who had a partner, no work, no physical exercise, a lower QOL, and more stigma.

### Bivariate correlation
Table 4 shows the correlation analysis between the total SIS score of PWS patients and its four dimensions. There were significant correlations between the total SIS score and its four dimensions ($r = 0.913$, $P < 0.01$; $r = 0.766$, $P < 0.01$; $r = 0.702$, $P < 0.01$; $r = 0.702$, $P < 0.01$; $r = 0.879$, $P < 0.01$), and there were also a significant correlations among the four dimensions.

Table 5 displays the findings of the bivariate connection between total stigma scores, QOL, and total depression

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**Table 1** Demographic and clinical characteristics in the total sample

| Variables | Total samples (n = 821) | Group without depression (n = 542, 66%) (n%; mean ± SD) | Group with depression (n = 279, 34%) (n%; mean ± SD) | X²/Z | P |
|---|---|---|---|---|---|
| Age | 821 | 542(48.26 ± 11.62) | 279(50.64 ± 12.48) | -2.926 | **0.003** |
| Gender | | | | | |
| Female | 427 | 265(62.1) | 162(37.9) | 6.207 | **0.013** |
| Male | 394 | 277(70.3) | 117(29.7) | | |
| Religion | | | | | |
| No | 701 | 464(66.2) | 237(33.8) | 0.065 | 0.799 |
| Yes | 120 | 78(65) | 42(35) | | |
| Educational level | | | | | |
| ≤ Middle school | 694 | 458(66.0) | 236(34.0) | 2.071 | 0.355 |
| High school/Secondary school | 100 | 63(63.0) | 37(37.0) | | |
| > High school | 27 | 21(77.8) | 6(22.2) | | |
| Marital status | | | | | |
| No | 378 | 272(72.0) | 106(28.0) | 11.020 | **0.001** |
| Yes | 443 | 270(60.9) | 173(39.1) | | |
| Job status | | | | | |
| No | 668 | 405(60.6) | 263(39.4) | 46.389 | **0.000** |
| Yes | 153 | 137(89.5) | 16(10.5) | | |
| Physical exercise | | | | | |
| No | 535 | 321(60.0) | 214(40.0) | 24.785 | **0.000** |
| Yes | 286 | 221(77.3) | 65(22.7) | | |
| Medication | | | | | |
| No | 80 | 51(63.7) | 29(36.3) | 0.203 | 0.652 |
| Yes | 741 | 491(66.3) | 250(33.7) | | |
| Average income | | | | | |
| < 2000 | 739 | 477(64.5) | 262(35.5) | 7.130 | **0.008** |
| ≥ 2000 | 82 | 65(79.3) | 17(20.7) | | |
| Smoking | | | | | |
| No | 671 | 428(63.8) | 243(36.2) | 8.153 | **0.004** |
| Yes | 150 | 114(76.0) | 36(24.0) | | |
| Drinking | | | | | |
| No | 766 | 499(65.1) | 267(34.9) | 3.888 | **0.049** |
| Yes | 55 | 43(78.2) | 12(21.8) | | |
| Duration of illness | 803 | 530(21.25 ± 11.15) | 273(22.86 ± 12.30) | -1.480 | 0.139 |
| Times of hospitalization | 795 | 523(2.97 ± 3.86) | 272(3.10 ± 3.70) | -0.739 | 0.460 |
| Age at onset of illness | 804 | 531(27.04 ± 11.13) | 272(27.84 ± 13.32) | -0.185 | 0.853 |
| WHOQOL-BREF score | 821 | 542(6.33 ± 1.22) | 279(5.31 ± 1.15) | -10.766 | **0.000** |
| SIS total score | 821 | 542(58.82 ± 9.26) | 279(65.18 ± 9.20) | -9.349 | **0.000** |

Bolded *P* < 0.05

scores in PWS. There was a strong positive correlations between stigma and depression severity were found ($r = 0.358$, $P < 0.001$), as well as a significant negative correlations between quality of life and depression severity ($r = -0.455$, $P < 0.001$). In addition, there was a significant negative correlation between stigma and QOL ($r = -0.318$, $P < 0.001$) was also found. As a result of these findings, which showed a connection between depression severity,

QOL, and stigma, depression severity (a continuous variable) was utilized as a mediating element in subsequent studies.

## Depression severity as a mediator between stigma and QOL

According to the hypothesis proposed in this study, we use SPSS PROCESS (3.4) to establish a simple mediating

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**Table 2** Logistic regression analysis on QOL

| Variables | Model1 | | Model2 | |
|---|---|---|---|---|
| | OR 95%CI | | OR 95%CI | |
| Age | 0.006 | [-0.030,0.043] | 0.007 | [-0.029,0.043] |
| Gender(female=0) | -0.004 | [-0.205,0.198] | -0.003 | [-0.204,0.198] |
| Religion(No=0) | 0.143 | [-0.084,0.369] | 0.153 | [-0.073,0.379] |
| Educational level (≤ Middle school=0) | -0.104 | [-0.278,0.070] | -0.099 | [-0.270,0.077] |
| Job status (No=0) | 0.153 | [-0.167,0.374] | 0.146 | [-0.074,0.365] |
| Exercise status (No=0) | -0.004 | [-0.175,0.167] | -0.011 | [-0.183,0.161] |
| Marital status (No=0) | 0.033 | [-0.163,0.230] | 0.027 | [0.788, -0.170] |
| Average family income (< 2000=0) | 0.167 | [0.035, 0.300] * | 0.173 | [0.040,0.306] * |
| Smoking status (No=0) | -0.070 | [-0.300,0.160] | -0.075 | [0.523, -0.306] |
| Drinking status (No=0) | 0.214 | [-0.117,0.545] | 0.208 | [0.216, -0.122] |
| Age at onset of illness | -0.005 | [-0.040,0.031] | -0.005 | [-0.041,0.031] |
| Duration of illness | -0.001 | [-0.037,0.034] | -0.002 | [-0.037,0.034] |
| Times of hospitalization | 0.013 | [-0.008,0.034] | 0.013 | [-0.008,0.034] |
| Medication | 0.141 | [-0.145,0.427] | 0.127 | [-0.160,0.414] |
| Depression score | -0.083 | [-0.098, -0.068] *** | -0.081 | [-0.096, -0.066] *** |
| SIS total score | -0.021 | [-0.030, -0.012] *** | | |
| Social Rejection | | | -0.014 | [-0.047,0.019] |
| Financial Insecurity | | | -0.037 | [-0.105,0.030] |
| Internalized Shame | | | 0.019 | [-0.016,0.054] |
| Social Isolation | | | -0.051 | [-0.092, -0.010] * |
| Constant | 7.300 | | 7.286 | |

*OR* odds ratio, *CI* confidence interval

* *p* < .05

** *p* < .01

*** *p* < .001

**Table 3** Logistic regression analysis on depression

| Variables | Model1 | | Model2 | |
|---|---|---|---|---|
| | OR | 95%CI | OR | 95%CI |
| Marital status(Yes=0) | 0.549 | 0.391–0.772** | 0.552 | 0.392–0.777** |
| Job status(Yes=0) | 4.623 | 2.549–8.385*** | 4.486 | 2.478–8.122*** |
| Physical exercise(Yes=0) | 2.187 | 1.507–3.172*** | 2.126 | 1.463–3.089*** |
| WHOQOL—BREF score | 0.561 | 0.484–0.651*** | 0.568 | 0.490–0.659*** |
| SIS total score | 1.063 | 1.043–1.084*** | | |
| Social rejection | | | 1.078 | 1.009–1.151* |
| Social isolation | | | 1.123 | 1.033–1.222* |
| Constant | 0.066 | | 0.064 | |

*OR* odds ratio, *CI* confidence interval

* *p* < .05

** *p* < .01

*** *p* < .001

**Table 4** Correlation between the total SIS score and its four dimensions

| Variables | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1.SIS total score | 1 | | | | |
| 2.Social Rejection | 0.913** | 1 | | | |
| 3.Financial Insecurity | 0.766** | 0.676** | 1 | | |
| 4.Internalized Shame | 0.702** | 0.508** | 0.386** | 1 | |
| 5.Social Isolation | 0.879** | 0.744** | 0.641** | 0.488** | 1 |

** :*P* < 0.01

**Table 5** Relationships between depression severity, stigmatization, and quality of life

| Variables | 1 | 2 |
|---|---|---|
| 1.PHQ-9 total score | 1 | |
| 2.SIS total score | 0.358*** | |
| 3.WHOQOL—BREF score | -0.455*** | -0.318*** |

*** :*P* < 0.001

model (Fig. 1). The model's independent, mediating, and dependent variables are stigma, depression severity, and QOL. The model was used to evaluate whether the severity of depression would mediate the impact of stigma

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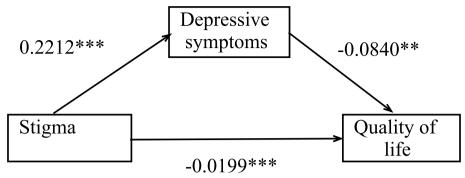
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**Fig. 1** Mediation analysis showed an association between stigma, depression severity and QOL

on patients' QOL. The results of the mediation model are shown in Table 6. Stigma had direct [ β = -0.0199, $P < 0.001$] and indirect [ β = -0.0186, $P < 0.001$] effects on the quality of life of PWS, and the sum of the two was the total effect [ β = -0.0385, $P < 0.001$]. Bivariate correlation analysis between covariates (age, gender, marriage, work, physical exercise, income, etc.) was evaluated by the Mann–Whitney U-test or chi-square test (Table 1). After controlling the covariates, the statistical results showed that the 95% confidence interval of the indirect effect did not contain zero [ -0.0232, -0.0144], which indicated that the total depression score had a significant indirect effect on the relationship between stigma and QOL, and the mediating effect accounted for 48.3% of the impact of stigma on patients' living standards.

## Discussion

To our knowledge, this research is the first to examine how stigma and QOL in rural China are impacted by depressive symptoms associated with schizophrenia. The results showed that PWS with depressive symptoms had greater stigma levels and worse QOL, with the intensity of depression acting as a significant mediating factor between stigma and QOL.

This study indicated that approximately 34% of stable schizophrenia patients had depressive symptoms, which is consistent with other research on depression in schizophrenia patients in various sociocultural situations [60]. Contrary to earlier findings, our analysis revealed that PWS with a spouse were more likely to have depressive symptoms than those without a partner. Many studies have shown that marriage benefits physical and mental

health, while divorce can be health-threatening [61]. However, while some people may experience long-lasting "scars" after separation or divorce, most people can quickly regain their health and happiness, and unhappy marriages might put couples in danger of poor intimacy and overall well-being [62].

Consistent with the findings of many studies, PWS who never engaged in physical activity were more likely than those who did to experience depressive symptoms [63, 64]. It has also been documented that appropriate physical activity not only reduces depressive symptoms in patients but also prevents cardiovascular disease [65]. The results of this study also show that PWS who are employed are less likely to experience depression than those who are not. Previous studies have well documented that employment provides productive benefits to patients and improves individual health and lifestyle quality [66, 67].

In recent studies, it was shown that the stronger the intensity of social rejection and social isolation in PWS, the more likely patients were to experience depression. Social exclusion has been linked to depression, which can lead to emotions of sadness and loneliness [68, 69]. Like significant physical sickness and QOL impairment related to despair, social isolation is also thought to be connected with mental health issues, particularly depression [70, 71].In this light, it is crucial to give PWS a social dimension. Research shows that social contact interventions between groups can reduce stigma [72].

The study's key conclusion is that the degree of depression partially mediates the link between stigma and life satisfaction. This finding is important because it has

**Table 6** Depression severity as a mediator between Stigmatization and QOL among study participants

|  | Total effect, *p*-value | Direct effect, *p*-value | Indirect effect, bootstrap confidence interval | Proportion mediated % |
|---|---|---|---|---|
| Quality of life(WHOQOL-BREF score) | -0.0385 <br> *P < 0.001* | -0.0199 <br> *P < 0.001* | -0.0186 <br> [-0.0232, -0.0144] | 48.3% |

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implications for therapies designed to lessen stigma and enhance PWS' living standards. First, in this study, the patient's living standards were significantly negatively correlated with the severity of stigma. Because of the history and understanding of the nature of the disease, people tend to reject PWS, and an interesting phenomenon in psychology is that the public tends to give socially desirable answers to controversial questions to maintain harmony [73]. Previous research has shown that the stigma of mental illness is far greater in Chinese culture than in Western culture [74]. Deeply rooted and specific cultural and philosophical ideas can contribute to stigma and act as barriers to remission and recovery. Traditional cultural values such as Confucianism and Taoism, which have influenced society for more than 2,000 years, also include the issue of "face" [75]. In Chinese society, people are first and foremost seen as living in a strict network of social interactions, and the maintenance of society depends on human interaction. As "face" represents power and status in Chinese society, preserving "face" is part of people's daily lives, and a diagnosis of schizophrenia can lead to a "loss of face", causing the individual to suffer from extreme symptoms of schizophrenia. A diagnosis of schizophrenia can lead to a "loss of face" for the individual, resulting in an extreme sense of shame for the patient [76–79]. In addition, some Chinese people believe that having a mental illness in this life means that they committed a moral wrong in a previous life, so that people with mental disorders are perceived by the public as being completely uncultivated and incapable of participating in social activities [80]. For example, in a survey of suicides in rural China, PWS were not accounted for, suggesting that people with schizophrenia were not considered morally competent [81].

In a collectivist society, people are more likely to recognize the public's stigmatization of mental illness than to express their values. This phenomenon severely limits and reduces the social status of patients. Schizophrenic patients are often considered different from others and are therefore negatively labelled, making it challenging to integrate into the community [82, 83]. Previous research has also demonstrated that stigmatization can lead to patients imposing negative stereotypes about themselves, resulting in self-discrimination and isolation [84] and a gradual withdrawal from social activities such as learning, working, and socializing, ultimately lowering their QOL [85]. Second, in this study, stigma is positively correlated with the severity of depression, and stigma can also indirectly affect the living standards of patients through the degree of depression (Fig. 1), which means that depression acts as a 'bridge.' Studies have found that stigmatization can result in slower healing rates and psychological issues [86]. For example,

a previous cross-sectional survey showed that discrimination could hurt the rehabilitation of people with schizophrenia spectrum disorders through depressive symptoms [87]. In addition, a longitudinal survey also confirmed the hypothesis that stigmatization is a factor leading to higher depressive symptoms [39]. Outpatients with prejudices about mental illness who do not want to believe that their symptoms will improve and thus behave in a more depressed manner [34, 36]. These aggravated depressive symptoms can reduce the patient's ability to work and result in their refusal to enter society, thus reducing their economic income and ultimately worsening their QOL [88]. Based on the above statements, our results may imply that one of the causes of the continued decline in the level of well-being for PWS who experience stigma is the intensity of depression.

Thus, these findings can guide mental health workers to develop effective measures for the rehabilitation of PWS. For example, due to the lack of public knowledge of mental illness, people tend to attribute the symptoms of the disease to patients, so it is essential to educate the public about the aetiology, symptoms, and treatment of schizophrenia [89]. In this era, when social media is widely used, we can educate the public through many platforms, so that patients can be understood, respected, and accepted. Assertive Community Treatment (ACT) can be used to provide multidisciplinary care for patients with mental illness. The team includes psychiatrists, nurses, and social workers who can assist patients with daily life needs such as disease treatment, drug management, work, housing, and transportation [90]. Finally, clinicians in the treatment of schizophrenia also need to pay attention to other interventions, such as cognitive behavioural therapy or social skills training, which may improve symptoms, dysfunctional attitudes, and functions to reduce self-stigma and depressive symptoms, thereby improving the patient's psychological well-being [91, 92].

The scope of this investigation has several limitations. First, as this is a cross-sectional study, it is not possible to elaborate on the causal relationship between variables but only to assess the correlation, so future longitudinal studies are needed for more in-depth exploration. Second, despite the extensive assessment of patient demographic and clinical characteristics, there is evidence that factors such as sleep, diet, and type of antipsychotic medication all influence depressive symptoms in PWS [93–95], and these factors could be examined in the future.

## Conclusion

According to studies, depressive symptoms can occur in up to 34% of PWS, and the intensity of depression may partially influence the link between stigma and life

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expectancy. To lessen the intensity of depression and further enhance patient QOL, health workers must pay close attention to the depressive symptoms of such patients, come to an agreement on the diagnosis of the illness, and develop efficient treatment and prevention measures. Additionally, more studies are required to validate the efficacy of antidepressant medication for PWS depression symptoms because there are currently few data [96].

## Abbreviations

| | |
|---|---|
| PWS | People with schizophrenia |
| QOL | Quality of life |
| PHQ-9 | 9-Item Patient Health Questionnaire |
| SIS | The Social Impact Scale |
| WHOQOL – BREF | The World Health Organization on Quality of Life Brief Scale |

## Availability of data and materials
The datasets used and/or analyzed during the current investigation are accessible from the corresponding author upon justifiable request, and all data supporting our conclusions are included in the publication.

## Declarations

### Ethics approval and consent to participate
The Ethics Committee of Chaohu Hospital affiliated to Anhui Medical University approved the research protocol with the ethics number 202212-kyxm-13. All participating patients and their legal guardians signed informed consent forms.

### Consent for publication
Not applicable.

### Competing interests
The authors declare no competing interests.

## References

1. Harvey PD, Strassnig MT, Silberstein J. Prediction of disability in schizophrenia: Symptoms, cognition, and self-assessment. J Exp Psychopathol. 2019;10:204380871986569.
2. He X-Y, Migliorini C, Huang Z-H, Wang F, Zhou R, Chen Z-L, et al. Quality of life in patients with schizophrenia: a 2-year cohort study in primary mental health care in rural China. Front Public Health. 2022;10:983733.
3. Chen J, Song H, Li S, Teng Z, Su Y, Chen J, et al. Social support and quality of life among chronically homeless patients with schizophrenia. Front Psychiatry. 2022;13:928960.
4. Rhee TG, Rosenheck RA. Does improvement in symptoms and quality of life in chronic schizophrenia reduce family caregiver burden? Psychiatry Res. 2019;271:402–4.
5. Ehrminger M, Roux P, Urbach M, André M, Aouizerate B, Berna F, et al. The puzzle of quality of life in schizophrenia: putting the pieces together with the FACE-SZ cohort. Psychol Med. 2022;52:1501–8.
6. Ertekin Pinar S, Tel H. The Effect of Music on Auditory Hallucination and Quality of Life in Schizophrenic Patients: a randomised controlled trial. Issues Ment Health Nurs. 2019;40:50–7.
7. Awad AG, Voruganti LNP. Measuring quality of life in patients with schizophrenia: an update. Pharmacoeconomics. 2012;30:183–95.
8. Hofer A, Mizuno Y, Wartelsteiner F, Wolfgang Fleischhacker W, Frajo-Apor B, Kemmler G, et al. Quality of life in schizophrenia and bipolar disorder: The impact of symptomatic remission and resilience. Eur Psychiatry. 2017;46:42–7.
9. Lu L, Zeng L-N, Zong Q-Q, Rao W-W, Ng CH, Ungvari GS, et al. Quality of life in Chinese patients with schizophrenia: a meta-analysis. Psychiatry Res. 2018;268:392–9.
10. Boyer L, Millier A, Perthame E, Aballea S, Auquier P, Toumi M. Quality of life is predictive of relapse in schizophrenia. BMC Psychiatry. 2013;13:15.
11. Bobes J, Garcia-Portilla MP, Bascaran MT, Saiz PA, Bouzoño M. Quality of life in schizophrenic patients. Dialogues Clin Neurosci. 2007;9:215–26.
12. Fleury M-J, Grenier G, Bamvita J-M, Tremblay J, Schmitz N, Caron J. Predictors of quality of life in a longitudinal study of users with severe mental disorders. Health Qual Life Outcomes. 2013;11:92.
13. Ruggeri M, Nosè M, Bonetto C, Cristofalo D, Lasalvia A, Salvi G, et al. Changes and predictors of change in objective and subjective quality of life: multiwave follow-up study in community psychiatric practice. Br J Psychiatry. 2005;187:121–30.
14. Evans S, Huxley P, Priebe S. A comparison of the quality of life of severely mentally ill people in UK & German samples. Int J Soc Psychiatry. 2000;46:47–55.
15. Ruggeri M, Gater R, Bisoffi G, Barbui C, Tansella M. Determinants of subjective quality of life in patients attending community-based mental health services. The South-Verona Outcome Project 5. Acta Psychiatr Scand. 2002;105:131–40.
16. Naguy A. Depression in schizophrenia - a good or bad omen? Asia Pac Psychiatry. 2018;10: e12312.
17. Li W, Yang Y, An F-R, Zhang L, Ungvari GS, Jackson T, et al. Prevalence of comorbid depression in schizophrenia: a meta-analysis of observational studies. J Affect Disord. 2020;273:524–31.
18. Hoertel N, Jaffré C, Pascal de Raykeer R, McMahon K, Barrière S, Blumenstock Y, et al. Subsyndromal and syndromal depressive symptoms among older adults with schizophrenia spectrum disorder: Prevalence and associated factors in a multicenter study. J Affect Disord. 2019;251:60–70.
19. van Rooijen G, van Rooijen M, Maat A, Vermeulen JM, Meijer CJ, Ruhé HG, et al. Longitudinal evidence for a relation between depressive symptoms and quality of life in schizophrenia using structural equation modeling. Schizophr Res. 2019;208:82–9.
20. Akinsulore A, Aloba OO, Mapayi BM, Oloniniyi IO, Fatoye FO, Makanjuola ROA. Relationship between depressive symptoms and quality of life in Nigerian patients with schizophrenia. Soc Psychiatry Psychiatr Epidemiol. 2014;49:1191–8.
21. Lin D, Joshi K, Keenan A, Shepherd J, Bailey H, Berry M, et al. Associations Between Relapses and Psychosocial Outcomes in Patients With Schizophrenia in Real-World Settings in the United States. Front Psychiatry. 2021;12:695672.
22. Hennings JM, Ising M, Uhr M, Holsboer F, Lucae S. Effects of weariness of life, suicide ideations and suicide attempt on HPA axis regulation in depression. Psychoneuroendocrinology. 2021;131:105286.
23. Jeong H, Cho S-J, Jeon S, Lee J, Lee YJ, Kim SJ. Association between snoring and depressive symptoms in adolescents. J Psychiatr Res. 2021;140:165–71.
24. van Rooijen G, Vermeulen JM, Ruhé HG, de Haan L. Treating depressive episodes or symptoms in patients with schizophrenia. CNS Spectr. 2019;24:239–48.

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25. Lien Y-J, Chang H-A, Kao Y-C, Tzeng N-S, Lu C-W, Loh C-H. Insight, self-stigma and psychosocial outcomes in Schizophrenia: a structural equation modelling approach. Epidemiol Psychiatr Sci. 2018;27:176–85.

26. Scambler G. Stigma and disease: changing paradigms. Lancet. 1998;352:1054–5.

27. Jacoby A. Felt versus enacted stigma: a concept revisited. Soc Sci Med. 1994;38:269–74.

28. Werner P, Segel-Karpas D. Depression-related stigma: comparing laypersons' stigmatic attributions towards younger and older persons. Aging Ment Health. 2020;24:1149–52.

29. Asrat B, Ayenalem AE, Yimer T. Internalized stigma among patients with mental illness attending psychiatric follow-up at Dilla University Referral Hospital, Southern Ethiopia. Psychiatry Journal. 2018;2018:1–7.

30. Kato Y, Chiba R, Yamaguchi S, Goto K, Umeda M, Miyamoto Y. Association between Work Environments and Stigma towards People with Schizophrenia among Mental Health Professionals in Japan. Healthcare (Basel). 2021;9:107.

31. Oexle N, Waldmann T, Staiger T, Xu Z, Rüsch N. Mental illness stigma and suicidality: the role of public and individual stigma. Epidemiol Psychiatr Sci. 2018;27:169–75.

32. Karakaş SA, Okanlı A, Yılmaz E. The Effect of Internalized Stigma on the Self Esteem in Patients with Schizophrenia. Arch Psychiatr Nurs. 2016;30:648–52.

33. Corrigan PW, Rao D. On the self-stigma of mental illness: stages, disclosure, and strategies for change. Can J Psychiatry. 2012;57:464–9.

34. Kamaradova D, Latalova K, Prasko J, Kubinek R, Vrbova K, Krnacova B, et al. Connection between self-stigma, adherence to treatment, and discontinuation of medication. PPA. 2016;10:1289–98.

35. Rüsch N, Angermeyer MC, Corrigan PW. Mental illness stigma: Concepts, consequences, and initiatives to reduce stigma. Eur psychiatr. 2005;20:529–39.

36. Livingston JD, Boyd JE. Correlates and consequences of internalized stigma for people living with mental illness: a systematic review and meta-analysis. Soc Sci Med. 2010;71:2150–61.

37. Riebel M, Rohmer O, Charles E, Lefebvre F, Weibel S, Weiner L. Compassion-focused therapy (CFT) for the reduction of the self-stigma of mental disorders: the COMpassion for Psychiatric disorders, Autism and Self-Stigma (COMPASS) study protocol for a randomized controlled study. Trials. 2023;24:393.

38. Ogundare T, Onifade PO, Ogundapo 'Deji, Ghebrehiwet S, Borba CPC, Henderson DC. Relationship between quality of life and social integration among patients with schizophrenia attending a Nigerian tertiary hospital. Qual Life Res. 2021;30:1665–74.

39. Pellet J, Golay P, Nguyen A, Suter C, Ismailaj A, Bonsack C, et al. The relationship between self-stigma and depression among people with schizophrenia-spectrum disorders: a longitudinal study. Psychiatry Res. 2019;275:115–9.

40. Aukst-Margetić B, Jakšić N, Boričević Maršanić V, Jakovljević M. Harm avoidance moderates the relationship between internalized stigma and depressive symptoms in patients with schizophrenia. Psychiatry Res. 2014;219:92–4.

41. Tang AL, Thomas SJ. Relationships between depressive symptoms, other psychological symptoms, and quality of life. Psychiatry Res. 2020;289:113049.

42. Ishii Y, Tomotake M, Chiba S, Tsutsumi R, Aono M, Taguchi K. Relationship between quality of life and clinical factors in inpatients with schizophrenia. J Med Investig. 2022;69(1.2):80–5.

43. Depression and subjective quality of life in chronic phase schizophrenic patients - PubMed. https://pubmed.ncbi.nlm.nih.gov/12956831/. Accessed 11 Oct 2023.

44. Fitzgerald PB, Williams CL, Corteling N, Filia SL, Brewer K, Adams A, et al. Subject and observer-rated quality of life in schizophrenia. Acta Psychiatr Scand. 2001;103:387–92.

45. Reynolds GP, McGowan OO. Schizophrenia, depressive symptoms, and antipsychotic drug treatment. Int J Neuropsychopharmacol. 2021;24:253–5.

46. Li Y-C, Bai W, Cai H, Wu Y, Zhang L, Ding Y-H, et al. Suicidality in clinically stable bipolar disorder and schizophrenia patients during the COVID-19 pandemic. Transl Psychiatry. 2022;12:303.

47. Ma Y-F, Li W, Deng H-B, Wang L, Wang Y, Wang P-H, et al. Prevalence of depression and its association with quality of life in clinically stable patients with COVID-19. J Affect Disord. 2020;275:145–8.

48. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. J Gen Intern Med. 2001;16:606–13.

49. Levis B, Benedetti A, Thombs BD, DEPRESsion Screening Data (DEPRESSD) Collaboration. Accuracy of Patient Health Questionnaire-9 (PHQ-9) for screening to detect major depression: individual participant data meta-analysis. BMJ. 2019;365:l1476.

50. Spitzer RL, Kroenke K, Williams JB. Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire. JAMA. 1999;282:1737–44.

51. Higgins JPT, Thompson SG. Quantifying heterogeneity in a meta-analysis. Stat Med. 2002;21:1539–58.

52. 卞崔冬, 何筱衍, 钱洁, 吴文源, 李春波. 患者健康问卷抑郁症状群量表在综合性医院中的应用研究. 同济大学学报(医学版). 2009;30:136–40.

53. Fife BL, Wright ER. The Dimensionality of Stigma: A Comparison of Its Impact on the Self of Persons with HIV/AIDS and Cancer. J Health Soc Behav. 2000;41:50.

54. Pan A-W, Chung L, Fife BL, Hsiung P-C. Evaluation of the psychometrics of the Social Impact Scale: a measure of stigmatization. Int J Rehabil Res. 2007;30:235–8.

55. The Whoqol Group. Development of the World Health Organization WHOQOL-BREF Quality of Life Assessment. Psychol Med. 1998;28:551–8.

56. Kruithof N, Haagsma JA, Karabatzakis M, Cnossen MC, de Munter L, van de Ree CLP, et al. Validation and reliability of the Abbreviated World Health Organization Quality of Life Instrument (WHOQOL-BREF) in the hospitalized trauma population. Injury. 2018;49:1796–804.

57. Li W, Zhao N, Yan X, Zou S, Wang H, Li Y, et al. The prevalence of depressive and anxiety symptoms and their associations with quality of life among clinically stable older patients with psychiatric disorders during the COVID-19 pandemic. Transl Psychiatry. 2021;11:75.

58. Li M, Xia L, Yang Y, Zhang L, Zhang S, Liu T, et al. Depression, Anxiety, Stress, and Their Associations With Quality of Life in a Nationwide Sample of Psychiatrists in China During the COVID-19 Pandemic. Front Psychol. 2022;13:881408.

59. Haag DG, Peres KG, Brennan DS. Tooth loss and general quality of life in dentate adults from Southern Brazil. Qual Life Res. 2017;26:2647–57.

60. Jeyagurunathan A, Vaingankar JA, Abdin E, Sambasivam R, Seow E, Pang S, et al. Gender differences in positive mental health among individuals with schizophrenia. Compr Psychiatry. 2017;74:88–95.

61. Zheng G, Lyu X, Pan L, Chen A. The role conflict-burnout-depression link among Chinese female health care and social service providers: the moderating effect of marriage and motherhood. BMC Public Health. 2022;22:230.

62. Sbarra DA, Hasselmo K, Bourassa KJ. Divorce and Health: Beyond Individual Differences. Curr Dir Psychol Sci. 2015;24:109–13.

63. Kwok JYY, Kwan JCY, Auyeung M, Mok VCT, Lau CKY, Choi KC, et al. Effects of mindfulness yoga vs stretching and resistance training exercises on anxiety and depression for people with Parkinson disease: a randomized clinical trial. JAMA Neurol. 2019;76:755.

64. Imboden C, Gerber M, Beck J, Holsboer-Trachsler E, Pühse U, Hatzinger M. Aerobic exercise or stretching as add-on to inpatient treatment of depression: Similar antidepressant effects on depressive symptoms and larger effects on working memory for aerobic exercise alone. J Affect Disord. 2020;276:866–76.

65. Philippot A, Dubois V, Lambrechts K, Grogna D, Robert A, Jonckheer U, et al. Impact of physical exercise on depression and anxiety in adolescent inpatients: a randomized controlled trial. J Affect Disord. 2022;301:145–53.

66. Petersson E-L, Wikberg C, Westman J, Ariai N, Nejati S, Björkelund C. Effects on work ability, job strain and quality of life of monitoring depression using a self-assessment instrument in recurrent general practitioner consultations: a randomized controlled study. WOR. 2018;60:63–73.

67. Chafi YK, Amare T, Haile K, Damene W, Tesfaye G, Minichil W. Prevalence and correlates of job loss among schizophrenia outpatients at St. AmanuelMental Specialized Hospital, Addis Ababa, Ethiopia; cross sectional study. PLoS One. 2020;15:e0242352.

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68. Kraines MA, White EJ, Grant DM, Wells TT. Social anxiety as a precursor for depression: Influence of interpersonal rejection and attention to emotional stimuli. Psychiatry Res. 2019;275:296–303.

69. Soltani S, Newman K, Quigley L, Fernandez A, Dobson K, Sears C. Temporal changes in attention to sad and happy faces distinguish currently and remitted depressed individuals from never depressed individuals. Psychiatry Res. 2015;230:454–63.

70. Valtorta NK, Kanaan M, Gilbody S, Ronzi S, Hanratty B. Loneliness and social isolation as risk factors for coronary heart disease and stroke: systematic review and meta-analysis of longitudinal observational studies. Heart. 2016;102:1009–16.

71. Valtorta NK, Kanaan M, Gilbody S, Hanratty B. Loneliness, social isolation and risk of cardiovascular disease in the English Longitudinal Study of Ageing. Eur J Prev Cardiolog. 2018;25:1387–96.

72. Jorm AF. Effect of contact-based interventions on stigma and discrimination: a critical examination of the evidence. PS. 2020;71:735–7.

73. Calear AL, Griffiths KM, Christensen H. Personal and perceived depression stigma in Australian adolescents: magnitude and predictors. J Affect Disord. 2011;129:104–8.

74. Georg Hsu LK, Wan YM, Chang H, Summergrad P, Tsang BYP, Chen H. Stigma of depression is more severe in Chinese Americans than Caucasian Americans. Psychiatry. 2008;71:210–8.

75. Yang LH. Application of mental illness stigma theory to Chinese societies: synthesis and new directions. Singapore Med J. 2007;48:977–85.

76. Lee S, Lee MTY, Chiu MYL, Kleinman A. Experience of social stigma by people with schizophrenia in Hong Kong. Br J Psychiatry. 2005;186:153–7.

77. Miyashiro GM. The illness narratives: suffering, healing and the human condition. Cad Saúde Pública. 1991;7:430–5.

78. Lee S, Chiu MYL, Tsang A, Chui H, Kleinman A. Stigmatizing experience and structural discrimination associated with the treatment of schizophrenia in Hong Kong. Soc Sci Med. 2006;62:1685–96.

79. Li P-L, Logan S, Yee L, Ng S. Barriers to meeting the mental health needs of the Chinese community. J Public Health. 1999;21:74–80.

80. Kolstad A, Gjesvik N. Collectivism, individualism, and pragmatism in China: implications for perceptions of mental health. Transcult Psychiatry. 2014;51:264–85.

81. Li L, Wu S, Wu Z, Sun S, Cui H, Jia M. Understanding family support for people living with HIV/AIDS in Yunnan. China Aids Behav. 2006;10:509–17.

82. Gerlinger G, Hauser M, De Hert M, Lacluyse K, Wampers M, Correll CU. Personal stigma in schizophrenia spectrum disorders: a systematic review of prevalence rates, correlates, impact and interventions. World Psychiatry. 2013;12:155–64.

83. Lv Y, Wolf A, Wang X. Experienced stigma and self-stigma in Chinese patients with schizophrenia. Gen Hosp Psychiatry. 2013;35:83–8.

84. Öztürk Z, Şahin Altun Ö. The effect of nursing interventions to instill hope on the internalized stigma, hope, and quality of life levels in patients With schizophrenia. Perspect Psychiatric Care. 2022;58:364–73.

85. Wahyuhadi J, Efendi F, Al Farabi MJ, Harymawan I, Ariana AD, Arifin H, et al. Association of stigma with mental health and quality of life among Indonesian COVID-19 survivors. PLoS One. 2022;17:e0264218.

86. Sewilam AM, Watson AM, Kassem AM, Clifton S, McDonald MC, Lipski R, et al. Suggested avenues to reduce the stigma of mental illness in the Middle East. Int J Soc Psychiatry. 2015;61:111–20.

87. Komatsu H, Ono T, Onoguchi G, Tomita H, Kakuto Y. Mediating effects of self-stigma and depression on the association between autistic symptoms and recovery in patients with schizophrenia-spectrum disorders: a cross-sectional study. BMC Psychiatry. 2021;21:464.

88. Sheehan DV, Nakagome K, Asami Y, Pappadopulos EA, Boucher M. Restoring function in major depressive disorder: A systematic review. J Affect Disord. 2017;215:299–313.

89. Karanci NA, Aras A, Kumpasoğlu GB, Can D, Çakır E, Karaaslan C, et al. Living with schizophrenia: Perspectives of Turkish people with schizophrenia from two Patient Associations on how the illness affects their lives. Int J Soc Psychiatry. 2019;65:98–106.

90. Gowda GS, Isaac MK. Models of Care of Schizophrenia in the Community-An International Perspective. Curr Psychiatry Rep. 2022;24:195–202.

91. Sönmez N, Romm KL, Østefjells T, Grande M, Jensen LH, Hummelen B, et al. Cognitive behavior therapy in early psychosis with a focus on depression and low self-esteem: a randomized controlled trial. Compr Psychiatry. 2020;97:152157.

92. Dubreucq J, Plasse J, Franck N. Self-stigma in Serious Mental Illness: a systematic review of frequency, correlates, and consequences. Schizophr Bull. 2021;47:1261–87.

93. Lassale C, Batty GD, Baghdadli A, Jacka F, Sánchez-Villegas A, Kivimäki M, et al. Healthy dietary indices and risk of depressive outcomes: a systematic review and meta-analysis of observational studies. Mol Psychiatry. 2019;24:965–86.

94. Sarris J, Byrne GJ, Stough C, Bousman C, Mischoulon D, Murphy J, et al. Nutraceuticals for major depressive disorder- more is not merrier: An 8-week double-blind, randomised, controlled trial. J Affect Disord. 2019;245:1007–15.

95. Fond G, Tinland A, Boucekine M, Girard V, Loubière S, Boyer L, et al. Improving the treatment and remission of major depression in homeless people with severe mental illness: The multicentric French Housing First (FHF) program. Prog Neuropsychopharmacol Biol Psychiatry. 2020;99:109877.

96. Whitehead C, Moss S, Cardno A, Lewis G. Antidepressants for the treatment of depression in people with schizophrenia: a systematic review. Psychol Med. 2003;33:589–99.

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