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Title:
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Date:
2021-06-01

Citation:
Li, W. & Reavley, N. (2021). Patients' and caregivers' knowledge and beliefs about mental illness in mainland China: A systematic review. Asia Pacific Psychiatry, 13 (2), https://doi.org/10.1111/appy.12423.

Persistent Link:
https://hdl.handle.net/11343/276311

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This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/appy.12423

Patients' and caregivers' knowledge and beliefs about mental illness in mainland China: A systematic review

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Abstract

This review aimed to systematically investigate patients' and caregivers' knowledge and beliefs about mental illness in mainland China. A total of 48 eligible studies (N = 11,895) were retrieved from 8 electronic databases. Prevalence statistics were computed for themes (e.g., stress) under each construct relating to knowledge or belief about mental illness (e.g., beliefs about causes). Effect size r was calculated for each correlation with an identified construct. We found that only 27.8% of patients recognized the symptoms of schizophrenia. Although 65% of caregivers declared that they knew the names of the disorders that their ill relatives had, depression (43.6%), schizophrenia (28.5%) and anxiety disorders (18.1%) had low recognition rates. Both caregivers and patients preferred psychosocial explanations of mental illness. Pharmacological interventions (e.g., antipsychotics), non-specific actives (e.g., "getting out and learning more"), mental health professionals (e.g., psychiatrists) and informal support (e.g., family) were each considered helpful for different disorders by caregivers, whereas regular contact with mental health professionals was not highly rated as helpful by patients. Additionally, while more patients knew about the effects of the medications that they were taking, more caregivers emphasized the importance of medicine adherence. Psychosocial variables (e.g., family burden) demonstrated significant effects on both groups' mental health literacy. The government should invest more in supporting caregivers of people with mental disorders and monitor the implementation of mental health policies.

Keywords: mental health literacy; mainland China; patients; caregivers

Introduction

Mental and behavioral disorders have become the leading causes of years lived with disability (YLDs) in mainland China, and the results of nationwide surveys show that lifetime prevalence of mental illness continues to increase – 1.4% in 1993, 13.2% in 2002 and 16.6% in 2015 (Huang et al., 2019; Kessler & Bedirhan, 2008; Yang et al., 2013; Zhang et al., 1998). Despite the government's efforts to establish high-quality mental health services to meet this increased demand for treatment and care, most of those with mental illnesses rely on family members for long-term care (Ma, 2012; National Health Commission of the People's Republic of China, 2015; Pan et al., 2016; Yu et al., 2018a; Zou et al., 2014). Family members are also often the ones who make decisions about treatment (e.g., admission and discharge), because in a Chinese context, people who are suffering from mental disorders are often considered incapable of making reasonable decisions due to their mental impairments (Chen & Fan, 2010; Fan & Wang, 2015). Responsibility for taking care of family members is a feature of China's mental health policies. For example, the Mental Health Law indicates that guardians should assist people with mental disorders to improve their social and independent living skills (National Health Commission of the People's Republic of China, 2013b). However, the central role of informal caregivers in treatment and caring has raised the question of whether they have sufficient knowledge to provide adequate support, and several studies have shown low levels of mental health literacy (MHL) in caregivers in China (e.g., Dixon et al., 2018; Li et al., 2017).

MHL is defined as "knowledge and beliefs about mental disorders which aid their recognition, management or prevention" (Jorm et al., 1997; p.183). Previous interview-based studies have shown that Chinese caregivers prefer somatic or supernatural explanations for their relatives' mental illnesses (Li et al., 2017; Phillips et al., 2000). They also tended to view psychotherapy and counselling as ineffective and believed that mental illness could not be treated(Dixon et al., 2018; Li et al., 2017). Not surprisingly, a low level of MHL has also been observed in people with mental disorders, with evidence showing that most of them either do not know the causes of their illnesses or believe they are caused by morally inappropriate thinking (i.e., deviation from socially accepted behaviors). Only a few have heard of evidence-based treatments such as psychological therapies (Lai-Ming Hui et al., 2015; Li et al., 2017; Yu et al., 2018a). Lack of mental health knowledge and negative beliefs about mental disorders can prevent or delay professional help seeking. Indeed, lack of knowledge about their disorders has been described by patients as a key reason for refusing treatment (Ran et al., 2001). Caregivers' limited understanding of the causes of mental illness, incorrect interpretation of observed symptoms and distrust of treatments are also significant barriers to patients receiving timely and appropriate treatments (Askey et al., 2007; Dixon et al., 2018; McConnell, 2017).

Despite its importance, there has been limited research into patients' and caregivers' MHL in mainland China, and most of the findings are based on one-to-one interviews or focus groups. To develop effective interventions to improve the quality of care and patients' knowledge and beliefs about their own illnesses (which have been shown to be important for

early identification of mental illness, timely treatment, medicine adherence and reduced risk of relapse), a better understanding of both groups' MHL is needed (Lau et al., 2018; Liu & Zhang, 2019; Ran et al., 2016; Zou et al., 2014). To date, we have not been able to identify any published systematic or meta-analytic reviews of studies of caregivers' and patients' MHL in mainland China. Accordingly, we aimed to consolidate the available research by performing a systematic review of quantitative studies that examined mainland Chinese patients' and caregivers' knowledge and beliefs about mental illness, and factors predicting these.

Method

Literature Search

A systematic search was conducted of 5 English databases (Cochrane Library, Embase, PsycINFO, PubMed and Scopus) and 3 Chinese databases (CNKI, VIP and WanFang; see search terms in online supplementary material, Table A) by the first author. To identify additional papers, this was supplemented with a search of relevant journals (e.g., *Medical Journal of Chinese People's Health*), and reference lists of a relevant review (Hsiao & Van Riper, 2010)and eligible studies. The initial search was deliberately kept broad to capture all potentially eligible papers.

Eligibility Criteria

Studies had to examine knowledge and/or beliefs about mental illness (e.g., causes, symptoms and treatment) and/or the correlates among people diagnosed with a mental illness and/or their caregivers in mainland China. In this review, caregivers were defined as informal

caregivers (either primary or secondary) who provide care to a person with a mental disorder, such as family members or friends (Family caregiver alliance, 2014). Eligible studies also had to be journal articles published in English or Chinese between January 1997 (this is the date of publication of the definition of MHL; Jorm et al., 1997) and September 2019, and reported quantitative data (e.g., means, SDs) that could be converted into effect size *r*. In the case of 4 studies with overlapping samples (Feng et al., 2016; Li et al., 2018; Tang et al., 2015a; Tang et al., 2015b), only the studies providing more demographic information were included (Li et al., 2018; Tang et al., 2015a) to ensure data independence (Lipsey & Wilson, 2001). In total, 48 studies with independent data were included in the current review (see Figure 1).

Data Collection and Assessment of Study Reporting Quality

Consistent with the PRISMA guidelines (Moher et al., 2009), study information (author, year, location where the research was conducted), methodological information (sample size, study design, measures, independent and dependent variables) and sample characteristics (age, gender, patients' mental illness, caregivers' relationships with patients) were extracted from eligible studies by the first author.

The quality of eligible studies was assessed for compliance with the Strengthening the Reporting of Observational Studies in Epidemiology checklist (STROBE; Vandenbroucke et al., 2007). Each of the 22 criteria was rated as met, met with some limitations, not met or not applicable, and the percentage of studies that met each criterion was calculated.

Statistical Analyses

All data analyses were performed using the Comprehensive Meta-Analysis software (CMA Version 2.0; Biostat, 2005). In the case of 3 studies (Jiao et al., 2017; Li et al., 2016; Zhang et al., 2018) which examined MHL in both patients and caregivers, data for each sample group contributed to the analyses independently (Lipsey & Wilson, 2001). To avoid bias, for 10 studies (Chen et al., 2008; Chen & Tan, 2010; Chen et al., 2011; Ding & Chen, 2012; Huang, 2013; Jin et al., 2006; Liu, 2009; Tan, 2005; Xing & Kang, 2017; Xing et al., 2002) which investigated participants' MHL before and after an intervention, only the data obtained before the intervention were utilized. Similarly, from 2 studies (Liu et al., 2005; Ran et al., 2003) which employed randomized controlled trails (RCTs) to test the effectiveness of psychoeducational interventions, only the datasets of the control groups (i.e., drug treatment only) were extracted and used. Thematic analysis approach was primarily applied to extract the theme that each survey item assesses. The identified themes were then classified into the following constructs according to the definition of MHL, namely recognition and knowledge of mental illness, causes, symptoms, negative outcomes of having a mental disorder, relapse, treatment and family involvement, beliefs about causes and treatment, and help-seeking intention. Each prevalence statistic (i.e., the response rate for each item) was then entered into CMA as an *event rate* (Abbey et al., 2015). The prevalence statistics were only pooled for studies that assessed the same theme. The included survey items can be found in the supplemental material (Table B).

Pearson's correlation coefficient (*r*) was the effect size metric utilized. Each *r* value or an estimate that can be converted into an *r* (i.e., odds ratio, *t*-value, X^2 statistic), representing each relationship between an independent variable (e.g., age) and a construct relating to MHL (e.g., beliefs about antipsychotic medications), was extracted. For a study provided more than one *r* for a relationship (i.e., for each gender group; Zhou et al., 2016), an average *r* was calculated. Each *r* value was then transformed into a Fisher's Z. The Fisher's Z scores were subsequently weighted by the inverse of the variance and averaged. The weighted mean Fisher's Z was back transformed to *r* for interpretation (Lipsey & Wilson, 2001). The transformation was computed automatically by the CMA software. It should be noted that *r* values were only pooled for studies that used the same measures. Cohen's (1988) guidelines were employed to assess the magnitude of *r*, with .10, .30, and .50, representing small, medium, and large effect, respectively. 95% confidence interval (CI) and *p*-value were also calculated to examine the statistical significance of each *r* value (Lipsey & Wilson, 2001). The heterogeneity of all pooled prevalence estimates and *r* values was tested using I^2 index, with large I^2statistics (i.e., I^2> 50%) representing considerable heterogeneity (Lipsey & Wilson, 2001). Subgroup analysis was also conducted to examine the effect of region (North versus South China) in the current findings, given people in different regions may have different understanding of mental illness due to the discrepancies in educational, economic and policy contexts (Ng et al., 2017; Sun et al., 2019). The random effect model was chosen for all analyses.

Results

Characteristics of Included Studies

In all, 48 studies (6 in English and 42 in Chinese), involving a pooled sample of 11,895 participants (*Mean age* = 44), were included in the review (Table 1). These included 36 cross-sectional studies, 10 pre-post intervention studies and 2 RCTs. Eleven studies (*N* = 2,226, *Mean age* = 41, male-to-female ratio of 1.16 to 1) focused only on patients, 34 studies (*N* = 8,241, *Mean age* = 45, male-to-female ratio of 1.04:1) recruited caregivers, and 3 studies (*N* = 1,428, *Mean age* = 47, male-to-female ratio of 1: 1.13) investigated MHL among both groups. Most of the studies originated from South China (*k* = 32, *N* = 8,626).

Study Evaluation

According to the STROBE guidelines, although the majority of included studies provided detailed information on study design (item 4: 97.9%) and setting (item 5: 93.8%), other key components of the methodology, including participant recruitment procedure (item 6: 47.9%; item 13c: 2.1%), variables tested (item 7: 31.3%), potential bias (item 9: 22.9%), sample size justification (item 10: 0%) and analysis procedure (item 11: 12.5%; item 12b: 54.2%;item 12e: 20.8%; item 17: 20.8%), were not well described. In addition, only a few studies explained missing data management (item 12c: 8.3%; item 13a: 37.5%; item 13b: 8.3%). Importantly, whereas the findings were well presented (item 14a: 81.3%; item 15: 100%; item 18: 87.5%), they were not always carefully interpreted (item 19: 10.4%; item 20: 10.4%; item 21: 45.8%; see online supplementary material, Figure A).

Patients' knowledge and beliefs about mental illness

Only 27.8% of the respondents recognized the symptoms of schizophrenia, and more than half considered stress (91.7%), introversion (68.1%), and abnormal body structure and function (61.7%) as causes (Table 2). In terms of relapse, only a small percentage of respondents believed that mental illness was highly recurrent (6.6%), and early treatment (7.1%) and medicine adherence (4%) could reduce the risk of relapse. For patients with schizophrenia or other severe mental disorders, more than 30% could identify the signs of relapse, and 90.5% declared that they knew how to deal with it.

Regarding available treatment for schizophrenia, 72.8% of the respondents believed that medical treatment was the main treatment method, and most patients knew the names (66.4%), appearance (81%), and doses (79.3%) of the antipsychotics that they were taking. Fewer than 45% knew about the therapeutic and side effects of the medications or how to deal with the side effects. Specifically, patients living in South China reported greater understanding of both therapeutic (South: 57.8%, 95%CI [48.7%-66.4%]; North: 24.5%, 95%CI [15.1%-37.2%]) and side effects (South: 46.2%, 95%CI [38.6%-54%]; North: 19.2%, 95%CI [10.9%-31.5%]). Although more than half of the patients admitted that one should not change the dose (64%) or take medications intermittently (50%), only 39.6% recognized the importance of medicine adherence. More than half of the patients indicated that living with family and keeping contact with friends could reduce their symptoms, and their health status could be influenced by family members' attitudes. On the contrary, keeping contact with mental health professionals (31.9%)

and attending rehabilitation training (13%) were not highly rated as helpful. For patients with severe mental disorders, approximately 40% reported that they knew the names, doses and therapeutic effects of the medications that they were taking, but only 28.2% were aware of the side effects and fewer than 35% realized the importance of medicine adherence.

Correlates of patients' knowledge and beliefs about mental illness

Length of illness, illness awareness and medication knowledge all demonstrated negative relationships with beliefs about antipsychotics, with small and medium to large effects, respectively (Table 3).Only two variables, beliefs about taking medications and medicine adherence, were examined and demonstrated significant and medium to large associations with patients' knowledge of their medications, with the former exhibited a positive effect, and the latter generated a negative relationship. Large effects of age and education level were found on their relationships with knowledge of mental illness in general, while small to medium and medium to large effects of residential area, marital status, education level and occupation were identified in the associations with knowledge of schizophrenia.

Caregivers' knowledge and beliefs about mental illness

Depression was recognized by 43.6% of caregivers, followed by schizophrenia (28.5%) and anxiety disorders (18.1%; Table 4). Approximately 65% (46.6%-77.5%) declared that they could tell the names of the disorders that their ill relatives had, but only a few knew about the signs and symptoms (10.2%-36.7%) or how to identify them (11.7%-13.2%).Only 33.3% knew the causes of severe mental illnesses, followed by schizophrenia (6.8%), and depression and

anxiety (3.5%). Most caregivers attributed the onset of mental illness to negative life events (95.5%), morally inappropriate thinking (68.9%) or the co-occurrence of various factors (64.2%), while positive attitudes, good interpersonal relationships and a healthy life style were considered to be effective buffers (96.1%). For schizophrenia, the top five most frequently cited causes were psychological stress, introversion, work or financial problems, daily problems and weakness of character. Caregivers in North China were more likely to consider psychological stress (North: 95.6%, 95%CI [93%-97.2%]; South: 85%, 95%CI [77.4%-90.3%]) as the cause of schizophrenia, whereas caregivers in South China were inclined to view virus of infection (North: 6.7%, 95%CI [4.6%-9.7%]; South: 15%, 95%CI [10.7%-20.6%]), heredity (North: 21.9%, 95%CI [18.1%-26.3%]; South: 46.6%, 95%CI [41.2%-52.1%]) and family environment (North: 50.7%, 95%CI [45.7%-55.7%]; South: 84.2%, 95%CI [76.5%-89.7%]) as possible causes. Similarly, for depression, the top five causes were work or financial problems, daily problems, recent traumatic events, weakness of character and death of someone else. Regarding relapse, 46% of caregivers declared that they knew the signs of relapse of severe mental illnesses, followed by schizophrenia (41.8%), depression and anxiety (33.5%), and any mental illness that the patient had (23%), but only a few knew about how to prevent it (any mental illness: 20.2%; schizophrenia: 9.1%; severe mental illnesses: 6.5%).

In terms of medical treatment, most caregivers believed that in addition to counseling, patients should also take medications regularly. However, although 41% knew the names of the medications that their ill relatives were taking, fewer knew about the duration of medical

treatment (18.1%), the therapeutic and side effects (2.9%-35.8%), and how to cope with the side effects (24.7%). In the case of treating a specific disorder, only a few caregivers knew the names of the medications that the patients were taking for their schizophrenia (30%) or severe mental illnesses of any type (25.8%). A significant difference between North and South China on caregivers' familiarity with the medications for severe mental illnesses, including names (North: 42.8%, 95%CI [22.3%-66.2%]; South: 13.8%, 95%CI [5.6%-30.3%]) and side effects (North: 19.9%, 95%CI [15.7%-24.8%]; South: 43.3%, 95%CI [35.6%-51.4%]), was observed.

More than half of the respondents agreed with the importance of family involvement (e.g., keep the doctor updated) in the treatment for schizophrenia and any other severe mental disorders, but only a few knew how to provide care at home (schizophrenia: 17.5%; severe mental illnesses: 18%).Both formal (i.e., psychiatrists, mental health nurses and psychologists) and informal (i.e., family and friends) support were very highly rated as being helpful for both depression and schizophrenia. In relation to interventions, "becoming more physically active", "getting out and learning more", "attending courses on relaxation", "massage and having a rest", and "receiving psychotherapy" were more often considered to be helpful for depression. In contrast, caregivers were more likely to view "cutting out alcohol" and "being admitted to a psychiatric ward" as helpful for schizophrenia. The top three most frequently cited activities for treating anxiety were "getting out and learning more", "attending courses on relaxation", and "massage and have a rest". More than 70% of the respondents considered antipsychotics, antidepressants and anxiolytics to be helpful for schizophrenia, antidepressants and anxiolytics to

be useful for depression, and antidepressants to be effective for anxiety. In terms of seeking professional help, a large proportion of caregivers (i.e., more than 80%) agreed that one should seek professional help for mental illness and declared that they would accompany their ill relatives to the services.

Correlates of caregivers' knowledge about mental illness

Public stigma displayed the strongest negative association with caregivers' levels of mental health knowledge, while age, financial and daily life burden, caregivers' physical health, and burden in family relationship and activity demonstrated medium to large or small to medium effects (Table 5). Having received psychoeducation and residential area were the only two variables which had positive relationships with the level of mental health knowledge. Burden in daily life, family relationship and family activity and caregivers' own physical health also demonstrated negative and small to medium associations with caregivers' levels of knowledge of recovery. A range of psychotic symptoms in caregivers (as measured by SCL-90-R) displayed small to medium negative effects on caregivers' levels of knowledge of schizophrenia. A positive and small to medium correlation was observed between caregivers' knowledge of mental illness and patient compliance with medication.

Discussion

This systematic review aimed to investigate patients' and caregivers' knowledge and beliefs about mental illness in mainland China. Our findings reveal that 43.6% of caregivers recognized depression, while only 28.5% and 18.1% identified schizophrenia and anxiety

respectively. Both patients and caregivers tended to attribute the causes of mental illness to psychosocial factors (e.g., stress). Importantly, a discrepancy was noted in the two groups' knowledge of medications – while more patients knew about the names and effects of the medications, more caregivers emphasized the importance of medicine adherence. Non-standard interventions (e.g., "getting out and learning more"), mental health professionals and family members were all viewed as helpful for mental illness by caregivers. A range of modifiable (e.g., family burden) and non-modifiable (e.g., gender) variables were identified as significant correlates of patients' and/or caregivers' beliefs about medications and/or knowledge of mental illness, recovery and medications.

Noticeably, although caregivers' ability to recognize depression (43.6%), schizophrenia (28.5%) and anxiety (18.1%) is much lower than primary healthcare workers (depression: 73.2%; schizophrenia: 61.1%; anxiety: 78.2%), mental health professionals (depression: 68.4%; schizophrenia: 66.1%) and non-mental health professionals working at general hospitals (depression: 56.8%; schizophrenia: 48.8%; anxiety: 31.8%) in mainland China, it is greater than medical students (depression: 38%; schizophrenia: 12.4%) and the general public (depression: 25.4%; schizophrenia: 18.4%; Li & Reavley, 2019a; Li & Reavley, 2019b). These findings may partially reflect caregivers' greater exposure to mental illness. Previous studies have observed that most persons with mental disorders rely on their families for long-term care in China – not only the basic care (e.g., financial support) but also medical administration, rehabilitation, health status monitoring (e.g., signs of relapse) and regular contacts with professionals (Hsiao & Van

Riper, 2010; Yu et al., 2018a; Zou et al., 2014). This review also found that most of the caregivers took an active role in cooperating with mental health professionals on follow-up care, and more caregivers than patients knew about the signs of relapse of schizophrenia and other severe mental disorders.

Regarding causes of mental illness, in contrast to Western populations, Chinese caregivers were less likely to attribute the onset of schizophrenia to biological factors (Angermeyer & Matschinger, 1996), and more likely to consider psychosocial (e.g., stress) and personality (i.e., introversion) factors as important causes (i.e., more than 80%). Patients showed a stronger tendency to attribute the development of schizophrenia to psychological stress (91.7%) rather than other factors (e.g., heredity: 19.1%). Future research could benefit from adopting interviews and/or focus groups to gain a deeper understanding of patients' and caregivers' own perspectives regarding the causes. Importantly, the current findings highlight both groups' lack of knowledge about causes of mental illness. Indeed, only a few caregivers (3.5% - 33.3%) in this review declared that they knew the causes of the illnesses that their ill relatives had (e.g., schizophrenia, depression). Given that one's beliefs about causes can influence their future help-seeking behaviors and family members often play an important role in treatment decision making in China, mental health professionals should explain the possible causes of the illnesses to both patients and caregivers in the interviews, and consider psycho-educational approaches to improve both groups' understanding of mental illness (Fan & Wang, 2015; Hsiao & Van Riper, 2010; Li et al., 2017; Yip, 2005). In addition, patients' and caregivers' beliefs in external factors

may be attributable to their tendency to avoid stigma attached to people with mental disorders and their families (i.e., affiliate stigma; Mo et al., 2008; Pearson, 1993). Research conducted among Asian Americans and Indians has indeed identified that environmental or socio-economic explanations (e.g., stress, work and financial issues) of mental illness was associated with reduced social distance (Cheng, 2015; Kermode et al., 2009). However, future studies are needed to explore the relationship between causal attribution and stigma in mainland China.

Consistent with Western literature (Brodaty et al., 2003; Goodman et al., 1999), a favorable attitude towards ECT was found among patients and caregivers in China, but differences between groups in their understanding of medications were found. While more patients knew about the names and effects of medications that they were taking, a better understanding of medicine adherence was observed among caregivers. It could be that instead of giving adequate information about patients' illnesses (e.g., causes, symptoms and treatments), mental health professionals are inclined to place emphasis on the importance of medicine adherence when making suggestions to caregivers about the ongoing care at home. Indeed, previous studies in mainland China have consistently indicated that medicine management is the most frequently cited caregiving experience, and ensuring patients take medications as prescribed is the most common advice given by the professionals (Pearson, 1993; Yu et al., 2018b). Furthermore, we also found that patients' adherence to medications was positively related to their caregivers' knowledge of the illnesses but negatively associated with their own knowledge of medications. One possible explanation is that patients may become more worried

about the adverse effects when they get to know more about the medications, while caregivers may be more worried about the negative outcomes of untreated illnesses and relapse. Indeed, the current review identified that 75.6% of patients were worried about the long-term effects of antidepressants, and 54.5% of caregivers knew about the negative outcomes caused by severe mental illnesses. To enhance patient adherence to medication, mental health professionals should therefore consider emphasizing more on positive consequences of medicine adherence when providing medicine information to patients, and continue providing individualized and adequate information about patients' illnesses to their caregivers.

Regarding beliefs about the helpfulness of pharmacological interventions, similar to health professionals working in China (i.e., mental health professional, non-mental health professionals working at general hospitals, and medical students; Li & Reavley, 2019a), caregivers also tended to view antipsychotics as more helpful for schizophrenia, and antidepressants for depression and anxiety. In terms of non-pharmacological interventions, congruent with beliefs of professional groups (Li & Reavley, 2019a), non-standard interventions (e.g., "getting out and learning more") were rated highly (i.e., more than 90%) for schizophrenia, depression and anxiety. The preference of non-specific activities may partially reflect caregivers' wishes for patients to return to society and re-establish "normal lives". Indeed, previous research has identified that, in mainland China, caregivers usually define patients' recovery from mental illness as not only returning to health but also integrating into society (Ramsay, 2010). Hence, in addition to delivering effective treatments, mental health facilities should also help patients

return to society such as providing rehabilitation services and occupational therapy. Encouragingly, China's mental health policies, such as the 686 program and the Mental Health Law, have instructed local governments to establish community-based rehabilitation services (Ma, 2012; National Health Commission of the People's Republic of China, 2013b). However, our findings reveal that only a few caregivers knew about rehabilitation services (9.4% - 25.2%), and both patients and caregivers tended to view rehabilitation training as less helpful for schizophrenia (87% - 85%). These may reflect a gap between China's central policy and local implementation, thus the central government should develop effective strategies to support and monitor the implementation of mental health policies.

Among health professionals, psychiatrists were most often cited (87.7% - 97%) as helpful for schizophrenia, depression and anxiety by caregivers, followed by psychologists (schizophrenia: 96%; depression: 93.1%). These findings are consistent with Chinese health professionals' and public's beliefs that psychiatrists and psychologists are more helpful for schizophrenia and depression (Li & Reavley, 2019a, 2019b). Noticeably, same with the professional group (Li & Reavley, 2019a), caregivers are also inclined to consider family members as helpful for schizophrenia (92.5%) and depression (87.6%). However, potential family burden should be noted. Previous research has found that both objective (i.e., practical issues that arise due to patients' illness such as financial issues) and subjective (i.e., caregivers' emotional suffering due to the situation such as depression) family burn is higher in schizophrenia than in physical diseases (e.g., heart disease, diabetes; Magliano et al., 2005). Our

findings also reveal that caregivers' psychological symptoms (as measured by SCL-90-R) and the increased family burden are associated with their decreased knowledge of patients' illnesses. It is possible that when the burden on caregivers increases, such as increased financial demands and own health problems, their attention will be distracted from caring for the patients.

Furthermore, the current review also provides some evidence that caregivers may be unprepared and struggle to provide ongoing care at home, for example, only 6.5% of caregivers knew about how to prevent relapse of severe mental illnesses. Therefore, in addition to providing treatment and support for patients, mental health professionals should also consider supportive interventions for caregivers such as family psychoeducation. Family psychoeducation focuses on benefiting both patients' and their family caregivers' well-being, and the content usually includes the information about patients' illnesses (e.g., treatment and medication) and coping strategies for dealing with unexpected situations (e.g., problem-solving skills; Lucksted et al., 2012). Cross-culturally, this intervention has been demonstrated as effective in reducing family burden, relapse and rehospitalization (Lucksted et al., 2012). Specifically, according to an RCT conducted in China (Ran et al., 2003), family psychoeducation can also improve family members' caring attitudes. This could be important for patients' recovery, given more than half of patients and caregivers in this review indicated that family members' negative attitudes could affect patients' conditions.

When delivering family psychoeducation to Chinese caregivers, strategies to assist in coping with stigma should also be included, taking into account the identified negative and

strong relationship between perceived stigma and caregivers' levels of mental health knowledge. Fear of being stigmatized may prevent caregivers getting information about mental illness such as attending educational workshops (Li et al., 2017). It is also possible that the fear of stigma may stop caregivers attending family psychoeducation programs. Thus, policy makers and mental health professionals could consider promoting individual family psychoeducation. For example, Article 55 of the Mental Health Law indicates that community health professionals should regularly follow up people with severe mental illnesses who stay at home, and educate their caregivers about how to take care of the person (National Health Commission of the People's Republic of China, 2013b). This Article could be extended by including what practitioners can do to support caregivers during their visits, such as checking caregivers' physical and mental health status and asking about their recent concerns (e.g., financial issues).

Several limitations should be noted. First, because China's current mental health policies (e.g., the 686 program; Ma, 2012) focus primarily on severe mental illnesses (e.g., schizophrenia), most of the included studies examined MHL among people with these disorders and/or their caregivers, less attention has been given to other mental illnesses. Further investigation of MHL among persons with other mental disorders (e.g., eating disorders) and their caregivers is therefore needed. Second, several domains of MHL (e.g., recognition of mental disorders) were only examined in caregivers. Future empirical studies should consider investigating these among patients as well, in order to assist in the design and implementation of interventions for patients. Third, most of the included studies were conducted in South China (*k*

= 32) and/or major cities. Although the difference between regions (i.e., North versus South China) on the current findings was explored, our analysis was restricted by the limited number of studies in North China (k = 16). Future research is therefore recommended to explore patients' and caregivers' MHL within different areas of China. Fourth, examination of different types of caregivers (e.g., patients' spouse, parents or children) as moderators was not possible as most included studies recruited family caregivers and did not provide separate data for each type. Finally, although patients' and caregivers' knowledge and beliefs about mental illness and treatment may change over time due to the progressive accumulation of their experiences, conclusions about this cannot be drawn from this review as no longitudinal studies were identified. Future longitudinal research using quantitative and/or qualitative methods is therefore suggested to explore the changes of patients' and caregivers' MHL in mainland China.

In conclusion, our findings advance the understanding of MHL among people with mental illness and their caregivers in mainland China – both groups prefer psychosocial explanations of mental illness and their knowledge and beliefs about medical treatment are inconsistent. The government should invest more resources in educating and supporting caregivers of people with mental illness.

Data availability statement

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

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Table 1
Description of 48 Studies Included in the Review

							Prevalence		Correlation	
Study	Region (Province)	*N*	Mean age	Gender	Patient's illness	Sample type	Theme	Measure	Dependent variable	Measure
Chen et al. (2008)	South (Hubei)	200	41	male (58%); female (42%)	schizophrenia	caregiver (family)	knowledge of treatment, causes, mental illness	self-designed	n/a	n/a
Chen et al. (2011)	South (Guangdong)	198	38.9	male (64.1%); female (35.9%)	schizophrenia	patient	knowledge of treatment, relapse, symptoms, causes	self-designed	n/a	n/a
Chen et al. (2017)	South (Hunan)	402	41.1	male (41.5%); female (58.5%)	any mental illness	caregiver (family or friend)	recognition; beliefs about causes, treatment	Jorm's vignettes	n/a	n/a
Chen et al. (2018b)	South (Hunan)	204	n/a	n/a	any mental illness	caregiver (family)	beliefs about treatment; recognition	Jorm's vignette	n/a	n/a
Chen et al. (2018a)	South (Hunan)	182	26.6	male (100%)	severe mental illnesses	patient	knowledge of treatment	self-designed	knowledge of the medication that he/she is taking	self-designed
Chen et al. (2019)	South (Shanghai)	400	n/a	male (48%); female (52%)	severe mental illnesses	patient	knowledge of treatment, family involvement, relapse	self-designed	knowledge of mental illness	self-designed
Chen and Liu (2006)	South (Guangdong)	280	n/a	n/a	any mental illness	caregiver (family)	knowledge of treatment, family involvement, relapse, causes, symptoms	self-designed	n/a	n/a
Chen and Tan (2010)	South (Hunan)	804	40.2	male (51.5%); female (48.5%)	any mental illness	caregiver (family)	knowledge of treatment, symptoms	self-designed	n/a	n/a
Ding and Chen (2012)	South (Zhejiang)	458	54.7	male (40.2%); female (59.8%)	schizophrenia	caregiver (family)	knowledge of mental illness, treatment, family involvement, relapse, symptoms, causes	self-designed	n/a	n/a
Gao et al.	South	79	42.2	male (54.4%);	any mental	caregiver	beliefs about treatment;	self-designed	n/a	n/a

(2004)	(Hunan)	female (45.6%)	illness	(family)	help-seeking intention; knowledge of mental illness

Table 1

Continued

Study	Region (Province)	*N*	Mean age	Gender	Patient's illness	Sample type	Prevalence		Correlation	
							Theme	Measure	Dependent variable	Measure
Huang (2013)	South (Sichuan)	150	37.2	male (40.7%); female (59.3%)	severe mental illnesses	caregiver (family)	knowledge of mental illness, treatment, family involvement, relapse, causes, symptoms	self-designed	n/a	n/a
Jiao et al. (2017)	North (Inner Mongolia)	patient: 386; caregiver: 386	patient: 39.8; caregiver: 49.2	patient: male (57.3%); female (42.7%) caregiver: male (37.3%); female (62.7%)	schizophrenia	patient & caregiver (n/a)	knowledge of treatment, family involvement; beliefs about treatment, causes	Knowledge-Attitude-Practice Awareness Questionnaire	knowledge of schizophrenia	Knowledge-Attitude-Practice Awareness Questionnaire
Jin et al. (2006)	South (Guangdong)	100	n/a	n/a	schizophrenia	caregiver (family)	knowledge of mental illness, treatment, family involvement	self-designed	n/a	n/a
Li (2007)	South (Hunan)	196	n/a	male (61.7%); female (38.3%)	any mental illness	caregiver (family)	knowledge of mental illness, treatment, family involvement, relapse	self-designed	n/a	n/a
Li et al. (2006)	South (Guangdong)	308	46.8	male (56.2%); female (43.8%)	any mental illness	caregiver (family)	knowledge of mental illness, treatment, family involvement, symptoms	self-designed	n/a	n/a
Li et al. (2016)	North	patient:	patient:	patient:	bipolar;	patient &	knowledge & beliefs	self-designed	n/a	n/a

	(Beijing)	210; caregiver: 210	34.2 caregiver: n/a	male (55.7%); female (44.3%)	schizophrenia; major depression	caregiver (family)	about ECT			
Li et al. (2018)	South (Jiangsu)	200	n/a	male (71.5%); female (28.5%)	schizophrenia	caregiver (family)	knowledge of treatment, causes, symptoms, family involvement, negative outcomes	self-designed	n/a	n/a

Table 1

Continued

							Prevalence		Correlation	
Study	Region (Province)	*N*	Mean age	Gender	Patient's illness	Sample type	Theme	Measure	Dependent variable	Measure
Li and Sun (2016)	North (Shandong)	157	n/a	male (40.8%); female (59.2%)	any mental illness	caregiver (family)	n/a	n/a	knowledge of mental health	MHKQ
Li and Zhao (2018)	North (Ningxia)	292	n/a	n/a	severe mental illnesses	caregiver (family)	knowledge of mental illness, treatment, family involvement, relapse, causes, symptoms, negative outcome	self-designed	n/a	n/a
Liu (2009)	North (Shandong)	98	n/a	male (57.1%); female (42.9%)	schizophrenia	patient	knowledge of treatment, relapse	self-designed	n/a	n/a
Liu et al. (2004)	North (Liaoning)	112	42	male (43.8%); female (56.2%)	any mental illness	caregiver (family)	beliefs about treatment, causes; knowledge of treatment, family involvement	self-designed	n/a	n/a
Liu et al. (2005)	North (Shandong)	57	32.4	male (57.9%); female (42.1%)	schizophrenia	patient	knowledge of relapse, symptoms,	self-designed	n/a	n/a

							treatment			
Lou (2013)	South (Chongqing)	246	41.3	male (37.8%); female (62.2%)	severe mental illnesses	caregiver (family)	knowledge of treatment, family involvement, relapse, symptoms	self-designed	n/a	n/a
Lu et al. (2016)	North (Beijing)	135	68.3	male (34.1%); female (65.9%)	major depression	patient	know & beliefs about treatment	Beliefs about Medicine	n/a	n/a
Luo and Deng (2002)	South (Hunan)	116	42.9	male (48.3%); female (51.7%)	any mental illness	caregiver (family)	knowledge of treatment, family involvement, relapse, causes, symptoms	self-designed	n/a	n/a
Ping et al. (2012)	South (Zhejiang)	116	48.2	male (91.4%); female (8.6%)	schizophrenia	patient	knowledge of treatment	self-designed	n/a	n/a

Table 1

Continued

							Prevalence		Correlation	
Study	Region (Province)	*N*	Mean age	Gender	Patient's illness	Sample type	Theme	Measure	Dependent variable	Measure
Qu et al. (2014)	South (Jiangxi)	300	n/a	male (62%); female (38%)	schizophrenia	caregiver (family or friend)	knowledge of mental illness, treatment, family involvement, relapse, negative outcome	self-designed	n/a	n/a
Ran et al. (2003)	South (Sichuan)	103	45.1	male (55.3%); female (44.7%)	schizophrenia	caregiver (family)	beliefs about causes; knowledge of treatment, relapse	Relatives' Beliefs Scale	n/a	n/a
Tan (2005)	South (Guangxi)	42	n/a	male (31%); female (69%)	schizophrenia	patient	knowledge of treatment, symptoms	self-designed	n/a	n/a

Tang et al. (2015a)	South (Shanghai)	120	58.8	male (39.2%); female (60.8%)	schizophrenia	caregiver (family)	beliefs about causes; knowledge of mental illness, treatment, family involvement, symptoms	self-designed	n/a	n/a
Tang et al. (2016)	North (Beijing)	107	n/a	n/a	schizophrenia	caregiver (family)	knowledge of treatment	self-designed	n/a	n/a
Wang et al. (2012)	North (Beijing)	192	39.5	male (43.2%); female (56.8%)	severe mental illnesses	patient	knowledge of treatment	self-designed	n/a	n/a
Wang et al. (2014)	North (Beijing)	197	46.7	male (55.8%); female (44.2%)	schizophrenia	caregiver (family)	n/a	n/a	knowledge of schizophrenia	self-designed
Wang and Yin (2016)	South (Jiangsu)	116	50.3	male (52.6%); female (47.4%)	any mental illness	caregiver (family)	knowledge of mental illness, treatment, family involvement, relapse, causes, symptoms, negative outcome	self-designed	n/a	n/a
Wen et al. (2008)	South (Guangxi)	120	38.5	male (58.3%); female (41.7%)	any mental illness	caregiver (family)	knowledge of treatment, family involvement, relapse, causes, symptoms	self-designed	n/a	n/a

Table 1

Continued

							Prevalence		Correlation	
Study	Region (Province)	*N*	Mean age	Gender	Patient's illness	Sample type	Theme	Measure	Dependent variable	Measure
Xing and Kang (2017)	North (Shandong)	200	n/a	n/a	depression, anxiety	caregiver (family)	knowledge of mental illness, treatment, relapse, causes, symptoms,	self-designed	n/a	n/a

							negative outcome			
Xing et al. (2002)	North (Henan)	44	43.6	male (56.8%); female (43.2%)	schizophrenia	caregiver (family)	knowledge of mental illness, treatment, relapse, symptoms, negative outcome	self-designed	n/a	n/a
Yang et al. (2018)	South (Guangdong)	796	52.2	male (58.7%); female (41.3%)	severe mental illnesses	caregiver (family)	knowledge of treatment, family involvement, relapse	self-designed	knowledge of the illness that the patient has	self-designed
Yu et al. (2006)	North (Shandong)	100	43	male (60%); female (40%)	schizophrenia	caregiver (family)	knowledge of symptoms, mental illness, treatment, family involvement, relapse	self-designed	n/a	n/a
Zhang et al. (2011)	South (Hunan)	306	42.9	male (27.1%); female (72.9%)	neurotic disorder	patient	knowledge of treatment,	self-designed	n/a	n/a
Zhang et al. (2014)	South (Hainan)	253	39	male (42.7%); female (57.3%)	schizophrenia	caregiver (family)	knowledge of treatment; help-seeking intention; beliefs about causes	MHKQ	knowledge of mental health	MHKQ
Zhang et al. (2018)	North (Beijing)	patient: 118; caregiver :118	patient: 63.6; caregiver: n/a	patient: male (28.8%); female (71.2%)	schizophrenia; bipolar; major depression	patient & caregiver (family or friend)	knowledge & beliefs about treatment	self-designed	n/a	n/a
Zhang et al. (2010)	South (Shanghai)	757	n/a	male (44.9%); female (55.1%)	any mental illness	caregiver (family)	knowledge of mental illness, treatment, family involvement, relapse, causes, symptoms; help-seeking intention; beliefs about causes	self-designed	n/a	n/a

Table 1

Continued

Study	Region (Province)	*N*	Mean age	Gender	Patient's illness	Sample type	Prevalence		Correlation	
							Theme	Measure	Dependent variable	Measure
Zhao et al. (2013)	North (Beijing)	150	52.4	male (40%); female (60%)	severe mental illnesses	caregiver (family)	n/a	n/a	knowledge of recovery; knowledge of mental health	self-designed
Zhao and Liang (2005)	South (Guangdong)	110	38.5	male (59.1%); female (40.9%)	any mental illness	caregiver (family)	knowledge of treatment, family involvement, relapse, causes, symptoms	self-designed	n/a	n/a
Zhou et al. (2016)	South (Hunan)	500	33.4	male (55%); female (45%)	schizophrenia	patient	beliefs about treatment	self-designed	beliefs about antipsychotics	self-designed
Zhu (2009)	South (Guangdong)	166	n/a	male (58.4%); female (41.6%)	any mental illness	caregiver (family)	knowledge of mental illness, treatment, family involvement, relapse	self-designed	n/a	n/a
Zhu et al. (2018)	South (Guangdong)	298	52.4	male (53.4%); female (46.6%)	severe mental illnesses	caregiver (family)	help-seeking intention; beliefs about causes; knowledge of treatment	MHKQ	knowledge of mental health	MHKQ

Note. severe mental illnesses include schizophrenia, schizoaffective disorder, persistent delusional disorder, bipolar disorder, mental illness associated with epilepsy, and intellectual disability (National Health Commission of the People's Republic of China, 2013a).

Table 2
Prevalence of each theme relating to knowledge or beliefs about mental illness for patients

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
Knowledge of causes – mental illness in general										
interaction between biological, psychological and environmental factors	1	198	5.6	3.1	9.8	-	-	-	-	(Chen et al., 2011)
know the effects of heredity, stress and personality	1	198	6.1	3.5	10.4	-	-	-	-	(Chen et al., 2011)
Knowledge of symptoms										
common symptoms of mental illness	1	198	3	1.3	6.5	-	-	-	-	(Chen et al., 2011)
symptoms of schizophrenia	2	99	27.8	15.7	44.2	61.4	2.59	.107	1N 1S	(Liu et al., 2005; Tan, 2005)
Knowledge of relapse – mental illness in general										
mental illness is highly recurrent	1	198	6.6	3.9	11	-	-	-	-	(Chen et al., 2011)
insomnia and restlessness are signs of relapse	1	198	9.6	6.2	14.6	-	-	-	-	(Chen et al., 2011)
early treatment can reduce the risk of relapse	1	198	7.1	4.3	11.6	-	-	-	-	(Chen et al., 2011)
medicine adherence can prevent relapse	1	198	4	2	7.8	-	-	-	-	(Chen et al., 2011)
Knowledge of relapse – schizophrenia										
early signs of relapse	2	155	30.1	18.3	45.4	68.6	-	-	2N	(Liu et al., 2005; Liu, 2009)

causes of relapse	1	42	38.1	24.8	53.4	-	-	-	-	(Tan, 2005)
Knowledge of relapse – severe mental illnesses										
signs of relapse	1	400	44.5	39.7	49.4	-	-	-	-	(Chen et al., 2019)
dealing with relapse	1	400	90.5	87.2	93	-	-	-	-	(Chen et al., 2019)

Table 2

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
Knowledge of treatment – ECT										
ECT is safe	2	328	64	58.7	69.1	0	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT does not generate fear	2	328	56.5	51.1	61.8	0	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
I do not think ECT is more dangerous than drugs	2	328	50.2	44.8	55.6	0	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT is not dangerous and should be used	2	328	65.6	52.4	76.7	80.3	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT is used for people who need it (e.g., critically ill patients)	2	328	44.4	31.4	58.3	83.3	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT should not be the last resort	2	328	41.1	35.9	46.5	0	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT is not used to punish patients	2	328	78.1	70	84.5	57.4	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
Knowledge of treatment – medication (mental illness in general)										
medicine adherence is important	1	198	9.1	5.8	14	-	-	-	-	(Chen et al., 2011)
risk of stopping taking medications or increasing the dose without permission	1	198	3.5	1.7	7.2	-	-	-	-	(Chen et al., 2011)
therapeutic and side effects of medications	1	198	7.6	4.6	12.2	-	-	-	-	(Chen et al., 2011)
one should ask professionals' help with the side effects of medications	1	198	8.6	5.4	13.4	-	-	-	-	(Chen et al., 2011)
know about the antidepressant I am taking	1	135	41.5	33.5	50	-	-	-	-	(Lu et al., 2016)

Knowledge of treatment – available services										
know about available community mental health services	1	189	26.4	20.6	33.1	-	-	-	-	(Wang et al., 2012)
Knowledge of treatment – schizophrenia										
therapeutic effects of the medication	2	173	40.5	14.2	73.6	93.7	15.93	<.001	1N 1S	(Liu et al., 2005; Ping et al., 2012)
name of the medication	1	116	66.4	57.3	74.4	-	-	-	-	(Ping et al., 2012)
shape and colour of the medication	1	116	81	72.8	87.1	-	-	-	-	(Ping et al., 2012)
dose	1	116	79.3	71	85.7	-	-	-	-	(Ping et al., 2012)
one should not increase or decrease the dose without permission	1	386	64	59.1	68.6	-	-	-	-	(Jiao et al., 2017)
one should not take medications intermittently	1	386	50	45	55	-	-	-	-	(Jiao et al., 2017)
one should not stop taking medications on his/her own decision	1	386	44	39.1	49	-	-	-	-	(Jiao et al., 2017)
side effects of the medication	3	215	36.4	21.2	55	83.3	11.94	.001	1N 2S	(Liu et al., 2005; Ping et al., 2012; Tan, 2005)
how to cope with the side effects	1	116	44.8	36	53.9	-	-	-	-	(Ping et al., 2012)

Table 2

Continued

				95%CI (%)			Effect of region			
Theme	*k*	*N*	Rate (%)	lower	upper	I^2(%)	*Q*	*p*	*k*	References
importance of medicine adherence	4	642	39.6	26.5	54.4	89.8	0.8	.372	2N 2S	(Jiao et al., 2017; Liu, 2009; Ping et al., 2012; Tan, 2005)
the importance of regular follow-up	1	386	74.1	69.5	78.2	-	-	-	-	(Jiao et al., 2017)
the details of follow-up (e.g., when)	3	197	29.7	21.9	39	41.2	3.39	.066	2N 1S	(Liu et al., 2005; Liu, 2009; Tan, 2005)
Knowledge of treatment – severe mental illnesses										
know about medical treatment	2	582	28.9	24.4	33.9	32.4	-	-	2S	(Chen et al., 2019; Chen et al., 2018a)
name of the medication and dose	1	182	42.3	35.3	49.6	-	-	-	-	(Chen et al., 2018a)
therapeutic effect of the medication	1	182	41.2	34.3	48.5	-	-	-	-	(Chen et al., 2018a)
side effects of the medication	2	582	28.2	14.8	47.1	93.6	-	-	2S	(Chen et al., 2019; Chen et al., 2018a)
importance of medicine adherence	1	182	34.1	27.6	41.3	-	-	-	-	(Chen et al., 2018a)
know about regular follow-up	1	400	59.8	54.9	64.4	-	-	-	-	(Chen et al., 2019)

Knowledge of treatment – neurotic disorder										
professional services should be sought	1	306	33	28	38.5	-	-	-	-	(Zhang et al., 2011)
Knowledge of family involvement – schizophrenia										
family members' negative attitudes can influence patients' conditions	1	386	54	49	58.9	-	-	-	-	(Jiao et al., 2017)
Knowledge of family involvement – severe mental illnesses										
how to respond to negative situations	1	400	47.2	42.4	52.2	-	-	-	-	(Chen et al., 2019)
how to provide care at home	1	400	42	37.3	46.9	-	-	-	-	(Chen et al., 2019)
Beliefs about causes – schizophrenia										
abnormal brain structure and function	1	386	42	37.2	47	-	-	-	-	(Jiao et al., 2017)
abnormal body structure and function	1	386	61.7	56.7	66.4	-	-	-	-	(Jiao et al., 2017)
ghosts	1	386	43	38.1	48	-	-	-	-	(Jiao et al., 2017)
introversion	1	386	68.1	63.3	72.6	-	-	-	-	(Jiao et al., 2017)
interpersonal relationship issue	1	386	43	38.1	48	-	-	-	-	(Jiao et al., 2017)
negative childhood experiences	1	386	18.1	14.6	22.3	-	-	-	-	(Jiao et al., 2017)
physical and intellectual development issue	1	386	9.4	6.9	12.7	-	-	-	-	(Jiao et al., 2017)
family environment	1	386	32.9	28.4	37.7	-	-	-	-	(Jiao et al., 2017)
heredity	1	386	19.1	15.5	23.3	-	-	-	-	(Jiao et al., 2017)
stress	1	386	91.7	88.5	94.1	-	-	-	-	(Jiao et al., 2017)
viral infection	1	386	4.1	2.5	6.6	-	-	-	-	(Jiao et al., 2017)
substance use	1	386	10.1	7.5	13.5	-	-	-	-	(Jiao et al., 2017)

Table 2

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
Beliefs about treatment – ECT										
ECT is beneficial	2	328	68.4	63.1	73.2	0	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT is more effective than drugs	2	328	61.9	54.1	69.2	48.3	-	-	2N	(Li et al., 2016; Zhang et al., 2018)

the effect of ECT is more rapid than drugs	2	328	64.4	59	69.4	0	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
would like to receive ECT again	2	328	53.4	47.9	58.7	0	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
Beliefs about treatment – medication										
medical treatment is key to treating mental illness	1	198	8.1	5	12.8	-	-	-	-	(Chen et al., 2011)
medical treatment is helpful	1	500	64.2	59.9	68.3	-	-	-	-	(Zhou et al., 2016)
antidepressants are helpful	1	135	66.5	58.1	73.9	-	-	-	-	(Lu et al., 2016)
worry about the long-term effects of antidepressants	1	135	75.6	67.7	82.1	-	-	-	-	(Lu et al., 2016)
worry about becoming too dependent upon antidepressants	1	135	55.6	47.1	63.7	-	-	-	-	(Lu et al., 2016)
Beliefs about treatment - schizophrenia										
medical treatment is the main treatment method for schizophrenia	1	386	72.8	68.1	77	-	-	-	-	(Jiao et al., 2017)
living with family members can improve the symptoms	1	386	50.2	45.2	55.2	-	-	-	-	(Jiao et al., 2017)
actively engaging in the communication with family members can improve the symptoms	1	386	48.1	43.2	53.1	-	-	-	-	(Jiao et al., 2017)
doing simple housework can improve the symptoms	1	386	50.9	45.9	55.9	-	-	-	-	(Jiao et al., 2017)
keeping contact with friends and relatives can improve the symptoms	1	386	52.9	47.9	57.8	-	-	-	-	(Jiao et al., 2017)
keeping contact with mental health professionals can improve the symptoms	1	386	31.9	27.4	36.7	-	-	-	-	(Jiao et al., 2017)
participating in social events can improve symptoms	1	386	42	37.2	47	-	-	-	-	(Jiao et al., 2017)
rehabilitation training is helpful	1	386	13	10	16.7	-	-	-	-	(Jiao et al., 2017)

Note. ECT = electroconvulsive therapy.

Table 3
Correlates of mental health literacy in patients (k = 4)

Dependent Variable (measure)	Independent variable (measure)	*k*	*N*	*r*	*p*	95%CI lower	95%CI upper	I^2(%)	References
beliefs about antipsychotic medications ("do you think you need antipsychotic medication" "did medication treatment help")	single	1	500	0.07	.114	-0.02	0.16	-	(Zhou et al., 2016)
	rural residence	1	500	0.08	.079	-0.01	0.17	-	(Zhou et al., 2016)
	unemployed	1	500	0.02	.735	-0.07	0.10	-	(Zhou et al., 2016)
	age	1	500	-0.02	.702	-0.11	0.07	-	(Zhou et al., 2016)
	age of onset	1	500	0.08	.067	-0.01	0.17	-	(Zhou et al., 2016)
	education	1	500	0.004	.922	-0.08	0.09	-	(Zhou et al., 2016)
	length of illness	1	500	-0.1	.030	-0.18	-0.01	-	(Zhou et al., 2016)
	number of psychiatric hospitalizations	1	500	-0.06	.184	-0.15	0.03	-	(Zhou et al., 2016)
	illness awareness (ITAQ)	1	500	-0.38	<.001	-0.45	-0.30	-	(Zhou et al., 2016)
	medication knowledge (ITAQ)	1	500	-0.49	<.001	-0.55	-0.42	-	(Zhou et al., 2016)
	somatization (SCL-90)	1	500	0.09	.040	0.004	0.18	-	(Zhou et al., 2016)
	obsession-compulsion (SCL-90)	1	500	0.06	.216	-0.03	0.14	-	(Zhou et al., 2016)
	interpersonal sensitivity (SCL-90)	1	500	0.12	.006	0.04	0.21	-	(Zhou et al., 2016)
	depression (SCL-90)	1	500	0.09	.045	0.002	0.18	-	(Zhou et al., 2016)
	anxiety (SCL-90)	1	500	0.10	.025	0.01	0.19	-	(Zhou et al., 2016)
	hostility (SCL-90)	1	500	0.15	.001	0.06	0.23	-	(Zhou et al., 2016)
	phobic anxiety (SCL-90)	1	500	0.09	.038	0.01	0.18	-	(Zhou et al., 2016)
	paranoid ideation (SCL-90)	1	500	0.13	.004	0.04	0.22	-	(Zhou et al., 2016)
	psychoticism (SCL-90)	1	500	0.10	.023	0.01	0.19	-	(Zhou et al., 2016)
knowledge of the medication that the patient is taking (self-designed survey)	beliefs about taking medications (Beliefs about Taking Medications Questionnaire)	1	182	0.44	<.001	0.31	0.55	-	(Chen et al., 2018a)
	medicine adherence ("are you willing to take medications as prescribed")	1	182	-0.35	<.001	-0.47	-0.21	-	(Chen et al., 2018a)
knowledge of mental illness (self-designed survey)	gender	1	400	0.20	<.001	0.10	0.29	-	(Chen et al., 2019)
	age	1	400	0.77	<.001	0.73	0.81	-	(Chen et al., 2019)
	education	1	400	0.65	<.001	0.59	0.70	-	(Chen et al., 2019)

knowledge of schizophrenia (Knowledge-Attitude-Practice Awareness Questionnaire for Schizophrenia)	gender	1	386	0.08	.108	-0.02	0.18	-	(Jiao et al., 2017)
	residential area	1	386	0.14	.007	0.04	0.23	-	(Jiao et al., 2017)
	marital status	1	386	0.14	.006	0.04	0.24	-	(Jiao et al., 2017)
	education	1	386	0.38	<.001	0.29	0.46	-	(Jiao et al., 2017)
	occupation	1	386	0.38	<.001	0.29	0.46	-	(Jiao et al., 2017)

Note. ITAQ = Insight and Treatment Attitudes Questionnaire; SCL–90 = Symptom Checklist-90.

Table 4
Prevalence of each theme relating to knowledge or beliefs about mental illness for caregivers

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
Recognition										
depression	1	202	43.6	36.9	50.5	-	-	-	-	(Chen et al., 2017)
schizophrenia	1	200	28.5	22.7	35.1	-	-	-	-	(Chen et al., 2017)
GAD	1	204	18.1	13.4	24	-	-	-	-	(Chen et al., 2018b)
Knowledge of mental illness										
know the name of the disorder that the patient has (schizophrenia)	4	620	77.5	51.9	91.6	96.5	5.28	.022	1N 3S	(Jin et al., 2006; Qu et al., 2014; Tang et al., 2015a; Yu et al., 2006)
know about schizophrenia	4	902	15.4	3	51.6	98.3	0.01	.934	1N 3S	(Chen et al., 2008; Ding & Chen, 2012; Li et al., 2018; Xing et al., 2002)
know the name of the disorder that the patient has (severe mental illnesses)	1	292	46.6	40.9	52.3	-	-	-	-	(Li & Zhao, 2018)
know the categories of severe mental illnesses	1	150	29.3	22.6	37.1	-	-	-	-	(Huang, 2013)
know the name of the disorder that the patient has (depression or anxiety)	1	200	66	59.2	72.2	-	-	-	-	(Xing & Kang, 2017)
know the nature of mental illness	3	441	42.4	33.6	51.7	72.2	-	-	3S	(Gao et al., 2004; Li, 2007; Zhu, 2009)
know the name of the disorder that the patient has (any mental illness)	3	1,181	71.5	50.7	86	97.3	-	-	3S	(Li et al., 2006; Wang & Yin, 2016; Zhang et al., 2010)
Knowledge of causes										
know about the causes of schizophrenia	2	400	6.8	2.6	16.6	82.9	-	-	2S	(Chen et al., 2008; Li et al., 2018)
effect of heredity on schizophrenia	1	458	37.6	33.2	42.1	-	-	-	-	(Ding & Chen, 2012)
know about the causes of severe mental illnesses	2	442	33.3	28.3	38.7	26.3	0.17	.685	1N 1S	(Huang, 2013; Li & Zhao, 2018)
know about the causes of depression or anxiety	1	200	3.5	1.7	7.2	-	-	-	-	(Xing & Kang, 2017)
know about the causes of the illness	5	742	27.7	21	35.7	79.4	-	-	5S	(Chen & Liu, 2006; Luo & Deng, 2002; Wang & Yin, 2016; Wen et al., 2008; Zhao & Liang, 2005)
binge drinking can cause mental health issues	1	757	20.2	17.5	23.2	-	-	-	-	(Zhang et al., 2010)
Knowledge of signs and symptoms										
know about the symptoms of schizophrenia	5	922	18.5	6.5	42.7	96.9	0.31	.576	2N 3S	(Ding & Chen, 2012; Li et al., 2018; Tang et al., 2015a; Xing et al., 2002; Yu

										et al., 2006)
know about how to recognize the symptoms of schizophrenia	1	120	11.7	7.1	18.8	-	-	-	-	(Tang et al., 2015a)
know about the symptoms of severe mental illnesses	3	688	36.7	9.7	75.9	98.7	0.04	.842	1N 2S	(Huang, 2013; Li & Zhao, 2018; Lou, 2013)
know about how to recognize the symptoms of severe mental illnesses	1	246	10.2	7	14.7	-	-	-	-	(Lou, 2013)
know about the symptoms of depression or anxiety	1	200	32	25.9	38.8	-	-	-	-	(Xing & Kang, 2017)
know about the early signs of mental illness	1	804	12.3	10.2	14.8	-	-	-	-	(Chen & Tan, 2010)

Table 4

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
know about the symptoms of the illness that the patient has	7	1,807	33.8	17.4	55.3	98.3	-	-	5S	(Chen & Liu, 2006; Li et al., 2006; Luo & Deng, 2002; Wang & Yin, 2016; Wen et al., 2008; Zhang et al., 2010; Zhao & Liang, 2005)
know about how to recognize the symptoms of the illness that the patient has	3	704	13.2	5.7	28	93.5	-	-	3S	(Chen & Liu, 2006; Li et al., 2006; Luo & Deng, 2002)
Knowledge of the negative outcome of having mental illness										
know about the negative outcome of having the illness that the patient has	1	116	54.3	45.2	63.1	-	-	-	-	(Wang & Yin, 2016)
know about the negative outcome of having schizophrenia (e.g., effect on the offspring)	3	544	12.7	3	40.7	94.6	1.13	.288	1N 2S	(Li et al., 2018; Qu et al., 2014; Xing et al., 2002)
know about the negative outcome of having severe mental illnesses	1	292	54.5	48.7	60.1	-	-	-	-	(Li & Zhao, 2018)
know about the negative outcome of having depression or anxiety	1	200	40	33.4	46.9	-	-	-	-	(Xing & Kang, 2017)
Knowledge of relapse –mental illness in general										
know about the signs of relapse	3	1,119	23	9.2	46.8	97	-	-	3S	(Li, 2007; Zhang et al., 2010; Zhu, 2009)
know about how to recognize the signs	3	346	35.2	23.8	48.6	83.4	-	-	3S	(Wang & Yin, 2016; Wen et al., 2008; Zhao & Liang, 2005)
know about how to prevent relapse	4	758	20.2	11.9	32.3	91	-	-	4S	(Chen & Liu, 2006; Li, 2007; Luo & Deng, 2002; Zhu, 2009)
Knowledge of relapse – schizophrenia										

know about the possibility of relapse	1	300	32	27	37.5	-	-	-	-	(Qu et al., 2014)
know about the signs of relapse	2	558	41.8	30.5	54	79.4	2.63	.105	1N 1S	(Ding & Chen, 2012; Yu et al., 2006)
know about how to prevent relapse	1	44	9.1	3.5	21.8	-	-	-	-	(Xing et al., 2002)
relapse can be prevented by relieving stress	1	75	65.3	53.9	75.2	-	-	-	-	(Ran et al., 2003)
medical treatment is the key to reduce the risk of relapse	1	458	57.6	53.1	62.1	-	-	-	-	(Ding & Chen, 2012)
keeping the patient at home will not prevent relapse	1	458	53.9	49.3	58.4	-	-	-	-	(Ding & Chen, 2012)
Knowledge of relapse – severe mental illnesses										
know about the signs of relapse	1	150	46	38.2	54	-	-	-	-	(Huang, 2013)
know about how to recognize the signs	1	292	22.3	17.9	27.4	-	-	-	-	(Li & Zhao, 2018)
know about how to prevent relapse	1	246	6.5	4	10.3	-	-	-	-	(Lou, 2013)
know about how to cope with relapse	1	796	63.1	59.7	66.4	-	-	-	-	(Yang et al., 2018)
Knowledge of relapse – depression or anxiety										
know about the signs of relapse	1	200	33.5	27.3	40.3	-	-	-	-	(Xing & Kang, 2017)

Table 4

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
Knowledge of treatment – mental illness in general										
most mental disorders can be cured	3	1,308	67	38.4	86.8	98.5	-	-	3S	(Zhang et al., 2014; Zhang et al., 2010; Zhu et al., 2018)
things one should pay attention to after the onset of the illness	1	116	37.1	28.8	46.2	-	-	-	-	(Wang & Yin, 2016)
importance of receiving professional help timely	1	804	37.1	33.8	40.5	-	-	-	-	(Chen & Tan, 2010)
treatment that the patient has received	3	346	37	30.4	44.1	45.2	-	-	3S	(Wang & Yin, 2016; Wen et al., 2008; Zhao & Liang, 2005)
know about family therapy	1	112	14.2	8.9	22	-	-	-	-	(Liu et al., 2004)
know about psychotherapy	2	230	23.4	18.4	29.4	0	-	-	2S	(Wen et al., 2008; Zhao & Liang, 2005)
know about rehabilitation	2	230	28.2	22.8	34.4	0	-	-	2S	(Wen et al., 2008; Zhao & Liang, 2005)

name of the medication that the patient is taking	4	1,297	41	22	63.1	97.8	-	-	4S	(Li et al., 2006; Luo & Deng, 2002; Wang & Yin, 2016; Zhang et al., 2010)
therapeutic and side effects of the medication	3	987	35.8	26.3	46.5	84.2	-	-	3S	(Wen et al., 2008; Zhang et al., 2010; Zhao & Liang, 2005)
therapeutic effects of the medication	2	424	13.2	0.8	74.6	98.5	-	-	2S	(Li et al., 2006; Wang & Yin, 2016)
side effects of the medication	1	308	2.9	1.5	5.5	-	-	-	-	(Li et al., 2006)
know about how to cope with the side effects	2	226	24.7	16.1	36	67.7	-	-	2S	(Wang & Yin, 2016; Zhao & Liang, 2005)
know about methods, side effects and precautions of medical treatment	2	362	17.6	6.1	41.4	94.3	-	-	2S	(Li, 2007; Zhu, 2009)
know about rational use of medications	1	280	14.3	10.7	18.9	-	-	-	-	(Chen & Liu, 2006)
seeking help from the doctor when the patient refuses to take medications	1	757	81.8	78.9	84.4	-	-	-	-	(Zhang et al., 2010)
importance of medicine adherence	9	2,661	41.1	24.3	60.1	98.6	2.48	.116	1N 8S	(Chen & Liu, 2006; Chen & Tan, 2010; Li, 2007; Liu et al., 2004; Wang & Yin, 2016; Wen et al., 2008; Zhang et al., 2010; Zhao & Liang, 2005; Zhu, 2009)
length of duration for keeping the patient on medications	2	362	18.1	7.4	38.1	92.6	-	-	2S	(Li, 2007; Zhu, 2009)
know about regular follow-up	1	196	4.6	2.4	8.6	-	-	-	-	(Li, 2007)
importance of regular follow-up	3	346	38.2	16.1	66.6	96	-	-	3S	(Wang & Yin, 2016; Wen et al., 2008; Zhao & Liang, 2005)
knowledge of treatment – schizophrenia										
schizophrenia can be treated	2	533	58.4	54.1	62.5	0	-	-	2S	(Ding & Chen, 2012; Ran et al., 2003)
know about treatment methods	2	400	3	0.1	44.8	90.6	-	-	2S	(Chen et al., 2008; Li et al., 2018)
know about treatment outcomes	1	200	72	65.4	77.8	-	-	-	-	(Li et al., 2018)
name of the medication that the patient is taking	2	420	30	23.9	36.9	49.1	-	-	2S	(Qu et al., 2014; Tang et al., 2015a)

Table 4

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
know about taking medications	1	100	44	34.6	53.8	-	-	-	-	(Jin et al., 2006)
therapeutic effects of the medication	1	120	15.8	10.3	23.5	-	-	-	-	(Tang et al., 2015a)

side effects of the medication	6	839	20	13.2	29.2	86.2	1.73	.189	2N 4S	(Chen et al., 2008; Qu et al., 2014; Ran et al., 2003; Tang et al., 2015a; Xing et al., 2002; Yu et al., 2006)
long-term use of medications will not cause addiction	1	458	36.2	32	40.7	-	-	-	-	(Ding & Chen, 2012)
one should not increase or decrease the dose without permission	2	844	71.3	25.2	94.8	99.2	129. 13	<.00 1	1N 1S	(Ding & Chen, 2012; Jiao et al., 2017)
length of duration for keeping the patient on medications	1	300	19	15	23.8	-	-	-	-	(Qu et al., 2014)
importance of medicine adherence	5	1,219	41.7	23.6	62.4	97.3	1.10	.294	2N 3S	(Chen et al., 2008; Ding & Chen, 2012; Jiao et al., 2017; Ran et al., 2003; Yu et al., 2006)
one should not take medications intermittently	1	386	80.9	76.7	84.5	-	-	-	-	(Jiao et al., 2017)
one should not stop taking medications on his/her own decision	1	386	73	68.4	77.2	-	-	-	-	(Jiao et al., 2017)
know about treatment for first-episode schizophrenia	1	44	4.6	1.1	16.4	-	-	-	-	(Xing et al., 2002)
know about psychoeducational interventions	1	100	44	34.6	53.8	-	-	-	-	(Jin et al., 2006)
regular exercise is helpful	1	458	85.6	82.1	88.5	-	-	-	-	(Ding & Chen, 2012)
importance of regular follow-up	2	586	37.5	0.4	98.8	99.5	181. 75	<.00 1	1N 1S	(Chen et al., 2008; Jiao et al., 2017)
know about the signs of recovery	2	244	7.1	0.9	38.8	92.3	0.03	.868	1N 1S	(Li et al., 2018; Xing et al., 2002)
know about how to improve the patient's self-care ability	1	100	47	37.5	56.8	-	-	-	-	(Yu et al., 2006)
know about how to help the patient return to society	2	500	11.6	5.9	21.6	83.9	-	-	2S	(Chen et al., 2008; Qu et al., 2014)
Knowledge of treatment – severe mental illnesses										
know about available treatment	1	150	52.7	44.7	60.5	-	-	-	-	(Huang, 2013)
things one should pay attention to after the onset of the illness	1	292	32.5	27.4	38.1	-	-	-	-	(Li & Zhao, 2018)
treatment that the patient has received	1	292	54.1	48.4	59.7	-	-	-	-	(Li & Zhao, 2018)
name of the medication that the patient is taking	2	538	25.8	7.1	61.2	98.0	4.75	.029	1N 1S	(Li & Zhao, 2018; Lou, 2013)
therapeutic effects of the medication	1	292	34.9	29.7	40.6	-	-	-	-	(Li & Zhao, 2018)
side effects of the medication	2	442	30.3	12.6	56.7	96.2	26.0 8	<.00 1	1N 1S	(Huang, 2013; Li & Zhao, 2018)
know about how to cope with the side effects	1	150	46	38.2	54	-	-	-	-	(Huang, 2013)

Table 4

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
importance of medicine adherence	2	442	51.6	39.8	63.2	82.7	1.6	.205	1N 1S	(Huang, 2013; Li & Zhao, 2018)
importance of regular follow-up	2	1,088	55.7	12	92.1	99.5	1.0	.318	1N 1S	(Li & Zhao, 2018; Yang et al., 2018)
know about the signs of recovery	1	150	26	19.6	33.6	-	-	-	-	(Huang, 2013)
know about rehabilitation for severe mental illnesses	1	150	64.7	56.7	71.9	-	-	-	-	(Huang, 2013)
Knowledge of treatment – depression or anxiety										
know about available treatment	1	200	26.5	20.8	33	-	-	-	-	(Xing & Kang, 2017)
know about medical treatment	1	200	9	5.7	13.8	-	-	-	-	(Xing & Kang, 2017)
know about side effects of the medication and how to cope with them	1	200	9.5	6.1	14.4	-	-	-	-	(Xing & Kang, 2017)
know about effects of psychotherapy	1	200	44	37.3	51	-	-	-	-	(Xing & Kang, 2017)
Knowledge of treatment – ECT										
ECT is safe	2	328	68.9	58.5	77.6	69.7	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT does not generate fear	2	328	54.2	47.5	60.7	30.8	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
I do not think ECT is more dangerous than drugs	2	328	48.1	42.7	53.5	0	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT is not dangerous and should be used	2	328	69.7	39.7	88.9	95.4	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT is used for people who need it (e.g., critically ill patients)	2	328	45	32.2	58.6	82.7	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT should not be the last resort	2	328	37.2	29.9	45.1	50.6	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT is not used to punish patients	2	328	78.6	73.8	82.7	0	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
Knowledge of treatment – medication										
medications should be taken regularly	2	551	69.5	65.5	73.2	0	-	-	2S	(Zhang et al., 2014; Zhu et al., 2018)
know about antipsychotic medications	1	804	35.1	31.9	38.5	-	-	-	-	(Chen & Tan, 2010)
Knowledge of treatment – available services										
patients can get free medical treatment	2	864	86.7	52.6	97.4	94.4	17.79	<.001	1N 1S	(Tang et al., 2016; Zhang et al., 2010)
patients can get free health check-up in community health services	1	107	89.7	82.4	94.2	-	-	-	-	(Tang et al., 2016)

patients can participate in rehabilitation training	1	107	25.2	17.9	34.3	-	-	-	-	(Tang et al., 2016)
patients can live in community rehabilitation institutions	1	107	9.4	5.1	16.6	-	-	-	-	(Tang et al., 2016)
know what community services are free to patients	1	796	69.3	66.1	72.5	-	-	-	-	(Yang et al., 2018)
Knowledge of family involvement – schizophrenia										
family involvement is important in the process of recovery	1	458	50.4	45.9	55	-	-	-	-	(Ding & Chen, 2012)
family members' negative attitudes can influence patients' conditions	1	386	52.5	47.5	57.4	-	-	-	-	(Jiao et al., 2017)
know about how to involve in the treatment	1	200	2	0.8	5.2	-	-	-	-	(Li et al., 2018)
know about skills and methods of coping with the illness at home	1	200	0	-	-	-	-	-	-	(Li et al., 2018)

Table 4

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
know about how to provide care at home	1	120	17.5	11.7	25.4	-	-	-	-	(Tang et al., 2015a)
know about how to keep the patient safe	1	100	21	14.1	30.1	-	-	-	-	(Yu et al., 2006)
know about how to provide healthy diet	1	100	49	39.4	58.7	-	-	-	-	(Yu et al., 2006)
know about family involvement in medication administration	2	500	33.3	11.4	66.1	97.9	-	-	2S	(Li et al., 2018; Qu et al., 2014)
know about the precautions of taking medications during pregnancy	1	300	9.3	6.5	13.1	-	-	-	-	(Qu et al., 2014)
know about how to communicate with the patient	2	400	24.9	9.9	50	94.7	0.02	.880	1N 1S	(Qu et al., 2014; Yu et al., 2006)
psychological support is important for recovery	1	458	46.1	41.6	50.7	-	-	-	-	(Ding & Chen, 2012)
keeping contact with the doctor	2	486	62.6	44.5	77.7	90.7	10.72	.001	1N 1S	(Jiao et al., 2017; Jin et al., 2006)
Knowledge of family involvement – severe mental illnesses										
importance of family involvement in the treatment	1	150	68	60.1	75	-	-	-	-	(Huang, 2013)
know about how to provide care at home	2	538	18	7.3	37.8	94.7	18.77	<.001	1N 1S	(Li & Zhao, 2018; Lou, 2013)
things one should pay attention to when taking care of the patient	1	292	30.5	25.5	36	-	-	-	-	(Li & Zhao, 2018)
know about family involvement in medication administration	2	1,088	63.4	13.1	95.3	99.6	242.2	<.001	1N 1S	(Li & Zhao, 2018; Yang et al., 2018)
cooperating with community health professionals for follow-up care	1	796	92.3	90.3	94	-	-	-	-	(Yang et al., 2018)

Knowledge of family involvement – mental illness in general										
family should involve in the treatment	2	869	30.3	14.1	53.5	93.9	16.42	<.001	1N 1S	(Liu et al., 2004; Zhang et al., 2010)
importance of family involvement	2	362	34.5	25.1	45.4	77.1	-	-	2S	(Li, 2007; Zhu, 2009)
know about how to take care of the patient	7	1,132	24.9	14.8	38.9	94.8	-	-	7S	(Li et al., 2006; Li, 2007; Luo & Deng, 2002; Wang & Yin, 2016; Wen et al., 2008; Zhao & Liang, 2005; Zhu, 2009)
things one should pay attention to after discharge	2	226	40.6	31.1	50.9	58.7	-	-	2S	(Wang & Yin, 2016; Zhao & Liang, 2005)
if a family member has a mental health issue, I will accompany him/her to see a doctor	1	757	81.4	78.4	84	-	-	-	-	(Zhang et al., 2010)
how to ensure that the patient takes medications as prescribed	1	116	35.3	27.2	44.4	-	-	-	-	(Wang & Yin, 2016)
how to prevent violent incidents and accidents	1	280	20.7	16.4	25.9	-	-	-	-	(Chen & Liu, 2006)

Table 4

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
Beliefs about causes – mental illness in general										
morally inappropriate thinking	3	626	68.9	35	90.1	98.1	-	-	3S	(Ran et al., 2003; Zhang et al., 2014; Zhu et al., 2018)
ghosts	1	75	34.7	24.8	46.1	-	-	-	-	(Ran et al., 2003)
external stressors	2	551	54.1	22.3	82.9	98.4	-	-	2S	(Zhang et al., 2014; Zhu et al., 2018)
positive attitudes, good interpersonal relationships and a healthy life style are barriers of developing a mental health issue	2	551	96.1	94.1	97.5	4.1	-	-	2S	(Zhang et al., 2014; Zhu et al., 2018)
heredity	2	551	63.5	52.8	72.9	84.2	-	-	2S	(Zhang et al., 2014; Zhu et al., 2018)
personality	3	663	47.8	20.2	76.8	98	6.41	.011	1N 2S	(Liu et al., 2004; Zhang et al.,

										2014; Zhu et al., 2018)
negative life events	2	551	95.5	63.2	99.6	94.5	-	-	2S	(Zhang et al., 2014; Zhu et al., 2018)
a combination of genetics, family environment, organic damage, personality and negative life events	1	757	64.2	60.7	67.5	-	-	-	-	(Zhang et al., 2010)
Beliefs about causes – schizophrenia										
virus of infection	2	586	10.1	4.5	21.4	90.0	10.0	.002	1N 1S	(Chen et al., 2017; Jiao et al., 2017)
allergy	1	200	17.5	12.8	23.4	-	-	-	-	(Chen et al., 2017)
daily problems	1	200	81.5	75.5	86.3	-	-	-	-	(Chen et al., 2017)
work or financial problems	1	200	82	76.1	86.7	-	-	-	-	(Chen et al., 2017)
poor interpersonal relationship	1	386	57.9	52.9	62.7	-	-	-	-	(Jiao et al., 2017)
death of someone else	1	200	50	43.1	56.9	-	-	-	-	(Chen et al., 2017)
recently traumatic event	1	200	64.5	57.6	70.8	-	-	-	-	(Chen et al., 2017)
negative childhood experience	2	586	37.7	17.4	63.5	97.1	0.39	.530	1N 1S	(Chen et al., 2017; Jiao et al., 2017)
heredity	3	706	37	20.8	56.8	95.7	46.4	<.001	1N 2S	(Chen et al., 2017; Jiao et al., 2017; Tang et al., 2015a)
chemical imbalance in the brain or abnormal brain structure	2	586	47	40.1	54.1	63.4	2.73	.098	1N 1S	(Chen et al., 2017; Jiao et al., 2017)
nervous person	1	200	59.5	52.6	66.1	-	-	-	-	(Chen et al., 2017)
weakness of character	1	200	72.5	65.9	78.2	-	-	-	-	(Chen et al., 2017)
introversion	1	386	84	80	87.3	-	-	-	-	(Jiao et al., 2017)

Table 4

Continued

				95%CI (%)			Effect of region			
Theme	*k*	*N*	Rate (%)	lower	upper	I^2(%)	*Q*	*p*	*k*	References
psychological stress	2	506	91.7	74.9	97.6	93	14.23	<.001	1N 1S	(Jiao et al., 2017; Tang et al., 2015a)
overthinking	1	120	70.8	62.1	78.2	-	-	-	-	(Tang et al., 2015a)
family environment	2	506	69.7	31.5	92	97.3	37.1	<.001	1N 1S	(Jiao et al., 2017; Tang et al.,

										2015a)
physical and intellectual development issue	1	386	15.4	12.1	19.4	-	-	-	-	(Jiao et al., 2017)
substance use	1	386	22.1	18.2	26.5	-	-	-	-	(Jiao et al., 2017)
physical health issues (e.g., abnormal body structure)	2	506	62.8	55.3	69.8	55.1	2.23	.136	1N 1S	(Jiao et al., 2017; Tang et al., 2015a)
ghosts	1	386	39.9	35.1	44.9	-	-	-	-	(Jiao et al., 2017)
Beliefs about causes – depression										
virus of infection	1	202	15.8	11.4	21.5	-	-	-	-	(Chen et al., 2017)
allergy	1	202	22.3	17.1	28.6	-	-	-	-	(Chen et al., 2017)
daily problems	1	202	79.2	73.1	84.2	-	-	-	-	(Chen et al., 2017)
work or financial problems	1	202	80.2	74.1	85.1	-	-	-	-	(Chen et al., 2017)
death of someone else	1	202	66.8	60	72.9	-	-	-	-	(Chen et al., 2017)
recently traumatic event	1	202	72.3	65.7	78	-	-	-	-	(Chen et al., 2017)
negative childhood experience	1	202	51.5	44.6	58.3	-	-	-	-	(Chen et al., 2017)
heredity	1	202	51	44.1	57.8	-	-	-	-	(Chen et al., 2017)
chemical imbalance in the brain	1	202	52	45.1	58.8	-	-	-	-	(Chen et al., 2017)
nervous person	1	202	60.9	54	67.4	-	-	-	-	(Chen et al., 2017)
weakness of character	1	202	68.3	61.6	74.3	-	-	-	-	(Chen et al., 2017)
Beliefs about treatment-medication										
counseling alone is not enough, patients should also take medicine	1	79	83.5	73.6	90.2	-	-	-	-	(Gao et al., 2004)
long-term use of psychiatric medications will not make the patient less intelligent	1	112	8	4.2	14.7	-	-	-	-	(Liu et al., 2004)
Beliefs about treatment – ECT										
ECT is beneficial	2	328	75.3	67	82.1	57.5	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
ECT is more effective than drugs	2	328	63.6	58.2	68.6	0	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
the effect of ECT is more rapid than drugs	2	328	70.8	65.6	75.4	0	-	-	2N	(Li et al., 2016; Zhang et al., 2018)
would like to let my relative receive ECT again	2	328	65.1	54.8	74.1	68.7	-	-	2N	(Li et al., 2016; Zhang et al., 2018)

Table 4

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
Beliefs about treatment – schizophrenia (professionals)										
GP or family doctor	1	200	62.5	55.6	68.9	-	-	-	-	(Chen et al., 2017)
pharmacist	1	200	40.5	33.9	47.4	-	-	-	-	(Chen et al., 2017)
counselor	1	200	74	67.5	79.6	-	-	-	-	(Chen et al., 2017)
social worker	1	200	46	39.2	52.9	-	-	-	-	(Chen et al., 2017)
telephone counseling service	1	200	46	39.2	52.9	-	-	-	-	(Chen et al., 2017)
psychiatrist	1	200	97	93.5	98.6	-	-	-	-	(Chen et al., 2017)
mental health nurse	1	200	89	83.9	92.6	-	-	-	-	(Chen et al., 2017)
psychologist	1	200	96	92.2	98	-	-	-	-	(Chen et al., 2017)
close family members	1	200	92.5	87.9	95.4	-	-	-	-	(Chen et al., 2017)
close friends	1	200	87.5	82.2	91.4	-	-	-	-	(Chen et al., 2017)
traditional healer/Chinese medicine doctor	1	200	52.5	45.6	59.3	-	-	-	-	(Chen et al., 2017)
dealing with problem on his/her own	1	200	11.5	7.8	16.7	-	-	-	-	(Chen et al., 2017)
religious leader	1	200	7	4.2	11.5	-	-	-	-	(Chen et al., 2017)
Beliefs about treatment – schizophrenia (interventions)										
becoming more physically active	2	586	78.9	16.2	98.6	98.8	2.15	.143	1N 1S	(Chen et al., 2017; Jiao et al., 2017)
reading about the problem	1	200	64	57.1	70.4	-	-	-	-	(Chen et al., 2017)
getting out and learning more	1	200	93	88.5	95.8	-	-	-	-	(Chen et al., 2017)
being kept at home	1	200	18	13.3	23.9	-	-	-	-	(Chen et al., 2017)
attending courses on relaxation	1	200	76.5	70.1	81.9	-	-	-	-	(Chen et al., 2017)
massage and having a rest	1	200	69.5	62.8	75.5	-	-	-	-	(Chen et al., 2017)
cutting out alcohol	1	200	83	77.1	87.6	-	-	-	-	(Chen et al., 2017)
having occasional drink	1	200	11.5	7.8	16.7	-	-	-	-	(Chen et al., 2017)
practicing Chi Kung/Tai Chi therapy	1	200	42.5	35.8	49.5	-	-	-	-	(Chen et al., 2017)
receiving acupuncture	1	200	35	28.7	41.9	-	-	-	-	(Chen et al., 2017)
receiving psychotherapy	1	200	94	89.7	96.6	-	-	-	-	(Chen et al., 2017)
participating in hypnosis	1	200	56	49	62.7	-	-	-	-	(Chen et al., 2017)
receiving aromatherapy	1	200	26.5	20.8	33	-	-	-	-	(Chen et al., 2017)

receiving rehabilitation training	1	386	14.7	11.5	18.6	-	-	-	-	(Jiao et al., 2017)
being admitted to a psychiatric ward in a general hospital	1	200	81	75	85.9	-	-	-	-	(Chen et al., 2017)
being admitted to a psychiatric hospital	1	200	70	63.3	75.9	-	-	-	-	(Chen et al., 2017)
receiving ECT	1	200	25.5	19.9	32	-	-	-	-	(Chen et al., 2017)
going on a special diet	1	200	45.5	38.7	52.4	-	-	-	-	(Chen et al., 2017)
living with family members	1	386	53.4	48.4	58.3	-	-	-	-	(Jiao et al., 2017)

Table 4

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%)		I^2(%)	Effect of region			References
				lower	upper		*Q*	*p*	*k*	
actively engaging in the communication with family members	1	386	51.3	46.3	56.3	-	-	-	-	(Jiao et al., 2017)
doing simple housework	1	386	54.6	49.6	59.5	-	-	-	-	(Jiao et al., 2017)
keeping contact with friends and relatives	1	386	54.5	49.5	59.4	-	-	-	-	(Jiao et al., 2017)
keeping contact with mental health professionals	1	386	35.8	31.2	40.7	-	-	-	-	(Jiao et al., 2017)
Beliefs about treatment – schizophrenia (medications)										
vitamins and minerals	1	200	40.5	33.9	47.4	-	-	-	-	(Chen et al., 2017)
laxatives	1	200	14	9.8	19.5	-	-	-	-	(Chen et al., 2017)
herbal medicines	1	200	36	29.6	42.9	-	-	-	-	(Chen et al., 2017)
pain relievers	1	200	11	7.4	16.1	-	-	-	-	(Chen et al., 2017)
antidepressants	1	200	78.5	72.3	83.6	-	-	-	-	(Chen et al., 2017)
antibiotics	1	200	17	12.4	22.9	-	-	-	-	(Chen et al., 2017)
sleeping pills	1	200	30	24.1	36.7	-	-	-	-	(Chen et al., 2017)
antipsychotics	1	200	82	76.1	86.7	-	-	-	-	(Chen et al., 2017)
tranquillizers	1	200	52	45.1	58.8	-	-	-	-	(Chen et al., 2017)
anti-anxiety drugs	1	200	77	70.7	82.3	-	-	-	-	(Chen et al., 2017)
medical treatment	1	386	86.7	82.9	89.7	-	-	-	-	(Jiao et al., 2017)
Beliefs about treatment – depression (professionals)										
GP or family doctor	1	202	69.3	62.6	75.3	-	-	-	-	(Chen et al., 2017)
pharmacist	1	202	40.1	33.6	47	-	-	-	-	(Chen et al., 2017)
counselor	1	202	71.3	64.7	77.1	-	-	-	-	(Chen et al., 2017)

social worker	1	202	45.5	38.8	52.4	-	-	-	-	(Chen et al., 2017)
telephone counseling service	1	202	49.5	42.7	56.4	-	-	-	-	(Chen et al., 2017)
psychiatrist	1	202	91.1	86.3	94.3	-	-	-	-	(Chen et al., 2017)
mental health nurse	1	202	77.7	71.4	82.9	-	-	-	-	(Chen et al., 2017)
psychologist	1	202	93.1	88.7	95.9	-	-	-	-	(Chen et al., 2017)
close family members	1	202	87.6	82.3	91.5	-	-	-	-	(Chen et al., 2017)
close friends	1	202	82.7	76.9	87.3	-	-	-	-	(Chen et al., 2017)
traditional healer/Chinese medicine doctor	1	202	51	44.1	57.8	-	-	-	-	(Chen et al., 2017)
dealing with problem on his/her own	1	202	20.8	15.8	26.9	-	-	-	-	(Chen et al., 2017)
religious leader	1	202	7.4	4.5	11.9	-	-	-	-	(Chen et al., 2017)

Table 4

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
Beliefs about treatment – depression (interventions)										
becoming more physically active	1	202	96	92.2	98	-	-	-	-	(Chen et al., 2017)
reading about the problem	1	202	71.3	64.7	77.1	-	-	-	-	(Chen et al., 2017)
getting out and learning more	1	202	90.1	85.2	93.5	-	-	-	-	(Chen et al., 2017)
being kept at home	1	202	30.2	24.3	36.9	-	-	-	-	(Chen et al., 2017)
attending courses on relaxation	1	202	81.2	75.2	86	-	-	-	-	(Chen et al., 2017)
massage and having a rest	1	202	82.7	76.9	87.3	-	-	-	-	(Chen et al., 2017)
cutting out alcohol	1	202	79.7	73.6	84.7	-	-	-	-	(Chen et al., 2017)
having occasional drink	1	202	22.3	17.1	28.6	-	-	-	-	(Chen et al., 2017)
practicing Chi Kung/Tai Chi therapy	1	202	50.5	43.6	57.3	-	-	-	-	(Chen et al., 2017)
receiving acupuncture	1	202	41.1	34.5	48	-	-	-	-	(Chen et al., 2017)
receiving psychotherapy	1	202	93.6	89.3	96.3	-	-	-	-	(Chen et al., 2017)
participating in hypnosis	1	202	65.3	58.5	71.5	-	-	-	-	(Chen et al., 2017)

receiving aromatherapy	1	202	33.7	27.5	40.5	-	-	-	-	(Chen et al., 2017)
being admitted to a psychiatric ward in a general hospital	1	202	68.3	61.6	74.3	-	-	-	-	(Chen et al., 2017)
being admitted to a psychiatric hospital	1	202	51.5	44.6	58.3	-	-	-	-	(Chen et al., 2017)
receiving ECT	1	202	21.3	16.2	27.5	-	-	-	-	(Chen et al., 2017)
going on a special diet	1	202	49.5	42.7	56.4	-	-	-	-	(Chen et al., 2017)
Beliefs about treatment – depression (medications)										
vitamins and minerals	1	202	47	40.2	53.9	-	-	-	-	(Chen et al., 2017)
laxatives	1	202	10.9	7.3	16	-	-	-	-	(Chen et al., 2017)
herbal/Chinese medicine	1	202	37.1	30.7	44	-	-	-	-	(Chen et al., 2017)
pain relievers	1	202	14.9	10.6	20.5	-	-	-	-	(Chen et al., 2017)
antidepressants	1	202	80.7	74.7	85.6	-	-	-	-	(Chen et al., 2017)
antibiotics	1	202	16.3	11.8	22.1	-	-	-	-	(Chen et al., 2017)
sleeping pills	1	202	43.1	36.4	50	-	-	-	-	(Chen et al., 2017)
antipsychotics	1	202	60.9	54	67.4	-	-	-	-	(Chen et al., 2017)
tranquillizers	1	202	51	44.1	57.8	-	-	-	-	(Chen et al., 2017)
anti-anxiety drugs	1	202	77.2	70.9	82.5	-	-	-	-	(Chen et al., 2017)

Table 4

Continued

Theme	*k*	*N*	Rate (%)	95%CI (%) lower	95%CI (%) upper	I^2(%)	Effect of region *Q*	Effect of region *p*	Effect of region *k*	References
Beliefs about treatment – GAD (professionals)										
GP or family doctor	1	204	62.3	55.4	68.6	-	-	-	-	(Chen et al., 2018b)
psychiatrist	1	204	87.7	82.5	91.6	-	-	-	-	(Chen et al., 2018b)
mental health nurse	1	204	71.6	65	77.3	-	-	-	-	(Chen et al., 2018b)
counselor	1	204	75	68.6	80.5	-	-	-	-	(Chen et al., 2018b)

pharmacist	1	204	26	20.4	32.5	-	-	-	-	(Chen et al., 2018b)
Chinese medicine doctor	1	204	37.3	30.9	44.1	-	-	-	-	(Chen et al., 2018b)
dealing with problem on his/her own	1	204	13.2	9.2	18.6	-	-	-	-	(Chen et al., 2018b)
religious leader is harmful	1	204	75.5	69.1	80.9	-	-	-	-	(Chen et al., 2018b)
Beliefs about treatment – GAD (interventions)										
being kept at home	1	204	21.6	16.5	27.8	-	-	-	-	(Chen et al., 2018b)
being admitted to a psychiatric ward in a general hospital	1	204	54.9	48	61.6	-	-	-	-	(Chen et al., 2018b)
receiving ECT is harmful	1	204	59.3	52.4	65.8	-	-	-	-	(Chen et al., 2018b)
reading about the problem	1	204	68.6	61.9	74.6	-	-	-	-	(Chen et al., 2018b)
getting out and learning more	1	204	91.7	87	94.8	-	-	-	-	(Chen et al., 2018b)
attending courses on relaxation	1	204	83.3	77.6	87.8	-	-	-	-	(Chen et al., 2018b)
massage and have a rest	1	204	76	69.6	81.3	-	-	-	-	(Chen et al., 2018b)
having occasional drink	1	204	18.1	13.4	24	-	-	-	-	(Chen et al., 2018b)
practicing Chi Kung/Tai Chi therapy	1	204	47.1	40.3	53.9	-	-	-	-	(Chen et al., 2018b)
receiving acupuncture	1	204	36.3	30	43.1	-	-	-	-	(Chen et al., 2018b)
participating in hypnosis	1	204	59.3	52.4	65.8	-	-	-	-	(Chen et al., 2018b)
Beliefs about treatment – GAD (medications)										
antibiotics	1	204	15.7	11.3	21.3	-	-	-	-	(Chen et al., 2018b)
laxatives	1	204	4.9	2.7	8.9	-	-	-	-	(Chen et al., 2018b)
pain relievers	1	204	8.3	5.2	13	-	-	-	-	(Chen et al., 2018b)
antidepressants	1	204	71.6	65	77.4	-	-	-	-	(Chen et al., 2018b)
Chinese medicine is harmful	1	204	25.5	20	31.9	-	-	-	-	(Chen et al., 2018b)
Help-seeking intention										
one should seek help from professional services when having mental health issues	3	1,308	84.4	63.3	94.5	97.6	-	-	3S	(Zhang et al., 2014; Zhang et al., 2010; Zhu et al., 2018)
going to see a psychiatrist is the last resort	1	79	32.9	23.5	43.9	-	-	-	-	(Gao et al., 2004)

Table 5
Correlates of mental health literacy in caregivers (k = 7)

Dependent Variable (measure)	Independent variable (measure)	*k*	*N*	*r*	*p*	95%CI lower	95%CI upper	I^2(%)	References
knowledge of recovery (self-designed survey)	financial burden (FIS)	1	150	-0.15	.069	-0.30	0.01	-	(Zhao et al., 2013)
	burden of daily life (FIS)	1	150	-0.21	.011	-0.36	-0.05	-	(Zhao et al., 2013)
	burden of family relationship (FIS)	1	150	-0.14	.088	-0.29	0.02	-	(Zhao et al., 2013)
	burden of family activity (FIS)	1	150	-0.21	.011	-0.36	-0.05	-	(Zhao et al., 2013)
	caregivers' physical health (FIS)	1	150	-0.20	.013	-0.35	-0.04	-	(Zhao et al., 2013)
	caregivers' mental health (FIS)	1	150	-0.03	.716	-0.19	0.13	-	(Zhao et al., 2013)
knowledge of mental health (MHKQ)	have received psychoeducation	1	298	0.27	.007	0.08	0.45	-	(Zhu et al., 2018)
	age	1	298	-0.34	.010	-0.56	-0.08	-	(Zhu et al., 2018)
	education	2	551	0.63	.082	-0.09	0.92	97.9	(Zhang et al., 2014; Zhu et al., 2018)
	gender	1	298	0.06	.327	-0.06	0.17	-	(Zhu et al., 2018)
	income	1	298	0.07	.219	-0.04	0.18	-	(Zhu et al., 2018)
	residential area	1	253	0.25	<.001	0.13	0.36	-	(Zhang et al., 2014)
	perceived stigma (PDD)	1	157	-0.40	<.001	-0.52	-0.25	-	(Li & Sun, 2016)
knowledge of mental health (self-designed survey)	financial burden (FIS)	1	150	-0.28	.001	-0.42	-0.12	-	(Zhao et al., 2013)
	burden of daily life (FIS)	1	150	-0.28	.001	-0.42	-0.12	-	(Zhao et al., 2013)
	burden of family relationship (FIS)	1	150	-0.23	.005	-0.37	-0.07	-	(Zhao et al., 2013)
	burden of family activity (FIS)	1	150	-0.20	.015	-0.35	-0.04	-	(Zhao et al., 2013)
	caregivers' physical health (FIS)	1	150	-0.27	.001	-0.41	-0.11	-	(Zhao et al., 2013)
	caregivers' mental health (FIS)	1	150	-0.15	.075	-0.30	0.02	-	(Zhao et al., 2013)
knowledge of schizophrenia (self-designed survey)	somatization (SCL-90-R)	1	197	-0.23	.001	-0.36	-0.09	-	(Wang et al., 2014)
	obsession-compulsion (SCL-90-R)	1	197	-0.27	<.001	-0.40	-0.14	-	(Wang et al., 2014)
	interpersonal sensitivity (SCL-90-R)	1	197	-0.16	.025	-0.29	-0.02	-	(Wang et al., 2014)
	depression (SCL-90-R)	1	197	-0.19	.007	-0.32	-0.05	-	(Wang et al., 2014)
	anxiety (SCL-90-R)	1	197	-0.13	.069	-0.27	0.01	-	(Wang et al., 2014)
	hostility (SCL-90-R)	1	197	-0.25	<.001	-0.38	-0.11	-	(Wang et al., 2014)
	phobic anxiety (SCL-90-R)	1	197	-0.21	.003	-0.34	-0.07	-	(Wang et al., 2014)
	paranoid ideation (SCL-90-R)	1	197	-0.28	<.001	-0.40	-0.15	-	(Wang et al., 2014)
	psychoticism (SCL-90-R)	1	197	-0.22	.002	-0.35	-0.08	-	(Wang et al., 2014)
knowledge of schizophrenia (Knowledge-Attitude-Practice Awareness Questionnaire for Schizophrenia)	gender	1	386	0.02	.673	-0.08	0.12	-	(Jiao et al., 2017)

	residential area	1	386	0.15	.003	0.05	0.25	- (Jiao et al., 2017)
	marital status	1	386	0.04	.398	-0.06	0.14	- (Jiao et al., 2017)
	education	1	386	0.29	<.001	0.20	0.38	- (Jiao et al., 2017)
	occupation	1	386	0.07	.165	-0.03	0.17	- (Jiao et al., 2017)
knowledge of the illness that the patient has (self-designed survey)	medicine adherence (reported by caregivers)	1	796	0.14	<.001	0.07	0.21	- (Yang et al., 2018)

Note. FIS = Family Impact Scale; MHKQ = Mental Health Knowledge Questionnaire; PDD = Perceived Devaluation-Discrimination; SCL-90-R = Symptom Checklist-90-Revised.

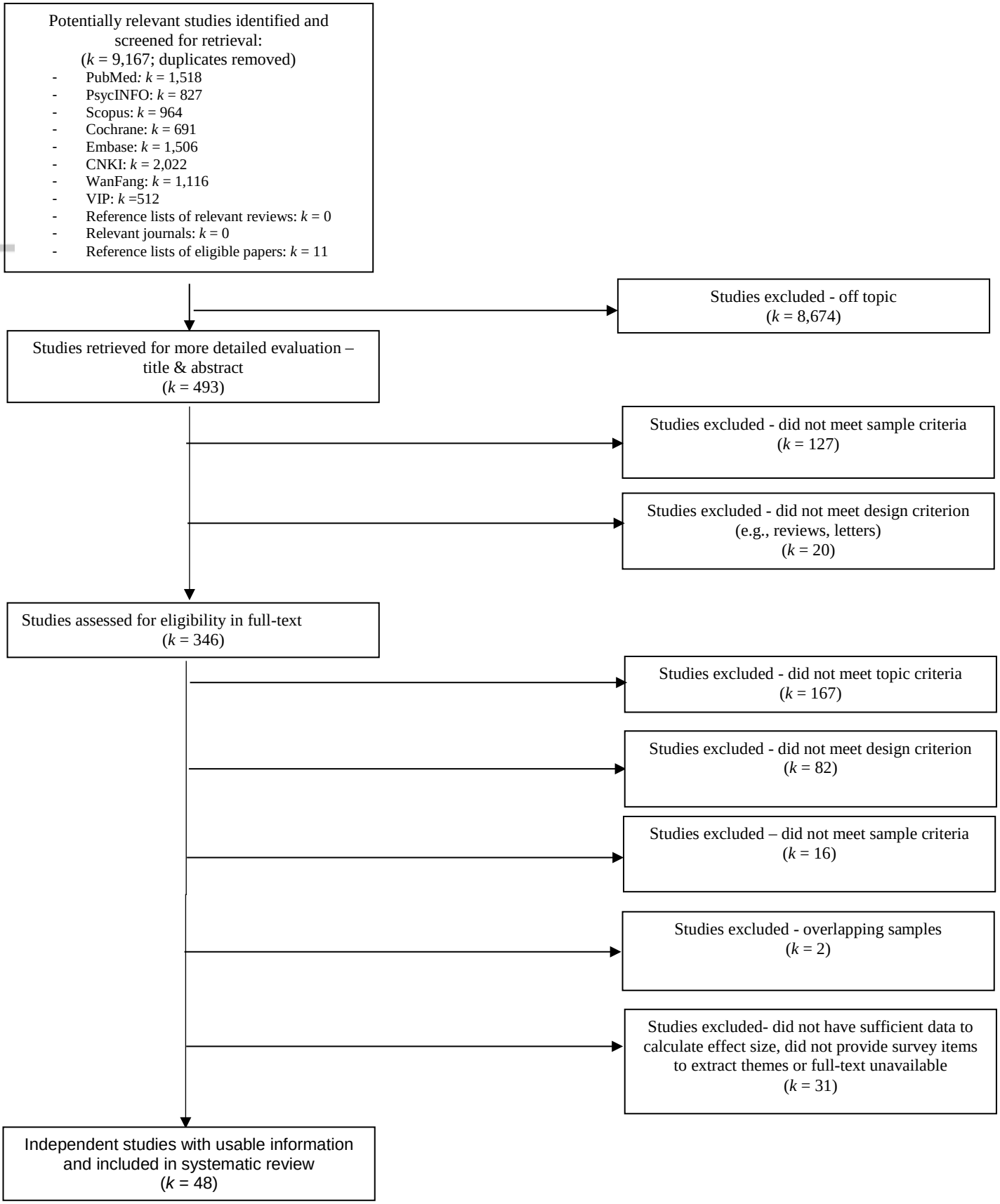

Figure 1. Flow chart of study selection