



Preparation of a questionnaire for disease knowledge-attitude-practice awareness of patients with remitted schizophrenia based on a structural equation model

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Abstract

Background: A relevant questionnaire that evaluates disease awareness of patients with remitted schizophrenia is lacking in China.

Objective: The purpose of the current study was to develop a questionnaire suitable for evaluating the disease knowledge-attitude-practice awareness on the part of patients with remitted schizophrenia, thus providing a reliable tool for evaluating patient knowledge of the disease and self-management ability.

Methods: To establish a theoretical framework, the literature was reviewed, experts were consulted, a semi-structured interview was conducted, and a questionnaire survey was administered to prepare a questionnaire for disease knowledge-attitude-practice awareness on the part of patients with remitted schizophrenia.

Results: Exploratory factor analysis showed that the questionnaire consists of four dimensions: etiology awareness; risk factor awareness; treatment awareness; and rehabilitation awareness. The four dimensions account for 56.6% of the total variability. Confirmatory factor analysis showed that the fitting indices for the structural equation model are as follows: $df=1.187$; $GFI=0.877$; $AGFI=0.856$; and $RMSEA=0.030$. The total Cronbach α factor for the questionnaire was 0.878. The Cronbach α for each dimension was 0.59–0.81.

Conclusion: The questionnaire for disease knowledge-attitude-practice awareness on the part of patients with remitted schizophrenia has better reliability and validity.

Keywords: Schizophrenia, Self-management, Structural equation model, Questionnaire preparation

Introduction

Schizophrenia is a highly recurrent and disabling chronic disease, the prognosis of which is not only related to treatment, but also patient traits, such as health consciousness and self-management ability [1]. In recent years, the point of view that patients with severe mental illnesses can be actively involved in disease

self-management has gained acceptance [2, 3]. If fact, active exploration and planning health and education projects on self-management of patients with schizophrenia has been implemented worldwide.

When patients with schizophrenia master the knowledge related to their disease and adopt the desired pattern of behavior,

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the patients can identify the early symptoms of recurrence in a timely fashion and take effective measures to prevent the recurrence. At the same time, the patients can actively begin the rehabilitation knowledge system and use rehabilitation techniques to delay or reduce the persistent mental residual symptoms [4, 5], and ultimately achieve self-management of their disease. Therefore, the assessment of disease awareness in patients with schizophrenia is a prerequisite to cultivate self-management ability, and the basic assessment materials to establish a diagnosis of schizophrenia in health education. An awareness questionnaire with different language versions for schizophrenia patients exists; such a questionnaire in China is in need of development. Research and development of a disease knowledge awareness questionnaire with schizophrenia patients is of vital importance for assessing the mastery of knowledge on the part of patients, verifying the effect of health education intervention, considering improvement in self-management ability, and predicting disease recurrence. Therefore, based on an in-depth exploration of the self-management ability of schizophrenia patients, and with reference to the multiple factors that influence theory on health-related behaviors and tertiary prevention theory of chronic diseases, a questionnaire suitable for the disease knowledge-attitude-practice with schizophrenia patients in China was developed.

Subjects and methods

Study subjects

Using the convenient sampling method, the patients who received outpatient regular treatment between April 2011 and April 2014 in the Psychiatric Department of the Inner Mongolia Anding Hospital and two grade three general hospitals. The inclusion criteria were as follows: ① patients who met the ICD-10 schizophrenia diagnostic standards; ② during the schizophrenia recovery period, through systematic treatment and a psychiatric diagnosis, psychotic symptoms are basically relieved or partially exist, with good reality testing ability, intact social function, or mild impairment, and a Brief Psychiatric Rating Scale (BPRS) score <30; ③ those who have understanding, barrier-free communication with researchers, can independently accomplish the determination of various indicators, and informed consent of voluntary participation in the research. The exclusion criteria were as follows: ① patients

with other types of mental diseases; and ② patients with other acute or chronic somatic diseases.

According to the requirements of exploratory factor analysis, the questionnaire test sample size should be 5–10 times the entry number [6]. Considering the accessibility of the sample, the sample size of the current study is determined to be 5 times the entry number. The initial questionnaire had 39 entries, therefore the questionnaire test required 390 samples. With the calculated 15% loss rate, the final sample was determined to be 448. Questionnaire prediction and formal measurement is expected to distribute a total of 448 questionnaires, which are divided into two parts by using the odd-even method, with one-half of the sample ($n=224$) for exploratory factor analysis and the other half designated the formal test sample ($n=224$) for confirmatory factor analysis.

Preparation of the initial questionnaire

Collection of questionnaire items: By reading the multiple factor influence theory on health-related behaviors and tertiary prevention theory of chronic diseases [7–9], in connection with an analysis of the literature, and on the basis of an open questionnaire survey on 18 cases of patients with remitted schizophrenia and semi-structured interviews of 15 cases, we collected various entries regarding the related knowledge, attitude, and practice with schizophrenia reconvalescents. The open questionnaire and semi-structured interview included the following: ① general information regarding the subjects; ② inquiry about the lesion and lesion foundation; ③ inquiry about the relevant factors of the disease; ④ inquiry about the treatment attitude and related treatment measures; and ⑤ inquiry about the rehabilitation attitude and related measures of rehabilitation.

Item classification, summary, and preparation of the initial questionnaire:

The collected entries were arranged and 39 were selected. We consulted four specialists and asked the specialists to evaluate the content and language of the entries. The four specialists included a clinical expert in psychological medicine, a community expert in psychological medicine, and two psychiatric nursing education experts, all of whom had senior titles with >20 years of work experience. Expert amendments involved the merger of similar entries and



modifying the entries with fuzzy meanings. Five entries were deleted and seven entries were modified. Thirty-four items were included in the questionnaire. Each questionnaire item described a situation and listed 3 choices, which were graded by the Likert 3 method as follows: disagree, 1 point; uncertain, 2 points; and agree, 3 points. The points gained were used to judge the mastery and implementation of the disease-related knowledge, attitude, and practice with schizophrenic reconvalescents. The questionnaire was intended for self-rating, and the general information about the subjects included gender, age, time of onset, education, occupation, marital status, monthly income, and method of payment.

Questionnaire survey

The questionnaire survey was carried out by collective and individual methods, and the questionnaires were completed on the spot and collected upon completion. The predictive questionnaire testing time was between April 2011 and September 2012. Two hundred twenty-four questionnaires were distributed and 219 questionnaires were recovered, with a recovery rate of 97.7%. Except for 4 invalid questionnaires, there were 215 valid questionnaires, among which 85 cases were males (39.5%), and 130 cases were females (60.4%). The formal questionnaire testing time was between November 2012 and April 2014. A total of 224 questionnaires were distributed and 220 questionnaires were recovered, with a recovery rate of 98.2%. With the exception of 2 invalid questionnaires, there were 218 valid questionnaires, among which 96 cases were males (44.0%), and 122 cases were females (55.9%).

Statistical processing

The original data were entered using Excel, and SPSS13.0 was used to conduct exploratory factor analysis (EFA) of the data. AMOS17.0 was used for confirmatory factor analysis (CFA) of the data, which tests the reliability and validity of the questionnaire.

Results

Analysis of each questionnaire item

Project analysis of the results of the predictive questionnaire was performed. With 27% of the highest scores and 27% of the lowest scores of the test as the grouping boundaries, the

differential degree of each item of the predictive questionnaire was verified using an independent sample t-test [10]. The item analysis results showed that the critical ratios of items 17, 23, and 34 (CR values) reached statistical significance ($P > 0.05$), suggesting that the 3 items had a low differential degree for different subjects, thus the items were deleted.

Validity test of the questionnaire

Exploratory factor analysis of the questionnaire for disease knowledge-attitude-practice awareness of patients with remitted schizophrenia:

The first order factor analysis of the 31 questions of the initial questionnaire completed by the 215 patients with remitted schizophrenia showed that the EFA sampling adequate KMO index was 0.87, which was a good effect. At the same time, Bartlett's spherical test statistic was 3165.26 ($P < 0.001$), which indicates the possibility of sharing factors among the items and the collected data are suitable for factor analysis. Extracting the factors using principal component analysis, the common degree after extracting all of the variables exceeded 0.5, suggesting that the extracted factors better reflect the information of the original variables. After orthogonal rotation, there were 5 factors in which the extracted feature value was > 1 . In connection with the scree plot, 4–5 factors were selected, and the 5th factor posed little increase in the percentage of total accumulated variation, with a variance contribution rate of only 2.44. Therefore, the first 4 factors were selected, with a cumulative variance contribution rate up to 56.6%. Each of the factors loaded after the rotation was > 0.4 , and the preliminary results are consistent with the expected theoretical hypothesis of the 4 factors.

Tables 1 and 2 show that the four extracted factors consisted of 30 items. Factor 1 included 9 variables, with a load between 0.70 and 0.81 and a total explained variation of 18.4%. Factor 2 included 9 variables, with a load between 0.58 and 0.79 and a total explained variation of 17.1%. Factor 3 included 9 variables, with a load between 0.59 and 0.78 and a total explained variation of 14.2%. Factor 4 included 3 variables, with a load between 0.68 and 0.85 and a total explained variation of 6.7%. Further content analysis of the 4 dimensions showed that the dimensional structure was clear and the measurement items initially expected were well-classified.

Preparation of a questionnaire for disease knowledge-attitude-practice awareness



Table 1. Factor structure and factor loading for each item after the rotation

| Item | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|------|----------|----------|----------|----------|
| V7 | 0.810 | — | — | — |
| V15 | 0.782 | — | — | — |
| V33 | 0.770 | — | — | — |
| V27 | 0.767 | — | — | — |
| V29 | 0.741 | — | — | — |
| V22 | 0.738 | — | — | — |
| V13 | 0.734 | — | — | — |
| V2 | 0.713 | — | — | — |
| V19 | 0.704 | — | — | — |
| V28 | — | 0.792 | — | — |
| V10 | — | 0.777 | — | — |
| V30 | — | 0.759 | — | — |
| V24 | — | 0.756 | — | — |
| V20 | — | 0.743 | — | — |
| V5 | — | 0.723 | — | — |
| V6 | — | 0.714 | — | — |
| V9 | — | 0.648 | — | — |
| V16 | — | 0.581 | — | — |
| V31 | — | — | 0.782 | — |
| V21 | — | — | 0.776 | — |
| V25 | — | — | 0.764 | — |
| V8 | — | — | 0.756 | — |
| V12 | — | — | 0.736 | — |
| V14 | — | — | 0.701 | — |
| V18 | — | — | 0.615 | — |
| V3 | — | — | 0.578 | — |
| V26 | — | — | 0.596 | — |
| V1 | — | — | — | 0.851 |
| V11 | — | — | — | 0.749 |
| V4 | — | — | — | 0.684 |

Notes: “—” means no such item.

Table 2. Feature values for each factor and the percentage of total variance explained

| Factor | Feature values | Percentage of total variance explained | Cumulative percentage explained |
|---------------------------|----------------|--|---------------------------------|
| Etiology management | 5.72 | 18.4% | 18.4% |
| Risk factor management | 5.32 | 17.1% | 35.6% |
| Treatment management | 4.43 | 14.2% | 49.9% |
| Rehabilitation management | 2.09 | 6.7% | 56.6% |

CFA of the questionnaire for disease knowledge-attitude-practice awareness of patients with remitted schizophrenia:

The remaining 30 items after item analysis and exploratory factor analysis were used to form a formal questionnaire and apply it to the subjects. The sample size was 218 cases, and the results were analyzed by CFA, using the maximum likelihood method (2ML) to verify the path coefficient of the model, then fit and amend the model (Fig. 1).

As shown in Fig. 1, the $\chi^2/df=1.237<3.00$, the goodness of fit model was a GFI=0.871, the absolute fit index of the model

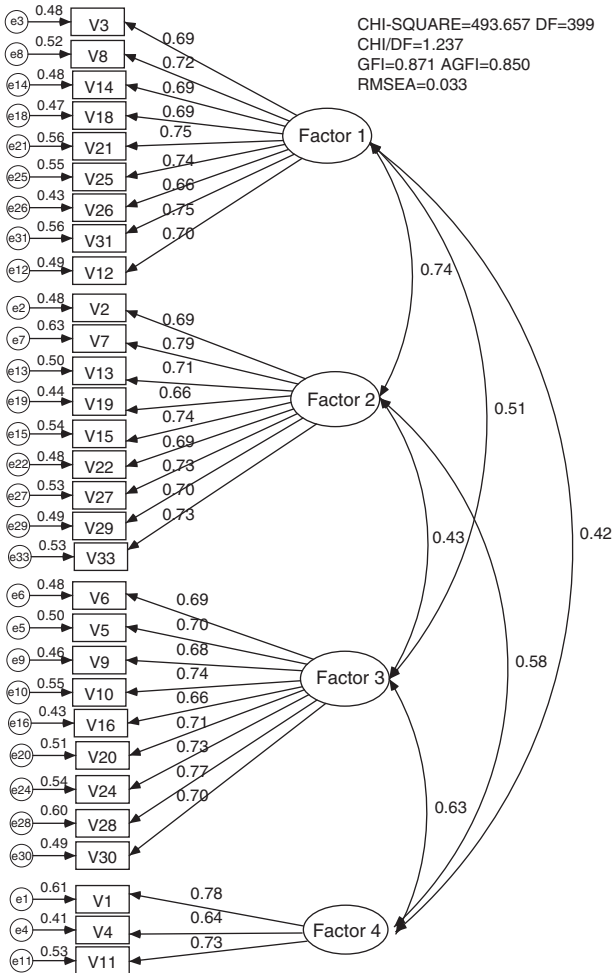


Fig. 1. Disease knowledge-attitude-practice awareness structural equation model of a four-factor questionnaire for patients with remitted schizophrenia.

was an AGFI=0.850, and the RMSEA=0.033, which shows that the model fitting degree was acceptable. The current study modified the original model (M1) according to the model modifying index and changed the path to a group of observed variables to seek a more fitting model. The modified model (M2) fitting index is shown in Table 3. The model data fitting indexes after modification are as follows, which demonstrates that the modified model indexes better fit a factor 4 model: $\chi^2/df=1.187<3.00$; GFI=0.877; AGFI=0.856; and RMSEA=0.030.

Reliability test of the questionnaire

The internal consistency reliability of the questionnaire (Cronbach α coefficient) is shown in Table 4. The total

Cronbach α coefficient of the questionnaire was 0.794, and the Cronbach α coefficient for each dimension was between 0.656 and 0.810, reaching an acceptable level, which indicates that the questionnaire had good reliability and was stable and reliable as a tool for measuring the disease knowledge-attitude-practice awareness with schizophrenic reconvalescents.

Discussion

Application value of the questionnaire

Domestic research involving disease awareness with schizophrenic reconvalescents has mainly used self-designed questionnaires, which lack systematic and scientific confirmation of their validation. The mastery of disease-related knowledge

Preparation of a questionnaire for disease knowledge-attitude-practice awareness



Table 3. Fit indices of the questionnaire before and after the amendment, $n=218$

| Model | <i>df</i> | <i>RMSEA</i> | <i>GFI</i> | <i>AGFI</i> | <i>NFI</i> | <i>IFI</i> | <i>CFI</i> |
|-------|-----------|--------------|------------|-------------|------------|------------|------------|
| M1 | 1.237 | 0.033 | 0.871 | 0.850 | 0.849 | 0.967 | 0.967 |
| M2 | 1.187 | 0.030 | 0.877 | 0.856 | 0.856 | 0.974 | 0.974 |

is a prerequisite for the formation of health behavior, and to develop an effective measurement tool is also an important basis for such research. Therefore, the research involving disease knowledge-attitude-practice awareness with schizophrenic reconvalescents is of a strong theoretical and practical significance to promoting the schizophrenia prevention and control work. The results of this study have shown that the self-designed *Questionnaire for Disease Knowledge-Attitude-Practice Awareness with patients with remitted schizophrenia* has good reliability and validity. Therefore, the questionnaire can be used as a tool for assessing disease awareness with such patients and help to measure the mastery of the disease knowledge and self-management ability on the part of the patients, thus taking targeted intervention measures in a timely manner and improving work efficiency.

The design and preparation of the questionnaire items

The conception and formation of the questionnaire was based on previous research involving an understanding of the influential and relapse factors on the status of patients with remitted schizophrenia proposes the theoretical structural concept of the questionnaire for disease knowledge-attitude-practice awareness with schizophrenics reconvalescents, mainly covering the following four dimensions: etiology awareness; risk factor awareness; treatment awareness; and rehabilitation awareness. Compared with the international table/questionnaire concerning disease knowledge and self-management on the part of patients with schizophrenia [11, 12], this questionnaire

involves content that can offer a comprehensive evaluation of the knowledge-attitude-practice status of patients with remitted schizophrenia. For writing questionnaire items, the basis is the true feelings of the relapse experience of patients with remitted schizophrenia in previous research [13]. The questionnaire entries directly select or modify the interview questions, which reflect the patients' real problems, beliefs, and behaviors in the rehabilitation process. Therefore, the questionnaire items after modification are more authentic and reliable.

Analysis on the reliability and validity of the questionnaire

This study showed that the related coefficient between the scores of each factor and total scores was between 0.50 and 0.64 ($P<0.001$), and the 4 factors of the questionnaire were representative to the overall concept, and the questionnaire structure was in accordance with the scale preparation requirements. The overall Cronbach α coefficient of the questionnaire was 0.794, and the Cronbach α coefficient of each dimension was between 0.656 and 0.810, which indicates that the questionnaire had good internal consistency.

The results of the exploratory factor of Tables 1 and 2 showed that the four factors of the disease knowledge-attitude-practice awareness with schizophrenic reconvalescents had a clear structure, the factor loading of the items was >0.4 , and the total variance explanation rate was 56.6%. Each factor item had a clear meaning and strong explanation, which shows that the questionnaire had good structural validity. At the same time, CFA results showed that the four factor structure model

Table 4. All dimensions and the total questionnaire internal consistency reliability coefficient (Cronbach α coefficient)

| Index | Etiology management | Risk factor management | Treatment management | Rehabilitation management | Total scale |
|-------------------|---------------------|------------------------|----------------------|---------------------------|-------------|
| Cronbach α | 0.656 | 0.701 | 0.733 | 0.810 | 0.794 |



fit well with the observed data, supported the EFA of the data results, and verified the structural validity of the questionnaire.

Features of disease knowledge-attitude-practice awareness with schizophrenic reconvalescents

The study assessed the disease knowledge-attitude-practice awareness with schizophrenic reconvalescents. The total correct rate of the patients answering the disease-related knowledge and practice with schizophrenia was 32.2%, which was far from the standard of “reaching 80% with ordinary population by 2015” required by *The Development Guidance Outline for the National Mental Health Working System (2008–2015)* [14]. The risk factor awareness and the awareness rate of rehabilitation cognition with reconvalescents was relatively low (33% and 35.5%, respectively); City reconvalescents with mental illnesses have a higher awareness rate than rural patients, and the educated patients have a relatively high awareness of disease-related knowledge and behavior. Mental health workers need to increase mental health knowledge propaganda, especially the popularization of risk factors and knowledge of rehabilitation of mental illness. At the same time, in the course of health publicity and education, we should distinguish the area and combine with the population characteristics to develop schizophrenia health education to promote the compliance of health behavior of patients and improve the social function of the patients to return to society as early as possible.

Summary

To conclude, the questionnaire for disease knowledge-attitude-practice awareness with schizophrenic reconvalescents has good reliability and validity, and can be used for the assessment of the mastery of the disease knowledge by schizophrenic reconvalescents. Due to the small study sample, the questionnaire structure must be revised in a large range of population. At the same time, the follow-up study shall make a more comprehensive psychological test concerning the questionnaire to comprehensively describe the mastery of disease knowledge and behavior status of the schizophrenic reconvalescents, and provide a scientific and effective tool for assessment of the community interference with schizophrenic reconvalescents.

Conflict of interest

The authors declare no conflict of interest.

References

1. Du F, Wei CX, Chu PH. Effects of self-management centered group education on schizophrenia patients about self-care, well-being and self-esteem. *China Nurs Manag Oct.* (1);2010:20–23.
2. Angell B, Test MA. The relationship of clinical factors and environmental opportunities to social functioning in young adults with schizophrenia. *Schizophr Bull* 2002;28:259–71.
3. Lu C, Frank RG, Liu Y, Shen J. The impact of mental health on labour market outcomes in China. *J Ment Health Policy Econ* 2009;12:157–66.
4. Gallagher R, Donoghue J, Chenoweth L, Stein-Parbury J. Self-management in older patients with chronic illness. *Int J Nurs Pract* 2008;14:373–82.
5. Mueser KT, Corrigan PW, Hilton DW, Tanzman B, Schaub A, Gingerich S, et al. Illness management and recovery: a review of the research. *Psychiatr Serv* 2002;53:1272–84.
6. Qian HJ, Yuan CR. (Chinese version) Reliability and validity assessment scale of cancer self management efficacy. *J Chinese Nurs* 2011;46:87–9.
7. Ma X. *Health Education*. Second edition. Beijing: People’s Medical Publishing House. 2012:19.
8. Cleary A, Dowling M. Knowledge and attitudes of mental health professionals in Ireland to the concept of recovery in mental health: a questionnaire survey. *J Psychiatr Ment Health Nurs* 2009;16:539–45.
9. Shi LY. *Epidemiology*. First edition. Beijing: People’s Medical Publishing House. 2008:230–32.
10. Wu ML. *SPSS Application of Statistical Practice*. First edition. Beijing: Science Press. 2003:8.
11. Hasson-Ohayon I, Roe D, Kravetz S. The psychometric properties of the Illness Management and Recovery scale: client and clinician versions. *Psychiatry Res* 2008;160:228–35.
12. Depp CA, Cain AE, Palmer BW, Moore DJ, Eyler LT, Lebowitz BD, et al. Assessment of medication management ability in middle-aged and older adults with bipolar disorder. *J Clin Psychopharmacol* 2008;28:225–9.
13. Liu L, Wang LN, Zhou YQ, Li YX. True feelings of relapse experience of patients with remitted schizophrenia. *China Nurs Manag* 2014;14:264–7.
14. Ministry of Health, National Development and Reform Commission, and Ministry of Public Security. *The Development Guidance Outline for the National Mental Health Working System (2008–2015)*, 2008.