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ABSTRACT

Introduction A common problem low- and middle- income countries (LMICs) face is the scarcity of Community-based Rehabilitation (CBR) resources and low service utilisation amongst persons with Severe Mental Illness (SMI). Despite the problem, there has no systematic analysis of the factors affecting service utilisation in China. This study aims to develop a theory-based model that systematically describes the integrated decision-making process of mental health CBR utilisation amongst persons with SMI in China.

Methods/Design This cross-sectional mixed-methods study involves three main stages. In Stage 1, Social Exchange Theory is deployed as an analytical framework, in order to comprehensively capture factors associated with tendency to use CBR services in China by using semi-structured interview methodology involving patients with SMI, their primary caregivers and CBR service providers. In Stage 2, Interpretive Structural Modelling will be applied to analyse the relationships between factors in different dimensions, at different levels, and with different levels of impact. Stage 3 involves a multi-region survey amongst at least 300 family decision-makers (either the patient or their caregivers) at six communities in three cities to statistically validate the initial model derived in Stage 2 using a further Structural Equation Modelling.

Ethics and dissemination Ethical approval was granted by the Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology (No. 2017S319). All interviewees will be provided with written information about the study, and a signed consent will be retrieved prior to the interview. Rules regarding the confidentiality and anonymity of data will be strictly followed. The findings of this study will be disseminated via international and domestic peer-reviewed journals, reports, conference presentations, and symposium discussions. Reports will be submitted to the funding agencies, National Natural Science Foundation of China and Fundamental Research Funds for the Central Universities.

KEY WORDS Mental Health, Community-based Rehabilitation, Service Utilisation

STRENGTHS AND LIMITATIONS OF THIS STUDY

1. In order to better understand families' perceived needs, concerns and their decision-making patterns, we use a theory-based model to provide a systematic understanding of the determinants and the influencing mechanisms of decision-making with new ideas and approaches.
2. The novelty of this mix-methods approach brings the underrepresented voice of mental health service users to the forefront to better identify and understand the gaps between policies and practice in China. This should inform evidence-based policy-making in a context of limited resources.
3. Given the diversity of healthcare systems, caution must be taken in applying findings to rural China or other LMICs.
4. Although the study aims to investigate associations, identification of causal relationships will of course have to await further investigation and validation using methods such as a RCT.

INTRODUCTION

The past few decades have witnessed a sharp increase in the global challenge posed by mental illness. The threefold challenge involves: the large and still increasing absolute need for mental health care,[1 2] especially for people with Severe Mental Illnesses (SMI);[3 4] the absolute lack of professional resources; and significant variation in the distribution of the limited

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professional resources between low- and high- income countries.[5 6] This, therefore, leaves nearly 75%-85% of people in low- and middle- income countries (LMICs) with SMI untreated,[7] bringing about high caregiving burden to their family and the society. In response to such critical situation, programmes, such as mental health Global Action Programme (mhGAP) and Movement for Global Mental Health, have been initiated with an aim to scale up the coverage of mental health care in LMICs.[8 9] The Community-based Rehabilitation (CBR) model has been repeatedly recommended as a valid means to provide affordable, accessible, and effective services to meet a wide range of needs of persons with chronic SMI.

China, an upper-middle-income country accounting for 18% of the world population and 17% of the global disease burden of psychiatric-related illness,[10] is also encountering a significant gap between need and supply in mental health services, and therefore, the potential disrupt and burden of the untreated SMI patients pose to their family and community.[11] In accordance with the World Health Organisation (WHO) recommendations, the Chinese government has issued several national-level policies establishing a nationwide mental health CBR network for patients with SMI since 2008.[12-14] Since 2009, community-based physical rehabilitative services, including follow-ups, health education and physical examination, have been part of the National Essential Public Health Service Package and are regularly provided to every patient with SMI by Community Healthcare Centres (CHCs) free of charge. The National Mental Health Law,[15] launched in 2013, provides instructions to build a closer hospital-CHC collaboration to deliver better mental healthcare services. Some better-off cities, such as Beijing, Shanghai, Shenzhen, and Wuhan, have recently borrowed from Western experience and practice to incorporate the somatic healthcare-based CBR network with psychological and social services to meet different types of needs (e.g. psychological and functional needs).

However, similar to the situation in other LMICs,[16] CBR programmes in China tend to confront various complex situations on the ground. One of the frequently occurred and critical problems is the low utilisation of CBR services: a large proportion of patients have discontinued treatments for various reasons, leaving only 37.1% of patients with SMI who have regularly used mental health services,[17] and a lot fewer who have positively sought social services.[18 19] This has resulted in wastes of resources, even in a context where a huge gap exists between large amount of absolute need and scarce professional resources.[19 20] This dilemma calls for special attention to understanding the predictors of one's tendency to use CBR services as well as the underlying mechanism while increasing resource allocated into this area, since the later requires long policy-making process and will not achieve meaningful outcomes if the demand-side lacks awareness of the service or willingness to use.[20 21]

KNOWLEDGE GAPS TO BE ADDRESSED
Investigation on public's willingness to use healthcare services derives from the concept of 'Help-Seeking Behaviour' and lay understandings of health and illness. Compared with the large number of studies in the physical health field, fewer studies focused on investigating one's decision on the utilisation of mental health services.

Lack comprehensive understanding of the driving factors
Of the small number of studies that examined the determinants of mental health service utilisation a large proportion looked into the predictors of peoples' intention to use mental health services. These studies have revealed that: firstly, decisions are influenced by a wide

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range of factors. Despite sociodemographic characteristics, some factors are vectors: practical and attitudinal barriers, such as poor access of professional service, low income[22], availability of alternative treatment models (such as spiritual treatment provided by traditional healers),[23] [24] stigma and wrong attribution of cause,[25-27] significantly impede one's utilisation of mental health services, whereas positive past experience,[28] high sense of perceived need[29] and social support[30] may increase the likelihood of doing so. Secondly, besides observable factors such as educational level, some crucial factors are underlying, deeply embedded in the political, economic and cultural context of the society.[31 32] These factors include public and self-stigma, [25 26] subjective norm,[33] attitude from significant others,[34 35] etc. In Chinese societies, the decision on whether to use CBR services is usually a consensus achieved amongst family members, especially between the patient and their family caregivers.[33 36] The integrated decision-making becomes more complex because of the number of factors involved. Thirdly, factors from different layers and directions may interact with each other, and therefore, jointly affect one's decision.[37] For instance, the absence of significant relationship between symptom severity and help-seeking intention can be attributed to the negative net force between stigma and actual service need.[38]

Meanwhile, knowledge in this field is mostly based on studies conducted in high-income countries,[39 40] leaving China and its culturally related or service-related factors under-investigated.[41] The limited number of studies that have focused on Chinese population were mainly carried out by scholars from Taiwan and Hong Kong against lay understandings. These studies, on the one hand, have explored the influencing mechanisms of underlying factors, such as Chinese cultural beliefs[36], subjective norm and attribution of the cause of illness,[33] on the decision-making; on the other hand, have revealed the social and cultural heterogeneity within the ethnic Chinese population,[24] which calls for context-driven studies subject to the status quo of mainland China. Furthermore, compared to studies investigating the barriers, less attention has been paid to identifying the facilitators,[30] especially those from the provider side. Although a positive relationship between higher quality services and stronger willingness to use CBR services has been documented,[38 42] the underlying mechanism has not been fully comprehended. In consideration of the complexity of factors and largely under-investigated underlying mechanisms, an advanced theory-based model is needed in order to understand the integrated decision-making process in mainland Chinese families (service users) regarding whether to use CBR services.

Lack sophisticated models to understand the influence mechanism
Studies that employ theory-based models to systematically investigate these predictors remain scarce in this field.[33] Attempts have been made to introduce some models, such as Andersen and Aday's Help-seeking Behaviour Model and Health Belief Model, into this field to help snapshot the integrated treatment choices.[43 44] Andersen and Aday's model indeed contributes to the classification of predictors (Need, Predisposing factors, and Enabling factors) and the exploration of more layers of factors, nevertheless, it fails to delineate the interaction of the factors from different layers,[43] or accurately predict one's decision-making in the mental health field.[45] Health Belief Model, as a whole, shows limited explanatory power, whereas 'perceived benefits' and 'perceived barriers' are direct predictors of help-seeking behaviour, leaving other variables of less explanatory power.[44] This indicates Social Exchange Theory (SET), formed based on a core idea of 'the decision for an action is made by weighting the potential benefits and costs', has the potential to serve as a theoretical framework to delineate one's decision-making process, though there is only one study retrieved using this theory in

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this field.

Potentially feasible model

Social Exchange Theory (SET), which is a social psychological and sociological perspective that explains social change and stability as a process of negotiated exchanges between parties expands the economic concepts of 'cost' and 'benefit' to a sociological perspective, respectively referring to the input and reward of conducting one action.[46] The theory illustrates the relationships within and between three core elements (costs, potential rewards, and actual rewards) involved in one's decision-making process: one's attitude towards an action depends on whether the motivation (accumulation of various potential rewards) overcomes the obstacles (accumulation of various costs); the worth of continuing the action is judged based on the costs paid and the actual rewards gained in the last action.

Aided with Structural Equation Modelling (SEM), various scholars used SET to explore the interactive pathways (accumulation or counteraction) amongst driving factors from multiple layers to explain one's decision-making process against an action or interpersonal relationships in the business management field.[47 48] To the best of our knowledge, only one study has been retrieved using this theory to explain one's decision on mental health service utilisation, with inter-factor relationships underexplored.[49]

AIM AND OBJECTIVES OF THE STUDY

Our aim with this cross-sectional, mixed methods study is to develop a sophisticated decision-making model based on SET to systematically capture the factors influencing the family integrated treatment choice on the use of mental health CBR services in China's context.

To achieve the aim of this study, we have two objectives:

➢ Comprehensively identify the major barriers and facilitators affecting family's integrated treatment choice (involving patients with SMI and their family caregivers), with special attention paid to the factors rooted in the context of an LMIC and those from the provider side.

➢ Explain the complex interactive relationships amongst factors from multiple layers and dimensions to identify intervene-able factors.

THEORETICAL FRAMEWORK

This study will therefore employ SET as the theoretical framework and incorporate the 'need' and 'predisposing factors' in Andersen and Aday's model to combine their strengths and to maximise its explanatory power.

In the theoretical framework (Figure 1. Decision-making model on the utilisation of CBR services among persons with SMI), factors are classified into four clusters: a) predisposing factors (including personal socio-demographic characteristics), b) motivation (including perceived needs, encouragement from significant others, etc.), c) rewards (including perceived/expected benefits such as symptom relief, self-efficacy, positive interpersonal relationship, etc.), and d) costs (including attitudinal and practice obstacles such as public and self-stigma, poor access to care, traditional Chinese beliefs about the cause of illness (supernatural explanation or personality explanation), etc.). Within each cluster, the impact accumulates from fundamental factors to observed factors; whereas between clusters, there is

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a trade between rewards and costs. The net force of these four clusters of factors determines the integrated decision on whether to use CBR services. The actual rewards and costs will then affect the value of each cluster in the next decision-making process.

RESEARCH DESIGN

In consideration of the variety and complexity of the on the ground factors, this study uses a mixed methods approach (qualitative and quantitative) conducted in three stages:

Stage 1: pre-identify relevant factors under the theoretical framework;

Stage 2: form the initial (theoretical) model using Interpretive Structural Modelling (ISM);

Stage 3: statistically validate the theoretical model using Structural Equation Modelling (SEM).

Stage 1: Pre-Identify Relevant Factors under the Theoretical Framework

Face-to-face semi-structured interview will be used to capture potential factors influencing the decision-making on CBR service utilisation. Grounded Theory Methodology (GTM) paradigm will be employed for data collection and analysis in order to extract all information, classify/summarise potential factors and sort out the relationships amongst these factors, and therefore, preliminarily depict how these factors influence one's tendency to use CBR services.

Participant recruitment

Taking into consideration the Chinese culture that the decision on whether to use CBR services is usually a consensus achieved between the patient and their primary caregiver, patients and their family primary caregivers will both be interviewed. Health workers and social workers involved in the provision of CBR services are considered as key informants and will be interviewed.

We categorise the patients with SMI into four groups (Table 1). Three registered families in each of these four group will be selected, the patients and their family caregivers will be interviewed. In consideration of the fact that stigma may impede the participant recruitment, we plan to choose one GP with rich experience in providing CBR services in the community as the key informant to lead the participant recruitment.

Table 1 Sampling method for semi-structured interviews

Information Source	Criteria	Subject	Interviewee
Demand Side	have not used any kind of CBR services in the past 12 months	patient	3
		caregiver	3
	have discontinuously used community-based physical rehabilitative services (covered by the National Essential Public Health Service Package) in the past 12 months	patient	3
		caregiver	3
	have regularly used community-based physical rehabilitative services (covered by the National Essential Public Health Service Package) in the past 12 months	patient	3
		caregiver	3

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	have pro-actively sought various types of CBR services in the past 12 months	patient	3
		caregiver	3
Supply Side	directly involved in CBR service provision	health worker	5
		social worker	4
Total			33

Regarding frontline health/social workers, this study will adopt a snowball methodology: firstly, ask the key informant to recommend two health workers and two social workers who are directly involved in the provision of CBR services as interviewees. Then, ask each interviewee to name one potential participant (healthcare/social worker) within their professional networks. Approximately 28-33 participants will be interviewed.

Data collection and analysis
A written invitation to participate in a 30-60 minutes' semi-structured interview will be sent to all participants followed by a brief introduction of the aim and focus of the interview given by the key informant.

Applying the Grounded Theory Methodology (GTM) principle, the interview will be conducted as progressive repetitive cycles. During the interview, the following themes will be covered:
- ➢ What are the status quo of the implementation of CBR services in urban China?
- ➢ Who makes decision on whether to use CBR services? How is the agreement achieved?
- ➢ How many motivating factors patients with SMI or their caregivers have in terms of using CBR services? How are these sources of motivation developed?
- ➢ For patients with good prescription/medication adherence, what are their expected/perceived rewards? Is there a difference (and what is the difference) between what they had expected and what they have received?
- ➢ What are the perceived and practical obstacles that impede CBR service utilisation? How and to what extent do these factors influence tendency to use CBR services?

The recording will be transcribed verbatim and all data will be managed in Nvivo V.10 Software. The development of theme follows Glaser and Strauss's model.[1]

Stage 2: Form Initial (Theoretical) Model Using Interpretive Structural Modelling (ISM)
In consideration of the complexity of the integrated model itself, Interpretive Structural Modelling (ISM), a sophisticated technique that transforms unclear, poorly articulated models into well-defined models,[2] will be employed to form the initial model.

Approximately 10 professionals from mental health, health policy, CBR service provision fields and local governments will be invited to jointly set up the model according to

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[1] Glaser B.G., Strauss A.L. The discovery of grounded theory: Strategies for qualitative research. Hawthorne, NY: Aldine 1967.

[2] Govindan K, Palaniappan M, Zhu Q, et al. Analysis of third party reverse logistics provider using interpretive structural modeling. *International Journal of Production Economics*, 2012; 140(1): 204-211.

Malone's[3] procedure (Figure 2. Flow diagram for developing the theoretical model). After professionals reviewing the comprehensiveness of the factors identified in Stage 1, this computer-assisted learning process will be employed to help experts develop relationships between any two factors, categorise and prioritise each factor into different layers, and therefore, formulate the theoretical model that delineates how motivating factors, barriers and attracting factors influencing one's tendency to use CBR services in China. Research hypotheses will generate according to this theoretical model.

Stage 3: Statistically Validate Theoretical Model Using Structural Equation Modelling (SEM)

In Stage 3, a cross-sectional survey will be conducted to test the validity of the theoretical model developed in Stage 2. Structural Equation Modelling (SEM) will be employed to test the loadings of each hypothesised pathway in order to validate the direction and magnitude of impact. This, on the one hand, will reveal how the factors from cultural, community-, organisational- and family-level influence family decision-makers' (either the patient or their family caregiver) tendency to use CBR services in China's context; on the other hand, help to identify any intervene-able factors to facilitate evidence-based policy-making.

Participant recruitment

The study will employ a multi-stage sampling methodology to consider generalisability and feasibility issues.

The study will first select three cities (1 in Western China, 1 in Eastern China, and 1 in Central China) to enhance representativeness of findings, according the following principles:

➢ The sample sites can represent the status quo of the geographic regions they are located;

➢ In order to investigate the impact of factors such as social culture and type of service on patients'/family's decision-making, there should be variations in social culture and type of CBR services amongst the sample sites.

The sample size was calculated based on the minimum sample size required for SEM: 10 cases per variable.[4] Approximately 25-30 variables would be determined, indicating the required minimum sample population of 300 individuals (patient or caregiver). Taking account of the prevalence of SMI (at least 0.5%[5]) and the response rate (set at 50%), the expected population our sample sites cover was 120,000, which equals to the coverage of 6 communities (one normally covers 20,000 population).

Therefore, in each city, the study will select one community where the Community Health Centre (CHC) provides the highest quality of physical CBR services (high level of patient adherence) as a research site. Then, we calculate its distance (X km) to the nearest facility that provides psychiatric rehabilitation services. All CHCs with X km's distance from the nearest

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[3] Malone D.W. An introduction to the application of interpretive structural modeling ISM. *Proceedings of the IEEE*, 1975; 63(3): 397-404.

[4] Nunnally JC. Psychometric theory. New York, NY: McGraw-Hill 1967.

[5] Baxter AJ, Charlson FJ, Cheng HG, et al. Prevalence of mental, neurological, and substance use disorders in China and India: A systematic analysis. *Lancet Psychiatry*, 2016; 3(9): 832-841.

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psychiatric rehabilitation services within the city will be identifies and one will be randomly selected. The community where this selected CHC is located will be selected as another research site. In the end, a total of six communities will be selected as our research sites and attempts will be made to include all families (registered) with a member suffering from SMI who live within these 6 communities. One primary decision-maker (either the patient or their primary caregiver) of each registered family will be invited to complete the questionnaire.

Questionnaire development

The questionnaire is developed to test the validity/explain-ability of the theoretical decision-making model. Regarding the measureable factors identified in the theoretical model, such as family burden and social support, the widely adopted Social Support Rating Scale (SSRS) and Burden Scale for Family Caregivers (BSFC) will be included; regarding those latent variables that lack sophisticated scales to measure, systematic review will be conducted and experts will be consulted in order to select appropriate observed variables.

The questionnaire includes information regarding:
➢ Patients' and their family primary caregivers' sociodemographic characteristics (age, gender, education, marital status, income, who makes decision, etc.);
➢ Utilisation of CBR services (intention, type, frequency, length, etc.);
➢ Factors that may influence decision-maker's tendency (motivation, rewards, costs).

The items will be pilot tested for face validity (content and structure), and test-retest reliability (1 week apart). Items with acceptable reliability (Cronbach's $\alpha \geq 70\%$) will be included in the final survey instrument.

Data collection and analysis

The anonymised questionnaire will be distributed via a web link to Wenjuanxing (an online survey platform). Participants can complete the questionnaire using mobile phone or desktop. Reminders will be sent two weeks after the dissemination via text-message or telephone.

The analysis will be conducted in two phases:
Phase 1 will include descriptive analysis examining CBR service utilisation patterns and the variations amongst non-users, those use CBR services occasionally, and those use CBR services regularly.

Phase 2 will use SEM to test the theoretical decision-making model using AMOS. Analysing procedure will follow Anderson and Gerbing's[6] two-step modelling process.

ETHICS AND DISSEMINATION

Ethical approval was granted by the Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology (No. 2017S319). Rules regarding the confidentiality and anonymity of data will be strictly followed. Prior to interview or survey, all participants will be informed that they have the right to refuse to participate and withdraw from the study at any time without questions being asked. Information regarding participants' rights will be

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6 Anderson JC, Gerbing DW. Structural Equation Modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 1988; 103(3): 411-423.

stated on the opening page of the survey. For participants who participate in the online survey, a completed questionnaire is deemed as having provided consent. Written consent will be obtained from participants before interviews are carried out. All interview and questionnaire data will be anonymised.

We will disseminate findings to the scientific community, policymakers and healthcare providers via international and domestic peer-reviewed journals, conferences and various symposiums. The major findings of the project will be submitted to National Natural Science Foundation of China. We aim to use the decision-making model to contribute towards the cumulative knowledge of underlying fundamental factors that affect the effective utilisation of mental health CBR services in developing countries. The identified intervene-able factors and verified effective services can be valuable in assisting community-level care providers to address gaps between need and provision.

CONCLUSION

In conclusion, this context-driven study considers both global commonalities and local variations in China, which may contribute to a deeper understanding of the underlying culturally and socioeconomically related factors in developing countries. In addition, the theory-based model will help to illustrate the impact pathway of these factors, according to which intervene-able factors and high quality services can be identified. This will not only help to inform evidence-based policy-making to increase the effective use of CBR services in China, but also provide implications for other developing countries in terms of developing effective CBR services or interventions in a context of limited resources.

Contributors RW, DF, ST and ZF conceived the study. RW, DF, ST, YL, HS and QF contributed to the design of the study, RW, IS, ZC, TW, HF, YH and XC drafted the manuscript and all authors contributed to the revise of this manuscript. All co-authors declare that they have no competing interests.

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REFERENCES

1. Steel Z, Marnane C, Iranpour C, et al. The global prevalence of common mental disorders: A systematic review and meta-analysis 1980-2013. *Int J Epidemiol* 2014;43(2):476-93. doi: 10.1093/ije/dyu038

2. Whiteford HA, Degenhardt L, Rehm J, et al. Global burden of disease attributable to mental and substance use disorders: Findings from the Global Burden of Disease Study 2010. *Lancet* 2013;382(9904):1575-86. doi: 10.1016/s0140-6736(13)61611-6

3. Foldemo A, Gullberg M, Ek AC, et al. Quality of life and burden in parents of outpatients with schizophrenia. *Soc Psychiatry Psychiatr Epidemiol* 2005;40(2):133-38. doi: 10.1007/s00127-005-0853-x

4. Almeida OP, Hankey GJ, Yeap BB, et al. Mortality among people with severe mental disorders who reach old age: A longitudinal study of a community-representative sample of 37892 men. *PLoS One* 2014;9(10) doi: 10.1371/journal.pone.0111882

5. World Health Organization. Mental Health Atlas 2011. Geneva: World Health Organization 2011.

6. World Health Organization. Mental Health Atlas 2014. Geneva: World Health Organization 2015.

7. World Health Organization. Mental Health Action Plan 2013–2020. Geneva: World Health Organization 2013.

8. World Health Organization. mhGAP: Mental Health Gap Action Programme: Scaling up care for mental, neurological and substance use disorders. Geneva: World Health Organization 2008.

9. Chisholm D, Flisher AJ, Lund C, et al. Global mental health 6 - Scale up services for mental disorders: A call for action. *Lancet* 2007;370(9594):1241-52. doi: 10.1016/s0140-6736(07)61242-2

10. Liu S, Page A. Reforming mental health in China and India. *Lancet* 2016;388(10042):314-16. doi: 10.1016/s0140-6736(16)30373-7

11. Li KQ, Sun XL, Zhang Y, et al. Mental health care in China: Review on the delivery and policy issues in 1949-2009 and the outlook for the next decade. *Acta Neuropsychiatrica* 2013;26(3):134-45. doi: 10.1017/neu.2013.40

12. State Council of People's Republic of China. National Mental Health Work Plan (2015–2020). Beijing: General Office of the State Council 2015. (In Chinese)

13. National Health and Family Planning Commission. Work specification on management and treatment of severe mental illness. Beijing: National Health and Family Planning Commission 2012. (In Chinese)

14. Ministry of Health, Publicity Department of the CPC Central Committee, National Development and Reform Commission, et al. National Mental Healthcare System Guidelines. Beijing: Chinese Center for Disease Control and Prevention 2008. (In Chinese)

15. Standing Committee of the National People's Congress. National Mental Health Law Beijing: Standing Committee of the National People's Congress 2012. (In Chinese)

16. Jacob KS. Community care for people with mental disorders in developing countries - Problems and possible solutions. *Br J Psychiatry* 2001;178:296-98. doi: 10.1192/bjp.178.4.296

17. Kang H, Guan L, Wang X, et al. Economic, insurance and treatment status of patients with Severe Mental Illness in 31 '686 Programme' pilot cities. *Chinese Journal of Public Health*, 2015, 31:997-1001. doi: 10.11847/zgggws2015-31-08-06 (In Chinese)

18. Li, H. Study on management of Community-based Rehabilitation model for mental disabled people - taking Shanghai Sunshine Soul Park as example. Fudan University 2013. (In Chinese)

19. Li L: Immaturity of the community-based mental health system. China Hospital CEO 2012; (8):62-63. (In Chinese)

20. Phillips MR. Can China's new mental health law substantially reduce the burden of illness attributable to mental disorders? *Lancet* 2013;381(9882):1964-66. doi: 10.1016/s0140-6736(13)61177-0

21. Prince M, Patel V, Saxena S, et al. Global mental health 1 - No health without mental health. *Lancet* 2007;370(9590):859-77. doi: 10.1016/s0140-6736(07)61238-0

22. Wang PS, Aguilargaxiola S, Alonso J, et al. Worldwide use of mental health services for anxiety, mood, and substance disorders: Results from 17 countries in the WHO World Mental Health (WMH) Surveys. *Lancet* 2007;370(9590):841. doi: 10.1016/S0140-6736(07)61414-7

23. Shaw I, Middleton H. Approaches to "mental health" in low-income countries: A case study of Uganda. *Mental Health Review Journal* 2013;18(4):204-13. doi: 10.1108/MHRJ-07-2013-0025

24. Wong DFK, Li JCM. Cultural influence on Shanghai Chinese people's help-seeking for mental health problems: Implications for social work practice. *Br J Soc Work* 2014;44(4):868-85. doi: 10.1093/bjsw/bcs180

25. Tsai YF, Ku YC. Self-care symptom management strategies for auditory hallucinations among inpatients with schizophrenia at a Veterans' Hospital in Taiwan. *Arch Psychiatr Nurs* 2005;19(4):194-99. doi: 10.1016/j.apnu.2005.05.005

26. Mackenzie CS, Gekoski WL, Knox VJ. Age, gender, and the underutilization of mental health services: The influence of help-seeking attitudes. *Aging Ment Health* 2006;10(6):574-82. doi: 10.1080/13607860600641200

27. Clement S, Schauman O, Graham T, et al. What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychol Med* 2015;45(1):11-27. doi: 10.1017/s0033291714000129

28. Coleman SJ, Stevelink SAM, Hatch SL, et al. Stigma-related barriers and facilitators to help seeking for mental health issues in the armed forces: a systematic review and thematic synthesis of qualitative literature. *Psychol Med* 2017;47(11):1880-92. doi: 10.1017/s0033291717000356

29. Jorm AF. Mental Health Literacy Empowering the Community to Take Action for Better Mental Health. *Am Psychol* 2012;67(3):231-43. doi: 10.1037/a0025957

30. Gulliver A, Griffiths KM, Christensen H. Perceived barriers and facilitators to mental health help-seeking in young people: A systematic review. *BMC Psychiatry* 2010;10 doi: 10.1186/1471-244x-10-113

31. Mohamed S, Rosenheck R, He H, et al. Insight and attitudes towards medication among inpatients with chronic schizophrenia in the US and China. *Social Psychiatry and Psychiatric Epidemiology* 2014;49(7):1063-70.

32. Patel V, Xiao S, Chen H, et al. The magnitude of and health system responses to the

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mental health treatment gap in adults in India and China. *Lancet* 2016;388(10063):3074-84. doi: 10.1016/s0140-6736(16)00160-4

33. Mo PKH, Mak WWS. Help-seeking for mental health problems among Chinese: The application and extension of the Theory of Planned Behavior. *Soc Psychiatry Psychiatr Epidemiol* 2009;44(8):675-84. doi: 10.1007/s00127-008-0484-0

34. Boydell KM, Gladstone BM, Volpe T. Understanding help seeking delay in the prodrome to first episode psychosis: A secondary analysis of the perspectives of young people. *Psychiatric Rehabilitation Journal* 2006;30(1):54-60. doi: 10.2975/30.2006.54.60

35. Vogel DL, Wade NG, Wester SR, et al. Seeking help from a mental health professional: The influence of one's social network. *J Clin Psychol* 2007;63(3):233-45. doi: 10.1002/jclp.20345

36. Tieu Y, Konnert CA. Mental health help-seeking attitudes, utilization, and intentions among older Chinese immigrants in Canada. *Aging Ment Health* 2014;18(2):140-47. doi: 10.1080/13607863.2013.814104

37. Chen HD, Fang XY, Liu CY, et al. Associations among the number of mental health problems, stigma, and seeking help from psychological services: A path analysis model among Chinese adolescents. *Children and Youth Services Review* 2014;44:356-62. doi: 10.1016/j.childyouth.2014.07.003

38. Chin WY, Chan KTY, Lam CLK, et al. Help-seeking intentions and subsequent 12-month mental health service use in Chinese primary care patients with depressive symptoms. *BMJ Open* 2015;5(1) doi: 10.1136/bmjopen-2014-006730

39. Razzouk D, Sharan P, Gallo C, et al. Scarcity and inequity of mental health research resources in low-and-middle income countries: A global survey. *Health Policy* 2010;94(3):211-20. doi: 10.1016/j.healthpol.2009.09.009

40. Baingana F, al'Absi M, Becker AE, et al. Global research challenges and opportunities for mental health and substance-use disorders. *Nature* 2015;527(7578):S172-S77. doi: 10.1038/nature16032

41. Yu Y, Liu ZW, Hu M, et al. Mental health help-seeking intentions and preferences of rural Chinese adults. *PLoS One* 2015;10(11) doi: 10.1371/journal.pone.0141889

42. Tang Y, Zheng H. Evaluation of patients' families on social workers involved in the Community Services for severe psychoses in Shanghai. *Medicine and Society* 2016;29(1):47-49. doi: 13723 /j.yxysh.2016.01.015 (In Chinese)

43. Young JT. Illness behaviour: A selective review and synthesis. *Sociol Health Illn* 2004;26(1):1-31. doi: 10.1111/j.1467-9566.2004.00376.x

44. O'Connor PJ, Martin B, Weeks CS, et al. Factors that influence young people's mental health help-seeking behaviour: A study based on the Health Belief Model. *J Adv Nurs* 2014;70(11):2577-87. doi: 10.1111/jan.12423

45. Roh S, Burnette CE, Lee KH, et al. Predicting help-seeking attitudes toward mental health services among American Indian older adults: Is Andersen's Behavioral Model a good fit? *Journal of Applied Gerontology the Official Journal of the Southern Gerontological Society* 2017;36(1):94. doi: 10.1177/0733464814558875

46. Homans GC. Social behavior as exchange. *American Journal of Sociology* 1958;63(6):597-606.

47. Aryee S, Walumbwa FO, Mondejar R, et al. Accounting for the influence of overall justice

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on job performance: Integrating Self-determination and and Social Exchange Theories. *J Manage Stud* 2015;52(2):231-52. doi: 10.1111/joms.12067

48. Guillet E, Sarrazin P, Carpenter PJ, et al. Predicting persistence or withdrawal in female handballers with Social Exchange Theory. *International Journal of Psychology* 2002;37(2):92-104. doi: 10.1080/00207590143000243

49. Hamrin V, McCarthy EM, Tyson V. Pediatric psychotropic medication initiation and adherence: A literature review based on social exchange theory. *J Child Adolesc Psychiatr Nurs* 2010;23(3):151-72. doi: 10.1111/j.1744-6171.2010.00237.x

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FIGURES
1. Figure 1. Decision-making model on the utilisation of CBR services among persons with SMI
2. Figure 2. Flow diagram for developing the theoretical model

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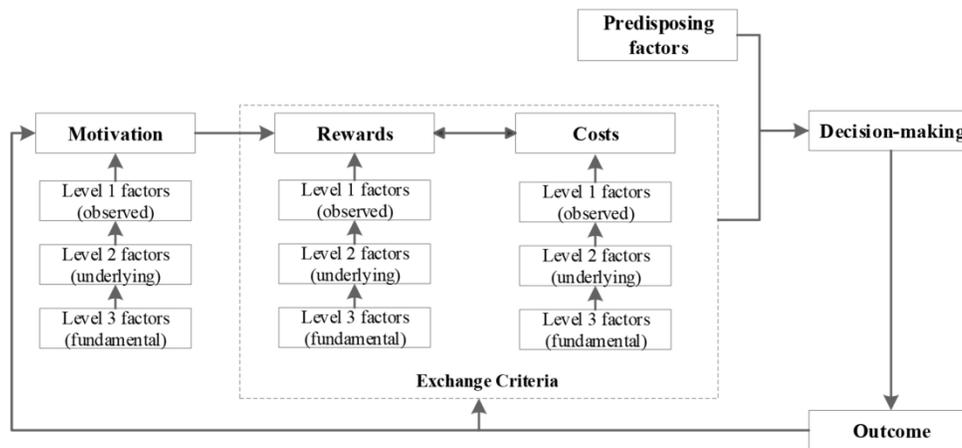Figure 1. Decision-making model on the utilisation of CBR services among persons with SMI (Mono-image)

173x78mm (300 x 300 DPI)

Step 1: Develop Structural Self-Interaction Matrix (SSIM)
1. Review and organise potential factors identified in Stage 1
2. Specify and finalise the contextual relationship among the interactions between any two factors (i and j)

Step 2: Develop Reachability Matrix
1. Convert SSIM to Adjacency Matrix by assigning binary values (1s or 0s) to the relationships
2. Convert Adjacency Matrix by to Reachability Matrix by adding 1* entries to incorporate transitivity

Step 3: Stratify factors
1. Extract reachability set and antecedent set for each factor
2. Determine ISM hierarchy and club factors to form Conical Matrix

Step 4: Develop diagraph
1. Visualise Conical Matrix using nodes and lines of edges
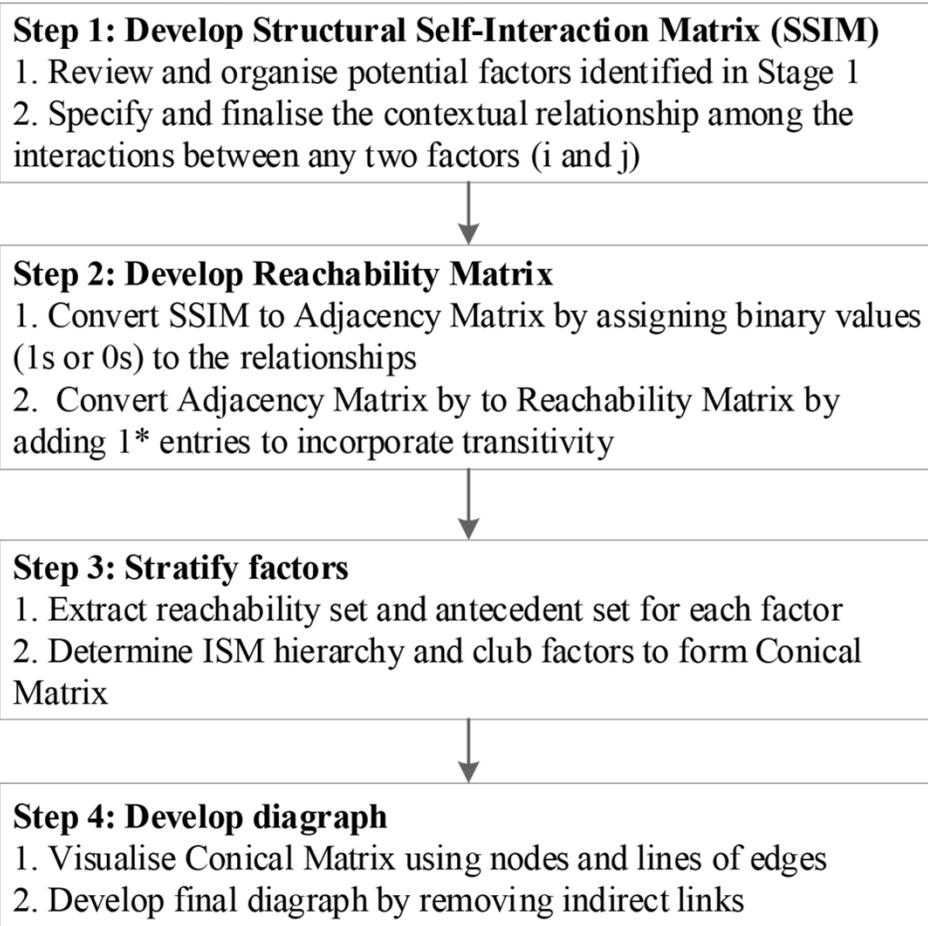2. Develop final diagraph by removing indirect links

Figure 2. Flow diagram for developing the theoretical model (Mono-image)

173x168mm (300 x 300 DPI)

Integrated Decision-making model for Community-based Rehabilitation service utilisation among persons with Severe Mental Illness in China: Protocol for a cross-sectional mixed-methods study

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Integrated Decision-making model for Community-based Rehabilitation service utilisation among persons with Severe Mental Illness in China: Protocol for a cross-sectional mixed-methods study

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ABSTRACT

Introduction A common problem low- and middle- income countries (LMICs) face is the scarcity of Community-based Rehabilitation (CBR) resources and low service utilisation amongst persons with Severe Mental Illness (SMI). Despite the problem, the factors and the pathways they influence one's decision on service utilisation in China have not been fully comprehended. This study aims to develop a theory-based model that systematically describes the integrated decision-making process of mental health CBR utilisation amongst persons with SMI in China.

Methods/Design This cross-sectional mixed-methods study involves three main stages and it is expected to last three years from January 2018 to December 2020. In Stage 1, Social Exchange Theory is deployed as an analytical framework, in order to comprehensively capture factors associated with tendency to use CBR services in China by using semi-structured interview methodology involving patients with SMI, their primary caregivers and CBR service providers. In Stage 2, Interpretive Structural Modelling will be applied to analyse the relationships between factors in different dimensions, at different levels, and with different levels of impact. Stage 3 involves a multi-region survey amongst at least 300 family decision-makers (either the patient or their caregivers) at six communities in three cities to statistically validate the initial model derived in Stage 2 using a further Structural Equation Modelling.

Ethics and dissemination Ethical approval was granted by the Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology (No. 2017S319). All interviewees will be provided with written information about the study, and a signed consent will be retrieved prior to the interview. Rules regarding the confidentiality and anonymity of data will be strictly followed. The findings of this study will be disseminated via international and domestic peer-reviewed journals, reports, conference presentations, and symposium discussions. Reports will be submitted to National Natural Science Foundation of China.

KEY WORDS Mental Health, Community-based Rehabilitation, Service Utilisation

STRENGTHS AND LIMITATIONS OF THIS STUDY

1. This study is one of the few studies that tend to provide a systematic understanding of the determinants and decision-making process of the utilisation of mental health CBR services amongst patients with severe mental illnesses in Low- and Middle- Income Countries.

2. This study is designed based on Social Exchange Theory (SET), a model widely used in the social science field, in order to systematically identify the driving factors from various layers and clusters.

3. This study employs Structural Equation Modelling (SEM) to quantitatively determine the impact the underlying factors (such as stigma, subjective norm, Chinese cultural value and trust between provider and service user) pose on CBR service utilisation.

4. Given the diversity of healthcare systems, caution must be taken in applying findings to rural China or other LMICs.

5. Although the study aims to investigate associations, identification of causal relationships will of course have to await further investigation and validation using methods such as a Randomised Control Trial.

INTRODUCTION

The past few decades have witnessed a sharp increase in the global challenge posed by mental

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illness. The threefold challenge involves: the large and still increasing absolute need for mental health care,[1 2] especially for people with Severe Mental Illnesses (SMI);[3 4] the absolute lack of professional resources; and significant variation in the distribution of the limited professional resources between low- and high- income countries.[5 6] This, therefore, leaves nearly 75%-85% of people in low- and middle- income countries (LMICs) with SMI untreated,[7] bringing about high caregiving burden to their family and the society. In response to such critical situation, programmes, such as mental health Global Action Programme (mhGAP) and Movement for Global Mental Health, have been initiated with an aim to scale up the coverage of mental health care in LMICs.[8 9] The Community-based Rehabilitation (CBR) model has been repeatedly recommended as a valid means to provide affordable, accessible, and effective services to meet a wide range of needs of persons with chronic SMI.[10 11]

China, a middle-income country accounting for 18% of the world population and 17% of the global disease burden of psychiatric-related illness,[12] is also encountering a significant gap between need and supply in mental health services, and therefore, the potential disrupt and burden of the untreated SMI patients pose to their family and community.[13] In accordance with the World Health Organisation (WHO) recommendations, the Chinese government has issued several national-level policies to establish a nationwide mental health CBR network for patients with SMI since 2008.[14-16] Since 2009, community-based physical rehabilitative services, including follow-ups, health education and physical examination, have been part of the National Essential Public Health Service Package and are regularly provided to every patient with SMI by Community Healthcare Centres (CHCs) free of charge. The National Mental Health Law,[17] launched in 2013, provides further instructions to build a closer hospital-CHC collaboration to deliver better mental healthcare services.

Meanwhile, most CHCs in China are providing the aforementioned physical rehabilitative services to patients with stable or no symptoms in the community under the supervision of a psychiatric hospital or the Department of Psychiatry from a general hospital. In this collaborative network, general practitioners or nurses at CHCs are mainly responsible for providing suggestions regarding medication and daily caring, monitoring symptoms, assessing severity of illness and referring the patient to a superior hospital when they meet admission criteria. Besides proving inpatient care, psychiatric professionals at secondary or tertiary hospitals issue prescriptions for patients at outpatient clinics and provide technical guidance and training to healthcare workers from CHCs. Some better-off cities, such as Beijing, Shanghai, Shenzhen and Wuhan, have recently borrowed from Western experience and practice to incorporate the somatic healthcare-based CBR network with psychological and social services to meet different types of needs (e.g. psychological and functional needs).[18] In these cities, psychiatric rehabilitation institutes have been built in the community, mostly near or even in the CHCs, and can provide psychological and functional rehabilitation services to patients who live in the community.[19 20]

However, similar to the situation in other LMICs,[21] CBR programmes in China tend to confront various complex situations on the ground. One of the frequently occurred and critical problems is the low utilisation of CBR services: a large proportion of patients have discontinued treatments for various reasons, leaving only 37.1% of patients with SMI who

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have regularly used mental health services,[22] and a lot fewer who have positively sought social services.[20][23] This has resulted in wastes of resources, even in a context where a huge gap exists between large amount of absolute need and scarce professional resources.[23][24] Approaches such as increasing the supply-side resource allocation and promoting the demand-side to make full use of the available resources have been considered as potential means to address this problem. However, it has also been noted that the former requires long policy-making process and may not achieve effective outcomes if the demand-side lacks awareness or willingness to use CBR services. Meanwhile, the latter has been regarded with higher feasibility, and therefore, worth special attention.[24][25] This requires comprehensive understanding of the driving factors as well as the underlying pathway of how they co-influence one's tendency to use CBR services.

KNOWLEDGE GAPS TO BE ADDRESSED

Investigation on one's willingness to use healthcare services starts from the studies on one's help-seeking behaviour and public's lay understandings of illness. Compared with the large number of studies in the physical health field, fewer studies focused on investigating one's decision on the utilisation of mental health services.

Lack of comprehensive understanding of the driving factors for seeking mental health services

Of the small number of studies that examined the determinants of mental health service utilisation a large proportion looked into the predictors of peoples' intention to use mental health services. These studies have revealed three main findings.

First, decisions are influenced by a wide range of factors, amongst which some are vectors with a direction of impact. For instance, practical barriers, such as poor access of professional service, low income[26] and availability of alternative treatment approaches (such as spiritual treatment provided by traditional healers),[27][28] significantly impede one's service utilisation. Stigma, one of the widely noted attitudinal barriers, predicts a less positive view toward service utilisation even when one can feel the need for care. Due to wrong attribution of cause,[29-31] another attitudinal barrier, one may merely perceive the helpfulness of CBR services, nor the need for care. These attitudinal barriers may result in one's lack of willingness to seek professional help. Nevertheless, positive past experience,[32] high sense of perceived need[33] and social support[34] may increase the likelihood of service utilisation.

Second, besides observable factors such as educational level, there are some essential underlying factors deeply embedded in the political, socio-economic and cultural context of the society.[35][36] These factors include public and self-stigma,[29][30] subjective norm,[37] attitude from significant others,[38][39] etc. For instance, a positive relationship between public stigma and self-stigma,[40] and the positive effect of government's mass education on reducing stigma[41] has been found. Compared to individualism societies, interpersonal relatedness is stronger in collectivistic societies, and the subjective norm plays a more important role in one's decision-making towards a behaviour.[37] In Chinese societies, collectivist and family-oriented culture is greatly valued, and therefore, the decision on whether to use CBR services lies not only on the patient themselves, rather, on a consensus achieved amongst family members, especially between the patient and their family caregivers.[37][42] The decision-making becomes complex because of the number of factors involved.

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Third, factors from different layers and directions may interact with each other, and therefore, jointly affect one's decision.[43] For instance, the absence of significant relationship between symptom severity and help-seeking intention can be attributed to the negative net force between stigma and actual service need.[44]

Meanwhile, knowledge in this field is mostly based on studies conducted in high-income countries,[45 46] leaving China and its cultural or service-related factors under-investigated.[47] The limited number of studies that have focused on Chinese population were mainly carried out by scholars from Taiwan and Hong Kong and the attention has been paid to investigating the public's understanding toward mental health service utilisation rather than the perspectives of persons with SMI. On the one hand, these studies have explored the influencing mechanisms of underlying factors, such as Chinese cultural beliefs[42], subjective norm and attribution of the cause of illness,[37] on the decision-making. On the other hand, they have also revealed the social and cultural heterogeneity within the ethnic Chinese population,[28] which calls for context-driven studies subject to the status quo of mainland China. Furthermore, compared to studies investigating the barriers (e.g. stigma, lack of access to care, insufficient income, etc.), less attention has been paid to identifying the facilitators (e.g. high level of health literacy, sufficient social support, experience with high quality services, etc.),[34] especially those from the provider side. Although a positive relationship between higher quality services and stronger willingness to use CBR services has been documented,[44 48] the underlying mechanism has not been fully comprehended. In consideration of the complexity of factors, the largely under-investigated underlying mechanisms and the underrepresented population, an advanced theory-based model is needed in order to understand the decision-making process in mainland Chinese families (service users) regarding whether to use CBR services.

Lack of sophisticated models to explain the drivers of seeking mental health CBR services

Studies that employ theory-based models to systematically understand the determinants of service utilisation remain scarce in this field.[37] Some models, such as Andersen and Aday's Health Services Utilisation Model[49] and Health Belief Model,[50] have been introduced into this field to help snapshot the decision-making process. Andersen and Aday's model[51] indeed contributes to the classification of predictors by attributing them into three main groups, including 'Need' (refers to perceived need for services, such as severity, chronicity, frequency of onset, etc.), 'Predisposing factors' (age, gender, level of education, etc.) and 'Enabling factors' (insurance, income, etc.). It also outlines several underlying/macro-sociological factors, including political, geographic, environmental and economic factors. Nevertheless, it fails to delineate the interaction of factors from different layers or dimensions.[49] Various studies have also questioned its explanatory power in the mental health field by pointing out the limited proportion of variance related to service utilisation it accounts for.[52 53]

Health Belief Model conceptualises factors influencing one's help-seeking behaviour into five main constructs, including 'Perceived Benefits', 'Perceived Barriers', 'Perceived Susceptibility', 'Perceived Severity' and 'General Health Motivation'. Since introduced in the mental health field, analyses consistently suggest 'Perceived Benefits' and 'Perceived Barriers' to be direct predictors of help-seeking behaviours.[54 55] Nevertheless, this theory has also been criticised for its validity issue since several studies revealed one or more core constructs of the model (such as 'Perceived Susceptibility', 'General Health Motivation') to be

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insignificant. O'Connor et al[50] even considered this theory, as a whole, of limited explanatory power (overall explained 25% of the variance).

The validity issue of these two models calls for alternative explanations of the driving factors as well as the pathway they co-vary and interact with each other. Meanwhile, the findings on the direct impact of 'Perceived Barriers' and 'Perceived Benefits' on one's decision-making indicate Social Exchange Theory (SET), formed based on a core idea of 'the decision for a behaviour is made by weighting the potential benefits and costs', has the potential to serve as a theoretical framework to delineate one's decision-making process.

Potentially feasible model

Social Exchange Theory (SET) is a social psychological and sociological perspective that explains social change and stability as a process of negotiated exchanges between parties. The theory proposes that individuals are motivated to conduct an activity if they feel the benefits more rewarding than the cost of it.[56] To be specific, it illustrates the relationships within and between three core elements (costs, rewards and outcomes) involved in one's decision-making process: one's attitude towards an action depends on whether the motivation (accumulation of various rewards) overcomes the obstacles (accumulation of various costs); the worth of continuing the action is judged based on the outcome (actual costs paid and actual rewards gained) in the last action. In other words, this assumption conforms to the findings regarding the direct relationship between decision-making, 'Perceived Costs' and 'Perceived Benefits' in the mental health field. Additionally, the SET allows coexistence of factors from multiple layers, which leaves space for further pathway analysis of the driving factors.

To the best of our knowledge, only two studies have been retrieved using this theory to explain one's decision on mental health service utilisation: in Hamrin et al's[57] literature review, SET was adopted as the theoretical framework to guide qualitative identification of the rewards and costs that influence parents' decision-making on the utilisation of paediatric psychotropic medication services; also under the SET framework, Prizer et al[58] revealed the direct association between neurologists' perceived costs and benefits of palliative care and their reported referral practice for their patients with Parkinson's diseases. However, the inter-factor relationships have not been underexplored in either of these two studies.

Structural Equation Modelling (SEM) is a mathematically modelling technique that includes two basic models: measurement model and structural model. The former allows quantitative measurement of a latent, or in other words an underlying factor, by invoking observed variables; whereas the latter imputes the relationship between latent variables. Aided with SEM, various scholars have used SET to explore the interactive pathways (accumulation or counteraction) amongst driving factors from multiple layers to explain one's decision-making process in the business management field.[59 60]

AIM AND OBJECTIVES OF THE STUDY

Our aim with this cross-sectional, mixed methods study is to develop an effective decision-making model based on SET to systematically capture the factors influencing the family integrated choice on the use of mental health CBR services in China's context. We refer 'family integrated choice' to the final decision a family with patients with SMI reaches by considering a wide range of factors, including perspectives from other significant others

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(family members).

To achieve the aim of this study, we have two objectives:
➢ Comprehensively identify the major barriers and facilitators affecting family's integrated choice (involving patients with SMI and their family caregivers), with special attention paid to the factors rooted in the context of an LMIC and those from the provider side.
➢ Explain the complex interactive relationships amongst factors from multiple layers and dimensions to identify factors of intervention.

THEORETICAL FRAMEWORK

This study will therefore employ SET as the theoretical framework and incorporate the 'need' and 'predisposing factors' in Andersen and Aday's model to combine their strengths and to maximise its explanatory power.

In the theoretical framework (Figure 1. Decision-making model on the utilisation of CBR services among persons with SMI), factors are classified into four clusters: a) predisposing factors (including personal socio-demographic characteristics), b) motivation (including perceived needs, encouragement from significant others, etc.), c) rewards (including perceived/expected benefits such as symptom relief, self-efficacy, positive interpersonal relationship, etc.), and d) costs (including attitudinal and practice obstacles such as public and self-stigma, poor access to care, traditional Chinese beliefs about the cause of illness, etc.). Within each cluster, factors can be further classified as observable (micro-level) and underlying (miso-/macro-level factors), and the impact accumulates from fundamental factors to observable factors. For instance, one's unperceived need for CBR service is one of the observable factors in the attitudinal cluster, and it can be influenced by their wrong beliefs about the cause of illness,[28] which is an underlying factor. One's causal attribution may be affected by Asian cultural values such as mind-body holism and the latter is a macro/fundamental-level factor.[61] In other words, influenced by the mind-body holism value, compared to Caucasian, Chinese are more likely to attribute the cause of mental health problems to somatic disorders, and therefore, tend to perceive higher needs for physical care rather than psychiatric care. This may result in less likelihood of mental health service utilisation in Chinese population. Between clusters, there is a trade between rewards and costs. The net force of these four clusters of factors determines the integrated decision on whether to use CBR services. The actual rewards and costs will then affect the value of each cluster in the next decision-making process.

RESEARCH DESIGN

In consideration of the variety and complexity of the on the ground factors, this study uses a mixed methods approach (qualitative and quantitative) conducted in three stages between January 2018 and December 2020:
Stage 1: pre-identify relevant factors under the theoretical framework;
Stage 2: form the initial (theoretical) model using Interpretive Structural Modelling (ISM);
Stage 3: statistically validate the theoretical model using Structural Equation Modelling (SEM).

Stage 1: Pre-Identify Relevant Factors under the Theoretical Framework

Face-to-face semi-structured interviews will be used to capture potential factors influencing the decision-making on CBR service utilisation. Grounded Theory Methodology (GTM)

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paradigm will be employed for data collection and analysis in order to extract all information, classify/summarise potential factors and sort out the relationships amongst these factors, and therefore, preliminarily depict how these factors influence one's tendency to use CBR services.

Participant recruitment

Taking into consideration the Chinese culture that the decision on whether to use CBR services is usually a consensus achieved between the patient and their primary caregiver, patients and their family primary caregivers will both be interviewed. Health workers and social workers involved in the provision of CBR services are considered as key informants and will be interviewed.

We categorise the patients with SMI into four groups (Table 1). Three registered families in each of these four group will be selected, and the patients and their family caregivers will be interviewed. In consideration of the fact that stigma may impede the participant recruitment, we plan to choose one GP with rich experience in providing CBR services in the community as the key informant to lead the participant recruitment.

Table 1 Sampling method for semi-structured interviews

Information Source	Criteria	Subject	Interviewee
Demand Side	have not used any kind of CBR services in the past 12 months	patient	3
		caregiver	3
	have discontinuously used community-based physical rehabilitative services (covered by the National Essential Public Health Service Package) in the past 12 months	patient	3
		caregiver	3
	have regularly used community-based physical rehabilitative services (covered by the National Essential Public Health Service Package) in the past 12 months	patient	3
		caregiver	3
	have pro-actively sought various types of CBR services in the past 12 months	patient	3
		caregiver	3
Supply Side	directly involved in mental health CBR service provision	health worker	5
		social worker	4
Total			33

Regarding frontline health/social workers, this study will adopt a snowball methodology: firstly, ask the key informant to recommend two health workers and two social workers who are directly involved in the provision of CBR services as interviewees. Then, ask each interviewee to name one potential participant (healthcare/social worker) within their professional networks. Approximately 28-33 participants will be interviewed.

Data collection and analysis

The key informant will help deliver a brief introduction of the study and this 30-60 minutes' semi-structured interview to the target participants. A written invitation will be sent to all

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participants after the introduction. A written consent will be obtained before an interview is carried out.

Applying the Grounded Theory Methodology (GTM) principle, the interview will be conducted as progressive repetitive cycles. During the interview, the following themes will be covered:

➢ What are the status quo of the implementation of CBR services in urban China?
➢ Who makes decision on whether to use CBR services? How is the agreement achieved?
➢ How many motivating factors patients with SMI or their caregivers have in terms of using CBR services? How are these sources of motivation developed?
➢ For patients with good prescription/medication adherence, what are their expected/perceived rewards? Is there a difference (and what is the difference) between what they had expected and what they have received?
➢ What are the perceived and practical obstacles that impede CBR service utilisation? How and to what extent do these factors influence tendency to use CBR services?

The recording will be transcribed verbatim and all data will be managed in Nvivo V.10 Software. The development of theme follows the principle of Grounded Theory Methodology,[1] including three steps: open coding, selective coding and theoretical coding. Firstly, regarding each transcript, anything related to the aforementioned themes (normally rough information about phenomena) will be coded through line-by-line reading. In this stage, all transcripts will then be dissembled into small units, and the potential driving factors will be identified and coded. Secondly, the links (such as causal, associate or interactive relationships) between various driving factors will be preliminarily identified and factors with links will be merged into the same category. In the theoretical coding stage, relationships and links between different categories will be identified and three major clusters (motivation, rewards and costs) with factors from different layers, will be extracted.

Stage 2: Form Initial (Theoretical) Model Using Interpretive Structural Modelling (ISM)

In consideration of the complexity of the integrated model itself, Interpretive Structural Modelling (ISM), a sophisticated technique that transforms unclear, poorly articulated models into well-defined models,[2] will be employed to form the initial model.

Approximately 10 professionals from the mental health, health policy, CBR service provision fields and local governments will be invited to jointly set up the model according to Malone's[3] procedure (Figure 2. Flow diagram for developing the theoretical model). After professionals review the comprehensiveness of the factors identified in Stage 1, this computer-assisted learning process will be employed to help experts develop relationships between any two factors, categorise and prioritise each factor into different layers, and

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[1] Glaser B.G., Strauss A.L. The discovery of grounded theory: Strategies for qualitative research. Hawthorne, NY: Aldine 1967.

[2] Govindan K, Palaniappan M, Zhu Q, et al. Analysis of third party reverse logistics provider using interpretive structural modeling. *International Journal of Production Economics*, 2012; 140(1): 204-211.

[3] Malone D.W. An introduction to the application of interpretive structural modeling ISM. *Proceedings of the IEEE*, 1975; 63(3): 397-404.

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therefore, formulate the theoretical model that delineates how motivating factors, barriers and rewards influence one's tendency to use CBR services in China. Research hypotheses will be generated according to this theoretical model.

Stage 3: Statistically Validate Theoretical Model Using Structural Equation Modelling (SEM)

In Stage 3, a cross-sectional survey will be conducted to test the validity of the theoretical model developed in Stage 2. Structural Equation Modelling (SEM) will be employed to test the loadings of each hypothesised pathway in order to validate the direction and magnitude of impact. This, on the one hand, will reveal how the factors from cultural-, community-, organisational- and family-level influence family decision-makers' (either the patient or their family caregiver) tendency to use CBR services in China's context; on the other hand, help to identify any factor of intervention to facilitate evidence-based policy-making.

Participant recruitment

The study will employ a multi-stage sampling methodology to consider generalisability and feasibility issues.

The study will first select three cities (1 in Western China, 1 in Eastern China, and 1 in Central China) to enhance representativeness of findings, according the following principles:
➢ The sample sites can represent the status quo of the geographic regions they are located;
➢ In order to investigate the impact of factors such as social culture and type of service on patients'/family's decision-making, there should be variations in social culture and type of CBR services amongst the sample sites.

The sample size was calculated based on the minimum sample size required for SEM: 10 cases per variable.[4] Approximately 25-30 variables would be determined, indicating the required minimum sample population of 300 individuals (patient or caregiver). Taking account of the prevalence of SMI (at least 0.5%[5]) and the response rate (set at 50%), the expected population our sample sites cover was 120,000, which equals to the coverage of 6 communities (one normally covers 20,000 population).

Therefore, in each city, the study will select one community where the Community Health Centre (CHC) provides the highest quality of physical CBR services (high level of patient adherence) as a research site. Then, we calculate its distance (X km) to the nearest facility that provides psychiatric rehabilitation services. All CHCs with X km's distance from the nearest psychiatric rehabilitation services within the city will be identified and one will be randomly selected. The community where this selected CHC is located will be selected as another research site. In the end, a total of six communities will be selected as our research sites. Attempts will be made to include all families (registered) with a member or more suffering from SMI who live in these 6 communities. One primary decision-maker (either the patient or

[4] Nunnally JC. Psychometric theory. New York, NY: McGraw-Hill 1967.

[5] Baxter AJ, Charlson FJ, Cheng HG, et al. Prevalence of mental, neurological, and substance use disorders in China and India: A systematic analysis. *Lancet Psychiatry*, 2016; 3(9): 832-841.

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their primary caregiver) of each registered family will be invited to complete the questionnaire.

Questionnaire development

The questionnaire is developed to test the validity/explain-ability of the theoretical decision-making model. Regarding the measureable factors identified in the theoretical model, such as family burden and social support, the widely adopted Social Support Rating Scale (SSRS) and Burden Scale for Family Caregivers (BSFC) will be included; regarding those latent variables that lack sophisticated scales to measure, a systematic review will be conducted and experts will be consulted to select appropriate observable variables.

The questionnaire includes information regarding:

➢ Patients' and their family primary caregivers' sociodemographic characteristics (age, gender, education, marital status, income, who makes decision, etc.);
➢ Utilisation of CBR services (intention, type, frequency, length, etc.);
➢ Factors that may influence decision-maker's tendency (motivation, rewards, costs).

The items will be pilot tested for face validity (content and structure), and test-retest reliability (1 week apart). Items with acceptable reliability (Cronbach's $\alpha \geq 70\%$) will be included in the final survey instrument.

Data collection and analysis

The anonymised questionnaire will be distributed via a web link to Wenjuanxing (an online survey platform). Participants can complete the questionnaire using mobile phone or desktop. Reminders will be sent two weeks after the dissemination via text-message or telephone.

The analysis will be conducted in two phases:

Phase 1 will include descriptive analysis examining CBR service utilisation patterns and the variations amongst non-users, those who use CBR services occasionally, and those who use CBR services regularly.

Phase 2 will use SEM to test the theoretical decision-making model using AMOS. Analysing procedure will follow Anderson and Gerbing's[6] two-step modelling process, including measurement model and structural model. Regarding the measurement model, confirmatory factors analysis (CFA) will be employed to examine the reliability of each construct using Cronbach's alpha, composite reliability (CR) and the significance of factor loading for each item. The convergent validity and the discriminant validity will be assessed by average variance extracted (AVE), the comparison of the square root of AVEs and construct correlations, respectively. Regarding the structural model, the path coefficients of each relationship will be estimated and the goodness-to-fit will be assessed by some indices, such as chi-square test, normed-fit index (NFI) and comparative fit index (CFI).

Patient and public involvement

Patient and public involvement was not sought in the design of this study protocol nor in the

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[6] Anderson JC, Gerbing DW. Structural Equation Modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 1988; 103(3): 411-423.

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development of the research questions. Patient involvement in the recruitment and conduct of this study is described in the sections Participant recruitment and Data collection and analysis of this protocol. Participants will be asked if they want to be informed about the study findings in the recruitment stage. We will disseminate our findings (edited in lay language) to those who indicate interests in our findings via the key informant or email (if the participant is willing to provide his/her email address).

ETHICS AND DISSEMINATION

Ethical approval was granted by the Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology (No. 2017S319). Rules regarding the confidentiality and anonymity of data will be strictly followed. Prior to interview or survey, all participants will be informed that they have the right to refuse to participate and withdraw from the study at any time without questions being asked. Information regarding participants' rights will be stated on the opening page of the survey. For participants who participate in the online survey, a completed questionnaire is deemed as having provided consent. Written consents will be obtained from participants before interviews are carried out. All interview and questionnaire data will be anonymised.

We will disseminate findings to the scientific community, policymakers and healthcare providers via international and domestic peer-reviewed journals, conferences and various symposiums. The major findings of the project will be submitted to National Natural Science Foundation of China. We aim to use the decision-making model to contribute towards the cumulative knowledge of underlying fundamental factors that affect the effective utilisation of mental health CBR services in developing countries. The identified factors of intervention and the verified effective services can be valuable in assisting community-level care providers to address gaps between need and provision.

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REFERENCES

1. Steel Z, Marnane C, Iranpour C, et al. The global prevalence of common mental disorders: A systematic review and meta-analysis 1980-2013. *Int J Epidemiol* 2014;43(2):476-93. doi: 10.1093/ije/dyu038

2. Whiteford HA, Degenhardt L, Rehm J, et al. Global burden of disease attributable to mental and substance use disorders: Findings from the Global Burden of Disease Study 2010. *Lancet* 2013;382(9904):1575-86. doi: 10.1016/s0140-6736(13)61611-6

3. Foldemo A, Gullberg M, Ek AC, et al. Quality of life and burden in parents of outpatients with schizophrenia. *Soc Psychiatry Psychiatr Epidemiol* 2005;40(2):133-38. doi: 10.1007/s00127-005-0853-x

4. Almeida OP, Hankey GJ, Yeap BB, et al. Mortality among people with severe mental disorders who reach old age: A longitudinal study of a community-representative sample of 37892 men. *PLoS One* 2014;9(10) doi: 10.1371/journal.pone.0111882

5. World Health Organization. Mental Health Atlas 2011. Geneva: World Health Organization 2011.

6. World Health Organization. Mental Health Atlas 2014. Geneva: World Health Organization 2015.

7. World Health Organization. Mental Health Action Plan 2013–2020. Geneva: World Health Organization 2013.

8. World Health Organization. mhGAP: Mental Health Gap Action Programme: Scaling up care for mental, neurological and substance use disorders. Geneva: World Health Organization 2008.

9. Chisholm D, Flisher AJ, Lund C, et al. Global mental health 6 - Scale up services for mental disorders: A call for action. *Lancet* 2007;370(9594):1241-52. doi: 10.1016/s0140-6736(07)61242-2

10. Chatterjee S, Patel V, Chatterjee A, et al. Evaluation of a community-based rehabilitation model for chronic schizophrenia in rural India. *Br J Psychiatry* 2003;182:57-62. doi: 10.1192/bjp.182.1.57

11. Jacob KS, Sharan P, Mirza J, et al. Global Mental Health 4 - Mental health systems in countries: where are we now? *Lancet* 2007;370(9592):1061-77. doi: 10.1016/s0140-6736(07)61241-0

12. Liu S, Page A. Reforming mental health in China and India. *Lancet* 2016;388(10042):314-16. doi: 10.1016/s0140-6736(16)30373-7

13. Li KQ, Sun XL, Zhang Y, et al. Mental health care in China: Review on the delivery and policy issues in 1949-2009 and the outlook for the next decade. *Acta Neuropsychiatrica* 2013;26(3):134-45. doi: 10.1017/neu.2013.40

14. State Council of People's Republic of China. National Mental Health Work Plan (2015–2020). Beijing: General Office of the State Council, 2015.

15. National Health and Family Planning Commission. Work specification on management and treatment of severe mental illness (In Chinese). Beijing: National Health and Family Planning Commission, 2012.

16. Ministry of Health, Publicity Department of the CPC Central Committee, National Development and Reform Commission, et al. National Mental Healthcare System Guidelines. Beijing: Chinese Center for Disease Control and Prevention, 2008.

17. Standing Committee of the National People's Congress. National Mental Health Law Beijing: Standing Committee of the National People's Congress, 2012.

18. Zheng H, Zhou J, Fu Z. Study on service situation and development strategies of community mental health services for schizophrenia. *Chinese Primary Health Care* 2012;26(5):7-9.

13

19. Yang Q. Study on community rehabilitation management of patients with mental disorders. Nanchang University, 2013.

20. Li H. Study on management of Community-based Rehabilitation Model for mental disabled people - taking Shanghai Sunshine Soul Park as example. Fudan University, 2013.

21. Jacob KS. Community care for people with mental disorders in developing countries - Problems and possible solutions. *Br J Psychiatry* 2001;178:296-98. doi: 10.1192/bjp.178.4.296

22. Kang H, Guan L, Wang X, et al. Economic condition basic medical insurance and medication among patients with severe mental illness in 31 demonstration cities for '686 program' implementation. *Chinese Journal of Public Health* 2015;31(8):997-1001. doi: 10.11847/zgggws2015-31-08-06

23. Li L. Community mental healthcare system awaits further development. *China Hospital CEO* 2012(8):62-63.

24. Phillips MR. Can China's new mental health law substantially reduce the burden of illness attributable to mental disorders? *Lancet* 2013;381(9882):1964-66. doi: 10.1016/s0140-6736(13)61177-0

25. Prince M, Patel V, Saxena S, et al. Global mental health 1 - No health without mental health. *Lancet* 2007;370(9590):859-77. doi: 10.1016/s0140-6736(07)61238-0

26. Wang PS, Aguilargaxiola S, Alonso J, et al. Worldwide use of mental health services for anxiety, mood, and substance disorders: Results from 17 countries in the WHO World Mental Health (WMH) Surveys. *Lancet* 2007;370(9590):841. doi: 10.1016/S0140-6736(07)61414-7

27. Shaw I, Middleton H. Approaches to "mental health" in low-income countries: A case study of Uganda. *Mental Health Review Journal* 2013;18(4):204-13. doi: 10.1108/MHRJ-07-2013-0025

28. Wong DFK, Li JCM. Cultural influence on Shanghai Chinese people's help-seeking for mental health problems: Implications for social work practice. *Br J Soc Work* 2014;44(4):868-85. doi: 10.1093/bjsw/bcs180

29. Tsai YF, Ku YC. Self-care symptom management strategies for auditory hallucinations among inpatients with schizophrenia at a Veterans' Hospital in Taiwan. *Arch Psychiatr Nurs* 2005;19(4):194-99. doi: 10.1016/j.apnu.2005.05.005

30. Mackenzie CS, Gekoski WL, Knox VJ. Age, gender, and the underutilization of mental health services: The influence of help-seeking attitudes. *Aging Ment Health* 2006;10(6):574-82. doi: 10.1080/13607860600641200

31. Clement S, Schauman O, Graham T, et al. What is the impact of mental health-related stigma on help-seeking? A systematic review of quantitative and qualitative studies. *Psychol Med* 2015;45(1):11-27. doi: 10.1017/s0033291714000129

32. Coleman SJ, Stevelink SAM, Hatch SL, et al. Stigma-related barriers and facilitators to help seeking for mental health issues in the armed forces: a systematic review and thematic synthesis of qualitative literature. *Psychol Med* 2017;47(11):1880-92. doi: 10.1017/s0033291717000356

33. Jorm AF. Mental health literacy empowering the community to take action for better mental health. *Am Psychol* 2012;67(3):231-43. doi: 10.1037/a0025957

34. Gulliver A, Griffiths KM, Christensen H. Perceived barriers and facilitators to mental health help-seeking in young people: a systematic review. *BMC Psychiatry* 2010;10 doi: 10.1186/1471-244x-10-113

14

35. Mohamed S, Rosenheck R, He H, et al. Insight and attitudes towards medication among inpatients with chronic schizophrenia in the US and China. *Social Psychiatry and Psychiatric Epidemiology* 2014;49(7):1063-70.

36. Patel V, Xiao S, Chen H, et al. The magnitude of and health system responses to the mental health treatment gap in adults in India and China. *Lancet* 2016;388(10063):3074-84. doi: 10.1016/s0140-6736(16)00160-4

37. Mo PKH, Mak WWS. Help-seeking for mental health problems among Chinese: The application and extension of the Theory of Planned Behavior. *Soc Psychiatry Psychiatr Epidemiol* 2009;44(8):675-84. doi: 10.1007/s00127-008-0484-0

38. Boydell KM, Gladstone BM, Volpe T. Understanding help seeking delay in the prodrome to first episode psychosis: A secondary analysis of the perspectives of young people. *Psychiatric Rehabilitation Journal* 2006;30(1):54-60. doi: 10.2975/30.2006.54.60

39. Vogel DL, Wade NG, Wester SR, et al. Seeking help from a mental health professional: The influence of one's social network. *J Clin Psychol* 2007;63(3):233-45. doi: 10.1002/jclp.20345

40. Evans-Lacko S, Brohan E, Mojtabai R, et al. Association between public views of mental illness and self-stigma among individuals with mental illness in 14 European countries. *Psychol Med* 2012;42(8):1741-52. doi: 10.1017/s0033291711002558

41. Corrigan PW, Morris SB, Michaels PJ, et al. Challenging the Public Stigma of Mental Illness: A Meta-Analysis of Outcome Studies. *Psychiatr Serv* 2012;63(10):963-73. doi: 10.1176/appi.ps.005292011

42. Tieu Y, Konnert CA. Mental health help-seeking attitudes, utilization, and intentions among older Chinese immigrants in Canada. *Aging Ment Health* 2014;18(2):140-47. doi: 10.1080/13607863.2013.814104

43. Chen HD, Fang XY, Liu CY, et al. Associations among the number of mental health problems, stigma, and seeking help from psychological services: A path analysis model among Chinese adolescents. *Children and Youth Services Review* 2014;44:356-62. doi: 10.1016/j.childyouth.2014.07.003

44. Chin WY, Chan KTY, Lam CLK, et al. Help-seeking intentions and subsequent 12-month mental health service use in Chinese primary care patients with depressive symptoms. *BMJ Open* 2015;5(1) doi: 10.1136/bmjopen-2014-006730

45. Razzouk D, Sharan P, Gallo C, et al. Scarcity and inequity of mental health research resources in low-and-middle income countries: A global survey. *Health Policy* 2010;94(3):211-20. doi: 10.1016/j.healthpol.2009.09.009

46. Baingana F, al'Absi M, Becker AE, et al. Global research challenges and opportunities for mental health and substance-use disorders. *Nature* 2015;527(7578):S172-S77. doi: 10.1038/nature16032

47. Yu Y, Liu ZW, Hu M, et al. Mental health help-seeking intentions and preferences of rural Chinese adults. *PLoS One* 2015;10(11) doi: 10.1371/journal.pone.0141889

48. Tang Y, Zheng H. Evaluation of patients' families on social workers involved in the community services of severe psychoses in Shanghai. *Med Soc (Berkeley)* 2016;29(1):47-49. doi: 13723 /j.yxysh.2016.01.015

49. Young JT. Illness behaviour: A selective review and synthesis. *Sociol Health Illn* 2004;26(1):1-31. doi: 10.1111/j.1467-9566.2004.00376.x

50. O'Connor PJ, Martin B, Weeks CS, et al. Factors that influence young people's mental health

15

help-seeking behaviour: A study based on the Health Belief Model. *J Adv Nurs* 2014;70(11):2577-87. doi: 10.1111/jan.12423

51. Andersen R, Aday LA. Access to medical care in the U.S.: realized and potential. *Med Care* 1978;16(7):533-46. doi: 10.1097/00005650-197807000-00001

52. Roh S, Burnette CE, Lee KH, et al. Predicting help-seeking attitudes toward mental health services among American Indian older adults: Is Andersen's Behavioral Model a good fit? *J Appl Gerontol* 2017;36(1):94. doi: 10.1177/0733464814558875

53. Jang Y, Chiriboga DA, Okazaki S. Attitudes toward mental health services: Age-group differences in Korean American adults. *Aging Ment Health* 2009;13(1):127-34. doi: 10.1080/13607860802591070

54. Henshaw EJ, Freedman-Doan CR. Conceptualizing Mental Health Care Utilization Using the Health Belief Model. *Clin Psychol-Sci Pract* 2009;16(4):420-39. doi: 10.1111/j.1468-2850.2009.01181.x

55. Castonguay J, Filer CR, Pitts MJ. Seeking Help for Depression: Applying the Health Belief Model to Illness Narratives. *South Commun J* 2016;81(5):289-303. doi: 10.1080/1041794x.2016.1165729

56. Homans GC. Social behavior as exchange. *American Journal of Sociology* 1958;63(6):597-606.

57. Hamrin V, McCarthy EM, Tyson V. Pediatric psychotropic medication initiation and adherence: A literature review based on social exchange theory. *J Child Adolesc Psychiatr Nurs* 2010;23(3):151-72. doi: 10.1111/j.1744-6171.2010.00237.x

58. Prizer LP, Gay JL, Perkins MM, et al. Using social exchange theory to understand non-terminal palliative care referral practices for Parkinson's disease patients. *Palliat Med* 2017;31(9):861-67. doi: 10.1177/0269216317701383

59. Aryee S, Walumbwa FO, Mondejar R, et al. Accounting for the influence of overall justice on job performance: Integrating Self-determination and and Social Exchange Theories. *J Manage Stud* 2015;52(2):231-52. doi: 10.1111/joms.12067

60. Guillet E, Sarrazin P, Carpenter PJ, et al. Predicting persistence or withdrawal in female handballers with Social Exchange Theory. *International Journal of Psychology* 2002;37(2):92-104. doi: 10.1080/00207590143000243

61. Wong YJ, Tran KK, Kim SH, et al. Asian Americans' Lay Beliefs About Depression and Professional Help Seeking. *J Clin Psychol* 2010;66(3):317-32. doi: 10.1002/jclp.20653

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FIGURES
1. Figure 1. Decision-making model on the utilisation of CBR services among persons with SMI
2. Figure 2. Flow diagram for developing the theoretical model

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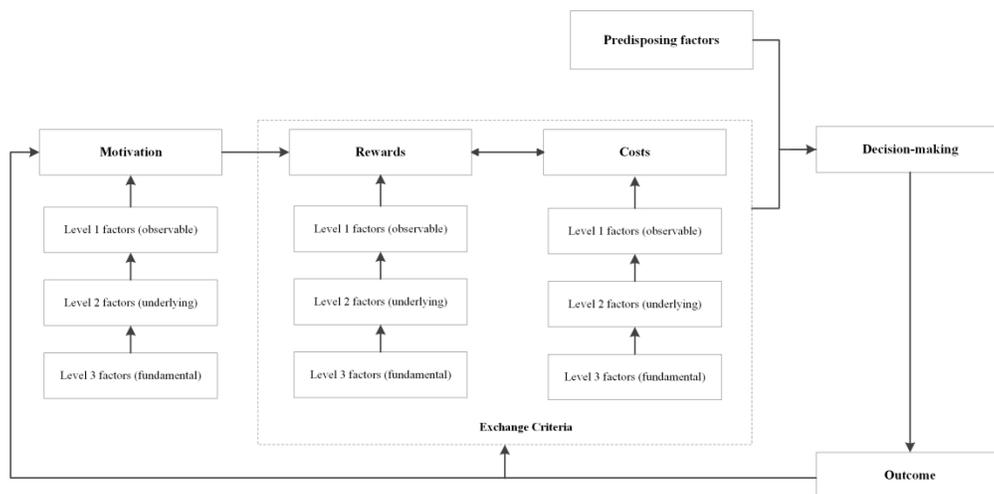Figure 1 Decision-making model on the utilisation of CBR services among persons with SMI

236x115mm (300 x 300 DPI)

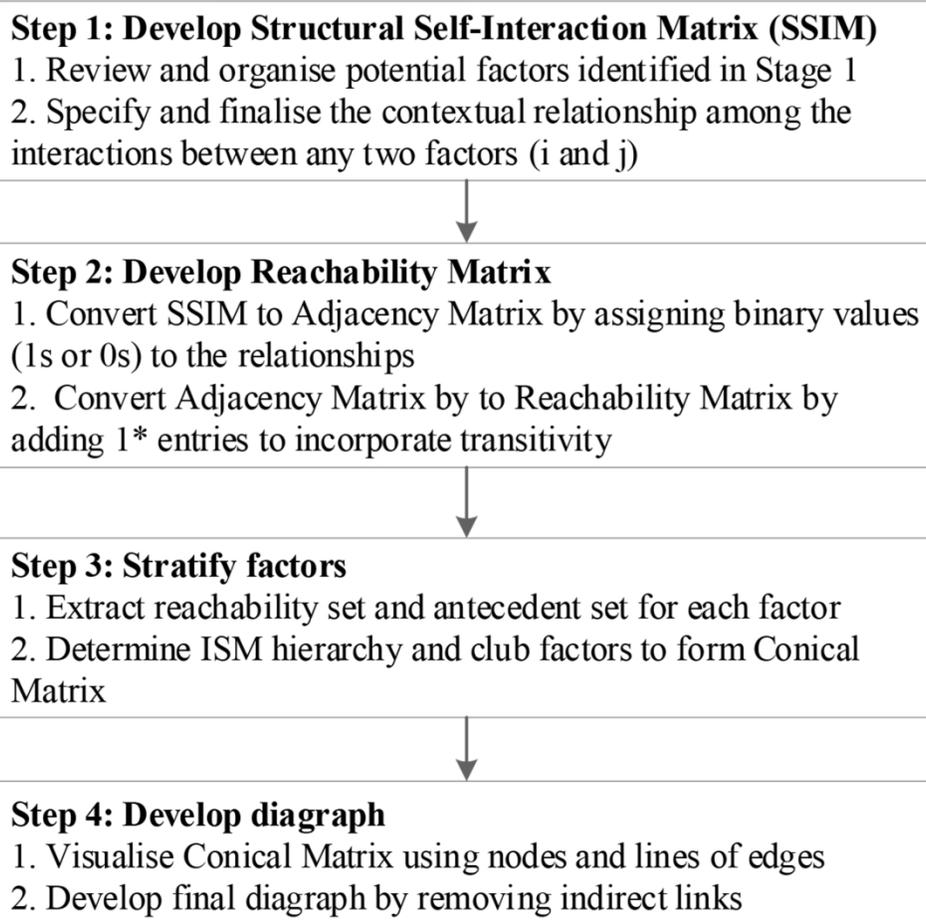**Step 1: Develop Structural Self-Interaction Matrix (SSIM)**
1. Review and organise potential factors identified in Stage 1
2. Specify and finalise the contextual relationship among the interactions between any two factors (i and j)

Step 2: Develop Reachability Matrix
1. Convert SSIM to Adjacency Matrix by assigning binary values (1s or 0s) to the relationships
2. Convert Adjacency Matrix by to Reachability Matrix by adding 1* entries to incorporate transitivity

Step 3: Stratify factors
1. Extract reachability set and antecedent set for each factor
2. Determine ISM hierarchy and club factors to form Conical Matrix

Step 4: Develop diagraph
1. Visualise Conical Matrix using nodes and lines of edges
2. Develop final diagraph by removing indirect links

Figure 2. Flow diagram for developing the theoretical model (Mono-image)

173x168mm (300 x 300 DPI)

Integrated Decision-making model for Community-based Rehabilitation service utilisation among persons with Severe Mental Illness in China: Protocol for a cross-sectional mixed-methods study

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Integrated Decision-making model for Community-based Rehabilitation service utilisation among persons with Severe Mental Illness in China: Protocol for a cross-sectional mixed-methods study

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Word Count: 4,982

ABSTRACT

Introduction A common problem low- and middle- income countries (LMICs) face is the scarcity of Community-based Rehabilitation (CBR) resources and low service utilisation amongst persons with Severe Mental Illness (SMI). Despite this problem, factors and pathways followed influencing one's decision on service utilisation in China have not been fully comprehended. This study aims to develop a theory-based model that systematically describes the integrated decision-making process of mental health CBR utilisation amongst persons with SMI in China.

Methods/Design This cross-sectional mixed-methods study involves three main stages and it is expected to last three years from January 2018 to December 2020. In Stage 1, Social Exchange Theory is deployed as an analytical framework, in order to comprehensively capture factors associated with tendency to use CBR services in China by using semi-structured interview methodology involving patients with SMI, their primary caregivers and CBR service providers. In Stage 2, Interpretive Structural Modelling will be applied to analyse the relationships between factors in different dimensions, at different levels, and with different levels of impact. Stage 3 involves a multi-region survey amongst at least 300 family decision-makers (either the patient or their caregivers) at six communities in three cities to statistically validate the initial model derived in Stage 2 using a further Structural Equation Modelling.

Ethics and dissemination Ethical approval was granted by the Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology (No. 2017S319). All interviewees will be provided with written information about the study, and a signed consent will be retrieved prior to the interview. Rules regarding the confidentiality and anonymity of data will be strictly followed. The findings of this study will be disseminated via international and domestic peer-reviewed journals, reports, conference presentations, and symposium discussions. Reports will be submitted to National Natural Science Foundation of China.

KEY WORDS Mental Health, Community-based Rehabilitation, Service Utilisation

STRENGTHS AND LIMITATIONS OF THIS STUDY

1. This study is one of the few studies that tend to provide a systematic understanding of the determinants and decision-making process of the utilisation of mental health CBR services amongst patients with severe mental illnesses in Low- and Middle- Income Countries.

2. This study is designed based on the Social Exchange Theory (SET), a model widely used in the social science field, in order to systematically identify the driving factors from various layers and clusters.

3. This study employs Structural Equation Modelling (SEM) to quantitatively determine the impact the underlying factors (such as stigma, subjective norm, Chinese cultural value and trust between the provider and the user) pose on CBR service utilisation.

4. Given the diversity of healthcare systems, caution must be taken in applying findings to rural China or other LMICs.

5. Although the study aims to investigate associations, identification of causal relationships will of course have to await further investigation and validation using methods such as a Randomised Control Trial.

INTRODUCTION

The past few decades have witnessed a sharp increase in the global challenge posed by mental

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illness. The threefold challenge involves: the large and still increasing absolute need for mental health care,[1 2] especially for people with Severe Mental Illnesses (SMI);[3 4] the absolute lack of professional resources; and significant variation in the distribution of the limited professional resources between low- and high- income countries.[5 6] This, therefore, leaves nearly 75%-85% of people in low- and middle- income countries (LMICs) with SMI untreated,[7] bringing about high caregiving burden to their family and the society. In response to such critical situation, programmes, such as mental health Global Action Programme (mhGAP) and Movement for Global Mental Health, have been initiated with an aim to scale up the coverage of mental health care in LMICs.[8 9] The Community-based Rehabilitation (CBR) model has been repeatedly recommended as a valid means to provide affordable, accessible, and effective services to meet a wide range of needs of persons with chronic SMI.[10 11]

China, a middle-income country accounting for 18% of the world population and 17% of the global disease burden of psychiatric-related illness,[12] is also encountering a significant gap between need and supply in mental health services, and therefore, the potential disrupt and burden of the untreated SMI patients pose to their family and community.[13] In accordance with the World Health Organisation (WHO) recommendations, the Chinese government has issued several national-level policies to establish a nationwide mental health CBR network for patients with SMI since 2008.[14-16] Since 2009, community-based physical rehabilitative services, including follow-ups, health education and physical examination, have been part of the National Essential Public Health Service Package and are regularly provided to every patient with SMI by Community Healthcare Centres (CHCs) free of charge. The National Mental Health Law,[17] launched in 2013, provides further instructions to build a closer hospital-CHC collaboration to deliver better mental healthcare services.

Meanwhile, most CHCs in China are providing the aforementioned physical rehabilitative services to patients with stable or no symptoms in the community under the supervision of a psychiatric hospital or the Department of Psychiatry from a general hospital. In this collaborative network, general practitioners or nurses at CHCs are mainly responsible for providing suggestions regarding medication and daily caring, monitoring symptoms, assessing severity of illness and referring the patient to a superior hospital when they meet admission criteria. Besides providing inpatient care, psychiatric professionals at secondary or tertiary hospitals issue prescriptions for patients at outpatient clinics and provide technical guidance and training to healthcare workers from CHCs. Some better-off cities, such as Beijing, Shanghai, Shenzhen and Wuhan, have recently borrowed from Western experience and practice to incorporate the somatic healthcare-based CBR network with psychological and social services to meet different types of needs (e.g. psychological and functional needs).[18] In these cities, psychiatric rehabilitation institutes have been built in the community, mostly near or even in the CHCs, and can provide psychological and functional rehabilitation services to patients who live in the community.[19 20]

However, similar to the situation in other LMICs,[21] CBR programmes in China tend to confront various complex situations on the ground. One of the frequently occurred and critical problems is the low utilisation of CBR services: a large proportion of patients have discontinued treatments for various reasons, leaving only 37.1% of patients with SMI who

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have regularly used mental health services,[22] and a lot fewer who have positively sought social services.[20 23] This has resulted in waste of resources, even in a context where a huge gap exists between large amount of absolute need and scarce professional resources.[23 24] Approaches such as increasing the supply-side resource allocation and promoting the demand-side to make full use of the available resources have been considered as potential means to address this problem. However, it has also been noted that the former requires long policy-making process and may not achieve effective outcomes if the demand-side lacks awareness or willingness to use CBR services. Meanwhile, the latter has been regarded with higher feasibility, and therefore, worth special attention.[24 25] This requires comprehensive understanding of how the driving factors and the underlying pathways co-influence one's tendency to use CBR services.

KNOWLEDGE GAPS TO BE ADDRESSED

Investigation of one's willingness to use healthcare services starts from the investigation of one's help-seeking behaviour and general understanding of mental illness. Compared to the large number of studies in the physical health field, fewer studies focused on investigating one's decision on the utilisation of mental health services.

Lack of comprehensive understanding of the driving factors for seeking mental health services

Of the small number of studies that examined the determinants of mental health service utilisation a large proportion looked into the predictors of peoples' intention to use mental health services. These studies have revealed three main findings.

First, decisions are influenced by a wide range of factors, amongst which some are "forces" with a direction of impact. For instance, structural barriers, such as poor access to professional service and low income[26] significantly impede one's service utilisation. Due to wrong attribution of cause or beliefs about mental illness (e.g. some people with Asian worldviews tend to attribute the cause to personal failure or interpersonal problems; whereas some Chinese are more likely to attribute the cause of mental health problems to somatic disorders, rather than psychological/psychiatric problems), one may merely perceive the helpfulness of psychiatric treatments.[27 28] Self-stigma refers to impaired self-esteem or feelings of shame when persons with mental illness internalise stigmatising attitudes, such as prejudice and discrimination, held by the public ("public stigma").[29] This feelings predict a less positive view toward service utilisation although one can feel the need for care.[30] Nevertheless, positive past experience,[29] high sense of perceived need[31] and social support[32] may increase the likelihood of service utilisation.

Second, besides observable factors such as educational level, there are some essential underlying factors deeply embedded in the political, socio-economic and cultural context of the Chinese society.[33 34] These factors include public and self-stigma,[35 36] subjective norm,[37] attitude from significant others,[38 39] etc. For instance, a positive relationship between public stigma and self-stigma,[40] and the positive effect of government's mass education on reducing stigma[41] has been found. Compared to individualism societies, interpersonal relatedness is stronger in collectivistic societies, and the subjective norm plays a more important role in one's decision-making towards a behaviour.[37] In Chinese societies, collectivist and family-oriented culture is greatly valued, and therefore, the decision on whether to use CBR services lies not only on the patient themselves, rather, on a consensus achieved amongst

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family members, especially between the patient and their family caregivers.[37 42] The decision-making becomes complex because of the number of factors involved.

Third, factors from different layers and directions may interact with each other, and therefore, jointly affect one's decision.[43] For instance, the absence of significant relationship between symptom severity and help-seeking intention can be attributed to the negative net force between stigma and actual service need.[44]

Meanwhile, knowledge in this field is mostly based on studies conducted in high-income countries,[45 46] leaving China and its cultural or service-related factors under-investigated.[47] The limited number of studies that have focused on Chinese population were mainly carried out by scholars from Taiwan and Hong Kong and the attention has been paid to investigating the public's understanding toward mental health service utilisation rather than the perspectives of persons with SMI. On the one hand, these studies have explored the influencing mechanisms of underlying factors, such as Chinese cultural beliefs[42], subjective norm and attribution of the cause of illness,[37] on the decision-making process. On the other hand, they have also revealed the social and cultural heterogeneity within the ethnic Chinese population,[48] which calls for context-driven studies considering the culturally-rooted determinants of mental health service utilisation in mainland China. Furthermore, compared to the studies investigating the barriers (e.g. stigma, lack of access to care, insufficient income, etc.), less attention has been paid to identifying the facilitators (e.g. high level of health literacy, sufficient social support, etc.),[32] especially those from the provider side (e.g. media-based or other user-friendly service delivery strategies,[49] high quality services, trust in the provider,[32] etc.). Although a positive relationship between higher quality services and stronger willingness to use CBR services has been documented,[44 50] the underlying mechanism has not been fully comprehended. In consideration of the complexity of factors, the largely under-investigated underlying mechanisms and the underrepresented population, an advanced theory-based model is needed in order to understand the decision-making process in mainland Chinese families (service users) regarding whether to use CBR services.

Lack of sophisticated models to explain the drivers of seeking mental health CBR services

Studies that employ theory-based models to systematically understand the determinants of service utilisation remain scarce in this field.[37] Some models, such as Andersen and Aday's Health Services Utilisation Model[51] and Health Belief Model,[52] have been introduced into this field to offer a good overview the decision-making process. Andersen and Aday's model[53] indeed contributes to the classification of predictors by classifying them into three main groups, including 'Need' (refers to perceived need for services, such as severity, chronicity, frequency of onset, etc.), 'Predisposing factors' (age, gender, level of education, etc.) and 'Enabling factors' (insurance, income, etc.). It also outlines several underlying/macro-sociological factors, including political (health policy, etc.), geographic (physician population ratio, etc.) and environmental (population health indices) factors.[53 54] Nevertheless, it fails to delineate the interaction of factors from different layers or dimensions.[51 55] Various studies have also questioned its explanatory power in the mental health field by pointing out the limited proportion of variance related to service utilisation it accounts for.[56 57]

Health Belief Model conceptualises factors influencing one's help-seeking behaviour into five

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main constructs, including 'Perceived Benefits', 'Perceived Barriers', 'Perceived Susceptibility', 'Perceived Severity' and 'General Health Motivation'. Since introduced in the mental health field, analyses consistently suggest 'Perceived Benefits' and 'Perceived Barriers' to be direct predictors of help-seeking behaviours.[58 59] Nevertheless, this theory has also been criticised for lack of validity since several studies revealed one or more core constructs of the model (such as 'Perceived Susceptibility', 'General Health Motivation') to be not significant. O'Connor et al[52] even considered this theory, as a whole, of limited explanatory power (as it overall explains 25% of the variance).

Due to the lack of validity of these two models, an alternative model is needed to better categorise the influencing factors, and therefore, clearly explain the pathways these factors influence each other.

Potentially feasible model

Social Exchange Theory (SET) is a social psychological and sociological perspective that explains social change and stability as a process of negotiated exchanges between parties. The theory proposes that individuals are motivated to conduct an activity if they feel the benefits more rewarding than the cost of it.[60] To be specific, it illustrates the relationships within and between three core elements (costs, rewards and outcomes) involved in one's decision-making process: one's attitude towards an action depends on whether the motivation (accumulation of various rewards) overcomes the obstacles (accumulation of various costs); the worth of continuing the action is judged based on the outcome (actual costs paid and actual rewards gained) in the last action. In other words, this assumption conforms to previous findings regarding the direct relationship between decision-making, 'Perceived Costs' and 'Perceived Benefits' in the mental health field.[58 59] Additionally, the SET allows coexistence of factors from multiple layers, which leaves space for further pathway analysis of the driving factors. In this case, we regard SET with potential to serve as a theoretical framework to delineate one's decision-making process.

To the best of our knowledge, only two studies have been retrieved using this theory to explain one's decision on mental health service utilisation: in Hamrin et al's[61] literature review, the SET was adopted as the theoretical framework to guide qualitative identification of the rewards and costs that influence parents' decision-making on the utilisation of paediatric psychotropic medication services; also under the SET framework, Prizer et al[62] revealed the direct association between neurologists' perceived costs and benefits of palliative care and their reported referral practice for their patients with Parkinson's diseases. However, the inter-factor relationships have been underexplored in either of these two studies.

Structural Equation Modelling (SEM) is a mathematically modelling technique that includes two basic models: measurement model and structural model. The former allows quantitative measurement of a latent, or in other words an underlying factor, by invoking observed variables; whereas the latter imputes the relationship between latent variables. Aided with SEM, various scholars have used the SET to explore the interactive pathways (accumulation or counteraction) amongst driving factors from multiple layers to explain one's decision-making process in the business management field.[63 64]

AIM AND OBJECTIVES OF THE STUDY

Our aim with this cross-sectional, mixed methods study is to develop an effective

decision-making model based on the SET to systematically capture the factors influencing the family integrated choice on the use of mental health CBR services in China's context. We refer 'family integrated choice' to the final decision a family with patients with SMI reaches by considering a wide range of factors, including perspectives from other significant others (family members).

To achieve the aim of this study, we have two objectives:

➢ Comprehensively identify the major barriers and facilitators affecting family's integrated choice (involving patients with SMI and their family caregivers), with special attention paid to the factors rooted in the context of an LMIC and those from the provider side.

➢ Explain the complex interactive relationships amongst factors from multiple layers and dimensions to identify factors of intervention.

THEORETICAL FRAMEWORK

This study will therefore employ the SET as the theoretical framework and incorporate the 'need' and 'predisposing factors' in Andersen and Aday's model to combine their strengths and to maximise its explanatory power.

In the theoretical framework (Figure 1. Decision-making model on the utilisation of CBR services among persons with SMI), factors are classified into four clusters: a) predisposing factors (including personal socio-demographic characteristics), b) motivation (including perceived needs, encouragement from significant others, etc.), c) rewards (including perceived/expected benefits such as symptom relief, self-efficacy, positive interpersonal relationship, etc.), and d) costs (including attitudinal and structural obstacles such as self-stigma, poor access to care, traditional Chinese beliefs about the cause of illness, etc.). Within each cluster, factors can be further classified as observable (micro-level) and underlying (miso-/macro-level factors), and the impact accumulates from fundamental factors to observable factors. For instance, one's unperceived need for CBR service is one of the observable factors in the motivation cluster, and it can be influenced by their wrong beliefs about the cause of illness,[48] which is an underlying factor. One's causal attribution may be affected by Asian cultural values such as mind-body holism and the latter is a macro/fundamental-level factor.[27] In other words, influenced by the mind-body holism value, compared to Caucasian, Chinese are more likely to attribute the cause of mental health problems to somatic disorders, and therefore, tend to perceive higher needs for physical care rather than psychiatric care. This may result in less likelihood of mental health service utilisation in Chinese population. Between clusters, there is a trade between rewards and costs. The net force of these four clusters of factors determines the integrated decision on whether to use CBR services. The actual rewards and costs will then affect the value of each cluster in the next decision-making process.

RESEARCH DESIGN

In consideration of the variety and complexity of the on the ground factors, this study uses a mixed methods approach (qualitative and quantitative) conducted in three stages between January 2018 and December 2020:

Stage 1: pre-identify relevant factors under the theoretical framework;

Stage 2: form the initial (theoretical) model using Interpretive Structural Modelling (ISM);

Stage 3: statistically validate the theoretical model using Structural Equation Modelling (SEM).

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Stage 1: Pre-Identify Relevant Factors under the Theoretical Framework

Face-to-face semi-structured interviews will be used to capture potential factors influencing the decision-making on CBR service utilisation. The Grounded Theory Methodology (GTM) paradigm will be employed for data collection and analysis in order to extract all information, classify/summarise potential factors and sort out the relationships amongst these factors, and therefore, preliminarily depict how these factors influence one's tendency to use CBR services.

Participant recruitment

Taking into consideration the Chinese culture that the decision on whether to use CBR services is usually a consensus achieved between the patient and their primary caregiver, patients and their family primary caregivers will both be interviewed. Health workers and social workers involved in the provision of CBR services are considered as key informants and will be interviewed.

We categorise the patients with SMI into four groups (Table 1). Three registered families in each of these four group will be selected, and the patients and their family caregivers will be interviewed. In consideration of the fact that stigma may impede the participant recruitment, we plan to choose one GP with rich experience in providing CBR services in the community as the key informant to lead the participant recruitment.

Table 1 Sampling method for semi-structured interviews

Information Source	Criteria	Subject	Interviewee
Demand Side	have not used any kind of CBR services in the past 12 months	patient	3
		caregiver	3
	have discontinuously used community-based physical rehabilitative services (covered by the National Essential Public Health Service Package) in the past 12 months	patient	3
		caregiver	3
	have regularly used community-based physical rehabilitative services (covered by the National Essential Public Health Service Package) in the past 12 months	patient	3
		caregiver	3
	have pro-actively sought various types of CBR services in the past 12 months	patient	3
		caregiver	3
Supply Side	directly involved in mental health CBR service provision	health worker	5
		social worker	4
Total			33

Regarding frontline health/social workers, this study will adopt a snowball methodology: firstly, ask the key informant to recommend two health workers and two social workers who are directly involved in the provision of CBR services as interviewees. Then, ask each interviewee to name one potential participant (healthcare/social worker) within their professional networks. Approximately 28-33 participants will be interviewed.

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Data collection and analysis

The key informant will help deliver a brief introduction of the study and this 30-60 minutes' semi-structured interview to the target participants. A written invitation will be sent to all participants after the introduction. A written consent will be obtained before an interview is carried out.

Applying the Grounded Theory Methodology (GTM) principle, the interview will be conducted as progressive repetitive cycles. During the interview, the following themes will be covered:

➢ What are the status quo of the implementation of CBR services in urban China?
➢ Who makes decision on whether to use CBR services? How is the agreement achieved?
➢ How many motivating factors patients with SMI or their caregivers have in terms of using CBR services? How are these sources of motivation developed?
➢ For patients with good prescription/medication adherence, what are their expected/perceived rewards? Is there a difference (and what is the difference) between what they had expected and what they have received?
➢ What are the perceived and practical obstacles that impede CBR service utilisation? How and to what extent do these factors influence tendency to use CBR services?

The recording will be transcribed verbatim and all data will be managed in Nvivo V.10 Software. The development of theme follows the principle of Grounded Theory Methodology,[1] including three steps: open coding, selective coding and theoretical coding. Firstly, regarding each transcript, anything related to the aforementioned themes (normally rough information about phenomena) will be coded through line-by-line reading. In this stage, all transcripts will then be dissembled into small units, and the potential driving factors will be identified and coded. Secondly, the links (such as causal, associate or interactive relationships) between various driving factors will be preliminarily identified and factors with links will be merged into the same category. In the theoretical coding stage, relationships and links between different categories will be identified and three major clusters (motivation, rewards and costs) with factors from different layers, will be extracted.

Stage 2: Form Initial (Theoretical) Model Using Interpretive Structural Modelling (ISM)

In consideration of the complexity of the integrated model itself, the Interpretive Structural Modelling (ISM), a sophisticated technique that transforms unclear, poorly articulated models into well-defined models,[2] will be employed to form the initial model.

Approximately 10 professionals from the mental health, health policy, CBR service provision fields and local governments will be invited to jointly set up the model according to

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[1] Glaser B.G., Strauss A.L. The discovery of grounded theory: Strategies for qualitative research. Hawthorne, NY: Aldine 1967.

[2] Govindan K, Palaniappan M, Zhu Q, et al. Analysis of third party reverse logistics provider using interpretive structural modeling. *International Journal of Production Economics*, 2012; 140(1): 204-211.

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Malone's[3] procedure (Figure 2. Flow diagram for developing the theoretical model). After professionals review the comprehensiveness of the factors identified in Stage 1, this computer-assisted learning process will be employed to help experts develop relationships between any two factors, categorise and prioritise each factor into different layers, and therefore, formulate the theoretical model that delineates how motivating factors, costs and rewards influence one's tendency to use CBR services in China. Research hypotheses will be generated accordingly.

Stage 3: Statistically Validate Theoretical Model Using Structural Equation Modelling (SEM)

In Stage 3, a cross-sectional survey will be conducted to test the validity of the theoretical model developed in Stage 2. Structural Equation Modelling (SEM) will be employed to test the loadings of each hypothesised pathway in order to validate the direction and magnitude of impact. This, on the one hand, will reveal how the factors from cultural-, community-, organisational- and family-level influence family decision-makers' (either the patient or their family caregiver) tendency to use CBR services in China's context; on the other hand, help to identify any factor of intervention to facilitate evidence-based policy-making.

Participant recruitment

The study will employ a multi-stage sampling methodology to consider generalisability and feasibility issues.

The study will first select three cities (1 in Western China, 1 in Eastern China, and 1 in Central China) to enhance representativeness of findings, according the following principles:

➢ The sample sites can represent the status quo of the geographic regions they are located;
➢ In order to investigate the impact of factors such as social culture and type of service on patients'/family's decision-making, there should be variations in social culture and type of CBR services amongst the sample sites.

The sample size was calculated based on the minimum sample size required for SEM: 10 cases per variable.[4] Approximately 25-30 variables would be determined, indicating the required minimum sample population of 300 individuals (patient or caregiver). Taking account of the prevalence of SMI (at least 0.5%[5]) and the response rate (set at 50%), the expected population our sample sites cover was 120,000, which equals to the coverage of 6 communities (one normally covers 20,000 population).

Therefore, in each city, the study will select one community where the Community Health Centre (CHC) provides the highest quality of physical CBR services (high level of patient adherence) as a research site. Then, we calculate its distance (X km) to the nearest facility that provides psychiatric rehabilitation services. All CHCs with X km's distance from the nearest

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[3] Malone D.W. An introduction to the application of interpretive structural modeling ISM. *Proceedings of the IEEE*, 1975; 63(3): 397-404.

[4] Nunnally JC. Psychometric theory. New York, NY: McGraw-Hill 1967.

[5] Baxter AJ, Charlson FJ, Cheng HG, et al. Prevalence of mental, neurological, and substance use disorders in China and India: A systematic analysis. *Lancet Psychiatry*, 2016; 3(9): 832-841.

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psychiatric rehabilitation services within the city will be identified and one will be randomly selected. The community where this selected CHC is located will be selected as another research site. In the end, a total of six communities will be selected as our research sites. Attempts will be made to include all families (registered) with a member or more suffering from SMI who live in these 6 communities. One primary decision-maker (either the patient or their primary caregiver) of each registered family will be invited to complete the questionnaire.

Questionnaire development

The questionnaire is developed to test the validity/explain-ability of the theoretical decision-making model. Regarding the measureable factors identified in the theoretical model, such as family burden and social support, the widely adopted Social Support Rating Scale (SSRS) and Burden Scale for Family Caregivers (BSFC) will be included; regarding those latent variables that lack sophisticated scales to measure, a systematic review will be conducted and experts will be consulted to select appropriate observable variables.

The questionnaire includes information regarding:
➢ Patients' and their family primary caregivers' sociodemographic characteristics (age, gender, education, marital status, income, who makes decision, etc.);
➢ Utilisation of CBR services (intention, type, frequency, length, etc.);
➢ Factors that may influence decision-maker's tendency (motivation, rewards, costs).

The items will be pilot tested for face validity (content and structure), and test-retest reliability (1 week apart). Items with acceptable reliability (Cronbach's $\alpha \geq 70\%$) will be included in the final survey instrument.

Data collection and analysis

The anonymised questionnaire will be distributed via a web link to Wenjuanxing (an online survey platform). Participants can complete the questionnaire using mobile phone or desktop. Reminders will be sent two weeks after the dissemination via text-message or telephone.

The analysis will be conducted in two phases:

Phase 1 will include descriptive analysis examining CBR service utilisation patterns and the variations amongst non-users, those who use CBR services occasionally, and those who use CBR services regularly.

Phase 2 will use SEM to test the theoretical decision-making model using AMOS. Analysing procedure will follow Anderson and Gerbing's[6] two-step modelling process, including measurement model and structural model. Regarding the measurement model, confirmatory factors analysis (CFA) will be employed to examine the reliability of each construct using Cronbach's alpha, composite reliability (CR) and the significance of factor loading for each item. The convergent validity and the discriminant validity will be assessed by average variance extracted (AVE), the comparison of the square root of AVEs and construct correlations, respectively. Regarding the structural model, the path coefficients of each

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[6] Anderson JC, Gerbing DW. Structural Equation Modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 1988; 103(3): 411-423.

relationship will be estimated and the goodness-to-fit will be assessed by some indices, such as chi-square test, normed-fit index (NFI) and comparative fit index (CFI).

Patient and public involvement

Patient and public involvement was not sought in the design of this study protocol nor in the development of the research questions. Patient involvement in the recruitment and conduct of this study is described in the sections Participant recruitment and Data collection and analysis of this protocol. Participants will be asked if they want to be informed about the study findings in the recruitment stage. We will disseminate our findings (edited in lay language) to those who indicate interests in our findings via the key informant or email (if the participant is willing to provide his/her email address).

ETHICS AND DISSEMINATION

Ethical approval was granted by the Ethics Committee of Tongji Medical College, Huazhong University of Science and Technology (No. 2017S319). Rules regarding the confidentiality and anonymity of data will be strictly followed. Prior to interview or survey, all participants will be informed that they have the right to refuse to participate and withdraw from the study at any time without questions being asked. Information regarding participants' rights will be stated on the opening page of the survey. For participants who participate in the online survey, a completed questionnaire is deemed as having provided consent. Written consents will be obtained from participants before interviews are carried out. All interview and questionnaire data will be anonymised.

We will disseminate findings to the scientific community, policymakers and healthcare providers via international and domestic peer-reviewed journals, conferences and various symposiums. The major findings of the project will be submitted to National Natural Science Foundation of China. We aim to use the decision-making model to contribute towards the cumulative knowledge of underlying fundamental factors that affect the effective utilisation of mental health CBR services in developing countries. The identified factors of intervention and the verified effective services can be valuable in assisting community-level care providers to address gaps between need and provision.

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Science and Technology (No. 2017S319).

Competing interests None.

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REFERENCES

1. Steel Z, Marnane C, Iranpour C, et al. The global prevalence of common mental disorders: A systematic review and meta-analysis 1980-2013. *Int J Epidemiol* 2014;43(2):476-93. doi: 10.1093/ije/dyu038

2. Whiteford HA, Degenhardt L, Rehm J, et al. Global burden of disease attributable to mental and substance use disorders: Findings from the Global Burden of Disease Study 2010. *Lancet* 2013;382(9904):1575-86. doi: 10.1016/s0140-6736(13)61611-6

3. Foldemo A, Gullberg M, Ek AC, et al. Quality of life and burden in parents of outpatients with schizophrenia. *Soc Psychiatry Psychiatr Epidemiol* 2005;40(2):133-38. doi: 10.1007/s00127-005-0853-x

4. Almeida OP, Hankey GJ, Yeap BB, et al. Mortality among people with severe mental disorders who reach old age: A longitudinal study of a community-representative sample of 37892 men. *PLoS One* 2014;9(10) doi: 10.1371/journal.pone.0111882

5. World Health Organization. Mental Health Atlas 2011. Geneva: World Health Organization 2011.

6. World Health Organization. Mental Health Atlas 2014. Geneva: World Health Organization 2015.

7. World Health Organization. Mental Health Action Plan 2013–2020. Geneva: World Health Organization 2013.

8. World Health Organization. mhGAP: Mental Health Gap Action Programme: Scaling up care for mental, neurological and substance use disorders. Geneva: World Health Organization 2008.

9. Chisholm D, Flisher AJ, Lund C, et al. Global mental health 6 - Scale up services for mental disorders: A call for action. *Lancet* 2007;370(9594):1241-52. doi: 10.1016/s0140-6736(07)61242-2

10. Chatterjee S, Patel V, Chatterjee A, et al. Evaluation of a community-based rehabilitation model for chronic schizophrenia in rural India. *Br J Psychiatry* 2003;182:57-62. doi: 10.1192/bjp.182.1.57

11. Jacob KS, Sharan P, Mirza J, et al. Global Mental Health 4 - Mental health systems in countries: where are we now? *Lancet* 2007;370(9592):1061-77. doi: 10.1016/s0140-6736(07)61241-0

12. Liu S, Page A. Reforming mental health in China and India. *Lancet* 2016;388(10042):314-16. doi: 10.1016/s0140-6736(16)30373-7

13. Li KQ, Sun XL, Zhang Y, et al. Mental health care in China: Review on the delivery and policy issues in 1949-2009 and the outlook for the next decade. *Acta Neuropsychiatrica* 2013;26(3):134-45. doi: 10.1017/neu.2013.40

14. State Council of People's Republic of China. National Mental Health Work Plan (2015–2020). Beijing: General Office of the State Council, 2015. (in Chinese)

15. National Health and Family Planning Commission. Work specification on management and treatment of severe mental illness. Beijing: National Health and Family Planning Commission, 2012. (in Chinese)

16. Ministry of Health, Publicity Department of the CPC Central Committee, National Development and Reform Commission, et al. National Mental Healthcare System Guidelines. Beijing: Chinese Center for Disease Control and Prevention, 2008. (in Chinese)

17. Standing Committee of the National People's Congress. National Mental Health Law Beijing: Standing Committee of the National People's Congress, 2012. (in Chinese)

18. Zheng H, Zhou J, Fu Z. Study on service situation and development strategies of community mental health services for schizophrenia. *Chinese Primary Health Care* 2012;26(5):7-9. (in

Chinese)

19. Yang Q. Study on community rehabilitation management of patients with mental disorders. Nanchang University, 2013. (in Chinese)

20. Li H. Study on management of Community-based Rehabilitation Model for mental disabled people - taking Shanghai Sunshine Soul Park as example. Fudan University, 2013. (in Chinese)

21. Jacob KS. Community care for people with mental disorders in developing countries - Problems and possible solutions. *Br J Psychiatry* 2001;178:296-98. doi: 10.1192/bjp.178.4.296

22. Kang H, Guan L, Wang X, et al. Economic condition · basic medical insurance and medication among patients with severe mental illness in 31 demonstration cities for '686 program' implementation. *Chinese Journal of Public Health* 2015;31(8):997-1001. doi: 10.11847/zgggws2015-31-08-06 (in Chinese)

23. Li L. Community mental healthcare system awaits further development. *China Hospital CEO* 2012(8):62-63. (in Chinese)

24. Phillips MR. Can China's new mental health law substantially reduce the burden of illness attributable to mental disorders? *Lancet* 2013;381(9882):1964-66. doi: 10.1016/s0140-6736(13)61177-0

25. Prince M, Patel V, Saxena S, et al. Global mental health 1 - No health without mental health. *Lancet* 2007;370(9590):859-77. doi: 10.1016/s0140-6736(07)61238-0

26. Wang PS, Aguilargaxiola S, Alonso J, et al. Worldwide use of mental health services for anxiety, mood, and substance disorders: Results from 17 countries in the WHO World Mental Health (WMH) Surveys. *Lancet* 2007;370(9590):841. doi: 10.1016/S0140-6736(07)61414-7

27. Wong YJ, Tran KK, Kim SH, et al. Asian Americans' Lay Beliefs About Depression and Professional Help Seeking. *J Clin Psychol* 2010;66(3):317-32. doi: 10.1002/jclp.20653

28. Andrade LH, Alonso J, Mneimneh Z, et al. Barriers to mental health treatment: results from the WHO World Mental Health surveys. *Psychol Med* 2014;44(6):1303-17. doi: 10.1017/s0033291713001943

29. Coleman SJ, Stevelink SAM, Hatch SL, et al. Stigma-related barriers and facilitators to help seeking for mental health issues in the armed forces: a systematic review and thematic synthesis of qualitative literature. *Psychol Med* 2017;47(11):1880-92. doi: 10.1017/s0033291717000356

30. Lannin DG, Vogel DL, Brenner RE, et al. Does Self-Stigma Reduce the Probability of Seeking Mental Health Information? *J Couns Psychol* 2016;63(3):351-58. doi: 10.1037/cou0000108

31. Jorm AF. Mental health literacy empowering the community to take action for better mental health. *Am Psychol* 2012;67(3):231-43. doi: 10.1037/a0025957

32. Gulliver A, Griffiths KM, Christensen H. Perceived barriers and facilitators to mental health help-seeking in young people: a systematic review. *BMC Psychiatry* 2010;10 doi: 10.1186/1471-244x-10-113

33. Mohamed S, Rosenheck R, He H, et al. Insight and attitudes towards medication among inpatients with chronic schizophrenia in the US and China. *Social Psychiatry and Psychiatric Epidemiology* 2014;49(7):1063-70.

34. Patel V, Xiao S, Chen H, et al. The magnitude of and health system responses to the mental health treatment gap in adults in India and China. *Lancet* 2016;388(10063):3074-84. doi: 10.1016/s0140-6736(16)00160-4

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35. Tsai YF, Ku YC. Self-care symptom management strategies for auditory hallucinations among inpatients with schizophrenia at a Veterans' Hospital in Taiwan. *Arch Psychiatr Nurs* 2005;19(4):194-99. doi: 10.1016/j.apnu.2005.05.005

36. Mackenzie CS, Gekoski WL, Knox VJ. Age, gender, and the underutilization of mental health services: The influence of help-seeking attitudes. *Aging Ment Health* 2006;10(6):574-82. doi: 10.1080/13607860600641200

37. Mo PKH, Mak WWS. Help-seeking for mental health problems among Chinese: The application and extension of the Theory of Planned Behavior. *Soc Psychiatry Psychiatr Epidemiol* 2009;44(8):675-84. doi: 10.1007/s00127-008-0484-0

38. Boydell KM, Gladstone BM, Volpe T. Understanding help seeking delay in the prodrome to first episode psychosis: A secondary analysis of the perspectives of young people. *Psychiatric Rehabilitation Journal* 2006;30(1):54-60. doi: 10.2975/30.2006.54.60

39. Vogel DL, Wade NG, Wester SR, et al. Seeking help from a mental health professional: The influence of one's social network. *J Clin Psychol* 2007;63(3):233-45. doi: 10.1002/jclp.20345

40. Evans-Lacko S, Brohan E, Mojtabai R, et al. Association between public views of mental illness and self-stigma among individuals with mental illness in 14 European countries. *Psychol Med* 2012;42(8):1741-52. doi: 10.1017/s0033291711002558

41. Corrigan PW, Morris SB, Michaels PJ, et al. Challenging the Public Stigma of Mental Illness: A Meta-Analysis of Outcome Studies. *Psychiatr Serv* 2012;63(10):963-73. doi: 10.1176/appi.ps.005292011

42. Tieu Y, Konnert CA. Mental health help-seeking attitudes, utilization, and intentions among older Chinese immigrants in Canada. *Aging Ment Health* 2014;18(2):140-47. doi: 10.1080/13607863.2013.814104

43. Chen HD, Fang XY, Liu CY, et al. Associations among the number of mental health problems, stigma, and seeking help from psychological services: A path analysis model among Chinese adolescents. *Children and Youth Services Review* 2014;44:356-62. doi: 10.1016/j.childyouth.2014.07.003

44. Chin WY, Chan KTY, Lam CLK, et al. Help-seeking intentions and subsequent 12-month mental health service use in Chinese primary care patients with depressive symptoms. *BMJ Open* 2015;5(1) doi: 10.1136/bmjopen-2014-006730

45. Razzouk D, Sharan P, Gallo C, et al. Scarcity and inequity of mental health research resources in low-and-middle income countries: A global survey. *Health Policy* 2010;94(3):211-20. doi: 10.1016/j.healthpol.2009.09.009

46. Baingana F, al'Absi M, Becker AE, et al. Global research challenges and opportunities for mental health and substance-use disorders. *Nature* 2015;527(7578):S172-S77. doi: 10.1038/nature16032

47. Yu Y, Liu ZW, Hu M, et al. Mental health help-seeking intentions and preferences of rural Chinese adults. *PLoS One* 2015;10(11) doi: 10.1371/journal.pone.0141889

48. Wong DFK, Li JCM. Cultural influence on Shanghai Chinese people's help-seeking for mental health problems: Implications for social work practice. *Br J Soc Work* 2014;44(4):868-85. doi: 10.1093/bjsw/bcs180

49. Kantor V, Knefel M, Lueger-Schuster B. Perceived barriers and facilitators of mental health service utilization in adult trauma survivors: A systematic review. *Clin Psychol Rev* 2017;52:52-68. doi: 10.1016/j.cpr.2016.12.001

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50. Tang Y, Zheng H. Evaluation of patients' families on social workers involved in the community services of severe psychoses in Shanghai. *Med Soc (Berkeley)* 2016;29(1):47-49. doi: 13723 /j.yxysh.2016.01.015

51. Young JT. Illness behaviour: A selective review and synthesis. *Sociol Health Illn* 2004;26(1):1-31. doi: 10.1111/j.1467-9566.2004.00376.x

52. O'Connor PJ, Martin B, Weeks CS, et al. Factors that influence young people's mental health help-seeking behaviour: A study based on the Health Belief Model. *J Adv Nurs* 2014;70(11):2577-87. doi: 10.1111/jan.12423

53. Andersen R, Aday LA. Access to medical care in the U.S.: realized and potential. *Med Care* 1978;16(7):533-46. doi: 10.1097/00005650-197807000-00001

54. Andersen RM. National health surveys and the Behavioral Model of Health Services Use. *Med Care* 2008;46(7):647-53. doi: 10.1097/MLR.0b013e31817a835d

55. Bradley EH, McGraw SA, Curry L, et al. Expanding the Andersen model: The role of psychosocial factors in long-term care use. *Health Serv Res* 2002;37(5):1221-42. doi: 10.1111/1475-6773.01053

56. Roh S, Burnette CE, Lee KH, et al. Predicting help-seeking attitudes toward mental health services among American Indian older adults: Is Andersen's Behavioral Model a good fit? *J Appl Gerontol* 2017;36(1):94. doi: 10.1177/0733464814558875

57. Jang Y, Chiriboga DA, Okazaki S. Attitudes toward mental health services: Age-group differences in Korean American adults. *Aging Ment Health* 2009;13(1):127-34. doi: 10.1080/13607860802591070

58. Henshaw EJ, Freedman-Doan CR. Conceptualizing Mental Health Care Utilization Using the Health Belief Model. *Clin Psychol-Sci Pract* 2009;16(4):420-39. doi: 10.1111/j.1468-2850.2009.01181.x

59. Castonguay J, Filer CR, Pitts MJ. Seeking Help for Depression: Applying the Health Belief Model to Illness Narratives. *South Commun J* 2016;81(5):289-303. doi: 10.1080/1041794x.2016.1165729

60. Homans GC. Social behavior as exchange. *American Journal of Sociology* 1958;63(6):597-606.

61. Hamrin V, McCarthy EM, Tyson V. Pediatric psychotropic medication initiation and adherence: A literature review based on social exchange theory. *J Child Adolesc Psychiatr Nurs* 2010;23(3):151-72. doi: 10.1111/j.1744-6171.2010.00237.x

62. Prizer LP, Gay JL, Perkins MM, et al. Using social exchange theory to understand non-terminal palliative care referral practices for Parkinson's disease patients. *Palliat Med* 2017;31(9):861-67. doi: 10.1177/0269216317701383

63. Aryee S, Walumbwa FO, Mondejar R, et al. Accounting for the influence of overall justice on job performance: Integrating Self-determination and and Social Exchange Theories. *J Manage Stud* 2015;52(2):231-52. doi: 10.1111/joms.12067

64. Guillet E, Sarrazin P, Carpenter PJ, et al. Predicting persistence or withdrawal in female handballers with Social Exchange Theory. *International Journal of Psychology* 2002;37(2):92-104. doi: 10.1080/00207590143000243

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FIGURES
1. Figure 1. Decision-making model on the utilisation of CBR services among persons with SMI
2. Figure 2. Flow diagram for developing the theoretical model

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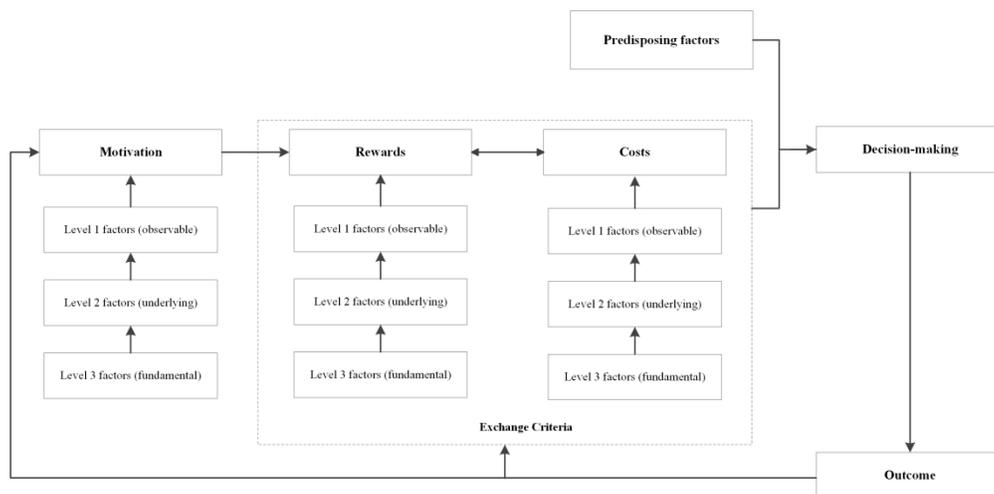Figure 1 Decision-making model on the utilisation of CBR services among persons with SMI

236x115mm (300 x 300 DPI)

Step 1: Develop Structural Self-Interaction Matrix (SSIM)
1. Review and organise potential factors identified in Stage 1
2. Specify and finalise the contextual relationship among the interactions between any two factors (i and j)

Step 2: Develop Reachability Matrix
1. Convert SSIM to Adjacency Matrix by assigning binary values (1s or 0s) to the relationships
2. Convert Adjacency Matrix by to Reachability Matrix by adding 1* entries to incorporate transitivity

Step 3: Stratify factors
1. Extract reachability set and antecedent set for each factor
2. Determine ISM hierarchy and club factors to form Conical Matrix

Step 4: Develop diagraph
1. Visualise Conical Matrix using nodes and lines of edges
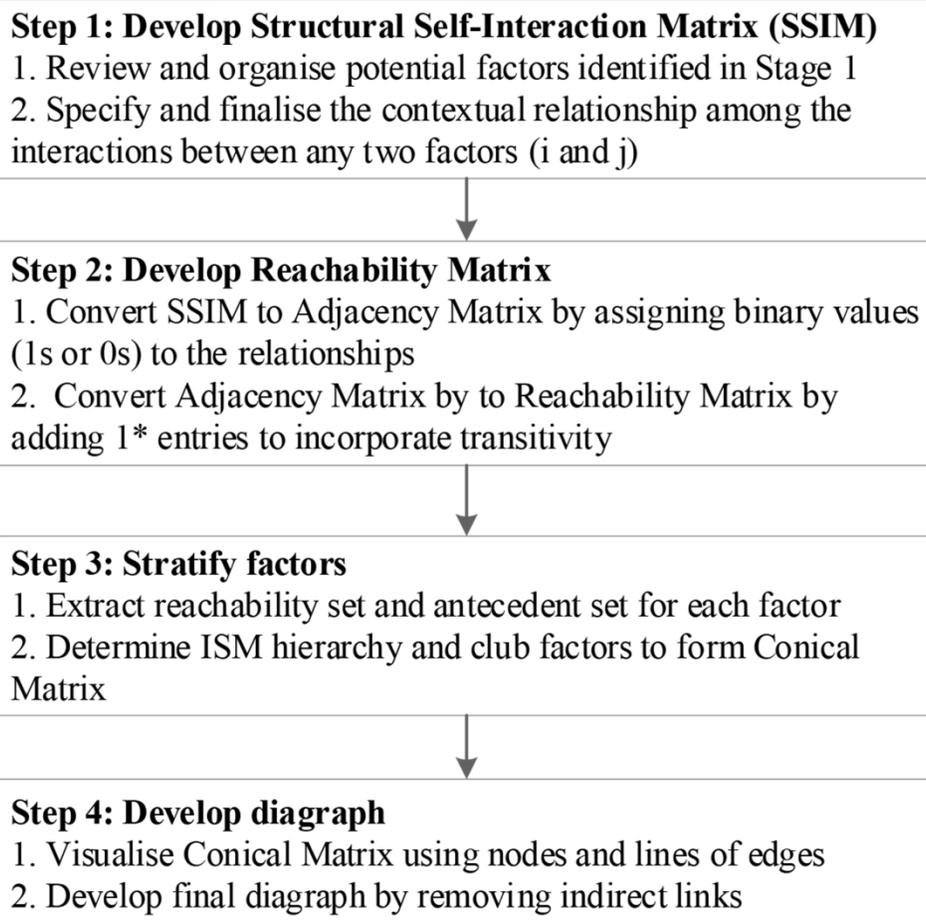2. Develop final diagraph by removing indirect links

Figure 2. Flow diagram for developing the theoretical model (Mono-image)

173x168mm (300 x 300 DPI)