

Mediating effects of empowerment on the relationship between global function and recovery among community-dwelling patients with schizophrenia: A cross-sectional study

Wen I Liu (✉ wenyi@ntunhs.edu.tw)

National Taipei University of Nursing and Health Sciences

Wen Ling Hsieh

National Taipei University of Nursing and Health Sciences

Shih Kai Lee

Tsaotun Psychiatric Center, Ministry of Health and Welfare

Kuen-Tai Lee

National Taipei University of Nursing and Health Sciences

Research Article

Keywords: Global function, empowerment, recovery, mediating effect, community-dwelling patients with schizophrenia

Posted Date: December 10th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-118746/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background: Functional degradation among community-dwelling patients with schizophrenia can negatively influence their recovery. Given the importance of patient empowerment during recovery, the current study aimed to examine the mediating effects of patient empowerment on the relationship between global function and recovery among such patients.

Methods: This cross-sectional study recruited community-dwelling patients with schizophrenia from northern and central Taiwan. Questionnaires with verified reliability and validity were provided and collected on site by trained nurses. The causal steps approach proposed by Baron and Kenny and the Sobel test were utilized to verify the mediation effect.

Results: A total of 373 participants completed the survey. After controlling for factors associated with recovery, empowerment was determined to exert “full mediation” over the effects of global function on patient recovery, with the mediation effect reaching 85.9% and the Sobel test indicating significant mediation.

Conclusions: Although improving the global function of community-dwelling patients with schizophrenia could likely encourage recovery, the present study suggested that offering empowerment-oriented care services may be more effective than global function improvement on recovery among these patients.

Background

Schizophrenia is a complex chronic mental illness characterized by delusions, hallucination, or confusion in speech and behavior. Cognitive impairment has been shown to affect global functions, leading to employment difficulties and social withdrawal, which consequently influence their recovery [1–3]. Approximately 152,110 individuals in Taiwan have schizophrenia, creating medical expenses as high as 11.2 billion Taiwan dollars [4]. One study that tracked 200 schizophrenia cases for 20 years found that 57% of patients often have delusional symptoms that interfere with recovery [5]. Despite continuous treatment, 23.7% of cases developed negative symptoms [6], while 75% exhibited poor functional outcomes [7], which affect the degree of recovery and necessitate long-term continuous care [8, 9].

Psychiatric consumers define recovery as the attainment of a meaningful and valued life rather than the absence of symptoms. Studies have also shown that recovery can be a care outcome [10–12]. Notably, global mental health care aims to improve recovery, with developed countries already having successfully developed related recovery programs and effectiveness evaluations [12–14]. Moreover, mental health services must be human-oriented, community-oriented, and recovery-oriented [15] considering that the extent of personal recovery can impact quality of life among community-dwelling patients with mentally illness [16, 17]. However, follow-up studies and meta-analyses have reported that recovery rates among individuals suffering from mental illness only ranged from 13.5–37.9% [10, 18, 19]. Hence, promoting recovery among patients with mental illness is urgently needed.

Several systematic reviews and follow-up studies have identified the following influence factors for recovery in patients with schizophrenia: gender, age, employment status, age of onset, illness duration, psychiatric symptoms, global function, side-effect, therapeutic alliance, insight, and medication adherence [8, 11, 19–21]. Among such factors, global function has been identified as an important factor of recovery among patients with schizophrenia [8, 20, 22]. However, some systematic reviews have found that rehabilitation or psychoeducation programs developed to improve global function and achieve better recovery for individuals with schizophrenia were ineffective [23, 24]. Schizophrenia is a debilitating chronic disease that impacts all major life areas. Given that substantial improvements may become difficult as the disease progresses, the empowerment concept has emerged as a novel approach to recovery-oriented interventions for community-dwelling patients with schizophrenia.

Empowerment plays a critical role in the recovery of patients with mental illness [8, 22, 24]. One systematic review that included 97 articles and redefined the recovery model, called the CHIME model, identified empowerment as one of the elements for recovery [24]. Empowerment mainly entails promoting patient autonomy, independent decision making and responsibility, and self-management [25, 26]. Evidence has shown that empowerment can play a mediating role in improving quality of life, hopelessness, or recovery among individuals with schizophrenia [27–30].

Although studies have suggested that empowerment is an element of recovery [8, 28, 31], few have explored the mediating effect of empowerment on global function needed for recovery. Even after prolonged functional rehabilitation, patients with schizophrenia find it hard to improve global functions [23, 24]. Assuming that empowerment functions as a mediator, it may therefore be able to hinder the negative impact of global function on recovery. Therefore, the current study aimed to explore the mediating effect of empowerment on global function among community-dwelling patients with schizophrenia. Based on the current literature, we hypothesized that empowerment could be a mediator of global function, consequently leading to personal recovery, among patients with schizophrenia.

Methods

Study design

This cross-sectional study utilized convenience sampling and determined the following control variables: basic demography (gender, age, education, employment status, and marriage), disease factors (age of onset, duration of illness, psychiatric symptoms, number of hospitalizations and global function), and therapeutic factors (drug side effects, therapeutic alliances, insight, and medication adherence). Global function was defined as the independent variable (X), empowerment as the mediating variable (mediator; M), and recovery as the dependent variable (Y).

Participants

This study was conducted at the community psychiatric department of two psychiatric hospitals in Taiwan. Participants were community-dwelling patients with schizophrenia. Those who satisfied the

DSM-5 criteria for schizophrenia, were able to communicate in Mandarin and Taiwanese, did not take abused substances, and resided within mental rehabilitation institutions were included as research subjects.

To estimate the sample size using G power 3.1.9.4 [32], we set F test to “Linear multiple regression: Fixed model, R2 deviation from zero” and R2 to 0.35 based on a previous study [29]. Thereafter, we calculated the effect size f^2 to be 0.54, with α being set to .05, β to .80, and the number of predictors to 15. Ultimately, our calculation showed that at least 150 samples need to be included, while 373 participants were needed for sufficient statistical power.

Procedure

This study had been reviewed and approved by the Human Test Review Committee of the studied hospitals before data collection from September 1, 2016 to April 30, 2017. During the indicated period, the researcher first explained the purpose of the research and asked the participants to fill out the questionnaire by themselves after obtaining consent. The researcher also participated in the collection of questionnaire. Data were only collected once per participant, with data collection lasting approximately 30 min. Those who wished to terminate participation midway through the study were allowed to do so to avoid answering deviations related to forced participation

Measures

The basic data sheet includes the participants’ general and illness information, including gender, age, education, employment, marriage, age of onset, duration of illness, and number of hospitalizations. The remaining variables were measured using the following structured questionnaires with good reliability and validity.

Global Assessment of Functioning (GAF)

The global assessment of functioning is an assessment tool proposed by the American Psychiatric Association. The single-term GAF uses a 0–100 Likert scale to measure the overall psychosocial and employment function, with higher scores indicating better functioning. The intraclass correlation coefficient of the GAF was 0.89–0.95 and showed good reliability, with higher scores indicating better function [33, 34].

Empowerment scale

The empowerment scale is a self-filled scale developed by Rogers et al. in 1997 [35] that uses a Likert scale, with 1 point indicating strong agreement and 4 points indicating strong disagreement, over a total of 25 questions. After the reverse scoring the questions, higher scores indicated higher empowerment.

Taiwanese scholars have translated and verified the reliability and validity of this scale in patients with mental illnesses and have revised it into a 13-question Chinese version of covering three factors, namely

self-efficacy, community action, and emotional control. The total explanatory variation was 59%, while the Cronbach's α value was .87 [36]. The Cronbach's α value obtained herein was .81.

Questionnaire on Process of Recovery (QPR)

The QPR is a self-filled scale developed by Neil et al. in 2009 [37] that uses a Likert scale ranging from 0 to 4, with a total of 22 questions. The total score can range from 0 to 88, with higher scores indicating better recovery. The scale covers three factors, namely self-empowerment, effective interpersonal relationships, and life reconstruction, with the Chinese version of the QPR having a Cronbach's α of .90 and a total explanatory variation of 70.2% [38]. The Cronbach's α obtained herein was .96.

Brief Psychiatric Rating Scale (BPRS)

The 16-item BPRS was developed by Overall and Gorham in 1962 [39] to measure the psychiatric symptoms and psychopathology, with good construct validity and retest reliability ($r = 0.78$, $p < .001$) [40]. The Chinese version of BPRS is scored from 0 to 6 points, with a total score ranging from 0 to 96 points. Higher scores indicate more psychiatric symptoms [41]. The Cronbach's α value obtained herein was .76.

Medication Adherence Rating Scale (MARS)

MARS is a 10-question self-administered questionnaire developed by Thompson et al. (2000) [42] that is scored between 0 and 10 points, with higher scores indicating better medication. Kao and Liu (2010) had translated this scale into Chinese, with a Cronbach's α value of .72, retest reliability after two weeks of .80 ($p < .01$), and total explained variance of 49.7% [43]. The Cronbach's α value obtained herein was .70.

Glasgow Antipsychotic Side-effect Scale (GASS)

GASS is a 22-item questionnaire developed by Waddell and Taylor in 2008 [44] that uses a Likert scale ranging from 0 to 3 points, with a total score of 0–63 points. Higher scores indicate more serious drug side effects. This scale had a Cronbach's α of .79 [45], while its construct validity was associated with the LUNSERS [44]. The Cronbach's α value obtained herein was .89.

Working Alliance Inventory-Short (WAI-s)

The 12-item Working Alliance Inventory-Short (WAI-S) uses a 7-point Likert scale to measure therapeutic alliance, with higher scores indicating better therapeutic alliance [46]. WAI-S had a Cronbach's α of .90 and total explained variance of 73.4%, indicating good reliability and validity [47].

The Schedule for assessment Insight in Psychosis (SIP)

The SIP is a 9-item questionnaire developed by Yen et al. [48] that uses a Likert scale ranging from 1 to 4 points, with a total score of 9–36 points. Higher scores indicate better sense of disease. This scale had a Cronbach's α of .92, which was related to the Scale to Assess Unawareness of Mental Disorder and

Schedule for the Assessment for Insight, with good reliability and validity [48]. The Cronbach's α value obtained herein was .89.

Statistical analyses

SPSS software package (New York: IBM) was used for data analysis. Frequencies, percentages, averages, and standard deviations were used to describe the distribution of each variable, while the scale of the main variable was converted into a score percentage (mean score/total score of the scale * 100%) to describe the variability of the results. The independent-samples t-test, ANOVA, and Pearson correlation were used to analyze the relationship between the independent variable and recovery. Hierarchical regression was used to analyze the influence and explanatory value of the independent variables for recovery.

The Baron and Kenny path analysis and Sobel test was adopted to verify the mediating effect of empowerment [49]. First, factors having a significant relationship with recovery were controlled, after which regression paths of the mediation model were examined individually: (1) path a: global function (X) regression coefficient for empowerment (M); (2) path b: empowerment (M) regression coefficient for recovery (Y); and (3) path c: global function (X) regression coefficient for recovery (Y), with significance in all three paths indicating that a mediating effect was established. The influence of the mediating effect is based on path c' (global function and empowerment are considered simultaneously in the regression coefficient of the global function on recovery). A significant path c' regression coefficient indicates that empowerment partially mediates the variable, whereas a non-significant path c' regression coefficient suggests that empowerment completely mediates the variable. Moreover, a significant Sobel test for double testing indicates that the mediation effect can be confirmed [50].

Results

Demographic characteristics and relationships with recovery

A total of 373 community-dwelling patients with schizophrenia (average age, 46.61 years; 58.2% males) participated herein. Details regarding their demographic characteristics are presented in Table 1.

Table 1
Participant characteristics and relationships with recovery (N = 373)

Variables	Data distribution		Relationship with recovery		
	N (%)	M (SD)	M (SD)	$t^a/p^b/F^c$	p
Sex				-.11 ^a	.915
Male	217 (58.2)		60.72 (13.35)		
Female	156 (41.8)		60.87 (12.50)		
Age		46.61(9.10)		.04 ^b	.412
Education level				1.36 ^c	.257
Middle school or below	137 (36.7)		59.33 (11.65)		
Senior high school	161 (43.2)		61.55 (12.19)		
College and above	75 (20.1)		61.77 (16.43)		
Marital status				1.20 ^c	.304
Single	264 (70.8)		61.36 (13.32)		
Married	58 (15.5)		60.24 (10.25)		
Divorced/widower	51 (13.7)		58.37 (13.86)		
Employment				-2.45 ^a	.015
no	285 (76.4)		59.87 (13.37)		
yes	88 (23.6)		63.73 (11.19)		
a, t -test; b, Pearson's correlation (r); c, ANOVA (F).					

Among the participant characteristics, a significant relationship was observed between employment status and recovery ($t = -2.45$, $p = .015$), whereas gender, age, education level, and marital status showed no significant relationship with recovery.

Relationships between the main variables and recovery

Among the main variables, psychiatric symptoms ($r = -.31$, $p < .001$), global function ($r = .23$, $p < .001$), drug side effects ($r = -.22$, $p < .001$), therapeutic alliance ($r = .39$, $p < .001$), insight ($r = .27$, $p < .001$), medication adherence ($r = .37$, $p < .001$), and empowerment ($r = .79$, $p < .001$) had a significant relationship with recovery. Variables not significantly related to recovery included age of onset, illness duration, and number of hospitalizations (Table 2).

Table 2
Main variable distribution and relationships with recovery (N = 373).

Variables	Data distribution		Relationship with recovery	
	M (SD)	score percentage	$t^a / r^b / F^c$	p
Age of onset	24.20 (7.29)	–	.01 ^b	.856
Illness duration	22.42 (9.15)	–	.04 ^b	.474
Psychiatric symptoms	12.29 (7.25)	12.8%	-.31 ^b	< .001
Number of hospitalizations	5.44 (6.20)	–	.03 ^b	.628
Global function	69.5 (15.28)	69.5%	.23 ^b	< .001
Side effects	11.99 (10.38)	19.0%	-.22 ^b	< .001
Therapeutic alliance	60.11 (14.24)	66.8%	.39 ^b	< .001
Insight	25.02 (5.52)	59.3%	.27 ^b	< .001
Medication adherence	6.04 (2.44)	60.4%	.37 ^b	< .001
Empowerment	66.56 (7.18)	55.4%	.79 ^b	< .001
Recovery	60.78 (12.98)	69.1%	-	-
a, t -test; b, Pearson's correlation (r); c, ANOVA (F).				

Mediating effects of empowerment on the relationship between global function and recovery

This study initially controlled for variables significantly related to recovery (employment, psychiatric symptoms, global function, drug side effects, therapeutic alliances, insight, and medication adherence) and subsequently verified path a (global function regression coefficient for empowerment) ($B = 0.11$, $SE = .03$, $\beta = .24$, $t = 4.32$, $p < .001$), path b (empowerment regression coefficient for recovery) ($B = 1.23$, $SE = .06$, $\beta = .68$, $t = 19.84$, $p < .001$), and path c (global function regression coefficient for recovery) ($B = 0.16$, $SE = .05$, $\beta = .19$, $t = 3.65$, $p < .001$). Accordingly, all three paths were significant. When considering global function and empowerment simultaneously, a non-significant regression coefficient was found for path c' ($B = 0.02$, $SE = .03$, $\beta = .03$, $t = .75$, $p = .452$), suggesting that empowerment had a completely mediating effect on recovery. After establishing the model, the Sobel test also found a significant mediation effect ($Z = 3.61$, $p < .001$) (Fig. 1).

Discussion

The current study included a large sample of community-dwelling patients with schizophrenia to explore the relationships between global function, empowerment, and recovery. Converting the scale used herein into a percentage shows an empowerment level of 55.4% and a recovery level of 69.1%, which are slightly higher than those presented in other studies [10, 19]. This may have been related to differences in the research populations considering that the current study included participants who availed of various community care services, such as outpatient clinics, day wards, or home treatment services, and excluded those not receiving community care services. In other words, the present study supports providing proper community care services, which can stabilize mental illness, reduce overall dysfunction, and reduce the negative impact of the disease on the recovery of community-dwelling patients with schizophrenia [51]. Therefore, community care is important for promoting recovery from mental disorders in community settings.

Our results identified employment, psychiatric symptoms, global function, side effects, therapeutic alliances, insight, medication adherence, and empowerment as recovery associated factors. Although such findings are consistent with previous related literature [8, 28], prior studies only explored the impact of a single factor [8, 28] on recovery. Nonetheless, the current the study incorporates a framework of multiple comprehensive factors, such as individuals, diseases, and treatments for analysis, which may contribute to the current knowledge regarding factors related to recovery from schizophrenia. The aforementioned results imply that establishing a therapeutic alliance with the clients is an important factor for recovery. Despite the importance of strengthening adherence to medication, attention should still be given to patient's discomfort during the process of medication administration. Developing and using empowerment-oriented care services may effectively influence and improve recovery rates among community-dwelling patients with schizophrenia.

The results of the current study, like others, support the concept that global function is related to recovery [8]. However, in actual situations where global function is difficult to modify immediately, our research has verified that empowerment can completely mediate the influence of global function on recovery. Despite the relationship between global function and degree of empowerment, limited general cognitive function can affect the degree of empowerment given its requirement of self-reflection, which consequently affects recovery owing to the close relationship between degree of empowerment and recovery [26, 30, 31, 52]. The current study verified that empowerment is indeed an important element for recovery, despite the negative impact of global function on recovery [8, 28]. Traditionally, mental health practices had emphasized strategies for enhancing the global function of patients. However, we believe that shifting toward relevant strategies for empowering patients is necessary and may be more effective for patient recovery than enhancing global functions.

The current study recommended that nursing education convey the importance of empowerment through which nursing students can learn the concept and coverage of empowerment-oriented care, including self-maintenance during illness and life and familial–societal connections [25]. The results presented herein provide clinical professionals with an alternative approach to care. Transitioning to an empowerment-oriented care strategy can effectively reduce the negative impact of poor global function on recovery. The empowerment strategy that assist in achieving recovery [31, 53].

Limitations

To our knowledge, this has been the first study to focus on the mediating effect of empowerment on the relationship between global function and recovery in schizophrenia after accounting for multiple related factors. Nonetheless, some research limitations of the study are worth noting. First, given the cross-sectional, descriptive design that lacked causal inference, our results should be interpreted with caution. Second, the main dependent recovery variable was the self-evaluated recovery scale, which may differ from the actual recovery status that contains specific indicators. Future longitudinal studies are thus needed to identify variables at different time points, thereby deepening our knowledge regarding the mediating effect of empowerment on the relationship between global function and recovery.

Conclusions

The current study identified employment, psychiatric symptoms, global function, drug side effects, therapeutic alliance, insight, medication adherence, and empowerment as factors related to recovery. Moreover, the empowerment mediating model confirmed that empowerment can reduce the negative impact of global functional decline on psychiatric recovery. The present study suggests that developing and applying empowerment-oriented community care may be more effective in promoting psychiatric recovery than focusing on global functions among community-dwelling patients with schizophrenia. Despite attempting to include all active variables affecting recovery, some may have still been missed. Future investigations on the relationships between empowerment and recovery might include additional variables. Developing empowerment- and recovery-oriented services for community-dwelling patients with schizophrenia and then utilizing carefully designed randomized controlled trials to investigate the effectiveness of such programs on improving psychiatric recovery are also essential.

Abbreviations

BPRS, Brief Psychiatric Rating Scale; GASS, Glasgow Antipsychotic Side-effect Scale; M, mediator; MARS, Medication Adherence Rating Scale; QPR, Questionnaire on Process of Recovery; SIP, The Schedule for assessment Insight in Psychosis; WAI-s, Working Alliance Inventory-Short

Declarations

Ethics approval and consent to participate

All scales utilized herein had been authorized by the original author. This study was approved by the Institutional Review Board of the Tsao-tun Psychiatric Center, Ministry of Health and Welfare (IRB no. 105026) and Tri-Service General Hospital (TSGHIRB no. 1-105-05-124). This study was conducted in accordance with the Declaration of Helsinki. Informed consent from all the participants and from their legally authorized representative/parents had been obtained prior to study inclusion.

Consent for publication

Not applicable.

Availability of data and materials

Datasets used and analyzed herein are available from the corresponding author upon reasonable request.

Competing interests

The authors declare no competing interests.

Funding

This study was funded by the Ministry of Health and Welfare planning project of Taiwan (Grant No. 10647).

Authors' contributions

Each author made substantial contributions to this study. WI and WL designed the study framework, analyzed data, interpreted the result, and wrote a first draft of the manuscript. SK supervised data collection. KT and WI had substantively revised the article. All authors have read the final version of the manuscript and approve of its submission.

Acknowledgements

We thank the Ministry of Health and Welfare for providing funding for the project, as well as all research participants for their contributions.

References

1. American Psychiatric Association. Diagnostic and statistical manual of mental disorders, Washington, DC: Author; 2013.
2. Barch DM, Ceaser A. Cognition in schizophrenia: core psychological and neural mechanisms. Trends Cogn Sci. 2012; 16(1):27-34. <https://doi.org/10.1016/j.tics.2011.11.015>
3. Elsevier Point of Care. Schizophrenia. 2019. https://www.clinicalkey.com/#!/content/clinical_overview/67-s2.0-a8814dcd-b1a7-4df4-b829-1097a0af2090?scrollTo=%23prognosis-heading-38. Accessed 6 June 2020

4. Ministry of Health and Welfare. Health Care Utilization of National Health Insurance. 2017.
<https://iiqsw.mohw.gov.tw/InteractiveIntro.aspx?L1CGID=BB7A2B19FBD8382F&MTID=8E2EEB289E857B17&STID=4961711909A023A2>. Accessed 6 June 2020
5. Harrow M, Jobe TH. How frequent is chronic multiyear delusional activity and recovery in schizophrenia: a 20-year multi-follow-up. *Schizophr Bull.* 2010;36(1):192-204.
<https://doi.org/10.1093/schbul/sbn074>
6. Chang WC, Hui CL, Tang JY, Wong GH, Lam MM, Chan SK, Chen EY. Persistent negative symptoms in first-episode schizophrenia: a prospective three-year follow-up study. *Schizophr Res.* 2011; 133(1):22-8. <https://doi.org/10.1016/j.schres.2011.09.006>
7. Newman SC, Bland RC, Thompson AH. Long-term course and outcome in schizophrenia: a 34-year follow-up study in Alberta, Canada. *Psychol Med.* 2012; 42(10):2137-43.
<https://doi.org/10.1017/S0033291712000177>
8. Vita A, Barlati S. Recovery from schizophrenia: is it possible? *Curr Opin Psychiatry.* 2018; 31(3):246-55. <https://doi.org/10.1097/YCO.0000000000000407>
9. Karson C, Duffy RA, Eramo A, Nylander AG, Offord SJ. Long-term outcomes of antipsychotic treatment in patients with first-episode schizophrenia: a systematic review. *Neuropsychiatr Dis Treat.* 2016; 12:57-67. <http://doi.org/10.2147/NDT.S96392>
10. Lim C, Barrio C, Hernandez M, Barragán A, Brekke JS. Recovery from schizophrenia in community-based psychosocial rehabilitation settings: rates and predictors. *Res Soc Work Pract.* 2017; 27(5):538-51. <http://doi.org/10.1177/1049731515588597>
11. Jose D, Ramachandra LK, Gandhi S, Desai G, Nagarajaiah. Consumer perspectives on the concept of recovery in schizophrenia: a systematic review. *Asian J Psychiatr.* 2015; 14:13-8.
<http://dx.doi.org/10.1016/j.ajp.2015.01.006>
12. Brijnath B. Applying the CHIME recovery framework in two culturally diverse Australian communities: qualitative results. *Int J Soc Psychiatry.* 2015; 61(7):660-7.
<https://doi.org/10.1177/0020764015573084>
13. McGuire AB, Kukla M, Green A, Gilbride D, Mueser KT, Salyers MP. Illness management and recovery: a review of the literature. *Psychiatr Serv.* 2014; 65(2):171-9.
<https://doi.org/10.1176/appi.ps.201200274>
14. Pincus HA, Spaeth-Rublee B, Sara G, Goldner EM, Prince PN, Ramanuj P, Patton L. A review of mental health recovery programs in selected industrialized countries. *Int J Ment Health Syst.* 2016; 10:1-9.
<https://doi.org/10.1186/s13033-016-0104-4>
15. Ministry of Health and Welfare. The 2025 Health and Welfare Policy White Paper. 2016.
<https://www.mohw.gov.tw/dl-47081-ffae335a-3d15-4ebc-bfb8-2c2c2f89b1e6.html>. Accessed 6 June 2020
16. Ho WWN, Chiu MYL, Lo WTL, Yiu MGC. Recovery components as determinants of the health-related quality of life among patients with schizophrenia: structural equation modelling analysis. *Aust N Z J*

- Psychiatry. 2010; 44(1):71-84. <https://doi.org/10.3109/00048670903393654>
17. Salyers MP, McGuire AB, Kukla M, Fukui S, Lysaker PH, Mueser KT. A randomized controlled trial of illness management and recovery with an active control group. *Psychiatr Serv*. 2014; 65(8):1005-11. <https://doi.org/10.1176/appi.ps.201300354>
 18. Jääskeläinen E, Juola P, Hirvonen N, McGrath JJ, Saha S, Isohanni M, et al. A systematic review and meta-analysis of recovery in schizophrenia. *Schizophr Bull*. 2013; 39(6):1296-306. <https://doi.org/10.1093/schbul/sbs130>
 19. Lally J, Ajnakina O, Stubbs B, Cullinane M, Murphy KC, Gaughran F, Murray RM. Remission and recovery from first-episode psychosis in adults: systematic review and meta-analysis of long-term outcome studies. *Br J Psychiatry*. 2017; 211(6):350-8. <http://doi.org/10.1192/bjp.bp.117.201475>
 20. Van Eck RM, Burger TJ, Vellinga A, Schirmbeck F, de Haan L. The Relationship Between Clinical and Personal Recovery in Patients With Schizophrenia Spectrum Disorders: A Systematic Review and Meta-analysis. *Schizophr Bull*. 2018;44(3):631-42.
 21. Soundy A, Stubbs B, Roskell C, Williams SE, Fox A, Vancampfort D. Identifying the facilitators and processes which influence recovery in individuals with schizophrenia: a systematic review and thematic synthesis. *J Ment Health*. 2015;24(2):103-10.
 22. Nevarez-Flores A, Sanderson K, Breslin M, Carr V, Morgan V, Neil A. Systematic review of global functioning and quality of life in people with psychotic disorders. *Epidemiology and psychiatric sciences*. 2019;28(1):31-44.
 23. Morin L, Franck N. To promote recovery from schizophrenia: a systematic review. *Frontiers in psychiatry*. 2017;8:100.
 24. Leamy M, Bird V, Le Boutillier C, Williams J, Slade M. Conceptual framework for personal recovery in mental health: systematic review and narrative synthesis. *Br J Psychiatry*. 2011; 199(6):445-52. <https://doi.org/10.1192/bjp.bp.110.083733>
 25. Chang LC, Li IC. Concept analysis of empowerment. *The Journal of Nursing*. 2004;51(2):84-90. <http://doi.org/10.6224/JN.51.2.84>
 26. National Empowerment Center. A working definition of empowerment. 2017. <https://power2u.org/a-working-definition-of-empowerment/>. Accessed 6 June 2020
 27. Kim YY, Park HS. The effects of insight and empowerment on function and quality of life for patients with schizophrenia. *J Korean Acad Psychiatr Ment Health Nurs*. 2010; 19(1):11-21. <https://doi.org/10.12934/jkpmhn.2010.19.1.11>
 28. Chan RC, Mak WW, Lam MY. Self-stigma and empowerment as mediating mechanisms between in group perceptions and recovery among people with mental illness. *Stigma and Health*. 2018; 3(3):283-93. <http://dx.doi.org/10.1037/sah0000100>
 29. Chou KR, Shih YW, Chang C, Chou YY, Hu WH, Cheng JS, et al. Psychosocial rehabilitation activities, empowerment, and quality of community-based life for people with schizophrenia. *Arch Psychiatr Nurs*. 2012; 26(4):285-94. <https://doi.org/10.1016/j.apnu.2012.04.003>

30. Hasan A, Musleh M. The impact of an empowerment intervention on people with schizophrenia: results of a randomized controlled trial. *Int J Soc Psychiatry*. 2017; 63(3):212-23.
<https://doi.org/10.1177/0020764017693652>
31. Park SA, Sung KM. The effects on helplessness and recovery of an empowerment program for hospitalized persons with schizophrenia. *Perspect Psychiatr Care*. 2013;49(2):110-7.
<https://doi.org/10.1111/ppc.12002>
32. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. *Behav Res Methods*. 2009; 41:1149-60.
33. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders: DSM-IV-TR*. Washington, DC: Author, 2000.
34. Chou KR, Shiau SJ, Tseng J, Hsieh SJ, Rong JR, Huang JY. The construction of clinical competence in psychiatric mental health nursing assessment. *J Psychiatr Ment Health Nurs*. 2006;1(1):15-22.
[http://doi.org/10.6847/TJPMHN.200603_1\(1\).0005](http://doi.org/10.6847/TJPMHN.200603_1(1).0005)
35. Rogers ES, Chamberlin J, Ellison ML. Measure empowerment among users of mental health services. *Psychiatr Serv*. 1997; 48(8):1042-7.
36. Chen SC, Liu CY, Hsieh CJ, Liu WL. Psychometric testing of a chinese empowerment scale for the patients with chronic mental illness. *J Psychiatr Ment Health Nurs*. 2017;12(1):5-13.
[http://dx.doi.org/10.6847/TJPMHN.201709_12\(1\).0001](http://dx.doi.org/10.6847/TJPMHN.201709_12(1).0001)
37. Neil ST, Kilbride M, Pitt L, Nothard S, Welford M, Sellwood W, Morrison AP. The questionnaire about the process of recovery (QPR): a measurement tool developed in collaboration with service users. *Psychosis*. 2009; 1(2):145-55. <https://doi.org/10.1080/17522430902913450>
38. Chien WT, Chan ZC. Chinese translation and validation of the questionnaire on the process of recovery in schizophrenia and other psychotic disorders. *Res Nurs Health*. 2013; 36(4):400-11.
<https://doi.org/10.1002/nur.21549>
39. Overall JE, Gorham DR. The brief psychiatric rating scale. *Psychol Rep*. 1962; 10(3):799-812.
<https://doi.org/10.2466/pr0.1962.10.3.799>
40. Andersen J, Larsen JK, Kørner A, Nielsen BM, Schultz V, Behnke K, Bjørum N. The brief psychiatric rating scale: schizophrenia, reliability and validity studies. *Nord Psykiatr Tidsskr*. 1986; 40(2):135-8.
<https://doi.org/10.3109/08039488609096456>
41. Chang TJ, Hwu HG, Wei FW. The inter-rater reliability of brief psychiatric rating scale (BPRS). *Chinese Society of the Neurology and Psychiatry Bulletin*. 1986;12(1):29-36.
42. Thompson K, Kulkarni J, Sergejew AA. Reliability and validity of a new Medication Adherence Rating Scale (MARS) for the psychoses. *Schizophr Res*. 2000; 42(3):241-7. [https://doi.org/10.1016/S0920-9964\(99\)00130-9](https://doi.org/10.1016/S0920-9964(99)00130-9)
43. Kao YC, & Liu YP. Compliance and schizophrenia: the predictive potential of insight into illness, symptoms, and side effects. *Compr Psychiatry*. 2010; 51(6):557-65.
<http://doi.org/10.1016/j.comppsy.2010.03.007>

44. Waddell L, Taylor M. A new self-rating scale for detecting atypical or second-generation antipsychotic side effects. *J Psychopharmacol*. 2008; 22(3):238-43. <https://doi.org/10.1177/0269881107087976>
45. Nystazaki M, Tsapakis E, Hadjulis M, Alevizopoulos G. Validation of the Glasgow Antipsychotic Side-Effect Scale (GASS) in Greece. *J Child Psychol Psychiatry*. 2014;1(4):1-6. <https://doi.org/10.1371/journal.pone.0201225>
46. Tracey TJ, Kokotovic AM. Factor structure of the working alliance inventory. *Psychological Assessment*. *J Consult Clin Psychol*. 1989; 1(3):207-10. <http://dx.doi.org/10.1037/1040-3590.1.3.207>
47. Munder T, Wilmers F, Leonhart R, Linster HW, Barth J. Working Alliance Inventory-Short Revised (WAI-SR): psychometric properties in outpatients and inpatients. *Clin Psychol Psychother*. 2010; 17(3):231-9. <https://doi.org/10.1002/cpp.658>
48. Yen CF, Yeh ML, Chong MY, Chung HH, Chen CS. A multidimensional assessment of insights in schizophrenic patients. *Kaohsiung J Med Sci*. 2001; 17(5):253-60.
49. Baron RM, Kenny DA. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J Pers Soc Psychol*. 1986; 51(6):1173-82.
50. Hayes AF. Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. New York: Guilford publications; 2017.
51. Färdig R, Fredriksson A, Lewander T, Melin L, Mueser KT. Neurocognitive functioning and outcome of the illness management and recovery program for clients with schizophrenia and schizoaffective disorder. *Nord J Psychiatry*. 2016; 70(6):430-5. <https://doi.org/10.3109/08039488.2016.1146797>
52. Lynall ME, Bassett DS, Kerwin R, McKenna PJ, Kitzbichler M, Muller U, Bullmore E. Functional connectivity and brain networks in schizophrenia. *J Neurosci*. 2010; 30(28): 9477-87. <https://doi.org/10.1523/JNEUROSCI.0333-10.2010>
53. Jana AK, Ram D, Praharaj SK. Empowerment and its associations in schizophrenia: a cross-sectional study. *Community Ment Health J*. 2014; 50(6):697-701. <http://dx.doi.org/10.1007/s10597-014-9736-5>

Figures

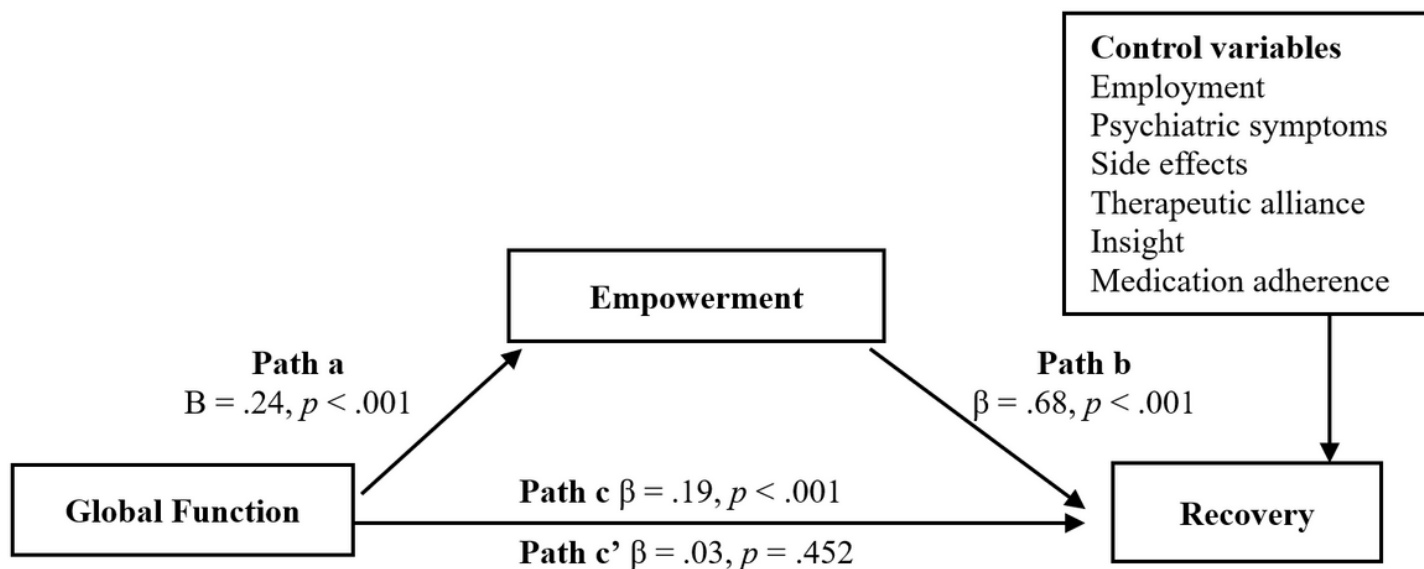


Figure 1

Mediating effects of empowerment on the relationship between global function and recovery. Note: Path c = Controlling the control variables to explore the influence; Path c' = Controlling the control variables and mediator (empowerment) to explore the influence.