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Navigating personal recovery: multinomial logistic regression analysis of schizophrenia outcomes in community-dwelling individuals

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ABSTRACT

Background Schizophrenia is a chronic mental disorder affecting individuals globally, emphasising the significance of personal recovery in mental healthcare. Understanding the recovery stages and the associated factors can provide essential insights for targeted interventions.

Aims This study aimed to discern the stages of personal recovery in Thai patients with schizophrenia and elucidate the associated factors with each stage.

Methods A multistage sampling technique was employed, selecting 231 patients with schizophrenia from mental health outpatient departments of general and psychiatric hospitals. Data collected from March to May 2023 included screening for psychotic symptoms using the Brief Psychiatric Rating Scale and six self-report questionnaires—Stage of Recovery Scale, Beck Cognitive Insight Scale, Brief Resilience Scale, Family Support, Therapeutic Relationship-Patients Version and Social Support Questionnaire—along with personal data sheets. Pearson correlation and multinomial logistic regression were performed.

Results The predominant personal recovery stage among participants was stage 3, 'living with disabilities', comprising 42.4% of the participants. Key factors contributing to personal recovery, explaining approximately 38.4% of the variance, included resilience, family support, therapeutic alliance, hospitalisations since onset and recovery-oriented nursing service utilisation. Logit equations for stages 3 and 4 are as follows: stage 3 (living with disability): logit=−4.44+0.74×resilience+0.07×therapeutic alliance+0.02×recovery-oriented nursing service utilisation; stage 4 (living beyond disability): logit=−11.57−0.05×hospitalisation since onset+1.96×resilience+0.11×family support+0.06×therapeutic alliance.

Conclusion The findings emphasise the significance of mental health nursing interventions. In conjunction with recovery-oriented nursing services, strengthening resilience, therapeutic alliances and family support may accelerate personal recovery and reduce hospitalisations among individuals with schizophrenia.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Schizophrenia is a multifaceted psychiatric disorder with global implications, impacting socioemotional and economic dimensions.
⇒ Treatment and personal recovery pathways have long been recognised as requiring personalised approaches.
⇒ In Thailand, despite notable advancements in mental health policy, there is a pronounced reliance on clinical and sociofunctional perspectives that predominantly promote a hospital-centric model, and this approach often neglects the invaluable benefits and nuanced insights offered by community-based interventions for schizophrenia.

WHAT THIS STUDY ADDS

⇒ Our study highlights the profound impact of schizophrenia in Thailand, with a notable prevalence rate of 74.9% for patients at personal recovery stages 1–3.
⇒ Concerningly, only about a quarter reached the pinnacle of recovery, personal recovery stage 4, indicating an urgent need for more effective therapeutic strategies and interventions.
⇒ This research identifies five key variables influencing personal recovery among patients with schizophrenia in Thailand: hospitalisation since onset, resilience, familial support, therapeutic alliance and the use of recovery-oriented nursing services.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Given the unique personal recovery trajectory for each individual, nursing practices in Thailand should prioritise initial personal recovery stage screenings; this facilitates individualised interventions, optimising patient outcomes.
⇒ Strong nurse–client rapport, resilience emphasis and family support are vital, along with efforts to reduce hospital readmissions.
⇒ Given the substantial number of individuals with schizophrenia in communities, policies should pivot towards community-based, recovery-oriented nursing services.

INTRODUCTION

Schizophrenia stands as one of the most profound psychiatric disorders, with its widespread repercussions resonating across social, emotional and economic dimensions globally.[1] This multifaceted disorder necessitates a more individualised approach

to recovery, intricately tailored to a patient's clinical presentation, socio-occupational circumstances and personal life story. In the distinctive landscape of Thailand, the narrative assumes a layered complexity. Even as the nation has made laudable advancements in mental health policy and infrastructure, the dominant hospital-centric paradigm tends to overshadow the critical need for community-based interventions, including mental health rehabilitation services.[2] As such, a holistic understanding of schizophrenia and its impacts is paramount, especially in shaping more inclusive and patient-centred therapeutic strategies.

Mental health rehabilitation is integral to the holistic functional recovery of individuals with schizophrenia, aiming to foster independence and enhance the quality of life. This rehabilitative process is multifaceted, focusing on the optimal restoration of a patient's abilities, social functioning, self-esteem and other essential skills for independent living. In doing so, functional rehabilitation addresses not only symptom reduction, but also critical aspects such as social interaction, vocational and social skills, cognitive functioning, and daily living abilities. Importantly, these interventions are individually tailored to meet the unique needs and circumstances of each patient, thereby ensuring a personalised and comprehensive approach to recovery.[3]

The Unity Model of Recovery (UMR) offers a refreshing perspective on the journey of recovery, emphasising that recovery is more than just a clinical progression; instead, it is a complex interplay of various internal and external factors.[4] Within this framework, the concept of 'personal recovery' emerges as a critical narrative, weaving together individual experiences, aspirations and challenges that go beyond mere symptomatology. Incorporating functional rehabilitation into the UMR can provide tangible pathways for personal recovery, promote reintegration into society, and improve the overall quality of life. For Thai communities, the UMR not only provides a theoretical model, but also serves as a guiding principle, illuminating the multifaceted nature of personal recovery outcomes for individuals with schizophrenia in community settings. While the UMR has shed light on certain aspects of the recovery journey, there remains a significant gap in the literature. Studies specifically addressing personal recovery rates and progression stages in community settings are limited. Moreover, the potential impact of factors associated with them, including the effectiveness of functional rehabilitation services, on these outcomes remains largely unclear.[4] As such, building on the foundational understanding established in the preceding discourse, it becomes imperative to delve deeper into these areas, bridging the gaps and creating a more holistic comprehension of schizophrenia recovery narratives.

Addressing these gaps extends beyond academia. Unearthing insights into personal recovery rates, stages and influential factors in community environments are essential for the development of impactful, UMR-informed interventions that resonate with the real-world experiences of individuals living with schizophrenia. A specific focus on functional rehabilitation can offer strategies that not only address the clinical aspects but also support individuals in regaining a sense of purpose, community engagement and a higher quality of life. Beyond the confines of policy and theory, the aim is to tangibly elevate care standards and enhance the quality of life for individuals affected by schizophrenia in Thailand. This research's objectives, thus, align with this broader vision, aiming to fill existing knowledge voids and contribute meaningfully to the personal recovery discourse.

METHODS

Participants and sample size

The study employed a cross-sectional descriptive approach. It involved individuals diagnosed with schizophrenia, aged 18 and above, living with their families in Thai communities. Furthermore, only those with psychotic symptom screening scores below 36 were included.[5] They were chosen from six hospitals, both general and psychiatric, through multi-random sampling. The criteria targeted those who had availed of mental health nursing services in outpatient settings for at least 18 months post-discharge. Proficiency in Thai and willingness to participate were essential. However, participants exhibiting intense psychotic symptoms, like hallucinations or delusions, during interviews were excluded.

The field test instrument phase sample size was based on a general guideline, needing at least 100 samples.[6] Taking potential dropouts into account, an additional 10% was incorporated, resulting in 110 samples. The primary study phase was guided by 5–10 participants per tool item,[7] with the tools comprising up to 45 items, resulting in 225 participants. Accounting for a 25% dropout rate, this number increased to 231. Both phases adhered to uniform criteria without any participant overlap. A visual representation of the sampling structure is provided in figure 1.

Research instruments

The research tools used were developed during a doctoral endeavour, aiming to understand personal recovery in individuals with schizophrenia residing in Thai communities. The instrument suite included three existing Thai scales: the Brief Psychiatric Rating Scale (BPRS), the Beck Cognitive Insight Scale (BCIS) and the modified Social Support Questionnaire (SSQ) for social support. Four additional scales were translated into Thai by the researchers employing the back-translation method, a cross-cultural research technique pioneered by Brislin in 1970, to ensure linguistic and conceptual consistency. The scales translated were the Stage of Recovery Scale (SRS), the Brief Resilience Scale (BRS), the Family Support Scale (FSS) and the Therapeutic Relationship-Patients Version (STAR-P). Additionally, a novel tool using the seven steps of the DeVellis and Thorpe method,[7] the

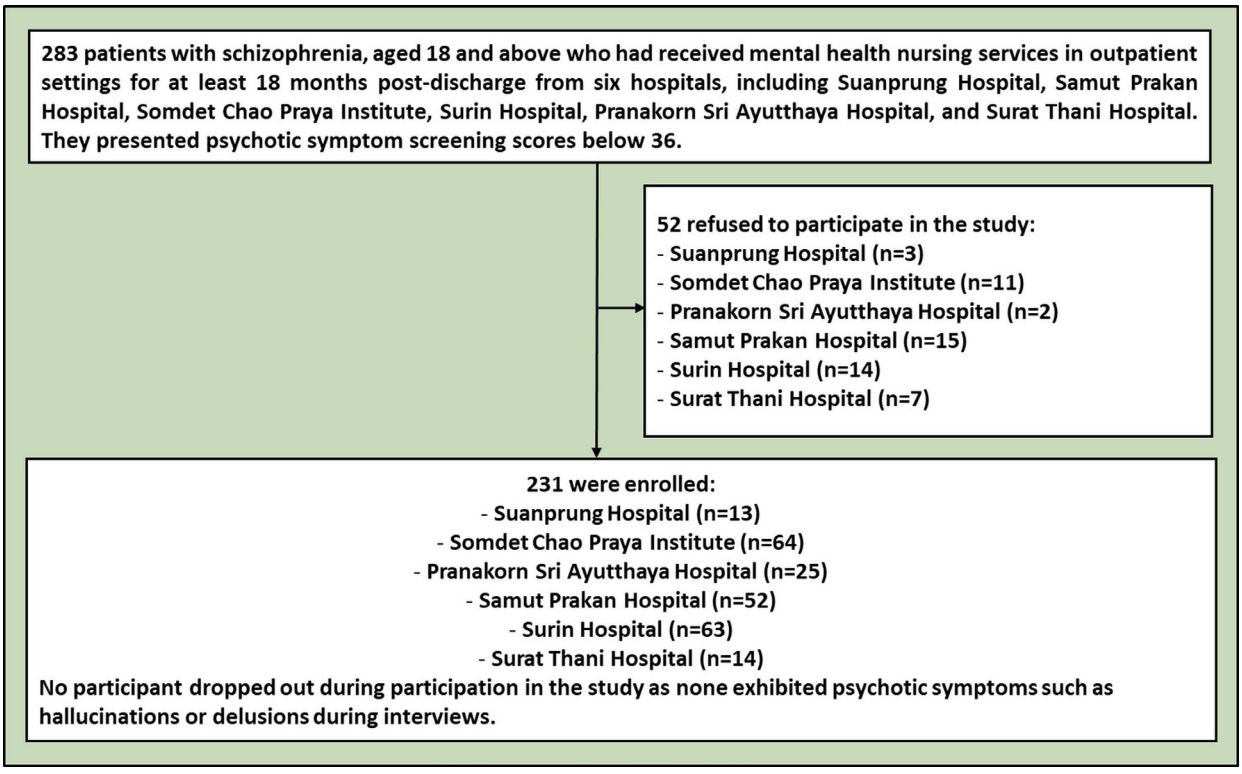


Figure 1 Study flowchart.

Recovery-Oriented Nursing Service Utilisation (RONSU), was introduced. A blend of original, translated and novel tools was employed to assess various factors that showcased impressive validity and reliability,[8] with specifics to be elaborated on in the subsequent sections.

Demographic information

Data on participants' personal attributes and medical history were collected, including 'hospitalisation since onset', which served as one of the independent variables.

BPRS Thai version

This tool was used to assess the psychotic symptoms of the participants. Translated from the original Overall and Gorham[9] version by Kittirattanapiboon,[10] this 18-item scale has a scoring spectrum from 1 to 108, with higher scores indicating increased symptom severity. Inclusion was restricted to those with scores below 36. Previous studies have underscored its reliability, with the inter-rater reliability of its subscales consistently above 0.80 ($p<0.001$), an intraclass correlation coefficient (ICC) and notable internal consistency. The tool's reliability coefficient was 0.87, while another investigation revealed an inter-rater reliability of 0.98 and an ICC of 0.88.[11]

BCIS Thai version

Initially conceptualised by Beck *et al*[12] and later translated into Thai by Ketchai *et al*,[13] this assessment evaluates cognitive insight through patient self-report, examining their capability to identify and correct misbeliefs. It consists of two dimensions—self-reflectiveness and self-certainty—across 15 items, scaled from 0 (do not agree at all) to 3 (agree completely). In a recent study, robust construct validity was confirmed for both dimensions, with notable metrics (χ^2=131.93, df=72; comparative fit index (CFI), goodness of fit index (GFI)=1; standardised root mean square residual (SRMR)=0.073). Composite reliability ranged from 0.76 to 0.83, and the average variance extracted (AVE) ranged from 0.35 to 0.37.[8]

Modified SSQ Thai version

Drawing upon the framework initially developed by Schaefer, Coyne, and Lazarus (1981) on the health-related functions of social support, this study utilises the Thai version translated by Hanucharurnkul,[14] aligning with our focus on support from friends and health providers among schizophrenia people. The 14-item tool, evenly distributed among these sources, measures perceived support ranging from 0 (none whatsoever) to 4 (extensively). Scores can range from 0 to 56, with higher values signifying increased social support. In the current study, robust construct validity was confirmed for both dimensions, with notable metrics (χ^2=566.5, df=76; CFI, normed fit index (NFI)=1; GFI=0.92; adjusted goodness of fit index (AGFI)=0.89). The composite reliability (pc) ranged from 0.87 to 0.96, with AVE values between 0.51 and 0.79.[8]

Stage of Recovery Scale

Introduced by Song and Hsu,[15] this assessment evaluates participants' personal recovery stages through a 45-item self-evaluation, with scores ranging from 0 to 135. Higher scores indicate further progression through the personal

recovery stages, categorised as follows: stage 1 (0–57), stage 2 (58–90), stage 3 (91–119) and stage 4 (120–135). In this study, the instrument showcased strong content validity, boasting a total content validity index (CVI) of 0.91 and item-CVI from 0.83 to 1. Construct validity was affirmed for six dimensions (χ^2=1916.29, df=939; CFI, GFI, AGFI, NFI=1; root mean square residual (RMR)=0.096; SRMR=0.079). Composite reliability for the latent constructs varied from 0.78 to 0.94, and the AVE values of SRS ranged from 0.43 to 0.66.[8]

Brief Resilience Scale

As developed by Smith *et al*,[16] this tool assesses resilience, understood as stress recovery capability. It consists of six items rated on a scale from 1 (strongly disagree) to 5 (strongly agree), with items 2, 4 and 6 being negative. The resilience metric ranges from 6 to 30, with higher scores indicating greater resilience according to the recommendations from Smith *et al*.[17] In this investigation, the BRS exhibited stellar content validity with both total CVI and item-CVI at 1. Construct validity was validated (χ^2=65.18, df=9; CFI, GFI, AGFI, NFI=1; RMR=0.14; SRMR=0.13), displaying the tool's reliability with a pc of 0.80 and an AVE of 0.44.[8]

Therapeutic Relationship-Patients Version

Developed by McGuire-Snieckus *et al*,[18] this tool measures therapeutic rapport between clinicians and patients with severe mental illness in community contexts. This 12-item self-assessment evaluates collaboration, clinician empathy and concern through three subscales. Responses range from 0 (never) to 4 (always), with total scores ranging from 0 to 48, and items 4, 7 and 9 requiring reverse coding. In this research, the STAR-P exhibited robust content validity (both CVI and item-CVI at 1). Construct validity was confirmed (χ^2=107.92, df=51; GIF=0.88; root mean square error of approximation (RMSEA)=0.07), while reliability metrics showed a pc between 0.79 and 0.95 and AVE values from 0.55 to 0.77.[8]

Family Support Scale

Devised by Song[4] (2017), this tool assesses family support through six items that evaluate instrumental and emotional assistance from the family over the past 6 months.[4] Responses range from 0 (never) to 3 (often), generating potential scores between 0 and 18, with higher scores corresponding to greater family support. In this study, the FSS showcased strong content validity (both total CVI and item-CVI at 1). Construct validity was verified (χ^2=10.83, df=5; GFI=0.99; RMR=0.032). The tool demonstrated high reliability, with a pc of 0.92 and an AVE of 0.65.[8]

Recovery-Oriented Nursing Service Utilisation

Specifically designed for this study, this tool assesses the utilisation of recovery-oriented nursing services through 32 self-report items post-exploratory factor analysis (EFA) testing, encapsulating four critical dimensions: social skills training, indirect nursing care management, therapeutic nurse–patient relationship and coping skills training. Its reliability is evident with a Cronbach's alpha consistently above 0.80. Construct validity is reflected by fit indices: χ^2=220.43, df=356, CFI=1 and RMSEA=0. The tool's composite reliability ranges between 0.94 and 0.97, highlighting its consistent representation. With AVE values from 0.72 to 0.77, the instrument adeptly captures the variance, reinforcing its accuracy in recovery-oriented nursing service utilisation.[8]

Data collection overview

In the instrument field testing phase, we refined novel, translated and existing Thai scales. Initial reliability testing was conducted on 30 samples from Surin Hospital. Subsequent analyses included EFA on the novel scale and confirmatory factor analysis on the translated versions, using 110 samples, with an equal distribution of 55 participants each from the Somdet Chao Praya Institute of Psychiatry and Surin Hospital. In the main study phase, data collection commenced after obtaining necessary approvals from a leading university's ethics committee and the institutional review boards of all selected hospitals. Data collection was conducted across six distinct settings, namely Suanprung Hospital, Samut Prakan, Somdet Chao Praya Institute, Surin Hospital, Pranakorn Sri Ayutthaya Hospital and Surat Thani Hospital. Candidates were either psychiatric nurse practitioners, master's degree holders in psychiatric nursing or those who completed a 4-month specialised course, all with at least 2 years of experience with patients with schizophrenia and a thorough knowledge of the BPRS. With these trained assistants, patients with schizophrenia were strategically approached at outpatient services, using proportional probability sampling based on the number of patients with schizophrenia in each setting. A total of 231 participants were engaged without any dropouts. The data were systematically collected through instruments such as the BPRS, personal data sheets and seven other thoroughly vetted questionnaires.

Ethical considerations

The entire study adhered to ethical approvals. The neutrality of the research team was paramount, avoiding any undue influence over participants. All information was conveyed in Thai for clarity, and participants were informed transparently about their rights, potential risks and the study's objectives. A vigilant monitoring system was in place to address potential distress, and data confidentiality and anonymity were strictly maintained. Participants provided written informed consent, affirming voluntary participation. Data collection spanned from March 2023 to May 2023. After the research concluded, all identifiable information was securely discarded to uphold participant privacy. As a gesture of gratitude, all participants received mask packages.

Data analysis

IBM SPSS Statistic version 29 was used for data analysis, with a p value of less than 0.05. Quality assurance included

assessing the frequency of data to identify issues in categorical variables and using descriptive statistics such as means and medians to validate numeric entries.[19] Missing data and outliers were systematically handled to reduce biases. Clarity on the study's demographics and variable distribution was achieved through descriptive statistics, such as frequencies and means. Pearson correlation coefficient was applied for correlation tests to measure the relationship dynamics between variables.[19] While existing studies offered a baseline, using Pearson within Thailand's unique context validated these findings and set the stage for more intricate analyses, like logistic regression.

In the regression analysis, multinomial logistic regression (MLOGIT) was employed due to the study's emphasis on personal recovery stages and the ordinal characteristics of certain variables. Through MLOGIT, factors such as hospitalisation since onset, cognitive insight, resilience, family support, social support, therapeutic alliance and recovery-oriented nursing service utilisation were assessed for significant associations with different personal recovery stages. The comprehensive 'enter' method allowed for an all-inclusive assessment of predictors, ensuring a balance between relevance and avoiding model overfitting. Before analysis, key MLOGIT assumptions were validated, including data independence, even data distribution and adherence to sample size norms. The model's reliability was ensured through multicollinearity checks, and likelihood ratio tests confirmed its fit.[20]

Moreover, predictive accuracy testing used the area under the curve (AUC) from the receiver operating characteristic curve, indicating a comprehensive evaluation of our model's performance to discriminate between positive and negative instances across all possible thresholds. This rigorous approach ensures that our findings are not only statistically significant but also clinically meaningful and applicable.[19]

RESULTS

Descriptive statistics and bivariate analyses

Table 1 classifies the participants into three personal recovery stages: 'overburdened by disability' (stages 1 and 2; 32.5%), 'living with disability' (stage 3; 42.4%) and 'living beyond disability' (stage 4; 25.1%), with a focus on stage 3 as the predominant group. In stage 3, 63.3% of the participants were male, with 89.8% aged between 18 and 59 years. Occupationally, 54.1% were unemployed, while 25.5% were employed. Notably, 58.2% had experienced over 21 hospitalisations since the onset of schizophrenia. Regarding schizophrenia duration, 32.7% had lived with the condition for 6–10 years.

In contrast, the 'overburdened by disability' stage (a combination of stages 1 and 2) comprised 32.5% of the participants. The majority were male (60.0%), with 74.7% earning below 10 000 baht per month. A considerable 32.0% had lived with the condition for 11–15 years. The 'living beyond disability' stage, accounting for 25.1% of the participants, predominantly consisted of men, at 63.3%. Notably, 39.7% had lived with the condition for over 21 years. Considering its prevalence and the distinct challenges and advancements observed, stage 3 is of particular significance because it reveals key demographic and medical characteristics that are most prevalent in this stage, highlighting its critical role in understanding the dynamics of personal recovery.

Table 2 presents a correlation matrix indicating significant relationships among variables and personal recovery. Cognitive insight (0.34) and resilience (0.33) correlate positively with personal recovery, while the frequency of hospitalisations exhibits a negative correlation (−0.26). Family (0.37) and social support (0.44) are positively associated with personal recovery, as are therapeutic alliance (0.39) and recovery-oriented nursing service utilisation (0.28).

For subsequent analyses, inferential statistics, particularly logistic regression, were employed to explore potential associated factors of personal recovery stages.

Assumption testing (MLOGIT)

In the MLOGIT analysis, we confirmed the independence of observations and addressed the small cell count in stage 1 by combining it with stage 2, labelled as 'overburdened'. This categorisation is based on the similar severity of disability in these groups. Our sample size of 231 was deemed adequate for the analysis. Pearson χ^2 test indicated significant associations between personal recovery and several variables including hospitalisations since onset, BCIS, BRS, family support, social support, therapeutic alliance and RONSU, with all p values below 0.05. No multicollinearity was detected, with tolerance and variance inflation factor values within acceptable ranges.

The likelihood ratio tests underscored the model's potency, indicating that five key associated factors—hospitalisations since onset, resilience, family support, therapeutic alliance and recovery-oriented nursing service utilisation—significantly enhanced the model's fit, all with p values below 0.05. However, amidst this network of relationships, both cognitive insight and social support did not yield similar impactful contributions to the model.

Correlated variables of personal recovery among people with schizophrenia (MLOGIT analysis)

The study assessed how cognitive insight, hospitalisations, resilience, family and social support, therapeutic alliance, and nursing service utilisation impacted personal recovery stages in patients with schizophrenia in Thai communities (table 3). Compared with stages 1 and 2 (overburdened), in stage 3 (living with disability), logistic regression results showed a significant positive association for resilience (β=0.74, p=0.031, Exp(B)=2.10), therapeutic alliance (β=0.07, p=0.004, Exp(B)=1.07) and recovery-oriented nursing service utilisation (β=0.02, p=0.025, Exp(B)=1.02), with the likelihood of being in stage 3. Each unit increase in resilience more than

Table 1 Characteristics and medical history of the participants by personal recovery stages

Demographics	Stages 1 and 2 (n=75, 32.5%) n (%)	Stage 3 (n=98, 42.4%) n (%)	Stage 4 (n=58, 25.1%) n (%)	Total (n=231, 100%) n (%)
Gender				
Male	45 (60.0)	62 (63.3)	35 (60.3)	142 (61.5)
Female	30 (40.0)	36 (36.7)	23 (39.7)	89 (38.5)
Age (years)				
18–59	66 (88.0)	88 (89.8)	51 (87.9)	205 (88.7)
60 and above	9 (12.0)	10 (10.2)	7 (12.1)	26 (11.3)
Occupation				
Unemployed	44 (58.7)	53 (54.1)	33 (56.9)	130 (56.3)
Government/state enterprise official	2 (2.7)	3 (3.1)	1 (1.7)	6 (2.6)
Employee	16 (21.3)	25 (25.5)	17 (29.3)	58 (25.1)
Business owner	11 (14.7)	10 (10.2)	3 (5.2)	24 (10.4)
Agriculturist	2 (2.7)	5 (5.1)	4 (6.9)	11 (4.8)
Monk	0 (0.0)	2 (2.0)	0 (0.0)	2 (0.9)
Household monthly income (Thai baht)				
<10 000	56 (74.7)	69 (70.4)	37 (63.8)	162 (70.1)
10 001–20 000	13 (17.3)	24 (24.5)	12 (20.7)	49 (21.2)
20 001–30 000	3 (4.0)	4 (4.1)	6 (10.3)	13 (5.6)
30 001–40 000	2 (2.7)	0 (0.0)	1 (1.7)	3 (1.3)
40 001–50 000	1 (1.3)	1 (1.0)	2 (3.4)	4 (1.7)
BPRS				
No symptoms	66 (88.0)	86 (87.8)	53 (91.4)	205 (88.7)
Very mild symptoms	9 (12.0)	12 (12.2)	5 (8.6)	26 (11.3)
Period last admitted (months)				
18–60	43 (57.3)	66 (67.3)	29 (50.0)	138 (59.7)
61–120	11 (14.7)	18 (18.4)	14 (24.1)	43 (18.6)
121–240	15 (20.0)	11 (11.2)	9 (15.5)	35 (15.2)
241 and above	6 (8.0)	3 (3.1)	6 (10.3)	15 (6.5)
Hospitalisation since onset (times)				
1–10	18 (24.0)	18 (18.4)	23 (39.7)	59 (25.5)
11–20	30 (40.0)	23 (23.5)	18 (31.0)	71 (30.7)
21 and above	27 (36.0)	57 (58.2)	17 (29.3)	101 (43.7)
Duration having schizophrenia (years)				
1–5	9 (12.0)	16 (16.3)	2 (3.4)	27 (11.7)
6–10	10 (13.3)	32 (32.7)	11 (19.0)	53 (22.9)
11–15	24 (32.0)	17 (17.3)	14 (24.1)	55 (23.8)
16–20	13 (17.3)	14 (14.3)	8 (13.8)	35 (15.2)
21 and above	19 (25.3)	19 (19.4)	23 (39.7)	61 (26.4)

Stages 1 and 2: overburdened by disability; stage 3: living with a disability; stage 4: living beyond disability.
BPRS, Brief Psychiatric Rating Scale.

doubled the likelihood of individuals with schizophrenia being in this stage, whereas strong therapeutic alliance and service utilisation were associated with a 7% and 2% increase, respectively, in the likelihood of progressing to this recovery stage.

Compared with stages 1 and 2 (overburdened), in stage 4 (living beyond disability) resilience (β=1.96, p<0.001, Exp(B)=7.10) exhibited a remarkably positive association with stage 4, with each unit increase boosting the chances of being in this stage by 610%. Both family support (β=0.11, p=0.049, Exp(B)=1.12) and therapeutic alliance (β=0.06, p=0.030, Exp(B)=1.06) were positively associated with this stage, increasing chances by 12% and 6%, respectively. However, hospitalisations since onset were

Table 2 Matrix of correlations among the examined variables (n=231)

Variables	HOS	BRS	BCIS	FS	SS	TA	RONSU	SRS
Hospitalisation since onset	1.00							
Resilience	−0.13*	1.00						
Cognitive insight	−0.37*	0.17**	1.00					
Family support	−0.27*	0.20**	0.13*	1.00				
Social support	−0.27*	0.24**	0.30**	0.47**	1.00			
Therapeutic alliance	−0.34*	0.20**	0.60**	0.19**	0.39**	1.00		
Recovery-oriented nursing service utilisation	−0.35*	0.23**	0.49**	0.17**	0.36**	0.50**	1.00	
Personal recovery	−0.26*	0.33**	0.34**	0.37**	0.44**	0.39**	0.28**	1.00

All listed correlations are statistically significant.
*p<0.05, **p<0.01 (two-tailed).
BCIS, Beck Cognitive Insight Scale; BRS, Brief Resilience Scale; FS, family support; HOS, hospitalisations since onset; RONSU, Recovery-Oriented Nursing Service Utilisation; SRS, Stage of Recovery Scale (Personal recovery); SS, social support; TA, therapeutic alliance.

negatively associated with this stage, reducing the chance by 5.2% for each additional hospitalisation. Interestingly, cognitive insight, social support and nursing service utilisation were not significantly associated factors for stage 4.

In summary, among individuals with schizophrenia in Thailand, resilience emerged as a potent associated factor across personal recovery stages. Therapeutic alliance and service utilisation played supportive roles in earlier stages, whereas family support became crucial in advanced recovery. Hospitalisations since onset, while not affecting the midstage of recovery, proved detrimental in the advanced stages. Factors such as cognitive insight and social support did not show significant impacts on personal recovery stages in this population.

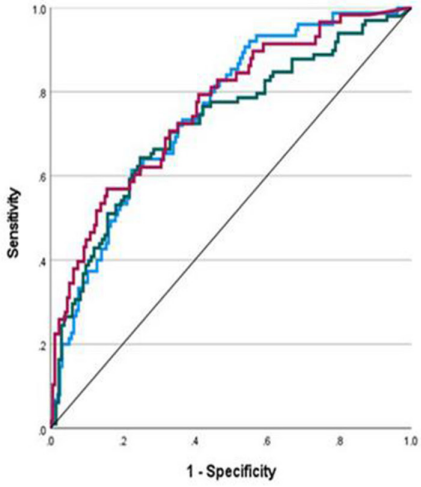
Therefore, the equations of logistic regression for explaining the predictive variables of personal recovery at each stage are displayed hereunder:

- Stage 3 (living with disability): logit=−4.44+0.74×resilience+0.07×therapeutic alliance+0.02×recovery-oriented nursing service utilisation.

Table 3 Multinomial logistic regression of various personal recovery stages in community-dwelling individuals with schizophrenia in Thailand

Personal recovery stages†	β	SE	Wald	Significance	Exp(B)
Stage 3, living with disability					
Intercept	−4.44	1.29	11.87	<0.001*	
Hospitalisations since onset	−0.02	0.02	1.37	0.243	0.98
Resilience	0.74	0.35	4.64	0.031*	2.10
Cognitive insight	−0.06	0.06	0.85	0.357	0.94
Family support	−0.03	0.04	0.63	0.428	0.97
Social support	0.01	0.02	0.68	0.409	1.01
Therapeutic alliance	0.07	0.03	8.20	0.004*	1.07
Recovery-oriented nursing service utilisation	0.02	0.01	5.00	0.025*	1.02
Stage 4, living beyond disability					
Intercept	−11.57	1.79	41.92	<0.001*	
Hospitalisations since onset	−0.05	0.02	6.07	0.014*	0.95
Resilience	1.96	0.42	21.50	<0.001*	7.10
Cognitive insight	0.03	0.08	0.12	0.731	1.03
Family support	0.11	0.05	3.71	0.049*	1.12
Social support	0.02	0.02	0.73	0.394	1.02
Therapeutic alliance	0.06	0.03	4.70	0.030*	1.06
Recovery-oriented nursing service utilisation	−0.00	0.00	0.01	0.929	1.00

*p<0.05.
†The reference category was stages 1 and 2 (overburdened).
SE, standard error.



Categories of Dependent variable: personal recovery	Area under Curve (AUC)
Stage 1 and 2 Overburdened by disability	0.75
Stage 3 Living with disability	0.72
Stage 4 Living beyond disability	0.76

Figure 2 Receiver operating characteristic curves for personal recovery stages. This figure illustrates the classification accuracy of the predictive model for different stages of personal recovery. Each curve represents a stage of recovery: stages 1 and 2 (overburdened by disability), stage 3 (living with disability) and stage 4 (living beyond disability), with their respective AUC values indicating the model's ability to distinguish between these stages. The AUC values ranged from 0.72 to 0.76, demonstrating the model's good discriminatory power. AUC, area under the curve.

- Stage 4 (living beyond disability): logit=−11.57–0.05×hospitalisation since onset+1.96×resilience+0.11×family support+0.06×therapeutic alliance.

Additionally, the logistic regression model fits well, explaining 38.4% of the variance in personal recovery (Nagelkerke R^2), with independent variables significantly affecting personal recovery ($p<0.001$).

Operating characteristic curve analysis shows the model's good predictive accuracy with AUC values of 0.75 for stages 1 and 2, 0.72 for stages 3 and 0.76 for stage 4, indicating moderate to high classification ability. This underscores the model's efficacy in differentiating personal recovery stages compared with random classification (figure 2).

DISCUSSION

Main findings

The primary objective was to understand the personal recovery stage among individuals with schizophrenia in the Thai community. Most participants (42.4%) were in stage 3, 'living with disability', similar to findings in Hong Kong (69.33%). However, Hong Kong reported better recovery outcomes, possibly due to its integrated mental healthcare system and societal openness.[21] This variance could stem from differences in healthcare infrastructure, societal mental health perspectives and public awareness campaigns. Hong Kong's advanced mental healthcare, particularly the introduction of the Integrated Community Centre for Mental Wellness, might explain its higher recovery rates,[22] contrasting with challenges in Thailand's mental health services.[2]

The personal recovery stage 3 is characterised by individuals accepting their condition, employing coping strategies and actively making adjustments to minimise schizophrenia's impact on their lives. Such adjustments often include self-education about schizophrenia, engaging in advocacy and reaching out for support,[23] underscoring the importance of improving community-based mental health services in Thailand to facilitate progression to stage 4, 'living beyond disability'. Interestingly, a significant demographic in Thailand at this personal recovery stage comprises men aged 18–59, primarily unemployed and earning below 10 000 baht per month. While many are asymptomatic according to the BPRS, they often have a history of multiple hospitalisations. This highlights the potential benefits of transitioning from solely acute symptom management to a more continuous, recovery-oriented care model, aligning with global perspectives and recommendations from the World Health Organization.

Regarding variables that influence personal recovery in individuals with schizophrenia within community contexts in Thailand, our findings revealed a multivariate and stage-specific relationship between the associated factors and recovery stages. Resilience and therapeutic alliance were consistently associated factors across both personal recovery stages (3 and 4). Resilience emerged as the most influential factor, indicating that as resilience increases, higher resilience levels correspond to greater chances of advancing in recovery stages, aligning with the existing literature emphasising the role of resilience in managing schizophrenia's chronicity. Enhanced resilience, including facets like self-efficacy and emotional regulation, emerges as a potential strategy for promoting personal recovery in schizophrenia, highlighting its association with positive outcomes in recovery-oriented interventions. Therapeutic alliance significantly influenced both personal recovery stages, although slightly less than resilience. This underscores the importance of

the relationship between mental health practitioners and individuals with schizophrenia in the recovery process.[24] This study adds to the existing literature, showing a correlation between therapeutic alliance and recovery outcomes in patients with schizophrenia.[25] The potency of the therapeutic bond was particularly pronounced in providing essential emotional backing and trust, which are fundamental to recovery. This finding emphasises the potential benefits of fostering solid therapeutic alliances in mental health interventions.

Recovery-oriented nursing service utilisation positively correlated with personal recovery stage 3, which reaffirms the necessity of accessible and quality nursing services early in recovery. These services encapsulate comprehensive care, medication management and psychosocial support, potentially enhancing the holistic recovery approach. Our findings underscore the role of recovery-oriented services in facilitating personal recovery, highlighting the role of nursing in the rehabilitation and support of individuals with schizophrenia in community settings.

In the context of progressing towards recovery stage 4 (living beyond disability) among individuals with schizophrenia in the Thai community, several insights and contradictions emerge from the findings. Family support emerged as a significant predictor in this stage, with a moderately positive correlation. The importance of family support is underscored by its multidimensional nature, encompassing emotional, instrumental and informational components, which may foster a reciprocal relationship between the giver and the receiver in the recovery journey.[26]

An inverse relationship was observed between the number of hospitalisations since onset and progression to stage 4 (living beyond disability) of personal recovery. This finding resonates with the suggestion from Bauer *et al*[27] that frequent hospitalisations, indicative of recurrent crises or severe symptoms, might be associated with disruptions in recovery.[27] However, contrasting results from Song (2017) posit a positive correlation between hospitalisations and personal recovery, implying a potential benefit from intensive treatment received during hospitalisations. The complex relationship between hospitalisation and personal recovery underscores the need for a nuanced understanding, considering factors like remission and relapse.[28]

Interestingly, while cognitive insight and social support showed a moderately positive correlation with personal recovery, neither of them emerged as significantly associated factors in the multinomial logistic model. This suggests that their influence may be less critical in differentiating specific recovery stages, especially within the Thai community setting. Previous literature has indeed indicated a positive relationship between social support, cognitive insight and recovery.[29] This study supports the notion that personal recovery in schizophrenia is multifaceted and non-linear, contingent on a plethora of factors.

In navigating the intricate terrain of personal recovery in schizophrenia, particularly in the Thai community setting, the findings of this study contribute to the growing literature on personal recovery in schizophrenia, emphasising the five key correlated variables that significantly predict different personal recovery stages among individuals with schizophrenia in the Thai community: hospitalisations since onset, resilience, family support, therapeutic alliance and recovery-oriented nursing service utilisation. Despite not all variables predicting recovery uniformly, these findings emphasise the need for mental health professionals to assess and address these variables, ensuring a holistic approach to promoting favourable personal recovery outcomes. The roles of cognitive insight and social support in the transition between personal recovery stages were less definitive. The results shed light on the intricate nature of personal recovery, highlighting areas requiring intervention and support. For mental health professionals working with individuals with schizophrenia, it is imperative to consider a comprehensive approach that factors in these variables to foster positive personal recovery outcomes.

Limitation

The cross-sectional design of the study captures a time snapshot, offering insights into the predictor variables' impact only during that specific period. Such a design constrains our capacity to establish cause-and-effect relationships or track the evolving recovery journey of individuals with schizophrenia over time.

Implications

The study highlights the intricate process of personal recovery among individuals with schizophrenia in Thai community settings. Recognising that personal recovery is unique to each individual, it is essential for nursing practices to incorporate an initial screening process to determine personal recovery stages. This personalised approach ensures tailored interventions, enhancing patient outcomes. Building a solid nurse–client relationship, emphasising resilience and involving family in the recovery process are pivotal to a successful recovery. Furthermore, efforts must be made to reduce frequent hospital readmissions. In terms of education, it is essential to integrate the insights from this study into the nursing curricula in Thailand. Undergraduate students should be introduced to personal recovery concepts, while graduate programmes should offer a deeper dive, equipping nurses with specific skills like motivational interviewing and recovery-oriented care principles. From a policy perspective, the study sheds light on the necessity of incorporating therapeutic alliances, resilience-building programmes and family support into mental healthcare frameworks. With many individuals with schizophrenia residing within the community, there is an urgent need for structured, community-centric mental health services. Policies should address this need, emphasising recovery-oriented nursing services. The study also presents the

UMR as a potential tool for policy planning and evaluation. In conclusion, the study underscores the importance of a personalised, recovery-focused approach in the care and policy frameworks for individuals with schizophrenia in Thailand.

CONCLUSION

This study enriches our comprehension of personal recovery in individuals with schizophrenia, especially within Thai community settings. It underscores the pivotal roles of resilience, therapeutic alliance and the use of recovery-oriented nursing services across various recovery phases. The MLOGIT models crafted in this research not only echo findings from previous studies, such as those by Badu *et al*,[30] but also shed light on the nuanced and intricate nature of personal recovery. These models emphasise that personal recovery is individualistic and multifaceted, rather than a uniform process.

The implications of the study are significant. The results advocate for the promotion of resilience, enhancing therapeutic partnerships and the promotion of recovery-oriented nursing approaches. Furthermore, the pronounced influence of family support in later stages accentuates its indispensable role in the recovery journey. A subtle yet crucial observation was the negative association between the number of hospitalisations and personal recovery, suggesting that recurrent hospitalisations might hinder recovery. This accentuates the need for effective community-based mental health services to minimise readmissions. Lastly, while both social support and cognitive insight showed a positive relationship with personal recovery, neither stood out as a decisive associated factor for various recovery stages, marking a potential avenue for more detailed exploration in future studies.

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Contributors JT led the development of the study's concepts, conduct of literature search, data acquisition, analysis and statistical work, as well as initial manuscript preparation. JY, the corresponding author and guarantor, contributed to the study's design and intellectual content, co-wrote the manuscript and oversaw manuscript editing. PU focused on manuscript editing and joined all authors in defining intellectual content and reviewing the final manuscript.

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