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Validity and reliability of Psychiatric Nurse Self-Efficacy Scales: cross-sectional study

Hironori Yada ,[1] Ryo Odachi,[2] Keiichiro Adachi,[3] Hiroshi Abe,[4] Fukiyo Yonemoto,[1] Toshiya Fujiki,[5] Mika Fujii,[6] Takahiko Katoh[7]

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For numbered affiliations see end of article.

Correspondence to
Dr Hironori Yada;
yada.hironori.jp@teikyo-u.ac.jp

ABSTRACT

Objectives To develop the Psychiatric Nurse Self-Efficacy Scales, and to examine their reliability and validity.

Design We developed the Improved Self-Efficacy Scale (ISES) and Decreased Self-Efficacy Scale (DSES) using existing evidence. Statistical analysis was conducted on the data to test reliability and validity.

Setting The study's setting was psychiatric facilities in three prefectures in Japan.

Participants Data from 514 valid responses were extracted of the 786 responses by psychiatric nurses.

Outcome measures The study measured the reliability and validity of the scales.

Results The ISES has two factors ('Positive changes in the patient' and 'Prospect of continuing in psychiatric nursing') and the DSES has three ('Devaluation of own role as a psychiatric nurse', 'Decrease in nursing ability due to overload' and 'Difficulty in seeing any results in psychiatric nursing'). With regard to scale reliability, the Cronbach's alpha coefficient was 0.634–0.845. With regard to scale validity, as the factorial validity of the ISES and DSES, for the ISES, χ^2/df (110.625/37) ratio=2.990 (p<0.001), goodness-of-fit index (GFI)=0.962, adjusted GFI (AGFI)=0.932, comparative fit index (CFI)=0.967 and root mean square error of approximation (RMSEA)=0.062; for the DSES, χ^2/df (101.982/37) ratio=2.756 (p<0.001), GFI=0.966, AGFI=0.940, CFI=0.943, RMSEA=0.059 and Akaike Information Criterion=159.982. The concurrent validity of the General Self-Efficacy Scale was r=0.149–0.446 (p<0.01) for ISES and r=−0.154 to −0.462 (p<0.01) for DSES, and the concurrent validity of the Stress Reaction Scale was r=−0.128 to 0.168 for ISES, r=0.214–0.398 for DSES (p<0.01).
Statistical analyses showed the scales to be reliable and valid measures.

Conclusions The ISES and DSES can accurately assess psychiatric nurses' self-efficacy. Using these scales, it is possible to formulate programmes for improving psychiatric nurses' feelings of self-efficacy.

Strengths and limitations of this study

- ► The first useful scales that measured psychiatric nurses' self-efficacy were developed in this study.
- ► The content and language of the scale items were carefully selected by specialists.
- ► Scale items were carefully selected by confirming the distribution and the discrimination power of item scores.
- ► Scales have been verified for the reliability and validity.
- ► The cross-validation and the test–retest reliability will be needed for future study.

INTRODUCTION

Bandura[1] defined self-efficacy as 'judgment of how well one can execute courses of action required to deal with prospective situations' (p122); individuals with high self-efficacy set their own goals, while those with low self-efficacy may produce poor outcomes.[2] Self-efficacy affects workers' efforts and sustainability in learning difficult tasks.[3] Self-efficacy may also partially buffer stress,[4] and should not only be considered a part of mental healthcare but also as a factor to improve the quality of patient care. Therefore, maintaining self-efficacy has important implications for nurses.

Nursing is recognised as emotional labour.[5 6] McVicar[7] conducted a scoping review to assess the antecedents of nurses' job stress and satisfaction. Nursing is perceived as a stressful occupation,[8–10] with urgent mental health issues that need to be addressed.[11 12] Mental health problems for nurses include conflict with other nursing staff, nursing role conflict, qualitative workload, quantitative workload and conflict with patients.[13] Nurses working in general wards care for physical illness. The average length of stay in general wards, excluding psychiatry, is 16.1 days.[14]

While the average duration of hospitalisation for psychiatric patients in Japan is one of the longest worldwide—averaging 265.8 days—this has been decreasing in recent years.[14] The Japanese government is now shifting the focus of psychiatric care from the hospital ward to the community, although it is difficult to know how quickly this change is being implemented. Psychiatric nurses need

to respond to the drastically different working environment in psychiatric wards, compared with general wards; and given the situation-specific difficulties encountered by psychiatric nurses, such as communication difficulties related to mental issues and violence from psychiatric patients, the necessity of specialised mental healthcare for psychiatric nurses has been emphasised.[15] At the same time, there is concern that psychiatric nurses exposed to such an environment may have reduced self-efficacy. Yada *et al*[16] also highlighted the importance of self-efficacy when evaluating psychiatric nurses' mental health. The factors associated with self-efficacy of psychiatric nurses were 'Positive reactions by patients', 'Ability to positively change nurse–patient relationship' and 'Practicability of appropriate nursing', and 'Uncertainty in psychiatric nursing' and 'Nurses' role loss' represent the reality of psychiatric nurses.[16]

To improve the self-efficacy of psychiatric nurses, it first needs to be evaluated. Existing self-efficacy scales are inadequate, due to their lack of focus on the specific issues and environmental contexts encountered by psychiatric nurses. Many studies that evaluate the self-efficacy of healthcare professionals, including nurses, have been conducted using Sakano and Tohjoh's[17] General Self-Efficacy Scale (GSES).[18] Bando *et al*[19] devised a self-efficacy scale for psychiatric nurses that takes their relationships with their patients into consideration. However, self-efficacy scales for psychiatric nurses should include factors such as uncertainty and role loss and should not be limited to patient relationships.[16] According to previous studies,[16 20] there are multiple factors related to self-efficacy of psychiatric nurses, and it is necessary to develop a scale corresponding to these factors. Devising a comprehensive scale to evaluate the self-efficacy of psychiatric nurses, which is not found in the conventional GSES[17] and patient-related self-efficacy scale,[19] will facilitate the planning of specific mental healthcare interventions for psychiatric nurses. In Japan, there are about 82 000 full-time nurses working in psychiatric departments,[21] and this cohort can be used for research that contributes to improving their quality of mental healthcare, thus improving patient care.

This study aimed to develop Psychiatric Nurse Self-Efficacy Scales (PNSS) to evaluate psychiatric nurses' feelings of self-efficacy, which is difficult to grasp with existing scales, and to examine the reliability and validity of these developed scales.

METHODS

Participants and procedure

The study adopted a cross-sectional survey design. The principal researcher requested the cooperation of 11 heads of nursing departments in psychiatric facilities in three prefectures. They gave written and verbal consent to distribute anonymous, self-administered questionnaires to nurses in their departments. A total of 514 valid responses with no missing values for scale scores were extracted from the 786 questionnaires completed by registered and associate nurses from January to March 2020. Participants provided written informed consent and were informed that they could freely withdraw from the survey. They did not receive any compensation or rewards. Each participant was given an envelope in which to seal their questionnaires to protect their privacy. Participation was anonymous, and only the researcher could access the data.

Patient and public involvement

No patients were involved with this study as it pertained to psychiatric nurses only.

Measures

Participant demographics

General demographic data (age, sex, job position, qualifications, years of experience as a nurse, experience working in a psychiatry department and nursing education level) were collected.

The PNSS

The initial PNSS included 52 items assessing factors related to self-efficacy, based on previously determined qualitative data on psychiatric nurses' self-efficacy.[20] Two researchers with experience in psychiatric nursing and two with experience as clinical psychologists reviewed the data and developed the question items. Forty-nine meaningful items from Yada *et al*[20] were used to create the 52 items. The accuracy of item expression was discussed by four researchers—two psychology and two psychiatric nursing faculty members. Participants' responses were rated on an 11-point scale from 0 (not at all) to 10 (yes). The initial PNSS comprised the Improved Self-Efficacy Scale (ISES; 26 items) and Decreased Self-Efficacy Scale (DSES; 26 items),

The ISES and DSES items were separately created based on linguistic data extracted using qualitative research.[20] The ISES examines what improves self-efficacy, and the DSES investigates what reduces self-efficacy. The items between the two scales are completely different. Therefore, the ISES and DSES were separately analysed. The higher the score for the ISES, the higher the self-efficacy; and the higher the score for the DSES, the lower the self-efficacy.

The GSES

The GSES was used to assess concurrent validity; its reliability and validity have been established.[17] It comprises 16 items rated on a 2-point scale, 0 (no) and 1 (yes); higher scores indicate higher self-efficacy. Cronbach's alpha coefficient was 0.849. Permission to use the GSES was obtained from Cocolonet Co.

The Stress Reaction Scale

Self-efficacy reduces stress conditions.[4] The Stress Reaction Scale (SRS) in the Brief Job Stress Questionnaire Short Version was used to assess the convergent validity of the PNSS; its reliability and validity were previously

established.[22] The SRS evaluates psychological stress and physical stress reactions and comprises 11 items rated on a 4-point Likert scale ranging from 0 (not at all) to 3 (definitely); higher scores indicate stronger stress reactions. Cronbach's alpha coefficient in this study was 0.929. Permission to use the SRS was obtained from the Japanese Ministry of Health, Labour and Welfare.

Statistical analyses

Means, SDs, frequencies (n) and percentages (%) were calculated for participants' demographic characteristics. For item analyses, the difficulty of the question item was confirmed by observing the number of missing values. Kurtosis, skewness, ceiling effect and floor effect were confirmed by observing their distribution on the 52 items (26 ISES item scores and 26 DSES item scores) in the initial version of the PNSS.

Item discrimination was confirmed by analysis of variance(ANOVA) (low, middle and high group) as a good–poor (G–P) analysis. The PNSS factor structure was identified using exploratory factor analysis (EFA). For reliability, the internal consistency of the factors was calculated using Cronbach's alpha coefficient. Factor structure validity was confirmed by confirmatory factor analysis (CFA). The following values are considered good for each good index: χ^2/df ratio from 2.0 to 3.0, goodness-of-fit index (GFI) >0.90, adjusted GFI (AGFI) >0.85, comparative fit index (CFI) >0.95 and root mean square error of approximation (RMSEA) <0.08.[23] For concurrent and convergent validity, Pearson's correlation coefficients were calculated to confirm correlation between the PNSS and the GSES and SRS factor structures. The significance level was set at $p<0.05$.

The evaluation score was developed by ±SD. Concretely, −1.5 SD≥ is low, −0.5 SD> to −1.5 SD< is low tendency, −0.5 SD ≤ to 0.5 SD≥ is normal, 0.5 SD< to 1.5 SD> is high tendency, and 1.5 SD≤ is high. Evolution scores were set for each scale and subscale score. The normal curve SD estimates include 38.2% of the data in the ±0.5 SD range and 86.6% of the data in the ±1.5 SD range.[24]

IBM SPSS V.24.0 for Windows was used for the item analysis, EFA, calculation of reliability, and calculation of convergent and predictive validity. IBM AMOS V.24.0 for Windows was used for the CFA.

Sample size

The main analysis used was factor analysis. If communalities are low, and there are a larger number of factors (more than 3 or 4), a sample size of more than 500 is likely to be required.[25] We required a sample size of over 500, and our sample met that requirement with 514 valid responses.

RESULTS

Demographics

Responses were received from 688 participants (recovery rate=87.53%). Among the respondents, 581 participants gave their informed consent to the investigation. The numbers of missing values for ISES and DSES of the 583 participants who agreed were 1–7, and it was judged that there were no items that were difficult to answer. There were four participants with large missing data that were presumed to be page oversight, and missing values were excluded. Valid respondents were 514 with no missing values in the scale item score (effective response rate=74.70%). Table 1 shows participant demographics.

Table 1 Participant demographics (N=514)

Variable	Mean or number	SD or percentage
Mean age (years)	44.76	11.30
Sex		
Male	189	36.8
Female	324	63.0
Unanswered	1	0.2
Job positions		
Manager*	93	18.1
Staff	416	80.9
Unanswered	5	1.0
Qualification		
Registered nurse	406	79.0
Associate nurse	106	20.6
Unanswered	2	0.4
Mean nursing experience (years)	18.82	11.56
Mean experience of psychiatry department (years)	13.20	9.93
Nursing-related educational background		
University/college	29	5.6
Junior college	26	5.1
Nursing school	454	88.3
Unanswered	5	1.0

*Manager: nursing director, head nurse or chief nurse.

Item analysis

Kurtosis and skewness were not detected within ±2 in the 52-item distribution of scores.[26] Discriminations for the 52 items were confirmed by a G–P analysis and all items were significant. Item discrimination was confirmed for all items. No ceiling or floor effect was detected within ±1 SD in the 52-item distribution of scores.

Factor structure of the PNSS

Items with communality less than 0.2 were excluded from subsequent analysis.[27] The factor structure of the PNSS was identified using EFA. In the process of conducting EFA, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was confirmed. The principal factor method

was used in the extraction of factors and promax rotation was conducted. The scree test[28] was used to decide the number of factors. A factor loading of more than 0.5, which is more factor related, was adopted.[29] Items with a factor loading of less than 0.5 were excluded from subsequent analysis. Factor names were determined and discussed by four researchers—two psychology and two psychiatric nursing faculty members.

For the ISES, four items with less than communality 0.2 were excluded from EFA.[27] The KMO measure of sampling adequacy was 0.911, showing that EFA was appropriate.[30] Two factors with 11 items were extracted: (1) 'Positive changes in the patient' with six items, including items related to those changes as recognised by the nurse; (2) 'Prospect of continuing in psychiatric nursing' with five items, including items related to experiences of failure and trust and the ability to persevere with nursing.

For the DSES, five items with communality less than 0.2 were excluded from EFA.[27] The KMO measure of sampling adequacy was 0.865, showing that EFA was appropriate.[30] Three factors with 11 items were extracted: (1) 'Devaluation of own role as a psychiatric nurse' with three items, including items that made nurses feel underappreciated; (2) 'Decrease in nursing ability due to overload' with four items, including items related to the deterioration of nursing ability in various situations; (3) 'Difficulty in seeing any results in psychiatric nursing' with four items, including items that make nurses feel their interventions have little effect on patients.

Tables 2 and 3 show the EFA results; Japanese–English translation–reverse translation was performed by translators, and agreement between languages confirmed (online supplemental file).

Reliability of the PNSS

To determine the ISES and DSES reliability, we calculated Cronbach's alpha coefficient for each scale and subscale (tables 2 and 3). Cronbach's alpha coefficient was 0.839 for 'Positive changes in the patient', 0.809 for 'Prospect of continuing in psychiatric nursing', 0.845 for the overall ISES, 0.655 for 'Devaluation of own role as a psychiatric nurse', 0.634 for 'Decrease in nursing ability due to overload', 0.737 for 'Difficulty in seeing any results in psychiatric nursing', and 0.749 for the overall DSES.

Validity of the PNSS

For factorial validity, the compatibility of the extracted factors was analysed by CFA. For the ISES, the results followed the goodness-of-fit model: χ^2/df (292.87/43) ratio=6.81 (p<0.01), GFI=0.897, AGFI=0.842, CFI=0.888, RMSEA=0.106 and Akaike Information Criterion (AIC)=338.87. The goodness of fit was not high; therefore, we assumed there were correlations among error variables in a factor, based on the modification index, and developed a revised model to fit the data. The error variable is an item-specific variable obtained by removing the influence of the factor from the observed variable. Paths were created between error variables as moderate positive correlations between e33 and e35, weak positive correlations between e29 and e31, e29 and e41, and e1 and e7; weak negative correlations between e31 and e35, and e27 and e41, yielding the following results: χ^2/df (110.625/37) ratio=2.990 (p<0.001), GFI=0.962, AGFI=0.932, CFI=0.967, RMSEA=0.062 and AIC=168.625 (figure 1).

For the DSES, the results followed the goodness-of-fit model: χ^2/df (181.369/41) ratio=4.424 (p<0.001), GFI=0.942, AGFI=0.906, CFI=0.876, RMSEA=0.082, AIC=231.369. The goodness of fit was not high, therefore, we assumed there were correlations among error variables in a factor, based on the modification index, and developed a revised model to fit the data. Paths were created between error variables as weak positive correlations between e44 and 46, e34 and e36, e28 and e30, and e14 and e12, yielding the following results: χ^2/df (101.982/37) ratio=2.756 (p<0.001), GFI=0.966, AGFI=0.940, CFI=0.943, RMSEA=0.059 and AIC=159.982 (figure 2).

To determine the concurrent and convergent validity of the ISES and DSES, the correlation coefficient with external variables was calculated for each scale and subscale score. In consideration of the concurrent validity, the GSES was used as an external variable. The correlation coefficient ranged from 0.149 to 0.446 (p<0.001) between the ISES and each ISES subscale score and the GSES score, indicating a weak–medium correlation. The correlation coefficient ranged from −0.154 to −0.462 between the DSES and each DSES subscale score and the GSES score, indicating a weak–medium correlation. In consideration of the convergent validity, the SRS was used as an external variable. The correlation coefficient ranged from −0.128 to −0.161 (p<0.001) between the ISES and each ISES subscale score and the SRS score, indicating a weak correlation. The correlation coefficient ranged from 0.214 to 0.398 between the DSES and each DSES subscale score and the SRS score, indicating a weak correlation. Table 4 shows the results of concurrent and convergent validities.

DISCUSSION

This study examined the development and usefulness of a scale to evaluate psychiatric nurses' self-efficacy comprehensively. The ISES has two factors ('Positive changes in the patient' and 'Prospect of continuing in psychiatric nursing') and the DSES has three ('Decrease in nursing ability due to overload', 'Devaluation of own role as a psychiatric nurse' and 'Difficulty in seeing any results in psychiatric nursing'). Statistical analyses showed the scales to be valid measures. The following is a discussion of the results.

Participants' characteristics

The distribution of age, years of psychiatric experience and job title seemed to be roughly the same, but the proportion of men in this study was higher than that in

Table 2 The factor structure for improved self-efficacy among psychiatric nurses

No	Content of items	Mean±SD	F1	F2	Communality
Factor 1: Positive changes in the patient (Cronbach's alpha=0.839)		37.08±8.21			
33	**I feel that I can get words of appreciation from patients by being considerate.**	6.45±1.87	0.882	−0.201	0.610
27	**I feel that compassion makes smile of patients.**	6.84±1.93	0.779	−0.117	0.513
35	**I feel that I can get words of thanks from patients.**	6.33±2.00	0.775	−0.171	0.375
31	**I feel that some patients are happy.**	6.82±1.78	0.690	−0.005	0.472
29	**I feel that the patient is satisfied.**	5.68±1.83	0.566	0.074	0.375
41	**I feel that the patient's mind is open.**	4.97±1.60	0.511	0.162	0.385
3	I feel that my involvement with the patient is helpful to my life experience.	6.73±1.97	0.491	0.122	0.326
43	I feel that a passive patient's mind is open.	4.83±1.57	0.463	0.134	0.305
45	I feel the building of a relationship of trust with patients.	5.94±1.68	0.458	0.355	0.526
15	I can see that patients are healthy after leaving the hospital.	6.02±2.23	0.412	0.123	0.244
5	I feel that the training is helpful.	7.14±1.72	0.309	0.221	0.225
Factor 2: Prospect of continuing in psychiatric nursing (Cronbach's alpha=0.809)		27.75±6.43			
9	**I can predict the patient's symptoms.**	5.27±1.71	−0.197	0.870	0.594
11	**I can foresee nursing.**	5.49±1.64	−0.069	0.822	0.614
7	**I feel that I can make a right nursing decision.**	5.25±1.73	−0.165	0.730	0.419
1	**I can make use of my own experience of failure.**	6.40±1.75	0.008	0.557	0.315
47	**I feel trust from my colleague nurses.**	5.33±1.71	0.109	0.507	0.333
21	I can reduce the patient's anxiety by giving advice.	5.80±1.46	0.229	0.459	0.386
39	I feel that the patients understand my explanation.	5.46±1.53	0.357	0.407	0.463
19	I can alleviate the patient's anxiety by listening to the patient's complaints.	6.35±1.63	0.258	0.339	0.347
23	I can improve the patient's rejection of medicine.	4.23±1.85	0.119	0.390	0.221
17	I can see a change in the behaviour of a passive patient.	5.27±1.58	0.306	0.336	0.328
25	I feel the patient's symptoms are stable.	5.31±1.69	0.304	0.311	0.300
Scale score total (Cronbach's alpha=0.845)		64.83±12.28			
	Correlation of factors				
	Factor 1		1.000		
	Factor 2		0.587	1.000	

Bold font indicates the items that comprise the factors.

a previous study.[31] The ratio of the education level of the study participants also seemed to be in rough agreement with a previous study.[16]

ISES analysis

The factor 'Positive changes in the patient' was similar to that of 'Positive reaction of patients', one of the factors of self-efficacy revealed in Yada *et al*'s[16] study. Patience is required to treat psychiatric symptoms. Drug therapy and psychotherapy are less effective for treating the negative symptoms of schizophrenia, and long-term interventions by skilled specialists are required for this purpose.[32] In such situations, psychiatric nurses may experience improved self-efficacy, when they see positive changes in the patient.

The factor 'Prospect of continuing in psychiatric nursing' was found to have a different meaning than that revealed in a previous study.[16] According to critics of psychiatry, psychiatric diagnoses lack objectivity.[33]

Table 3 The factor structure for decreased self-efficacy among psychiatric nurses

No	Content of items	Mean±SD	F1	F2	F3	Communality
F1: Devaluation of own role as a psychiatric nurse (Cronbach's alpha=0.655)		13.82±4.77				
44	**I feel that patients do not need me.**	3.97±1.87	0.647	−0.239	0.122	0.424
52	**I have lost confidence in my attitude toward nursing.**	4.81±2.30	0.616	0.112	−0.003	0.436
46	**I feel that patients need other staff members than me.**	5.04±2.00	0.536	0.024	−0.066	0.271
50	I have forgotten to speak to patients with the passage of time.	4.21±2.28	0.431	−0.070	0.065	0.193
16	The action was positive for the patient but it was disappointing for me.	4.68±1.89	0.426	−0.117	0.369	0.385
6	I feel that even if I make a promise, the patient refuses.	4.47±2.29	0.418	0.036	0.264	0.354
8	I feel bad communicating with patients.	4.82±1.99	0.391	0.098	0.147	0.270
48	I feel a lack of physical strength.	5.80±2.60	0.349	0.208	−0.047	0.193
F2: Decrease in nursing ability due to overload (Cronbach's alpha=0.634)		27.03±5.95				
34	**I feel that nursing care is increasing due to the ageing of patients.**	8.25±1.72	−0.193	0.582	0.026	0.312
28	**I feel a risk of violence from patients.**	6.11±2.23	0.012	0.574	0.084	0.387
30	**I encounter the excitement of patients.**	6.28±2.25	0.129	0.549	−0.039	0.342
36	**I feel that I have little interaction with patients because of other work.**	6.39±2.36	0.271	0.503	−0.171	0.329
26	I feel patients have a relapse of mental illness.	6.73±1.82	−0.131	0.494	0.215	0.340
32	I feel a decline in my ability to judge for nursing to being busy.	5.98±2.16	0.412	0.465	0.201	0.401
10	I feel that I'm repeating the same explanation to the patient.	6.38±1.88	0.114	0.314	0.199	0.251
F3: Difficulty in seeing any results in psychiatric nursing (Cronbach's alpha=0.737)		21.54±5.58				
14	**I do not feel the effectiveness of the care given to the patients.**	4.50±1.81	0.124	−0.187	0.641	0.399
12	**I feel that the patient's symptoms have not improved.**	5.72±2.00	0.068	0.045	0.612	0.442
20	**I feel ambiguity about the treatment effect.**	5.72±1.88	0.054	0.083	0.589	0.431
18	**I feel uncertain about the patient's symptoms.**	5.61±1.76	0.036	0.113	0.504	0.338
22	I feel that there are patients who are uncooperative for treatment.	6.51±2.04	−0.142	0.431	0.460	0.508
4	I feel that there are patients who do not participate in the treatment.	7.00±2.07	−0.132	0.323	0.398	0.328
Scale score total (Cronbach's alpha=0.749)		68.37±13.10				
	Correlation of factors					
	Factor 1		1.000			
	Factor 2		0.334	1.000		
	Factor 3		0.407	0.464	1.000	

Bold font indicates the items that comprise the factors.

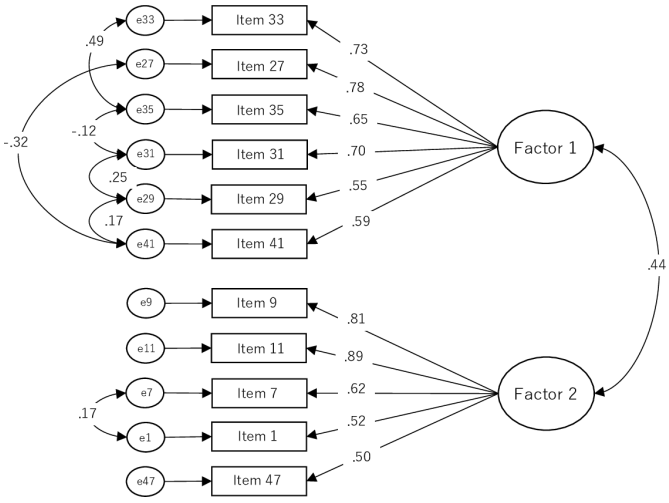

Figure 1 Fit indices of the proposed models for the Improved Self-Efficacy Scale (ISES). The ISES was found to fit a two-factor structure with 11 items. $\chi 2/df$ (110.625/37, p<0.001): 2.990; goodness-of-fit index: 0.962; adjusted goodness-of-fit index: 0.932; comparative fit index: 0.967; root mean square error of approximation: 0.062; Akaike Information Criterion: 168.625.

Psychiatric nurses need to predict the condition from the patient's behaviour. This requires working together with their own experience and teams, which may improve self-efficacy when psychiatric nurses are able to see patient care.

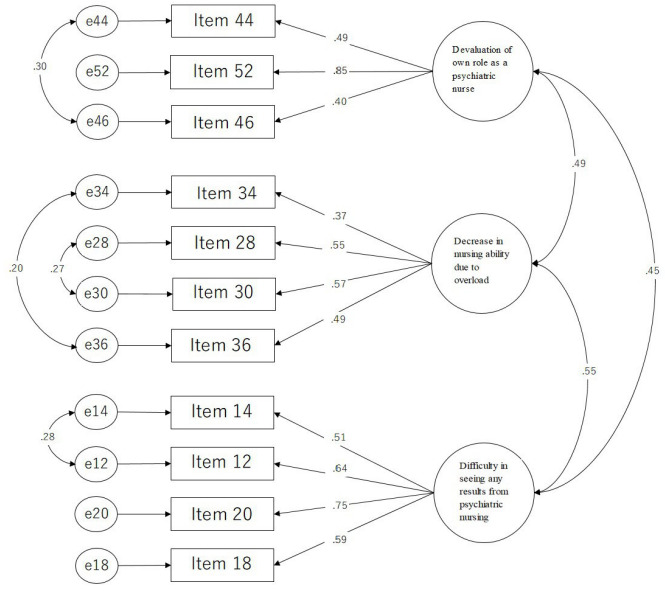

Figure 2 Fit indices of the proposed models for the Decreased Self-Efficacy Scale (DSES). The DSES was found to fit a three-factor structure with 12 items. $\chi 2/df$(101.982/37, p<0.001): 2.756; goodness-of-fit index: 0.966; adjusted goodness-of-fit index: 0.940; comparative fit index: 0.943; root mean square error of approximation: 0.059; Akaike Information Criterion: 159.982.

Table 4 The PNSS and the GSES, the SRS and the intention to continue working correlations

	The GSES	The SRS
Positive changes in the patient	0.149*	−0.128*
Prospect of continuing in psychiatric nursing	0.446*	−0.143*
Improved Self-Efficacy Scale total	0.333*	−0.161*
Devaluation of own role as a psychiatric nurse	−0.462*	0.398*
Decrease in nursing ability due to overload	−0.154*	0.214*
Difficulty in seeing any results in psychiatric nursing	−0.174*	0.272*
Decreased Self-Efficacy Scale total	−0.201*	0.302*

*P<0.001.
GSES, General Self-Efficacy Scale; PNSS, Psychiatric Nurse Self-Efficacy Scales; SRS, Stress Reaction Scale.

DSES analysis

The factor 'Devaluation of own role as a psychiatric nurse' was similar to 'Nurse's loss of role'.[16] In psychiatry, the sense of distance from the patient varies from person to person, and it is difficult to obtain an appropriate distance in patient care.[20] If the psychiatric nurse does not keep the proper distance from the patient, the patient may rely on other reliable nurses, and the psychiatric nurse may feel role loss and reduce self-efficacy.[20]

The factor 'Decrease in nursing ability due to overload' was found to have a different meaning to that found in a previous study.[16] The responsibilities of psychiatric nurses include not just patient care but also lots of administrative work. One survey of psychiatric nurses found that 2.18 min was spent on symptom management, while 2 hours was spent on the related paperwork, and nurses who spent more time on direct patient care were more satisfied.[34] When psychiatric nurses are unable to spend enough time on patient care, they may feel that they are not providing sufficient care, which may lead to reduced feelings of self-efficacy. In addition, one-third of patients admitted to Japan's psychiatric wards in 2017 were 75 years and over.[35] Older people often experience two or more chronic illnesses.[36] Ageing increases the risk of dementia. Most dementias require care in daily life, and dealing with behavioural and psychological symptoms of dementia is also a problem as a symptom of dementia in psychiatry.[37] Moreover, about half of Japanese psychiatric home-visiting nurses experience violence from their patients, especially verbal violence, and some nurses are at risk of post-traumatic stress disorder.[38] According to previous research, when commissioned welfare volunteers feel threatened by people with mental health problems, it can lead to a deterioration of social distance between commissioned welfare volunteers and people with mental

health problems.[39] Similarly, when psychiatric nurses experience patient violence, they may feel threatened and unable to care for the patient any longer, which can lead to a feeling of decreased self-efficacy due to the loss of their role. Thus, as psychiatric nurses are burdened with ageing and violence in their patient, it may result in reduced self-efficacy.

The factor 'Difficulty in seeing any results in psychiatric nursing' was similar to 'Uncertainty about psychiatric nursing'.[16] As discussed, the average length of stay for Japanese psychiatric patients is much longer than in other countries,[14] and deinstitutionalisation is evolving slowly. Psychiatric nurses, even with hard care, may not see the patient's condition improve and be discharged. Psychiatric nurses may feel they do not achieve any results from their care and thus experience feelings of lower self-efficacy.

Reliability and validity of scales

To prove the reliability of subscales and scales, Cronbach's alpha should exceed 0.60, and scores greater than 0.95 indicate redundancy.[40] A previous study indicated that 'an alpha coefficient of 0.70 has often been regarded as an acceptable threshold for reliability; however, 0.80 or 0.95 is preferred for the psychometric quality of scales'.[41] The internal consistencies of some subscale may not be unacceptable, but not enough. As mentioned above, some of the factor structures related to the self-efficacy of psychiatric nurses in our previous study[16] were similar to those in this study. However, unlike the current findings, most of the previous studies reported high internal consistencies. Therefore, this decrease in Cronbach's alpha coefficient may be due to sample differences, and thus, future research is needed.

The factorial validity and GFIs were confirmed for ISES and DSES. Each value of the revised model for the ISES and the DSES exceeded indices,[23] indicating acceptable goodness of fit. For convergent and predictive validity, the ISES and the DSES showed a weak–medium significant correlation between the GSES and the SRS. The ISES and the DSES were judged to be measures that can evaluate self-efficacy and associated stress.

The future of psychiatric nurses' mental health

The ISES factors 'Positive changes in the patient' and 'Prospect of continuing in psychiatric nursing', and the DSES factors 'Decrease in nursing ability due to overload', 'Devaluation of own role as a psychiatric nurse', and 'Difficulty in seeing any results in psychiatric nursing' were developed in the current study. Self-efficacy is recovered through resilience,[42] so it was necessary to confirm how resilience can control 'Positive changes in the patient', 'Prospect of continuing in psychiatric nursing', 'Decrease in nursing ability due to overload', 'Devaluation of own role as a psychiatric nurse' and 'Difficulty in seeing any results in psychiatric nursing' for psychiatric nurses' future mental healthcare.

Future avenues for this research

The scales of this study have aspects of improving and decreasing self-efficacy of psychiatric nurses, and each scale has multiple subscales. Therefore, it is possible to grasp the self-efficacy from multiple aspects. In the future, multifaceted intervention in the self-efficacy of psychiatric nurses will be possible. However, this scale requires further examination for reliability and validity among different samples to determine its cross-validation and predictive validity. Moreover, future studies are also needed to validate the test–retest reliability.

Study limitations

Some limitations of the present study are that there were more male participants than in previous studies, which may be due to selection bias. A method such as non-probability sampling is required as a sample extraction method. In addition, the standard scores were calculated from the data of this study, so the results are not absolute indices; follow-up studies are required.

CONCLUSIONS

In this study, the ISES factors 'Positive changes in the patient' and 'Prospect of continuing in psychiatric nursing', and the DSES factors 'Decrease in nursing ability due to overload', 'Devaluation of own role as a psychiatric nurse', and 'Difficulty in seeing any results in psychiatric nursing' were developed for the PNSS. Reliability and validity analyses indicated that the ISES and the DSES are useful. Using these scales, it is possible to formulate programmes for improving psychiatric nurses' feelings of self-efficacy.

Interventions to increase resilience are useful for improving their positive feelings of self-efficacy and preventing feelings of decreased self-efficacy. It is necessary to confirm how resilience can control 'Positive changes in the patient', 'Prospect of continuing in psychiatric nursing', 'Decrease in nursing ability due to overload', 'Devaluation of own role as a psychiatric nurse' and 'Difficulty in seeing any results in psychiatric nursing' for mental healthcare planning. When measuring the self-efficacy of psychiatric nurses in intervention studies, scales should be used to indicate directions for effective mental healthcare. Interventions to increase the resilience of psychiatric nurses are useful for improving self-efficacy and preventing feelings of decreased self-efficacy. Improved psychiatric nurse self-efficacy will have positive consequences for patient care.

Author affiliations
[1]Department of Nursing, Faculty of Fukuoka Medical Technology, Teikyo University, Omuta, Fukuoka, Japan
[2]Division of Health Sciences, Graduate School of Medicine, Osaka University, Suita, Osaka, Japan
[3]Department of Fundamental Nursing, Yamaguchi University, Graduate School of Medicine, Ube, Yamaguchi, Japan
[4]Department of Clinical Psychology, Health Sciences University of Hokkaido, Ishikari-gun, Hokkaido, Japan
[5]Kumamoto Seimei Hospital, Chuo-ku, Kumamoto, Japan

[6]Sakuragaoka Hospital, Chuo-ku, Kumamoto, Japan
[7]Department of Public Health, Kumamoto University, Chuo-ku, Kumamoto, Japan

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ORCID iD
Hironori Yada http://orcid.org/0000-0001-7883-7239

REFERENCES

1 Bandura A. Self-Efficacy mechanism in human agency. *Am Psychol* 1982;37:122–47.
2 Bandura A. *Self-Efficacy: the exercise of control*. New York, NY: W. H. Freeman and Company, 1997.
3 Lunenburg FC. Self-Efficacy in the workplace: implications for motivation and performance. *Int J Bus Adm* 2011;14:1–6.
4 Schönfeld P, Brailovskaia J, Xiao AB. The effects of daily stress on positive and negative mental health: mediation through self-efficacy. Efectos del estrés cotidiano en La salud mental positiva Y negativa: mediación de la autoeficacia. *Int J Clin Health Psychol* 2016;16:1–10.
5 Kwak Y, Han Y, Song J-S, *et al*. Impact of emotional labour and workplace violence on professional quality of life among clinical nurses. *Int J Nurs Pract* 2020;26:e12792.
6 Edward K-L, Hercelinskyj G, Giandinoto J-A. Emotional labour in mental health nursing: an integrative systematic review. *Int J Ment Health Nurs* 2017;26:215–25.
7 McVicar A. Scoping the common antecedents of job stress and job satisfaction for nurses (2000-2013) using the job demands-resources model of stress. *J Nurs Manag* 2016;24:E112–36.
8 Marcinowicz L, Taranta E. Perspectives of older patients on the qualities which define a "good family nurse": A qualitative study. *Nurs Open* 2020;7:814–21.
9 Van Laar D, Edwards JA, Easton S. The work-related quality of life scale for healthcare workers. *J Adv Nurs* 2007;60:325–33.
10 Yoshizawa K, Sugawara N, Yasui-Furukori N, *et al*. Relationship between occupational stress and depression among psychiatric nurses in Japan. *Arch Environ Occup Health* 2016;71:10–15.
11 Chen J, Li J, Cao B, *et al*. Mediating effects of self-efficacy, coping, burnout, and social support between job stress and mental health among young Chinese nurses. *J Adv Nurs* 2020;76:163–73.
12 Maharaj S, Lees T, Lal S. Prevalence and risk factors of depression, anxiety, and stress in a cohort of Australian nurses. *Int J Environ Res Public Health* 2019;16:61.
13 Ohue T, Moriyama M, Nakaya T. Examination of a cognitive model of stress, burnout, and intention to resign for Japanese nurses. *Jpn J Nurs Sci* 2011;8:76–86.
14 Ministry of health, labour and welfare, 2019. Available: www.mhlw.go.jp/toukei/saikin/hw/iryosd/18/ [Accessed 16 Jun 2021].
15 Yada H, Abe H, Funakoshi Y, *et al*. Development of the psychiatric nurse job stressor scale (PNJSS). *Psychiatry Clin Neurosci* 2011;65:567–75.
16 Yada H, Abe H, Odachi R, *et al*. Exploration of the factors related to self-efficacy among psychiatric nurses. *PLoS One* 2020a;15:e0230740.
17 Sakano Y, Tohjoh M. The general self-efficacy scale (GSES): scale development and validation. *Japan Journal of Behavior Therapy* 1986;12:73–82. In Japanese.
18 Iyama S, Maeda H. A literature review on the self-efficacy of different professionals. *Bulletin of Kumamoto University School of Health Sciences* 2015;11:13–23. In Japanese.
19 Bando K, Nishida M, Takama S. Psychiatric nurses' relations with patients: development of a self-efficacy measurement scale. *Journal of Japan Society of Nursing and Health Care* 2015;17:22–33. In Japanese.
20 Yada H, Kobayashi M, Odachi R, *et al*. Factors relating to self-efficacy among psychiatric nurses. *J Uoeh* 2017;39:229–34. In Japanese.
21 Ministry of health, labour and welfare, 2018. Available: www.mhlw.go.jp/toukei/saikin/hw/iryosd/17/ [Accessed 16 Jun 2021].
22 Inoue A, Kawakami N, Shimomitsu T, *et al*. Development of a short version of the new brief job stress questionnaire. *Ind Health* 2014;52:535–40.
23 Schermelleh-Engell K, Moosbrugger H, Muller H. Evaluating the fit of structural equation models: tests of significance and descriptive goodness of fit measures. *Methods for Psychological Research* 2003;8:23–74.
24 Aylward GP. Chapter 14. Providing feedback. In: *Bayley 4 clinical use and interpretation. clinical use and interpretation*. London: Academic Press (United Kingdom, 2020: p149.
25 Reeve CL, Blacksmith N. Identifying G: a review of current factor analytic practices in the science of mental abilities. *Intelligence* 2009;37:487–94.
26 George D, Mallery M. *SPSS for windows step by step: a simple guide and reference, 17.0 update*. 10th ed. Boston, MA: Pearson, 2010.
27 Mohd Fauzi MF, Mohd Yusoff H, Mat Saruan NA, *et al*. Development and validation of work-related activities during Non-Work time scale (wants) for doctors. *PLoS One* 2020;15:e0241577.
28 Cattell RB. The scree test for the number of factors. *Multivariate Behav Res* 1966;1:245–76.
29 Cheung W, Chang MK, Lai VS. Prediction of Internet and world wide web usage at work: a test of an extended Triandis model. *Decis Support Syst* 2000;30:83–100.
30 Kaiser HF. An index of factorial simplicity. *Psychometrika* 1974;39:31–6.
31 Matsumoto Y, Yoshioka S-I. Factors influencing psychiatric nurses' job satisfaction levels: focusing on their frequency of experiencing negative emotions toward patients and support at their workplaces. *Yonago Acta Med* 2019;62:293–304.
32 Nguyen A, Frobert L, McCluskey I, *et al*. Development of the positive emotions program for schizophrenia: an intervention to improve Pleasure and motivation in schizophrenia. *Front Psychiatry* 2016;7:13.
33 Pies R. How "objective" are psychiatric diagnoses?: (guess again). *Psychiatry* 2007;4:18–22.
34 Seed MS, Torkelson DJ, Alnatour R. The role of the inpatient psychiatric nurse and its effect on job satisfaction. *Issues Ment Health Nurs* 2010;31:160–70.
35 Okayama T, Usuda K, Okazaki E, *et al*. Number of long-term inpatients in Japanese psychiatric care beds: trend analysis from the patient survey and the 630 survey. *BMC Psychiatry* 2020;20:522.
36 Fabbri LM, Ferrari R. Chronic disease in the elderly: back to the future of internal medicine. *Breathe* 2006;3:40–9.
37 Yada H, Abe H, Lu X, *et al*. Job-related stress in psychiatric nurses in Japan caring for elderly patients with dementia. *Environ Health Prev Med* 2014;19:436–43.

38 Fujimoto H, Hirota M, Kodama T, *et al*. Violence exposure and resulting psychological effects suffered by psychiatric visiting nurses in Japan. *J Psychiatr Ment Health Nurs* 2017;24:638–47.
39 Yada H, Odachi R, Adachi K, *et al*. Attitudes related to social distance between commissioned welfare volunteers (minsei-iin) and people with mental illness. *J Rural Med* 2020b;15:204–11.
40 Hulin C, Netemeyer R, Cudeck R. Can a reliability coefficient be too high? *J Consum Psycholo* 2001;10:55–69.
41 Boateng GO, Neilands TB, Frongillo EA, *et al*. Best practices for developing and validating scales for health, social, and behavioral research: a primer. *Front Public Health* 2018;6:149.
42 Foster K, Roche M, Delgado C, *et al*. Resilience and mental health nursing: an integrative review of international literature. *Int J Ment Health Nurs* 2019;28:71–85.