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Research Paper

Development and psychometric testing of the nursing practice difficulty scale for nurses caring for patients with dementia in general hospitals

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ABSTRACT

Objective: As aging in the Chinese population increases, the hospitalization rates of patients with dementia have also risen. Research on the difficulties of nurses who care for patients with dementia in Chinese general hospitals is limited. This study aimed to develop a scale to measure the difficulties nurses face in nursing patients with dementia in Chinese general hospitals and to verify its reliability and validity.

Methods: Guided by the biopsychosocial theory, an initial scale was created through a literature review, qualitative interviews, and expert consultation. A web-based survey for psychometric testing was conducted with 394 nurses from 11 general hospitals during September to November 2021. Validity was verified using content validity, exploratory factor analysis, the known-groups method, and concurrent validity. Cronbach's α coefficient and split-half reliability were used to assess reliability.

Results: The Item-level Content Validity Index was 0.833–1.000. The Scale-level Content Validity Index was 0.929. Twenty-one items with four factors were extracted from the item analysis and exploratory factor analysis. According to the known-groups method, the difficulty of the experienced group and the group with training experience was significantly lower than that of the less experienced group and the group without training experience. Based on external standards, the correlation coefficient was 0.387 with the Nursing Job Stress Scale and -0.239 with the Dementia Care Attitude Scale. Cronbach's α coefficient for each factor ranged from 0.889 to 0.905, and the total was 0.959. The split-half reliability for each factor ranged from 0.814 to 0.894, and the total was 0.911.

Conclusion: This study discovered a four-factor structure related to the difficulty scale of dementia nursing practice, and the scale's reliability and validity were confirmed. The scale can be utilized to assess the difficulty of dementia nursing practice in general hospitals and may be employed in future research to improve dementia nursing practices.

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What is known?

- Meeting the needs of patients with dementia in general hospitals is difficult.

- Providing care for patients with dementia in general hospitals presents challenges.
- Difficulties in dementia-related nursing practice are correlated with nurse burnout.

What is new?

- This study developed a Nursing Practice Difficulty Scale for patients with dementia in general hospitals and verified its reliability and validity.

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- The findings could provide a reference for developing the content of the nursing training plan for patients with dementia in general hospitals.

1. Introduction

In 2021, the World Health Organization [1] reported that approximately 55 million people worldwide suffer from dementia. Most of these individuals live in low- and middle-income countries. According to reports, the estimated number of people with dementia in Asian countries, such as China and India, is the largest. Patients with dementia are expected to become increasingly common in general hospitals as the number of older individuals with dementia increases. In addition to worsening symptoms, older persons with dementia may require treatment in general hospitals for various physical illnesses, such as dehydration, electrolyte disturbances, urinary tract infections, and fractures [2]. Thus, general hospitals play a crucial role in treating and caring for patients with dementia but also face several challenges. The incidence of cognitive impairments among older adults admitted to general hospitals has been reported to be 25%–40% [2,3]. People with dementia are more likely to be hospitalized [4] and have longer hospital stays and higher medical expenses than people without dementia [5]. Additionally, patients with dementia are more likely to develop behavioral and psychological symptoms due to environmental changes and physical pain caused by hospitalization. However, in general hospitals, treatment of the major disease is prioritized over dementia care. Moreover, the nursing staff does not have the time or ability to meet patient needs, resulting in inadequate dementia care for patients [6,7].

Meanwhile, nurses face numerous difficulties in dementia care, including patients refusing treatment or nursing care, violence, wandering, and unpredictable behavior of patients, and lack of knowledge and experience in dementia nursing and organizational support in hospitals [8,9]. Furthermore, nurses experience a great deal of stress in situations, such as dealing with dementia behavior [10,11]. Consequently, they experience several difficulties with providing care for patients with dementia, leading to decreased job satisfaction and burnout [12,13]. Nursing burnout may impede the provision of appropriate care to older adults with dementia [6] and adversely affect nursing practice. To reduce nurses' feelings of difficulty in providing nursing care to patients with dementia and to improve the quality of nursing care, there is a need for indicators or scales to capture the difficulties in providing nursing care to patients with dementia.

Several scales have been designed to assess dementia nursing stress and difficulty. The Strain in Dementia Care Scale formulated by Edberg et al. [14] covers dementia care not only in general hospitals but also in other institutions. Japanese researchers [15,16] have developed two scales to measure nursing difficulties with patients with dementia in general hospitals. Most of these scales focus on nurses' psychological difficulties associated with caring for patients with dementia, including worry, difficulty, anxiety, burden, and tension. In the scale developed by Kawamura et al. [15], expressions such as 'I feel scared of patients' verbal abuse, violence, and sudden behavior' and 'It hurts when I disagree with colleagues about dementia care' are included. The items included in these scales appear to be a failure to reflect the dementia nursing practices required of nurses in general hospitals. Furthermore, these scales, created in developed countries, are likely unsuitable for application in developing countries, like China, due to differences in medical care levels and healthcare systems.

General hospitals in China are faced with many challenges, including the need for improved treatment and nursing care for

older individuals with dementia, a lack of knowledge on dementia among nurses, and negative attitudes toward patients with dementia, as well as insufficient training for medical and health care workers [17,18]. To understand the difficulties that nurses face while dealing with patients with dementia in general hospitals in China and improve nursing practice, it is necessary to develop a nursing difficulty scale consistent with the national conditions of general hospitals in developing countries. Therefore, this study aimed to shift the focus from the psychological difficulties of nurses to the practices for dementia care that nurses are required to perform in general hospitals, as well as to develop a scale for assessing the level of difficulty experienced by nurses in these practices. Clarifying the difficulties in dementia care is meaningful in improving dementia care quality in general hospitals in similar countries.

2. Methods

2.1. Theoretical framework

This study used the Bio-Psycho-Social (BPS) theory proposed by the American psychologist Engel [19] in the 1970s as a theoretical framework. In the BPS theory model, it is essential to consider both the psychological and social backgrounds of the patients, in addition to their biological background, in order to increase understanding of their disease and provide them with effective treatment and care methods. A BPS-based clinical practice provides patient-centered, evidence-based, and comprehensive care. The BPS theory has been widely developed and used in the field of dementia care. Training interventions based on the BPS theory can meet the needs of patients with dementia and reduce their mental and behavioral symptoms [20,21]. This study, based on the BPS theory, explored the challenges nurses face in their professional practice related to the physical, psychological, and social factors of patients with dementia.

2.2. Creating the item pool

To generate the item pool for the initial scale, we conducted a literature review and qualitative survey.

We searched four databases: PubMed, CINAHL, ICHUSHI (Japanese), and China National Knowledge Infrastructure (Chinese), using the keywords 'nurses', 'difficulties or distress', and 'dementia'. Finally, fourteen articles (three in English and eleven in Japanese) were selected based on the following criteria: 1) the research subject is nursing for patients with dementia; 2) the research location is in a general hospital ward; 3) the research subjects are nurses; and 4) the language is English, Chinese, or Japanese. According to the literature review, we identified three themes: difficulties related to patients with dementia, difficulties dealing with caregivers or other patients, and psychological burdens on nurses.

Based on the findings of the literature review, an interview outline was developed to conduct semi-structured interviews with nurses working in general hospitals in China. Participants were selected according to the following criteria: 1) employed in a general hospital; 2) experience of at least a year in the nursing profession; 3) experience caring for patients with dementia, including those without a definitive diagnosis, or caring for patients with dementia at the time of the study; 4) consented to participate in the study. According to the concept of data saturation in qualitative research [22], we finally conducted interviews with 11 nurses [23]. All interviews were audio recorded and transcribed, and the data were analyzed using the conventional content analysis approach described by Hsieh and Shannon [24]. The researchers discussed whether the results of the qualitative research

correspond to the three elements of BPS theory, and finally identified four categories (nursing practice, medical system, surrounding support, and psychological burden), nine subcategories, and 33 codes. The codes were used as an item pool for dementia nursing practice difficulty.

2.3. Developing the initial scale

The initial scale was developed through expert consultation and a pilot test, and the content validity and face validity of the scale were evaluated.

It is generally recommended that the expert consultation panel includes at least six members [25]. Therefore, we solicited the opinions of six experts. The selection criteria for experts were: 1) a master's degree or higher as an educational background; 2) extensive experience in dementia care or engagement in teaching and research related to dementia care; and 3) experience in scale development. The exclusion criterion was the inability to respond within a week. We sought expert opinions on the following contents to ensure that the item pool contents were valid: 1) the importance of the items; 2) the correctness of the content expression; and 3) whether there were any items that needed to be added. We calculated the Item-level Content Validity Index (I-CVI) and the Scale-level Content Validity Index (S-CVI). For the I-CVI with six experts, the cut-off value is 0.83 [26], and therefore items below this value were deleted. Additionally, according to expert opinion on distinguishing between existing scales and focusing on nursing practice, items related to the physical environment, nursing training environment, and psychological difficulties of nurses were removed. Items containing multiple elements and those with ambiguous expressions were revised. Finally, 26 items were used to construct the initial dementia nursing practice difficulty scale.

A pilot test was conducted to assess the clarity and comprehensibility of each item. If the purpose of the pilot testing is to assess the clarity and answerability of the scale, a sample size of 10 or fewer is sufficient [27]. The final questionnaire was pretested by 20 nurses working in general hospitals in China who had experience in dementia nursing. The findings revealed that the participants encountered no issues in comprehending or answering the 26 items included in the scale. The face validity of the scale was confirmed.

2.4. Formal investigation

2.4.1. Participants

Generally, the sample size for scale development is 5–10 times the number of questions [28]. In this study, the scale included 26 items, therefore, the required sample size was 130–260. We set a recruitment goal of 260 individuals. Participants were required to meet the following criteria: 1) nurses working in general hospitals; 2) certified clinical nurses; 3) experience caring for one or more patients with dementia. The exclusion criteria were the following: 1) unformal nurses, such as study nurses, practice nurses, and part-time nurses; 2) not providing consent to participate.

2.4.2. Data collection

The joint researcher contacted the general hospital's nursing director or nurse chief. After obtaining consent for research cooperation, we distributed the links to the online survey websites through the nursing director or nurse chief. These links were sent to nurses working in wards where patients with dementia are hospitalized, such as the geriatric, neurology, or respiratory wards. The websites were available to nurses who agreed to participate in the study and had experience with dementia care. We used Sojump

to create the questionnaires for the online survey and WeChat to distribute them. Sojump is a professional platform for conducting online surveys, assessments, and voting, offering many advantages over traditional survey methods, including speed, ease of use, and low cost [29]. WeChat is a popular social tool with a large user base in China [30]. We conducted the survey between September and November 2021.

2.4.3. Measures

2.4.3.1. Basic characteristics. This included participants' demographic information, such as sex, age, educational background, years of experience, nursing experience with patients with dementia, and so on.

2.4.3.2. Dementia Nursing Practice Difficulty Scale (DNPDS, the initial scale). The initial scale consists of 26 items rated on a 5-point Likert scale ranging from 1 (not difficult) to 5 (very difficult). A higher score indicated a more challenging dementia nursing practice.

2.4.3.3. External criterion. Nursing Job Stress Scale. The scale was developed by Li and Liu [31], and Cronbach's α coefficient for the total scale was 0.98. This scale has 35 items across five subscales: 1) nurses' work and specialization (seven items); 2) time management and workload problems (five items); 3) work conditions and equipment issues (three items); 4) healthcare problems (11 items), and 5) management and interpersonal problems (nine items). Each item uses a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). A higher total score indicates higher job stress. In this study, Cronbach's α coefficient was 0.963.

Dementia Care Attitude Scale (DCAS). The DCAS was developed by Bryans et al. [32]. The reliability and validity of the Chinese version were examined by Wang et al. [33], and Cronbach's α coefficient was 0.71. The scale includes eight items, with responses scored on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Four of the eight items are negative and reversed in definite order (e.g., a score of 5 becomes 1). A higher score indicates a more positive attitude toward people with dementia and their caregivers. In this study, Cronbach's α coefficient was 0.704.

2.5. Statistical analysis

IBM SPSS Statistics for Windows Version 26 was used for the analysis. *P* values < 0.05 were considered statistically significant.

2.5.1. Item analysis

To examine the reliability of the DNPDS, ceiling, and floor effects, item-total (I-T) correlations, and inter-item correlations were used. The ceiling effects were set to Mean (M) + Standard Deviation (SD) above 5 points, and the floor effects were set to M – SD below 1 point. The I-T correlations were calculated, and $r \leq 0.40$ was used as the criteria for the deletion of items. For inter-item correlation, highly correlated coefficients may affect the results [34], so the inter-item correlation was set at $r \geq 0.70$, and items of high importance were retained.

2.5.2. Examination of validity

Validity was tested through content validity, exploratory factor analysis, the known groups method, and concurrent validity.

2.5.2.1. Content validity. The content validity of the items was evaluated by I-CVI and S-CVI. Calculations were based on the results of expert consultation. I-CVI ≥ 0.78 and S-CVI ≥ 0.90 were considered acceptable [35].

2.5.2.2. Exploratory factor analysis. To confirm the factor structure, an exploratory factor analysis (principal factor method/promax rotation) was conducted. To verify the validity of the sample size, Kaiser–Meyer–Olkin (*KMO*) analysis was used, and Bartlett's test was used to determine compatibility with factor analysis.

2.5.2.3. The known-groups method. To evaluate construct validity, we used the known-groups method after performing exploratory factor analysis. The known-groups method is a technique used to estimate the construct validity of an instrument. It involves analyzing the extent to which the instrument can differentiate between groups that are expected to differ based on known characteristics or theory [36]. Nurses' experience and continuing education have been reported to improve their practical abilities [37]. Nursing practice ability and difficulty have a negative relationship [38]. Therefore, to examine the known-groups method, this study assumed that there would be a difference in the DNPDS score depending on the amount of dementia nursing experience and the presence or absence of dementia nursing training experience. We hypothesized that the nurses who have more dementia nursing experience and nurses who have dementia nursing training experience will score lower on the DNPDS. The Mann–Whitney *U* test and Kruskal–Wallis test were performed to examine the correlation for the groups varying in dementia nursing experience and dementia training experience with the total scores for difficulty. Additionally, multiple comparisons were performed after confirming the Kruskal–Wallis test results of $P < 0.05$.

2.5.2.4. Concurrent validity. For testing concurrent validity, we calculated the correlation coefficient between DNPDS and Nursing Job Stress Scale, and DCAS. We hypothesized that the DNPDS would be positively correlated with the Nursing Job Stress Scale and negatively correlated with the DCAS.

The use of the Nursing Job Stress Scale and the DCAS was approved by the developers.

2.5.3. Examination of reliability

The reliability of the DNPDS was evaluated by determining Cronbach's α coefficients and Spearman–Brown split-half reliability for the overall scale and each factor.

2.6. Ethics

The Ethical Committee for Epidemiology at Hiroshima University (Approval Number: E812 and E2571) approved this study before data collection. For the qualitative study, written informed consent was obtained from each participant. Since the quantitative survey was web-based, consent to participate was required on the first page. Only those respondents who provided consent were allowed to participate in the survey.

3. Results

3.1. Demographic characteristics of participants

In this study, we surveyed 1,280 nurses working in wards where patients with dementia were hospitalized at eight general hospitals in Shandong Province and three in Zhejiang Province, China, and 394 (30.8%) responded. A total of 313 questionnaires (79.4% valid response rate) were analyzed, excluding those with consecutive identical answers to more than half of the questions. Two hundred and ninety-one of the participating nurses (93.0%) were female. Most belonged to the neurology and geriatrics departments. Overall, 248 nurses (79.2%) had experience with training in caring for patients with dementia (Table 1).

3.2. Item analysis

Descriptive statistics and ceiling and floor effects were calculated (Table 2). No items exhibited a ceiling or floor effect. No items had an I-T correlation ≤ 0.40 . An inter-item correlation ≥ 0.70 was considered, and items 4, 11, and 16 were eliminated.

3.3. Validity analysis

3.3.1. Content validity

The I-CVI of the initial dementia nursing practice difficulty scale was 0.833–1.000, and the S-CVI was 0.929.

3.3.2. Exploratory factor analysis

Exploratory factor analysis was performed on the remaining 23 items (Table 3). The *KMO* value was found to be 0.952, and the Bartlett's test yielded significant results ($P < 0.001$). A four-factor solution was adopted based on the interpretability of the factors and eigenvalues of ≥ 1.0 , and factor analysis was performed using the principal factor method and promax rotation. Based on the interpretability of the factors, two items were deleted (item 25, followed by item 6), and the remaining 21 items were retained. The cumulative variance explained by this solution was 63.95%, and each variable had a loading ≥ 0.40 .

Factor 1 consisted of eight items and was entitled 'responding appropriately to dementia symptoms.' This factor relates to difficulties encountered when dealing with symptoms associated with dementia, including low cognitive ability, refusal to receive care, and day and night reversal, among others. Factor 2 contained five items and was named 'maintaining and respecting the individuality of patients with dementia.' It includes difficulties in providing individual care, meeting the patient's life and psychological needs, or minimizing restrictive care. Factor 3 consisted of four items and was named 'cooperation with people who are involved with patients with dementia.' It encompasses collaboration with the family of the patients, with other caregivers, or with other patients. Factor 4 contained four items and was entitled 'assessment for providing appropriate care to patients with dementia.' This factor mainly includes the assessment of the patient's cognitive function, physical status, and psychological status.

3.3.3. Examination of the known-groups

When comparing the dementia nursing experience, a significant difference was found in the total scale scores ($P < 0.001$) (Table 4). Additionally, multiple comparisons revealed significant differences between the group with extensive nursing experience and the groups with moderate ($P < 0.01$) and limited ($P < 0.001$) nursing experience. The difficulty level reported by the experienced group was significantly lower than that reported by the less experienced group. The total scale score showed significant differences in the dementia training experience ($P < 0.001$). The training and non-training groups showed a significant difference in difficulty.

3.3.4. Examination of concurrent validity

Nursing job stress showed a weak positive association ($r = 0.387$) for the entire scale: Factor 1, $r = 0.336$; Factor 2, $r = 0.358$; Factor 3, $r = 0.339$; and Factor 4, $r = 0.382$ (all $P < 0.01$). A weak negative correlation was observed between attitudes toward dementia care based on the overall scale ($r = -0.239$; Factor 1, $r = -0.211$; Factor 3, $r = -0.250$; and Factor 4, $r = -0.337$; all $P < 0.01$) (Table 5). As predicted, nurses with greater difficulty in dementia nursing practice had higher occupational stress and weaker positive attitudes toward dementia care.

Table 1
Demographic characteristics of the participants (n = 313).

Characteristic	Item	n	%
Sex	Men	22	7.0
	Women	291	93.0
Age (years)	≤25	37	11.8
	26–30	86	27.5
	31–35	89	28.4
	36–40	48	15.3
	≥41	53	16.9
Educational level	Secondary vocational education	3	1.0
	Higher vocational education	32	10.2
	Undergraduate education	267	85.3
	Master education	11	3.5
	Job title	Junior nurse	159
Working period as nurse (years)	Mid-level nurse	129	41.2
	Senior nurse	25	8.0
	≤5	69	22.0
Department	6–10	112	35.8
	11–20	88	28.1
	21–30	36	11.5
	≥31	8	2.6
	Neurology	118	37.7
Dementia nursing experience	Geriatric	98	31.3
	Rehabilitation center	22	7.0
	Intensive care unit	32	10.2
	Others	43	13.7
	Limited	58	18.5
Dementia training experience	Moderate	155	49.5
	Extensive	100	31.9
	Yes	248	79.2
Presence family members with dementia	No	65	20.8
	Yes	101	32.3
	No	212	67.7

Table 2
Item analysis of the DNPDS (n = 313).

Item	Likert score (M ± SD)	Ceiling effect (M+SD)	Floor effect (M–SD)	Item-total correlation(r)	P
1. I can respond appropriately when patients with dementia refuse care.	3.05 ± 1.11	4.16	1.94	0.64	<0.001
2. I can prevent patients with dementia from displaying violent behavior (including verbal violence).	2.95 ± 1.10	4.05	1.85	0.65	<0.001
3. I can explain nursing behaviors in a way that patients with dementia can understand.	2.76 ± 1.10	3.86	1.66	0.69	<0.001
4. I can provide health information in a way that patients with dementia can understand.	2.65 ± 1.08	3.73	1.58	0.71	<0.001
5. I can improve sleep disturbances in patients with dementia through nursing care.	2.81 ± 1.04	3.85	1.77	0.73	<0.001
6. I can provide nursing care that is sensitive to the feelings of a patients with dementia who repeats the same complaint.	2.12 ± 0.97	3.09	1.15	0.65	<0.001
7. I can provide nursing care to prevent patients with dementia from falling.	2.54 ± 1.17	3.71	1.37	0.76	<0.001
8. I can provide nursing care to prevent patients with dementia from getting lost.	2.57 ± 1.18	3.75	1.39	0.74	<0.001
9. I can provide nursing care to prevent patients with dementia from voluntarily removing intravenous drips or tubes.	2.87 ± 1.18	4.05	1.69	0.77	<0.001
10. I can understand the intentions of patients with dementia from what they say.	2.70 ± 1.09	3.79	1.61	0.74	<0.001
11. I can establish trusting relationships with patients with dementia through communication.	2.59 ± 1.08	3.67	1.51	0.77	<0.001
12. I can correctly assess the cognitive function of patients with dementia.	2.46 ± 1.03	3.49	1.43	0.78	<0.001
13. I can detect changes in the condition of patients with dementia rapidly by assessing their general state.	2.29 ± 0.95	3.24	1.34	0.73	<0.001
14. I can provide psychological care by assessing the mental condition of patients with dementia.	2.41 ± 1.03	3.44	1.38	0.80	<0.001
15. I can judge the use and timing of medicines for insomnia or restlessness in patients with dementia.	2.43 ± 1.01	3.44	1.42	0.74	<0.001
16. I can improve the quality of life of patients with dementia through nursing care.	2.48 ± 1.05	3.53	1.43	0.78	<0.001
17. I can make sure I have enough time to communicate with patients with dementia.	2.89 ± 1.17	4.06	1.72	0.73	<0.001
18. I can make sure I have time to provide individualized care for patients with dementia.	2.74 ± 1.15	3.89	1.59	0.76	<0.001
19. I can provide care for patients with dementia as a caregiver.	2.46 ± 1.09	3.55	1.37	0.72	<0.001
20. I can provide nursing care to maintain the activities of daily living for patients with dementia.	2.52 ± 1.07	3.59	1.45	0.78	<0.001
21. I can provide high-quality of care to patients with dementia without using medical restraints.	2.93 ± 1.08	4.01	1.85	0.66	<0.001
22. I can collaborate and communicate with nursing assistants who have poor knowledge of dementia.	2.15 ± 0.97	3.12	1.18	0.69	<0.001
23. I can collaborate and communicate with family members who have limited knowledge of dementia.	2.08 ± 0.92	3.00	1.16	0.68	<0.001
24. I can provide nursing care to avoid family complaints regarding patients with dementia.	2.32 ± 1.01	3.33	1.31	0.75	<0.001
25. I can provide nursing care to prevent patients with dementia from causing trouble for other patients.	2.79 ± 1.11	3.90	1.68	0.77	<0.001
26. I can provide nursing care so that other patients and their families will not be dissatisfied with patients with dementia.	2.50 ± 1.05	3.55	1.45	0.77	<0.001

Note: M = Mean; SD = Standard Deviation. DNPDS = Dementia Nursing Practice Difficulty Scale. Mean Likert scale scores range: 1 = 'not difficult', 2 = 'not very difficult', 3 = 'neutral', 4 = 'difficult', 5 = 'very difficult'.

Table 3
Factor analysis of the 21 items of the DNPDS (n = 313).

Items	Factors			
	1	2	3	4
Factor 1 Responding appropriately to dementia symptoms (Cronbach's $\alpha = 0.905$)				
1. I can respond appropriately when patients with dementia refuse care.	0.827	-0.165	0.140	-0.137
8. I can provide nursing care to prevent patients with dementia from getting lost.	0.785	-0.052	-0.132	0.201
9. I can provide nursing care to prevent patients with dementia from voluntarily removing intravenous drips or tubes.	0.771	0.122	-0.149	0.078
5. I can improve sleep disturbances in patients with dementia through nursing care.	0.690	-0.125	0.066	0.176
7. I can provide nursing care to prevent patients with dementia from falling.	0.660	0.053	0.003	0.117
2. I can prevent patients with dementia from displaying violent behavior (including verbal violence).	0.566	0.146	0.092	-0.118
3. I can explain nursing behaviors in a way that patients with dementia can understand.	0.498	0.068	0.060	0.112
10. I can understand the intentions of patients with dementia from what they say.	0.446	0.180	-0.023	0.202
Factor 2 Maintaining and respecting the individuality of patients with dementia (Cronbach's $\alpha = 0.889$)				
18. I can make sure I have time to provide individualized care for patients with dementia.	-0.134	0.972	-0.033	0.076
17. I can make sure I have enough time to communicate with patients with dementia.	-0.022	0.901	-0.158	0.111
19. I can provide care for patients with dementia as a caregiver.	0.048	0.544	0.271	-0.032
20. I can provide nursing care to maintain the activities of daily living for patients with dementia.	0.129	0.471	0.278	0.022
21. I can provide high-quality of care to patients with dementia without using medical restraints.	0.292	0.440	0.117	-0.133
Factor 3 Cooperation with people who are involved with patients with dementia (Cronbach's $\alpha = 0.891$)				
23. I can collaborate and communicate with family members who have limited knowledge of dementia.	-0.075	-0.143	0.786	0.298
24. I can provide nursing care to avoid family complaints regarding patients with dementia.	0.194	0.078	0.710	-0.073
22. I can collaborate and communicate with nursing assistants who have poor knowledge of dementia.	-0.129	-0.027	0.704	0.332
26. I can provide nursing care so that other patients and their families will not be dissatisfied with patients with dementia.	0.308	0.192	0.486	-0.097
Factor 4 Assessment for providing appropriate care to patients with dementia (Cronbach's $\alpha = 0.898$)				
13. I can detect changes in the condition of patients with dementia rapidly by assessing their general state.	0.072	-0.044	0.126	0.723
15. I can judge the use and timing of medicines for insomnia or restlessness in patients with dementia.	-0.053	0.084	0.206	0.664
14. I can provide psychological care by assessing the mental condition of patients with dementia.	0.084	0.127	0.159	0.570
12. I can correctly assess the cognitive function of patients with dementia.	0.261	0.140	-0.030	0.539
Overall scale (Cronbach's $\alpha = 0.959$)				
Factor correlation coefficients				
Factor 1	1.000			
Factor 2	0.740	1.000		
Factor 3	0.673	0.679	1.000	
Factor 4	0.680	0.656	0.642	1.000
Cumulative contribution ratio (%)				
		63.950		

Note: DNPDS = Dementia Nursing Practice Difficulty Scale.

Table 4
Comparison of mean scores of the DNPDS among different groups.

Attribute of participants	n	Difficulty total scores		
		M \pm SD	P	
Dementia nursing experience	Limited	58	59.97 \pm 14.19	<0.001
	Moderate ^a	155	56.17 \pm 17.08	
	Extensive ^b	100	48.59 \pm 15.81	
Dementia training experience	Yes	248	52.35 \pm 16.16	<0.001
	No	65	62.46 \pm 16.32	

Note: DNPDS = Dementia Nursing Practice Difficulty Scale. M = Mean; SD = Standard Deviation.

^a There were significant differences between the moderate experience group and extensive experience group (P < 0.01).

^b There were significant differences between the limited experience group and extensive experience group (P < 0.001).

Table 5
Concurrent validity of DNPDS.

Items	DNPDS				
	Total	Factor 1	Factor 2	Factor 3	Factor 4
Nursing Job Stress Scale	0.387**	0.336**	0.358**	0.339**	0.382**
Dementia Care Attitude Scale	-0.239**	-0.211**	-0.129*	-0.250**	-0.337**

Note: DNPDS = Dementia Nursing Practice Difficulty Scale.

*P < 0.05, **P < 0.01.

3.4. Reliability analysis

The Cronbach's α coefficient for each factor ranged from 0.889 to 0.905, and the total was 0.959 (Table 3). The Spearman-Brown split-half reliability for each factor ranged from 0.814 to 0.894, and the total was 0.911.

4. Discussion

4.1. Contents of the scale

In this study, 21 items and four factors associated with difficulties in nursing practice in general hospitals were confirmed. The

scale's content reflects nursing practices that consider the patient's biological, psychological, and sociological factors, which are not independent but are interrelated.

The first factor was 'responding appropriately to dementia symptoms,' which mainly reflects the biological and psychological factors in the BPS theory. Dementia symptoms can be classified as cognitive (such as memory loss, etc.) or non-cognitive (such as behavior and psychological symptoms). This agrees with previous research [8,39], and existing scales have similar factors [15]. The item with the highest loading factor was 'I can respond appropriately when patients with dementia refuse care'. The experience of a patient refusing care can cause mental and physical fatigue for nurses [40]. As a result, nurses must be provided with the training and support to respond effectively to patient refusals. Patients with dementia hospitalized for acute illnesses often experience cognitive decline due to changes in their living environment and treatment. Their behavioral and psychological symptoms may also worsen as a result of these changes. Education is necessary for identifying the causes and underlying causes of dementia-related symptoms, especially Behavioral and Psychological Symptoms of Dementia (BPSD), and for providing appropriate nursing care.

The second factor, 'maintaining and respecting the individuality of patients with dementia,' primarily embodies the psychological aspects of the BPS theory. This factor aligns with Kitwood's person-centered model of care, which is widely recognized as optimal for the care of people with dementia [41]. Providing care while understanding the perspective and standpoint of older individuals with dementia is referred to as person-centered care, and it has become globally popular as an approach to dementia care. The implementation of person-centered care is significantly associated with reducing BPSD and improving health and function in patients with dementia [42]. Generally speaking, general hospitals tend to place a high priority on treatment, which makes it difficult to provide individualized care that is sensitive to the psychological needs of patients with dementia and to practice nursing care that respects patients with dementia and does not physically restrain them. As a result of the difficulty faced by general hospitals in implementing person-centered care, this concept was developed. Providing individual-centered care to patients with dementia in general hospitals is one of the most important topics for nurses to consider in their continuing education.

The third factor, 'cooperation with people who are involved with patients with dementia,' underscores the significance of social relationships in the care of individuals with dementia, as outlined in the BPS theory. This factor recognizes that the health and behavior of hospitalized patients with dementia are influenced not only by biological factors but also by the social environment, such as family members. In previous research [15,16], the people around hospitalized patients with dementia were primarily the patient's family and fellow patients. This study extracted a factor analysis of difficulties in collaboration with caregivers, including not only the patient's family but also the nursing assistants. Hospitalized patients in China are often cared for by family members, relatives, or nursing assistants [43]. The nursing assistants in Chinese hospitals tend to possess limited education and medical knowledge [44], and the family caregivers possess limited dementia nursing expertise [45]. Because nursing care for patients with dementia is highly specialized, it would be challenging to collaborate with caregivers if most of the work was left to family members or nursing assistants with insufficient caregiving skills. It also demonstrates the importance of caregiver support in dementia nursing practice.

The fourth factor, 'assessment for providing appropriate care to patients with dementia,' focuses on the comprehensive evaluation of patients with dementia, encompassing both physical and

psychological assessments. This factor predominantly addresses the biological and psychological factors of patients within the BPS theory. As people with dementia struggle to communicate, nurses are required to have a high level of assessment ability when providing care and to be able to recognize abnormalities in patients and respond accordingly. In addition to the difficulty nurses face in assessing a patient's general condition, it is also difficult to understand their symptoms and conditions [46]. Patients with dementia are more likely to develop delirium during hospitalization. However, there are situations in which nurses cannot differentiate between dementia and delirium [47], and it is difficult to determine whether drugs for insomnia and restlessness should be administered. Based on the above, this factor was extracted.

4.2. Scientific rigor, validity, and reliability of the scale

Based on the BPS theory model, we determined the difficulties associated with nursing practice for patients with dementia through a literature review and semi-structured interviews to develop a draft scale. In order to assess the significance of the scale, six experts were consulted. These experts had knowledge of scale development. Two of them had extensive clinical experience in geriatric nursing and neurology related to dementia care, while the remaining four were involved in geriatric care or nursing management education and had research experience in dementia care. Thus, the representativeness of the selected experts was guaranteed. The I-CVI value was greater than 0.83, and that of the S-CVI exceeded 0.9, indicating good content validity. To ensure face validity, a pretest was conducted prior to the formal survey.

Based on the known groups method to verify construct validity, the scale scores differed significantly between groups with varying levels of dementia nursing experience and dementia training. The findings of our study revealed that nurses with more experience in dementia nursing had less difficulty with dementia care practices than those with less experience. Nurses with more experience can better assess patients' needs and respond appropriately [48], thus encountering fewer difficulties in nursing practice. Dementia-associated training has been reported to increase job satisfaction and attitudes toward patients with dementia [49], which may contribute to reducing difficulty in nursing practice. As a result, this scale can identify differences in dementia nursing practice difficulty according to the level of dementia nursing experience and the receipt of dementia nursing training.

For concurrent validity, we examined the relationships between nursing job stress and attitudes toward dementia care. The findings indicate a positive correlation between dementia nursing practice difficulty and nursing stress, consistent with prior research [12,13]. The correlation coefficient between attitude toward dementia care and the total score of this scale was $r = -0.239$; the weak negative correlation indicates that the higher the positive attitude toward dementia care, the lower the perceived difficulty in dementia nursing practice. Based on the results of the examination of concurrent validity, ongoing training to improve attitudes towards dementia care is important for alleviating difficulties associated with dementia nursing.

Cronbach's α coefficient and the split-half coefficient were used to measure the reliability of the scale. Both the Cronbach's α coefficient and the split-half reliability of the total scale and individual subscales exceeded 0.80, meeting a good standard [50,51]. Thus, the reliability of the scale was confirmed.

The above results support the scientific rigor of scale development and provide evidence showing that the scale is valid and reliable.

4.3. The practicality of the scale

The provision of nursing care to patients with dementia in general hospitals is complex. Nurses need to acquire the necessary dementia-related nursing skills and provide appropriate care based on the individual characteristics of each patient. Existing scales tend to focus on the psychological burden on nurses, but this scale is based on a biopsychosocial approach and focuses on nursing practice specific to dementia. The content of the scale encompasses biological, psychological, and social aspects of the patient, providing nurses with a comprehensive understanding of the care required by patients with dementia. The use of this scale could allow nursing practice in general hospitals to be evaluated for its difficulty level, and by identifying nursing practices that are difficult, policies and content for dementia education could be developed.

This study has some limitations. First, because of the use of convenient sampling, the generalizability of the results from this survey is limited. In the future, the validity and reliability of this scale should be re-examined by expanding the geographical area and target population. Second, this was an internet-based survey, and the response rates were low regarding recovery and validity. This may have affected the validity of our results. Third, this study examined two scales for concurrent validity, but no medium-to-high correlation was found. Previous research has found a moderate correlation between the work stressor scale for caring for patients with mental disorders and intractable disease and the difficulty of caring for patients with dementia [15]. Since the measurement scale had limitations, we used general stressors affecting nurses in this study. This factor may have been responsible for the low correlation observed. In the future, it will be necessary to determine the validity of this scale with an appropriate external scale.

5. Conclusion

This study developed a scale to measure the difficulty of nursing care practice for patients with dementia in Chinese general hospitals. The scale consisted of 4 factors and 21 items, and its reliability and validity were demonstrated. Therefore, it can be used to evaluate the difficulties nurses encounter in caring for patients with dementia. Simultaneously, it can provide a foundation for developing nursing training programs for patients with dementia, thus enhancing the quality of dementia care.

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Nothing to declare.

Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Credit authorship contribution statement

Ting Liu: Conceptualization, Formal Analysis, Methodology, Validation Supervision, Investigation, Data curation, Writing - original draft, Writing - review & editing. **Hisae Nakatani:** Conceptualization, Methodology, Formal Analysis, Supervision, Writing - review & editing. **Huifang Chen:** Methodology, Investigation, Writing - review & editing. **Nan Gao:** Investigation, Writing - review & editing.

Declaration of competing interest

The authors have no conflict of interest to declare.

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Appendix A. Supplementary data

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