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Reliability and validity of the Chinese version of the family presence risk-benefit and self-confidence scales in Chinese nurses

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Abstract

Background Controversy surrounding Family Presence during Resuscitation (FPDR) continues internationally. The attitudes of medical professionals toward FPDR are particularly important for its clinical implementation. Currently, there is a lack of validated tools to evaluate medical professionals' perceptions of FPDR in China. The study aimed to: (1) Cross-culturally adapt and validate the Family Presence Risk-Benefit Scale (FPR-BS) and the Self-Confidence Scale (FPS-CS) for use in China; and (2) investigate the nurses' perceptions of FPDR and explore the relationships between the nurses' perceptual variables and demographic variables.

Methods The English version of the FPR-BS and FPS-CS underwent a rigorous process of translation, back-translation, proofreading, and cultural adaptation to create the Chinese versions. In the first stage, a sample of 200 nurses were recruited to evaluate the reliability and validity of the scales. In the second stage, a larger cohort 519 nurses were invited to assess their perceptions of FPDR and the relationships between these perceptual variables and demographic variables.

Results Exploratory factorial analysis identified a single dimension for both the FPR-BS and FPS-CS, explaining 43.84% and 48.43% of the variance, respectively. The Scale-level content validity index (S-CVI) of the FPR-BS and the FPS-CS was 0.98 and 0.97, respectively. Reliability assessments yielded Cronbach's alpha coefficients of 0.933 for the FPR-BS and 0.930 for the FPS-CS. The split-half reliability coefficients were 0.832 for the FPR-BS and 0.835 for the FPS-CS, while the retest reliability coefficients were 0.742 and 0.927, respectively. The average scores obtained were 2.76 (SD = 0.52) for the FPR-BS and 3.43 (SD = 0.58) for the FPS-CS. Statistical analyses revealed that factors such as patient type, family members' prior experience with resuscitation, and the number of times nurses invited family members during resuscitation significantly influenced perceptions of the benefits and risks associated with FPDR ($P < 0.05$). Furthermore, obtaining certification as an intensive care specialist was positively associated with nurses' self-confidence in managing FPDR ($P < 0.05$).

Conclusions The FPR-BS and FPS-CS were validated as effective instruments for measuring nurses' perceptions of PFDR, demonstrating acceptable levels of validity and reliability. While nurses reported fewer benefits and greater risks of FPDR, they exhibited increased self-confidence in managing family presence during resuscitation.

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Keywords Family Presence during Resuscitation, Resuscitation, Nurses, Validation

Background

Resuscitation refers to the application of emergency medical techniques to restore spontaneous breathing and circulatory function in patients experiencing cardiac or respiratory arrest. During this critical process, the medical team typically separates the patient from their family members. In 1982, two families at the Foote Hospital in the United States requested to be present during resuscitation [1], marking the beginning of international discussions on Family Presence during Resuscitation (FPDR). FPDR is defined as the medical team allows family members to be present during resuscitation, highlighting the essential role of family members in the medical treatment process [2].

Despite its growing recognition, FPDR remains a contentious issue worldwide. Many healthcare professional express concerns that FPDR may disrupt the resuscitation process, increase the stress among medical staff, cause psychological trauma to family members, and potentially lead to medical disputes [3–5]. Nevertheless, previous studies have demonstrated that allowing family members to witness resuscitation can alleviate anxiety and stress for both patients and their loved ones, while also enhancing communication and decision-making between medical teams and families [6, 7]. A multicenter randomized trial indicated that family members who witnessed resuscitation reported lower anxiety, depression, and post-traumatic stress disorder (PTSD) symptoms compared to those who did not [2]. Furthermore, witnessing the medical professionals' efforts to rescue patients may help family members mitigate feelings of regret and better accept the patient's outcome [8]. FPDR humanizes resuscitation process and fosters mutual understanding [9]. Currently, FPDR is endorsed by several international medical institutions [10, 11].

Perceptions of FPDR vary significantly among medical professionals across different countries. There is a higher overall acceptance of FPDR in North America and Europe [11]. In contrast, many Asian medical professionals exhibit limited support for FPDR [6, 12, 13], with reported acceptance rates of approximately 37% in Iran, 25% in Korea, 20% in Singapore, and only 10% in Hong Kong [8, 14–16]. Their primary concerns include the potential disruption of the resuscitation process and the risk of medical disputes. Cultural sensitivities regarding death in Eastern countries often lead to the avoidance of FPDR. Additionally, Asian cultures frequently emphasize hierarchical authority and clearly defined professional roles, which can limit the respect for and consideration of patients' and families' autonomy and decision-making rights. Most Asian countries also lack policy support for FPDR, coupled with a significant shortage of experience and training in this area [12]. As a result, the implementation of FPDR in Asian countries remains limited.

In clinical practice, the decision to involve family members during resuscitation is typically made by medical professionals. Thus, assessing medical professionals' perceptions of FPDR is crucial for its effective application. However, there is a notable dearth of research on FPDR in China, along with the absence of specific tools to evaluate these perceptions. While some self-developed questionnaires have been created in Western countries to assess the perceptions of FPDR [12, 14, 17, 18], there remains a lack of established scales. Twibell [19] developed the Family Presence Risk-Benefit Scale (FPR-BS) and the Self-Confidence Scale (FPS-CS) to evaluate nurses' perceptions towards FPDR and their confidence in managing family presence-tools recognized as classic and widely utilized internationally. These scales have been applied in various countries, including Turkey [20], Spain [4], Korea [8], the United Kingdom [21], Australia [22], and the United States [19].

In this study, we aimed to: (1) adapt and validate the two scales; and (2) investigate the nurses' perceptions regarding FPDR, while also exploring the relationship between these perceptual variables and demographic variables.

Methods

Design and participants

A two-stage cross-sectional survey was conducted in a tertiary hospital in Hunan Province, China, utilizing convenience sampling for participant recruitment. The first stage was undertaken during April and May 2022 to examine the reliability and validity of the two scales. The criterion requires 5–10 respondents per item, and a mini-mum of 100 respondents is required in Exploratory Factor Analysis (EFA) [23]. In this study, the FPR-BS with a large number of items was used to calculate the sample size. The FPR-BS contained 26 items, and the sample size should be 156–312 cases considering the 20% invalid scale. A total of 200 nurses were surveyed. The second stage was conducted from May to July 2022 to investigate the nurses' perceptions regarding FPDR, and explore the relationships between demographic variables, Risks-Benefits, and Self-Confidence. The sample size was determined using the general rule that requires a minimum of 10 respondents per item [24]. There are 39 items in the Chinese version of FPR-BS and FPS-CS, and the sample size should be at least 468 cases considering the 20% invalid scale. A total of 519 nurses were included in the study. The inclusion criteria were as follows: (i) registered

nurses; (ii) consent to participate in the study. The exclusion criteria were as follows: (i) interns; (ii) unwilling to participate in this study.

Instruments

The family presence risk-benefit scale

The FPR-BS [19] is a one-factor, 26-item instrument designed to assess nurses' perceptions of the risks and benefits associated with Family Presence During Resuscitation (FPDR). A 5-point Likert scale is employed for rating each item, with responses options ranging from "Strongly Disagree" to "Strongly agree". Items 2, 3, 5, 7, 8, 11, 12, 13, and 14 are reverse scored. Total scores range from 26 to 130, with higher scores indicating that nurses perceive greater benefits and fewer risks associated with FPDR. This scale demonstrates excellent internal consistency, with a Cronbach's alpha of 0.96.

The self-confidence scale

The FPS-CS [19] is a one-factor, 17-item instrument designed to assess nurses' self-confidence in managing resuscitation measures when family members were present. Each item is rated on a 5-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree." Total scores on this scale range from 17 to 85, with higher scores indicative of greater self-confidence in executing resuscitation measures. This scale demonstrates excellent internal consistency, with a Cronbach's alpha of 0.95.

Procedures

Translation procedure

The Brislin's model was used to translate and adapt the FPR-BS and FPS-CS [25]. Two nurses with master's degree were invited to independently translate the two scales into Chinese. Subsequently, a third nurse compared the two translations, and if discrepancies were encountered between the two translations, discussions were conducted. An English teacher with a master's degree and a nursing master's student conducted the back-translation process independently. Finally, another nursing master's student integrated the two back-translations.

Data collection procedure

The study was conducted in a Chinese tertiary hospital with nearly 3,000 nurses. The investigator briefed the nurses on the content, purpose and significance of the questionnaire before distribution. After obtaining informed consent, the paper questionnaires were distributed to the nurses on site. They completed the questionnaires independently and returned them on the spot after completion. In order to ensure the quality of questionnaires, all questionnaires were issued in paper format.

Data analysis

Descriptive analysis and frequency analysis were used for demographic variables. The correlation between scores for perceived risk-benefit and perceived self-confidence was determined by Pearson r correlations. The relationship between the nurses' perceptual variables and demographic variables was measured by t test and one-way analysis of variance (ANOVA). All analysis was conducted by Statistical Package for the Social Science (SPSS) 25.0.

Items analysis

Items analysis was assessed by discriminant validity and item-total correlation. The total score of the translated scales was ranked from high to poor, and the relationship between the first 27% (high-score group) and the last 27% (poor-score group) was analyzed to assess the scales' discrimination ability. The correlation between each item and the scale was analyzed to evaluate whether each item of the translated scale can be retained.

Validity analysis

Six experts were invited to evaluate the content validity of the translated scales using the Delphi method. The content validity was evaluated by the Item-level content validity index (I-CVI) and the Scale-level content validity index (S-CVI). Each item was rated based on its relevance to the theme using a 4-point Likert scale, where '1' indicates 'strongly irrelevant' and '4' indicates 'strongly relevant.' The I-CVI is calculated as the ratio of experts who rated the item as either 3 or 4 points out of the total number of experts. The S-CVI is the average of the I-CVI values for all items. When I-CVI$\geq$0.78 and S-CVI$\geq$0.80, the content validity of the scale is ideal.

Maximum likelihood EFA with varimax rotation was performed to evaluate the construct validity, the Kaiser-Meyer-Olkin (KMO) and Bartlett's spherical test were used to assess the suitability of EFA. The cumulative total variance explanation rate must be >40%, and the factor loading of each item must be >0.40.

Reliability analysis

The Cronbach's α coefficients of the translated scales was calculated to assess the internal consistency reliability. The items were categorized into odd and even groups, the split-half reliability was evaluated by examining the correlation between divided groups. Two weeks later, the translated scales were used to assess its stability among 24 nurses. Test-retest correlation analysis was performed to assess the stability and consistency of the scales across the entire period of time during which data were collected.

Ethical considerations

This study was approved by the Ethics Committee of Xiangya Nursing School of Central South University (No. E2023124).

Table 1 Sample characteristics ($N=200$)

Characteristics	*N*	%
Gender		
Male	8	4
Female	192	96
Years of working		
≤ 5	44	22
6–10	81	40.5
11–20	58	29
≥ 21	17	8.5
Age		
18–25	28	14
26–30	57	28.5
31–40	94	47
≥ 41	21	10.5
Level of education		
Associate degree	7	3.5
Bachelor Degree	168	84
Master Degrees or above	25	12.5
Patients type		
Adult	167	83.5
Children	8	4
Neonates	14	7
Elderly	11	5.5
Type of clinical unit		
Internal medicine	50	25
Surgery department	57	28.5
Intensive care unit	80	40
Emergency	13	6.5
Professional title		
Primary	69	34.5
Intermediate	129	64.5
Senior	2	1
Position		
Staff nurse	190	95
Supervisor	10	5
whether to obtain the certificate of critical care specialist nurse		
Yes	24	12
No	176	88
Experience of resuscitating patients		
Yes	171	85.5
No	29	14.5
Whether family members have experienced CPR		
Yes	27	13.5
No	173	86.5
Number of times invited family presence		
0	174	87
< 5	20	10
≥ 5	6	3

Results

Cross-cultural adaptation and translation

Six experts (supplementary material Table 1) in the field of critical care were invited for the adaptation of the two scales, they provided suggestions for the 4 items in FPS-CS. Item 12 was revised from "administer drug therapies" to "administer drug therapies as prescribed by the doctor." Item 14 was expanded from "encourage family members to talk to their family member" to "encourage family members to talk to their family member at the appropriate time." Item 15 was supplemented from "support family members" to "support family members (i.e., psychological comfort, explaining the resuscitation work)." Item 17 was expanded from "bereavement follow-up" to "bereavement follow-up (i.e., cadaver care, handling of various formalities in the hospital)."

The reliability and validity of the FPR-BS and the FPS-CS

Participant characteristics

A total of 220 questionnaires were received. After excluding 20 invalid questionnaires, the number of valid questionnaires was 200, resulting in a valid response rate of 90.9%. Table 1 shows the demographic information of participants.

Items analysis

The Pearson correlation analysis revealed a statistically significant difference ($P<0.001$) in the item-total score correlations. The item-total correlation for the FPR-BS ranged from 0.323 to 0.829 (supplementary material Table 2), while for the FPS-CS, it ranged from 0.497 to 0.847 (supplementary material Table 3). The critical ratio of 26 items in the FPR-BS were 3.22 to 14.57 (supplementary material Table 4), while in the FPS-CS, it ranged from 5.85 to 14.29 (supplementary material Table 5), indicating good item discrimination for both scales.

Validity analysis

Construct validity

The Kaiser–Meyer–Olkin (KMO) test was 0.892, and Bartlett sphericity test was significant ($\chi2=3598.861$, $P<0.001$). A single factor was extracted from the FPR-BS (supplementary material Fig. 1). In the first four rounds of factor analysis, items 8, 7, 15, and 5 were successively removed (supplementary material Tables 6 - Table 9). In the fifth EFA (supplementary material Table 10), the cumulative variance contribution rate was 43.842%, and each item had a factor loading of 0.40 or higher (Table 2). Through five EFAs, a total of 4 items were removed, and 22 items were retained.

The Kaiser–Meyer–Olkin (KMO) test was 0.906, and Bartlett sphericity test was significant ($\chi2=2569.582$, $P<0.001$). A single factor was extracted from the FPS-CS (supplementary material Fig. 2). In the EFA, no items

Table 2 Factor analysis of the final FPR-BS items

Item	Factor loading
1.Family members should be given the option to be present when a loved one is being resuscitated.	0.717
2.Family members will panic if they witness a resuscitation effort.	-0.416
3.Family members will have difficulty adjusting to the long-term emotional impact of watching a resuscitation effort.	-0.432
4.The resuscitation team may develop a close relationship with family members who witness the efforts, as compared to family members who do not witness the efforts.	0.568
6.If my loved one were being resuscitated, I would want to be present in the room.	0.447
9.Family members who witness unsuccessful resuscitation efforts will have a better grieving process.	0.602
10.If my loved one were being resuscitated, I should be allowed to be present because I am a nurse.	0.423
11.Family members will become disruptive if they witness resuscitation efforts.	-0.631
12.Family members who witness a resuscitation effort are more likely to sue.	-0.556
13.The resuscitation team will not function as well if family members are present in the room.	-0.550
14.Nurses with whom I work are not supportive of family presence during resuscitation efforts.	-0.508
16.The presence of family members during resuscitation efforts is beneficial to patients.	0.602
17. Family presence during resuscitation is beneficial to families.	0.680
18. Family presence during resuscitation is beneficial to nurses.	0.755
19. Family presence during resuscitation is beneficial to physicians.	0.769
20. Family presence during resuscitation should be a component of family-centered care.	0.794
21. Family presence during resuscitation will have a positive effect on patient ratings of satisfaction with hospital care.	0.856
22. Family presence during resuscitation will have a positive effect on family ratings of satisfaction with hospital care.	0.876
23. Family presence during resuscitation will have a positive effect on nurse ratings of satisfaction in providing optimal patient and family care.	0.873
24. Family presence during resuscitation will have a positive effect on physician ratings of satisfaction in providing optimal patient and family care.	0.866
25. Family presence during resuscitation is a right that all patients should have.	0.651
26. Family presence during resuscitation is a right that all family members should have.	0.621

Table 3 Factor analysis of the final FPS-CS items

Item	Factor loading
1. I could communicate about the resuscitation effort to family members who are present.	0.628
2. I could administer drug therapies during resuscitation efforts with family members present.	0.678
3. I could perform electrical therapies during resuscitation efforts with family members present.	0.712
4. I could deliver chest compressions during resuscitation efforts with family members present.	0.691
5. I could communicate effectively with other health team members during resuscitation efforts with family members present.	0.784
6. I could maintain dignity of the patient during resuscitation efforts with family members present.	0.713
7. I could identify family members who display appropriate coping behaviors to be present during resuscitation efforts.	0.772
8. I could prepare family members to enter the area of resuscitation of their family member.	0.742
9. I could enlist support from attending physicians for family presence during resuscitation efforts.	0.609
10. I could escort family members into the room during resuscitation of their family member.	0.709
11. I could announce family member's presence to resuscitation team during resuscitation efforts of their family member.	0.734
12. I could provide comfort measures to family members witnessing resuscitation efforts of their family member.	0.847
13. I could identify spiritual and emotional needs of family members witnessing resuscitation efforts of their family member.	0.799
14. I could encourage family members to talk to their family member during resuscitation efforts.	0.763
15. I could delegate tasks to other nurses in order to support family members during resuscitation efforts of their family member.	0.463
16. I could debrief family after resuscitation of their family member.	0.513
17. I could coordinate bereavement follow-up with family members after resuscitation efforts of their family member, if required.	0.545

were removed from the FPS-CS (supplementary material Table 11). The cumulative variance contribution rate was 48.427%, and each item had a factor loading of 0.40 or higher (Table 3).

Content validity

Six experts were invited to evaluate the content validity of the FPR-BS and the FPS-CS. The results showed that the I-CVI for both scales ranged from 0.78 to 1, while the S-CVI was 0.98 for the FPR-BS and 0.97 for the FPS-CS (supplementary material Tables 8 - Table 9).

Reliability analysis

Reliability assessments yielded Cronbach's alpha coefficients of 0.933 for the FPR-BS and 0.930 for the FPS-CS. The split-half reliability coefficients were 0.832 for the FPR-BS and 0.835 for the FPS-CS, while the test-retest reliability coefficients were 0.742 and 0.927, respectively.

Perceptions of risks-benefits and self-confidence

Participant characteristics

A total of 550 questionnaires were collected, with 31 deemed invalid and excluded from analysis, leaving 519 valid responses and a final valid response rate of 94.5%. Table 4 shows the demographic information of participants.

Scores on study variables

The average scores obtained were 2.76 (SD = 0.52) for the FPR-BS and 3.43 (SD = 0.58) for the FPS-CS.

Correlations among perceptions of risks-benefits and self-confidence

The correlation coefficient between the FPR-BS and FPS-CS scores was 0.532 ($P < 0.05$), indicating that nurses who perceived more benefits and fewer risks of FPDR, they also perceived greater self-confidence in the ability to manage family presence.

Relationships between demographic variables, risks-benefits, and self-confidence

Statistical analyses revealed that factors such as patient type, family members' prior experience with resuscitation, and the number of times nurses invited family members during resuscitation significantly influenced perceptions of the benefits and risks associated with FPDR ($P < 0.05$). Furthermore, obtaining certification as an intensive care specialist was positively associated with nurses' self-confidence in managing FPDR ($P < 0.05$). Further details were presented in Table 4.

Discussion

This study represents the first investigation in mainland China to evaluate the reliability and validity of FPR-BS and FPS-CS, while also exploring nurses' perceptions of FPDR. Through cross-cultural adaptation, we have validated these scales for application within the Chinese context. Our findings indicated that while nurses perceived fewer benefits and more risks with FPDR, they also report a greater self-confidence in their ability to manage family presence during resuscitation efforts.

To assess the content validity of the two scales, six experts were consulted, and the results demonstrated strong content validity. Four items in the FPS-CS were modified to account for cultural and system differences between countries. Specifically, item 12 was revised from "administer drug therapies" to "administer drug therapies as prescribed by the doctor." This adjustment reflects the current legal framework in China, where nurses do not possess the authority to prescribe medication [26]. Additionally, item 14 and item 15 were supplemented to eliminate ambiguity and enhance understanding. Traditional Chinese culture places significant value funeral rituals, which encompass a comprehensive set of practices. As a result, it is essential to clarify the specific responsibilities of nurses in assisting family members during the bereavement process. Following consultations with emergency department nurses, item 17 was expanded from "bereavement follow-up" to "bereavement follow-up (i.e., cadaver care, handling of various formalities in the hospital. The original author approved these modifications, ensuring that the scale is culturally relevant and contextually appropriate.

The results of EFA indicated that the construct validity of both scales was satisfactory. The factor loadings of the remaining 22 items in FPR-BS were above 0.4, explaining 43.84% of the variance. All the 17 items in the FPS-CS were retained following EFA, contributing to a cumulative variance of 48.43%. In the study, items 5, 7, 8, and 15 were removed from FPR-BS. Specifically, item 5, which stated, "I would be more anxious about doing things right if family members were present during a resuscitation effort." was deleted due to its redundancy with items 11, 12, and 13. These three items address the disruptive behaviours of family members, which can contribute to anxiety among medical professionals involved in FPDR. In the context of the prevailing medical environment in China, FPDR is generally not permitted [12]. Asian cultures often emphasized hierarchical authority and clearly defined professional roles. In medical emergencies, doctors and nurses are viewed as ultimate authorities, and decisions regarding FPDR are typically made by medical professionals, often disregarding the preferences of patients and their families. This contrasts sharply with the emphasis in Western countries on keeping patients and their families informed and actively involved in the care process. Consequently, item 7, "Patients do not want family members present during a resuscitation attempt," and item 15, "Family members on the unit where I work prefer to be present in the room during resuscitation efforts," were removed. Currently, standardized guidelines for resuscitation exist internationally [27]. The resuscitation measures taken by the resuscitation team not influenced by whether family members are present. Thus, item 8, "The resuscitation team will try more extensive interventions if family members are present," was deleted.

Consistent with findings from other countries [4, 19–22], our results demonstrated that both scales exhibit strong reliability. The Cronbach's alpha coefficients for

Table 4 Sample characteristics and univariate analysis on the score of FPR-BS and FPS-CS(*N* = 519)

Characteristics	*N* (%)	the score of FPR-BS (Mean ± SD)	t/F	*P*	the score of FPS-CS (Mean ± SD)	t/F	*P*
Gender							
Male	31(6)	60.81 ± 11.39	0.057[a]	0.954	56.74 ± 11.82	0.955[a]	0.340
Female	488(94)	60.69 ± 11.34			58.49 ± 9.75		
Years of working							
≤ 5	110 (21.2)	61.62 ± 11.57	0.395[b]	0.757	57.54 ± 9.90	0.384[b]	0.764
6–10	217 (41.8)	60.70 ± 10.95			58.55 ± 9.69		
11–20	142 (27.4)	60.23 ± 12.11			58.55 ± 10.34		
≥ 21	50 (9.6)	59.94 ± 10.32			59.08 ± 9.46		
Age							
18–25	68 (13.1)	62.21 ± 12.31	0.772[b]	0.510	58.07 ± 10.18	0.259[b]	0.855
26–30	150 (28.9)	60.98 ± 11.04			57.88 ± 10.23		
31–40	247 (47.6)	60.42 ± 11.41			58.70 ± 9.51		
≥ 41	54 (10.4)	59.26 ± 10.56			58.74 ± 10.38		
Level of education							
Associate degree	23 (4.4)	62.57 ± 12.99	0.731[b]	0.482	58.39 ± 10.17	1.465[b]	0.232
Bachelor Degree	431 (83)	60.43 ± 11.27			58.09 ± 10.09		
Master Degree	65 (12.5)	61.78 ± 11.22			60.34 ± 8.11		
Patients type							
Adult	428 (82.5)	60.08 ± 11.37	3.369[b]	0.018	57.94 ± 10.08	2.234[b]	0.083
Children	38 (7.3)	62.42 ± 7.99			59.61 ± 8.01		
Neonates	34 (6.6)	62.68 ± 11.07			59.97 ± 9.24		
Elderly	19 (3.7)	67.47 ± 14.17			63.11 ± 8.68		
Type of clinical unit							
Internal medicine	128 (24.7)	60.07 ± 11.29	0.372[b]	0.773	58.86 ± 9.60	0.224[b]	0.880
Surgery department	144 (27.7)	60.49 ± 12.04			58.30 ± 10.17		
Intensive care unit	206 (39.7)	61.32 ± 10.86			58.04 ± 9.81		
Emergency	41 (7.9)	60.24 ± 11.50			58.93 ± 10.33		
Professional title							
Primary	197 (38)	61.10 ± 11.71	0.334[b]	0.716	58.01 ± 10.22	0.294[b]	0.746
Intermediate	317 (61.1)	60.40 ± 11.11			58.59 ± 9.63		
Senior	5 (1)	63.00 ± 12.02			60.20 ± 13.59		
Position							
Staff nurse	494 (95.2)	60.74 ± 11.41	0.458[a]	0.647	58.19 ± 9.93	1.963[a]	0.050
Supervisor	25 (4.8)	59.68 ± 9.86			62.16 ± 8.15		
whether to obtain the certificate of critical care specialist nurse							
Yes	74 (14.3)	60.68 ± 9.94	2.016[a]	0.987	60.97 ± 9.51	0.277[a]	0.015
No	445 (85.7)	60.70 ± 11.56			57.96 ± 9.88		
Experience of resuscitating patients							
Yes	453 (87.3)	60.34 ± 11.35	1.890[a]	0.059	58.43 ± 9.90	0.272[a]	0.786
No	66 (12.7)	63.15 ± 10.98			58.08 ± 9.83		
Whether family members have experienced resuscitation							
Yes	72 (13.9)	63.50 ± 10.36	2.273[a]	0.023	59.33 ± 7.81	1.060[a]	0.292
No	447 (86.1)	60.24 ± 11.43			58.23 ± 10.17		
Number of times invited family presence							
0	444 (85.5)	60.17 ± 11.26	7.459[b]	0.001	58.14 ± 9.74	1.768[b]	0.172
< 5	65 (12.5)	62.37 ± 11.08			59.23 ± 11.13		
≥ 5	10 (1.9)	73.20 ± 8.26			63.60 ± 5.54		

Note: a is *t* value; b is *F* value

the Chinese version of the FPR-BS and the FPS-CS in this study were 0.933 and 0.930, respectively. Additionally, the split-half reliability coefficient for the two scales was 0.832 and 0.835. A retest involving 24 nurses conducted over a two-week interval yielded reliability scores of 0.742 for the FPR-BS and 0.927 for the FPS-CS, indicating good stability. Therefore, the Chinese version of both scales is deemed suitable for application within our country.

In the second stage of the study, we observed that Chinese nurses perceive fewer benefits and greater risks associated with FPDR, yet they report increased self-confidence in their ability to manage family presence. While there is a higher acceptance of FPDR in Western countries [11], most medical professionals in Eastern countries generally exhibit negative attitudes towards this practice [6, 12, 13]. Currently, FPDR is not a common practice in mainland China, and most medical professionals lack both experience and training in this area [12]. Furthermore, there are no relevant policies governing FPDR in China. Cultural sensitivities surrounding discussions of death add another layer of complexity, as medical disputes are relatively common within the context of Chinese healthcare. Consequently, Chinese healthcare professionals generally exhibit a limited willingness to implement FPDR [12, 14, 28]. Previous studies [8, 29–33] have indicated that supportive policy, educational initiatives, and the involvement of family support persons could facilitate the implementation of FPDR. These findings provide valuable insights for further research on FPDR in the domestic context, highlighting the need for targeted interventions to enhance understanding and acceptance of FPDR among Chinese healthcare professionals.

The differences in the total scores of FPR-BS were observed based on patient type, family members' prior experience with resuscitation, and the number of times nurses invited family members during resuscitation. The score of the FPS-CS was varied among nurses who possessed certifications as critical care specialists. In our study, nurses perceived greater benefits of FPDR when caring for elderly patients. Possible reasons are as follows: China has stepped into an aging society, the illness of the elderly has led to a great economic burden on their family members [34]. In this context, the implementation of FPDR may help alleviate some of this economic strain. Furthermore, for elderly patients who experience chronic illnesses, death is frequently viewed as a form of relief, which may reduce the pressure on medical professionals when facilitating FPDR. According to Bandura's [35] research, individual behaviour is largely influenced by personal perceptions. Our findings indicated that as nurses more frequently invite family members into the resuscitation process, they perceive greater benefits from FPDR. This aligns with the results reported by Twibell [19] and Chapman [22]. Additionally, we found that nurses whose family members had previously experienced resuscitation perceived more benefits from this practice. Forcibly separating the family members from the patient during resuscitation can be emotionally detrimental to those family members [36]. Given the lack of information during resuscitation, family members are often more willing to confront the painful realities associated with the process [32]. Nurses certified as critical care specialists exhibit higher self-confidence in managing family presence during resuscitation. These specialized nurses possess more extensive experience and stronger core competencies compared to non-specialized counterparts [37]. Consequently, they are better equipped to manage family involvement effectively, thereby enhancing the quality of care provided to both patients and their families. The observed differences in scale scores among nurses with varying characteristics may serve as a valuable reference for future research on FPDR.

Even though many hospitals in Western countries have implemented policies allowing for FPDR [38], this practice has not been universally implemented. Significant progress has been made in acknowledging the potential benefits for both patients and their families; however, the extent of FPDR's adoption and the consistency of its application continue to vary across institutions. In contrast, the implementation of FPDR has been particularly limited in Asian countries. The cultural context in many Asian countries is characterized by strong family ties and a pronounced emphasis on family involvement in medical decision-making. As such, implementing FPDR could align with these cultural values and offer crucial emotional support to families during critical situations [6]. Furthermore, promoting FPDR in Asia has the potential to bridge existing gaps in healthcare practices, ultimately enhancing the experiences of both patients and their families during resuscitation efforts [10]. Nonetheless, the feasibility of implementing FPDR in China requires further exploration. Future research, including a pilot study, could be beneficial in assessing the practical application of FPDR within the Chinese healthcare system. Such investigations would provide valuable insights into how FPDR can be effectively integrated into clinical practice while respecting cultural norms and enhancing patient care.

Limitations

This study has several limitations that warrant consideration. Firstly, this research was conducted in a single tertiary hospital, which may limit the generalizability of the findings to broader contexts. Future studies should aim to expand the sample size and incorporate a multicenter design to enhance the robustness and representativeness of the results. Secondly, this investigation was exclusively

quantitative in nature; thus, the inclusion of qualitative methodologies in future research could provide deeper insights into the perceptions of diverse stakeholder groups regarding FPDR. Such qualitative approaches would allow for a more nuanced understanding of the factors influencing attitudes and experiences related to FPDR.

Conclusions

In this study, both FPR-BS and the FPS-CS demonstrated strong validity and reliability, establishing them as effective tools for evaluating nurses' perceptions of FPDR. While Chinese nurses reported perceiving fewer benefits and greater risks associated with FPDR, they also exhibited increased more self-confidence in their ability to manage family presence during resuscitation efforts. These findings underscore the need for targeted educational initiatives and policy development to enhance the implementation of FPDR in the Chinese healthcare context, ultimately improving both patient care and family involvement.

Supplementary Information

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Supplementary Material 1

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Author contributions

Conceived and designed the research: Y-m L. Wrote the paper: YG. Analyzed the data: YG and J-x Y. Revised the paper: J-x Y, JP, Y-t L, Y-s T, and Z-y C. The authors read and approved the final manuscript.

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Data availability

Data is provided within the manuscript or supplementary information files.

Declarations

Ethics approval and consent to participate

All individuals have provided informed consent before the data collection. Participating nurses were promised that the information provided would remain anonymous. Approval for the study was obtained from the Ethics Committee of Xiangya Nursing School of Central South University (E2023124), and all methods were performed in accordance with the relevant guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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