

Supplementary Material

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Supplementary Material 1. Good reporting of a mixed-methods study (GRAMMS) checklist.

Guideline	Page No
1. Describe the justification for using a mixed methods approach to the research question.	4~5
2. Describe the design in terms of the purpose, priority and sequence of methods.	4~6
3. Describe each method in terms of sampling, data collection and analysis.	6~13
4. Describe where integration has occurred, how it has occurred and who has participated in it.	5~6; 14~15
5. Describe any limitation of one method associated with the present of the other method.	23~26; 29~30
6. Describe any insights gained from mixing or integrating methods.	21-22; 23~26

Reference: O'Cathain A, Murphy E, Nicholl J. The quality of mixed methods studies in health services research. J Health Serv Res Policy. 2008;13: 92-98.

Supplementary Material 2. STROBE Statement—Checklist of items that should be included in reports of cross-sectional studies.

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found	1 1~2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	3~5
Objectives	3	State specific objectives, including any prespecified hypotheses	3~6
Methods			
Study design	4	Present key elements of study design early in the paper	5~8
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	6~7
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8~9; 11
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8~9
Bias	9	Describe any efforts to address potential sources of bias	9; 15~16
Study size	10	Explain how the study size was arrived at	7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	11
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) If applicable, describe analytical methods taking account of sampling strategy (e) Describe any sensitivity analyses	11 11; 17~18 11 N/A N/A
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	16
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	16
		(b) Indicate number of participants with missing data for each variable of interest	16
Outcome data	15*	Report numbers of outcome events or summary measures	16~17
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	17~18
		(b) Report category boundaries when continuous variables were categorized	16
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	N/A
Discussion			
Key results	18	Summarise key results with reference to study objectives	21~22
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	30~31
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	22~31
Generalisability	21	Discuss the generalisability (external validity) of the study results	30~31
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	33

Supplementary Material 3. Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist.

No. Item	Guide questions/description	Page No
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	10
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	10
3. Occupation	What was their occupation at the time of the study?	10
4. Sex	Was the researcher male or female?	10
5. Experience and training	What experience or training did the researcher have?	10
Relationship with participants		
6. Relationship established	Was a relationship established prior to study commencement?	13
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	10
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	13
Domain 2: Study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	7~8; 11~13
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	7~8
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	10
12. Sample size	How many participants were in the study?	7~8; 18~21
13. Non-participation	How many people refused to participate or dropped out? Reasons?	NR
Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	10
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	9
16. Description of sample	What are the important characteristics of the	18~21

	sample? e.g. demographic data, date	
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	10
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	NR
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	10
20. Field notes	Were field notes made during and/or after the interview or focus group?	10
21. Duration	What was the duration of the interviews or focus group?	10
22. Data saturation	Was data saturation discussed?	7~8
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	NR
Domain 3: Analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	
25. Description of the coding tree	Did authors provide a description of the coding tree?	11~13
26. Derivation of themes	Were themes identified in advance or derived from the data?	11~13; 18~21
27. Software	What software, if applicable, was used to manage the data?	N/A
28. Participant checking	Did participants provide feedback on the findings?	11~13
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number	18~21
30. Data and findings consistent	Was there consistency between the data presented and the findings?	18~21
31. Clarity of major themes	Were major themes clearly presented in the findings?	18~21
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	18~21

Supplementary Material 4. Family Member Demographic Questionnaire

Dear Family Member,

Thank you for taking the time to complete this questionnaire. This survey aims to investigate the needs of family members of intensive care unit (ICU) patients and the factors associated with these needs, in order to help healthcare professionals better support patients and their families.

Please answer the following questions based on your actual situation. There are no right or wrong answers. All information will be kept strictly confidential and used only for research purposes.

1. Sex

- Male
- Female

2. Ethnicity

3. Date of Birth

- Year: _____ Month: _____

4. Relationship to the Patient

- Child
- Parent
- Spouse
- Sibling
- Other (please specify): _____

5. Educational Level

- Junior high school or below
- Senior high school / Technical secondary school
- College diploma
- Bachelor's degree or above

6. Occupation

- Unemployed
- Retired
- Farmer / Worker
- Self-employed
- Government employee / Public institution employee / Company staff

7. Marital Status

- Married
- Single
- Divorced / Widowed

8. Self-rated Health Status

- Good
- Fair
- Poor

9. Average Monthly Household Income per Capita (RMB)

- $\leq 2,000$
- 2,001–4,000
- 4,001–6,000
- $\geq 6,001$

10. Do You Live with the Patient?

- Yes
- No

11. Were You the Primary Caregiver During the Patient's Hospitalization?

- Yes
- No

12. Place of Residence

- Rural area
- Urban area

13. How Well Do You Understand the Patient's Illness?

- Well informed
- Somewhat informed
- Not informed

14. Religious Belief

- Yes
- No

15. Previous Experience Caring for an ICU Patient

- Yes
- No

Supplementary Material 5. Semi-Structured Interview Guide

Dear Participant,

Thank you very much for your understanding, cooperation, and willingness to participate in this study. The purpose of this study is to explore the psychological needs of family members of patients admitted to the Intensive Care Unit (ICU). The findings may help healthcare professionals better understand family members' needs and provide individualized psychological support to reduce emotional distress. The interview will last approximately 30–45 minutes. With your permission, the interview will be audio-recorded to ensure the accuracy and completeness of the information collected. The recordings will be transcribed into text for analysis. All information collected during this study will be kept strictly confidential and used solely for research purposes. Participation in this study is entirely voluntary. You have the right to decline participation or withdraw from the study at any time without providing a reason.

Thank you again for your valuable participation and support.

I have received an explanation of the purpose and procedures of this study from the researcher and voluntarily agree to participate.

Participant Signature: _____

Date: _____

Contact Information: _____

Semi-Structured Interview Guide:

- (1) What support do you expect from healthcare professionals when your family member is admitted to the ICU?
- (2) What needs do you have during hospitalization, and which are the most important?
- (3) Can you provide specific examples?
- (4) What has been the most difficult aspect for you during this period?
- (5) How can healthcare professionals better support your needs?
- (6) What support would you expect after the patient is discharged?
- (7) Is there anything else you would like to add?

Note: The order of questions could be adjusted according to the flow of the interview and participants' responses.

Supplementary Material 6. Dummy coding scheme for categorical predictors included in the multiple linear regression models.

Outcome dimension	Predictor	Categories	Reference category	Dummy-coded comparisons
Need for assurance	ICU experience	Yes / No	Yes	No vs. Yes
	Occupation	Unemployed / Retired / Farmer/worker / Self-employed / Staff in public institutions	Unemployed	Retired vs. Unemployed; Farmer/worker vs. Unemployed; Self-employed vs. Unemployed; Staff in public institutions vs. Unemployed
Need for professional support	Residence	Rural / Urban	Rural	Urban vs. Rural
	Disease knowledge	Understand / Partially understand / Do not understand	Understand	Partially understand vs. Understand; Do not understand vs. Understand
Need for information	Living with patient	Yes / No	Yes	No vs. Yes
	Ethnicity	Han / Hui / Tibetan	Han	Hui vs. Han; Tibetan vs. Han
	Disease knowledge	Understand / Partially understand / Do not understand	Understand	Partially understand vs. Understand; Do not understand vs. Understand
Proximity	Age	18–30 / 31–49 / 50–69 / ≥ 70	18–30	31–49 vs. 18–30; 50–69 vs. 18–30; ≥ 70 vs. 18–30
	Occupation	Unemployed / Retired / Farmer/worker / Self-employed / Staff in public institutions	Unemployed	Retired vs. Unemployed; Farmer/worker vs. Unemployed; Self-employed vs. Unemployed; Staff in public institutions vs. Unemployed
Need for personal comfort	Residence	Rural / Urban	Rural	Urban vs. Rural
	Religious belief	Yes / No	Yes	No vs. Yes
	Age	18–30 / 31–49 / 50–69 / ≥ 70	18–30	31–49 vs. 18–30; 50–69 vs. 18–30; ≥ 70 vs. 18–30
	Education level	Junior high or below / High school / College / Bachelor or above	Junior high or below	High school vs. Junior high or below; College vs. Junior high or below; Bachelor or above vs. Junior high or below

Supplementary Material 7. Illustrative application of Colaizzi's seven-step phenomenological analysis in the present study.

Colaizzi's step	Standard analytic procedure	Operationalization in the present study	Illustrative example from the present study
1. Familiarization with the data	Read and reread the complete accounts to obtain an overall understanding of the phenomenon.	Interview transcripts were transcribed verbatim and reviewed repeatedly together with field notes before formal coding.	The researchers repeatedly reviewed participants' accounts concerning psychological needs, emotional responses, communication, visitation, and caregiving experiences to gain an overall understanding of the phenomenon.
2. Extraction of significant statements	Identify statements that are directly relevant to the phenomenon under investigation.	Statements relevant to ICU family members' psychological needs were identified from the interview transcripts and retained for analysis.	"I want to communicate with the patient and provide basic care, such as cleaning, wiping, and massaging."
3. Formulation of meanings / meaning units	Condense each significant statement into a concise statement that captures its essential meaning while remaining grounded in the participant's account.	The significant statement was condensed into a coherent meaning unit representing the participant's expressed need for direct involvement in patient care.	Illustrative meaning unit: <i>Family members want to maintain contact with the patient through direct participation in basic care.</i>
4. Clustering of meanings into themes	Group conceptually related meanings/codes according to their similarity and relevance to the phenomenon.	Related initial codes were grouped into subthemes. The qualitative analysis ultimately yielded 115 initial codes and 10 subthemes.	Illustrative initial code: <i>Desire to participate in basic patient care</i> → Subtheme: <i>Providing direct care</i>
5. Developing overarching themes	Integrate related subthemes into broader themes representing major dimensions of the lived experience.	Conceptually related subthemes were organized into 5 overarching themes representing the main dimensions of family members' psychological needs.	Providing direct care → Overarching theme: <i>Need for proximity to the patient</i>
6. Developing a	Synthesize the themes into an	The identified themes and subthemes were	For example, the proximity-related

comprehensive description	integrated description of the phenomenon as a whole.	synthesized to describe family members' psychological needs across emotional, informational, relational, proximity, and support-related experiences.	findings collectively captured family members' desire for visiting and companionship, flexible visiting, and direct participation in patient care.
7. Formulating and validating the fundamental structure	Synthesize the essential structure of the phenomenon and assess the credibility of the interpretation through appropriate validation procedures.	The analysis was reviewed by multiple researchers; two researchers independently coded the transcripts, discrepancies were discussed until consensus was reached, and member checking was conducted by returning summaries of the interpreted findings to selected participants.	The final synthesis was retained after researcher discussion and participant checking to ensure that the interpretation remained consistent with family members' reported experiences.

Supplementary Material 8. Demographic and clinical characteristics of ICU patients (N = 200).

Variable	Frequency (%)
Sex	
Male	131 (65.5)
Female	69 (34.5)
Age (years)	
18~30	17 (8.5)
31~49	46 (23.0)
50~69	99 (49.5)
≥70	38 (19.0)
Payment method	
Self-pay	56 (28.0)
Employee medical insurance	64 (32.0)
Resident medical insurance	80 (40.0)
Length of stay (days)	
1~5	107 (53.5)
6~10	67 (33.5)
11~20	23 (11.5)
≥21	3 (1.5)
APACHE II score	
≤8	23 (11.5)
9~15	76 (38.0)
16~24	68 (34.0)
25~30	23 (11.5)
≥31	10 (5.0)

Supplementary Material 9. Top 10 items of psychological needs among ICU family members (N = 200).

Item	Score		
	Min	Max	Mean $\pm$ SD
Knowing the patient's prognosis	2	4	3.80 $\pm$ 0.45
Feeling hopeful about the patient's improvement	2	4	3.77 $\pm$ 0.49
Being notified when the patient's condition changes	2	4	3.75 $\pm$ 0.48
Being assured the patient receives the best care	2	4	3.74 $\pm$ 0.53
Knowing specific changes in the patient's condition	2	4	3.73 $\pm$ 0.48
Receiving daily updates about the patient's condition	1	4	3.71 $\pm$ 0.50
Receiving honest answers from healthcare staff	2	4	3.69 $\pm$ 0.55
Receiving clear and understandable explanations from healthcare staff	2	4	3.67 $\pm$ 0.55
Understanding the patient's current treatment	2	4	3.67 $\pm$ 0.49
Feeling that healthcare staff care about the patient	2	4	3.66 $\pm$ 0.54

Supplementary Material 10a. Univariate Analysis of Assurance Scores.

Variables	Mean $\pm$ SD	<i>t/F</i>	<i>P</i>
Patient characteristics			
Sex		0.219	0.827
Male	26.30 $\pm$ 2.32		
Female	26.22 $\pm$ 2.73		
Age (years)		1.360	0.256
18–30	27.00 $\pm$ 1.80		
31–49	26.43 $\pm$ 2.49		
50–69	26.30 $\pm$ 2.30		
≥ 70	25.66 $\pm$ 3.02		
Length of ICU stay (days)		0.918	0.433
1–5	26.32 $\pm$ 2.19		
6–10	25.96 $\pm$ 2.97		
11–20	26.87 $\pm$ 2.07		
≥ 21	27.00 $\pm$ 1.73		
Healthcare payment method		1.955	0.144
Self-pay	25.84 $\pm$ 2.31		
Urban employee insurance	26.16 $\pm$ 2.73		
Urban/rural resident insurance	26.66 $\pm$ 2.32		
APACHE II score		2.183	0.072
≤ 8	26.70 $\pm$ 2.14		
9–15	25.83 $\pm$ 2.77		
16–24	26.21 $\pm$ 2.41		
25–30	26.78 $\pm$ 2.04		
≥ 31	27.90 $\pm$ 0.32		
Family-member characteristics			
Sex		-0.108	0.914
Male	26.25 $\pm$ 2.39		
Female	26.29 $\pm$ 2.57		
Living with the patient		1.312	0.191
Yes	26.49 $\pm$ 2.20		
No	26.02 $\pm$ 2.73		
Primary caregiver		0.571	0.569
Yes	26.31 $\pm$ 2.49		
No	26.00 $\pm$ 2.28		
Residence		-0.741	0.460
Rural	26.14 $\pm$ 2.47		
Urban	26.39 $\pm$ 2.46		
Religious belief		-1.328	0.196
Yes	25.48 $\pm$ 3.12		
No	26.37 $\pm$ 2.36		
ICU experience		3.658	<0.001
Yes	27.23 $\pm$ 1.31		

No	26.10 ± 2.58		
Ethnicity		1.808	0.167
Han	26.31 ± 2.47		
Hui	24.00 ± 2.45		
Tibetan	26.75 ± 0.50		
Health status		0.192	0.825
Good	26.27 ± 2.57		
Fair	26.14 ± 2.25		
Poor	26.70 ± 0.82		
Age (years)		1.448	0.230
18–30	26.94 ± 1.92		
31–49	25.98 ± 2.70		
50–69	26.39 ± 2.60		
≥70	27.00 ± 1.41		
Disease knowledge		2.060	0.130
Understand	26.27 ± 2.43		
Partially understand	26.02 ± 2.67		
Do not understand	27.24 ± 1.34		
Relationship to patient		1.543	0.191
Child of the patient	26.37 ± 2.34		
Parents	27.78 ± 0.67		
Spouse	26.29 ± 2.32		
Siblings	25.50 ± 2.89		
Others	26.16 ± 2.84		
Education level		2.291	0.080
Junior high or below	25.93 ± 2.68		
High school	25.96 ± 2.66		
Junior college	27.21 ± 1.10		
Bachelor or above	26.63 ± 2.30		
Occupation		2.661	0.034
Unemployed	25.45 ± 2.94		
Retired	26.38 ± 1.81		
Farmer/worker	26.06 ± 2.53		
Self-employed	26.79 ± 2.20		
Staff in public institutions	27.00 ± 1.99		
Marital status		2.329	0.100
Married	26.28 ± 2.45		
Unmarried	26.66 ± 1.86		
Divorced/widowed	24.67 ± 3.97		
Monthly income (CNY)		0.211	0.889
≤2000	26.40 ± 2.22		
2000~4000	26.13 ± 2.58		
4000~6000	26.41 ± 2.58		
≥6000	26.12 ± 2.55		

Supplementary Material 10b. Univariate Analysis of Support Scores.

Variables	Mean $\pm$ SD	t/F	P
Patient characteristics			
Sex		1.071	0.285
Male	43.81 $\pm$ 8.89		
Female	42.35 $\pm$ 9.70		
Age (years)		0.855	0.465
18–30	40.71 $\pm$ 9.23		
31–49	44.30 $\pm$ 10.31		
50–69	43.69 $\pm$ 9.25		
≥ 70	42.26 $\pm$ 7.39		
Length of ICU stay (days)		0.028	0.994
1–5	43.36 $\pm$ 9.52		
6–10	43.37 $\pm$ 9.19		
11–20	43.04 $\pm$ 8.47		
≥ 21	42.00 $\pm$ 2.00		
Healthcare payment method		2.021	0.135
Self-pay	41.25 $\pm$ 9.46		
Urban employee insurance	44.38 $\pm$ 8.97		
Urban/rural resident insurance	43.89 $\pm$ 9.03		
APACHE II score		0.481	0.750
≤ 8	43.52 $\pm$ 9.75		
9–15	43.12 $\pm$ 9.71		
16–24	42.54 $\pm$ 9.04		
25–30	44.83 $\pm$ 7.87		
≥ 31	45.90 $\pm$ 8.14		
Family-member characteristics			
Sex		0.623	0.534
Male	43.68 $\pm$ 9.49		
Female	42.87 $\pm$ 8.83		
Living with the patient		1.666	0.097
Yes	44.31 $\pm$ 8.80		
No	42.15 $\pm$ 9.51		
Primary caregiver		0.149	0.881
Yes	43.34 $\pm$ 9.06		
No	43.04 $\pm$ 10.17		
Residence		-2.073	0.039
Rural	41.92 $\pm$ 9.33		
Urban	44.59 $\pm$ 8.89		
Religious belief		0.120	0.905
Yes	43.52 $\pm$ 9.86		
No	43.28 $\pm$ 9.11		
ICU experience		1.316	0.190
Yes	45.33 $\pm$ 8.07		

No	42.95 ± 9.33		
Ethnicity		0.104	0.901
Han	43.25 ± 9.17		
Hui	45.25 ± 13.20		
Tibetan	44.00 ± 7.17		
Health status		0.092	0.912
Good	43.17 ± 9.59		
Fair	43.90 ± 7.03		
Poor	43.80 ± 8.36		
Disease knowledge		3.123	0.046
Understand	42.46 ± 9.39		
Partially understand	43.11 ± 8.53		
Do not understand	47.90 ± 9.77		
Age (years)		0.639	0.591
18–30	44.50 ± 10.03		
31–49	43.37 ± 8.38		
50–69	42.70 ± 10.24		
≥70	36.50 ± 0.71		
Relationship to patient		2.183	0.072
Child of the patient	26.70 ± 2.14		
Parents	25.83 ± 2.77		
Spouse	26.21 ± 2.41		
Siblings	26.78 ± 2.04		
Others	43.32 ± 8.70		
Education level		1.860	0.138
Junior high or below	42.14 ± 10.10		
High school	44.93 ± 7.50		
Junior college	45.67 ± 7.77		
Bachelor or above	41.98 ± 9.87		
Occupation		1.269	0.284
Unemployed	43.18 ± 9.25		
Retired	47.38 ± 9.88		
Farmer/worker	42.14 ± 8.27		
Self-employed	42.16 ± 10.99		
Staff in public institutions	44.55 ± 9.44		
Marital status		0.013	0.987
Married	43.36 ± 9.45		
Unmarried	43.09 ± 8.41		
Divorced/widowed	43.11 ± 7.62		
Monthly income (CNY)		0.208	0.891
≤2000	43.00 ± 10.55		
2000~4000	43.09 ± 8.49		
4000~6000	44.24 ± 8.53		
≥6000	42.82 ± 9.56		

Supplementary Material 10c. Univariate Analysis of Information Scores.

Variables	Mean $\pm$ SD	t/F	P
Patient characteristics			
Sex		1.316	0.190
Male	28.34 $\pm$ 3.74		
Female	27.57 $\pm$ 4.29		
Age (years)		1.985	0.118
18–30	28.41 $\pm$ 4.14		
31–49	28.83 $\pm$ 4.45		
50–69	28.15 $\pm$ 3.71		
≥ 70	26.79 $\pm$ 3.65		
Length of ICU stay (days)		0.339	0.797
1–5	28.07 $\pm$ 4.05		
6–10	28.00 $\pm$ 4.17		
11–20	27.96 $\pm$ 2.96		
≥ 21	30.33 $\pm$ 0.58		
Healthcare payment method		2.141	0.120
Self-pay	27.21 $\pm$ 4.96		
Urban employee insurance	28.13 $\pm$ 3.91		
Urban/rural resident insurance	28.63 $\pm$ 2.30		
APACHE II score		0.685	0.603
≤ 8	27.57 $\pm$ 3.15		
9–15	27.78 $\pm$ 4.44		
16–24	28.22 $\pm$ 3.96		
25–30	28.39 $\pm$ 3.37		
≥ 31	29.70 $\pm$ 2.54		
Family-member characteristics			
Sex		-0.700	0.485
Male	27.89 $\pm$ 4.04		
Female	28.28 $\pm$ 3.85		
Living with the patient		3.492	0.001
Yes	28.95 $\pm$ 3.72		
No	27.05 $\pm$ 3.97		
Primary caregiver		1.309	0.192
Yes	28.20 $\pm$ 3.71		
No	27.08 $\pm$ 5.36		
Residence		-0.384	0.701
Rural	27.96 $\pm$ 4.39		
Urban	28.17 $\pm$ 3.50		
Religious belief		-0.146	0.884
Yes	27.96 $\pm$ 4.36		
No	28.08 $\pm$ 3.90		
ICU experience		1.354	0.177
Yes	28.97 $\pm$ 3.02		

No	27.91 ± 4.07		
Ethnicity		3.988	0.020
Han	27.92 ± 3.87		
Hui	33.00 ± 5.60		
Tibetan	30.25 ± 2.36		
Health status		1.563	0.212
Good	27.98 ± 4.12		
Fair	27.83 ± 3.30		
Poor	30.20 ± 1.75		
Disease knowledge		6.272	0.002
Understand	27.62 ± 4.53		
Partially understand	27.88 ± 3.03		
Do not understand	30.86 ± 3.34		
Age (years)		4.028	0.008
18–30	29.88 ± 3.13		
31–49	28.05 ± 3.35		
50–69	26.98 ± 5.01		
≥70	29.00 ± 2.83		
Relationship to patient		0.825	0.511
Child of the patient	27.94 ± 3.79		
Parents	29.11 ± 5.09		
Spouse	28.85 ± 3.48		
Siblings	27.62 ± 5.57		
Others	27.52 ± 2.93		
Education level		1.142	0.333
Junior high or below	27.39 ± 4.60		
High school	28.63 ± 3.93		
Junior college	28.13 ± 2.77		
Bachelor or above	28.35 ± 3.98		
Occupation		1.035	0.390
Unemployed	28.18 ± 4.21		
Retired	29.46 ± 3.31		
Farmer/worker	27.47 ± 4.34		
Self-employed	28.11 ± 3.48		
Staff in public institutions	28.53 ± 3.34		
Marital status		1.547	0.215
Married	27.91 ± 4.02		
Unmarried	29.13 ± 3.53		
Divorced/widowed	27.11 ± 3.59		
Monthly income (CNY)		0.391	0.759
≤2000	27.95 ± 5.14		
2000~4000	28.43 ± 3.34		
4000~6000	27.72 ± 3.30		
≥6000	27.76 ± 3.65		

Supplementary Material 10d. Univariate Analysis of Proximity Scores.

Variables	Mean $\pm$ SD	t/F	P
Patient characteristics			
Sex		-0.379	0.705
Male	30.98 $\pm$ 4.31		
Female	31.23 $\pm$ 4.90		
Age (years)		0.216	0.885
18–30	30.41 $\pm$ 4.60		
31–49	31.39 $\pm$ 4.63		
50–69	31.09 $\pm$ 4.58		
≥ 70	30.89 $\pm$ 4.26		
Length of ICU stay (days)		0.407	0.748
1–5	31.28 $\pm$ 4.29		
6–10	30.88 $\pm$ 4.73		
11–20	30.91 $\pm$ 4.80		
≥ 21	28.67 $\pm$ 6.66		
Healthcare payment method		0.813	0.445
Self-pay	30.57 $\pm$ 5.00		
Urban employee insurance	30.91 $\pm$ 4.73		
Urban/rural resident insurance	31.54 $\pm$ 3.94		
APACHE II score		1.467	0.214
≤ 8	30.87 $\pm$ 3.73		
9–15	30.58 $\pm$ 4.94		
16–24	31.18 $\pm$ 4.43		
25–30	31.17 $\pm$ 4.09		
≥ 31	34.20 $\pm$ 3.49		
Family-member characteristics			
Sex		-0.721	0.472
Male	30.85 $\pm$ 4.57		
Female	31.31 $\pm$ 4.45		
Living with the patient		1.229	0.220
Yes	31.43 $\pm$ 4.79		
No	30.65 $\pm$ 4.15		
Primary caregiver		0.027	0.979
Yes	31.07 $\pm$ 4.46		
No	31.04 $\pm$ 4.97		
Residence		-1.360	0.175
Rural	30.61 $\pm$ 4.73		
Urban	31.48 $\pm$ 4.28		
Religious belief		1.821	0.069
Yes	30.09 $\pm$ 3.20		
No	31.19 $\pm$ 4.64		
ICU experience		-0.173	0.863
Yes	30.93 $\pm$ 4.67		

No	31.09 ± 4.49		
Ethnicity		0.130	0.878
Han	31.08 ± 4.50		
Hui	30.00 ± 6.48		
Tibetan	31.50 ± 3.70		
Health status		1.421	0.244
Good	31.17 ± 4.60		
Fair	29.97 ± 4.31		
Poor	32.50 ± 2.92		
Disease knowledge		2.176	0.116
Understand	30.61 ± 5.17		
Partially understand	31.13 ± 3.75		
Do not understand	32.86 ± 3.72		
Age (years)		2.899	0.163
18–30	32.74 ± 3.51		
31–49	30.93 ± 4.19		
50–69	30.18 ± 5.37		
≥70	35.00 ± 1.41		
Relationship to patient		0.254	0.907
Child of the patient	31.33 ± 4.46		
Parents	31.11 ± 6.01		
Spouse	31.12 ± 4.58		
Siblings	30.46 ± 5.12		
Others	30.68 ± 3.71		
Education level		1.373	0.252
Junior high or below	30.23 ± 4.96		
High school	31.46 ± 3.70		
Junior college	31.00 ± 4.41		
Bachelor or above	31.78 ± 4.67		
Occupation		3.103	0.017
Unemployed	30.73 ± 4.54		
Retired	32.23 ± 3.92		
Farmer/worker	30.01 ± 4.67		
Self-employed	30.89 ± 3.76		
Staff in public institutions	32.69 ± 4.26		
Marital status		0.132	0.876
Married	30.99 ± 4.61		
Unmarried	31.44 ± 4.15		
Divorced/widowed	31.11 ± 4.26		
Monthly income (CNY)		0.109	0.954
≤2000	30.95 ± 4.30		
2000~4000	30.94 ± 4.30		
4000~6000	31.30 ± 4.51		
≥6000	31.41 ± 4.15		

Supplementary Material 10e. Univariate Analysis of Comfort Scores.

Variables	Mean $\pm$ SD	t/F	P
Patient characteristics			
Sex		0.549	0.584
Male	16.82 $\pm$ 5.03		
Female	16.39 $\pm$ 5.55		
Age (years)		1.182	0.318
18–30	15.59 $\pm$ 3.87		
31–49	17.74 $\pm$ 5.81		
50–69	16.23 $\pm$ 5.37		
≥ 70	17.00 $\pm$ 4.35		
Length of ICU stay (days)		0.595	0.619
1–5	16.96 $\pm$ 5.29		
6–10	16.49 $\pm$ 5.00		
11–20	16.26 $\pm$ 5.35		
≥ 21	13.33 $\pm$ 6.43		
Healthcare payment method		0.172	0.915
Self-pay	15.73 $\pm$ 5.01		
Urban employee insurance	17.31 $\pm$ 4.90		
Urban/rural resident insurance	16.81 $\pm$ 5.52		
APACHE II score		1.645	0.165
≤ 8	16.26 $\pm$ 5.08		
9–15	17.25 $\pm$ 5.35		
16–24	16.21 $\pm$ 5.34		
25–30	15.26 $\pm$ 4.33		
≥ 31	19.60 $\pm$ 4.33		
Family-member characteristics			
Sex		-1.110	0.268
Male	16.29 $\pm$ 5.38		
Female	17.11 $\pm$ 4.98		
Living with the patient		0.635	0.526
Yes	16.89 $\pm$ 4.77		
No	16.42 $\pm$ 5.67		
Primary caregiver		1.013	0.321
Yes	16.85 $\pm$ 4.88		
No	15.33 $\pm$ 7.12		
Residence		-2.434	0.016
Rural	15.75 $\pm$ 5.03		
Urban	17.52 $\pm$ 5.23		
Religious belief		-2.257	0.025
Yes	14.39 $\pm$ 5.07		
No	16.97 $\pm$ 5.16		
ICU experience		0.490	0.624
Yes	17.10 $\pm$ 4.97		

No	16.59 ± 5.25		
Ethnicity		0.581	0.560
Han	16.71 ± 5.25		
Hui	14.00 ± 4.69		
Tibetan	17.50 ± 3.00		
Health status		1.171	0.312
Good	16.86 ± 5.30		
Fair	16.45 ± 4.45		
Poor	14.30 ± 5.48		
Disease knowledge		0.040	0.960
Understand	16.78 ± 5.06		
Partially understand	16.58 ± 4.92		
Do not understand	16.52 ± 6.95		
Age (years)		1.087	0.036
18–30	17.21 ± 4.89		
31–49	16.29 ± 5.17		
50–69	17.11 ± 5.01		
≥70	16.00 ± 4.24		
Relationship to patient		0.430	0.787
Child of the patient	17.12 ± 4.80		
Parents	16.33 ± 4.15		
Spouse	16.66 ± 5.19		
Siblings	16.19 ± 5.88		
Others	15.84 ± 6.15		
Education level		3.370	0.020
Junior high or below	15.17 ± 5.01		
High school	17.34 ± 5.62		
Junior college	18.42 ± 4.78		
Bachelor or above	17.14 ± 4.79		
Occupation		2.111	0.081
Unemployed	16.30 ± 5.16		
Retired	16.69 ± 6.49		
Farmer/worker	16.16 ± 4.73		
Self-employed	15.00 ± 7.28		
Staff in public institutions	18.35 ± 4.39		
Marital status		0.424	0.655
Married	16.51 ± 5.26		
Unmarried	17.44 ± 5.25		
Divorced/widowed	16.78 ± 3.96		
Monthly income (CNY)		0.172	0.915
≤2000	16.86 ± 5.75		
2000~4000	16.34 ± 4.59		
4000~6000	16.91 ± 5.80		
≥6000	16.88 ± 4.55		

Supplementary Material 11. Additional characteristics of interview participants (n = 16).

ID	Household income	Living with patient	Primary caregiver	Residence	Disease knowledge	Religious belief	ICU experience
N1	2000–4000	No	Yes	Urban	Understand	No	No
N2	2000–4000	No	Yes	Urban	Understand	No	No
N3	4000–6000	Yes	Yes	Rural	Partially understand	No	Yes
N4	≤2000	No	Yes	Rural	Understand	No	Yes
N5	≤2000	Yes	Yes	Rural	Understand	No	Yes
N6	≤2000	Yes	Yes	Rural	Do not understand	Yes	No
N7	≤2000	Yes	Yes	Rural	Understand	No	No
N8	4000–6000	No	Yes	Urban	Understand	No	No
N9	4000–6000	Yes	Yes	Urban	Understand	No	No
N10	2000–4000	Yes	Yes	Rural	Partially understand	No	Yes
N11	≤2000	Yes	Yes	Rural	Partially understand	No	No
N12	≤2000	Yes	Yes	Rural	Understand	No	No
N13	4000–6000	Yes	Yes	Urban	Partially understand	No	No
N14	2000–4000	Yes	Yes	Rural	Understand	No	No
N15	2000–4000	Yes	Yes	Rural	Understand	No	No
N16	≥6000	Yes	Yes	Urban	Understand	No	No

Supplementary Material 12. Characteristics of interview participants (n = 16).

ID	Sex	Relationship to patient	Education	Occupation	Marital status	Health status	Payment
N1	Female	Adult son/daughter	College	Staff in public institutions	Married	Good	Resident insurance
N2	Female	Adult son/daughter	High school	Unemployed	Married	Good	Resident insurance
N3	Male	Sibling	High school	Farmer/worker	Unmarried	Good	Self-pay
N4	Female	Adult son/daughter	Junior high or below	Unemployed	Married	Good	Resident insurance
N5	Female	Adult son/daughter	Junior high or below	Unemployed	Unmarried	Good	Resident insurance
N6	Female	Adult son/daughter	Bachelor	Unemployed	Unmarried	Good	Employee insurance
N7	Male	Adult son/daughter	Bachelor	Staff in public institutions	Married	Good	Resident insurance
N8	Female	granddaughter	College	Staff in public institutions	Married	Good	Resident insurance
N9	Female	Sibling	Bachelor	Staff in public institutions	Married	Good	Employee insurance
N10	Female	Adult son/daughter	High school	Self-employed	Married	Good	Self-pay
N11	Female	Adult son/daughter	College	Farmer/worker	Unmarried	Good	Resident insurance
N12	Male	Spouse	Junior high or below	Farmer/worker	Married	Good	Resident insurance
N13	Male	Adult son/daughter	High school	Staff in public institutions	Married	Good	Employee insurance
N14	Male	Adult son/daughter	College	Unemployed	Married	Good	Self-pay
N15	Male	Adult son/daughter	Junior high or below	Farmer/worker	Married	Good	Self-pay
N16	Female	Adult son/daughter	Bachelor	Staff in public institutions	Married	Good	Employee insurance