Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Patterns of Communication Competence Among Nursing Students Interacting with Older Patients During Clinical Placements: A Cross-Sectional Study

Xin Liu
The Second Nanning People's Hospital
Xiao-Xue Wei
The Second Nanning People's Hospital
Ruoyu Li
Liuzhou City Vocational College
Yan Liao
The Second Nanning People's Hospital
Dan Xi Lan
The Second Nanning People's Hospital
Hua Lin
1532629@qq.com

The Second Nanning People's Hospital

Research Article

Keywords: Nursing students, Communication competence, Older patients, Clinical placement, Nursing education, Persona

Posted Date: November 1st, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11274780/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background

Population aging underscores the need to develop nursing students' communication competence with older patients during clinical placements. However, conventional variable-centered approaches that focus primarily on overall competence scores may obscure the heterogeneity in how communication competencies are combined and expressed across learners. This study aimed to identify distinct communication competence patterns among nursing students interacting with older patients during clinical placements, characterize the defining features of each pattern through persona-based representations, and examine the factors associated with pattern membership.

Methods

A cross-sectional study was conducted among nursing students undertaking clinical placements at a tertiary teaching hospital in China. Data were collected through an online survey assessing general characteristics and nursing students' communication competence with older patients. The elbow method with K-means clustering was used to identify distinct communication competence patterns, and discriminant analysis was used to assess the classification accuracy of the clustering solution. Persona-based visualizations were used to characterize the defining communication behaviors of each statistically identified pattern, and multinomial logistic regression was used to examine factors associated with pattern membership.

Results

Three distinct communication competence patterns were identified: Passive Responders, Rapport Builders, and Proactive Facilitators. The three patterns differed in their item-level configurations of communication behaviors when interacting with older patients. The frequency of caring for older patients during clinical placements, perceived gerontological nursing climate, and daily duration of socio-emotional communication were significantly associated with pattern membership.

Conclusions

Three distinct communication competence patterns were identified among nursing students, demonstrating heterogeneity in how communication competence is expressed during interactions with older patients. Persona-based representations provided an interpretable representation of the defining communication behaviors within each pattern, supporting differentiated communication education and targeted educational support during clinical placements.

Background

The rapid aging of the global population has substantially increased the demand for healthcare services among older adults. Global population aging is projected to accelerate over the next three decades, with the number of people aged ≥ 65 years expected to more than double, reaching approximately 1.5 billion by 2050 [1]. Older adults commonly experience physiological decline, reduced physiological reserves, and a high burden of multimorbidity, with approximately 84.2% of individuals aged ≥ 65 years reporting two or more chronic conditions [2, 3]. The increasing demand for chronic disease management among older adults, encompassing health monitoring, functional maintenance, symptom management, medication guidance, and rehabilitation care, has created a substantial need for nursing services [4]. Nurses, as the largest group of healthcare professionals directly involved in patient care [5], play a central role in ensuring the safety of older adults and supporting their health management.

Effective communication is a fundamental component of high-quality nursing care, particularly in interactions with older adults[6]. Age-related sensory decline, cognitive changes, and psychosocial vulnerabilities among older adults may increase the complexity of nurse–patient communication and require nurses to possess advanced communication skills to meet complex care needs [6, 7]. Effective nurse–patient communication supports treatment adherence, enhances patient safety, reduces adverse events, and improves patient satisfaction [8, 9]. Strengthening communication competence among nursing students is therefore an important component of preparing the future nursing workforce to provide safe and high-quality care for older patients.

As the future nursing workforce, nursing students play a pivotal role in meeting the growing healthcare needs of the aging population. Developing communication competence is a core objective of nursing education and is essential for translating theoretical knowledge into clinical practice, supporting the development of clinical practice abilities, and delivering high-quality nursing care [10, 11]. Clinical placements provide a critical transition between classroom learning and professional practice, allowing nursing students to apply theoretical knowledge in authentic care settings and develop communication competence through direct patient interactions [12]. However, previous studies have shown that nursing students commonly experience communication anxiety [13], limited communication self-efficacy [14], and difficulty in applying effective communication strategies in clinical practice [15], highlighting the difficulty of translating communication knowledge into clinical practice. Given the complexity of communication with older adults, nursing students may encounter greater challenges when interacting with older patients [16, 17].

Communication with older patients is characterized by greater complexity and differs substantially from routine nurse–patient communication. Age-related hearing and visual impairment, cognitive decline, and reduced information-processing capacity can affect mutual understanding and information sharing [18]. In addition, emotional distress, loneliness, and depressive symptoms are common among older patients and influence their engagement, self-expression, and interactions with healthcare professionals [19, 20]. From the healthcare provider's perspective, time constraints, workload, and differences in communication preferences across generations further shape nurse–patient interactions. These patient- and healthcare professional-related factors make communication with older adults a contextually complex clinical task, requiring nursing students to adapt their communication strategies to meet individual patient needs.

Existing research has insufficiently addressed context-specific communication needs in older adult care and individual differences among learners. First, communication competence has largely been examined as a general professional competency, with limited attention to the context-specific demands of communicating with older patients. Although communication with older patients requires nursing students to adapt their approaches to age-related sensory, cognitive, emotional, and social characteristics, these specific demands may not be adequately captured by general communication competence measures [17, 18]. Second, previous studies have mainly adopted variable-centered approaches, focusing on overall communication competence levels [21] or associations among variables [22], while overlooking potential heterogeneity among learners. Although these approaches provide insights into overall performance and related factors, they may fail to capture distinct competence patterns. Given that communication competence develops through the interaction of individual characteristics, clinical experiences, learning environments, and clinical behaviors, nursing students may exhibit different patterns of communication competence when interacting with older patients. Identifying these patterns may provide a more comprehensive understanding of learner heterogeneity.

Personas provide a practical heuristic for translating statistically identified patterns into representative and interpretable learner profiles [23]. By synthesizing the key characteristics of different patterns into representative personas [24], this approach makes learner heterogeneity more visible and educationally meaningful, enabling nursing educators to recognize differences among students and tailor educational support accordingly. Thus, personas complement conventional one-size-fits-all approaches by offering a more individualized representation of learner differences during clinical placements.

China provides an important context for examining nursing students' communication competence in interactions with older patients. In recent years, China has experienced rapid population ageing, with adults aged 65 years and older accounting for 15.6% of the population in 2024 and projected to approach 30% by 2050 [25]. This demographic transition has increased the need for nurses with communication competence to effectively engage with older patients [26, 27]. As the care needs of older adults continue to grow, nursing students in China are increasingly exposed to opportunities to interact with older patients during clinical placements, making China a relevant setting for investigating their communication competence in older adult care [28, 29]. Insights from this context may inform nursing education strategies for developing communication competence in response to global population ageing.

Accordingly, this study aimed to (1) identify distinct patterns of communication competence among nursing students interacting with older patients during clinical placements; (2) characterize the defining features of each pattern through representative personas to provide an educationally meaningful representation of learner heterogeneity; and (3) examine factors associated with pattern membership. This study aimed to enhance the understanding of heterogeneity in nursing students' communication competence when interacting with older patients and provide evidence to support tailored approaches to communication competence development in nursing education.

Methods

Design, participants and sampling

This descriptive cross-sectional study was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines. Convenience sampling was used to recruit participants.

Between December 2025 and January 2026, all eligible nursing students undertaking clinical placements at the study hospital in Nanning, Guangxi Zhuang Autonomous Region, China, were invited to participate. The inclusion criteria were as follows: (1) nursing students undertaking clinical placements at the study hospital and (2) students who voluntarily agreed to participate and provided informed consent. The exclusion criteria were as follows: (1) self-reported psychological problems or psychiatric disorders; (2) undertaking a second clinical placement; and (3) participating in clinical observation rather than formal clinical placement.

The required sample size was estimated using Kendall's sample size estimation method [30], calculated as n = [maximum number of items × (5–10)] × [1 + (10%–30%)]. In this study, the maximum number of items was 21. Using a coefficient of 10, the minimum sample size was 210 participants. A total of 236 questionnaires were submitted, of which 231 were deemed valid and included in the final analysis.

Measures

General Information Questionnaire

A researcher-developed questionnaire was used to collect participants' demographic characteristics, educational background, and experiences related to older adult care. Socio-emotional communication refers to conversations about emotions, life experiences, personal interests, and psychosocial concerns rather than interactions primarily focused on routine nursing procedures or clinical tasks.

NSCC-Ops

The Scale was developed by Wang et al.[31] within the Chinese cultural context and is specifically designed to assess nursing students' communication competence in interactions with older patients. It comprises 21 items across four

dimensions: emotional support, proactive engagement, information sharing, and care planning and coordination. Items are rated on a 5-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”), with total scores ranging from 21 to 105. Higher scores indicate greater communication competence. In the present study, the scale demonstrated excellent internal consistency, with a Cronbach’s α coefficient of 0.958 for the total scale. The Cronbach’s α coefficients for the four dimensions ranged from 0.822 to 0.962.

Data collection

Data were collected using an online survey. Before the formal survey, a pilot test was conducted with six nursing students to estimate completion time and identify potential issues with the questionnaire. Based on their feedback, minor revisions were made to improve the clarity and comprehensibility of selected items in the general information questionnaire. Participants were required to complete all items sequentially, with automated prompts displayed for unanswered items. The survey was anonymous and voluntary, and completion took approximately 20 minutes.

Statistical analysis

Data were analyzed using IBM SPSS Statistics version 27.0 and Python version 3.12. The chi-square or Kruskal–Wallis H test was used to compare differences across communication competence patterns. Before clustering, the scores for each NSCC-Ops dimension were standardized. The elbow method was used to determine the optimal number of clusters, followed by K-means clustering to identify distinct communication competence patterns among the nursing students. Discriminant analysis was conducted to assess the classification accuracy of the clustering solutions. Multinomial logistic regression was performed to identify the factors associated with communication competence pattern membership. All statistical tests were two-tailed, and statistical significance was set at $p < 0.05$.

Persona construction

Personas for each communication competence pattern were visualized using Python version 3.12 to enhance the interpretability of the identified patterns. Before visualization, the item scores were transformed according to the characteristics of each pattern. Font size represented the transformed mean score of each communication competence item within the corresponding pattern. The seven highest-scoring items were highlighted in red, the middle-ranked seven items in blue, and the seven lowest-scoring items in black. Larger font sizes indicated more prominent communication competence characteristics within the corresponding pattern.

Ethical considerations

This study was approved by the Ethics Committee of hospital (Approval No. 2025348). Participants were informed of the study’s purpose and procedures and provided informed consent before completing the questionnaire.

Results

Participants characteristics

A total of 236 nursing students who undertook clinical placements participated in this survey. After data quality screening, 231 valid responses were retained for analysis. The characteristics of the 231 participants are presented in Table 1.

Table 1
Characteristics of nursing students (N = 231)

Variables	Categrories	N(%)
Sex, n (%)	Male	32(13.9)
	Female	199(86.1)
Age (years), n (%)	17–20	78(33.8)
	21–22	141(61)
	23–27	12(5.2)
Residence, n (%)	Rural	167(72.3)
	Urban	64(27.7)
Only child status, n (%)	Yes	23(10.0)
	No	208(90)
Educational level, n (%)	Technical secondary school	8(3.5)
	Junior college	137(59.3)
	Undergraduate	86(37.2)
Duration of clinical placements (months), n (%)	1–3	3(1.3)
	4–6	123(53.2)
	7–10	105(45.5)
Co-living with grandparents ≥ 3 months, n (%)	Yes	176(76.2)
	No	55(23.8)
Completed geriatric nursing course, n (%)	Yes	211(91.3)
	No	20(8.7)
Experience in caring for older adults before clinical placements, n (%)	None	44(19)
	Limited experience	152(65.8)
	Extensive experience	35(15.2)
Frequency of caring for older patients during clinical placements, n (%)	Rarely or never	71(30.8)
	Occasionally	144(62.3)
	Almost always	16(6.9)
Perceived gerontological care climate in the clinical unit, n (%)	Moderate emphasis	21(9.1)
	High emphasis	108(46.7)
	Very high emphasis	102(44.2)
Daily duration of socio-emotional communication (minutes), n (%)	< 15	31(13.4)
	15–30	69(29.9)
	≥ 30	131(56.7)

Distinct patterns of nursing students' communication competence with older patients

The elbow method was used to determine the optimal number of clusters. As shown in Fig. 1, the curve shows a clear inflection point at k = 3, supporting a three-cluster solution. K-means clustering was performed to identify distinct patterns of communication competence among the nursing students. The three patterns differed across the four dimensions of emotional support, proactive engagement, information sharing, and care planning and coordination (Fig. 2). The three-cluster solution showed the largest F-values across all four dimensions and achieved a classification accuracy of 96.97%.

Persona Characteristics of Communication Competence Patterns

As shown in Fig. 3, the three communication competence patterns exhibited distinct item-level characteristics in interactions with older patients. Drawing on Hymes' communicative competence model [32], each pattern was assigned a descriptive persona name based on its core communication characteristics. The lowest-scoring pattern (62.85 ± 7.76) was characterised by limited encouragement of patients to ask questions, limited exploration of their concerns, and a tendency to overlook patients' responses or communication cues, and was designated "Passive Responders." The moderate-scoring pattern (81.52 ± 5.71) was characterised by respect for patients' privacy and autonomy, respectful forms of address, and a friendly manner, but limited encouragement of patients to express themselves and limited exploration of their concerns, and was designated "Rapport Builders." The highest-scoring pattern (93.94 ± 8.75) was characterised by respect for patients' privacy and autonomy, a friendly manner, and active use of open-ended questions, reflecting greater use of communication strategies and more patient-centred communication practices, and was designated "Proactive Facilitators."

Characteristics Associated with Communication Competence Patterns

As shown in Table 2, group comparisons identified significant differences across the three communication competence patterns in terms of the frequency of caring for older patients during clinical placements, perceived gerontological nursing climate within the clinical unit, and daily duration of socio-emotional communication (all $P < 0.05$). These variables were subsequently entered into a multinomial logistic regression model, with communication competence pattern membership as the dependent variable and Passive Responders as the reference category. As shown in Table 3, all three variables were significantly associated with communication competence pattern membership among nursing students (all $P < 0.05$).

Table 2
Characteristics of nursing students across communication competence patterns in older patient interactions (N = 231)

Variables	The Passive Responders(*n* = 54)	The Rapport Builders(*n* = 99)	The Proactive Facilitators(*n* = 78)	Test statistic	P
Sex, n (%)				0.484[a]	0.785
Male	6(11.1)	15(15.2)	11(14.1)		
Female	48(88.9)	84(84.8)	67(85.9)		
Age (years), n (%)				2.434[b]	0.296
17–20	21(38.9)	28(28.3)	29(37.2)		
21–22	31(57.4)	65(65.6)	45(57.7)		
23–27	2(3.7)	6(6.1)	4(5.1)	0.660[a]	0.719
Residence, n (%)					
Rural	38(70.4)	70(70.7)	59(75.6)		
Urban	16(29.6)	29(29.3)	19(24.4)		
Only child status, n (%)				2.444 [a]	0.295
Yes	5(9.3)	7(7.1)	11(14.1)		
No	49(90.7)	92(92.9)	67(85.9)		
Educational level, n (%)				1.410 [b]	0.494
Technical secondary school	4(7.4)	3(3)	1(1.3)		
Junior college	27(50)	64(64.7)	46(59.0)		
Undergraduate	23(42.6)	32(32.3)	31(39.7)		
Duration of clinical placements (months), n (%)				2.264 [b]	0.322
1–3	0(0)	2(2)	1(1.3)		
4–6	34(63)	52(52.5)	37(47.4)		
7–10	20(37)	45(45.5)	40(51.3)		
Co-living with grandparents ≥ 3 months, n (%)				2.316 [a]	0.314
Yes	38(70.4)	80(80.8)	58(74.4)		
No	16(29.6)	19(19.2)	20(25.6)		
Completed geriatric nursing course, n (%)				5.575 [a]	0.062
Yes	48(88.9)	87(87.9)	76(97.4)		
No	6(11.1)	12(12.1)	2(2.6)		

Notes: a χ^2 value; b H value (Kruskal–Wallis test).

Variables	The Passive Responders(*n* = 54)	The Rapport Builders(*n* = 99)	The Proactive Facilitators(*n* = 78)	Test statistic	P
Experience in caring for older adults before clinical placements, n (%)				4.788 [b]	0.091
None	19(35.2)	13(13.1)	12(15.4)		
Limited experience	26(48.1)	74(74.8)	52(66.7)		
Extensive experience	9(16.7)	12(12.1)	14(17.9)		
Frequency of caring for older patients during clinical placements, n (%)				8.495[b]	0.014
Rarely or never	25(46.3)	27(27.3)	19(24.4)		
Occasionally	26(48.1)	69(69.7)	49(62.8)		
Almost always	3(5.6)	3(3)	10(12.8)		
Perceived gerontological care climate in the clinical unit, n (%)				23.880 [b]	< 0.001
Moderate emphasis	10(18.5)	5(5.1)	6(7.7)		
High emphasis	35(64.8)	44(44.4)	29(37.2)		
Very high emphasis	9(16.7)	50(50.5)	43(55.1)		
Daily duration of socio-emotional communication (minutes), n (%)				17.364 [b]	< 0.001
< 15	1(1.9)	17(17.2)	13(16.6)		
15–30	10(18.5)	29(29.3)	30(38.5)		
≥ 30	43(79.6)	53(53.5)	35(44.9)		

Notes: a χ^2 value; b H value (Kruskal–Wallis test).

Table 3
Factors associated with communication competence pattern membership among nursing students

Variables	The Rapport Builders					The Proactive Facilitators				
	B	*P*	OR	95%CI		*B*	*P*	OR	95%CI	
Lower				Upper	Lower				Upper	
Frequency of caring for older patients during clinical placements, n (%)(ref: Almost always)										
Rarely or never	-0.773	0.047	0.462	0.215	0.991	-0.817	0.055	0.442	0.191	1.019
Occasionally	0.252	0.784	1.287	0.212	7.815	-1.621	0.046	0.198	0.040	0.969
Perceived gerontological care climate in the clinical unit, n (%)(ref: Very high emphasis)										
Moderate emphasis	-1.067	0.087	0.344	0.101	1.168	-0.253	0.682	0.776	0.231	2.605
High emphasis	-2.313	0.001	0.099	0.026	0.377	-1.862	0.005	0.155	0.042	0.575
Daily duration of socio-emotional communication (minutes), n (%)(ref: ≥30)										
< 15	-0.825	0.063	0.438	0.184	1.044	-1.399	0.002	0.247	0.100	0.610
15–30	-2.323	0.030	0.098	0.012	0.801	-2.270	0.036	0.103	0.012	0.864

Notes. Reference group: The Passive Responders; OR: Odds ratio; 95% CI: 95% Confidence Interval.

Discussion

This study identified three distinct communication competence patterns among nursing students interacting with older patients. Compared with previous studies that primarily examined overall communication competence [33] or identified latent communication subgroups [34], the persona-based approach further characterized the defining features of each pattern and offered an interpretable representation of learner heterogeneity. Even within the same clinical placement context, nursing students exhibited different levels of communication competence when interacting with older patients. These findings highlight the value of differentiated assessment and individualized approaches to communication competence development in gerontological nursing education.

Persona representations highlighted distinct emphases in communication competence across the three patterns, ranging from information sharing and basic interpersonal interaction to rapport building and more proactive communication [35, 36]. These findings suggest that communication competence among nursing students interacting with older patients

comprises multiple interrelated competencies that can be expressed in different configurations, rather than reflecting a simple linear accumulation of individual competencies [37]. Personas can help identify nursing students' communication strengths and developmental needs, providing a basis for more targeted educational support strategies [38]. Therefore, communication education should be tailored to the characteristics of different communication competence patterns, rather than adopting a one-size-fits-all approach.

The frequency of caring for older patients during clinical placements was significantly associated with nursing students' communication competence patterns. This finding is consistent with previous evidence linking more frequent direct interactions with older patients to greater communication self-efficacy, more positive attitudes, and stronger gerontological nursing competence among nursing students[38–40]. Frequent interactions provide opportunities to practise interpersonal communication, adapt communication approaches to individual patient needs, and receive feedback in authentic clinical contexts [38]. They can also facilitate a more comprehensive understanding of older patients' multidimensional needs, including physical, psychological, and social needs, and the integration of theoretical communication knowledge into clinical practice [37, 38]. Therefore, providing nursing students with sustained opportunities to interact with older patients could support experiential learning and the development of communication competence in clinical practice.

The perceived gerontological nursing climate within clinical units was another factor associated with communication competence patterns. This finding is consistent with previous research highlighting the important role of the clinical learning environment in shaping nursing students' learning outcomes [41].A supportive clinical learning environment can provide opportunities for professional learning through positive role modelling by clinical educators, a collaborative team culture, and organizational support, which can shape students' communication behaviors and professional values [28, 42]. Such an environment can reinforce patient-centered communication behaviors [43] and support students' confidence in communicating with older patients [38]. Communication education for nursing students should extend beyond classroom-based instruction to the clinical learning environment, where students can observe, practice, and receive feedback on their communication behaviors. Therefore, clinical nursing education programs should provide a supportive environment for the development of nursing students' communication competence with older patients and support clinical educators in modeling therapeutic communication skills.

Time spent in socio-emotional communication with older patients is an important component of nursing students' communication learning during clinical placements. This finding is consistent with previous research showing that opportunities for socio-emotional communication support therapeutic nurse–patient relationships, promote positive interpersonal interactions, and contribute to the psychological and social well-being of older patients [44]. Unlike communication focused primarily on nursing procedures and routine clinical tasks, socio-emotional communication enables nursing students to engage with older patients' life experiences, personal interests, and emotional concerns [37]. Such communication provides opportunities for students to recognize patients' needs, respond to emotional cues, and practice responsive communication that encourages patient participation in care. Therefore, nursing educators and clinical mentors should incorporate structured opportunities for socio-emotional communication into clinical placements to support the development of nursing students' communication competence.

Limitations

This study has two limitations. First, it was conducted in a single hospital in the Guangxi Zhuang Autonomous Region, China, and most participating nursing students were recruited from universities within the same region. Therefore, the sample may not fully represent nursing students from diverse educational settings, limiting the generalizability of the findings. Second, the cross-sectional design precludes causal inference regarding the relationship between communication competence pattern membership and the identified associated factors. Future research should recruit nursing students from multiple regions and institutions and use longitudinal designs to enhance sample diversity,

examine the applicability of the identified communication competence patterns across educational settings, and clarify temporal relationships between pattern membership and associated factors.

Conclusion

This study identified three distinct communication competence patterns among nursing students interacting with older patients during clinical placements, with pattern membership associated with the frequency of caring for older patients, perceived gerontological nursing climate, and time spent on socio-emotional communication. Persona-based representations further characterized the distinct communication behaviors within each pattern, providing an interpretable basis for differentiated communication education and targeted educational support during clinical placements.

Abbreviations

STROBE Strengthening the Reporting of Observational Studies in Epidemiology

NSCC-Ops Nursing Students' Communication Competence with Older Patients

Declarations

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Nanning Second People's Hospital (Approval No. 2025348). Participants were informed of the study's purpose and procedures and provided informed consent before completing the questionnaire.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author Contribution

Xin Liu: Conceptualization, Methodology, Writing – original draft, Writing – review & editing. Xiao-Xue Wei: Investigation, Formal analysis, Visualization, Writing – review & editing. Li Ruoyu: Conceptualization, Writing – review & editing. Yan Liao: Investigation, Data curation. Dan Xi Lan: Investigation, Data curation.Hua Lin: Conceptualization, Supervision, Project administration, Writing – review & editing.

Acknowledgement

The authors thank all the nursing students who participated in this study for their time and valuable contributions. The authors also thank the clinical educators and staff who assisted with participant recruitment and data collection.

Data Availability

The datasets generated and/or analysed during the current study are not publicly available but are available from the corresponding author on reasonable request.

References

1. Navaneetham K, Arunachalam D, Global Population Aging. 1950–2050. Handbook of Aging, Health and Public Policy. Singapore: Springer; 2023. pp. 1–18. https://doi.org/10.1007/978-981-16-1914-4_154-1.
2. Wang S, Chen Y, Xiong L, Jin N, Zhao P, Liang Z, et al. Multimorbidity measures associated with cognitive function among community-dwelling older Chinese adults. Alzheimers Dement J Alzheimers Assoc. 2024;20:6221–31. https://doi.org/10.1002/alz.14117.
3. Xie F, Li J, Song W, Liu Q, Jiang S, Chen Z-Y, et al. Long-term Care Facility and its Elderly Chronic Diseases in Jishou: Insights into Underdeveloped Area of China. Inq J Med Care Organ Provis Financ. 2022;59:469580221128735. https://doi.org/10.1177/00469580221128735.
4. Liu Q, Zhang T, Yuan J, Mei X, Wan C, Liu Y, et al. Need for community-based medical-nursing combined services among urban empty nesters in China and its influencing factors: a cross-sectional study. Geriatr Nur (Lond). 2025;63:581–9. https://doi.org/10.1016/j.gerinurse.2025.04.033.
5. Guitar NA, Connelly DM, Prentice K, Nguyen A, McIntyre A, Tanlaka EF, et al. The role of nurses in inpatient geriatric rehabilitation units: A scoping review. Nurs Open. 2023;10:6708–23. https://doi.org/10.1002/nop2.1951.
6. Caughey G, Lang C, Bray S, Moldovan M, Jorissen R, Wesselingh S, et al. International and national quality and safety indicators for aged care. Royal Commission into Aged Care Quality and Safety; 2020.
7. Cheng J, Feng D, Zheng D, Hu L, Yuan F, Xiao Y, et al. The relationship between caring ability and communication competence among nursing staff in Chinese tertiary hospitals: A cross-sectional and analytical study. Sci Rep. 2025;15:36034. https://doi.org/10.1038/s41598-025-19896-6.
8. Kwame A, Petrucka PM. A literature-based study of patient-centered care and communication in nurse-patient interactions: barriers, facilitators, and the way forward. BMC Nurs. 2021;20:158. https://doi.org/10.1186/s12912-021-00684-2.
9. Lee YJ, Lee H, Choi E-H. Moderating Role of Communication Competence in the Association between Professionalism and Job Satisfaction in Korean Millennial and Generation Z Nurses: A Cross-Sectional Study. Healthcare. 2023;11:2547. https://doi.org/10.3390/healthcare11182547.
10. Grant JB, Jones J, Candrian C, Oman KS, Reed SM. The role of nursing communication: A critical interpretive synthesis. Int J Nurs Stud Adv. 2025;9:100373. https://doi.org/10.1016/j.ijnsa.2025.100373.
11. Wu P-L, Liu N-Y, Chung C-H, Lu W-J, Tseng SM, Cheng H-H. The correlation and impact of nursing students' communication ability on nursing competence. Teach Learn Nurs. 2025;20:e1106–12. https://doi.org/10.1016/j.teln.2025.05.023.
12. Konlan KD, Damiran D, Lee TW. Clinical Readiness for Practice of Nursing Students: A Concept Analysis. Int J Environ Res Public Health. 2024;21:1610. https://doi.org/10.3390/ijerph21121610.
13. Gaberson KB, Foreman RM, Brzustowicz R. Integrative Review of Sources of Baccalaureate Nursing Students' Clinical Practice Anxiety. J Nurs Educ. 2024;63:349–55. https://doi.org/10.3928/01484834-20240207-05.

14. Schulenberg SL, Goldberg D, Kreps G, Oh KM. Communication self-efficacy and communication apprehension in a national sample of undergraduate nursing students: A cross-sectional study. Nurse Educ Pract. 2024;77:103977. https://doi.org/10.1016/j.nepr.2024.103977.
15. Al-Sheikhly D, Östlundh L, Arayssi T. Remediation of learners struggling with communication skills: a systematic review. BMC Med Educ. 2020;20:215. https://doi.org/10.1186/s12909-020-02074-9.
16. Sundler AJ, Eide H, van Dulmen S, Holmström IK. Communicative challenges in the home care of older persons - a qualitative exploration. J Adv Nurs. 2016;72:2435–44. https://doi.org/10.1111/jan.12996.
17. Wanko Keutchafo EL, Kerr J, Jarvis MA. Evidence of nonverbal communication between nurses and older adults: a scoping review. BMC Nurs. 2020;19:53. https://doi.org/10.1186/s12912-020-00443-9.
18. Chen AT, Teng AK, Zhao J, Asirot MG, Turner AM. The use of visual methods to support communication with older adults with cognitive impairment: A scoping review. Geriatr Nur (Lond). 2022;46:52–60. https://doi.org/10.1016/j.gerinurse.2022.04.027.
19. Hafskjold L, Sundling V, van Dulmen S, Eide H. The use of supportive communication when responding to older people's emotional distress in home care - An observational study. BMC Nurs. 2017;16:24. https://doi.org/10.1186/s12912-017-0220-8.
20. Koszalinski RS, Olmos B. Communication challenges in social isolation, subjective cognitive decline, and mental health status in older adults: A scoping review (2019–2021). Perspect Psychiatr Care. 2022;58:2741–55. https://doi.org/10.1111/ppc.13115.
21. Li T, Jiang T, Shi G, Song C, Shi T. Correlation between self-awareness, communication ability and caring ability of undergraduate nursing students/A cross-sectional study. Nurse Educ Today. 2022;116:105450. https://doi.org/10.1016/j.nedt.2022.105450.
22. Song MO, Ryu S, Kim Y-H. Factors related to Communication Skills of Nursing Students: A Systematic Review and Meta-analysis. J Muscle Jt Health. 2025;32:249–60.
23. Dominello A, Cheek C, Clay-Williams R. The use of personas to involve consumers in healthcare co-design: a scoping review. BMC Health Serv Res. 2025;25:649. https://doi.org/10.1186/s12913-025-12786-7.
24. Shao L, Zhang D, Cheng H, Xie X, Hou J, Wu B, et al. Patterns of fall-risk perception and response among nursing home residents: A qualitative study. Int J Nurs Stud. 2026;184:105672. https://doi.org/10.1016/j.ijnurstu.2026.105672.
25. National Bureau of Statistics of China. National Bureau of Statistics of China. 2025. https://www.stats.gov.cn/english/AI/OS/202208/t20220824_1887612.html. Accessed 27 Sept 2026.
26. Baumbusch J, Blakey EP, Carapellotti A, Dohmen M, Fick DM, Kagan SH, et al. Nurses and the Decade of Healthy Ageing: An Unprecedented Opportunity. J Gerontol Nurs. 2022;48:3–6. https://doi.org/10.3928/00989134-20220422-01.
27. Rahman MM, Rosenberg M, Flores G, Parsell N, Akter S, Alam MA, et al. A systematic review and meta-analysis of unmet needs for healthcare and long-term care among older people. Health Econ Rev. 2022;12:60. https://doi.org/10.1186/s13561-022-00398-4.
28. Pun J, Chow JCH, Fok L, Cheung KM. Role of patients' family members in end-of-life communication: an integrative review. BMJ Open. 2023;13:e067304. https://doi.org/10.1136/bmjopen-2022-067304.
29. Badanta B, González-Cano-Caballero M, Suárez-Reina P, Lucchetti G, de Diego-Cordero R. How Does Confucianism Influence Health Behaviors, Health Outcomes and Medical Decisions? A Scoping Review. J Relig Health. 2022;61:2679–725. https://doi.org/10.1007/s10943-022-01506-8.
30. Gunawan J, Marzilli C, Aungsuroch Y. Establishing appropriate sample size for developing and validating a questionnaire in nursing research. Belitung Nurs J. 2021;7:356.

31. Wang S, Fang X, Qin S, Wang Y. Development and psychometric testing of the Nursing Students' Communication Competence with Older Patients Scale. Nurs Res. 2024;38:2821–6.
32. Kemp CL, Ball MM, Jason K, Appel JAD, Fitzroy AF. Communicative Competence: Responding to Residents' Health Changes in Assisted Living. Gerontologist. 2020;60:754–64. https://doi.org/10.1093/geront/gnz119.
33. Xie J, Ding S, Wang C, Liu A. An evaluation of nursing students' communication ability during practical clinical training. Nurse Educ Today. 2013;33:823–7. https://doi.org/10.1016/j.nedt.2012.02.011.
34. He S, Yu J, Guan J, Yang Y, Chen Z, Zhang Y, et al. The clinical communication competence and influencing factors among undergraduate nursing interns: A latent profile analysis. Nurse Educ Today. 2026;167:107231. https://doi.org/10.1016/j.nedt.2026.107231.
35. Wang L, Yan S, Xiao R, Zhang Q, Yang Y, Pan X, et al. Family engagement in the management of breast cancer-related lymphedema: A qualitative study. Int J Nurs Stud. 2026;182:105610. https://doi.org/10.1016/j.ijnurstu.2026.105610.
36. Silverman J, Kurtz S, Draper J. Skills for Communicating with Patients. 3rd edition. London: CRC Press; 2016. https://doi.org/10.1201/9781910227268
37. Sharkiya SH. Quality communication can improve patient-centred health outcomes among older patients: a rapid review. BMC Health Serv Res. 2023;23:886. https://doi.org/10.1186/s12913-023-09869-8.
38. Gutiérrez-Puertas L, Márquez-Hernández VV, Gutiérrez-Puertas V, Granados-Gámez G, Aguilera-Manrique G. Educational Interventions for Nursing Students to Develop Communication Skills with Patients: A Systematic Review. Int J Environ Res Public Health. 2020;17:2241. https://doi.org/10.3390/ijerph17072241.
39. Dahlke S, Rayner J-A, Fetherstonhaugh D, Butler JI, Kennedy M. Gerontological educational interventions for student nurses: a systematic review of qualitative findings. Int J Nurs Educ Scholarsh. 2025;22. https://doi.org/10.1515/ijnes-2023-0042.
40. King BJ, Roberts TJ, Bowers BJ. Nursing student attitudes toward and preferences for working with older adults. Gerontol Geriatr Educ. 2013;34:272–91. https://doi.org/10.1080/02701960.2012.718012.
41. Nasirudeen AMA, Song X, Sng B, Pan D. Nursing Students' Perception of the Clinical Learning Environment: A Longitudinal, Cohort Study. Nurse Educ. 2025;50:E85–9. https://doi.org/10.1097/NNE.0000000000001740.
42. Flott EA, Linden L. The clinical learning environment in nursing education: a concept analysis. J Adv Nurs. 2016;72:501–13. https://doi.org/10.1111/jan.12861.
43. Cortés-Rodríguez AE, López-Rodríguez MM, Roman P, Granero-Molina J, Fernández-Sola C, Hernández-Padilla JM. Effect of two teaching methods on nursing students' acquisition of patient-centered communication competence in older people care: a cluster randomized trial. Front Public Health. 2024;12:1510620. https://doi.org/10.3389/fpubh.2024.1510620.
44. Gustafsson T, Lindberg E, Maurin Söderholm H, Hedén L, van Dulmen S, Sundler AJ. Exploring Emotional Communication Between Older Persons and Nursing Assistants in Home Care: A Qualitative Study. Int J Older People Nurs. 2025;20:e70048. https://doi.org/10.1111/opn.70048.

Figures

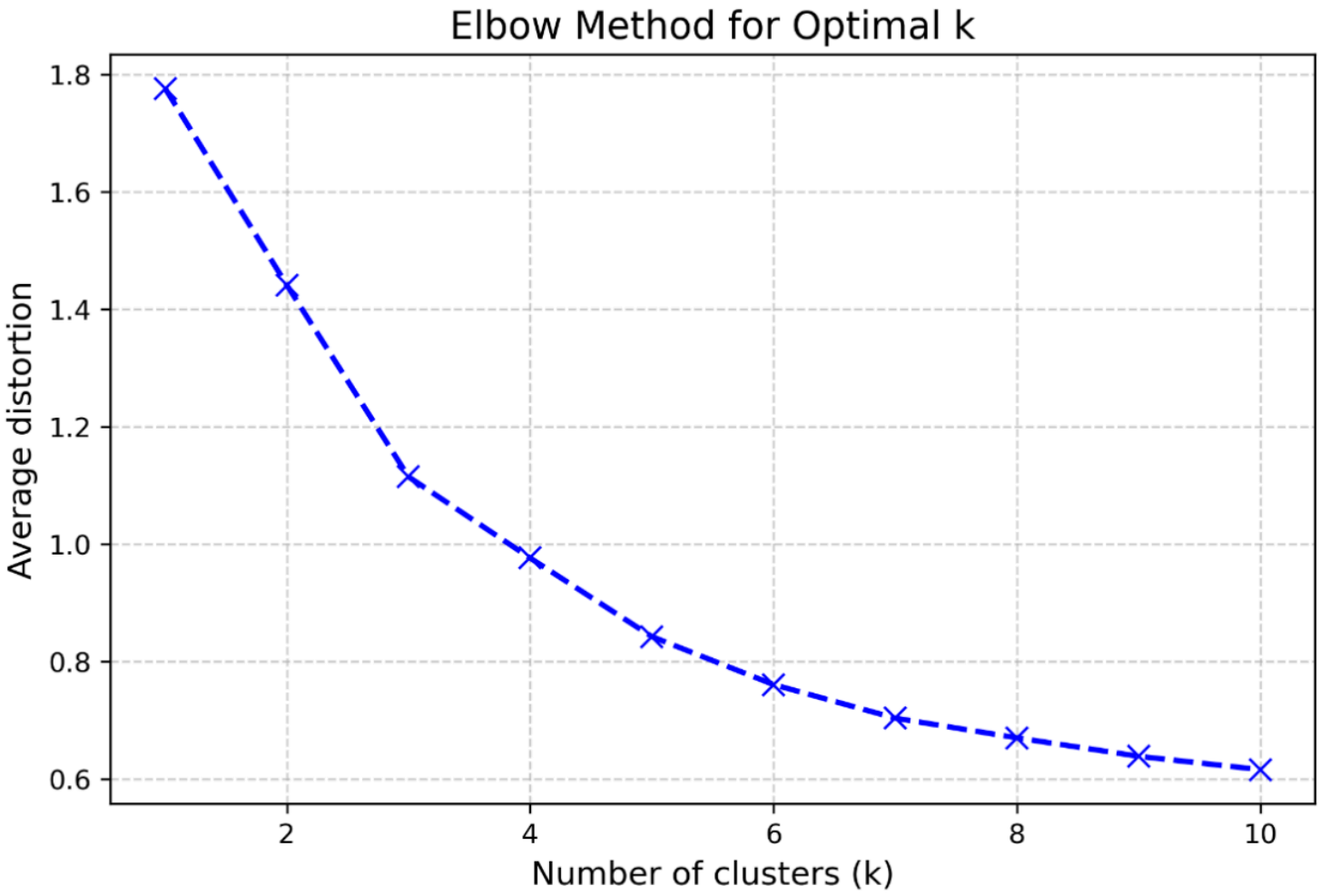


Figure 1

Determination of the optimal number of clusters using the elbow method.

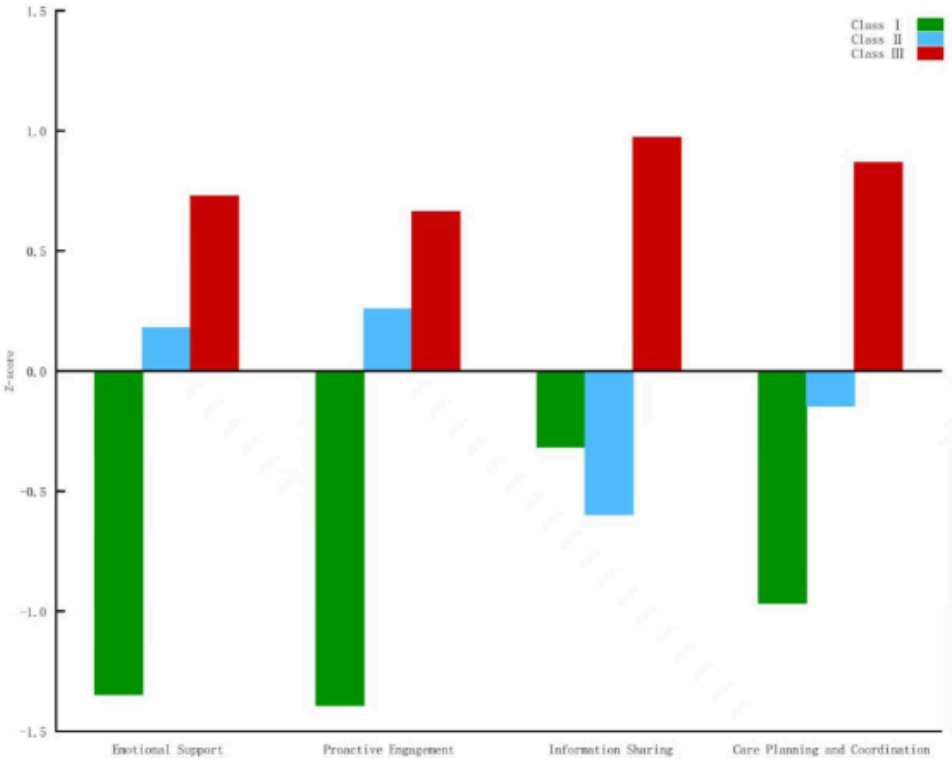


Figure 2

Standardized communication competence dimension scores across three K-means clusters.



Figure 3

Persona-based representations of communication competence patterns among nursing students during clinical placements.