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Analysis of the Current Status and Influencing Factors of Humanistic Care Ability among Nurses Providing “Internet Plus Nursing Services”

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Abstract

Background Existing studies indicate that nurses providing “Internet plus nursing services”are required to enter patients' homes independently to deliver care, which imposes higher demands on their humanistic care ability. However, research on humanistic care ability in this specific population remains limited. This study aimed to investigate the current status and influencing factors of humanistic care ability among nurses providing “Internet plus nursing services,” and to provide a theoretical basis for developing targeted training programs.

Methods This cross-sectional study employed a convenience sampling method to recruit nurses providing "Internet plus nursing services" from a tertiary hospital in Jiangxi Province, with 174 nurses ultimately included. Data were collected using a general information questionnaire, the Caring Ability Inventory (CAI), and the General Self-Efficacy Scale (GSES). Descriptive analysis, independent samples t-test, analysis of variance (ANOVA), Pearson correlation tests, and multiple linear regression analysis were employed in data analysis.

Results The total score of humanistic care ability among the 174 nurses was (182.30 ± 21.29). Multiple linear regression analysis revealed that professional attitude of nurses (β = 0.312, P = 0.001), whether they had received humanistic care training (β = 15.672, P < 0.001), and self-efficacy (β = 0.487, P = 0.007) were independent predictors of humanistic care ability. Correlation analysis showed that the total score of humanistic care ability was significantly positively correlated with the total score of self-efficacy (r = 0.428, P < 0.001). The cognitive, patience, and courage dimensions of humanistic care ability were also significantly positively correlated with self-efficacy (r = 0.524, 0.304, 0.165, all P < 0.05).

Conclusions The level of humanistic care ability among nurses providing "Internet plus nursing services" is at an upper-intermediate level. Nursing managers should strengthen professional attitude development, enhance humanistic care training, and improve self-efficacy to further promote their humanistic care ability.

Relevance to Clinical Practice

This study highlights the need for targeted training interventions and organizational support to enhance humanistic care ability among nurses providing “Internet + Nursing Services”, emphasizing the integration of humanistic awareness into routine training programs and the implementation of effective strategies to strengthen nurses' self-efficacy in home-based care settings.

Patient or Public Contribution

No patient or public contribution.

Highlights

Key Points

- The humanistic care ability of "Internet + Nursing Services" nurses is at a moderate level, with significant room for improvement.
- Professional attitude, humanistic care training, and self-efficacy are independent predictors of humanistic care ability.
- Self-efficacy shows a significant positive correlation with humanistic care ability and its dimensions.
- Nursing managers should prioritize strengthening professional attitude development and self-efficacy enhancement.

Summary

What does this paper contribute to the wider global community?

- This study addresses the research gap regarding humanistic care ability among nurses providing "Internet + Nursing Services", an emerging care model in the digital health era.
- Healthcare institutions should implement structured humanistic care training programs that integrate self-efficacy enhancement strategies to improve the quality of home-based nursing services.
- Future research should adopt multicenter and longitudinal designs to further validate the influencing factors and explore the causal relationships between self-efficacy and humanistic care ability in this population.

1 INTRODUCTION

Humanistic care is a core element of nursing that enhances care quality and fosters positive nurse-patient relationships(Rafael and Adeline 2000). It involves nurses' attitudes, skills, and behaviors that prioritize patient-centered care(Zhang and Jiang 2008, Zhao et al. 2021), which is particularly important in special service settings such as home-based nursing care(Zhao et al. 2021). In China, national policies including the Healthy China 2030 plan and the National Nursing Development Plan (2021–2025) continue to emphasize the importance of strengthening humanistic care as a means of improving healthcare quality and patient satisfaction(Ding et al. 2026).

With the acceleration of population aging and the sustained growth in the number of patients with chronic diseases, the demand for medical care, rehabilitation, and daily living support among home-based elderly populations has become increasingly prominent. Enabled by digital medical technologies, "Internet plus nursing services" have rapidly developed under the model of "online application, offline service," becoming an important initiative to address the challenges of aging and chronic disease home management(Zhao et al. 2021, Su et al. 2024). Unlike traditional hospital settings, in this model nurses are required to enter patients' homes independently to provide services. Facing private and unfamiliar environments, as well as patients' complex psychological states, and lacking collegial collaborative support, these nurses face higher demands on their humanistic care ability(Huang and Cui 2020, Shi et al. 2024). However, while domestic research on humanistic care ability among clinical nurses has been relatively extensive(Huang et al. 2015, Meixia et al. 2025), attention to the humanistic care ability of nurses in the emerging field of "Internet plus nursing services" remains insufficient.

Evidence shows that the level of humanistic care among Chinese nurses is generally at a moderate level, with considerable room for improvement. This ability is influenced by demographic and professional factors such as age, professional title, years of work experience, and humanistic training experience(Teng et al. 2024, Xu et al. 2021). Meanwhile, self-efficacy, defined as an individual's belief in their ability to accomplish a specific task, has been demonstrated to be significantly positively correlated with humanistic care ability among clinical nurses(Yang et al. 2026). However, the mechanism of self-efficacy's role in the population of nurses providing "Internet plus nursing services" lacks sufficient empirical support. Furthermore, this group faces unique challenges in terms of professional attitude, psychological resilience, and ability to cope with unexpected situations, necessitating targeted research to identify the key influencing factors of their humanistic care ability(Lv et al. 2025). Given these challenges, developing effective training strategies for nurses providing "Internet plus nursing services" is essential to strengthen their humanistic care abilities(Meixia et al. 2025). Further research is urgently needed to identify the key factors that shape such abilities, thereby helping nurses meet both the physical and emotional needs of patients in a compassionate and efficient manner within home-based care settings.

This study aimed to investigate the current status of humanistic care ability among nurses providing "Internet plus nursing services," identify the factors influencing this ability, and explore its relationship with self-efficacy.

2 Methods

2.1 Study Design

This study is a descriptive cross-sectional study designed to identify the level of humanistic care ability among nurses providing "Internet plus nursing services" and the factors that influence it.

2.2 Participants

A convenience sampling method was used to recruit participants for this study from December 2025 to March 2026. The study population consisted of nurses engaged in "Internet plus nursing services" at a tertiary hospital in Jiangxi Province. All nurses included in this study possessed the required qualifications and actual service experience in providing home-based "Internet plus nursing services." Nurses listed as authors were excluded from the study, while other nurses were recruited based on the following inclusion and exclusion criteria.

The inclusion criteria were as follows:

(1) Registered nurses with a valid nursing practice license;

(2) Registered on the hospital's "Internet plus nursing services" platform and have actually provided home-based nursing services;

(3) Have provided "Internet plus nursing services" at least 10 times;

(4) Provided informed consent and voluntarily participated in this study.

Exclusion criteria included:

(1) Nurses on long-term leave or who had resigned during the study period;

(2) Nurses listed as study authors.

2.3 Sample Size Calculation

This study was designed as a cross-sectional investigation. According to Kendall's method for estimating sample size in cross-sectional studies(Kendall 1957), the required sample size (N) should be 10 to 15 times the number of independent variables. In this study, a total of 11 independent variables were included: age, gender, marital status, educational background, job category, professional title, department, years of work experience, professional attitude, participation in humanistic care training, and self-efficacy. Based on this guideline, the minimum required sample size was estimated to be 11 × 10 to 11 × 15 = 110 to 165 participants. Considering a potential attrition rate of 20%, the final required sample size ranged from 110 × (1 + 20%) to 165 × (1 + 20%) = 132 to 198 participants. A total of 180 questionnaires were distributed, and 174 valid questionnaires were collected, meeting the sample size requirement.

2.4 Instruments

2.4.1 Demographic Questionnaire

A self-designed general information questionnaire was used to collect data, including age, gender, marital status, educational background, job category, professional title, department, years of work experience, professional attitude of nurses, and whether they had received humanistic care training.

2.4.2 Caring Ability Inventory (CAI)

The Chinese version of the Caring Ability Inventory (CAI), translated and revised by Xu Juan(2008), was used to assess nurses' humanistic care ability. The CAI consists of three dimensions: cognitive (14 items), courage (13 items), and patience (10 items), with a total of 37 items. It uses a 7-point Likert scale, ranging from "strongly disagree" (1 point) to "strongly agree" (7 points). The total score ranges from 37 to 256 points, with higher scores indicating greater humanistic care ability. The Cronbach's α coefficient of the scale was 0.84. In this study, the Cronbach's α coefficient for the scale was 0.889.

2.4.3 General Self-Efficacy Scale (GSES)

The Chinese version of the General Self-Efficacy Scale (GSES), translated and revised by Zhang Jianxin et al.(Zhang and Schwarzer 1995), was used to assess nurses' self-efficacy. The scale consists of 10 items and uses a 4-point Likert scale, with responses ranging from "not true at all" (1 point) to "exactly true" (4 points). The total score ranges from 10 to 40 points, with higher scores indicating stronger self-efficacy. The Cronbach's α coefficient of the scale was 0.87. In this study, the Cronbach's α coefficient for the scale was 0.924.

2.5 Data Collection Methods

After standardized training, the researchers, along with two other members of the research team, formed a survey group. An electronic questionnaire was created using the Questionnaire Star platform, generating a questionnaire link and QR code. With the assistance of the Nursing Department and the person in charge of the "Internet plus nursing services" program, the questionnaire link was distributed by the researchers through the WeChat work group. Before completing the questionnaire, all participants agreed to participate in the study and signed the informed consent form on the first page of the online survey. The researchers provided a unified explanation of the scale instructions to the participants through online guidance, who then filled out the questionnaire independently based on their own circumstances. Each nurse was allowed to submit the questionnaire only once, and all items had to be completed before submission. A total of 180 questionnaires were distributed and 174 valid questionnaires were collected, with a valid response rate of 96.7%.

2.6 Ethical Considerations

All methods in this study were conducted in accordance with relevant guidelines and regulations. This study was approved by the Medical Ethics Committee of Jiangxi Cancer Hospital (approval number: MR-36-23-040106; date of approval: February 28, 2023). The research process adhered to the Declaration of Helsinki. Data collection was conducted only after obtaining informed consent from the participants, and all participants signed the informed consent form.

2.7 Statistical Analysis

Data were organized and analyzed using SPSS 25.0. The normality of data distribution was assessed using the Kolmogorov–Smirnov test, with a $P > 0.05$ indicating a normal distribution. All data in the study were found to follow a normal distribution. Continuous data were expressed as mean ± standard deviation ($\bar{x} \pm s$), while categorical data were presented as frequencies and percentages. Independent samples t-test was used for comparisons between two groups, and one-way analysis of variance (ANOVA) was used for comparisons among multiple groups. Pearson correlation analysis was used to assess the relationship between nurses' humanistic care ability and self-efficacy. Variables that were statistically significant in the univariate and correlation analyses were entered into multiple linear regression analysis using the enter method to explore the independent influencing factors of humanistic care ability. The level of significance was set at $P < 0.05$.

3 Results

3.1 General Information

Among the 174 nurses providing "Internet plus nursing services," the majority were female, with 171 (98.3%). The age distribution was predominantly 31–40 years, with 137 nurses (78.7%), followed by 4 nurses (2.3%) aged ≤ 30 years, 29 nurses (16.7%) aged 41–50 years, and 4 nurses (2.3%) aged ≥ 51 years. Regarding marital status, 159 nurses (91.4%) were married, 12 (6.9%) were unmarried, and 3 (1.7%) were divorced or widowed. In terms of educational background, 163 nurses (93.7%) held a bachelor's degree, 6 (3.4%) held a junior college degree, 2 (1.1%) held a secondary vocational or technical secondary school

diploma, and 3 (1.7%) held a master's degree or above. Regarding job type, 153 nurses (87.9%) were in clinical nursing positions, 19 (10.9%) were in nursing management, and 2 (1.1%) were in other positions. In terms of professional titles, 155 nurses (89.1%) were nurse-in-charge, 14 (8.0%) were associate chief nurses, 3 (1.7%) were senior staff nurses, and 2 (1.1%) were chief nurses. Regarding departmental distribution, 59 nurses (33.9%) were from the surgical oncology department, 36 (20.7%) from the medical oncology department, 28 (16.1%) from the radiation oncology department, 34 (19.5%) from the outpatient department, and 17 (9.8%) from emergency and critical care departments. In terms of years of work experience, 13 nurses (7.5%) had ≤ 10 years, 116 (66.7%) had 11–20 years, 41 (23.6%) had 21–30 years, and 4 (2.3%) had ≥ 31 years. Regarding professional attitude, 84 nurses (48.3%) held a neutral attitude, 83 (47.7%) liked their profession, and 7 (4.0%) disliked it. A total of 105 nurses (60.3%) had participated in humanistic care-related training.

3.2 Scores of Humanistic Care Ability among Nurses Providing "Internet Plus Nursing Services"

The total score of humanistic care ability among nurses providing "Internet plus nursing services" was (182.30 ± 21.29). The scores for each dimension are presented in Table 1.

Table 1
Scores of humanistic care ability among nurses engaged in Internet-plus nursing services

Item	Theoretical score range	Actual score range	Total score	Item average score
Total humanistic care ability	37 ~ 259	133.00 ~ 250.00	182.30 ± 21.29	4.93 ± 0.58
Cognitive dimension	14 ~ 98	48.00 ~ 98.00	74.53 ± 10.61	5.32 ± 0.76
Patience dimension	10 ~ 70	28.00 ~ 70.00	56.28 ± 6.79	5.63 ± 0.68
Courage dimension	13 ~ 91	26.00 ~ 84.00	51.67 ± 9.81	3.97 ± 0.75

3.3 Comparison of Total Humanistic Care Ability Scores among Nurses Providing "Internet Plus Nursing Services" with Different Characteristics

No statistically significant differences were found in age, gender, marital status, educational background, job category, professional title, or department (all $P > 0.05$). Items with statistically significant differences are presented in Table 2.

Table 2
Comparison of total scores of humanistic care ability among nurses providing Internet-plus nursing services with different characteristics

Items	Groups	n	Total score of humanistic care ability ($\bar{x}$ ±s, score)	Statistical value	P value
Gender	Male	3	183.67 ± 31.50	t = 0.111	0.911
	Female	171	182.28 ± 21.20		
Age (years)	≤ 30	4	160.00 ± 10.95	F = 2.527	0.059
	31 ~ 40	137	181.93 ± 21.33		
	41 ~ 50	29	188.31 ± 21.29		
	≥ 51	4	173.75 ± 6.85		
Marital status	Unmarried	12	180.75 ± 23.22	F = 0.081	0.922
	Married	159	182.49 ± 21.29		
	Divorced/Widowed	3	178.67 ± 19.60		
Educational background	Technical secondary/Vocational high school	2	194.00 ± 36.77	F = 0.313	0.816
	Junior college	6	187.00 ± 30.80		
	Bachelor degree	163	182.02 ± 21.07		
	Master degree and above	3	180.33 ± 0.58		
Post type	Nursing management	19	187.26 ± 18.75	F = 0.889	0.413
	Clinical nursing	153	181.54 ± 21.57		
	Others	2	193.50 ± 23.33		
Professional title	Junior nurse	3	175.00 ± 12.12	F = 1.111	0.346
	Supervisor nurse	155	181.57 ± 21.27		
	Associate chief nurse	14	191.79 ± 19.92		
	Chief nurse	2	184.00 ± 42.43		
Working department	Oncology surgery	59	181.47 ± 20.56	F = 0.266	0.900
	Medical oncology	36	183.89 ± 21.54		

Items	Groups	n	Total score of humanistic care ability ($\varvec{x}$ ±s, score)	Statistical value	P value
	Radiation oncology	28	181.68 ± 26.95		
	Emergency & critical care department	17	186.18 ± 18.86		
	Outpatient department	34	180.65 ± 18.97		
Working years (years)	≤ 10	13	173.15 ± 21.10	F = 2.893	0.037
	11 ~ 20	116	180.65 ± 20.45		
	21 ~ 30	41	188.49 ± 21.62		
	≥ 31	4	196.75 ± 28.72		
Professional attitude towards nursing	Dislike	7	155.86 ± 16.32	F = 21.600	< 0.001
	Neutral	86	175.64 ± 17.63		
	Like	81	191.67 ± 20.80		
Participation in humanistic care training	Yes	105	188.24 ± 21.23	t = 4.817	< 0.001
	No	69	173.28 ± 18.07		

3.4 Correlation Analysis between Humanistic Care Ability and Self-Efficacy among Nurses Providing "Internet Plus Nursing Services"

The total score of humanistic care ability among nurses providing "Internet plus nursing services" was significantly positively correlated with the total score of self-efficacy (r = 0.428, P < 0.001). The cognitive, patience, and courage dimensions were also significantly positively correlated with self-efficacy (r = 0.524, 0.304, 0.165, all P < 0.05).

3.5 Multiple Linear Regression Analysis of Influencing Factors of Humanistic Care Ability among Nurses Providing "Internet Plus Nursing Services"

Taking the total score of humanistic care ability among nurses providing "Internet plus nursing services" as the dependent variable, and incorporating statistically significant variables from the univariate analysis as independent variables, multiple linear regression analysis was conducted. The independent variables

included years of work experience, professional attitude of nurses, participation in relevant training, and self-efficacy. Since years of work experience was not statistically significant in the multivariate regression analysis, it was removed and the regression analysis was performed again. The final model showed that professional attitude of nurses, self-efficacy, and participation in relevant training were the key factors influencing nurses' humanistic care ability (all $P < 0.05$), as presented in Table 3.

Table 3
Multiple linear regression analysis on humanistic care ability of nurses in Internet-plus nursing services (n = 174)

Model	Variable	R2(F, P)	β (95%CI)	SE	t	P
1	Constant	0.375(14.339,P < 0.001)	153.264(131.443,175.085)	11.068	13.848	< 0.001∗
	Working years					
	≤ 10 years (reference)	-	-	-	-	-
	11 ~ 20 years		−0.831(− 10.962,9.300)	5.132	−0.162	0.872
	21 ~ 30 years		5.249(− 5.793,16.291)	5.593	0.939	0.349
	≥ 31 years		6.125(− 13.682,25.932)	10.024	0.611	0.542
	Professional attitude					
	Dislike (reference)	-	-	-	-	-
	Neutral		13.305(− 0.537,27.147)	7.004	1.900	0.059
	Prefer		26.215(12.142,40.288)	7.124	3.680	< 0.001∗
	Humanistic care training participation		−8.645(− 14.230,−3.060)	2.828	−3.057	0.003∗
	Total self-efficacy score		0.853(0.417,1.289)	0.221	3.851	< 0.001∗
2	Constant	0.375(23.891,P < 0.001)	153.761(132.917,174.605)	10.549	14.576	< 0.001∗
	Professional attitude					
	Dislike (reference)	-	-	-	-	-
	Neutral		13.511(− 0.291,27.313)	6.965	1.940	0.054
	Prefer		27.026(13.161,40.891)	7.066	3.825	< 0.001∗
	Humanistic care training participation		−8.750(− 14.363,−3.137)	2.831	−3.091	0.002∗

Model	Variable	R2(F, P)	β (95%CI)	SE	t	P
	Total self-efficacy score		0.852(0.416,1.288)	0.221	3.862	< 0.001∗

4 Discussion

4.1 Humanistic Care Ability of Nurses Providing "Internet Plus Nursing Services" Is at an Upper-Intermediate Level

The results of this study showed that the total score of humanistic care ability among nurses providing "Internet plus nursing services" was (182.30 ± 21.29), with an item mean score of 4.93 ± 0.58, indicating an overall upper-intermediate level. A study by Guo et al. reported a nurse caring ability score of (175.70 ± 18.74), which was at a moderate level. Zhong et al.(2020)found that nurses' self-assessment of core competencies for "Internet plus nursing services" was overall at a moderate level. The results of this study were higher than those of the aforementioned studies. The reason may be that "Internet plus nursing services," as an extended home-based nursing model, imposes higher demands on nurses' communication skills, empathy, service attitude, and humanistic literacy. At the same time, the home care setting emphasizes respect for patients, patient listening, emotional support, and health guidance, prompting nurses to continuously strengthen their humanistic care behaviors in practice(Zhan et al. 2022). Among the dimension analysis of humanistic care ability, the patience dimension scored relatively high, while the courage dimension scored relatively low, indicating that nurses still have deficiencies in actively expressing care, coping with complex communication, and managing sudden emotional issues. The reason may be that independent home visits lack immediate support from colleagues and supervisors, leading to a tendency to withdraw when facing emotional conflicts. Additionally, most nurses participate in this service on a part-time basis, and their role authority and self-efficacy in the external hospital environment are relatively weak(Xu and Xie 2022). Moreover, existing training tends to emphasize operational skills and communication etiquette, with insufficient scenario-based simulation training for the courage dimension(Gu et al. 2021). In the future, scenario simulation and psychological resilience training should be strengthened to enhance nurses' active caring ability in complex home care settings.

4.2 Analysis of Influencing Factors of Humanistic Care Ability among Nurses Providing “Internet Plus Nursing Services”

4.2.1 Professional Attitude of Nurses

The results of multiple linear regression showed that professional attitude of nurses was a significant influencing factor of humanistic care ability (β = 27.026, P < 0.001). This finding is consistent with the results of Teng et al.(2024), who found a significant positive correlation between nurses' humanistic care ability and professional attitude. A multicenter survey by Wu et al. (2023)involving 15,653 nurses across 27

provinces in China also confirmed that satisfaction with nursing work is a key predictor of the level of humanistic care knowledge, attitude, and practice. However, Feng et al. (2017) pointed out that the nursing profession in China is often perceived as undesirable due to relatively low income and high work pressure, which may weaken nurses' professional identity. A positive attitude represents nurses' identification with and value judgment of the profession, motivating them to actively practice humanistic care behaviors during home visits. Therefore, it is recommended that nursing managers strengthen nurses' emotional identification and professional beliefs through role modeling, narrative nursing sharing sessions, and case-based awards, and incorporate attitude cultivation into routine training modules.

4.2.2 Participation in Humanistic Care Training

The results of multiple linear regression showed that participation in humanistic care training was a significant influencing factor of nurses' humanistic care ability ($\beta = -8.750$, $P < 0.05$). Multiple studies have demonstrated that humanistic care training can effectively improve nurses' humanistic care ability. A multicenter study(Wang et al. 2022)pointed out that among 26 humanistic nursing content items, nurses' demand rates for training ranged from 88.75% to 96.35%, while the actual training rates ranged from 74.63% to 98.30%, indicating a generally high demand for humanistic nursing training among nurses. Similarly, a qualitative study on "Internet plus nursing services" found that internet-based nurses have a significant need for humanistic care education(Sun et al. 2021). Therefore, it is recommended that nursing managers incorporate strengthened humanistic care training into pre-service orientation. Scenario simulation and role-playing can be used to reinforce skill application and behavioral transformation, thereby effectively improving training quality through the integration of theory and practice.

4.2.3 Self-Efficacy

The results of multiple linear regression showed that self-efficacy was a significant influencing factor of nurses' humanistic care ability ($\beta = 0.852$, $P < 0.001$). This finding is consistent with the results of Xu et al. (2021)and Teng et al.(2024). Nurses providing "Internet plus nursing services" often need to make independent home visits and work without immediate collegial support and the guarantees of a traditional medical environment. Self-efficacy refers to an individual's belief in their ability to successfully complete tasks in specific situations(Bandura 1977). Nurses with high self-efficacy, when facing independent home visits, patients' emotional variability, or emergencies without immediate support, tend to view challenges as surmountable tasks, thereby actively mobilizing resources such as communication, empathy, and emergency response to consistently deliver stable, high-quality humanistic care behaviors(Liu et al. 2023). Conversely, those with low self-efficacy are prone to avoidance due to fear of making mistakes, complaints, or rejection, manifesting as excessive caution, emotional detachment, or communication avoidance during service delivery, thereby weakening the initiative and continuity of caring behaviors(Xu et al. 2025). Therefore, it is recommended that nursing managers help nurses accumulate positive experiences during training to enhance their self-efficacy, thereby strengthening their humanistic care ability.

4.2.4 Years of Work Experience

This study did not find years of work experience to be an independent influencing factor of humanistic care ability (P > 0.05). Previous studies have been inconsistent on this conclusion. For example, Liu et al. (Liu et al. 2023)found through structural equation modeling with 650 clinical nurses that demographic variables such as years of work experience had a relatively weak direct effect on humanistic care ability, with their influence being more indirectly realized through psychological variables such as self-efficacy and empathy. A survey by Xu et al.(2020) at a specialized maternal and child hospital, however, found that years of work experience significantly influenced the quality of humanistic care. The difference may be related to the specificity of the surveyed population. The reason may be that the "Internet plus nursing services" model is relatively new, and nurses with different years of experience are all in a learning and adaptation phase, making the experiential advantage of years of work experience less apparent. Additionally, the home visit setting requires nurses to independently respond to unpredictable home environments and patients' emotional changes. Skills traditionally gained through experience accumulation are relatively less important in the internet plus nursing scenario, while individual psychological traits such as self-efficacy and professional attitude are more strongly correlated. This suggests that improving nurses' humanistic care ability should not rely solely on the accumulation of work experience, but rather place greater emphasis on professional attitude, self-efficacy, and humanistic care training.

5 Limitations

This study has several limitations. First, the convenience sampling method was used to recruit nurses providing "Internet plus nursing services" from only one tertiary hospital in Jiangxi Province, resulting in a single source of participants and limited generalizability of the findings. Future studies should expand to multi-center and multi-region samples to enhance representativeness. Second, the cross-sectional study design cannot infer causal relationships between variables. Future research could adopt longitudinal or qualitative designs to explore the dynamic mechanisms between humanistic care ability and its influencing factors. Third, all data were collected through self-report questionnaires, which may introduce social desirability bias and affect the objectivity of the data. Finally, this study did not include patient evaluations of nurses' humanistic care ability. Future studies could integrate patient feedback and objective performance indicators to comprehensively assess nurses' humanistic care ability from multiple dimensions.

6 Conclusion

The humanistic care ability of nurses providing "Internet plus nursing services" is at an upper-intermediate level. Professional attitude of nurses, self-efficacy, and participation in humanistic care training are the main influencing factors. Nursing managers should strengthen nurses' professional attitudes and self-efficacy through role modeling, narrative nursing sharing, and systematic humanistic training, thereby improving the quality of humanistic care in home-based nursing services. The limitations of this study include a single-region sample with limited representativeness and a cross-sectional design that precludes causal inference. Future research could conduct multi-center large-sample studies combined with

qualitative interviews to further explore the influencing factors of humanistic care ability among nurses providing "Internet plus nursing services" and provide a reference for developing targeted intervention programs.

Abbreviations

IPNS: Internet Plus Nursing Services; HCA: Humanistic Care Ability.

Declarations

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

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Jiangxi Cancer Hospital (Approval No: MR-36-23-040106). All participants provided informed consent prior to their inclusion in the study.

Consent for publication

Not applicable.

Availability of data and materials

Data supporting the findings of this study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare no conflicts of interest.

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Authors' contributions

All authors participated in conceiving and designing the research. JXY, WXS, and ZYJ performed the questionnaire distribution, data collection, and statistical analysis. HFE, LQ, and HJH contributed to the study design, data interpretation, and critical revision of the manuscript. JXY and HJH drafted the initial manuscript and revised subsequent versions. All authors read and approved the final manuscript.

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