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Research Paper

Attitude of nursing students towards Internet-based nursing services for the aged

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ABSTRACT

Objective: To investigate the attitude, willingness, and motivation of third-year undergraduate nursing students from a university of Chinese medicine toward Internet-based nursing services for the aged (IBNSA), providing a reference for its development and related nursing education.

Methods: This study was conducted from March to April 2019. Using a self-designed questionnaire, this cross-sectional study comprised 508 third-year undergraduate nursing students from a university of Chinese medicine. The questionnaire was divided into two parts. The first part contained the general information of nursing students. The second part investigated nursing students' attitudes, willingness, and motivation towards IBNSA (a total of seven questions).

Results: Of the 508 nursing students, 314 (61.81%) expressed support for the IBNSA, 44(8.66%) expressed disapproval. Regarding career choice, 279 (54.92%) were willing to choose IBNSA, 51 (10.04%) were unwilling. The top three motivations for choosing IBNSA as a nursing student career were increased income, high autonomy and flexibility, and good job prospects. On the contrary, the top three reasons not to choose this option were safety concerns, lack of time and energy, and unwillingness to undertake elderly care. Experience with community activities or a part-time job, experience with elderly care, willing to choose the nursing profession, willing to engage in nursing care after graduation, and willing to engage in nursing for elderly patients after graduation were significantly associated with the motivation of nursing students to participate in IBNSA ($P < 0.05$).

Conclusion: The majority of nursing students have a positive attitude towards IBNSA and are willing to choose it as their future career. Nurses' and patients' safety guarantees and salary distribution were critical factors influencing their choice. Nursing schools should pay attention to the concerns of nursing students, constantly improve the management system of IBNSA, strengthen safety education, and provide professional knowledge and skills to improve the quality of personnel training.

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What is known?

- The impact of disease spectrum change, the aging process, and the elderly home care-based traditional concept has led to an increased demand for long-term care and home health care services.
- Internet-based nursing services for the aged (IBNSA) expands the model of integrated nursing services, enhances the

coordination between the home, community, hospital, and nursing institution, and highlights the critical role of nursing staff in inpatient management, health education, and disease prevention.

- Undergraduate nursing students are potential forces that cope with social aging and rebuilding the image of the public health system and the critical group with IBNSA.

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What is new?

- More than fifty percent of nursing students have a positive attitude towards IBNSA and were willing to choose it as their future career choice.
- Safety and salary concerns were the key issues that affected their choice towards IBNSA.
- Nursing students have not sufficiently mastered the knowledge and skills required for elderly care and lack confidence in caring for the disabled/semi-disabled elderly population.

1. Introduction

In the last decade, the aging population trend in China has become increasingly apparent. According to *China's seventh population census* conducted in 2020, 264 million people aged 60 or over, accounting for 18.7% of the total population. Among them, the number of older persons with chronic diseases was about 150 million, and the disabled or semi-disabled elderly population numbered approximately 44 million [1]. The impact of disease spectrum change, the aging process, and the elderly home care-based traditional concept has led to an increased demand for long-term care and home health care services. Meeting this demand has been difficult due to the shortage of nurses and has become an urgent problem within the current Chinese medical industry [2]. The imbalance between the supply and demand of services for the aged is also prominent outside China. The common practice to address this challenge is to provide visiting nursing services, which is pivotal in medical care for the aged. For example, there are two main categories of visiting nursing services obtained through the Internet in the US. The first is the specialized non-profit visiting nursing agency, the central body providing visiting nursing services, such as the Visiting Nurse Service of New York. The second category is medical enterprises, such as Julius Caesar Medical-Care, which offers Primary Care @ Home, and Uber, which provides visiting nursing services [3]. Likewise, China is also attempting to explore the application of an integrated Internet-based nursing service model, big data, and 'cloud hospital' to cope with the challenges of the aging population.

In November 2015, the first Internet-based nursing services for the aged (IBNSA) platform in China were established. IBNSA serves as the base for nurses to take orders online and provide visiting nursing services offline such as infusion, dressing change, pipeline maintenance, bed care, health management, and other professional nursing care tasks. However, due to the late establishment of visiting medical services and other various limitations, the development of IBNSA is advancing slowly in China. To address this challenge, the Chinese government implemented a pilot project called 'Internet plus Nursing Service' in six provinces and cities from February to December 2019. In December 2020, the National Health Commission reiterated the initiative and expanded the pilots to include at least one city in each province across China. The project provides chronic disease management, rehabilitation nursing, health education, hospice care, and other nursing services for older patients with mobility difficulties by adopting an 'online application and offline services' approach. To ensure the quality of nursing services and the safety of nursing staff and patients, medical institutions connected with IBNSA first assess patients' diseases, health needs, and other conditions, then send nurses with corresponding qualifications and technical capabilities to provide the relevant services [4,5]. IBNSA expands the model of integrated nursing services, enhances the coordination between the home, community, hospital, and nursing institution, and highlights the important role of nursing staff in inpatient management, health

education, and disease prevention. The National Health Commission issued the notice for the pilot projects in different cities. These projects showed that IBNSA makes excellent use of the Internet, maintaining a good balance between the supply and demand of nursing services. It also expands nursing services outside the hospital to meet diverse nursing needs.

Undergraduate nursing students are essential individuals who will cope with social aging and rebuild the image of the public health system and are a crucial group for the implementation of IBNSA [6]. Thus, their attitude, willingness, and motivation towards IBNSA are worthy of respect and in-depth research. This study investigates the attitude, willingness, and motivation of third-year undergraduate nursing students from a university of Chinese medicine towards IBNSA. It provides a reference for the long-term development of IBNSA within professional nursing education.

2. Methods

2.1. Study design and participant recruitment

This study was conducted using a cross-sectional quantitative design from March to April 2019. The study used cluster sampling and included 510 third-year undergraduate nursing students from 11 classes at a nursing school at the University of Medicine. The university offers a four-year undergraduate nursing education program, including three years of theoretical study and one year of clinical practice. The study participants were full-time students willing to participate in the survey and provide informed consent. Participants on sick leave during data collection were excluded.

To ensure that nursing students fully understood the concept of IBNSA, they were instructed to study the subject in class, including its background, management system, service model, service specifications, and operating mechanism. They also consulted the literature on IBNSA before completing a paper related to the topic.

2.2. Instrument

The self-designed survey was divided into two parts. The first part contained the general information of nursing students, including gender, whether they were an only child or not, and home location. The second part investigated nursing students' attitudes, willingness, and motivation towards IBNSA. First, relevant literature was reviewed to analyse the characteristics and differences of each questionnaire item to extract and integrate the items that met the purpose of this research. After completing the draft, eight third-year nursing students were invited to pre-fill the questionnaire. Inappropriate words and ambiguities were subsequently corrected. Four nursing experts were invited to conduct content validity analysis on the questionnaire, including two senior teachers with teaching experience of more than 10 years and professional titles of associate professor or above and two directors of nursing departments from first-class hospitals. After two rounds of consultation with experts, two items expressing the same contents were integrated, and one ambiguous item was deleted. In addition, the order of each question was rearranged according to logical flow to form the final questionnaire.

The survey was formed through two rounds of examination and revision of four experts. The survey asked students a total of seven questions: 1) experience with community activities or a part-time job; 2) experience with elderly care; 3) knowledge and skills required for elderly care; 4) willing to choose the nursing profession; 5) willing to engage in nursing care after graduation; 6) willing to engage in nursing for elderly patients after graduation, and 7) motivation for accepting/not accepting IBNSA as their career choice. Questions 1–6 were single-choice questions, while 7 was a

fill-in-the-blank question requiring no less than four items to be completed to ensure the comprehensiveness of the investigation. According to the experts' assessment, the content validity of the questionnaire was 0.831, and the Cronbach's α coefficient was 0.712, which is considered acceptable. Subject-related interviews were conducted with five third-year nursing students, five nursing teachers, five nurses, and three nursing managers from hospitals contracted to provide IBNSA. This was to further explore the connotations behind the quantitative research results.

2.3. Data collection

The survey link was generated from a Chinese online survey platform called 'Questionnaire Star.' The nursing students independently and anonymously completed the survey without the impact of other factors to ensure the expression of their genuine willingness. The survey was considered valid if every question was answered.

The researchers issued questionnaire links, and nursing students completed the questionnaires with mobile devices. To ensure the quality of the answers, the questionnaire was set up as follows: 1) prompts were provided for each question to briefly introduce the relevant items of the questionnaire to reduce completion inefficiencies; 2) each item of the questionnaire was set as a required question. In the case of omissions, a reminder was displayed after clicking 'submit' to ensure the completion of the questionnaire; 3) new questions could only be answered on the premise that the previous question was completed. Re-answering was required if participants logged out; 4) only one WeChat account could be used for each participant to avoid double filling. Extreme values and unreasonable data were deleted during statistics and analysis.

2.4. Statistical analysis

The researchers downloaded the raw data through 'Questionnaire Star' and analysed the data using 'Questionnaire Star' software and SPSS version 22.0 software. The statistical description of nursing students' general data and answers for each item were expressed in means, standard deviations, frequency, and percentages. The willingness of nursing students with different characteristics for IBNSA was compared using chi-square tests. Pearson's chi-square test was used to make comparisons between groups. Data that failed to meet Pearson's chi-square test conditions were processed with Fisher's exact test with $\alpha = 0.05$ as the test level.

2.5. Ethical considerations

The study was conducted following the Declaration of Helsinki and approved by the Medical Ethics Committee of Shanxi University of Chinese Medicine (2019LL176). Before obtaining the data, students were briefed about the purpose of the study. All nursing students volunteered to participate in this survey and signed the informed consent.

3. Results

3.1. Demographics of the participants

Five hundred ten nursing students completed the surveys through the 'Questionnaire Star' platform. Two unqualified questionnaires with ambiguous expressions were excluded. Finally, 508 valid questionnaires were collected and analysed. The percentage of valid collection was 99.61%. The mean age of 508 nursing students was 21.25 ± 0.91 years.

3.2. Attitude of nursing students towards IBNSA

Of the 508 nursing students, 314 (61.81%) expressed support for the IBNSA, 150 (29.52%) remained neutral, and 44 (8.66%) expressed disapproval.

3.3. Willingness and motivation of nursing students on IBNSA

Of the 508 nursing students, 279 (54.92%) were willing to choose IBNSA as their future career choice, 51 (10.04%) were unwilling, and 178 were unsure. The motivation of nursing students' willingness or unwillingness to choose IBNSA as their future career choice is shown in Tables 1 and 2.

3.4. Comparison of the willingness of nursing students with different characteristics to participate in IBNSA

Gender, only child or not, home location, and degree of knowledge and skills required for elderly care were not significantly associated with the willingness of nursing students to participate in IBNSA ($P > 0.05$). Experience of community activities or part-time jobs, the experience of elderly care, choice of the nursing profession, willing to engage in nursing work after graduation, and willing to engage in elderly care work were significantly associated with the willingness of nursing students to participate in IBNSA ($P < 0.05$), see Table 3.

4. Discussion

4.1. Most nursing students hold a positive attitude toward IBNSA

The nursing students participating in this survey are from the generation that have grown up with the internet and are familiar with and prefer 'Internet plus.' This study revealed that more than half of the nursing students supported implementing the project and were willing to choose IBNSA as their future career choice. These nursing students believed that IBNSA could break the limitations of hospital services and extend nursing services to families, thereby meeting patients' needs for home health care and alleviating the problem of nursing shortages in hospitals. Moreover, nurses could increase their income by using IBNSA in their spare time, enhancing their value [7–9]. Nursing students recognized that IBNSA represents opportunities. In addition, nursing students expressed that satisfying the service needs of patients was the motivation for their career choice. This highlighted the professional spirit and responsibility of young nurses and is aligned with the vision of IBNSA. IBNSA's vision is to utilize Internet technology to effectively expand, extend, and operate a variety of medical resources. However, about one-third of nursing students still held a neutral or unsupportive attitude toward IBNSA. The home and school education caused them to identify with nursing within the hospital environment. Therefore, in their views, medical institutions are important components of their professional safety. Their inherent cognition makes them sceptical about 'practice

Table 1
Motivation for accepting Internet-based nursing services for the aged as their career choice ($n = 457$).

Variables	n	%
Increasing income	401	87.75
High autonomy and flexibility	367	80.31
Good job prospects	322	70.46
Meeting the needs of the service object	282	61.71
Self-improvement	274	59.96

Table 2
Reasons for not accepting Internet-based nursing services for the aged as their career choice (n = 229).

Variables	n	%
Safety concern	192	83.84
Lack of time and energy	167	72.93
Unwilling to undertake elderly care	135	58.95
Unwilling to choose the nursing profession	87	37.99
Worrying about not being good enough for the job	73	31.88

outside the hospital' and their ability to be qualified for nursing work outside medical institutions. This suggests that school education must remain sensitive and concerned about the changes in social development and enhance the cognition of nursing students regarding IBNSA.

In addition, nursing students with experience in community activities or part-time jobs were more willing to accept the concept of IBNSA. Team occupational activities are beneficial for developing the emotional intelligence of nursing students and facilitating the formation of a positive professional identity. Additionally, associations and part-time experiences shape their willingness to serve others. Therefore, nursing education should create a supportive environment for nursing students when nursing services usher in the era of 'Internet plus.' Furthermore, nursing students should actively participate in community activities and extracurricular practice activities. They should consciously cultivate their professional ethics, attitudes, and style, along with other qualities such as communication skills, cultural sensitivity, interdisciplinary cooperation capacity, responsibility, professional dedication, team awareness, and professional integrity. Nursing students should also be encouraged to maintain good psychological and physical health, and nursing education should enhance their ability to cope with stress and frustration [10–12].

Table 3
Comparison of the willingness of nursing students with different characteristics to participate in Internet-based nursing services for the aged (n = 508).

Variables	n(%)	Willing, n(%)	Unwilling, n(%)	Unclear, n(%)	χ^2	P
Gender					2.09	0.337
Female	463(91.14)	255(55.08)	49(10.58)	159(34.34)		
Male	45(8.86)	24(53.33)	2(4.44)	19(42.22)		
Only child					1.31	0.520
Yes	89(17.52)	51(57.30)	6(6.74)	32(35.96)		
No	419(82.48)	228(54.42)	45(10.74)	146(34.84)		
Home location					1.61	0.446
Countryside	413(81.30)	224(54.24)	39(9.44)	150(36.32)		
Town	95(18.70)	54(56.84)	12(12.63)	29(30.53)		
Experience with community activities or a part-time job					106.26	<0.001
Yes	257 (50.59)	199(77.43)	5(1.95)	53(20.62)		
No	251 (49.41)	83(33.07)	41(16.33)	127(50.60)		
Experience with elderly care					14.13	0.001
Yes	212 (41.73)	137(64.62)	15(7.08)	60(28.30)		
No	296 (58.27)	142(47.97)	36(12.16)	118(39.86)		
Knowledge and skills required for elderly care					20.67	0.300
High level	83 (16.34)	35 (42.17)	5(6.02)	43(51.81)		
Middle level	314 (61.81)	81 (25.80)	85(27.07)	148(47.13)		
Low level	111 (21.85)	38 (34.23)	28(25.23)	45(40.54)		
Willing to choose the nursing profession					25.35	<0.001
Voluntary	196 (38.58)	127(64.80)	20(10.20)	49(25.00)		
Non-voluntary	312 (61.42)	165(52.88)	57(18.27)	90(28.85)		
Willing to engage in nursing care after graduation					72.91	<0.001
Willing	255 (50.20)	180(70.59)	22(8.63)	53(20.78)		
Unwilling	29 (5.71)	8(27.59)	10(34.48)	11(37.93)		
Unclear	224 (44.09)	91(40.63)	19(8.48)	114(50.89)		
Willing to engage in nursing for elderly patients after graduation					52.01	<0.001
Willing	263 (51.77)	188(71.48)	12(4.56)	63(23.95)		
Unwilling	88 (17.32)	37(42.05)	24(27.27)	27(30.68)		
Unclear	157 (30.91)	54(34.39)	15(9.55)	88(56.05)		

4.2. Pay attention to the professional identity and career planning of nursing students

To be successful in a profession, individuals should be physically and mentally ready and voluntarily choose it. Thus, we should first pay attention to the professional identity of nursing students before investigating whether nursing students accept IBNSA. The survey shows that 61.42% of the nursing students did not willingly choose the nursing major. The choice was based on their parents' wishes or influenced by their college major for those students. In addition, nearly half of the students were unsure whether they would engage in nursing care after graduation or even become clinical nurses in the future. This indicates that the professional identity of nursing students was not high. Nursing is a professional discipline with a scientific and contemporary approach. Nursing students must be aware of their professional identity, guiding their personal and professional behaviours to provide qualified service. Career choice and professional values can affect their perception of identity with the profession [13].

Nursing educators should cultivate nursing students' positive and stable professional identities. Educators should be alert to the emotions and attitudes of nursing students beginning at enrolment, thereby helping these students make good career choices based on self-awareness and the relevant environment and improving the willingness of nursing students to continue to work in the field after graduation. Projects such as alumni associations and career development forums could help nursing students face their career choices rationally to avoid wasting human and financial resources [14,15].

4.3. Strengthen nursing education and arouse the interest of nursing students in elderly care

The critical service focus of IBNSA is the elderly or disabled/

semi-disabled elderly population. Considering the physiological and psychological specificity of the people mentioned above, professional geriatric nurses are urgently required to meet their health needs [16,17]. The survey suggested that nursing students have not sufficiently mastered the knowledge and skills required for elderly care and lacked confidence in caring for the disabled/semi-disabled elderly population. Additionally, they lacked the willingness to engage in elderly care after graduation.

The nursing students who participated in this study had completed *Community Nursing and Elderly Nursing* courses at school. However, the current issue is that nursing students have rich theoretical knowledge but little experience in community nursing and elderly care activities. This means that these students are often at a loss in real nursing scenarios. Poor practice results in fewer opportunities for nursing students to understand older persons in close proximity [18]. Only a minority of undergraduate nursing students are willing to engage in elderly care [19]. Nursing is a highly relevant subject, and the education and training of community nursing, especially nursing related to the aged, is taken seriously in foreign countries. Nursing students' skills and professional values are improved by participating in various community nursing practices, enhancing their competence, and developing a professional identity [20,21].

In the US, elderly care-related knowledge and skills are included in the category of registered nurse examinations, elderly care practice certificates are well established, and nurse's practice and courses in elderly care are encouraged to promote the development of the specialization [22]. In recent years, there have been an increasing number of studies on Information and Communication Technology (ICT) management and monitoring older people's health. Identifying the challenges of undergraduate nursing students in applying ICT when providing care for older adults could improve training and the direction of future nursing services [23].

Nursing students with experience in elderly care were more willing to engage in elderly care than those without experience of elderly care. Thus, an elderly care education program that combines theory, experiments, and practice into nursing education needs to be developed. A practical training base of elderly care should be built for a professional practice experience. Nursing students' awareness regarding their profession, life, emotions, and the elderly should be identified and heightened to arouse their responsibility and meet the diversified and differentiated health needs of elderly patients. In a systematic evaluation of medical student's attitude towards the elderly in intervention studies [24,25]. Samra et al. [26] proposed adding empathy building into elderly care courses and encouraged students to contact older patients directly to listen to their stories. Fisher and Walker [27] enacted a situation where students could feel old through simulation-based teaching, increasing students' awareness of the elderly population and improving their attitudes towards older persons.

4.4. Safety and salary of IBNSA key issues for nursing students

This survey showed that safety concern was the main reason preventing students from accepting IBNSA as their career choice. The personal safety issue regarding going to an unfamiliar environment to provide home nursing services is one element of the safety mentioned above concern. 'Nobody knows what kind of people the patients and their families are. It's full of unknown and risks.' The nursing students were also worried about medical security for themselves and their patients in the case of providing out-of-hospital care services for high-risk populations such as the elderly or disabled people. Any nursing procedure is not smooth and safe. Medical teams and equipment support act as vital backups

in a hospital if a tricky problem is encountered. How to deal with these risks when providing out-of-hospital nursing services? Nursing students were interested in the increased income from IBNSA, as it reflected their value and met their requirement for high income. Most nursing students believed that 'nursing work was very hard. If the salary obtained was not satisfactory after using their time off for a part-time job, the participation enthusiasm of nurses would be affected'.

5. Strengths and limitations

IBNSA is still in its pilot stage in China and requires further study. This study aimed to contribute to the smooth development of IBNSA. The survey on the nursing students' attitude, willingness, and motivation offer the opportunity for these students to understand IBNSA better and provides suggestions and ideas for the reform of nursing education to facilitate the development of IBNSA. This study, however, has limitations. It was conducted at only one university in China. As only a few variables were included in the study, we were limited to analysing the research results comprehensively. The data collection methods used in the research quickly led to deviations due to the cultural or personal factors of the subjects, which may have affected the rationality of the study. Different results could be found in future research by incorporating other relevant variables and various data collection methods according to the research purpose.

6. Conclusions

The research findings show that more than 50% of nursing students had a positive attitude towards IBNSA and were willing to choose it as their future career. However, they lacked the willingness to engage in elderly care after graduation. Safety and salary concerns were the key issues that affected their choice. The government and nursing schools should pay attention to the concerns of nursing students, reinforce the service procedures and salary management of IBNSA, enhance safety education, and provide professional knowledge and skills to improve the quality of personnel training that addresses social and economic development. These measures would help meet the opportunities and overcome the challenges brought on by the internet era.

CRedit authorship contribution statement

Hua Zhao: Conceptualization, Methodology, Validation, Questionnaire design, Investigation, Data curation, Writing-original draft, Writing-review & editing, Supervision, Project administration. **Peng Zhao:** Conceptualization, Methodology, Validation, Software, Formal analysis, Investigation, Writing-review & editing, Supervision, Project administration. **Yanni Wang:** Conceptualization, Methodology, Validation, Investigation, Writing-review & editing, Supervision, Project administration.

Declaration of competing interest

The authors have declared no conflict of interest.

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Data availability statement

The datasets used and analysed during the current study are available from the corresponding author on reasonable request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijnss.2021.12.013>.

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