International Journal of General Practice Nursing, 2025, Volume 3, Issue 2
https://ojs.bbwpublisher.com/index.php/IJGPN
ISSN Online: 2981-9423
ISSN Print: 2981-9415

# Generation Mechanism and Optimization Path of Nurses' Willingness to Participate in China's "Internet+Nursing Service" Model: A Cross-National Comparative Study Based on Multicenter Data

**Li Yang[1]†, Limin Zhang[2]†, Meiqing Kuang[3], Jiali Li[1]***

[1]The Fifth Affiliated Hospital of Southern Medical University, Guangzhou, Guangdong, China
[2] Zhuhai Campus of Zunyi Medical University, Zhuhai, Guangdong, China
[3] Jiekou Street Community Health Center, Conghua District, Guangzhou, Guangdong, China
†These authors contributed equally to this work and share the first authorship.

**Author to whom correspondence should be addressed.*



**Abstract:** *Background*: Under the dual pressures of a global aging population and rising burden of chronic diseases, digital healthcare services have emerged as a core strategy for healthcare system transformation. Developed countries have established three paradigms: technology-driven transformation, institutional innovation, and payment incentive breakthroughs to shift nursing services from an "institution-centered" model to a "network ecosystem." China faces more severe challenges: By 2021, the population aged 60 and above reached 264 million, with 44 million elderly individuals with partial or total functional impairments. However, the nurse-to-population ratio remains low at 3.18 per 1,000 people, exacerbating supply-demand imbalances. In response, China has piloted "Internet Plus Nursing Services", connecting nurses and patients through an "online application, offline service" model to optimize resource allocation and meet home-based nursing needs. *Aim*: This study used Boolean operators to systematically search the literature in five databases. Based on the literature base, the authors conducted a survey of nurses in a tertiary hospital in Guangzhou City on their intention to participate in Internet home nursing care, and further comprehensively analyzed the influencing mechanisms of the nurses' willingness to participate in home nursing care services in the typical countries and China in the past five years. *Results*: Findings indicate that Chinese nurses' willingness to participate is influenced by factors such as professional title, education, income, marital status, and service perception. However, domestic studies suffer from methodological limitations, including imperfect measurement tools, small sample sizes, and insufficient regional representation, with most research focusing on general nurse populations rather than region-specific groups. *Conclusion*: As direct implementers of "Internet Plus Nursing Services", nurses' participation willingness and behavior are critical to service quality and industry development. Future research should develop multidimensional measurement tools, expand cross-regional sample sizes, and explore influencing factors in context-specific ways to provide scientific evidence for policymaking and standardized development. At the policy level, China must balance "innovation encouragement" and "regulated development", reduce regional disparities in rules, and promote a transition toward a data-driven nursing ecosystem.

**Keywords:** Internet+Nursing services; Nurses; Willingness to participate; Generative mechanisms; Transnational

**Online publication:** June 6, 2025

# 1. Background

Under the double pressure of accelerating global aging and increasing burden of chronic diseases, digital care services have become a core strategy for healthcare system transformation. OECD data show that the nursing manpower shortage in its member countries reaches 24%, while the average annual growth rate of nursing care demand for the population over 65 years old is 7.2%, and the traditional service model is facing a severe "scissors gap" dilemma [1]. In this context, developed countries through technological innovation and institutional restructuring to form three typical paradigms. Firstly, technology-driven change. Second, system-guaranteed innovation. For example, in terms of legal empowerment, the amendment of Japan's Nursing Care Insurance Law included telecare in the statutory service catalog, and the insurance payment coverage rate reached 73% [2]. In terms of standard construction, the UK NHS issued the Digital Care Service Certification Standards, establishing a six-dimensional assessment system of service quality (safety/effectiveness/accessibility, etc.). Thirdly, a payment incentive-based breakthrough. In terms of multiple financing mechanisms, the Netherlands established a government-insurance-charity tripartite co-payment system to reduce the out-of-pocket expenses for home care services to 12% [3]. Under the synergistic evolution, the paradigm shift of care services from "institutional centrality" to "network ecology" has been promoted. The essence of this structural change lies in reconfiguring the interaction of "nurse-technology-patient" to form a new type of service production function linked by data flow. Based on the above international background, this paper compares the current generation mechanism of nurses' willingness to participate in home nursing services between typical countries and China in the context of the development of China's Internet nursing model, in order to provide a basis for optimizing the feasibility of promoting the development of China's "Internet+Nursing Service."

# 2. Approach

A complete internet-based search of five databases was conducted through Academic Search Complete, Medical Line, CINAHL, Health Source: Nursing/Academic Edition, and Google Scholar, to identify the generation mechanism and optimization path of nurses' willingness to participate in China's "Internet+Nursing Service" model. Keywords or free text are combined using Boolean operators (i.e., "AND" and "OR"). During the search, the keywords and terms "Internet+Nursing Service," "Generation mechanism," "Optimization path," "Willingness," and "Participate" were used in various combinations.

Then, this study used convenience sampling to recruit nurses from a tertiary general hospital in Guangdong Province to conduct a questionnaire survey on the intention to participate in door-to-door nursing care in order to further provide a scientific basis for mechanism analysis.

# 3. Results

## 3.1. Transformation of nursing service models under China's internet healthcare ecology

As China's aging population increases, national statistics show that by 2021, the number of people over 60 years old will have reached 264 million, accounting for 18.7% of the total population. There are 150 million people suffering from chronic diseases such as diabetes and hypertension, 85% of the elderly have varying degrees of home care needs, and the demand for home care services for 44 million elderly with disabilities or partial disabilities is increasing [4]. By 2050, China's elderly population is expected to reach 487 million [5]. The ratio of registered nurses per 1,000 population in China is only 3.18 [6]. The imbalance between the supply and demand

of healthcare resources, and the hospital-centered healthcare service model can no longer meet the continuous healthcare needs of patients; therefore, home care services have become a key demand gap, and an inevitable trend in China's healthcare reform and nursing service model reform [7–9]. "Internet + Nursing Service" combines nursing expertise and information technology to meet the diverse and multi-level health needs of patients, overcome time and space constraints, and provide home care services for special groups, such as continuing care after discharge from the hospital or seeking nursing home services for families with difficulties [10–11]. In 2020, the National Health and Wellness Commission issued the Notice on Further Promoting the Pilot Work of "Internet + Nursing Service", and six provincial-level regions across the country were selected for the pilot program, further expanding the scope of the pilot work of "Internet + Nursing Service" [12–13]. The scope of the pilot work is further expanded, emphasizing people's health as the center, focusing on the main contradictions and key issues in the field of nursing, innovating the nursing model, expanding the supply of services, and accurately matching the diversified and multi-level health needs of the people [12–15].

## 3.2. Comparative analysis of typical countries on internet nursing service models

For "Internet + nursing services", domestic and foreign scholars have different ways and scopes to define [16–25]. Overseas scholars usually refer to "Internet + nursing service" as home care, home nursing, home health care, etc., which has been standardized and systematized, with medical teams providing home services for patients [26–28]. However, the development of "Internet + nursing service" in China is relatively slow, and needs to be further optimized to improve the system [29]. China's National Health and Health Commission (NHHC) launched a pilot program of Internet + Nursing Service in 2019, and "Internet + Nursing Service" is described as "Internet + Nursing Service" in English, which can also be referred to as Internet + Home Care (IHC) [30–31], the policy evolution reflects the shift in governance logic from "encouraging innovation" to "regulating development", but the difference in implementation rules between regions is still up to 43% [29]. Domestic "Internet + nursing service" refers to the combination of nursing expertise and information technology, through the "online application, offline service" nursing model to connect the medical institutions registered nurses and patients, patients through the application to place an order; then, the management personnel patients place their orders through an app; then, managers use a web-based platform to send orders based on the nurse's qualifications, level of expertise, and distance; and online nurses accept them during their off-duty hours [32]. Dedicated to meeting the diverse and multilevel health needs of patients and overcoming time and space constraints, it provides home care services for special groups, such as continuing care after hospital discharge or families with difficulties seeking nursing home care [10–11]. IHC services are a valuable complement to traditional and transitional care, optimizing nursing talent, balancing the allocation of nursing resources, and meeting diverse patient needs [33]. In addition, this model provides flexibility for nurses to organize the hours and content of their work, increase their income, and improve their professional competence [33].

## 3.3. The current situation and optimization path of the generating mechanism of the nurses' group's willingness to participate in home care services in typical countries

First of all, the author searched domestic and foreign scholars on "Internet + nursing services", home care and other content retrieval research data in the past five years for 43,505, continue to add the search conditions for the nurses willingness to influence the factors, excluding deviations from the data is nearly 400 articles. On the basis of the above, after further exclusion of foreign scholars' research and removal of duplicated literature, only 40

pieces of research by domestic scholars on "Internet + Nursing Service" are retained.

From the direction of the study showed that some foreign scholars through a systematic search of seven electronic databases, identification, screening, and inclusion of 32 articles that met the inclusion criteria the results showed that the research methodology was mainly qualitative, and home care teamwork is closely related to the background of family nurses, but the status quo is rare in multi-methodological and ethnographic field studies, often lack of description of the background, and it is recommended that more attention is paid to the nurses' backgrounds in the future [30]. Some domestic scholars used a cross-sectional survey to study the willingness and demand for nurses to provide IHC services in Chinese municipal hospitals, and the results of the study showed that nurses were willing to provide IHC services, preferred service distance was less than 5 kilometers, and a personal share of >60% was the expected remuneration for the service; binary logistic regression analyses showed that job title, education level, monthly income, and marital status were related to the willingness of nurses to provide IHC services correlated, with charge nurses 1.177 times more likely to express willingness to provide IHC services than senior nurses, nurses with a bachelor's degree 1.167 times more likely to express willingness to provide IHC services than nurses with a college degree or less, and married nurses 1.075 times more likely to express willingness than unmarried nurses; and emphasized that nurses in municipal hospitals had a higher willingness and demand to provide IHC services, but that there are differences in willingness and need across demographic characteristics [30]. The results of a questionnaire survey conducted by some scholars on 80 itinerant nurses participating in the "Internet+Nursing Service" program in a tertiary hospital in Zhuhai, China, showed that 55% of the nurses believed that high costs, medical safety and nurse safety were factors that hindered the development of "Internet+Nursing Service" [30]. Some scholars conducted a survey of 150 nurses in three hospitals in Weifang, China, and the results of the study showed that education, marital status, nurses' judgment of the necessity of the service, and their own subjective judgment of competence were the factors affecting nurses' participation in Internet+Nursing Service [17]. Some other scholars' research results reached similar conclusions, and the factors influencing nurses' willingness to participate in "Internet+Nursing Service" include age, gender, education level, specialty nurses, monthly income, title, marital status, nurses' training needs, and "Internet+Nursing Service" awareness [18–21]. At the same time, most of the studies on the willingness to use "Internet + nursing services" were conducted on general nurses or nursing students, which lacked strong population or geographical specificity [16–22].

The overall empirical results show that nurses, as direct participants and implementers of "Internet+Nursing Service", their willingness and behavioral participation have a significant impact on the quality of nursing services and the development of the industry [18].

However, based on the current state of research, there are still many defects and deficiencies in the current domestic research on the willingness and influencing factors of "Internet + nursing service", such as: lack of completeness of the measurement tool leads to insufficient integration of influencing factors of nurses' actual individual research, certain bias in the sample size, and poor geographic spread and representativeness of the sample size, etc. [16]. Most of the scholars suggested that the sample size could be expanded in the future. The scholars suggested that the sample size could be expanded, cross-regional, and multi-dimensional "Internet+Nursing Service" measurement tools could be selected for research and promotion [16–22, 25, 30].

In order to further validate the empirical evidence, the authors conducted a survey on the willingness of nurses to come to the door by using convenience sampling of a tertiary hospital in Guangdong Province. 700 questionnaires were distributed, 518 questionnaires were retrieved, and 497 valid questionnaires remained after excluding invalid questionnaires. The results showed that a total of 25 male nurses and 472 female nurses were

surveyed (**Table 1**). It was concluded that 277 nurses thought that "Internet+Nursing Service" would distract nurses from their work, and 238 nurses thought that it would affect the work motivation of the department.

**Table 1.** General information on nurses (*n*=497)

| Project | Classification | Examples | Constituent ratio (%) |
|---|---|---|---|
| Sex | Male | 25 | 5.03 |
| | Female | 472 | 94.97 |
| Age | ≤30 | 162 | 32.60 |
| | 31-39 | 210 | 42.25 |
| | 40-49 | 92 | 18.51 |
| | 50-59 | 18 | 3.62 |
| | ≥60 | 0 | 0.00 |

## 4. Conclusion

To summarize, there are many shortcomings and deficiencies in the current research, such as: the lack of completeness of the measurement tool leads to the lack of integration of the factors affecting the actual individual study of nurses, and the lack of geographic spread and representativeness of the sample size for the sake of convenient sampling in many studies. As direct participants and implementers of "Internet + nursing services", nurses' willingness and behavioral participation have a significant impact on the quality of nursing services and the development of the industry. It is important to comprehensively understand the mechanism of nurses' willingness to participate in home care services in order to continuously promote the development of China's "Internet+Nursing Service" pilot, promote the stable development of the nursing team, and better meet the needs of the elderly with disabilities and the needs of the aging society. In the future, it is necessary to explore the "Internet+Nursing Service" willingness survey tool to concentrate on the region and expand the sample size for measurement, in order to understand the current situation of nurses' willingness to use the tool and the influencing factors in line with local conditions, and to accumulate experience and provide scientific and practical information for the promotion of the standardized development of "Internet+Nursing Service" and the development of related policies in the region. This will accumulate experience and provide a scientific and effective practical basis for the standardized development of "Internet+Nursing Service" and the formulation of related policies in the region.

**Ethical review**

The study was approved by the Medical Ethics Committee of the Fifth Affiliated Hospital of Southern Medical University with the ethical review approval number 2023-HLB-K-002.

## Funding

The 2023 Nursing Special Grants from the President's Fund of the Fifth Affiliated Hospital of Southern Medical University (Project No: YZ2023ZX12)

## Disclosure statement

The authors declare no conflict of interest.

### Author contributions

Li Yang conceived the idea of the study and wrote the manuscript, as well as evaluated the literature. Limin Zhang and Meiqing Kuang also reviewed the literature, participated in the evaluation, and provided ideas and manuscript revisions. Li Yang and Jiali Li were the main contributors to revising the manuscript, as well as guiding the entire manuscript. All authors read and approved the final manuscript.

## References


[1] Tamata AT, Mohammadnezhad M, 2023, A Systematic Review Study on the Factors Affecting Shortage of Nursing Workforce in the Hospitals. Nursing Open, 10(3): 1247–1257.

[2] Li Q, Cheng F, Zeng H, et al., 2024, Health Insurance Payment for Telehealth Services: Scoping Review and Narrative Synthesis. Journal of Medical Internet Research, 2024(26): e56699.

[3] Loo MVH, Kahan JP, Okma KGH, 2019, Developments in Health Care Cost Containment in the Netherlands, in Health Care and Cost Containment in the European Union. Routledge, England, 573–603.

[4] National Bureau of Statistics, 2021, Seventh National Population Census Bulletin (No. 5). Accessed November 7, 2022. http://www.stats.gov.cn/tjsj/tjgb/rkpcgb/qgrkpcgb/202106/t20210628_1818824.html

[5] China Gerontology Research Center, 2022, National Health Commission: By 2035, the Population Aged 60 and Above will Exceed 400 Million, Accounting for more than 30%. Accessed January 18, 2023. http://www.crca.cn/index.php/13-agednews/765-2035-60-4-30.html

[6] Cheng LH, Song YL, Fang XP, et al., 2019, Analysis of the Allocation of Nursing Human Resources in China Based on Rank Sum Ratio Method. Chinese Hospital Management, 39(2): 74–76.

[7] Gong Y, Zhou J, Ding F, 2022, Investigating the Demands for Mobile Internet-based Home Nursing Services for the Elderly. Journal of Investigative Medicine. 70(3): 844–852. https://doi.org/10.1136/jim-2021-002118

[8] Tarver WL, Haggstrom DA, 2019, The Use of Cancer-specific Patient-centered Technologies among Underserved Populations in the United States: Systematic Review. Journal of Medical Internet Research, 21(4): e10256. https://doi.org/10.1080/02701960.2015.1116070

[9] Gong Y, Zhou J, Ding F, 2022, Investigating the Demands for Mobile Internet based Home Nursing Services for the Elderly. Journal of Investigative Medicine, 70(3): 844–852. https://doi.org/10.1136/jim-2021-002118

[10] Tian YT, Zhang Y, Hou XH, et al., 2020, Research on The Construction and Application of Internet Nursing Service Platform. Chinese Journal of Nursing, 55(10): 1537–1542. https://doi.org/10.3761/j.issn.0254-1769.2020.10.017

[11] Wu XJ, 2020, Status Quo and Thinking on the Cross-age Development of "Internet + Nursing Service" in China. The Journal of Nursing Administration, 20(5): 305–308. https://doi.org/10.3969/j.issn.l671-315x.2020.05.001

[12] National Health Commission of the People's Republic of China, 2019, China Pilots Internet Plus Nursing Program. Accessed January 18, 2023. http://www.nhc.gov.cn/yzygj/s7657g/201902/bf0b25379ddb48949e7e21edae2a02da.shtml

[13] National Health Commission of the People's Republic of China, 2020, China to Extend Pilot Program of "Internet Plus Nursing Service" Nationwide. Accessed January 18, 2023. http://www.gov.cn/zhengce/zhengceku/2020-12/16/content_5569982.htm

[14] Cheng LH, Song YL, Fang XP, et al., 2019, Analysis of Nursing Human Resource Allocation in China Based on the Rank Sum Ratio Method. Chinese Hospital Management, 39(2): 74–76.

[15] Sheng ZR, Xu Q, Zhou HD, et al., 2018, Investigation and Analysis of Nurses' Willingness to Provide "Internet + Home Care" Services. Chinese Journal of Modern Nursing, 24(22): 2612–2615.

[16] Li JY, Zhong YH, Han XL, et al., 2021, A Survey on Limiting Factors of "Internet Plus Nursing Service". Medical Research, 3(3): 73–80.

[17] Li Z, Zhao C, Yin W, et al., 2020, Analysis of Nurses' Cognition and Willingness to Provide Internet Plus Nursing Service in Weifang. Chinese Journal of Hospital Administration, 2020(36): 151–155.

[18] Han MD, Zhao ML, Zhang XW, et al., 2020, Investigative on Nurses, Knowledge of and Willingness to Participate in Internet Plus Nursing Service. Journal of Nursing Science, 35(4): 53–56. https://doi.org/10.3870/j.issn.1001-4152.2020.04.053

[19] Ju YY, Gao WJ, 2022, Survey on Willingness of Nurses to Participate in "Internet Plus Nursing Service": The Influencing Factors. Journal of Nursing Science, 37(6): 88–91. https://doi.org/10.3870/j.issn.1001-4152.2022.06.088

[20] He XF, Wu ZH, Yang DY, et al., 2020, Willingness of Nurses in Guangzhou and Foshan to "Internet + Nursing Service" and its Influencing Factors. Chinese Journal of Modern Nursing, 26(29): 4047–4052. https://doi.org/10.3760/cma.j.cnl15682-20191227-04812

[21] Li JJ, Gou JX, Zhou Q, et al., 2020, Investigation and Analysis on Willingness of Nurse to Use Internet + Nursing Services in Non-pilot Provinces. Chinese Journal of Nursing, 55(12): 1825–1830. https://doi.org/10.3761/j.issn.0254-1769.2020.12.012

[22] Davis LL, 1992, Instrument Review: Getting the Most from your Panel of Experts. Applied Nursing Research, 5(4): 194–197.

[23] Xiang MH, Shen XZ, Chen GL, et al., 2023, Investigation of Nurses' Willingness to Use "Internet + Nursing Services" in Guangdong Province and Analysis of Influencing Factors. Journal of Nurses Training, 38(5): 437–441.

[24] National Health Commission of the People's Republic of China, 2019, Six Regions Pilot "Internet + Nursing Services". Chinese Health Quality Management, 26(2): 78.

[25] Tian F, Xi Z, Ai L, et al., 2023, Investigation on Nurses' Willingness to "Internet+ Nursing Service" and Analysis of Influencing Factors. Journal of Multidisciplinary Healthcare, 2023(16): 251–260.

[26] Evans L, Oberlink MR, Stafford PB, 2020, A Practical Methodology for Improving the Aging-Friendliness of Communities: Case Studies from Three U.S. Communities. Innovation in Aging, 4(1): igaa004. https://doi.org/10.1093/geroni/igaa004

[27] Van Steenwinkel I, Dierckx de Casterle B, Heylighen A, 2017, How Architectural Design Affords Experiences of Freedom in Residential Care for Older People. Journal of Aging Studies. 2017(41): 84–92. https://doi.org/10.1016/j.jaging.2017.05.001

[28] Cadmus E, Helms P, Christopher MA, et al., 2015, Interprofessional Shared Governance: The VNSNY Experience. Nursing Management, 46(9): 34–41. https://doi.org/10.1097/01.NUMA.0000470773.94859.2d

[29] Xiang MH, Feng XL, Chen JY, et al., 2023, Investigation on Nursing Services in Pilot Medical Institutions of "Internet + Nursing Services" in Guangdong Province. Journal of Nursing Science, 38(3): 54–58.

[30] Wei J, Wang YF, 2019, Healthcare Plan Launches in Six Pilot Areas. China Daily, February 13, 2019. https://www.chinaservicesinfo.com/s/201902/13/WS5c64c164498e27e33803847f/healthcare-plan-launches-in-six-pilot-areas.html

[31] Zhang J, Peng S, Hou J, et al., 2023, Nurses' Willingness and Demand for Internet+Home Care Services and the Associated Factors in Municipal Hospitals in China: Cross-Sectional Survey. Journal of Medical Internet Research, 4(25): e45602. https://doi.org/10.2196/45602

[32] Sheng Z, Wang J, Sun K, et al., 2020, Nurses' Attitudes Toward Internet-based Home Care: A Survey Study. Computers, Informatics, Nursing, 39(2): 97–104. https://doi.org/10.1097/CIN.0000000000000670.00024665-202102000-00007

[33] Wolff-Baker D, Ordona RB, 2019, The Expanding Role of Nurse Practitioners in Home-based Primary Care: Opportunities and Challenges. Journal of Gerontological Nursing, 45(6): 9–14. https://doi.org/10.3928/00989134-20190422-01