A critical assessment of factors influencing the perceived professional benefit of internet nurses

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Abstract

Objective: We investigated the perceived professional benefit of nurses engaged in internet nursing services of Internet Cooperative Hospitals in Nanjing, China, and explored factors influencing nurse assessment.

Method: From July to August 2020, 300 nurses engaged in internet nursing services at the Internet Cooperative Hospitals of Nanjing, China were assessed using a standardized general information questionnaire with a cumulative score of 145 (range 29-145).

Result: The perceived professional benefit score measured in this study was 121.21 ± 14.97. Linear regression analysis showed that personal recognition of internet nursing services, children's education, position, leader's attitude toward nurses engaging in internet nursing services, and the number of night shifts were the main factors influencing score.

Conclusion: This study demonstrated that perceived professional benefit was influenced by diverse factors. We recommend that targeted intervention measures be used to ensure that nursing managers provide opportunities and platforms for nurses who actively participate in online nursing services.

KEYWORDS
influence factors, internet nurse, perceived professional benefit

INTRODUCTION

The rapid development of internet technology and with an investment from the Chinese government, the National Health Commission issued a pilot program named “Internet + Nursing Services” in February 2019.1 The program identified 6 provinces and/or municipalities as pilot areas for “Internet + Nursing Services,” to encourage the exploration of nurse lead services. The goal was to rely on the new technologies and achievements to establish a new innovative internet model of nursing services, and to potentially show unique advantages of the platform.2 The perceived professional benefit is a positive experience related to professional emotions produced by continuous development based on positive psychology. The sense of perceived professional benefit of nurses refers to the positive emotional experience of nurses when they feel the benefits of the profession of nursing and the recognition that the profession of nurses can promote their all-round growth.3

This study explored the perceived professional benefit of nurses dedicated to online nursing, analyzed the influence of diverse factors on nurses’ perceived professional benefit, and provided basis for the
intervention to improve the level of internet nurses’ perceived professional benefit.

2 | PARTICIPANTS AND METHODS

2.1 | Participants

This is a cross-sectional study conducted from a network of Internet cooperative hospitals in Nanjing City, Jiangsu Province. A total of 310 nurses were invited to complete the online survey voluntarily, but 10 did not respond (96% response rate). A total of 300 surveys were included in this research. Nurses surveys were included if the nurse: (a) Had a nurse qualification certificate and was registered for the job; (b) Had working experience ≥1 year; (c) Voluntarily participated in the study. Nurses were excluded if they were: (a) Interns or (b) Nurses in non-nursing positions.

2.2 | Research method

2.2.1 | Survey questionnaire

The questionnaire consisted of two parts: (a) the general information questionnaire and (b) the nurses’ perceived professional benefit questionnaire.

(a) The general information questionnaire was designed based upon available literature, which was combined with the advice of experts. The questionnaire included gender, age, education level, department status, frequency of night shifts, marital status, children status, position, personnel relations, scientific research status, number of working years, working hours engaged in Internet + nursing, monthly income, hospital level, leadership support. In addition, the willingness of the nurse to participate in Internet + nursing work was also assessed.

(b) The nurses’ perceived professional benefits questionnaire was developed by Hu in 2013. It consists of 29 items mainly includes five categories: positive professional perception, team effort, family and friend identification, nurse-patient relationship, and self-growth. The Cronbach’s α coefficient of complete questionnaire and each dimension was between 0.821 and 0.958, and the split-half reliability coefficient was between 0.813 and 0.938, making the questionnaire reliable and valid. The Likert 5-level scoring method was used in the questionnaire: 1 point means “very disagree”; 2 points means “relatively disagree”; 3 points means “uncertain”; 4 points means “relatively agree”; 5 points means “very agree.” The total score of the questionnaire is between 29 and 145 points; the higher the score, the stronger the sense of professional benefits of nurses.

2.2.2 | Data collection procedure

We obtained permission from the Nanjing Nursing Association, the nursing deans and nursing department directors of various Internet hospitals, and Internet nurses, prior to distributing the questionnaire using the Questionnaire Star platform, which relies on WeChat. After agreeing to informed consent, the purpose and confidentiality of the study and data outcome were explained. Each participant was recorded using a unique IP address. A total of 310 questionnaires were collected, including 300 used in this study, an effective recovery rate of 96%.

2.2.3 | Data analysis

Excel was used to sort out the collected data, and spss22.0 software was used for statistical analysis. Descriptive statistics such as x ± s, frequency and constituent ratio were used for the measurement data. T-test and analysis of variance were used to compare the scores of nurses’ occupation acquisition. Multiple linear regression analysis was used to analyze the factors influencing the occupation benefit of nurses working in Internet plus nursing. P < .05 was deemed statistically significant.

3 | RESULTS

3.1 | Participants characteristics

The 300 Internet nurses surveyed had an average of 12.9 ± 7.2 (years) of clinical nursing work, of which the minimum was 1 year and the maximum was 38 years, and Internet + nursing service time varied from 1 month to 5 years. 90.7% of nurses showed no extra income, and only 6.9% of nurses had increased extra income (100-1000 yuan), while 2.6% of nurses had a monthly extra income greater than 1000 yuan (see Table 1).

3.2 | The scores of internet nurses’ perceived professional benefits

The results of this study showed that the total score of the professional benefit of nurses engaged in Internet + nursing work was 121.21 ± 14.97 points, and the items were equally divided into 4.18 ± 0.51 points. The scores of each dimension are shown in Table 2.

3.3 | Comparison of perceived professional benefit scores of Internet nurses with different characteristics

The following measures significantly (P < .05) influenced score: age, marital status, children’s education, organizational affiliation, personal attitude toward Internet + nursing work, and personal attitude toward internet + nursing work, while hospital level, department, education level, gender, and scientific research had no statistically significant effect (P > .05). Single-factor
analysis of the perceived professional benefit of nurses working in Internet + nursing is summarized in Table 3.

### 3.4 Multiple regression analysis on Influencing Factors of Internet nurses’ perceived professional benefit

Single factor analysis was based on age, marital status, children’s education, organizational affiliation, positions, titles, monthly night shift, leaders’ attitude and personal attitude towards Internet + nursing work, and multiple linear stepwise regression analysis was used. Analysis results are shown in Table 4.

### 4 DISCUSSION

The perceived professional benefit score measured in this study was 121.21 ± 14.97, and the average score of five categories ranged from 3.86 to 4.45, which is in agreement with
| Items                  | Numbers | Total score | Positive career perception | Good nurse-patient relationship | Family and friends identification | Sense of belonging | Own growth  |
|------------------------|---------|-------------|----------------------------|---------------------------------|-----------------------------------|---------------------|-------------|
| **Age**                |         |             |                            |                                 |                                   |                     |             |
| ≤29                    | 71      | 117 ± 17.61 | 21.96 ± 4.57              | 22.04 ± 3.06                    | 23.58 ± 4.35                      | 20.37 ± 3.65        | 29.06 ± 4.79 |
| 30–39                  | 172     | 122.26 ± 13.40 | 23.40 ± 3.76          | 22.88 ± 2.59                    | 24.72 ± 3.60                      | 21.33 ± 2.66        | 30.53 ± 3.57 |
| 40–49                  | 46      | 122.17 ± 15.91 | 23.52 ± 4.19          | 22.34 ± 3.55                    | 25.07 ± 3.51                      | 20.83 ± 3.03        | 30.41 ± 3.91 |
| ≥50                    | 11      | 127.91 ± 11.23 | 25.64 ± 3.38          | 22.27 ± 1.79                    | 26.00 ± 2.53                      | 22.00 ± 2.49        | 32.00 ± 3.00 |
| **F**                  |         |             |                            |                                 |                                   |                     |             |
| **P**                  |         |             |                            |                                 |                                   |                     |             |
| **Marital status**     |         |             |                            |                                 |                                   |                     |             |
| Unmarried              | 67      | 118.19 ± 18.37 | 22.61 ± 4.24          | 22.22 ± 2.92                    | 23.84 ± 4.71                      | 20.28 ± 3.88        | 29.24 ± 4.91 |
| Married                | 233     | 122.08 ± 13.77 | 23.31 ± 4.02          | 22.44 ± 2.82                    | 24.76 ± 3.45                      | 21.27 ± 2.65        | 30.50 ± 3.61 |
| **t**                  | 3.53    | 1.54        | 0.002                    | 3.103                           | 5.707                             |                     |             |
| **P**                  | .05     | 22.96       | .012                    | .018                            | .021                              |                     |             |
| **Children's education**|       |             |                            |                                 |                                   |                     |             |
| No                     | 76      | 116.32 ± 17.88 | 21.88 ± 4.05          | 21.86 ± 2.93                    | 23.32 ± 4.60                      | 20.17 ± 3.86        | 29.08 ± 4.96 |
| Preschool              | 102     | 120.90 ± 12.32 | 22.86 ± 4.00          | 22.28 ± 2.67                    | 24.47 ± 3.09                      | 21.14 ± 2.46        | 30.15 ± 3.43 |
| Primary school         | 72      | 123.63 ± 12.98 | 23.89 ± 3.60          | 22.36 ± 2.52                    | 25.15 ± 3.61                      | 21.46 ± 2.55        | 30.76 ± 3.27 |
| Middle school          | 28      | 124.64 ± 18.91 | 23.96 ± 5.10          | 22.57 ± 4.02                    | 25.40 ± 3.93                      | 21.54 ± 3.19        | 31.18 ± 4.51 |
| University             | 14      | 128.00 ± 10.57 | 26.07 ± 3.02          | 22.57 ± 1.95                    | 26.29 ± 3.12                      | 21.57 ± 2.21        | 31.50 ± 2.68 |
| Other                  | 8       | 126.00 ± 13.45 | 24.50 ± 2.78          | 22.38 ± 3.54                    | 25.75 ± 2.31                      | 21.88 ± 2.95        | 31.50 ± 3.74 |
| **F**                  | 3.15    | 4.09        | 0.43                    | 3.10                            | 1.99                             | 2.37               |             |
| **P**                  | .01     | .01         | .01                     | .01                             | .01                              | .04                |             |
| **Organizational affiliation** |   |             |                            |                                 |                                   |                     |             |
| Contract               | 210     | 120.01 ± 14.93 | 22.98 ± 3.92          | 22.14 ± 2.77                    | 24.19 ± 3.86                      | 20.88 ± 3.03        | 29.82 ± 4.02 |
| Establishment          | 86      | 125.00 ± 13.63 | 24.01 ± 3.64          | 22.65 ± 2.71                    | 25.52 ± 3.37                      | 21.51 ± 2.81        | 31.30 ± 3.57 |
| Temporary employment   | 4       | 102.50 ± 24.13 | 14.00 ± 8.64          | 18.25 ± 5.56                    | 22.50 ± 5.00                      | 20.00 ± 4.08        | 27.75 ± 5.32 |
| **F**                  | 6.80    | 13.18       | 1.2                     | 4.49                            | 1.63                             | 5.16               |             |
| **P**                  | .01     | .01         | .01                     | .01                             | .20                              | .01                |             |
| **Position**           |         |             |                            |                                 |                                   |                     |             |
| No                     | 225     | 122.69 ± 13.86 | 23.73 ± 3.56          | 22.38 ± 2.70                    | 24.86 ± 3.54                      | 21.26 ± 2.73        | 30.46 ± 3.73 |
| Yes                    | 75      | 116.77 ± 17.27 | 21.44 ± 4.97          | 21.81 ± 3.19                    | 23.63 ± 4.31                      | 20.40 ± 3.62        | 29.50 ± 4.57 |
| **t**                  | 9.01    | 18.80       | 2.24                    | 6.07                            | 4.74                             | 3.38               |             |
| **P**                  | .01     | .01         | .14                     | .01                             | .03                              | .07                |             |
| **Positional title**   |         |             |                            |                                 |                                   |                     |             |
| Junior                 | 112     | 117.16 ± 15.88 | 22.00 ± 4.35          | 21.80 ± 2.89                    | 23.64 ± 3.89                      | 20.47 ± 3.32        | 29.24 ± 4.32 |
| Intermediate          | 142     | 123.73 ± 12.65 | 23.88 ± 3.58          | 22.50 ± 2.52                    | 25.13 ± 3.61                      | 21.38 ± 2.40        | 30.85 ± 3.38 |
| Senior                | 27      | 123.22 ± 18.28 | 23.89 ± 4.69          | 22.07 ± 3.94                    | 25.41 ± 3.30                      | 21.37 ± 3.41        | 30.48 ± 4.44 |
| **F**                  | 4.52    | 5.04        | 1.85                    | 3.84                            | 2.22                             | 3.80               |             |
| **P**                  | .01     | .01         | .01                     | .01                             | .09                              | .01                |             |
| **Monthly night shifts**|       |             |                            |                                 |                                   |                     |             |
| 0                      | 133     | 123.13 ± 13.95 | 23.59 ± 4.11          | 22.38 ± 2.80                    | 25.23 ± 3.40                      | 21.31 ± 2.76        | 30.62 ± 3.57 |
| 1–2                    | 73      | 122.19 ± 13.14 | 23.25 ± 3.90          | 22.47 ± 2.70                    | 24.47 ± 2.70                      | 21.22 ± 2.70        | 30.79 ± 3.59 |
| 3–4                    | 44      | 118.84 ± 14.27 | 23.02 ± 3.09          | 21.70 ± 2.75                    | 23.90 ± 3.81                      | 20.66 ± 2.96        | 29.55 ± 4.16 |
The study from Zhang\(^5\) The Internet + nursing work was supported by 95% of nurses responding to the questionnaire, suggesting that they perceive benefits from Internet + nursing services.

In all dimensions of perceived professional benefit, the highest score of 4.45 ± 0.57 was in the category of nurse-patient relationship. After medical treatment, patients had increased demand for nursing service, and nurses were more integrated in the complete process of patient care promoting a more harmonious relationship between nurses and patients.

The second is professional growth with a score of 4.32 ± 0.57. With the continuous development of information technology, the internet has brought great innovation and new opportunities and challenges to the medical and nursing industry. Nurses have the ability to expand professionally to continue to learn and train. This is supplemented by direct training experience from patients who put forward real-time suggestions on the network platform.

Positive occupational perception scored the lowest at 3.86 ± 0.68, which was consistent with the research results of Zhao\(^6\). It suggests that nurses have insufficient understanding of the influence of their works done using the internet, and may also involve a deficiency of nurses' welfare, human resource allocation, and work autonomy due to the current medical system.\(^7\)\(^-\)\(^9\)

Nursing managers can intervene to provide occupation resources, improve the working environment, formulate an extra pay scheme for Internet plus nursing services, and increase the positive acknowledgment of nursing work through media and other publicity.

The Internet plus nursing occupation nurses scored a higher level of professional benefit (\(P < .05\)). Nurses who supported Internet + nursing work had higher occupation identity and focused on their professional growth to better handle nurse-patient relationships and have a strong sense of belonging to the team. Some studies have pointed out that career perception can be improved through cognitive intervention, thus increasing nurses' sense of professional benefit.\(^10\)

Therefore, while paying attention to the cultivation of nurses' professional knowledge and clinical skills, nursing managers should also pay attention to changes in their professional ideas, and help nurses establish good professional values by actively carrying out continued education and training.\(^11\) The study also found that family, aging of children's age and improved education could benefit the nurses' sense of professional benefit. Moreover, the survey found that nursing leaders' attitude towards nurses' work in Internet plus nursing had a profound impact on the team belonging of nurses. Therefore, managers should pay attention to the sense of professional benefit of primary clinical nurses, help nurses establish good professional values by actively carrying out continued education and training.\(^11\) The study also found that family, aging of children's age and improved education could benefit the nurses' sense of professional benefit. Moreover, the survey found that nursing leaders' attitude towards nurses' work in Internet plus nursing had a profound impact on the team belonging of nurses. Therefore, managers should pay attention to the sense of professional benefit of primary clinical nurses, help nurses establish good professional values by actively carrying out continued education and training.\(^11\) The study also found that family, aging of children's age and improved education could benefit the nurses' sense of professional benefit.

At the same time, nursing shifts should be reasonable; managers should improve the welfare of nurses, stimulate their enthusiasm for work, and enhance their sense of professional benefit. From shift analysis, night shift work was regarded as less fulfilling or important

| Items                      | Numbers | Total score          | Positive career perception | Good nurse-patient relationship | Sense of belonging | Own growth |
|----------------------------|---------|----------------------|-----------------------------|---------------------------------|--------------------|------------|
| Good nurse-patient relationship | 50      | 116.76 ± 19.38       | 21.98 ± 4.80               | 11.94 ± 12.47                  | 11.92 ± 18.38     | 11.03      |
| Sense of belonging          | 2       | 2.72 ± 1.95          | 2.29 ± 1.95                | 2.34 ± 1.95                    | 2.29 ± 1.95       | 2.13 ± 1.95|
| Own growth                  | 50      | 28.92 ± 4.76         | 20.44 ± 3.16               | 13.66 ± 3.26                   | 26.76 ± 3.40      | 3.24       |
| Positive career perception  | 50      | 24.05 ± 4.00         | 23.07 ± 3.66               | 21.04 ± 4.73                   | 20.14 ± 3.86      | 2.04 ± 1.95|
| Good nurse-patient relationship | 50      | 22.71 ± 2.76         | 21.11 ± 2.46               | 19.09 ± 3.81                   | 19.09 ± 3.81      | 2.04 ± 1.95|
| Sense of belonging          | 50      | 23.73 ± 3.75         | 24.11 ± 3.08               | 22.67 ± 4.71                   | 22.67 ± 4.71      | 2.04 ± 1.95|
| Own growth                  | 50      | 26.04 ± 4.45         | 25.3 ± 3.75                | 21.33 ± 3.50                   | 21.33 ± 3.50      | 2.04 ± 1.95|
| Positive career perception  | 50      | 24.55 ± 4.10         | 23.57 ± 3.66               | 21.04 ± 4.73                   | 21.04 ± 4.73      | 2.04 ± 1.95|
| Good nurse-patient relationship | 50      | 22.29 ± 2.64         | 21.85 ± 2.47               | 19.78 ± 3.57                   | 19.78 ± 3.57      | 2.04 ± 1.95|
| Sense of belonging          | 50      | 24.55 ± 4.10         | 23.57 ± 3.66               | 21.04 ± 4.73                   | 21.04 ± 4.73      | 2.04 ± 1.95|
| Own growth                  | 50      | 25.3 ± 3.75          | 24.11 ± 3.08               | 22.67 ± 4.71                   | 22.67 ± 4.71      | 2.04 ± 1.95|

\(\text{F} = 2.72, \text{P} = .04\) \(11.92 ± 18.38\) \(22.67 ± 4.71\) \(19.09 ± 3.81\) \(19.09 ± 3.81\) \(2.04 ± 1.95\)

\(\Delta = 2.04 ± 1.95\) \(\text{F} = 11.03, \text{P} = .01\) \(21.04 ± 4.73\) \(21.04 ± 4.73\) \(2.04 ± 1.95\)

\(\text{F} = 2.72, \text{P} = .01\) \(21.85 ± 2.47\) \(19.78 ± 3.57\) \(19.78 ± 3.57\) \(2.04 ± 1.95\)
than normal shift, and the sense of identity of relatives and friends was negatively correlated with the shift ($\beta = -0.41$), indicating that nurses on the night shift could not balance work and family life. Therefore, nursing managers should potentially reward night shift nurses and endeavor to arrange flexible shifts according to the region, hospital management, department staff ratio, and disease types.

5 | CONCLUSION

This study demonstrated that perceived professional benefit was influenced by diverse factors. We recommend that targeted intervention measures be used to ensure that nursing managers provide opportunities and platforms for nurses who actively participate in online nursing services.

6 | LIMITATION

The research used convenience sampling rather than random sampling. Moreover, the chosen samples were concentrated in Nanjing, resulting in a lack of representation, which affected the accuracy of the results.

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CONFLICT OF INTEREST

The authors declare no potential conflict of interest.

AUTHOR CONTRIBUTIONS

Yun Zhao contributed to the concept of the study; Xiaoxu Li contributed significantly to analysis and wrote the manuscript; Yichang Zhu performed the experiment and data analysis; Meixiang Wang and Bo Yang helped the design of the experiment with constructive discussion and instruction; Wu Bing gave some suggestions on the revision of this article.

ETHICS STATEMENT

This study was approved by the Ethics Committee of Jiangsu Cancer Hospital, and all participants signed an informed consent form.

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REFERENCES

1. General Office of the National Health Commission. Notice of the General Office of the National Health Commission on the Pilot Work of Internet + Nursing Services”. 2019.
2. Chen GY. What kind of spark will be created when nursing encounters “internet +” — interview with Wu Y, dean of the School of Nursing, Capital Medical University[J]. Chin Nurs Manage. 2016;16(3):289-291.
3. Ma HW, Dan X, Xu SH, et al. Current status of nurses’ perceived professional benefits and influencing factors in 3A-level hospitals in Tianjin[J]. Chin J Ind Hyg Occup Dis. 2017;35(6):443.
4. Hu J, Liu XH. Compilation of nurse occupational acquisition questionnaire and its reliability and validity test[J]. PLA Nurs J. 2013;30(22):1-5.
5. Zhang J, Yang X, Jiang JX, et al. Prevalence study on the perceived professional benefits of nurses in emerg-ency department of grade-a tertiary hospital in Shanghai [J]. Chin Med Herald. 2020;17(08):43-47.
6. Zhao MH, Ge XD. Analysis of occupational benefit of clinical nurses and its influencing factors [J]. Nurs Res. 2017;31(32):4070-4073.
7. He Y, Hou AH, Cao ME. Effect of the nurse organization atmosphere on job involvement [J]. Chin J Nurs. 2011;46(5):436-439.
8. Djukic M, Jun J, Kovner C, Brewer C, Fletcher J. Determinants of job satisfaction for novice nurse managers employed in hospitals[J]. Health Care Manage Rev. 2017;42(2):172-183.
9. Ahlstedt C, Eriksson LC, Holmström IK, et al. What makes registered nurses remain in work? An ethnographic study [J]. *Int J Nurs Stud*. 2019;89:32-38.
10. Mao BJ, Hu YL, Liu XH. Cognitive intervention research of nurses’ perceived professional benefit [J]. *Chin J Nurs*. 2016;51(2):161-165.
11. Knecht LD, Dabney BW, Cook LE, Gilbert GE. Exploring the development of professional values in an online RN-to-BSN program [J]. *Nurs Ethics*. 2019;27(2):470-479.

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