

# Analysis on the Status and Influencing Factors of Oncology Nurses' Nursing Core Competence and Its Correlation with Self-Efficacy



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## Abstract

**Purpose:** The consistent improvement of nursing core competence has been the popular discussed topic over the past decade, which is closely linked with high-quality nursing service. Thus, oncology nurses' clinical nursing core competences are essential for coping with clinical problems. This study aims to investigate the current status and influencing factors of nursing core competencies, and to explore the correlations with self-efficacy of nurses in the oncology departments of the Third Grade A Hospitals.

**Methods:** The STROBE statement was utilized to guide the study. A cross-sectional study was conducted from June to December 2019 in five different Third Grade A Hospitals. The data was selected by simple random sampling. Data were collected by means of three questionnaires, including the general information questionnaire, the Oncology Nurse Core Competence and Scale and the Self-efficacy Scale.

**Results:** The total scores of core competency of oncology nurses in the Third Grade A Hospitals was (227.72±24.38), and there were statistically different between the age, the length of nursing service, the level of education, hiring policy and nurses' nursing core competency; the total score of self-efficacies was (28.17±6.07), and the self-efficacy was positively correlated with the core competency of nurses. Multiple stepwise regression showed that the self-efficacy independently predicted 28.0% of the variance.

**Conclusion:** The total scores of nursing core competence and self-efficacy the oncology department of the Third Grade A Hospitals were generally in the medium to high levels, but the professional development ability, clinical practice ability, and critical thinking ability of oncology nurses need to be further improved. The self-efficacy is a positive predictor of the core competence. It is recommended that nurse leaders make the effort to improve the self-efficacy of nursing staff through various channels so that the cores competence of oncology nurses can be further advanced.

**Keywords:** Oncology Nursing; Clinical Competence; Self Efficacy; Nurse Specialists

**Abbreviations:** NHFPC: The National Health and Family Planning Commission; STROBE : The Strengthening the Reporting of Observational Studies in Epidemiology; SD: Standard Deviation; LSD: Least Significant Difference

## Introduction

The National Health and Family Planning Commission (NHFPC) issued the latest National Nursing Career Development Plan (2016-2020), mainly targeting about specialist nurses. The major projects include conducting training, the establishment of a management system, the intensification of training, and the improvement of the core competence during the "13<sup>th</sup> Five-Year Plan" Period [1]. Apparently, the training for clinical specialized nurses has become an extremely urgent task, and it has become a mandatory requirement for medical institutions, professional

nursing institutions and the public to continue to improve the core competence of nurses [2]. The core competence of nursing has been defined as the ability to effectively demonstrate a series of attributes, such as special knowledge, skills, judgement, values, attitudes, and personal characteristics that are required for nurses to provide safe and ethical patients care services [3,4]. At present, the research on the nursing core competence mainly concentrates on the nursing student's education, while there are few studies tailored to clinical specialist nurses [5-7].

Cancer is currently the most lethal disease in the world, and it also causes a serious threat to human health [8]. The number of cancers in China ranks first in the world, which brings great challenges to Chinese medical staffs [9]. As the clinical staffs, the ability of oncology nurses is directly connected with the patients' medical experience and clinical prognosis [10]. Hence, nursing core competence significantly impacts the clinical performance and patients' outcomes. Therefore, it is a pressing need for helping oncology nurses to enhance their nursing core competence.

Further, self-efficacy, which refers to people's confidence or belief in their ability to achieve behavior goals in a specific area, were rarely studied in the aspect of nursing competence [11]. Some studies have shown that self-efficacy has been widely utilized in various fields of nursing interventions that have achieved prominent application values in multiple countries [12,13]. Nowadays, the research on self-efficacy is currently focusing on school nursing education and nursing intern performance, rarely involving the training for specialized nurses [14]. Therefore, this study intends to investigate the status quo and explore the influencing factors of nursing core competency of oncology nurses. Also, it will analyze the correlation between self-efficacy and nursing core competence, and ultimately promote the development of nursing in oncology department.

## Methods

### Study Design and Data Collection

The *Strengthening the Reporting of Observational Studies in Epidemiology* (STROBE) statement (Guidelines for reporting observational studies) was utilized to guide our study to improve the reporting quality [15]. A cross-sectional study was conducted from June to October 2020 in five different Third Grade A Hospitals. The data was selected by simple random sampling with the purpose of investigating the general demographic characters, nursing core competencies and self-efficacy of oncology nurses who met the inclusion criteria. The questionnaire survey was executed by three investigators who had received related training at a training workshop. After gaining the consent from the nursing departments, the head nurses, and nurses of the oncology departments in these five selected hospitals, investigators took the advantages of morning handover time and distributed the questionnaire and explained a unified instruction about how to complete the questionnaire. These questionnaires were filled independently and collected after being completed on the spot. In our study, 260 questionnaires were collected, and 230 valid questionnaires were collected. The response rate was 88.5%. All data were collected from August 2020 to October 2020.

### Participants

Respondents were nurse from oncology departments in five randomly selected Third Grade A Hospitals and met the following criteria. Inclusion criteria: (1) Registered nurses who had acquired their Chinese nursing certificates and have worked

in the oncology department for more than one year; (2) Those who were willing to cooperate with the investigators. Exclusion criteria: (1) Nurses who were internships or for advanced studies in the oncology department; (2) Nurses from the general department who supported or temporarily transferred to the oncology department.

### Measurements

There are three main parts of the questionnaire. ① The demographic characteristics of nurses consist of questions related to gender, age, length of nursing service, education level, professional title, position and hiring policy. ② The Oncology Nursing Core Competence Scale has been used, the validity and reliability of the contents (the internal consistency of the scale was Cronbach's alpha =.98) have been approved by Chen [16,17]. The official scales were utilized to measure the nursing core competencies. This tool is classified into five dimensions and 55 items (22 items for clinical practice, 6 items for management ability, 8 items for critical thinking ability, 8 items for communication and coordination ability, 11 items for professional development ability). All items of the scale were related to Likert 5-level scoring from "not competent at all" (1 points) to "extremely competent" (5 points), with higher scores manifesting higher nursing core competencies. The overall score of this scale was from 55 to 275 points, and the results were divided into three levels: high (average item score > 4 points or total score 221-275 points), medium (average item score < 3 points or total score < 165 points) [18]. In our study, the Cronbach's alpha equaled .97 and the Cronbach's alpha of each dimension ranged from .86 to .98 exceeding 0.70. ③ General Self-Efficacy Scale was originally published by renowned German psychologists Ralf Schwarzer et al. [19], and then translated into Chinese version and revised by Wang Caikang [20]. The Chinese version was used to test nurses' self-efficacy, which containing 10 items based on a 4-point Likert scale rated from "strongly disagree" (1 point) to "strongly agree" (4 points), requiring participants to answer questions according to their actual conditions. The results depended on the total score of the scale, which ranged from 10 to 40 points, which the higher the score indicating the higher self-efficacy of the subject. The internal consistency of the score indicating the higher self-efficacy of the subject. The internal consistency of the scale Cronbach's alpha was .97 [20]; in this study, the Cronbach's alpha was .92, which showed high reliability.

### Statistical Analysis

Data was entered using Excel 2013, and analyzed by SPSS version 22.0, also  $p < 0.05$  was considered as significant level. Data were described as frequency (percentage) for qualitative variables and mean  $\pm$  standard deviation (SD) for continuous variables. Quantitative variables were compared using independent sample *t-test* and one-way ANOVA. For Post Hoc multiple comparisons: if equal variances assumed, the least significant difference (LSD) was selected; if equal variances not assumed, we selected the

Welch program to re-analyze and selected Dunnett's T3 for comparison [21]. The correlations between nursing competency and self-efficacy were analyzed using Pearson correlation analysis. Besides, those variables associated with the core competence in univariate analysis were considered for stratified stepwise multiple linear regression analysis using a cutoff of  $p < 0.05$ .

### Ethical Consideration

Our study design was approved by the Ethics Committee of S hospital (approval ID: 2020S626). Our research was performed after receiving the ethical approval from the hospital district ethics review board and gaining permission to collect data from the oncology nursing directors in each participating hospital. The research participants obtained information regarding the research purpose, meaning, method and ethical guidelines in the cover letter. All participants were voluntary, confidentiality and anonymity were guaranteed, and that the anonymous return of the questionnaire indicated that they agreed to participate in the study.

### Result

#### Demographic Items in the Participants

The study included a total of 230 nurses, with women accounting for more than 96.5 percent of the participants. The age of nurses ranged from 22 to 50 years old ( $33.18 \pm 5.89$ ) and the length of nursing service among the participants ranged from 1 to 30 years ( $11.29 \pm 6.69$ ). Among of the study sample, part-time undergraduate nurse accounted for the most in the educational

level, reaching 142 (61.7%). Clinical nurses accounted for the most in position, reaching 195 (84.7%). Nurse with long-term contract system of hiring policies accounted for the largest number, reaching 106 (46.1%).

#### Univariate Analysis of Nursing Core Competence of Oncology Nurses

Statistically, the length of nursing service, education level, and hiring policy were significant components for nurses' core competence ( $F=7.34, p < .001$ ;  $F=6.84, p < .001$ ;  $F=4.82, p < .001$ ;  $F=9.16, p < .001$ ). A multiple comparison showed that nurses age  $\leq 25$  years and range 26-35 years possessed lower nursing core competency than nurses aged 35-45 years old and  $\geq 46$  years old. However, there was no significant difference in the core competence scores between nurses age  $\leq 25$  years and 26-35 years old, neither between nurses aged 36-45 years old and  $\geq 46$  years old. The length of nursing service  $\leq 10$ , 11-20 years had a lower score than nurses with 21-30 years old. Nurses with education levels for technical secondary schools had lower scores than nurses with junior college, part-time undergraduate, full-time undergraduate and postgraduate. The scores of nurses with temporary contract in hiring policy were lower than those of long-term contract and career establishment nurses, who staffing of government-affiliated institutions. The scores of nurses with the long-term contract were lower than those of nurses with career establishment. The score of nurses in the human agency was lower than that in career establishment. There was no statistical significance between the other two groups. See Table 1 for other statistical analyses.

**Table 1:** General demographic data on the nursing core competence of nurses in the oncology department of Shandong Third Grade A Hospitals.

| Study Variables                   |                     | Frequency (%) | Total Nursing Competency (Mean±Sd) | Clinical Practice Ability (Mean±Sd) | Management Ability (Mean±Sd) | Critical Thinking Ability (Mean±Sd) | Communication and Coordination Ability (Mean±Sd) | Professional Development Ability (Mean±Sd) |
|-----------------------------------|---------------------|---------------|------------------------------------|-------------------------------------|------------------------------|-------------------------------------|--|--|
|                                   | 1 Male              | 8(3.5%)       | 233.88±12.64                       | 96.25±6.23                          | 25.50±1.31                   | 33.75±2.49                          | 34.50±2.07                                       | 43.88±3.00                                 |
|                                   | 2 Female            | 222(96.5%)    | 227.50±24.69                       | 91.55±9.78                          | 25.97±3.11                   | 34.17±4.01                          | 34.93±3.97                                       | 40.88±7.06                                 |
|                                   | t, p                |               | t=1.34, .214                       | t=1.35, .179                        | t=-0.92, .378                | t=-0.29, .771                       | t=-0.55, .596                                    | t=1.19, .234                               |
| Age (years)                       | 1 $\leq 25$         | 14(6.1%)      | 214.93±12.38                       | 88.57±8.20                          | 24.57±2.41                   | 30.57±2.77                          | 34.00±2.29                                       | 37.21±3.53                                 |
|                                   | 2 26-35             | 148(64.3%)    | 225.33±24.99                       | 90.55±9.66                          | 25.78±3.18                   | 34.05±3.92                          | 34.61±3.95                                       | 40.34±7.37                                 |
|                                   | 3 36-45             | 60(26.1%)     | 234.30±21.58                       | 94.35±9.21                          | 26.40±2.84                   | 34.93±3.84                          | 35.75±4.00                                       | 42.87±5.24                                 |
|                                   | 4 $\geq 46$         | 8(3.5%)       | 245.00±31.01                       | 99.00±10.72                         | 28.25±1.91                   | 36.50±3.82                          | 35.75±4.56                                       | 45.50±10.27                                |
|                                   | Statistics, P       |               | W=7.34, .001                       | F=4.36, .005                        | F=3.13, .027                 | F=5.92, .001                        | W=1.82, .169                                     | W=8.22, P<0.001                            |
|                                   | Multiple comparison |               | ①,②<③,④                            | ①,②<③,④                             | ①<③,④<br>②<④                 | 1<②,③,④                             | -  | 1,②<③                                      |
| Length of nursing service (years) | 1 1-10              | 116(50.4%)    | 225.79±23.66                       | 90.79±9.24                          | 25.91±3.12                   | 33.94±3.74                          | 35.18±3.53                                       | 39.97±7.46                                 |
|                                   | 2 11-20             | 88(38.3%)     | 225.47±24.31                       | 91.01±9.94                          | 25.43±2.99                   | 33.84±4.22                          | 34.02±4.26                                       | 41.16±6.09                                 |
|                                   | 3 21-30             | 26(11.3%)     | 243.96±22.46                       | 98.23±8.75                          | 27.92±2.21                   | 36.15±3.55                          | 36.73±3.74                                       | 44.92±6.29                                 |
|                                   | F, p                |               | F=6.84, .001                       | F=6.96, .001                        | F=7.03, .001                 | F=3.85, .023                        | F=5.54, .004                                     | F=5.61, .004                               |
|                                   | Multiple comparison |               | ①,②<③                              | ①,②<③                               | ①,②<③                        | ①,②<③                               | ②<①,③  | 1,②<③                                      |

|                     |                              |               |                 |                 |                 |                 |                 |                 |
|---------------------|------------------------------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Education level     | 1 Technical secondary school | 4 (1.7%)      | 185.00±25.40    | 75.00±9.24      | 21.00±2.31      | 27.50±5.20      | 28.00±4.62      | 33.50±4.04      |
|                     | 2 Junior college             | 12 (5.3%)     | 228.83±24.45    | 96.25±10.01     | 24.83±3.10      | 32.33±4.03      | 34.17±3.21      | 41.25±7.42      |
|                     | 3 Part-time undergraduate    | 142 (61.7%)   | 229.93±23.48    | 92.55±9.85      | 26.20±2.68      | 34.54±3.75      | 35.60±3.49      | 41.04±6.64      |
|                     | 4 full-time undergraduate    | 66 (28.7%)    | 223.82±23.37    | 90.09±8.36      | 25.76±3.51      | 33.83±3.78      | 33.77±4.21      | 40.36±7.05      |
|                     | ⑤ Graduate student           | 6 (2.6%)      | 244.67±27.09    | 92.00±8.53      | 27.67±3.61      | 36.67±5.16      | 37.33±4.13      | 51.00±6.20      |
|                     | F, p                         |               | F=4.82, p<0.001 | F=4.62, .001    | F=3.40, .004    | F=4.80, p<0.001 | F=6.91, p<0.001 | F=4.66, .001    |
| Multiple comparison |                              | ①<②③④⑤<br>④<⑤ | ①<②③④⑤<br>②<④   | ①<②③④⑤          | ①<②③④⑤<br>②<⑤   | ①<②③④⑤<br>④<③⑤  | 1<②③④<br>⑤      |                 |
| Professional title  | 1 Nurse                      | 36 (15.7%)    | 221.06±22.42    | 89.58±9.07      | 24.89±2.91      | 32.89±3.94      | 34.56±3.38      | 39.14±6.44      |
|                     | ② Senior nurse               | 68 (29.6%)    | 230.72±20.79    | 92.97±9.26      | 26.66±2.45      | 34.50±3.05      | 35.97±3.10      | 40.62±6.59      |
|                     | ③ Supervisor nurse           | 122 (53.0%)   | 227.47±26.19    | 91.43±10.01     | 25.80±3.32      | 34.27±4.34      | 34.41±4.34      | 41.56±7.16      |
|                     | ④ Associate chief nurse      | 4 (1.7%)      | 244.50±32.91    | 98.50±10.97     | 28.00±2.31      | 36.00±4.62      | 35.50±5.20      | 46.50±9.81      |
|                     | F, p                         |               | F=1.90, .131    | F=1.66, .176    | F=3.47, .017    | F=1.74, .160    | F=2.50, .061    | F=2.04, .109    |
|                     | Multiple comparison          |               | —               | —               | 1<②             | —               | —               | —               |
| Position            | 1 Nurse                      | 195 (84.7%)   | 226.26±23.91    | 91.41±9.81      | 25.78±3.01      | 33.95±3.92      | 34.83±3.77      | 40.29±6.73      |
|                     | 2 Deputy head nurse          | 7 (3.1%)      | 234.71±26.78    | 93.86±8.13      | 25.71±4.19      | 35.14±4.56      | 35.14±3.98      | 44.86±7.08      |
|                     | 3 Head nurse                 | 28 (12.2%)    | 236.14±25.95    | 93.36±9.41      | 27.21±2.94      | 35.29±4.04      | 35.43±4.94      | 44.86±7.31      |
|                     | F, p                         |               | F=2.33, .991    | F=0.67, .513    | F=2.76, .066    | F=0.30, .200    | F=6.67, .745    | F=2.33, .001    |
|                     | Multiple comparison          |               | —               | —               | —               | —               | —               | 1<③             |
| Hiring policy       | 1 Temporary contract         | 42 (18.3%)    | 215.02±16.70    | 86.79±7.75      | 24.62±1.96      | 32.45±2.42      | 33.55±3.01      | 37.62±6.22      |
|                     | 2 Long-term contract         | 106 (46.1%)   | 229.31±22.35    | 92.81±9.37      | 26.05±2.94      | 34.49±3.91      | 35.35±3.47      | 40.61±6.18      |
|                     | 3 Human agency               | 38 (16.5%)    | 222.89±29.73    | 88.68±10.00     | 25.53±3.91      | 33.42±4.82      | 33.79±4.88      | 41.47±8.02      |
|                     | 4 Career Establishment       | 44 (19.1%)    | 240.18±24.03    | 96.41±9.31      | 27.36±2.84      | 35.59±3.87      | 36.14±4.29      | 44.68±6.93      |
|                     | F, p                         |               | F=9.16, p<0.001 | F=9.73, p<0.001 | F=6.49, p<0.001 | F=5.51, .001    | F=4.83, .003    | F=8.26, p<0.001 |
|                     | Multiple comparison          |               | ①<②<④<br>③<④    | ①, ③<②<br>④     | ①<②, ④          | ①<②, ④          | ①<②, ④          | 1<②, ③<br>④     |

### Status Quo of Nursing Core Competency and Self-Efficacy of Nurses in the Oncology Department

The total score of nursing core competence of 230 nurses in oncology department was (227.72 ± 24.38), with a mean of (4.14 ± 0.44) for each item. In all dimensions, the score of

communication and coordination ability was the highest (4.36 ± 0.49), but professional development ability was the lowest (3.73 ± 0.63). The total score of self-efficacies was (28.17 ± 6.07), and the average score was (2.82 ± 0.61) for every item, as shown in Table 2.

**Table 2:** Status Quo of Nursing Core Competence and Self-efficacy of Oncology Nurses in Shandong Third Grade a Hospitals.

| Dimentions                             | Score Range | Score        | Items | Item Mean   | Rank for Item Mean |
|--|-------------|--------------|-------|-------------|--------------------|
|  |             | (Mean ± SD)  |       | (Mean ± SD) |                    |
| Communication and coordination ability | 8~40        | 34.91±3.92   | 8     | 4.36±0.49   | 1                  |
| Management ability                     | 6~30        | 25.95±3.06   | 6     | 4.33±0.51   | 2                  |
| Critical thinking ability              | 8~40        | 34.15±3.96   | 8     | 4.27±0.50   | 3                  |
| Clinical practice ability              | 22~110      | 91.72±9.71   | 22    | 4.17±0.44   | 4                  |
| Professional development ability       | 11~55       | 40.99±6.98   | 11    | 3.73±0.63   | 5                  |
| Total nursing competency               | 55~275      | 227.72±24.38 | 55    | 4.14±0.44   | —                  |
| Self-efficacy                          | 10~40       | 28.17±6.07   | 10    | 2.82±0.61   | —                  |

**Correlation Analysis of Nursing Core Competency and Self-Efficacy of Nurses in the Oncology Department**

significant positive correlation between self-efficacy and five dimensions of nursing core competence. See Table 3 for details.

Pearson correlation analysis showed that there was a

**Table 3:** Correlation Analysis of Nursing Core Competence and Self-efficacy of Nurses in Oncology Department.

| Management   | Critical Thinking Ability | Communication and Coordination Ability | Professional Development Ability | Total Nursing Competency |
|--|---------------------------|--|----------------------------------|--------------------------|
| Item Clinical Practice Ability                               |                           |  |                                  |                          |
| Ability  |                           |  |                                  |                          |
| Self-efficacy .44** .42**                                    |                           |  |                                  |                          |
| ** .Correlation is significant at the 0.01 level (2-tailed). | .50**                     | .45**                                  | .66**                            | .57**                    |

**Stepwise Multiple Linear Regression Analysis of Nursing Competence of Nurses in the Oncology Department**

With nurses’ nursing competency as the dependent variable, the influence of self-efficacy on nurses’ nursing competency was measured by hierarchical stepwise regression, which was tested in two layers aiming to control confounding factors. The first layer is total core competence regarding as dependent variables and general demographic variables. Meanwhile, statistical significance

in the univariate analysis acting as independent variables were introduced into the equation. In the second layer, the self-efficacy was introduced into the equation after controlling the impact of general demographic characteristics on nurses’ nursing competencies. The variables that entered the equation were hiring policy and self-efficacy. The R square of the hiring policy entering the equation was .07 and the R square of the equation became .35 after the self-efficacy entered. The self-efficacy therefore independently predicted 28.0% of variance. See Table 4 here.

**Table 4:** Stratified Stepwise Multiple Linear Regression Analysis of Oncology Nurses’ Nursing Core Competence.

| Variables                       | regression coefficient | standardized regression coefficient | t    | P     | R2   |
|---------------------------------|------------------------|-------------------------------------|------|-------|------|
| The first layer: Hiring policy  | 6.42                   | 0.26                                | 4.08 | <.001 | 0.07 |
| The second layer: Self-efficacy | 2.17                   | 0.54                                | 9.87 | <.001 | 0.35 |

## Discussion

### Analysis of the Current Situation of Nursing Core Competence of Nurses in the Oncology Department

To improve the core competence of nurses is not only the objective requirement for promoting the development of nursing work but also the requirement for adapting to continuous improvement of nurses in the oncology departments in Third Grade A Hospitals was at a medium to high level ( $227.72 \pm 24.38$  points). The dimensions with scores from high to low respectively were communication and coordination ability, management ability, critical thinking ability, clinical practice ability and professional development ability. Interestingly, these results were not in completely in line with other research outcomes [22]. The reasons are: (1) different research tools used. [22] used the "Core Competence Scale of Chinese Registered Nurses", which was developed by Liu Ming and targeted to general registered nurses [23]. However, our study utilized the "Core Competence Scale of Oncology Nurses", a special investigation tool for oncology nurses' nursing core competence [17]. The research points out that the universal scale is not as sensitive as the special scale for targeted groups [24]. The particularity of oncology nursing care determine that the requirements of oncology nurses' abilities are different from that of general registered nurses, so the general evaluation tool of nurses' core competence is not strong for oncology nurses' specificity. (2) Differences in the baseline data of the study subjects leading to different results. Different hospital culture, management modes, opportunities for nurses to receive standardized training, age of the research objects, the length of nursing services, professional titles, hiring forms may results in different levels of core competence of nurses.

One research showed that nurses had the lowest scores in critical thinking ability and scientific research ability, but this study showed that the critical thinking ability of oncology nurses was at a medium level. The reason may be that the nursing academic field has realized the lack of critical thinking of nurses and paid more consideration to relevant research, which arousing the attention of nursing colleagues in the area. The nursing leader of the Third Grade A hospital also continuously emphasizes the importance of nursing critical thinking in the implementation of medical orders, decision-making, nursing intervention, which potentially requiring nurses to reflect on the critical thinking ability.

### Analysis of Factors Influencing the Core Competence of Oncology Nurses

**Influence of age and the length of nursing service on nursing competence of nurse in the oncology department:** The results can be seen from the Table 1 that age and length of nursing services were statistically significant for nurses' nursing core competence. The research indicated that nurses at each stage have their knowledge and behavioral characteristics [25]. In particular, young nurses in oncology department lack the ability

to transfer theory to practice perfectly in clinical settings due to the less clinical experience. Meanwhile, young nurses are tired of completing clinical assignments and developing personal career planning under the high load pressure and facing complex nurse-patient relationship. With the growth of age and the length of nursing service, as well as continuous learning and training, the nurses' experience will be more abundant, theoretical knowledge and work will also be improved so that the nursing competency of clinical nursing will be improved.

**Influence of education level on the nursing core competence of nurses in the oncology department :** The results of One-Way ANOVA in this study showed that there was a significant difference between the current education level and nursing competency of nurses in the oncology department ( $p < .001$ ). However, multiple comparisons found that the core competence of nurses with technical secondary school education and junior college education or above had statistical significance, which the pairwise comparison of core competence of nurses with junior college education or above had no statistical significance. It illustrates the reason that the nurses who graduated from the technical secondary school passively received knowledge and lacked the motivation in seeking true knowledge is related to their cultural background and education methods [26]. There was no statistical significance between core competencies of nurses with a junior college degree or above. The reason is that the nursing education, especially the high-level education, was launched late in China. For a long time, the subordinate status of nursing work and fact that clinical nursing staff did not reflect the status of hierarchical work have made nursing education and clinical work focusing on the accuracy of implementing doctors' orders and the proficiency of operating skills [20]. The ministry of Education in 2003 firstly proposed the nursing competence for Chinese nurses, in which it is required that the guiding ideology of nursing professional education should follow the principle of competence-based principle, and nursing professional education should integrate knowledge, cultivation ability, and quality improvement, which should penetrate the whole process of school education. Therefore, the critical thinking ability of nurses has been improved in recent years.

**The influence of professional title and position on the nursing competence of oncology nurses:** The study (Table 1) showed that nurses had lower management ability than that of senior nurses, and nurses had lower professional development ability compared with head nurses. The professional title can reflect the technical level of the profession to a certain extent. Generally speaking, the higher professional title of nurses has, the more clinical experience they have. Therefore, the management ability score of the senior nurse is higher than others. With the ascending of nurses' positions, their abilities in all aspects have been trained to certain extent. In addition, there are certain necessities for scientific research ability when assessing professional titles. For example, some hospitals require research

papers to be published, so the professional development ability score of head nurses is higher than that of other nurses.

**The influence of hiring policy on nursing competence of nurses in the oncology department:** This study showed that different kinds of hiring policy ( $p < .001$ ), have different consequences for nursing core competency in the oncology department, and *Table 4* shows that the hiring policy was the main demographic influencing factor of nursing core competence. Career Establishment Nurses, who staffing of government-affiliated institutions, scored higher than nurses without career establishment. The reason is that these hospitals neither want to invest much in the nurses without the career establishment system nor pay attention to training. Nowadays, there are some problems between the contract nurses and the Career Establishment nurses, such as unequal social status, different payment for the same work, unfair treatment, which affect the work enthusiasm of the contracts nurses and lose nursing talents [27]. Therefore, a cost-benefit analysis should be done and key training objects should be identified through evaluation and selection for nurses without Career Establishment, and their positions and promotion routes should be reasonably arranged to encourage and certain these talents by hospitals.

**The influence of self-efficacy on the nursing score competence of oncology nurses in the Third Grade A hospital:** Pearson correlation analysis showed that there was a significantly positive correlation between self-efficacy and nursing core competency, and hierarchical stepwise regression analysis further confirmed the correctness and conclusion. In the study, self-efficacy was positively correlated with the overall nursing core competence and the ability level of all dimensions of nursing staffs. The condition of cancer patients is changeable, and they are physiologically and psychologically ill. The nurses with high self-efficacy believe that they have ability to fulfill the job and can provide comprehensive nursing for cancer patients. There are some setbacks during the process of taking care of patients, but nurses with high efficacy can actively solve and be willing to meet the challenges of emergencies, and be able to control the idea of self-abandonment [28]. Additionally, they will appropriately use their wisdom and skills when necessary and will not have a negative attitude towards nursing work [29]. Therefore, it is necessary to vigorously enhance the sense of self-efficacy of oncology nurses so that they can better exert their potentials and perfectly complete nursing work. The sense of self-efficacy is mainly influenced by four sources of information: physiology and psychology, oral persuasion, direct and indirect experience [30]. Based on these fundamentals, nursing managers should pay more attention to the mental health of nursing staffs, and regularly conduct psychological counseling lectures by combining their successful experience. Therefore, oncology nurses should draw on the example of others to maintain good physical and mental health to improve the self-efficacy, enhance the nursing core competency,

work efficiency and happiness.

## Limitation and Expectations

In this study, only nurses from the oncology departments of five the third Grade A hospital were selected as the research participants. The selection of samples was relatively limited, and the representativeness was not very strong. It is necessary to expand the example size to further verify the effectiveness of the conclusions. The evaluation method of this study is self-evaluation with subjectivity. The next step is suggested to more objective way of evaluating others and compare the difference between self-evaluation and others' evaluation to explore more effective assessment and training methods.

## Conclusion

The result of our study showed that the overall level of nursing core competency of oncology nurses in Third-Grade A hospitals was above average. To a certain extent, they are competent for the basic nursing work, but the professional development, clinical practice ability, and critical thinking ability need to be further improved. Also, more in-depth intervention research is needed to improve the ability of nurses in these aspects. The study found that the affecting factors of nursing core competence include age, the length of nursing service, current education level, hiring policy and self-efficacy. Therefore, it is recommended to conduct stratified training in nursing core competence and attach importance to the enhancement of nurses' self-efficacy to boost the training effect, and pay attention to the reasonable positions and job promotion routes arrangement of nurses without Career Establishment, especially the temporary contract nurses to encourage and keep their talents.

## Relevance to Clinical Practice

To improve oncology nurses' nursing core competencies, objective factors that affect clinical nursing core competencies must be emphasized. Multiple strategies for enhancing oncology nurses' core competencies can be provided via oncology specialist core competency promotion training projects and activities, and promoting nursing core competencies can be explored in clinical settings through stratified training in nursing enhancement, self-efficacy, self-reflection, situational simulation and objective structured clinical examinations.

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## Ethical Approval

Our research was performed after receiving the permission and approval of the Ethics Committee of the Shandong Provincial Qianfoshan Hospital, Shandong University in 2019 (approval ID: 2019S626). The research subjects obtained information regarding the research purpose, meaning, method and ethical guidelines in the cover letter. They were also notified that they were free to choose to join or not and that the anonymous return of the questionnaire indicated that they agreed to participate in the study.

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