



# The Relationship Between Critical Thinking and Clinical Competence in Nurses

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## Abstract

**Background:** The lack of clinical competence in nurses leads to problems in providing nursing services. Studies indicate that nurses lacking the required skills can endanger the public health in medical centers. Critical thinking is a factor that can affect nurses' clinical competence.

**Objectives:** The current study aimed at investigating the relationship between critical thinking and clinical competence in nurses.

**Methods:** The current descriptive-analytical and cross sectional study was conducted on 120 nurses selected by random sampling method. Data collection tools included the California Critical Thinking Disposition Inventory (CCTDI), as well as clinical competence and demographic information questionnaires. Data were analyzed with SPSS using Pearson correlation coefficient, linear regression, and *t*-test.

**Results:** Pearson correlation test showed a positive correlation between the total scores of critical thinking and clinical competence. Based on the results of the linear regression analysis, the tendency toward critical thinking could predict 28.4% of the clinical competence. The nurses mean CCTDI scores were at the positive level and their mean clinical competence scores were at the average level.

**Conclusions:** According to the obtained results, nursing authorities can organize practical workshops on the development of critical thinking of clinical nurses as one of the most important and operational strategies to improve nursing clinical competence and, ultimately, move towards optimal care.

**Keywords:** Critical Thinking, Clinical Competence, Nurses

## 1. Background

In spite of the close relationship between clinical competence and quality care concept, as a practical discipline, clinical competence enjoys a unique position in nursing (1). According to the experts, having clinical competence is one of the essential conditions to assign and accept professional responsibility and accountability (2). According to the American Nurses Association, clinical competence is the utilization of knowledge in decision-making, psychomotor, and interpersonal skills, which nurses expect from their role (3). One of the current problems is the lack of clinical competence in nurses, which causes problems in providing nursing services. Studies show that nurses working in medical centers may endanger the health of the community, if they lack the necessary skills (4). Several factors affect the acquisition, retention, and promotion of nurses' clinical competence, i.e., the experience, environ-

ment, use of opportunities, motivation, theoretical knowledge, individual characteristics (5), the organization of the clinical environment, mental atmosphere of the department, continuation of the educational programs, employment of the available technologies, effective management, and control and supervision (6).

Critical thinking is one of the factors influencing nurses' clinical competence (5), which is an essential component of clinical decision making and professional competence and its utilization, using cognitive skills and intellectual abilities, helps nurses to promote their position from a follower of others' commands to an independent decision-maker (7), which strengthens their decision-making ability to better identify patient needs and choose the best nursing practices (8). Today, the gap between theory and practice in medical fields, including nursing, is one of the main dilemmas. Students, despite passing

theoretical units in the clinical environment, cannot use their scientific knowledge; whereas critical thinking can turn the scientific knowledge into practice and apply it. In fact, critical thinking is a way to eliminate the gap between theory and practice (9). Critical thinking is one of the remarkable determinants influencing human's thinking ability and plays an important role in obtaining, evaluating, and effectively using information, which includes skills and tendency toward critical thinking. Skills form the cognitive aspect, and tendencies form the sympathetic-emotional aspect of critical thinking and are one of the areas of personality (10). The tendency toward critical thinking is a set of mental habits or a tendency toward critical thinking, which consists of seven dimensions of truth-seeking, open-mindedness, analyticity, systematic, critical self-confidence, maturity of judgment, and inquisitiveness (11).

There are several definitions for the concept of critical thinking in nursing. Some experts believe that there is no general agreement on the definition of this concept, except for the emphasis on its importance in clinical nursing (12). Nursing researchers consider critical thinking as a kind of rational, purposeful, and consequential thinking relied on patient needs and guided by professional standards and policies (13). Carbogim Fda et al., by analyzing the concept of critical thinking in nursing, acknowledged that the use of critical thinking can enhance the safety, quality of patient care, professional growth, professional satisfaction, autonomy in practices, and professional skills and competence compared with those of technical variables (14).

The results of many studies show that critical thinking, as a valid method in thinking and tendency toward critical thinking plays an important role in personal and social situations; as many studies emphasize a significant relationship between the tendency toward critical thinking, academic achievement, problem-solving skills, and caring behaviors (15-21). Despite the great importance of critical thinking in decision-making and the improvement of nurses' clinical competence, the researchers stated that little attention is paid to the development and promotion of critical thinking in nursing (22). Although many studies were performed on critical thinking in nursing, and nursing clinical competence and their relationship with some variables, to the best of authors' knowledge, there were no adequate studies on the effect of the tendency toward critical thinking on the clinical competence in nurses.

## 2. Objectives

Therefore, the present study aimed at investigating the relationship between the tendency toward critical thinking and clinical competence in nurses.

## 3. Methods

The current descriptive-analytical study with cross sectional design was conducted in 2017. The research population consisted of all nurses working in two hospitals in Tehran, Iran. Sampling was performed based on tables of random numbers and the sample size was determined based on the total number of nurses in each hospital. The sample size was set to 120, with 95% confidence interval, 90% power test, using the sample size estimation formula used in correlation studies (23), and correlation coefficient was based on the pilot study ( $r = 0.23$ ). According to the samples dropouts, the questionnaires were distributed among 140 nurses. Finally, 120 questionnaires were evaluated due to the incompleteness or confounding of some questionnaires.

The inclusion criteria were having at least an associated degree in nursing, not participating in other research with similar questions within the past year, having at least six months of clinical working experience, and willingness to participate in the study. After obtaining the approval of Ethics Committee (code No. IR.IAU.K.REC.1395.41), sampling was started by referring to the selected hospitals and obtaining informed consent from nurses willing to participate in the study. The study objectives and the method of completing the questionnaire were explained to the subjects and they were assured about the confidentiality of the information. The California Critical Thinking Disposition Inventory (CCTDI), and nurses' clinical competence assessment questionnaire were given to the participants. Their demographic information was also recorded.

The CCTDI was first developed by Facione et al., consisting of 75 items scored based on a six-point Likert scale from 1 to 6 according to the scoring system of the questionnaire. The CCTDI assesses the seven subscales of tendency toward critical thinking, i.e., truth-seeking (12 items), criticism (11 items), systematic (11 items), critical self-confidence (9 items), maturity of judgment (10 items), inquisitiveness (10 items), and analyticity (11 items).

To score the negative items, score 1 is given if selects "I totally agree", and 6 is given if selects "I totally disagree".

Since the test has seven sub-scales, the scores range 70 to 420.

The total score < 210 means negative, 210 - 279 instable, and 280 - 350 positive, and > 350 means a strong and stable tendency toward critical thinking (24). This test was frequently used by Facione et al. (11), as an appropriate tool to evaluate critical thinking factors. The validity and reliability of the CCTDI in Iran was confirmed by Bahman Poor (25). The reliability of the instrument was assessed in a study by Badry Gargari and Fathi Azar using the Cronbach's alpha coefficient ( $\alpha = 0.89$ ) (26). In the study by Facione et al., performed on 164 students, the reliability of the CCTDI was

0.90 for the whole instrument, and 0.80 for the seven subscales using Cronbach's alpha (11).

Clinical competence was assessed using the nurses' clinical competence assessment instrument, which involves amateur to professional subjects according to the Benner theory (27). This instrument evaluates 73 nursing skills in seven different areas including helping the patient (seven skills), training and guidance (16 skills), diagnostic measures (7 skills), managerial abilities (8 skills), therapeutic interventions (10 skills), quality assurance (6 skills), and occupational and organizational tasks (19 skills). The items are scored based on a four-point Likert scale from never to always, and the total score ranges from 0 to 219. Based on the obtained scores, the utilization of clinical competence was divided into three levels of low, moderate, and high. A score of < 73 is referred to low, 74 - 146 to moderate, and 147 - 219 to high clinical competence (27).

Among the advantages of nurses' clinical competence assessment questionnaire, its ease-of-use and good validity and reliability are noteworthy. The internal consistency of the seven areas of this scale in the study by Meretoja et al., was 0.79 to 0.91, indicating the desired internal consistency of areas and the appropriate reliability of the instrument (28). Also, Bahreini et al., by translating the scale from the original language into Persian and then reversing the translation, according to the World Health Organization recommendation, examined its validity approved based on the comments of clinical teaching experts and professors as well as experienced nurses from different Iranian universities. The reliability was 0.75 - 0.89 based on the Cronbach's alpha coefficient in the seven areas of the instrument (29, 30).

Data were analyzed by descriptive (mean, median, frequency, frequency percentage, and standard deviation) and inferential (Pearson correlation coefficient, linear regression, and *t*-test) tests with SPSS version 15 (SPSS Inc., Chicago, IL). Regarding the normality of the research variables, based on the Kolmogorov-Smirnov test, at a significant level of 0.05, Pearson correlation test was used to examine the relationship between clinical competence variables and tendency toward critical thinking. Linear regression test was also used to predict the effect of tendency toward critical thinking on clinical competence.

The study protocol was approved by the Ethics Committee of Islamic Azad University, Karaj Branch, (ethical core: IR.IAU.K.REC.1395.41); the study was funded by the local institution.

#### 4. Results

Of the 140 questionnaires, 20 (14.28%) had incomplete information. Therefore, statistical analysis was performed on 120 nurses including 84 female (70%) and 36 male (30%)

subjects. The mean age of participants was  $29.00 \pm 7.76$  years, with average of experience  $68.64 \pm 4.92$  years; 42% of the subjects were married ( $n = 50$ ), 65% ( $n = 78$ ) had undergraduate education, and 35% ( $n = 42$ ) held Master's degree in nursing. The average score of nurses in CCTDI was  $28.81 \pm 41.77$  that was in the positive level, and the highest score of the nurses was in the truth-seeking dimension (Table 1). However, 1.7% of the nurses had negative, 0.66% instable, 36.2% positive, and 0.6% strong tendency toward critical thinking.

The average score of clinical competence was  $37.148 \pm 37.21$  and  $12.62 \pm 25.79$  for female and male subjects, respectively. The average total score of clinical competence was  $32.184 \pm 34.7$  (Table 1). Based on the findings regarding the clinical competence utilization, 9% ( $n = 10$ ) of the participants were at low, 64% ( $n = 76$ ) moderate, and 40% ( $n = 48$ ) high levels. More than half of the nurses were in average level in all areas of clinical competence. The utilization of clinical competence in female subjects was significantly higher than that of male subjects ( $P = 0.041$ ). The mean scores of clinical competence utilization were significantly higher in nurses with a bachelor's degree than their counterparts with Master's degree ( $P = 0.1010$ ).

The results of Pearson correlation test showed a positive correlation between the total scores of critical thinking and the utilization of clinical competence ( $r = 0.284$ ;  $P = 0.002$ ) (Tables 2 and 3).

Based on the results of linear regression analysis, the tendency toward critical thinking can predict 8.1% of clinical competence utilization ( $P = 0.004$ ) (Table 4).

#### 5. Discussion

Today, experts believe that critical thinking is an integral part of education at any level, since critical thinking is the kind of thinking that leads to the best solution using analysis, evaluation, selection, and application (31). The current study aimed at investigating the relationship between tendency toward critical thinking and clinical competence of nurses. It is noteworthy that the current study results were compared among similar groups, such as nursing students and other medical fields, since to the best of authors' knowledge, there were no similar study on the relationship between critical thinking and the utilization of clinical competence in nurses. In the current study, there was a significant and positive correlation between the level of tendency toward critical thinking and the utilization of clinical competence; since by increasing clinical thinking tendency, the utilization of clinical competence among nurses also increased. Some studies on critical thinking and its impact on nurses' performance showed similar results. Facione examined the impact of critical thinking on evidence-based performance

**Table 1.** Means of the Dimensions of Tendency Toward Critical Thinking and Areas of Clinical Competence

Dimensions of Tendency Toward Critical Thinking	Mean $\pm$ SD	Clinical Competence Areas	Mean $\pm$ SD
Tendency toward critical thinking	258.19 $\pm$ 41.37	Total clinical competence	132.84 $\pm$ 34.77
Truth-seeking	46.97 $\pm$ 7.37	Helping the patient	12.82 $\pm$ 3.20
Criticism	45.41 $\pm$ 7.33	Education and guidance	29.46 $\pm$ 8.20
Systematic	42.81 $\pm$ 8.75	Diagnostic measures	12.53 $\pm$ 3.90
Critical self-confidence	35.61 $\pm$ 6.42	Quality assurance	14.26 $\pm$ 4.41
Maturity of judgment	37.50 $\pm$ 6.95	Managerial abilities	18.22 $\pm$ 5.65
Inquisitiveness	33.80 $\pm$ 7.49	Quality assurance	10.18 $\pm$ 3.33
Analyticity	43.00 $\pm$ 7.46	Occupational and organizational tasks	35.34 $\pm$ 10.00

**Table 2.** Correlation Between Tendency Toward Critical Thinking and Clinical Competence and the Dimensions of Critical Thinking Tendency

Variable	Total Tendency Toward Critical Thinking	Truth-Seeking	Criticism	Systematic	Critical Self-Confidence	Maturity of Judgment	Inquisitiveness	Analyticity
Total clinical competence	$r = 0.284^a$	$r = 0.375^a$	$r = 0.272^a$	$r = 0.217$	$r = 0.246^a$	$r = 0.162$	$r = 0.137$	$r = 0.181$

<sup>a</sup> $P < 0.001$ .**Table 3.** Correlation Between Critical Thinking Tendency and Clinical Competence Areas

Variable	Helping the Patient	Education and Guidance	Diagnostic Measures	Managerial Abilities	Therapeutic Measures	Quality Assurance	Occupational and Organizational Tasks
Total critical thinking tendency	$r = 0.256^a$	$r = 0.246^a$	$r = 0.152$	$r = 0.240^b$	$r = 0.296^a$	$r = 0.324^a$	$r = 0.260^a$

<sup>a</sup> $P < 0.001$ .<sup>b</sup> $P < 0.050$ .**Table 4.** The Results of Linear Regression Analysis to Predict Nurses Clinical Competence

Predictor variable	$\beta$	Standard Error	$\beta$	t	P Value
F	64.27	-	-	2.92	0.004
Disposition of critical thinking	0.024	0.284	0.284	3.51	0.002
	$r = 0.284$	$R^2 = 0.081$	Adjusted $R^2 = 0.073$	-	-

of nurses at clinical practices and concluded that nurses' perception of evidence-based performance was very low at clinical practices and they often had no proper understanding of evidence-based performance (32). The results of McKinley et al., showed a significant relationship between evidence-based care and critical thinking skills (33). Also, Pai and Eng performed a study on nursing students and found a significant relationship between tendency toward critical thinking and nurses' caring behaviors (21). In other words, students with higher levels of critical thinking got more success. Accordingly, Kırbaşlar and Özsoy-Güneş concluded that the tendency toward critical thinking influenced students' entrepreneurship (34).

The results of a study by Paryad et al., on nursing students showed that the highest mean of scores belonged to deductive reasoning, inductive reasoning, evaluation, inference, and analysis courses (35). Nasrabadi et al. (36),

reported a positive correlation between students' critical thinking and academic achievement. The role of critical thinking attitude in academic performance of students is of great importance, and due to the teachable nature of critical thinking, this importance is stressed. This can be due to the fact that people with a positive tendency towards critical thinking, due to their sense of truth-seeking, openness to criticism, systematic, critical self-confidence, maturity of judgment, inquisitiveness, and analyticity, can have better academic performance and, based on the results of the current study, clinical competence, because nurses should have the personality to make effective decisions in the clinical setting. Many research results show that critical thinking is a good predictor for students' academic performance (37-40).

According to the results of the current study, the highest score of tendency toward critical thinking belonged to

truth-seeking dimension, which was consistent with the results of the study by Abbasi et al. (41). Results of a study on 27 Norwegian nursing colleges showed that nearly 80% of newly graduated nurses had a positive tendency toward critical thinking. The highest and lowest means belonged to inquisitiveness and truth-seeking dimensions (42), which were not in line with the results of the current study. In the current study, the lowest score of tendency toward critical thinking belonged to analyticity dimension that could be due to the dominance of traditional teaching methods at the university, since these methods do not allow analytical expressions in students. Also, the results of the current study showed no significant relationship between the dimensions of critical thinking tendency in male and female nurses. In this regard, Ricketts and Rudd found a significant difference only in some dimensions of critical thinking tendency between the genders; therefore, female students got higher scores in mental openness than their male counterparts, and male students got higher scores in truth-seeking and cognitive maturity than their female counterparts (43). The contradictory results of studies show that in order to investigate the relationship between critical thinking tendency and gender, it is essential to qualitatively study various gender-associated aspects.

The results of the current study showed that the mean of critical thinking tendency in nurses was at positive level that was consistent with the findings of studies by Gharib et al. (44), Sabouri Kashani et al. (45), and Ojewole and Thompson (46) that studied the critical thinking tendency of nursing and other medical fields' students. Also, there was no significant difference in the mean score of tendency toward critical thinking between male and female nurses in the current study that was in agreement with the results of the studies by Ozdemir (47), Kawashima and Shiomi (48), Azar (49), Nazem Ghadi et al. (50), and Kolayış (51). In the current study, no significant relationship was observed between age and tendency toward critical thinking. There was no significant relationship between age and critical thinking in the studies by Shabouni et al. (52), and Khoda Moradi et al. (53), but this relationship was reported significant in the study by Noohi et al. (54), in which the contradictory results can be attributed to the differences in the age range of participants.

Based on the results of the current study, there was no significant difference in the tendency toward critical thinking between undergraduate and postgraduate nurses, which was consistent with the findings of Abbasi et al. (41). They concluded that the scores of tendency toward critical thinking, except for open mindedness dimension, did not have a significant difference in the two levels of education (41). These results indicated that postgraduate curriculum did not work to improve critical thinking,

as well as inference-making and analyzing ability. Most of the nurses in the current study were in a moderate level for the utilization of clinical competence, which was in line with the results of the study by Komeili Sani et al., in which the mean total score of clinical competence of nurses was at moderate level and reported good (55). Also, the utilization of clinical competence in female nurses was more than that of their male counterparts and in postgraduate nurses it was higher than those of undergraduate ones and the results can be attributed to the fact that in postgraduate nursing curricula less attention is paid to clinical education and nurses that continue to study, most of the times get away from clinical settings. There was no relationship between the educational level (nurse, head nurse, and supervisor), department, and work experience, and clinical competence, which was consistent with the findings of some studies (56). In the current study, nurses got the highest score in education and guidance dimension of the clinical competence questionnaire, which was consistent with the results of studies by Komeili Sani et al. (55), but inconsistent with the results of the study in Australia, in which nurses' competence in therapeutic interventions was higher than that of other dimensions (57), the controversy between the results of overseas and domestic studies could be due to the difference in educational methods that in some countries, in addition to theoretical education, the clinical training is also provided more successfully.

In the current study, there was no significant relationship between age and work experience, and clinical competence of nurses, which was consistent with the results of the study by Bahreini et al. (29), and even inconsistent with the results of some other studies (58, 59). The contradictory results in this regard suggested that further studies are needed on the causes of clinical competence growth cessation with the age and work experience increase in nurses, as it is expected that with the age increase and subsequently clinical experience, the clinical competence of nurses also increases.

Since the studies on critical thinking and their impacts on the clinical competence of nurses in Iran are very limited and the current study was conducted only on a small sample of nurses, and given the importance of the subject, it is suggested that further studies be conducted on larger populations and different clinical environments as well as the last year nursing students. It is necessary to consider the impact of providing practical strategies of critical thinking promotion on clinical competence increase through implementing interventional studies. The results of the current study indicated the necessity of designing suitable educational programs to strengthen critical thinking in nursing students and nurses working in hospitals. According to the results of the current study, which is a positive relationship between tendency toward critical

thinking and utilization of clinical competence in nurses, nursing practitioners can hold practical workshops on the development of critical thinking of clinical nurses as one of the important and practical strategies to improve nursing clinical competence, and finally, move on to the optimal care that is the ultimate goal of nursing.

### 5.1. Limitations

The main limitation of the current study was the difficulty of accessing participants and collecting data. In addition, the complexity of questions on the CCTDI from nurses' viewpoint, spending more time to complete the questionnaire, and the lack of collaboration in some nurses were the other limitations that led to dropouts.

### Supplementary Material

Supplementary material(s) is available [here](#) [To read supplementary materials, please refer to the journal website and open PDF/HTML].

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### Footnotes

**Conflict of Interests:** It is not declared by the authors.

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