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Original Research

# Critical thinking in nursing students and its relationship with professional self-concept and relevant factors

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**Abstract**

***Background:*** The proper levels of critical thinking (CT) and professional self-concept (PSC) both have key roles in the academic achievements of nursing students. The present study was conducted to examine a possible correlation between PSC and CT.

***Methods:*** This descriptive-correlational study was conducted on 154 eligible nursing students, selected through the stratified random sampling technique. For this purpose, two instruments were utilized: the Persian version of nurses' self-concept questionnaire and Ricketts' Critical Thinking Disposition Assessment Scale. Pearson's correlation coefficient was employed to analyze data using SPSS 16.

***Results:*** Although levels of CT vary in different semesters, the correlation coefficient between CT and PSC among nursing students was -0.46 ($P<0.001$). Therefore, there was a significant, inverse, moderate correlation between these two variables.

***Conclusion:*** The correlation between the total scores of PSC and CT was significant and negative, indicating increasing professional self-concept in students decreases their levels of CT. It seems that modern teaching methods based on problem-solving are less used in nursing students' education, which leads to greater development of CT. It is believed that other underlying factors may have contributed to the negative correlation between PSC and CT. Further studies in this regard are recommended.

## Introduction

Critical thinking (CT) is a complex concept which appreciably determines the success or failure of nursing students.[1] A variety of definitions have been proposed for this concept. For instance, according to Richard Paul, CT is a 'purposeful thinking paradigm' by which the thinker habitually establishes wise criteria and standards for thinking, directs the structure of thoughts based on these standards, and evaluates the effect and efficiency of thinking based on the goal, criteria, and standards.[2] Paryad et al hold that CT indicates a nurses' cognitive ability, especially the ability to process information and make decisions. It functions as a key part of nursing performance.[3] CT is an essential skill for nurses.[4] Nurses who exert CT in taking care of patients have effective cognitive skills of analysis, diagnosis, prediction, and prognosis.[5]

The concept of CT is complicated, and it might be the reason for the contradictory results reported by many studies conducted on CT and effective factors. Regarding the level of CT, some research findings have shown that, overall, the mean level of CT is low among nursing students.[6,7] Other findings indicate that sophomores, juniors, and seniors had lower levels of CT than freshmen,[8,9] while some studies have reported increased CT in higher academic semesters,[10,11] and other studies have found no significant correlation between the level of CT and the academic semester.[12,13]

Numerous studies have focused on identification of factors affecting and developing CT due to the importance of this concept. The most important factors affecting CT include demographic variables (e.g., sex, age, major,

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and education level), personality factors, metacognition skills, and cultural differences. Despite numerous studies on demographic variables affecting CT,[14-16] few studies have examined psychosocial variables such as professional self-concept (PSC), although PSC is a key factor affecting the success of nursing students.[17] PSC is defined by scholars as a person's recognition of his/her professional qualities, standards, and abilities as well as their acquisition and practice, which impacts his/her thinking, role improvement, behavior, and occupational performance.[18-21]

Improving PSC leads to the acceptance of challenges, increasing efforts, and overcoming difficult situations.[22] A high level of PSC in nurses leads to professional empowerment and success and increases efficient care, which then leads to job satisfaction in terms of personal health.[23] As a major and profession, nursing requires a high level of PSC.[24]

Given the importance of both CT and PSC in academic achievement, questions arise as to whether there is a correlation between these two concepts. Can one expect nursing students to have superior CT in facing clinical problems through developing PSC? Since little research has been conducted on the relationship between CT and PSC in nursing students, this study aims to examine CT and its relationship with PSC among nursing students.

## Materials and Methods

In this descriptive-correlational study, the research population included nursing students at the Faculty of Nursing and Midwifery at the Tabriz University of Medical Sciences, studying the 2nd through 8th semesters of their program.

Inclusion criteria were 2nd through 8th semesters and no history of psychological disorders (such as anxiety and depression) based on the participant's medication history or report.

Exclusion criteria were failure to complete the questionnaires and failure to pass the internships based on the clinical education program.

### *Sample size and sampling method*

Taking into account the first type of error of 5%, the test power of 80%, and the correlation coefficient of 0.25, we estimated a sample size of 124. Considering the probability of the response rate of 80%, the sample size increased to 154.

A random stratified sampling method was utilized in this study. Each semester was considered to be one stratum, and the research population was divided equally across seven semesters, since the number of students in each semester was relatively equal. A sample of 22 was selected for each semester, selected through visiting classes in which the majority of students were presented. As 22 students were to be selected from each class, the number of students in each class was divided by 22, and the questionnaires were distributed to every second or third student (in the order of sitting from the right-hand side).

### *Research tools*

The questionnaire consisted of three sections. In the first section, demographic characteristics (age, gender, etc.) were collected. The second section included the Persian version of the nurses' self-concept questionnaire (NSCQ), and the third section included the Ricketts' Critical Thinking Disposition Assessment (CTDA) Scale.

The Persian version of NSCQ: The nurses' self-concept questionnaire scale was developed by Cowin et al to appraise and evaluate PSC in nurses based on the hierarchical self-concept model. This scale consists of 36 items analyzing six dimensions: self-esteem, care, knowledge, staff relations, communication, and leadership. Scores range from 1 to 8, and the score of each subscale is determined by summing the scores of all items belonging to the subscale in question. To determine the total score of the scale, scores of all items are summed. The higher the total score, the higher the self-concept.[25] In Iran, Badiyepeymaie Jahromi et al confirmed the psychometric evaluation of this scale in nursing students. In their research, the Spearman-Brown correlation coefficient and Cronbach's alpha were 0.84 and 0.97, respectively. The inter-item reliability of the questionnaire subscales was also confirmed, with coefficients ranging from 0.41 to 0.75; all were significant.[26] Ricketts developed CTDA. It includes 33 items evaluating the level of inclination toward CT, scored on a 5-point Likert scale. Scores range from 1 to 5. To calculate the score of each subscale, the scores of all the items belonging to that subscale must be added and divided by the number of items.[27] The Persian version of the inventory was culturally and linguistically adapted by Pakmehr et al, who reported that the Cronbach's alpha values of the inventory and its three domains were 0.68, 0.72, 0.76, and 0.64, respectively.[28] This inventory has previously been used in Iran for CTD assessment among medical, nursing, and midwifery students.[29,30]

In this study, the reliability levels were measured using Cronbach's alpha, which equaled 0.83 and 0.80 for NSCQ and CTDA, respectively.

### *Data analysis*

The data were analyzed in SPSS 16. Quantitative data were reported as mean and standard deviation (SD). Pearson's correlation coefficient was utilized to analyze the correlation between PSC and CT scores. Moreover, multiple regression analysis was employed to analyze this correlation after adjustment for probable confounding variables (age, sex, etc.). For all tests, $P < 0.05$ was regarded as significant.

## Results

The mean age of participants was 21.98 ± 1.84 years, with

35.1% female and 64.9% male (Table 1). The mean score of PSC was 210.80 ± 37.41, and that of CT was 74.75 ± 13.94 (Table 2).

In this study, the mean score of CT was higher in men, and the mean score of PSC was higher in women. Regarding PSC, the highest mean score of women belonged to the domain of leadership (Table 3).

Pearson's correlation coefficient between CT and age was -0.093 ($P > 0.001$), indicating no significant correlation between them (Table 4). Moreover, the mean score of CT varied across semesters, showing no significant difference between the 2nd and 8th semesters (Figure 1).

Using a linear regression model for determining factors related to CT, variables of sex ($P = 0.003$), marital status ($P = 0.05$), ethnicity ($P = 0.003$), and the PSCS score ($P < 0.001$) significantly affected CT (Table 5). Women had a lower CT by 6.32 (95% CI, -2.18 and -10.46), and single students had a lower CT by 6.38 (95% CI, 0.11 and -12.58).

**Table 1.** Participants' characteristics

| Quantitative variables | Mean | SD |
|---|---|---|
| Age | 21.98 | 1.84 |
| Academic Average | 16.45 | 1.34 |
| **Qualitative variables** | **n** | **%** |
| Sex | | |
| Male | 100 | 64.9 |
| Female | 54 | 35.1 |
| Marital status | | |
| Single | 137 | 89.5 |
| Married | 16 | 10.5 |
| Habitation | | |
| Native | 77 | 50.3 |
| Non-native | 76 | 49.7 |
| Academic semester | | |
| Two | 22 | 14.3 |
| Three | 22 | 14.3 |
| Four | 22 | 14.3 |
| Five | 22 | 14.3 |
| Six | 22 | 14.3 |
| Seven | 22 | 14.3 |
| Eight | 22 | 14.3 |

## Discussion

In the present study, CT scores were moderate and fluctuated among students of different semesters, and no significant difference was observed in CT scores between freshmen and seniors. The lowest CT score was seen in the 3rd semester and the highest was seen in the 7th semester. In a study conducted in Ireland in 2018, CT scores of nursing freshmen were higher than those of juniors.[31] Similar results were reported in studies of nursing students in Hong Kong and Jordan.[32,33] However, the results of the current study are inconsistent with those of the studies with nursing students in Canada and Australia.[33,34] In a study conducted in Canada, CT scores were highest among seniors.[21] A 2008 study of nursing students in Iran found no significant difference between freshmen and seniors in CT.[32] With observation of a possible decrease in CT in higher semesters may be explained by modern teaching methods based on problem-solving are less used in nursing students' education, which leads to an increase of CT in students and enhances their learning. This may indicate that teaching methods must be re-examined to achieve better learning.[9]

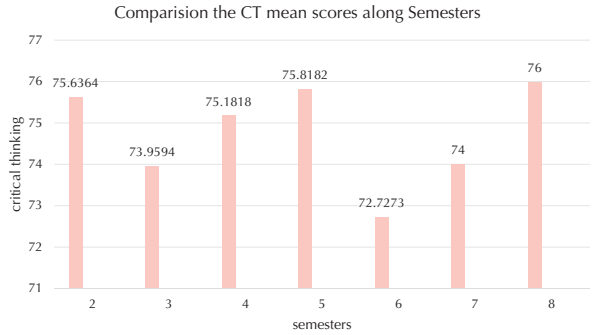


**Figure 1.** Comparing the CT mean scores along Semesters .

According to the research, a negative correlation has been observed between academic grades and CT. This finding is inconsistent with that of the study by Khodamoradi et al, reporting that students with grades equal to or above 17 also had the highest levels of CT.[35]

As already noted, CT had a negative correlation with age and grade. In other words, CT decreases as age or grade increases. According to studies by Stupnisky et al,[36] academic education does not affect academic CT. According to Rezaian et al, these results may be explained by taking into account the time allocated and effort made by students with higher grades in memorizing more difficult nursing lessons.[30] A 2016 study in California found no significant correlation between CT and learning outcomes (academic achievement).[37]

According to the results of the present study, the correlation between the total scores of PSC and CT was significant and negative, indicating that increasing PSC in students decreases their levels of CT. It is believed that other underlying factors may contribute to the negative correlation between PSC and CT. In a 2018 review study, the qualities of an educator and underlying factors such

**Table 2.** Mean distribution of main variables among nursing students

| Variable | Number | Mean and SD | CI | |
|---|---|---|---|---|
| | | | Min score | Max score |
| Total score of PSC | 154 | 210.80 ±37.41 | 87.00 | 278.00 |
| Total score of CT | 154 | 74.75 ±13.94 | 46.00 | 107.00 |

**Table 3.** The mean scores of PSC and CT among both sex

| Variables | | n | Mean ± SD |
|---|---|---|---|
| PSC | Women | 54 | 214.98 ± 36.77 |
| | Men | 100 | 208.55 ± 37.73 |
| CT | Women | 54 | 71.16 ± 13.88 |
| | Men | 100 | 76.70 ± 13.64 |

as heavy teaching workload and lack of support from leaders were regarded as obstacles to CT.[38] However, based on the negative correlation between grades and PSC, we hypothesize that modern teaching methods based on problem-solving, which leads to the development of CT and better learning in the student, are less likely to be used in nursing students' education in clinical education and classroom. It is believed that other underlying factors may also contribute to the negative correlation between PSC and CT. The implementation of further studies in this regard is recommended.

Our study has some strengths and limitations. The principal strength is including sufficient sample size. In this research, the sample group was selected only from undergraduate nursing students at the Tabriz University of Medical Sciences; thus the results could only be generalized within this geographical range and population. Additionally, a self-report method was used to measure the variables: participants may have concealed their actual feelings in filling out the questionnaires. Nevertheless, as they were informed that their answers would remain confidential, would not affect evaluations in any way, and would be used solely for research purposes, this issue was controlled to some extent. It is recommended that future studies focus on modeling while considering all possible effective variables to strengthen the proposed hypothesis.

**Table 4.** Pearson's correlation coefficients of the correlations of PSC and CT with Grade and Age

| Variable | Total PSC score | | Total CT score | |
|---|---|---|---|---|
| | r | *P* value | r | *P* value |
| Age | 0.087 | 0.282 | -0.93 | 0.25 |

## Conclusion

The correlation between the total scores of PSC and CT is significant and negative, indicating that increasing PSC in students decreases their CT levels. It seems that modern teaching methods based on problem-solving, which leads to the development of CT and better learning in the student, are less used in nursing students' education. In addition, other underlying factors may have contributed to the negative correlation between PSC and CT. The implementation of further studies in this regard is recommended.

### Ethical approval

The study protocol was reviewed and approved by the Human Research Ethics Committees (IR.TBZMED.REC.1396.122) of the Tabriz University of Medical Sciences. All questionnaires were anonymous. Before completing the questionnaires, the study objectives were explained to the participants, and they were informed that participation in the study was voluntary. All participants signed written informed consent for participation.

### Competing interests

We had no conflicts of interest in this study.

### Authors' contributions

Data collection and writing the primary form of manuscript was done by AB and data were analyzed by PS. KP (first supervisor) supervised all steps, FJT (second supervisor) supervised writing of the manuscript and final confirmation of this article. BS and AA critically reviewed the manuscript.

**Table 5.** Regression table for factors affecting CT

| Tests of Between-Subjects Effects | | | | | | |
|---|---|---|---|---|---|---|
| Source | Type III sum of squares | df | Mean square | F | Sig. | Total |
| Sex | 1128.603 | 1 | 1128.603 | 9.109 | 0.003 | -6.326 |
| Marriage | 467.901 | 1 | 467.901 | 3.776 | 0.054 | -6.383 |
| Residence | 110.324 | 1 | 110.324 | 0.890 | 0.347 | 1.972 |
| Age | 99.154 | 1 | 99.154 | 0.800 | 0.373 | -0.466 |
| Average | 19.820 | 1 | 19.820 | 0.160 | 0.690 | -0.284 |
| Cowin total | 2367.016 | 1 | 2367.016 | 19.104 | 0.000 | -0.115 |

Note: R squared = 0.384 (adjusted R squared = 0.340).

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