

# Study on Knowledge of Intravenous Injection, Self-confidence, Competence and Critical Thinking Disposition in Nursing Student

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## Abstract

*This study explored the convergence relationship between intravenous catheter knowledge, self-confidence, competence, and critical thinking disposition in nursing students. The study follows a descriptive, cross-sectional design, and the participants were 158 nursing students. Data were collected using self-report questionnaires and practice evaluation. There was a significantly positive correlation between self-confidence and competence. Also, critical thinking disposition is correlated with self-confidence. Conclusion: To improve nursing students' nursing practice of intravenous catheters, it is necessary to develop an education program to enhance their self-confidence, competence, and critical thinking disposition.*

**Keywords:** Nursing student, Intravenous catheter, Knowledge, Self-confidence, Competence, Critical thinking disposition

## 1. Introduction

Intravenous injection is the best measure to expect exact and quick effects during an emergency, acute care, and transfusion [1]. Since it is implemented for more than 80% of inpatient [2] and invasive procedures, it is one of the greatest fears for the patient. Also, as diverse complications are caused for the patient, such as phlebitis, infiltration, infection related to catheter insertion, etc., if the intravenous injection is not performed correctly, it is essential to educate the correct intravenous injection method the nursing student [3]

Recently, the medical dispute related to intravenous injection has increased, and the legal responsibility of the nurse is increased in intravenous injection management. So, in the nursing students' curriculum, it is necessary to determine the measures to improve intravenous injection competence to enhance the safety and well-being of the patient.

The curriculum of the nursing department on intravenous injection provides for the practice of intravenous infusion through the essential nursing practice in the school and for the observation or performance of intravenous injection personally through the clinical practice education of junior and senior years [4]. However, since clinical practice education is inclined toward simple nursing activity, as the patient's rights and safety are emphasized,

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### Article history:

Received (July 28, 2019), Review Result (August 30, 2019), Accepted (October 6, 2019)

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more than 70% of nursing students observe intravenous injections [5]. Then, nursing students experience limitations in applying what they have learned to the clinical site [6], which may result in the degradation of self-confidence in intravenous injection performance. Since the nursing student's self-confidence related to the practice may have diverse influences on the practice satisfaction, interest, competence, etc [7], the change in the curriculum is required to enhance the self-confidence related to intravenous injection in the nursing student.

In the meantime, the critical thinking disposition refers to the motive and attitude to try to think critically, placing importance on the critical thinking disposition [8]. The higher the critical thinking disposition of nursing students, the more their nursing competence can be enhanced [5]. However, in the research related to the intravenous injection of nursing students, there is a lot of research knowledge on intravenous injection, self-confidence, and competence. Still, there needs to be research on these variables and the critical thinking disposition.

Therefore, this study was intended to provide the essential data to establish the strategy for the efficient application of the intravenous injection education method for the nursing student by identifying the relations between the knowledge of the intravenous injection, self-confidence, and competence of the nursing student.

## **2. Methods**

### **2.1. Study design**

This study is a descriptive study performed to verify the degree of knowledge on intravenous injection, self-confidence, competence, and critical thinking disposition in nursing students and to find their relationships.

### **2.2. Research subject**

The subjects of this study were 158 nursing students who, as nursing students at a university located in K Province, had heard the explanation of the purpose and process of the research in advance and agreed voluntarily to participate in the study.

### **2.3. Measurements**

#### **2.3.1. knowledge of intravenous injection**

To measure the knowledge of intravenous injection, the researchers developed 20 questions based on the Evidence-based Practice Guidelines for Intravenous Injection Therapy by the Hospital Nurses Association. Their content validity was verified through the consultation of 2 professors in basic nursing and three clinical experts. The correct answer for each question was processed with 1 point, and the wrong answer was 0 points. The score range was 0 to 20 points; the higher the score, the higher the knowledge. The reliability of this study was KR (Kuder-Richardson) -20 = .91.

#### **2.3.2. Self-confidence on intravenous injection**

The self-confidence in the intravenous injection was measured using the questionnaire to measure the self-confidence on the intravenous infusion designed by Eugun et al. [9]. The measurement tool of self-confidence on the intravenous injection was five questions, measured with a 5-point Likert scale, and the higher the score, the higher the self-confidence.

Cronbach's alpha at the time of developing the instrument was .88, and in this study, it was .92.

### **2.3.3. Intravenous injection competence**

To measure intravenous injection competence, out of the Core Fundamental Nursing Skills of the Accreditation Board of Nursing Education [10], 29 questions in the intravenous injection checklist were used, evaluating the non-performance as 0 points and performance as 1 point based on the theoretical evidence of the Basic Nursing Practice Textbook [11]. In this study, KR (Kuder-Richardson) -20 was .90.

### **2.3.4. Critical thinking disposition**

The measuring instrument of critical thinking disposition developed by Yoon [8] was used for the critical thinking disposition. This tool has a total of 27 questions composed of 7 sub-categories of sound skepticism, intellectual fairness, objectivity, system, prudence, intellectual passion/curiosity, and self-confidence. Each question was measured with a 5-point Likert scale from 1 point (Not at all) to 5 points (Absolutely right). The higher the score, the higher the critical thinking disposition, and for the instrument's reliability, Cronbach's alpha in the research by Yoon [8] was .89, and in this study, it was .95.

## **2.4. Data collection**

The data was collected from November 28, 2016, to December 16, the intravenous injection skill practice period after the theoretical class on intravenous injection.

## **2.5. Data analysis**

The collected data was analyzed using SPSS 20.0. Descriptive statistics were performed for the general characteristics of the subject, and the difference in the dependent variables according to the general characteristics was analyzed with a t-test and one-way ANOVA. The Scheffé test was used for the post hoc analysis. In addition, Pearson's correlation analysis was performed to determine the relations between knowledge, self-confidence, competence of the intravenous injection, and critical thinking disposition.

## **2.6. Ethical considerations**

This researcher explained the purpose of this study and that the collected data is encoded anonymously by computer and will not be used other than for research purposes. After explaining that participating in the study is voluntary, the data collection started.

# **3. Results**

## **3.1. General characteristics of the subject**

The subjects who participated in this study were primarily female (87.7%). In the previous semester's grades, 3.5 to 4.0 was 57 (37.0%), and 3.0 to 3.5 was 48 (31.2%). Of the students who were satisfied with the essential nursing practice, 110 (71.4%) occupied the majority. Students need to be interested in the practice. In addition, those who showed an active attitude toward the practice were 95 (61.7%).

### **3.2. Subject's knowledge, self-confidence, competence of intravenous injection, and critical thinking disposition**

The subject's average knowledge score on the intravenous injection was 10.16 points, and the average score of self-confidence on it was 23.56 points. The average score of the subject's intravenous injection competence was 26.56 points, and the average score of the subject's critical thinking disposition was 101.62.

### **3.3. Difference in subject's knowledge, self-confidence, competence of intravenous injection, and critical thinking disposition**

The self-confidence of the intravenous injection showed a significant difference in satisfaction with practice ( $F=9.78$ ,  $p<.001$ ), interest in practice ( $t=17.43$ ,  $p<.001$ ), attitude toward the practice ( $F=10.66$ ,  $p<.001$ ). The critical thinking disposition showed a significant difference in satisfaction with practice ( $F=6.43$ ,  $p=.002$ ), interest in practice ( $t=14.77$ ,  $p<.001$ ), and attitude toward the practice ( $F=8.83$ ,  $p<.001$ ).

### **3.4. Relations among knowledge, self-confidence, the competence of intravenous injection, and critical thinking disposition**

The self-confidence in intravenous injection showed a strong positive correlation with competence ( $r= .70$ ,  $p<.001$ ). In addition, the relationship between critical thinking disposition and self-confidence showed a weak positive correlation ( $r= .17$ ,  $p<.05$ ).

## **4. Discussion**

This study was performed to identify the degree of knowledge, self-confidence, competence of the intravenous injection, and the critical thinking disposition in the nursing student, as well as the relation among them.

First, in this study, self-confidence in intravenous injection was significant with satisfaction with the practice, interest in the practice, and attitude toward the practice, which is similar to the prior research results performed with the nursing students showing that there is a correlation between the self-confidence and the satisfaction with the practice when conducting the clinical practice [7].

Since, as invasive nursing, the intravenous injection has a higher risk of failure and is likely to cause patient safety problems, the intravenous injection skills are educated mainly utilizing the practice model. This would drop the self-confidence for the intravenous injection and reduce the interest related to intravenous injection skills. Therefore, to maintain the interest continuously in intravenous injections among nursing students and to enhance satisfaction with practice through a positive attitude, the changing curriculum.

The self-confidence of the intravenous injection showed a strong positive correlation with competence. The comparative analysis is complex since there has yet to be prior research on the relationship between self-confidence and competence performed by nursing students. However, the preceding study [12] that showed a significant difference in the success of intravenous injection according to self-confidence after educating the simulation-based intravenous injection would indirectly support this study's results. In addition, after learning the knowledge and skill of intravenous infusion and applying the program to the nursing student, the knowledge, self-confidence, and comfort related to the intravenous injection were increased[2][6].

Also, the critical thinking disposition showed significant satisfaction with the practice, interest in the practice, and attitude toward the practice, which is similar to the research by Yoon [12] showing that the critical thinking disposition on patient safety has significant relations with the satisfaction and attitude toward the practice. Self-confidence regarding the intravenous injection was shown to have a substantial correlation with critical thinking disposition. A comparative analysis is complex since no research exists on the relationship between self-confidence for fundamental nursing skills and critical thinking disposition. However, according to a prior study [13], self-confidence in ethical decision-making can enhance the critical thinking disposition; as a student can find and solve problems by themselves through intravenous injection skills and judge more prudently, their critical thinking disposition is enhanced, and their self-confidence could be enhanced.

Through the above results, the knowledge and the clinical application should be integrated, matching the step with the expectation of patients and the medical environment being changed, and to produce the nurses with ability, combining the knowledge and the technique through the practice education considering the safety of the patient and developing the critical thinking disposition in the nursing student are essential.

## 5. Conclusion

This study attempted to identify the correlation between knowledge, self-confidence, competence in intravenous injection skills, and critical thinking disposition in nursing students. In the results of the study, the self-confidence for the intravenous injection and the critical thinking disposition in the subject having high satisfaction with the practice and interest in the practice were shown high, and the positive correlation among the self-confidence, the competence of intravenous injection, and the critical thinking disposition was shown. This study has limitations in generalizing its results as the subjects were limited to nursing students in one university. The research is required to verify the knowledge, self-confidence, competence of the intravenous injection, the critical thinking disposition, and the degree of change in the nursing student.

## Acknowledgments

The authors thank the nursing students who participated in this study.

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