



# Clinical Decision-Making and Self-efficacy Skills in Anesthesiology Nursing Students: A Cross-Sectional Study

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## Abstract

**Background:** Clinical decision-making and self-efficacy are essential parts of nurses' professional work, which includes information analysis, and proper implementation of decisions in the clinical field.

**Objectives:** The present study investigated the perspectives of anesthesia nursing students on clinical decision-making and clinical self-efficacy skills.

**Methods:** This cross-sectional study was done on 70 undergraduate anesthesia nursing students at Jundishapur University of Medical Sciences in Ahvaz, Iran, in 2021, who were recruited through the census method. The required data were collected using a questionnaire containing demographics, clinical decision-making, and self-efficacy in clinical performance. The collected data were analyzed in SPSS 16 using the chi-square test, Mann-Whitney U test, and Kruskal Wallis test at a statistical significance of 0.05.

**Results:** Mean age of students was  $21.70 \pm 1.06$  years. The median score of all students' perceptions of clinical decision-making was  $66.5 \pm 6$ . Moreover, 60% of the students had a weak perception of clinical decision-making (systematic analytical). The median clinical self-efficacy score of all students was  $87.50 \pm 22$ . Also, 51.4% of the students had a moderate level of clinical self-efficacy.

**Conclusions:** There is insufficient perception of clinical decision-making and clinical self-efficacy among anesthesia nursing students at Jundishapur University of Medical Sciences in Ahvaz. Therefore, it is recommended to pay more attention to the curricula and educational programs in order to promote students' perceptions.

**Keywords:** Anesthetic, Nursing Education, Students, Clinical Decision-making, Self-efficacy, Skills

## 1. Background

In nursing education, self-efficacy is particularly important because it is considered an influential factor in correlating students' knowledge and attitudes, considering their ability to communicate, provide information and support, and manage situations (1). Self-efficacy regulates students' performance by increasing their effort, endurance, and self-correction. Increasing clinical self-efficacy helps improve students' clinical performance, and its negligence will undoubtedly reduce the quality of trained human resources in the nursing profession (2).

Also, clinical decision-making is an essential part of nurses' professional work, which includes information analysis, decision-making, and proper implementation of

these decisions in the clinical field (3). The decision must be made when there are several options, or it is practically possible to do so; therefore, various programs should be evaluated, and appropriate decisions should be made in a particular situation (4). Nurses' decisions consequently affect patients' care, safety, and recovery outcomes (5).

Anesthesia nurses working in the operating room are in direct contact with the patient from when the patient enters the operating room until leaving it. Anesthesia nurses offer a wide range of clinical care, including the preoperative evaluation and intraoperative care, as well as many aspects of postoperative care (6). Anesthesia nurses provide anesthesia equipment appropriate to the patient's condition and surgery (equipment for airway management, induction of anesthesia, monitoring, and positioning), reduce the patient's stress and anxiety

before anesthesia induction, perform intravenous administration, assist anesthesiologists in the induction of anesthesia and analgesia, care for the patient's vital signs during surgery, help in awakening the patient from anesthesia at the end of a surgical procedure and transferring the patient safely to Post-anesthesia Care Unit (PACU), report special intraoperative events to PACU personnel, and provide the necessary care in the PACU (7).

Despite increasing attention to clinical decision-making in the nursing curriculum, no effective educational intervention has been provided to improve nurses' clinical decision-making skills (8). On the other hand, although it is mandatory to observe the patient's safety measures in all parts of the hospital, the possibility of making errors and unwanted events is maximized in intensive care units, like the operating room, which requires serious attention. In such an environment, clinical decision-making ability and self-efficacy affect the quality of care more than any other factor (9).

## 2. Objectives

Moreover, undergraduate anesthesiology nursing is one of the new programs in medical education, and despite the increased courses, especially practical ones, the necessary infrastructure has not yet been designed to implement all relevant educational objectives and identify barriers and problems. Additionally, there are few related studies available on anesthesia nurses. Hence, the present study aimed to determine the perspectives of anesthesia nursing students at Ahvaz Jundishapur University of Medical Sciences toward clinical decision-making and clinical self-efficacy.

## 3. Methods

### 3.1. Study Design

The current cross-sectional study was conducted on undergraduate anesthesia nursing students at Ahvaz Jundishapur University of Medical Sciences in 2021. Inclusion criteria were studying at the university, willingness to participate in the study, and signing an informed consent form.

### 3.2. Sample and Setting

According to the type of variables studied (clinical decision-making and self-efficacy), we should have selected students experienced in the operating room environment and sufficient knowledge of clinical settings.

Therefore, considering the ethical considerations, only the junior and senior students were included, as they had passed at least one subject of their practical training course and were familiar with the clinical setting. Hence, overall 70 anesthesia nursing students were selected using the census method.

### 3.3. Ethical Considerations

The present study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran (IR.AJUMS.REC.1400.387). A trained research assistant explained the research objectives to the included students and provided them with instructions on completing the questionnaire. The participants were free to withdraw from the study without their rights or interests being violated. After obtaining written informed consent from the participants, they completed the questionnaires in person. Finally, the research assistant collected the completed questionnaires.

### 3.4. Data Collection

A three-part questionnaire was used to collect the required data in this study. The first part included the demographic data, including age, sex (male/female), academic year (third-year/fourth-year), academic performance, satisfaction with anesthesia nursing major (satisfied/moderate/dissatisfied), and satisfaction with the practical training courses. Students' academic performance total scores classified them in the good (scores 17 - 20), moderate (scores 14 - 17), and weak (scores < 14) levels.

The second part included the standard clinical decision-making (CDM) questionnaire (Lauri & Salanterä) (10). This questionnaire, which measures students' clinical decision-making perception, has 24 items scored on a five-point Likert scale (from 5 = Always to 1 = Never). It is the short form of the original 56-item questionnaire. Even-numbered items represent decisions in unstable situations or situations with available short time, such as "I consider possible nursing diagnoses on first contact with the patient." Odd-numbered items represent decisions in structured tasks or situations with sufficient time to search or manage information or plan the required actions; for example, "Based on my previous information, I determine the questions I should ask the patient." The possible score range is from 24 to 120, and a score below 67 indicates systematic analytical decision-making; a score between 68 and 78 indicates the second decision-making level, intuitive analytical; and a score above 78 indicates the third

clinical decision-making level, intuitive-interpretive. The time required to answer this questionnaire is about 10 to 15 minutes. Analytical and intuitive decision-making is on both sides of the decision level. Correspondingly, intuitive analytical decision-making involves connecting previous learning and current perceptions of a clinical condition and relying on senses and perceived information from multiple past and present sources. A systematic analytical process, on the other hand, is a linear method used for deciding on solving a problem. In the analytical process, individuals may ignore their personal beliefs and values when making decisions. Intuitive-interpretive decision-making is a combination of these two types. A study by Szalai and Shahrokhi confirmed the validity and reliability of this instrument (11, 12), and it showed the desired internal reliability (Cronbach's alpha = 0.85).

The third part included a self-efficacy in clinical performance scale (SECP) designed in Iran by Cheraghi et al., consisting of 37 items on the nursing process in the following four domains: "assessment" (12 items), "diagnosis and planning" (9 items), "implementation" (10 items), and "evaluation" (6 items) scored on a five-point Likert scale from one (no confidence) to five (complete confidence). The total score range is from 37 to 185. The content validity and the face validity of the scale were examined by twenty nursing specialists from nursing faculties. A CVI on relevancy of dimensions to concepts indicated a high degree of agreement among experts (0.98; mean = 0.89, SD = 1.9). The dimensions' Cronbach's alpha varied from 0.90 to 0.92, while the entire scale's internal reliability was  $\alpha = 0.96$ . A 2-week gap between tests resulted in a test-retest reliability of  $r = 0.94$  (13). In a study by Bahador et al., the concurrent validity of the clinical self-efficacy instrument was found to be appropriate ( $r = 0.73$ ,  $P < 0.01$ ), and its Cronbach's alpha coefficient was calculated to be  $\alpha = 0.97$  (14). In a study by Salimi et al., the internal consistency method was used to assess the instrument's reliability as 0.83 (15). In the present study, Cronbach's alpha reliability of the instrument was obtained as 0.89, which indicates acceptable reliability.

### 3.5. Data Analysis

Descriptive statistics of median and intra quartile range (IQR) described the scores related to each aspect of SECP and CDM. A Mann-Whitney U test or Kruskal Wallis test was used to investigate the associations among demographic variables, median CDM scores, and median SECP scores. The chi-square test was also used to assess the association between demographic variables and CDM

levels. The data were analyzed using SPSS ver. 16 software. Significance level considered P-value less than 0.05.

## 4. Results

The mean  $\pm$  SD age of the students was  $21.70 \pm 1.06$  years old, and the age range was from 20 to 24. There were 36 (51.43%) and 34 (48.57%) senior and junior students, respectively. The majority of the participants (80%) were female. All the students (100%) pointed to the necessity of education in clinical self-efficacy and clinical decision-making. Besides, 33 (47.14%) students were satisfied with the field of anesthesia nursing, and 60% were satisfied with the practical training courses. Moreover, 47.14% of the students had a moderate academic performance. The median scores of the students' SECP and CDM by demographic variables are reported in Table 1.

The median  $\pm$  IQR score of students' perceptions of CDM was  $66.50 \pm 6$  (range = 56 - 77). Also, 60% of the students had systematic analytical decision-making, 40% had intuitive-analytical decision-making, and none had intuitive-interpretive decision-making. Table 1 shows the association between demographic variables and CDM score. The results showed a significant correlation among perceived CDM, sex ( $P = 0.021$ ), and satisfaction with clinical training sessions ( $P = 0.046$ ), but no significant correlation was found between other demographic variables ( $P > 0.05$ ). The students who were satisfied with the clinical training sessions had a higher median CDM score than others ( $67.50 \pm 6.25$ ). In addition, CDM's median  $\pm$  IQR score was higher in men than in women ( $69.50 \pm 8.50$ ).

The median  $\pm$  IQR score of SECP was  $87.50 \pm 22$  (range of 52 to 131). A total of 48.6% of the students had low SECP scores, and 51.4% had moderate SECP. The median scores in each of the instrument subscales were also calculated, and accordingly, SECP was lower in the fourth dimension (evaluation) than in other subscales ( $14 \pm 6.25$ ), and the highest SECP score was related to the first dimension (assessment) ( $27.50 \pm 11.25$ ). The second (diagnosis and planning) and third (implementation) dimension scores were  $21 \pm 8.25$  and  $23 \pm 7$ , respectively. Besides, the association between students' demographic variables and SECP was measured, showing no statistically significant correlation ( $P > 0.05$ ) (Table 1).

Table 2 shows the correlation between demographic variables by CDM levels based on descriptive statistics. The chi-square test showed a significant correlation between satisfaction with clinical training sessions and CDM levels

**Table 1.** Frequency of Participants and Comparison of CDM and SECP Median Scores of the Participants in Terms of Demographic Characteristics

Variables/Categories	No. (%)	CDM, Median $\pm$ IQR	P-Value	SECP, Median $\pm$ IQR	P-Value
<b>Academic year</b>			Z = -0.389, P = 0.697		Z = -1.105, P = 0.269
Fourth-year	36 (51.4)	66.50 $\pm$ 6.75		92 $\pm$ 24.25	
Third-year	34 (48.6)	66.50 $\pm$ 6		84 $\pm$ 22	
<b>Gender</b>			Z = -2.312, P = 0.021		Z = -0.411, P = 0.681
Male	14 (20)	69.50 $\pm$ 8.50		83 $\pm$ 35	
Female	56 (80)	66 $\pm$ 5.75		88 $\pm$ 20.50	
<b>Academic performance</b>			$\chi^2 = 3.999$ , P = 0.135		$\chi^2 = 2.071$ , P = 0.355
Good	18 (25.7)	68 $\pm$ 4.50		87 $\pm$ 21.50	
Moderate	33 (47.1)	66 $\pm$ 7		80 $\pm$ 29.50	
Weak	19 (27.1)	67 $\pm$ 6		93 $\pm$ 15	
<b>Satisfaction with nursing: Anesthesia</b>			$\chi^2 = 2.232$ , P = 0.328		$\chi^2 = 1.150$ , P = 0.563
Satisfied	33 (47.1)	67 $\pm$ 6.50		89.00 $\pm$ 24.50	
Moderate	26 (37.1)	66.50 $\pm$ 6		84.00 $\pm$ 25.75	
Dissatisfied	11 (15.7)	66 $\pm$ 8		88 $\pm$ 21	
<b>Satisfaction with clinical: Training</b>			$\chi^2 = 6.171$ , P = 0.046		$\chi^2 = 0.078$ , P = 0.962
Satisfied	42 (60)	67.50 $\pm$ 6.25		87 $\pm$ 26.25	
Moderate	18 (25.7)	65.50 $\pm$ 6.50		90 $\pm$ 26.50	
Dissatisfied	10 (14.3)	65 $\pm$ 5.50		85.50 $\pm$ 17.50	

(P = 0.015). In other words, 75% of the students who reached the intuitive level had satisfaction with the clinical training courses. However, there was no significant correlation between other demographic variables and levels of the students' responses to CDM (P > 0.05).

## 5. Discussion

The present study showed that the median  $\pm$  IQR score of CDM was 66.50  $\pm$  6, indicating the students' low perception of clinical decision-making, which is consistent with the results of the other studies. Karimi Noghondar et al. reported the CDM score of senior nursing students as 68.05  $\pm$  4.46. A total of 40% of the subjects had the systematic-analytical decision-making level with a score of 63.64  $\pm$  1.86, 60% had the intuitive-analytical decision-making level with a score of 70  $\pm$  2.98, and none had reached the intuitive-interpretive decision-making (16). Szalai et al. also investigated the CDM of senior medical students and found that most of them used analytical approaches when making decisions. Some students showed intuitive levels in clinical situations (12).

In Masoudi and Alavi's study, the score of CDM in nurses was 67.18  $\pm$  8.15, showing the second level of Lauri CDM (intuitive-analytical) (17). Moreover, Khanmoradi et

al. stated that the CDM score of emergency nurses was at the intuitive level, indicating their moderate responses to daily events, which may be due to the lack of effort to improve these skills when planning for and educating students (18). Nibbelink et al. stated that low levels of nursing CDM skills require some efforts to improve these skills through planning for student education and continuing their education programs (19).

Considering the importance of clinical learning by anesthesia nursing students and their critical profession in mastering essential and complex tasks and procedures, it is vital to pay more attention to effective learning methods and valid and reliable evaluations. Lee et al. showed that among non-technical skills, decision-making was the least frequent practice in the educational rotation of anesthesia nursing students (20). The present study's results highlight that anesthesia nursing students had moderate to low CDM, and the majority (60%) used a predominantly systematic analytical approach.

Although paying attention to non-technical training such as clinical decision-making and clinical self-efficacy in preoperative environments has been increasing, its acceptance in formal education is still lagging behind (21, 22). In previous research, Phillips et al. stated that preparing nursing students for CDM is an integral part of

**Table 2.** Frequency Distribution of Participant's Demographic Characteristics in Terms of CDM Levels

Variables/Categories	CDM, No. (%)		$\chi^2$	P-Value
	Systematic-analytical	Intuitive-analytical		
<b>Academic year</b>			0.038	0.845
Fourth-year	22 (52.4)	14 (50)		
Third-year	20 (47.6)	14 (50)		
<b>Gender</b>			2.143	0.143
Male	6 (14.3)	8 (28.6)		
Female	36 (85.7)	20 (71.4)		
<b>Academic performance</b>			2.558	0.278
Good	8 (19.1)	10 (35.7)		
Moderate	21 (50)	12 (42.9)		
Weak	13 (30.9)	6 (21.4)		
<b>Satisfaction with nursing: Anesthesia</b>			0.167	0.920
Satisfied	19 (45.2)	14 (50)		
Moderate	16 (38.1)	10 (35.7)		
Dissatisfied	7 (16.7)	4 (14.3)		
<b>Satisfaction with clinical: Training</b>			8.426	0.015
Satisfied	21 (50)	21 (75)		
Moderate	11 (26.2)	17 (25)		
Dissatisfied	10 (23.8)	0		

their nursing education (23).

The results also showed a significant association between CDM, sex, and satisfaction with the clinical training sessions, which is consistent with the study by Ravanipour (24). The average CDM scores were higher in male students than in female students, which may be due to the unequal number of male and female students in the study population. Moreover, the average CDM score was higher in the students who were satisfied with the clinical training courses, which indicates the importance of clinical education and students' familiarity with the clinical environment. Masoudi and Alavi found no significant difference between the CDM score and sex ( $P = 0.834$ ). They also stated that sex could not be considered a good factor for measuring CDM skills (17). Additionally, Alizadeh et al. observed no significant relationship between demographic variables and the mean CDM score in nurses (25), which is not consistent with the results of the present study.

The results showed that the highest SECP scores belonged to the assessment domain. Therefore, it can be stated that students had more belief in their initial assessment skill and had less faith in their ability in other

areas, especially in diagnosis and evaluation, which is similar to the study by Bahador et al. and Salimi et al. (14, 15). However, in another study, the highest SECP score belonged to the implementation area (24). Different educational approaches and teaching methods in other faculties may be the reason for this difference.

Motahari et al. reported that 98% of senior nursing students had high and moderate SECP scores. They showed that the highest score belonged to the implementation area, and the lowest was related to diagnosis and planning (26). Other studies also showed a high SECP of nursing students (27, 28), which is not consistent with the results of the present study. Considering that several factors could affect the SECP of nursing students, it can be stated that obtaining different results on the SECP in different studies is acceptable.

One of the limitations of the present study was the small sample size. Performing the study at only one university can also impede generalizability. Another limitation was the use of a self-report questionnaire. It is suggested to perform multi-center studies with a larger sample size consisting of students from different disciplines.

### 5.1. Conclusions

Most anesthesia nursing students had a low perception of clinical decision-making, which indicates the need to develop appropriate training programs. Since the syllabus is the primary source of information for students during their study period, it is suggested to pay more attention to the curricula and educational content of anesthesia nursing students to promote self-efficacy and clinical decision-making skills. Hence, the results of the current study can be a basis for conducting appropriate training courses.

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### Footnotes

**Authors' Contribution:** MA: Conceptualization, methodology, supervision, VS: Investigation, visualization, KAA: Formal analysis, and MF: Writing - original draft, writing - review & editing. All authors have seen and approved the final, submitted version of this manuscript.

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