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The role of reflective capacity in clinical self-efficacy of nursing students: a cross-sectional study

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Abstract

Background The ability of nursing students to reflect may change their thinking and potentially impact their clinical self-efficacy. This study aims to determine the role of reflective capacity in the clinical self-efficacy of nursing students.

Methods This cross-sectional study was conducted on nursing students at Yazd Branch, Islamic Azad University/Iran, in 2024. A total of 199 nursing students were selected through a census method. To collect data, the demographic information form, the reflective capacity scale (RCS), and self-efficacy in clinical performance (SECP) for nursing students were used. Data analysis was performed using descriptive and inferential statistics with SPSS 20 software.

Results The mean reflective capacity of the students was 4.39 ± 0.51, with the highest and lowest mean scores associated with the dimension of active self-appraisal (4.58 ± 0.62) and reflective-in-action (4.23 ± 0.67), respectively. The mean score of clinical self-efficacy was 119.98 ± 20.91. A direct and significant correlation was found between reflective capacity and clinical self-efficacy ($r = 0.366$, $p < 0.001$). Also, the findings indicated that reflective capacity predicted 13% of students' clinical self-efficacy ($\beta = 0.92$, $p < 0.001$).

Conclusion Nursing students with higher reflective capacity have greater clinical self-efficacy. Therefore, reflection should be guided and facilitated by nursing educators. Nursing educators can use innovative teaching methods to enhance the development of reflective capacity, subsequently leading to improved clinical self-efficacy.

Keywords Reflective capacity, Clinical self-efficacy, Nursing students

Background

The development of competencies among nursing students is a core activity for nursing educators and managers. Nursing students are exposed to various stressors during their clinical training, including fear of infection, unsafe practices, and low self-efficacy, which may lead to errors that threaten patient safety [1].

Bandura describes self-efficacy as a person's belief in their capability to perform tasks successfully [2]. He suggested that self-efficacy are formed by combining four sources of information: past performance on similar tasks, observations of others' success, feedback from others regarding one's ability and performance, and temporary physical or mental states that could affect performance. Among these, past performance on similar tasks was considered the most prominent in shaping self-efficacy judgments [3]. Self-efficacy is an vital part of successful practice [4] and a predictor of academic success, decision-making, and judgment [5], playing a central role in acquiring knowledge, developing skills, and utilizing

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professional knowledge and skills [4]. Students with a stronger sense of self-efficacy are motivated individuals with high achievement [6].

In nursing education, self-efficacy can be used to assess the reliability of nursing students' clinical skills [7]. Clinical self-efficacy refers to a nursing student's belief in their ability to effectively perform tasks and make decisions within a clinical setting [8], and is a crucial prerequisite for providing safe and high quality care [2, 9]. Moderate and moderate to high levels of clinical self-efficacy among nursing students have been reported in several studies [10, 11, 12, 13]. However, effective education for nursing students can lead to their self-esteem and clinical self-efficacy [14]. In the realm of clinical skills, although knowledge and repetition may suffice for executing a skill, self-efficacy, or the belief in one's potential to perform a skill, significantly impacts mastery of that skill [15].

Reflection is considered a key driver in improving clinical skills, alongside deliberate practice and critical feedback [16]. Reflective practice can be related to Bandura's self-efficacy theory [3]. Bandura [17] suggests that an individual's ability to reflect may change their thinking and potentially impact their self-efficacy. Reflective capacity is defined as students' capability, eagerness, and inclination to engage in reflective thinking throughout their education and clinical performances [18]. Reflective capacity encompasses the deliberate analysis of clinical practice, self-awareness of one's cognitive and behavioral patterns, and the ability to extract valuable insights from clinical experiences [19]. Enhancing the reflective capacity plays a crucial role in fostering ongoing improvements in their clinical decision-making and nursing practices [20]. Students' alertness and interest in identifying and correcting errors are largely related to reflective capacity [21]. Around the world, reflective capacity is increasingly acknowledged as an essential element in improving the quality of nursing care and promoting professional growth among clinical nurses [22].

Several studies have examined the link between reflection and general self-efficacy or academic self-efficacy in nurses [23, 24, 25]. However, clinical self-efficacy, a key aspect of self-efficacy specific to clinical professions like nursing, has received less attention. The relationship between reflective capacity and clinical self-efficacy, as well as the role of reflective capacity as a predictor of clinical self-efficacy, remains largely unexplored in the existing literature [7]. This is despite its important role in improving the performance of trained professionals [26]. Given that nursing students are in the formative early phases of building clinical self-efficacy, investigating how reflective capacity serves as a predictor of clinical self-efficacy is essential for shaping effective educational approaches and promoting successful clinical practice early in their training. Therefore, this study aims to determine the role of reflective capacity in the clinical self-efficacy of nursing students.

Methods

Study design

This is a cross-sectional study. The study population consisted of nursing students enrolled at the Yazd Branch, Islamic Azad University/Iran, in 2024. In this research, all eligible students were included in the study. Thus, 199 nursing students were selected through a census method. The inclusion criteria included having completed at least one internship semester and being present in the clinical setting.

To conduct the research, a list of eligible students was obtained from the nursing education manager. After accessing the participants, the purpose of the research and guidance for completing the questionnaires were provided. Informed written consent was obtained from the participants, and the questionnaires were made available for completion.

Data collection tools

The data collection tool in this study consisted of three sections.

Section 1. the demographic information form

This form included five questions concerning age, gender, marital status, overall grand point average (GPA), and academic year.

Section 2. the reflective capacity scale (RCS)

This scale is designed by Priddis and Rogers (2018) [27]. This scale consists of 16 items that assess four dimensions: reflective-in-action (RiA), reflective-on-action (RoA), reflective with others (RO), and active self-appraisal (SA) (3, 32). Each dimension contains four items. Scoring is determined using a six-degree Likert scale (from never to extremely). All items are scored directly, with no reverse scoring. To calculate the average score, the scores from each item are summed and then divided by the total number of items. As a result, the highest possible score is 6, and the lowest is 1. A higher score indicates a higher reflective capacity. The validity and reliability of this scale have been assessed in a community of medical students in the USA [18] and nursing education in Sweden [28], showing satisfactory results. This scale was translated into Persian and psychometrically evaluated by Khoshgoftar and Barkhordari-Sharifabad. They qualitatively examined the face and content validity of the scale, and the results showed that the Persian-language version of the scale was acceptable. An exploratory factor analysis (EFA) identified four factors, which together explained 63.79% of the total variance.

The confirmatory factor analysis (CFA) results indicated a good model fit. The Cronbach's alpha for the overall scale was 0.83, and for the dimensions of RiA, RoA, RO, and SA, it was 0.76, 0.73, 0.79, and 0.76, respectively. Additionally, an intraclass correlation coefficient (ICC) of 0.98 was reported [29]. In this study, the reliability of the scale was assessed, yielding a Cronbach's alpha of $\alpha = 0.93$.

Section 3. self-efficacy in clinical performance (SECP)

The questionnare was developed by Cheraghi et al. in 2009 [30]. This tool consists of 37 statements divided into four domains. The "patient assessment" domain includes 12 questions, the "nursing diagnosis and planning" domain includes 9 questions, the "implementation of care plans" domain includes 10 questions, and the "evaluation of care plans" domain includes 6 questions. This questionnaire uses a five-degree Likert scale (from not at all to completely), scoring from 1 to 5. The minimum and maximum scores for individuals are 37 and 185, respectively. Higher scores reflect greater levels of clinical self-efficacy. Research conducted by Cheraghi et al. [30] and Sadeghi et al. (2015) [31] established the validity of the tool. According to report Cheraghi et al. [30], the content validity index (CVI) was 0.98. In examining construct validity through EFA, the four extracted components explained 58.85% of the total variance. The internal reliability of the overall scale was 0.96, with Cronbach's alpha for the dimensions ranging from 0.90 to 0.92. Additionally, the test-retest reliability was reported as $r = 0.94$ [30]. In this study, the reliability of this scale was evaluated with a Cronbach's alpha of $\alpha = 0.93$.

Data analysis

Data were coded and entered into SPSS-20 software after collection. Descriptive statistics such as mean and standard deviation, absolute and relative frequency were employed to describe the data. The results of the Kolmogorov-Smirnov (KS) test indicated a normal distribution of the data ($p > 0.05$). Differences in the mean scores of reflective capacity and clinical self-efficacy based on participants' descriptive characteristics (gender and marital status) were analyzed using an independent t-test. The one-way analysis of variance (ANOVA) was used to examine differences in the mean scores of reflective capacity and clinical self-efficacy across academic years. To analyze the relationships between the mean scores of reflective capacity and clinical self-efficacy, as well as their associations with age and GPA, Pearson correlation was used. A linear regression analysis was conducted to examine the role of reflective capacity as a predictor of clinical self-efficacy, which was treated as the dependent variable. Statistical significance was determined by a p-value of less than 0.05, with the confidence intervals set at 95%.

Findings

A total of 199 nursing students contributed, with no dropouts. The students had an average age of 21.50 ± 2.41 years and a GPA average of 16.35 ± 1.20 (GPA is scored on a 20-point scale). The majority were female (70.9%), single (89.9%), and in their second year of study (34.2%). The Pearson correlation test showed a relationship between reflective capacity and the students' GPA ($r = 0.24$, $p = 0.02$) (Table 1).

Additionally, the ANOVA test revealed a difference in reflective capacity across different academic years ($p < 0.001$) (Table 1). According to the Tukey post-hoc

Table 1 The relationship between reflective capacity and clinical self-efficacy with demographic information of participants

Variable		**Mean ± SD**	**Reflective capacity (Mean ± SD) (4.39 ± 0.51)**		**Clinical Self-efficacy (Mean ± SD) (119.98 ± 20.91)**	
			r	***P***	***r***	***P***
Age		21.50 ± 2.41	0.06	0.52	0.04	0.60
Grand point average (GPA)		16.35 ± 1.20	0.24	0.02	-0.07	0.51
Variable		**N (%)**	**Reflective capacity (Mean ± SD)**	**P**	**Clinical Self-efficacy (Mean ± SD)**	**P**
Gender	Female	141 (70.9)	4.44 ± 0.50	0.06[a]	122.41 ± 20.67	0.29 [a]
	male	58 (29.1)	4.29 ± 0.55		118.99 ± 21.00	
Marital status	Married	20 (10.1)	4.45 ± 0.54	0.57[a]	127.25 ± 20.62	0.10 [a]
	Single	179 (89.9)	4.39 ± 0.51		119.17 ± 20.84	
Academic year	Second	68 (34.2)	4.27 ± 0.50	0.001[b]	117.20 ± 21.95	0.164 [b]
	Third	67 (33.7)	4.33 ± 0.49		119.04 ± 18.95	
	Fourth	64 (32.2)	4.59 ± 0.51		123.93 ± 21.45	

N: Frequency, SD: Standard Deviation, P: *P*-value

Note: [a]: independent t test, [b]: ANOVA

Note: In the Iranian education system, GPA is scored on a 20-point scale

Table 2 Descriptive findings of reflective capacity, and clinical self-efficacy

Variables	Min (obtainable)	Max (obtainable)	Mean ± SD
RiA	1	6	4.23 ± 0.67
RoA	1	6	4.41 ± 0.67
RO	1	6	4.35 ± 0.63
SA	1	6	4.58 ± 0.62
Reflective capacity	1	6	4.39 ± 0.51
Assesment	12	60	38.30 ± 6.87
Diagnosis/Planing	9	45	27.57 ± 6.56
Implemantion	10	50	34.81 ± 6.58
Evaluation	6	30	19.28 ± 4.08
Clinical Self efficacy	37	185	119.98 ± 20.91

RiA: Reflective-in-action, RoA: Reflective-on-action, RO: Reflective with others, SA: active self-appraisal, Min: Minimum; Max: Maximum; SD: Standard Deviation

test, significant differences were found between the second and fourth years ($p < 0.001$), as well as between the third and fourth years ($p = 0.004$).

The students' average reflective capacity was 4.39 ± 0.51, with the highest mean in the dimension of SA (4.58 ± 0.62) and the lowest mean in RiO (4.23 ± 0.67). The average score for clinical self-efficacy was 119.98 ± 20.91 (Table 2).

The Pearson correlation test results revealed a significant positive relationship between reflective capacity and clinical self-efficacy and its dimensions (Table 3).

Furthermore, the results from regression analysis revealed that reflective capacity accounts for 13.0% of the variance, indicating that reflective capacity contributes 13% of nursing students' clinical self-efficacy (Table 4). As shown in Table 4, for each unit increase in reflective capacity, the mean clinical self-efficacy score increased by 0.92 units ($p < 0.001$).

Discussion

The aim of this study was to determine the role of reflective capacity in the clinical self-efficacy of nursing students.

The results indicated a significant correlation between reflective capacity and clinical self-efficacy, along with its dimensions, showing that as reflective capacity increases, the clinical self-efficacy of students also increases. Additionally, reflective capacity explains 13% of clinical self-efficacy. This suggests that reflective capacity is an important factor influencing clinical self-efficacy, but it accounts for only a portion of the overall variability. These results contrast with the findings of Yong and Roberts (2023) [32], whose quantitative section showed no significant statistical effect of interaction with reflection on self-efficacy for clinical skills. However, the qualitative section of their study aligns with the current findings, indicating that students believe interaction with reflection has a considerable impact on clinical self-efficacy [32]. The discrepancies between the findings of the current study and the quantitative findings of Yong and Roberts (2023) may be attributed to factors such as differences in the research population, sample size, or measurement instruments. Yong and Roberts focused on medical students in the preclinical stage and utilized the self-reflection and insight scale (SRIS) along with the learning self-efficacy scale (L-SES) for Clinical Skills to measure the relevant variables. However, the differences in results may be attributed to confounding factors such as prior clinical experience, educational background, and teaching methods, which could influence clinical self-efficacy. Overall, as shown in the qualitative section of Yong and Roberts' study, reflection enhances students' self-efficacy by helping them identify and address weaknesses. Other studies suggest that greater reflection is associated with higher self-efficacy [33]. The relationship between self-efficacy and reflective capacity in novice clinical nurses has also been demonstrated in Huang et al.'s study,

Table 3 Correlation matrix of reflective capacity, and clinical self-efficacy

Variables	1	2	3	4	5	6	7	8	9	10
1-RiA	1									
2-RoA	0.618**	1								
3-RO	0.406**	0.389**	1							
4-SA	0.595**	0.589**	0.454**	1						
5-Reflective capacity	0.830**	0.823**	0.700**	0.825**	1					
6-Assesment	0.355**	0.306**	0.244**	0.248**	0.365**	1				
7-Diagnosis/Planning	0.252**	0.194**	0.161*	0.117	0.230**	0.760**	1			
8-Implemantion	0.312**	0.278**	0.296**	0.321**	0.379**	0.582**	0.585**	1		
9-Evaluation	0.322**	0.218**	0.205**	0.148*	0.283**	0.664**	0.772**	0.680**	1	
10-Clinical self-efficacy	0.357**	0.292**	0.264**	0.249**	0.366**	0.880**	0.898**	0.822**	0.870**	1

RiA: Reflective-in-action, RoA: Reflective-on-action, RO: Reflective with others, SA: active self-appraisal

**. Correlation is significant at the 0.01 level (2-tailed)

*. Correlation is significant at the 0.05 level (2-tailed)

Table 4 Linear regression analysis for clinical self efficacy

Predictor	B	Standardized beta	T	*P*
(Constant)	55.07		4.65	< 0.001
Reflective capacity	0.92	0.36	5.52	< 0.001

F [1, 197] = 30.55; $p < 0.001$; $R = 0.36$; adjusted $R^2 = 0.13$

Dependent variable: clinical self efficacy

Predictors: (Constant), reflective capacity

which found that reflection positively predicts self-efficacy [23]. Additionally, the relationship between general self-efficacy and reflection has been reported in a study by Zarrin et al. on Iranian nurses [24]. Black highlight that one of the important factors in reshaping people' cognition and behavior is self-reflection, which is referred to as the cornerstone of the concept of self-efficacy [34]. Reflection is closely connected to learning and personal development [35], and this leads to nurses' transformation both professionally and personally. Reflection helps nurses understand care better, which is crucial for nursing and important for being a caring nurse [23].

The findings indicated that the nursing students who participated in this study had a mean score of 4.39 ± 0.51. This score was reported as 4.53 ± 0.50 in medical students in Iran [36], 4.16 ± 0.53 in medical students from one of the universities in Colorado [18], and 4.19 in nurses in Sweden [28]. The differences in results may stem from variations in the study population and environment, as well as different teaching methods in universities, since reflection can be taught and habitualized. In this study, the SA dimension exhibited the highest mean, whereas the RiO dimension had the lowest mean. Participants in the study by Khoshgoftar and Barkhordari-Sharifabad [36] also achieved the highest mean in the dimension of SA. The lowest mean in participants of the study by Priddis and Rogers (2018) [27], and Gustafsson et al. (2021) [28] related to the dimension of RiO, which aligns with the results of the current study.

Additionally, the results showed a clinical self-efficacy score of 119.98 ± 20.91 among nursing students, which is consistent with the findings of other studies [12, 13, 37, 38]. However, some studies have reported higher levels of self-efficacy [9, 39, 40, 41], while others have reported lower levels of self-efficacy compared to those observed in the present study [42]. Given the multiple factors affecting nursing students' self-efficacy, such as the academic term, type of internship, and education, the varying results regarding self-efficacy levels across different studies are predictable and unavoidable [39, 43, 44].

The results indicated a positive relationship between reflective capacity and students' GPA. This suggests that students with higher reflective capacity tend to have slightly higher GPA. Reflective capacity allows students to critically evaluate their experiences, which can lead to a deeper understanding of their strengths and areas for improvement. This self-awareness and ability to adapt may improve their academic performance and, consequently, their GPA. Of course, these results are not consistent with the findings of the studies by Ottenberg et al. [45] and Khoshgoftar and Barkhordari-Sharifabad [36]. Perhaps the discrepancy is due to differences in context, such as academic settings, disciplines, or cultural factors.

Furthermore, reflective capacity varied significantly across different academic years and second-year students had achieved higher scores. The results of Al-Osaimi's study also revealed that third-year students scored higher on reflection than fourth-year students [46]. Bjerkvik and Hilli note that students often fail to prioritize reflective practice, citing their demanding study schedules as the reason, unless it is explicitly required for formal evaluation [47].

Limitations

A limitation of the current study was the use of a self-report tool for data collection, which may have led some students to refrain from providing their true responses due to social desirability bias. Although students were assured of the confidentiality of their data to mitigate this limitation. Furthermore, the data were collected from nursing students at a single university in Iran, so the generalizability of the findings should be approached with caution. Also, potential confounding factors such as prior clinical experience, educational background, teaching methods, and personality traits were not accounted for in the regression analyses. These factors may independently influence self-efficacy and could contribute to variations in the results. Additionally, the cross-sectional design of the study restricts the capacity to establish causal links between reflective capacity and clinical self-efficacy. Future research should consider longitudinal designs that allow for a more comprehensive examination of causal pathways.

Practical implications

Nursing programs should prioritize the development of reflective practices within their curricula. Therefore, nursing education administrators should consider designing systematic educational programs that may enhance reflective capacity among nursing students, potentially improving clinical self-efficacy. By integrating reflective exercises, educators can help students build reflective capacity needed to improve their clinical self-efficacy, which leads to more confident and competent nursing practice.

Nursing educators could incorporate more opportunities for students to engage in self-assessment activities. Encouraging students to evaluate their clinical skills, identify strengths, and work on areas for improvement may enhance their self-confidence in clinical settings.

Clinical instructors can leverage the understanding that reflective students have greater self-efficacy by fostering environments where students feel encouraged to reflect on their experiences, ask questions, and seek guidance. This approach can lead to greater confidence in their ability to handle complex clinical situations.

For students with lower reflective capacity, additional support such as mentorship or reflective practice workshops may be beneficial. These resources can help students enhance self-reflection skills, ultimately improving their clinical performance and self-efficacy.

Conclusion

In this study, nursing students with higher reflective capacity showed greater clinical self-efficacy. Therefore, reflection should be guided and facilitated by nursing educators. Nursing educators can use innovative teaching methods to enhance the development of reflective capacity, subsequently leading to improved clinical self-efficacy.

Abbreviations

RCS	Reflective capacity scale
SECP	Self-efficacy in clinical performance
RiA	Reflective-in-action
RoA	Reflective-on-action
RO	Reflective with others
SA	Self-appraisal
EFA	Exploratory factor analysis
CFA	Confirmatory factor analysis
ICC	Intraclass correlation coefficient
CVI	Content validity index
SD	Standard deviation
KS	Kolmogorov-smirnov
GPA	Grand point average
SRIS	Self-reflection and insight scale
L-SES	Learning self-efficacy scale

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Author contributions

All authors (MB-SH, ZA, and RJ) have participated in the conception and design of the study. ZA and RJ contributed the data collection and prepared the first draft of the manuscript. MB-SH critically revised and checked closely the proposal, the analysis and interpretation of the data and design the article. MB-SH carried out the analysis, interpretation of the data and drafting the manuscript. All authors read and approved the final manuscript.

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Data availability

The datasets generated and analyzed during the current study are not publicly available due to an agreement with the participants on the confidentiality of the data but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This research was approved by the Ethics Committee of the Islamic Azad University, Khurasgan Branch/Isfahan (IR.IAU.KHUISF.REC.1403.423). Informed written consent was obtained from the students after explaining the research objectives and the voluntary and confidential nature of their participation. All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication

The article does not contain any individual's details and consent for publication is not applicable.

Competing interests

The authors declare no competing interests.

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