

RESEARCH ARTICLE

Reflective Practice in Nursing to Enhance Critical Thinking: A Meta-Analysis

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Abstract

Purpose: Reflective practice is widely recognized as a fundamental component of nursing education and professional development that had the potential to enhance critical thinking skills. This study intended to evaluate the effect of reflective practice interventions on the critical thinking capability of student nurses.

Design and Methods: The quantitative, meta-analysis design was employed. CINAHL, Medline, PubMed, Health Sources and Google Scholar databases were searched for publications in English until December 2020. The studies were subjected to quality assessment with the JBI checklist, systematic data extraction and statistical analysis using Comprehensive Meta-analysis version 3.0.

Findings: A total of four studies satisfied the inclusion criteria. Reflective practice strategies such as journaling/journal writing and self-regulated learning had effectively enhance critical thinking skills of student nurses (summary effect=0.24; 95% CI [0.13-0.44]; p-value= 0.00004). Sensitivity analysis confirmed the strength of the findings and the publication bias was assessed and found to be minimal.

Conclusion: Reflective practice interventions had positive impact on the improvement of critical thinking capacity of nursing students. With the practical implications for nursing education and professional development, this study had recommended to integrate reflective practice strategies into the curriculum and training programs.

Keywords: *Reflective practice, critical thinking, meta-analysis, nursing, sustainable development goal*

Introduction

In navigating the ever-changing landscape of healthcare, nurses play a pivotal role by engaging in critical assessment and reflective practices in order to ensure the delivery of safe and high-quality services. A paradigm shift from reductionism to holism as a client-care strategy offers a variety of opportunities for nurses and nursing students to reflect on their practices and to develop their critical thinking abilities (Nairn, 2014; Risjord, 2013). However, compelling challenges have surfaced within the realm of nursing education. These challenges encompass limited frameworks, guidelines, or targeted strategies (Alt, Raichel & Naamati-Schneider, 2022; Willers, Jowsey & Chen, 2021), a lack of consensus regarding standardized assessment tools (Dyment & O'Connell, 2011; Cornally & McCarthy, 2011; Cowan, 2013; Tangen & Borders, 2016; Gusa, 2021) and a poor understanding of corporate cultures conducive to supporting reflective practice. In light of these critical issues, this paper intended to evaluate the

effectiveness of reflective practice in enhancing the critical thinking capabilities of nursing students.

Reflective practice involves systematically extracting meaningful insights from personal experiences with its application extending beyond specialized settings (Bass, Sidebotham, Creedy & Sweet, 2020). Nursing students, irrespective of their background, can employ reflective practice as a valuable tool for ongoing self-assessment. The primary objective is to enhance decision-making, foster critical thinking skills, and shape individual developmental paths (Johns, 2017). This approach is recognized as a crucial competency for nursing students who are navigating the various aspects of their daily lives (Oelofsen, 2012). In addition, Barbagallo (2021) underscores its significant role in connecting practical experiences with theoretical knowledge while emphasizing its relevance for students beyond the confines of a specific profession.

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The exploration of reflective practice and critical thinking within the context of nursing education unveils a nuanced landscape, particularly concerning nursing students. While widely recognized as beneficial, there exists a spectrum of perspectives highlighting potential challenges specific to nursing students. Some critics express concerns that an excessive focus on analyzing experiences might lead to delays in responding promptly to patient needs as the delicate balance between reflection and immediate action is questioned (Mantzoukas & Jasper, 2004; Mahon & O'Neill, 2020). Moreover, the variability in how reflective practice is taught and assessed across nursing programs poses a unique challenge in consistently measuring its impact on critical thinking for nursing students (Gusa, 2021).

Authors argue that integration of reflective practice into the clinical environment is not always effective for nursing students since the said activities result in isolation from their daily work. This separation makes it challenging for nursing students to apply critical thinking skills in real-time patient care situations (Mann, Gordon & McLeod, 2009). As the academic landscape evolves during the ongoing impact of the Covid 19 pandemic, faculty members are encouraged to demonstrate flexibility in instructional modalities. This adaptability is crucial for nursing students, as course redesign since hybrid delivery may significantly influence the choice and planning of activities aimed at enhancing their reflective practice (Llewellyn, 2021).

Reflective practice interventions in nursing education are often complex and multifaceted. A meta-analysis is well-suited to handle this complexity by providing a structured and systematic approach to analyze and to synthesize data from diverse interventions. This is in contrast to experimental designs that may be limited in capturing the complexity of real-world reflective practice implementations.

The paucity of frameworks and guidelines, the lack of consensus on assessment measures, and the uncertainty surrounding the integration of reflective practice into clinical settings underscore the rationale for exploring the potential link between reflective practice and the enhancement of critical thinking skills. This study aimed to address the central question: In nursing students, does the implementation of reflective practice interventions compared to no reflective practice affect their critical thinking capability?

Methodology

Research design

The quantitative design specifically meta-analysis (Borenstein et al., 2009) was used to examine the magnitude

of reflective practice's effect on critical thinking enhancement.

Protocol and registration

This study adhered to the guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) that has been officially registered in the PROSPERO database under the registration number 461595.

Eligibility criteria

To be eligible, studies have to satisfy the following criteria: i) investigated nursing students who have undergone reflective practice interventions; ii) measured critical thinking using assessment tools; iii) included a control group who did not receive any reflective practice intervention; and iv) published in English from January 2000 to December 2020. Studies were not included if there were methodological flaws, exhibited high risk of bias, and conducted exclusively with experienced nurses or other healthcare professionals.

Search Methods

To identify relevant studies, searches in multiple electronic databases namely, CINAHL, MEDLINE, Science Direct and Google Scholar were conducted. Boolean search phrases and combinations of descriptors/medical subject headings revolved on the following key terms: *reflective practice*; *nursing*; *critical thinking*; *reflective journaling*; *reflective thinking*; and *reflection*. Furthermore, the researcher checked the reference lists from relevant studies to locate for additional material about the impact of reflective practice on critical thinking.

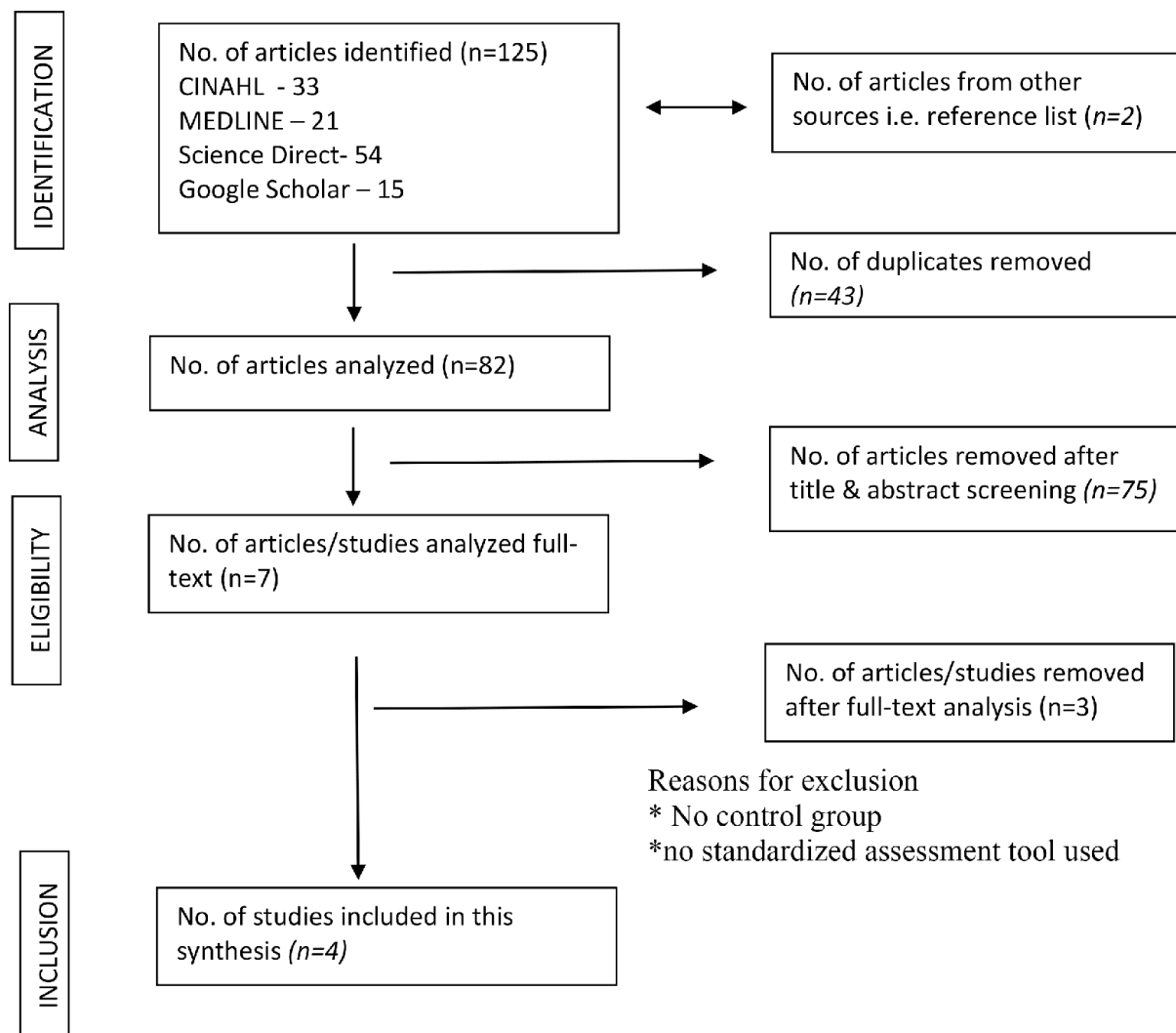
Selection of Studies

The computer searches yielded 125 studies. However, adherence to the inclusion criteria with abstract and full-paper analysis excluded 121 articles. Consequently, four primary studies composed the whole unit for this meta-analysis. Figure 1 shows the course from study identification to inclusion.

Data Extraction

The four primary studies dealt with reflective practice in nursing at various settings such as clinical and academic. A standardized data extraction form based on Preferred Reporting Items for Systematic Reviews and Meta-

Figure 1. Study Selection Process



Analyses (PRISMA) guidelines was used. It detailed the following information: author name, year of publication, participants, study design, intervention, and outcome measures. Two studies reported correlations while the remaining two which are prospective in nature presented dichotomous data.

To critically appraise the studies, data accuracy was verified and the risk of bias was assessed. Heterogeneity in study characteristics was examined, as well as, discrepancies or disagreements were addressed through consensus. Moreover, periodic checks and reviews of extracted data to identify and to rectify errors or inconsistencies throughout the extraction process were implemented.

Statistical Analysis

Since the studies utilized different designs and reported data in different formats, Comprehensive Meta-Analysis (CMA) version 3.0 was used for this meta-analysis (Borenstein et al., 2009). Based on the heterogeneity index (I² statistics of 26.92%), the p-value for Q statistic is 0.071, rejecting the null hypothesis; i.e. the effect sizes vary across studies. Hence, the fixed-effect model was employed. The effect size index appropriate for the types of data provided is the odds ratio as presented in the articles.

Results

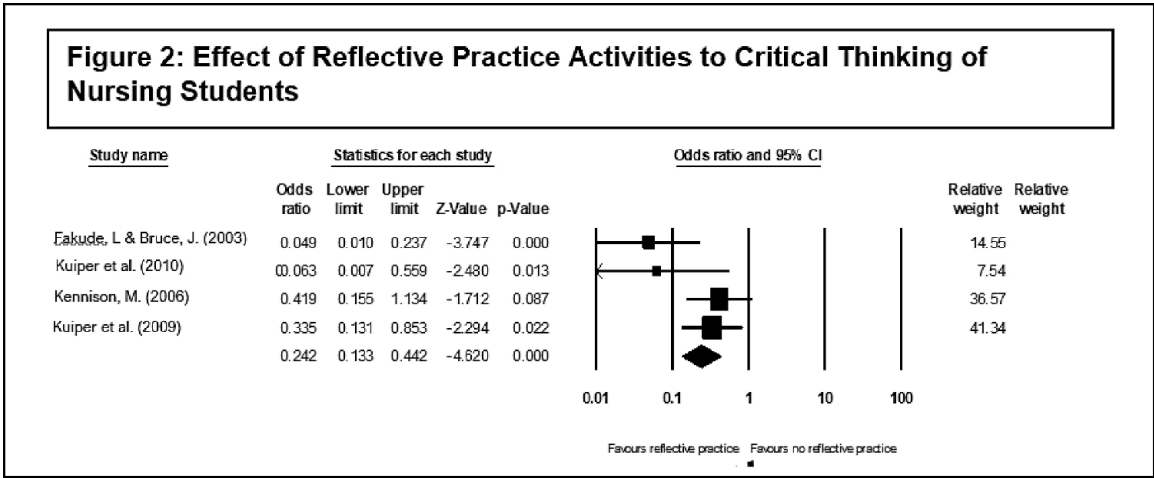
Table 1 provides a concise summary of key information from each of the four studies included in the meta-analysis.

The forest plot (Figure 2) highlights the odds ratio which ranges from 0.05 to 0.40. This finding indicates that the effect

sizes are reasonably consistent from study to study. Notable too are the effect sizes plotted to the left of the center. This pattern indicates that reflective practice was more likely to improve critical thinking skills of student nurses. The summary effect is 0.24 with a 95% confidence interval of 0.13 to 0.44. These values reflect a 76%-enhancement of critical thinking, with 95% confidence

Table 1. Summary Table of Results

| No. | Study & Author/s | Participant | Design | Context | Intervention | Outcome |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|----------------------------------------------------|----------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Journaling: a quasi-experimental study of student nurses' reflective learning ability Fakude LP; Bruce JC, 2003 | Student nurses | Quantitative | Clinical | Use of journaling or reflective writing in clinical education | Students in the experimental group performed better in exploring alternatives of action ($p < 0.10$) and formulating responses in similar future situations ($p < 0.05$) during the process of reflection |
| 2 | Thinking strategies of baccalaureate nursing students prompted by self-regulated learning strategies Kuiper, Murdock & Grant, 2010 | Student nurses | Quantitative | Clinical | Weekly reflective journals | The 60-hour practicum group used more behavioral self-monitoring reasoning strategies (42.4%) and environmental structuring (35.2%) and fewer metacognitive strategies (22.4%). The 120-hour practicum group used more metacognitive self-evaluation reasoning strategies (34.8%), followed by environmental structuring (33.1%) and behavioral selfmonitoring strategies (32.1%). |
| 3 | The Evaluation of Students' Reflective Writing for Evidence of Critical Thinking Kennison, M | Student nurses | Nonexperimental, descriptive, correlational design | Academic | Use of reflective writing | Results indicated statistically significant positive relationships between the California Critical Thinking Skills Test (CCTST) total critical thinking score and mean teacher ratings using the CTS. Meaningfully significant interrater reliability ratings for the CTS were also found |
| 4 | Promoting the self-regulation of clinical reasoning skills in nursing students Kuiper, Pesut & Kautz, 2009 | Baccalaureate nursing students | Quantitative | Clinical | Self - Regulation Learning journals and Outcome - Present-Test worksheets | Significant correlations between the sub-groups of students and the ability to frame situations over time (Pearson Chi-Square 6.84, $p=0.033$) and in the ability to make decisions about appropriate interventions over time (Pearson Chi-Square 9.882, $p=0.007$) |



interval of 56% to 87%. Although Kennison's study reported insignificant results, the p-value for the summary effect (i.e. 0.000004) proves statistically significant outcomes.

In terms of study weights and precision, the study of Kuiper, Pesut & Kautz (2009) was determined to be the most precise and it received the heaviest weight. Based on the Self-Regulated Learning Model (SRL) and the Outcome-Present-State-Test (OPT) Model of Reflective Clinical Reasoning, the utilization of reflective journals assisted the development of critical thinking abilities. Critical thinking is a result of reflective practice backed by self-regulation.

Fakude and Bruce (2003) looked into how student nurses used journals to reflect on their clinical experiences. The findings demonstrated that using journals or journal writing as part of clinical education is one method for fostering critical thinking. In 2006, Kennison completed a study on the assessment of students' reflective writing as an indicator of developing critical thinking. According to the findings, reflective writing and critical thinking are significantly correlated.

Discussion

This meta-analysis encompassed a diverse range of studies exploring the effectiveness of reflective practice in enhancing critical thinking among student nurses. While the odds ratios varied widely on the different levels of effectiveness that were considered across studies, the observed consistent effect of sizes imply a positive impact on critical thinking skills across diverse contexts and populations.

Considering the characteristics of the studies included such as consistent themes in terms of interventions, outcomes or

observed trends in results, and their implication for the promotion of critical thinking skills through reflective practices--it is noteworthy that the majority of effect sizes on the forest plot were consistently plotted to the left of the center. This concern suggests that reflective practice is more likely to improve critical thinking skills among student nurses. This observation aligns well with the hypothesis that encourage reflective practice as an effective strategy for promoting critical thinking skills in nursing education.

In examining the summary effect representing a substantial improvement, the significant positive impact of incorporating reflective practice into nursing education is herein enforced. With a narrow confidence interval, there is a high level of confidence that the true effect size falls within this range. This confidence reinforces the idea that reflective practice is indeed a valuable tool for enhancing critical thinking in nursing.

Regarding specific characteristics of studies, it is crucial to address Kennison's study that reported insignificant results. The specific frequency and duration of reflective writing were not explicitly stated in this study. Also, the level of facilitator training in guiding students' reflective writing is unclear. The sample size in Kennison's study was not explicitly stated, but it might be smaller compared to the other studies. Despite this, the remarkably low p-value for the summary effect (0.000004) attests to the overall statistical significance of the meta-analysis outcomes. This implies that the observed improvement in critical thinking skills that has been associated with reflective practice is highly unlikely to have occurred by chance. The cumulative evidence strongly supports the effectiveness of reflective practice given the presence of individual studies with varying results.

Kuiper, Pesut & Kautz' study focused on a diverse student population in various clinical settings had highlighted

substantial correlations between student subgroups, their ability to frame events over time, and their capacity to decide on effective actions. This diverse setting underscores the need for formal evaluation of techniques to help beginners understand the bigger picture, sort through data, and make optimal decisions during the teaching process.

Considering the specifics of the reflective practice interventions across studies, the majority of reflections from student nurses encompassed thinking processes, environmental settings, and self-monitoring of performance. Notably, studies implementing Self-Regulated Learning (SRL) journaling revealed more cause-and-effect correlations compared to those without the SRL model. This observation indicates that the use of SRL journaling leads to metacognitive awareness and thinking techniques that support Zimmerman & Schunk (2001) findings where SRL journaling encourages metacognitive self-evaluation and the consequent enhancement of critical thought.

A related study by Kuiper, Murdock & Grant (2010) employ the preceptorship approach in a clinical setting and also emphasize the significance of reflective journaling in capturing critical thinking strategies during hands-on experiences. Despite contrasting research that shows no advantages compared with other structured clinical experiences (Udlis, 2008), students perceived the development of clinical competence through reflective practice and critical thinking. The results coincide with previous research revealing that self-confidence and reflective journaling improved professional identity, critical thinking, and greater independence (Dunlop, 2005)

When reference phrases were examined across the groups, the reflective journaling experience included more thinking strategies and personnel interactions. This was also seen in a journal analysis of newly graduated nurses' reflective practice.

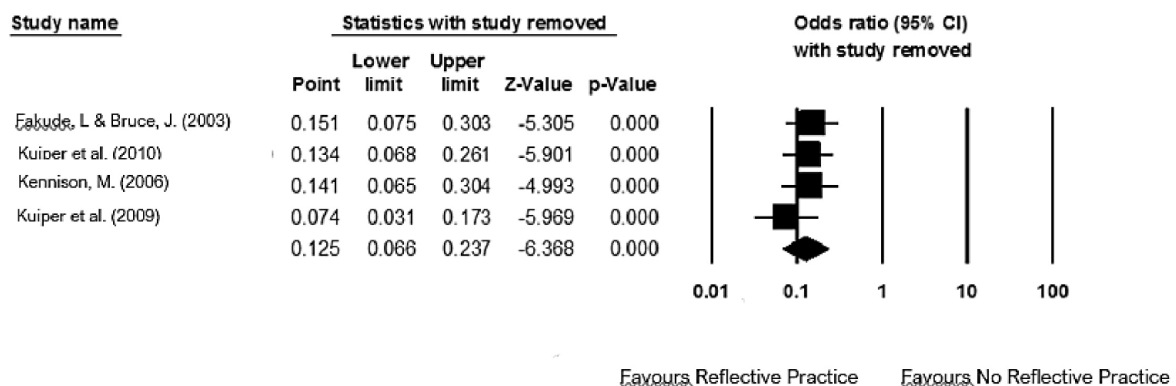
When they recognized areas for improvement, these students were interested in self-evaluating their performance. They also spent a lot of time completing patient interventions and measuring their own efficiency in using resources. Higher-level thinking techniques are needed because of the emphasis on care planning and the knowledge work required for setting and achieving patient goals.

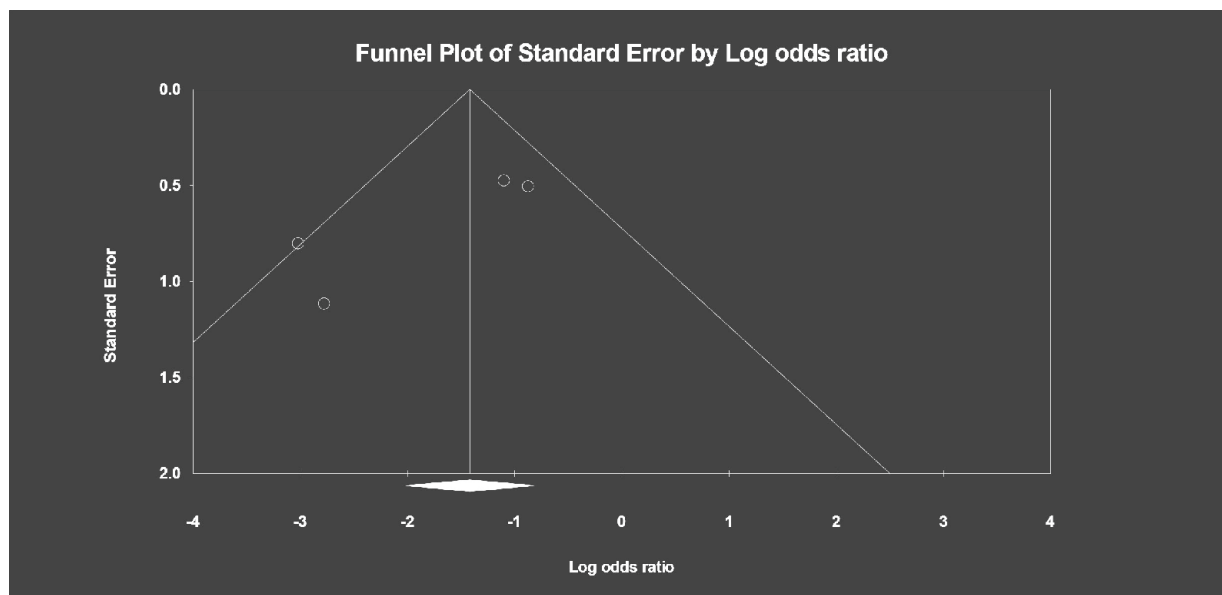
Sensitivity Analysis

The sensitivity analysis was conducted to assess the robustness of the findings by systematically examining the impact of individual studies on the overall results. This analysis ensures the reliability of the meta-analysis while identifying whether the inclusion or exclusion of specific studies significantly influence the outcomes. By gauging the stability of the results, the sensitivity analysis enhances the overall validity and confidence in the conclusions drawn from the meta-analysis.

With one study removed, a sensitivity analysis was performed by conducting another statistical treatment. The second forest plot (Figure 3) exhibits that the findings are robust. The overall conclusions drawn from the meta-analysis remain consistent and reliable even when one study is excluded. The pattern of plotted study weights still remains (to the left of the center) with only 1 that has been clustered over the 0.1 axis. This suggests that the positive effect of reflective practice on critical thinking skills remains consistent. The summary effect decreased by 50% (0.242 to 0.125) with a 95% confidence interval of 0.066-0.237. The fact that the findings remained robust and the pattern of results largely persisted despite the removal of one study strengthens the reliability of the research's conclusion regarding the positive effect of reflective practice on critical thinking skills among nursing students.

Figure 3: Effect of Reflective Practice Activities to Critical Thinking of Nursing Students





Publication Bias

In figure 4, it is evident that there is a gap on the left where the nonsignificant studies would have been if the investigator had been able to locate them. The visual impression is consistent with the possibility that some studies are missing from the left. To quantify this observation, the Classic-Fail N test computes the need for 24 missing studies to be able to bring the p-value to 0.05.

There may be studies with nonsignificant findings that were not included in the analysis. The Classic-Fail N test indicates that a substantial number of such studies would be needed to change the overall conclusions of the analysis from statistically significant to nonsignificant.

Conclusion and Recommendation

It is crucial to acknowledge the limitations of this meta-analysis. The generalizability of the findings may be influenced by variations in study designs, participant characteristics, and the methodologies employed across the included studies. Moreover, the potential for publication bias and the dynamic nature of educational practices in different nursing institutions could impact the overall validity of the conclusions drawn.

The cumulative evidence from this meta-analysis strongly supports the integration of reflective practice such as journaling, into nursing education. The findings consistently demonstrate positive outcomes that include improved critical thinking, problem-solving skills, and clinical reasoning. To enhance critical thinking skills among student nurses, it is recommended that nurse faculty members adopt similar reflective learning activities. Furthermore, by providing

professional development opportunities for nurse educators and implementing standardized assessment tools, the effectiveness of reflective practice can be measured by noting its impact on students' critical thinking abilities. The findings from Kennison's study contribute to the broader conclusion that incorporating reflective practice positively affects the critical thinking capabilities of nursing students. The assessment of reflective writing not only reveals students' engagement in the reflective process but also serves as tangible evidence of the enhancement of critical thinking skills within the context of nursing education. In Kuiper et al (2010), the examination of thinking strategies prompted by self-regulated learning strategies among baccalaureate nursing students revealed a positive association between self-regulated learning, reflective thinking, and the development of critical thinking capabilities. This suggests that engaging in self-regulated and reflective practices contributes to the cultivation of critical thinking skills among nursing students.

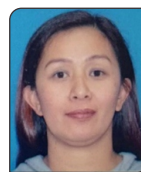
While this meta-analysis provides supplementary evidence, further research could explore the specific aspects of reflective practice that are most effective, as well as its impact on patient outcomes and healthcare quality. For ongoing evaluation and improvement of reflective practice initiatives, standardized tools and assessment methods to measure the impact of reflective practice need to be in place.

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