Addressing academic challenges: A quasi-experimental study on the effect of remedial exam strategy for nursing students with low academic performance

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Abstract

Background: Universities are responsible for providing education and support to all students, including those who may be underachieving. To fulfill this responsibility, universities need effective strategies to help these students graduate successfully.

Objective: This study aimed to evaluate the effectiveness of a midterm remedial exam strategy in improving the academic performance of nursing students.

Methods: A quasi-experimental design was employed to conduct this research at a private college in Dammam, Saudi Arabia’s eastern region. The study included 306 convenient bachelor nursing students who had failed their midterm exam. Of these, 103 students voluntarily participated in the remedial midterm exam (intervention group) to enhance their midterm scores, while 203 students did not take the remedial exam (control group). Data collection took place in the spring of 2022 by reviewing course files and student records, encompassing formative and summative evaluations across 14 courses. Data analysis involved using SPSS (2023) and Jamovi (version 2.3, 2022) software to conduct paired t-tests, Mann-Whitney, and correlational tests.

Results: The remedial group demonstrated significant differences between their midterm and remedial exam scores. However, only 15.5% of students in the remedial group passed the exam, despite 68% showing improvement. Additionally, there were significant differences between the intervention and control groups in midterm and overall course scores. The control group outperformed the remedial group in the midterm, final exams, and overall course scores (p < 0.05).

Conclusion: Remedial exams can be beneficial for students who are close to passing but may not effectively support those who perform poorly. To address this, implementing a comprehensive remedial program or providing ongoing remedial activities throughout the course can offer better support for strongly underperforming students. Additionally, educational institutions can enhance students’ motivation and performance by providing study skills classes and time-management workshops, equipping them with valuable tools for academic success.

Keywords

academic performance; nursing students; remedial exam; underachievement; academic success; Saudi Arabia

Background

Underachievement refers to the difference between a student’s potential, expected academic performance, and actual accomplishments (Veas et al., 2016). Although universities employ rigorous screening processes to admit the most promising candidates, a significant portion of students, approximately half, do not complete their degrees within the four-year timeframe (Renzulli, 2015; Symonds et al., 2011). In the United States, the retention rate for four-year private universities was 63% in 2020, while public and private non-profit universities boasted rates above 80% (National Center for Education Statistics (NCES), 2022). Unfortunately, a notable percentage of students either drop out or face expulsion due to persistently poor academic performance, ultimately failing to obtain a degree. Freshman year is particularly susceptible to dropout rates, often attributed to academic difficulties (Abdulghani et al., 2023). As a result, universities must identify the root causes of poor performance and implement various strategies to support struggling students in catching up with their peers.

Academic performance has been a subject of great interest among social scientists, particularly psychologists, as they seek to understand the factors influencing students’
achievement (Kolo et al., 2017). Unpreparedness for college-level work has been identified as the primary cause of student attrition (Symonds et al., 2011). Additionally, challenging course material, inadequate study skills, poor time management, lack of enthusiasm, and language barriers are among the potential contributors to subpar academic performance (Balduf, 2009; Deacon et al., 2017). Various strategies have been proposed and tested to address these issues. Some researchers have attempted to combat underachievement by modifying curriculum and course assignments while exploring the impact of changes in teaching methods and instructor performance (McCoach & Siegle, 2003; Ritchotte et al., 2015). However, the results of these efforts have often fallen short of expectations. In light of this, this paper aims to investigate whether remedial exams can effectively mitigate poor academic performance.

Remediation serves as a targeted strategy to address and rectify student performance deficiencies (Cieland et al., 2010). Students facing learning difficulties or those who would benefit from additional support can participate in remediation programs or activities to enhance their learning skills and comprehension of course material (International Bureau of Education, 2022). The remediation process typically involves three stages: diagnosis, implementation of corrective measures, and re-evaluation (Cieland et al., 2010). Within these stages, various remedial activities can be employed to assist students facing academic challenges, including re-testing, tutoring, academic advising, computer-assisted interventions, and the option to drop a course (Deacon et al., 2017; Drew, 2022). These interventions aim to provide targeted assistance and support to students experiencing academic difficulties.

Limited research exists regarding the optimal practices for remediation in universities. Bierer et al. (2015) highlighted in their published study that faculty members often lack knowledge about which remedial practices to employ to enhance student performance without overwhelming them. Snyder et al. (2019) encountered difficulties drawing generalizations from their systematic review due to the diverse range of interventions reported in the literature. They recommended that researchers focus on replicating studies on specific interventions rather than assessing the impact of new interventions in order to contribute to the existing body of evidence. Moreover, they suggested conducting further studies on underachieving college students better to understand the developmental needs of adolescents and young adults (Snyder et al., 2019).

Similarly, we faced a similar challenge while conducting this study. Our research specifically examines the effects of remedial exams; however, existing literature on remedial exams tends to predominantly focus on general remedial procedures. Most relevant studies test the outcomes of implementing multiple remediation programs and strategies simultaneously, evaluating the overall impact of remediation on students’ academic performance. In this paper, we will present our findings on the effects of remedial exams and compare them with the only other study we found that specifically focuses on remedial exams alone (Ferman & Fontes, 2021).

Additionally, we will explore the literature on academic remediation strategies and relevant studies concerning the effects of implementing remedial strategies in general. By doing so, we aim to provide clearer insights and present more concrete results and recommendations.

A remediation test is a second-chance examination opportunity provided to students who have not achieved a passing grade on a required course exam (Carr, 2011). This test aims to assist students in improving their performance and raising their overall academic standing and GPA. Ferman and Fontes (2021) describe remedial exams as a means for students to catch up on essential material necessary for passing, offering them an opportunity to demonstrate their acquired knowledge. Following Brazilian legislation, students whose grades in a course fall below the passing threshold are eligible to take a remedial exam to elevate their grades. The pre-remediation course grades are combined with the remedial exam score to determine their eligibility for progression to the next level. Ferman and Fontes (2021) observed that the test scores of low-performing students showed improvement after participating in a remedial exam.

This study aimed to evaluate the effectiveness of the remedial midterm exam strategy in enhancing the academic performance of nursing students who did not achieve a passing grade on their initial midterm exam. In this context, “academic performance” is defined as the overall cumulative grade obtained by students from both formative assessments (such as quizzes, midterms, and ongoing evaluations) and summative assessments (including the final exam) conducted throughout the semester, which collectively determine the final course score. The term “remediation midterm exam” refers to the approach employed to support students who failed their initial midterm exam by providing them with a second opportunity to improve their performance. Students who are eligible for the remedial exam are required to acknowledge their agreement to participate in it.

The study aimed to address two research questions: 1) Is the remedial exam strategy effective in improving nursing students’ midterm exam scores and overall academic performance in the course? 2) Which students can benefit from the remedial exam strategy? Two hypotheses were formulated to investigate these research questions: First Hypothesis: The students’ scores in the remedial midterm exam are higher than their initial midterm exam scores. Second Hypothesis: There is a significant difference between the remedial and no-remedial exams groups concerning midterm and total course scores.

Methods

Study Design
A quasi-experimental (forward) design was employed to examine the effect of a remedial midterm exam at a private college in Saudi Arabia’s eastern region, which offered a bachelor’s degree in nursing.

Samples/Participants
A convenient sample of nursing students enrolled in a bachelor’s nursing program was used for the study. The sample consisted of students who failed their midterm exams, where the passing score was determined to be 60% according to the college policy. All the students who failed their exams were given the option to take a remedial midterm exam, and the decision to do so was entirely up to them. Those who
agreed to take the remedial exam were assigned to the intervention group (Remedial Group), while those who declined to take the exam were assigned to the control group (No-Remedial Group). The inclusion criteria for the study included all bachelor nursing students who failed a midterm exam in any course ranging from level three to level eight. However, students from levels one and two were excluded from the study as they were treated differently within the program. Using Jamovi software, a sample size of 300 nursing students was determined to be necessary to ensure reliable results with a probability greater than 0.9. The study groups were assigned a relative size of 1:2, with the control group having twice the number of participants compared to the intervention group. The sample size calculation was based on detecting a medium effect size of $\delta \geq 0.4$, assuming a two-sided detection criterion that allows a Type I error rate of no more than $\alpha = 0.05$.

**Instruments**

For this study, the primary instrument used was the students’ grades for various assessments, including the remedial midterm exam, formative evaluations (quizzes, continuous assessments, and midterm exams), summative evaluations (final exams), and total course scores for the Spring semester of 2022.

**Data Collection**

Data collection for this study involved reviewing course files and student records during the semester. The researchers contacted course coordinators to gather the students’ grades. The course coordinators were unaware that their students’ midterm exams and the effectiveness of the remedial strategy would be examined and analyzed. This blinding process aimed to prevent any bias in the construction of the exams. The remedial midterm exam scores and other assessment scores were collected to evaluate the research questions and the first research hypothesis. All formative and summative assessments within each course were summed to calculate the total course score. This total score was used to compare the two groups and analyze any differences in overall course performance. The researcher ensured all courses used the same grading criteria and assessment methods. Multiple-choice questions were used in all exams, which were autocorrected by the examination unit. Independent exam reviewers reviewed all midterm and final exams to ensure validity and consistency with the course learning outcomes. Item analysis was conducted after each assessment to assess discrimination and difficulty indices.

To ensure the integrity of the study, the students were not informed that the same questions from the first midterm exam were recycled for the remedial midterm exam. This was done to eliminate any influence of the remedial exam’s difficulty on students’ grades and to maintain participant blindness. The college’s legislation for the remedial midterm exam was applied to all levels. After the exams were autocorrected and the midterm scores were published, course coordinators emailed the students who failed the exam and offered them the opportunity to retake the remedial midterm exam. The students were free to decide whether to take the remedial exam. In addition, academic advising was available to all students from the beginning of the semester, providing support and guidance on their academic progress and effective study techniques/strategies. This counseling aimed to enhance students’ performance and help them make informed decisions about participating in the remedial exam. Overall, the data collection involved collecting the students’ grades from course files and student records, ensuring consistency in grading criteria and assessment methods, and maintaining participant blindness to prevent potential biases.

**Data Analysis**

The data were analyzed using the SPSS software (2023) and Jamovi software (2022, version 2.3). Hypotheses were evaluated by comparing mean and median scores. The paired t-test and Mann-Whitney test were employed to compare the intervention and control groups. The correlation test was utilized to examine the relationship between the midterm and remedial exams and to determine which students would benefit from the remedial strategy. This information will assist college administrators in effectively implementing this technique when setting legislation. The statistical significance level was set at $p < 0.05$.

**Ethical Considerations**

The study received approval from the Institutional Review Board (IRB) at Mohammed AL-Mana College for Medical Sciences (Reference Number: SR/RP/88). Participating students were given the autonomy to choose whether or not to take the remedial midterm exam. All collected data were treated with strict confidentiality throughout the study and remained secure. The college granted permission to utilize the students’ grades to analyze the effectiveness of the remediation strategy. This analysis aimed to assist the college in revising its policies and developing more efficient strategies to support students facing academic challenges. Ultimately, these efforts align with the college’s goals and mission.

**Results**

The sample for this study consisted of 306 students who failed the midterm exam in various courses. Among them, 103 students opted to take the remedial exam (Remedial group) to enhance their midterm scores, while 203 students chose not to take the remedial exam (No-Remedial Group). The study encompassed 14 courses conducted at different levels, as illustrated in Table 1.

| Table 1 Courses that offered remedial midterm exam for underachieving students |
|---|---|---|
| **Level** | **No. of Courses** | **Courses’ Name** |
| Level 3 | 2 | Medical Terminology Microbiology |
| Level 4 | 3 | Pathophysiology Psychology Health Assessment |
| Level 5 | 2 | Nursing Care of Adult I Psychiatric Nursing |
| Level 6 | 3 | Sociology Nursing Care of Adult II Obstetrics & Gynecology Nursing |
| Level 7 | 1 | Critical Care Nursing |
| Level 8 | 3 | Nursing Informatics Nursing Education Geriatric Nursing |
Testing the First Hypothesis
The first hypothesis postulated that the remedial group would achieve higher scores in the remedial exam than their initial midterm exam scores. To assess the normality of the students’ performance, the Shapiro-Wilk Test was conducted, yielding a p-value greater than 0.05 (W = 0.976, p = 0.059), indicating that the data followed a normal distribution. Subsequently, the paired t-test was utilized to compare the students’ scores in both the initial and remedial midterm exams, aiming to identify any significant improvement in their results after being provided with an additional opportunity to study. Table 2 demonstrates a significant difference between the students’ midterm scores and their remedial exam scores (p <0.001), thus supporting the first hypothesis.

Table 2 Comparison of the remedial group’s midterm and remedial midterm exam scores

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>SE</th>
<th>95% CI</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm score</td>
<td>9.52</td>
<td>2.94</td>
<td>0.290</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remedial score</td>
<td>10.60</td>
<td>3.72</td>
<td>0.372</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midterm - Remedial</td>
<td>-1.08</td>
<td>2.43</td>
<td>0.239</td>
<td>-1.554 to -0.682</td>
<td>-4.51</td>
<td>102</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

While a statistically significant difference was observed between the scores of the two exams (midterm and remedial exams) (t = -4.51, p <0.001), indicating an improvement for the majority of students (68%) in their second chance (remedial exam), the outcome was not entirely successful. Out of the 103 students who took the remedial exam, only 16 (15.5%) managed to pass by achieving a 60% or higher score. Conversely, a significant number of students, 87 in total (84.5%), failed to pass the remedial exam.

Additionally, to address the second research question, “Which students can benefit from the remedial exam strategy?”, the Pearson correlation test was employed to examine the relationship between the students’ scores in the remedial midterm exam and their initial midterm exam. The results revealed a strong positive correlation between the two scores (r = 0.766, n = 103, p <0.001). This correlation indicated that higher midterm scores were associated with higher scores in the remedial midterm exam. These findings provide insights into the research question, suggesting that the remedial exam strategy may be beneficial for students who require only a few additional points to pass the exam (≥60%). However, it may not be effective for those students who are significantly far from reaching the passing threshold.

Testing the Second Hypothesis
The second hypothesis aimed to compare the performance of students who took the remedial midterm exam (Remedial group) with their peers who failed the midterm exam but chose not to take the remedial exam (No-Remedial group). This comparison was conducted based on their midterm scores and total course scores. In order to ensure that other course factors such as quizzes, continuous assessments, and the final exam did not distort the analysis of the effectiveness of the remediation technique on the total course scores, these factors were included in the analyses.

The normality and homogeneity assumptions were tested for both groups. The Shapiro-Wilk test indicated a significant deviation from the normal distribution for the data, as evidenced by p-values below 0.05. The test results were 0.004 for quizzes, <0.001 for continuous assessment, <0.001 for the midterm exam, 0.006 for the final exam, and <0.001 for the total course score. Conversely, the Levene test for homogeneity of variance revealed that both groups exhibited homogeneity, as indicated by p-values greater than 0.05. The test results were 0.420 for quizzes, 0.058 for continuous assessment, 0.756 for the midterm exam, 0.131 for the final exam, and 0.481 for the total course score.

Given the non-normal distribution of the data, the Mann-Whitney U test was used to compare the two groups and evaluate the second hypothesis. The following section presents a comparison between the two groups concerning quiz scores, continuous assessment scores, midterm exam scores, final written exam scores, and total course scores. It is noted that for the remedial group, the midterm scores considered are those obtained after taking the remedial exam.

Table 3 Remedial group vs. no-remedial group descriptive data in various assessments

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Median</th>
<th>Q1 (25th)</th>
<th>Q3 (75th)</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remedial</td>
<td>103</td>
<td>8.43</td>
<td>2.31</td>
<td>8.00</td>
<td>6.75</td>
<td>10</td>
<td>0.227</td>
</tr>
<tr>
<td>No-Remedial</td>
<td>203</td>
<td>8.77</td>
<td>2.62</td>
<td>9.00</td>
<td>7.50</td>
<td>10.5</td>
<td>0.184</td>
</tr>
<tr>
<td>Continuous Assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remedial</td>
<td>103</td>
<td>12.34</td>
<td>2.38</td>
<td>13.00</td>
<td>11.02</td>
<td>14.1</td>
<td>0.234</td>
</tr>
<tr>
<td>No-Remedial</td>
<td>203</td>
<td>12.02</td>
<td>2.75</td>
<td>12.75</td>
<td>10.67</td>
<td>14.1</td>
<td>0.193</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remedial</td>
<td>103</td>
<td>10.93</td>
<td>3.36</td>
<td>10.50</td>
<td>8.75</td>
<td>12.6</td>
<td>0.331</td>
</tr>
<tr>
<td>No-Remedial</td>
<td>203</td>
<td>11.85</td>
<td>3.07</td>
<td>11.40</td>
<td>9.55</td>
<td>15.0</td>
<td>0.216</td>
</tr>
<tr>
<td>Final Exam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remedial</td>
<td>102</td>
<td>16.12</td>
<td>5.51</td>
<td>16.00</td>
<td>12.54</td>
<td>18.9</td>
<td>0.545</td>
</tr>
<tr>
<td>No-Remedial</td>
<td>203</td>
<td>18.17</td>
<td>6.30</td>
<td>18.00</td>
<td>13.41</td>
<td>21.5</td>
<td>0.442</td>
</tr>
<tr>
<td>Total Course Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remedial</td>
<td>103</td>
<td>55.51</td>
<td>9.89</td>
<td>57.54</td>
<td>48.18</td>
<td>61.6</td>
<td>0.975</td>
</tr>
<tr>
<td>No-Remedial</td>
<td>203</td>
<td>58.98</td>
<td>9.99</td>
<td>60.13</td>
<td>53.35</td>
<td>65.8</td>
<td>0.701</td>
</tr>
</tbody>
</table>

The second hypothesis posited a significant difference between the two groups regarding midterm and total course scores (Table 3 and Table 4). The data analysis confirmed a statistically significant difference between the two groups for the midterm and total course scores, thereby supporting the second hypothesis. In light of the non-normal distribution of the data, the median (Mdn) and interquartile range (IQR) were utilized for data analysis.

a. The analysis of midterm exam scores using the Mann-Whitney test revealed a significant difference between the two groups (U = 8572.5, z = -2.576, p = 0.010, p <0.05). The median score of the remedial group (Mdn = 10.50, IQR
These results suggest that, apart from the remedial exam strategy, it was observed that a majority of low-performing students, particularly among females. Additionally, it was found that students demonstrated better results in the year following remediation on cognitive and noncognitive tests. However, it is essential to note that the students who took the remedial exam in Ferman’s study had initial scores averaging around 58, which is very close to the passing cutoff point of 60. Therefore, their findings may not necessarily apply to students with significantly lower grades. Nevertheless, these results align with our findings, suggesting that the remedial exam strategy is most beneficial for students only a few grades away from passing the exam but may not provide substantial advantages for those with significantly lower performance levels.

Despite observing a statistically significant difference between midterm and remedial exam scores, the participation of students in the remediation strategy did not improve their chances of passing the midterm or the overall course. This lack of improvement may be attributed to the students’ failure to learn from their mistakes on the initial midterm exams and insufficient preparation for the remedial exam. It is possible that modifying the approach to conducting the remediation technique could yield better outcomes. In order to obtain a more comprehensive understanding of the subject, we deemed it necessary to investigate the effectiveness of remedial interventions as a whole. Consequently, we also considered studies that examined remedial strategies in general instead of focusing solely on remedial exams but implemented them in different ways. Vandenbussche et al. (2018) reported that a 2-hour revision program with teacher support between the initial and re-take exams was associated with higher student success, indicating that a lack of prerequisite knowledge presents a significant barrier for students. Additionally, Asio and Jimenez (2020) found significant academic improvement in fifth-grade students’ scores after implementing remediation activities in the subject of Technology and Livelihood Education (TLE). Similarly, studies evaluating the effects of providing remedial courses to college freshmen revealed that these interventions aided students in developing clear educational goals, practical skills, and a better understanding of what it takes to succeed in college, particularly considering the challenges freshmen often face due to the substantial transition from high school (Zeidenberg et al., 2007).

Furthermore, Bettinger and Long (2009) conducted an evaluation of the impact of remedial courses on students’ performance of Technology and Livelihood Education (TLE). Similarly, studies evaluating the effects of providing remedial courses to college freshmen revealed that these interventions aided students in developing clear educational goals, practical skills, and a better understanding of what it takes to succeed in college, particularly considering the challenges freshmen often face due to the substantial transition from high school (Zeidenberg et al., 2007).
mathematics and English skills. Their findings revealed that students who enrolled in remedial courses demonstrated better academic performance than those who did not participate. Esposito et al. (2019) conducted a study investigating the effects of a rigorous 2-week remediation program for students who had failed a final exam with a score that fell 10% or less below the cutoff grade. The program required eligible students to sign a written contract outlining a concentrated study plan that thoroughly assessed their strengths and weaknesses. They also participated in study sessions with faculty members and engaged in personalized remediation activities. Upon completing the remediation period, the students were required to take a remedial exam. Esposito and her colleagues reported a pass rate of 75.2% among those who chose to participate in the remediation plan. This success rate is notably higher than the one observed in our study. It is important to note that the disparity in success rates may be attributed to the fact that in Esposito’s study, the remedial exams were preceded by a mandatory period of remediation where various techniques were applied to assist struggling students. Furthermore, they only allowed students within 10% of the required minimum grade to participate. In contrast, our study included all students who failed the exam, regardless of their initial grades.

Conflictingly, it is worth noting that several research studies on remedial interventions have produced negative results. Nietzel (2018) argued that remedial programs are less effective than commonly believed, citing data from the Complete College America advocacy group (CCA). The data indicated that only 1 in 10 students in two-year colleges who enrolled in remedial programs managed to obtain a degree within three years or less. Similarly, only 35% of four-year college students in remedial programs achieved a degree within six years. Additionally, the dropout rates for students enrolled in remedial courses were significant, with approximately 40% of students in two-year colleges and 25% of students in four-year colleges dropping out. Martorell and McFarlin Jr (2011) conducted a study on the effects of mathematics remediation on Texas College students, examining their academic scores and subsequent labor market outcomes. The findings revealed that the impact of remedial courses on academic success was small and statistically insignificant. Moreover, there were no labor market advantages observed among students who received mathematics remediation compared to those who did not. These outcomes may be attributed to the fact that many underperforming students fail to acknowledge their deficiencies and often do not seek appropriate help or support (Cleland et al., 2010).

The participants’ decline in performance and lack of improvement in the remedial exam can be attributed to various factors, including poor study skills (such as planning and time management), inadequate English language proficiency, deficient time management skills, and underdeveloped critical thinking abilities. This is indicated by the finding that the remedial group’s performance in the final exam did not significantly differ from their performance in the initial midterm exam. Bergey et al. (2017) conducted a study on first-year university students and found that students with reading difficulties had a lower cumulative GPA of 2.8 (out of 4.3) in their first year compared to students without such difficulties, who achieved a GPA of 3.0. Tseng et al. (2016) and other studies have reported that students themselves identify inadequate learning strategies, course-related factors (e.g., difficulty, teaching styles, lack of prerequisite knowledge, comprehension challenges), personal factors (e.g., health issues, emotions, motivation, family difficulties), language barriers, and a lack of academic advising as the primary reasons for poor performance. Balduf (2009) and Ritchotte et al. (2014) suggested that low performance may stem from a lack of academic confidence, motivation, or self-regulation. Many of these factors cannot be fully addressed through remedial interventions, which could explain their limited effectiveness.

Several possible strategies can be implemented to address the identified factors hindering academic progress. Personal problems may be tackled by providing readily-available social-emotional counseling services, while course-related challenges can be addressed through academic counseling and support. Offering study-skills workshops and tutoring can also greatly assist students, particularly those with a history of reading difficulties (Chevalier et al., 2017; Deacon et al., 2017). However, a persistent challenge is that students in the current study have been observed to rarely seek assistance from academic advisors or university psychological counselors, and sometimes they do not even reach out to their course professors for help. Encouraging students to actively seek support and guidance is crucial in effectively implementing these strategies.

Moreover, a systematic review and meta-analysis conducted by Snyder et al. (2019) emphasized that despite numerous studies on interventions to improve underachieving students’ academic performance, definitive answers have yet to emerge. The findings of the review indicated that interventions had a moderate effect on enhancing students’ achievement and psychosocial outcomes, with the effectiveness varying across different grade levels. Notably, the effectiveness of interventions tended to be lower at older age levels, such as high school and post-secondary education.

Contrary to the second hypothesis, the group that participated in the remedial exam did not perform better than the group that did not. No significant difference was observed in final exam scores or total course scores between the remedial and non-remedial groups. Interestingly, it seems that the students in the non-remedial group, who experienced the negative outcome of failing the midterm exam, were motivated to study harder or strive for higher scores on the final exam to compensate for their earlier performance. This finding aligns with studies that suggest students’ responses to adverse academic events, such as being placed on college probation, can lead to improved performance in subsequent exams (Lindo et al., 2010). In a related study, Hvidman and Sievertsen (2021) reported that students in Denmark whose GPAs were negatively affected by a reform in GPA calculation performed better in subsequent examinations, particularly female students.

**Limitations and Recommendations for Future Research**

This study is subject to several limitations that should be considered. Firstly, using a convenient sample could introduce bias and limit the generalizability of the findings. It is essential to acknowledge that the results may not represent the entire
population of nursing students. Secondly, the existing literature on remedial interventions lacks comprehensive research on every remedial intervention strategy. As a result, it is challenging to determine which specific strategies are effective and which are not. Further research is needed to compare different remedial intervention approaches and conduct longitudinal follow-ups to assess the long-term effects on students’ academic performance. These limitations highlight the need for future studies that employ more rigorous sampling methods and investigate a wider range of remedial intervention strategies. Long-term assessments would provide valuable insights into the sustained impact of these interventions on students’ educational outcomes.

Implications of this Study
The study findings suggest that the remedial exam strategy is most effective for students who narrowly miss passing the initial exam by a small margin. However, the majority of students who struggle significantly fail to recognize their weaknesses and, as a result, do not benefit from the remedial exam. To address this issue, implementing a remedial program or providing remedial activities throughout the course, prior to the remedial exam, may yield better results for these strongly underperforming students. In addition to targeted remedial interventions, educational institutions can enhance students’ motivation and performance by offering study skills classes and time-management workshops. These initiatives can equip students with the tools and strategies to overcome academic challenges and improve their performance. Educational institutions can create an environment conducive to academic success for all students by focusing on developing essential skills and providing support throughout the course.

Conclusion
Despite the significant difference between the students’ midterm scores and their scores in the remedial exam, the majority of students were unable to pass the remedial exam or raise their total course scores to a level that would lead to passing the course. Additionally, the average performance of the students in the remedial group was worse than that of the no-remedial group on the final exam. The no-remedial group outperformed the remedial group in terms of midterm exam scores and total course scores. Although the remedial exam strategy proved beneficial for students who narrowly missed passing the initial midterm exam, it was insufficient to improve the academic performance of underachieving students on its own. Additional interventions or strategies may be necessary to address the needs of these students and enhance their overall academic performance.

Declaration of Conflicting Interest
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Author’s Contribution
The author solely contributed to all of the research efforts.

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Data Availability
Upon a reasonable request, the corresponding author will make available the datasets used and/or analyzed during the current study for the journal reviewer panel only. Data were not made public as a web link because it includes students' scores and the results of institutional exams.

Declaration of Use of AI in Scientific Writing
The author did not employ any artificial intelligence (AI) or AI-assisted technology during the writing of this paper except the tools that were used for checking spelling, grammar, and references.

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