

REMEDIAL EXAMS EFFECTIVENESS IN IMPROVING MEDICAL STUDENT BLOCK PASS RATES BASED ON MULTIPLE CHOICE QUESTIONS (MCQ) SCORES

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ABSTRACT

Remedial exam is a method used in Medical Education to improve below-standard summative scores, such as student's Multiple Choice Question (MCQ) block scores. This study aimed to determine the effectiveness of remedial exams in improving block pass rates for medical students at Universitas Andalas based on Multiple Choice Question (MCQ) scores. An observational analytic study was conducted using total sampling with a population of 249 first-year students registered in the 2022/2023 academic year. Student academic data was obtained from the Study Program of Medicine at Universitas Andalas. The data was collected using a computerized program and analyzed using paired-samples t-test statistics. The results were presented in frequency tables, graphic figures, and paired-samples t-test interpretation tables. This study found the highest number of remedial exam participants was in block 1.2 (212) out of the six blocks studied. Block 1.1 got the highest average remedial MCQ score (65.4), while the lowest average remedial MCQ

score was in block 1.4 (44.5). The highest remedial MCQ score improvement percentage was in block 1.1 (93.1%). The paired t-test analysis result showed that the comparison of pre-remedial MCQ and post-remedial MCQ scores for block 1.1 was significant ($p\text{-value}<0.001$) but not significant for other blocks ($p\text{-value}>0.05$). This study found the highest number of remedial exam participants was in block 1.2 (212) out of the six blocks studied. Block 1.1 got the highest average remedial MCQ score (65.4), while the lowest average remedial MCQ score was in block 1.4 (44.5). The highest remedial MCQ score improvement percentage was in block 1.1 (93.1%). The paired t-test analysis result showed that the comparison of pre-remedial MCQ and post-remedial MCQ scores for block 1.1 was significant ($p\text{-value}<0.001$) but not significant for other blocks ($p\text{-value}>0.05$).

ABSTRAK

Ujian remedial dalam pendidikan kedokteran adalah suatu metode untuk memperbaiki nilai sumatif seperti nilai Multiple Choice Questions (MCQ) blok mahasiswa yang di bawah standar. Tujuan penelitian ini adalah mencari tahu efektivitas ujian remedial dalam meningkatkan kelulusan blok mahasiswa Pendidikan Dokter Universitas Andalas berdasarkan nilai Multiple Choice Questions (MCQ). Penelitian ini analitis observasional menggunakan total sampling dengan besar sampel 249 orang mahasiswa tahun pertama angkatan 2022. Data akademik mahasiswa didapatkan dari Bagian Program Studi Pendidikan Dokter FK Unand. Selanjutnya data dikumpulkan dengan program komputerisasi lalu dianalisis menggunakan uji-T berpasangan kemudian ditampilkan dalam tabel distribusi frekuensi dan tabel interpretasi uji-T berpasangan. Hasil penelitian ini menunjukkan bahwa dari keenam blok yang diteliti, peserta remedial terbanyak didapat pada blok 1.2 (212 orang). Nilai rata-rata MCQ remedial tertinggi mahasiswa yaitu pada blok 1.1 (65,4). Sedangkan nilai rata-rata MCQ remedial terendah didapat pada blok 1.4 (44,5). Persentase kenaikan nilai tertinggi MCQ remedial yaitu pada blok 1.1 (93,1%). Hasil analisis uji-T menunjukkan perbandingan nilai Sebelum remedial dan MCQ remedial blok 1.1 signifikan ($p\text{-value}<0,001$) dan tidak signifikan pada blok lainnya ($p\text{-value}>0,05$). Kesimpulan penelitian ini yaitu ujian remedial MCQ tidak dapat secara efektif meningkatkan kelulusan blok mahasiswa Pendidikan Dokter Universitas Andalas angkatan 2022 Tahun Akademik 2022/2023. Evaluasi dan eksplorasi faktor yang mempengaruhi performa ujian mahasiswa dibutuhkan untuk menentukan penyebab kegagalan mahasiswa dalam ujian MCQ blok

INTRODUCTION

The Department of Medicine is a complex, university-based academic field with high competency standards. The primary goal of this field is to produce competent and professional doctors for healthcare services. One key indicator of a medical student's competency is their performance in passing each block of the undergraduate medical school program (Konsil Kedokteran Indonesia, 2019). Block passing grades in Medical Education are typically measured through various assessments. Medical Education utilizes two main assessment methods: summative and formative (Elshama, 2020). Summative assessments, such as final exams, aim to provide a final score and measure overall learning (Ismail, 2022). In contrast, formative assessments focus on developing critical thinking skills through feedback and guidance. According to Elshama (2020), ideally, both methods work together to provide a comprehensive evaluation of a student's abilities. The ultimate goal of assessment is to gauge a student's knowledge, skills, and overall professional attitude gained throughout their studies (Dent, 2021).

The vast amount of information medical students need to learn can make summative assessments a popular choice for institutions, as they aim to efficiently measure student learning despite the heavy study load. Multiple Choice Questions (MCQs) are a common form of summative assessment used by medical institutions worldwide to evaluate their students' scores (Javaeed, 2018). The question items in block MCQ exams are based on case scenarios (vignettes) that are aligned with the Standar Nasional Pendidikan Profesi Dokter Indonesia (SNPPDI), also known as the National Standards of Education of the Doctor's Profession of Indonesia (Konsil Kedokteran Indonesia, 2019). Properly constructed MCQ questions can provide an objective assessment for measuring students' understanding, knowledge, application, and analytical skills (Javaeed, 2018).

Despite the advantages of MCQs, many students still face difficulties during these exams. The challenges include various item-writing flaws (IWFs), such as ambiguous wording or phrasing in some questions, which can lead to difficulties in interpreting the questions. Moreover, the difficulty of MCQ question items and distractors can also negatively impact students' test performance on block MCQ exams (Moore et al., 2023). Students who struggle with these issues often achieve underwhelming scores (Saadat, 2020). According to Kirtchuk (2022) and Sarabia (2021), these students have a chance to improve their scores by taking remedial exams offered by the academic services of each medical institution.

Remediation in Medical Education is the process of facilitating correction to improve students' scores that were below standards (passing grades) in block MCQ exam results (Lacasse, 2019). Remediation is intended to support all students in achieving adequate competencies (Lacasse, 2019). Kirtchuk (2022) describes remedial programs are offered to medical students and junior doctors who have performed poorly in either written exams or clinical skills. Currently, remedial exam interventions in Medical Education focus solely on improving students' scores by allowing them to retake exams

to meet or surpass the passing grades. As Sarabia (2021) and Lacasse (2019) stated, this intervention is carried out without providing any additional learning opportunities or assignments to enhance students' learning.

The need for remedial intervention arises from academic problems in Medical Education, which can be caused by students, teaching staff or lecturers, or the institution's system itself (Lacasse, 2019). Many students do not know what is expected of them, leading to preventable difficulties. Effective strategies to address these issues include: (1) setting clear expectations and learning achievement targets for students, (2) providing constructive feedback and guidance, and (3) conducting continuous evaluations to help students improve their academic performance. According to research at Universitas Trisakti by Wahab (2021), using 228 students as respondents, it was found that students who participated in the remedial program had a higher dropout rate (18.3%) compared to students who did not take the remedial program (9.6%). Therefore, paying attention to students with academic difficulties is crucial for their success in completing their studies.

Other factors that can cause academic difficulties, such as unsatisfactory scores for new Medical Education students, can generally be grouped into three categories (Kirtchuk, 2022):

- Academic factors: Transitions in educational levels for new students tend to be challenging, requiring students to readjust their study strategies and habits in college.
- Psychological factors: The rapidly increasing and accumulating subject matter can lead to high levels of stress and anxiety, which may further result in depression and burnout, especially for new students.
- Social factors: Cultural differences and the process of adapting to a new environment can also influence students' academic performance.

To overcome these problems, appropriate adjustments and support are needed for students, especially from teaching staff and institutions. This support should be both academic (such as remediation) and emotional, to help restore students' learning motivation and improve their academic performance. The various difficulties that students encounter in the learning process and when assessing learning outcomes occur quite often. These complicating factors cause many medical students to fail the block exams. Therefore, corrective action is needed so that students can re-evaluate their abilities and knowledge in their academic fields. Currently, the Faculty of Medicine at Universitas Andalas has implemented a Computer-Based Test (CBT)-based MCQ exam as a summative assessment method for pre-remedial and post-remedial block written exams.¹³ Scores below 50 (<50) are declared as failures, and these students are required to take a remedial exam. Whereas, students with scores between 50 and 74 are allowed (but not required) to take a remedial exam to improve their scores, with a maximum achievable grade of B+ (equivalent to a score of 74).

In this study, the authors aim to identify the problems mentioned previously and assess the effectiveness of remediation carried out through block MCQ exams in

increasing the pass rates of medical students at Universitas Andalas. This research involves observing changes in the students' summative scores (including improvements, declines, or unchanged scores) in both pre-remedial and post-remedial block MCQ exams and analyzing their relationship with the factors involved. This study focuses on first-year Medical Education students at Universitas Andalas who are participating in the 2022/2023 academic year.

METHODS

An observational analytic study using a cross-sectional design was conducted on first-year medical students in the Faculty of Medicine, Universitas Andalas, from August 2023 to May 2024. The population of this research consists of 249 first-year students who are registered in 2022 and participating in first-year blocks of the 2022/2023 academic year. The sample criteria are divided into two categories:

- Inclusion criteria: Students registered for MCQ remedial exams in blocks 1.1 (Biomedical), 1.2 (Circulation and Respiration), 1.3 (Hormones and Nerves), 1.4 (Metabolism), 1.5 (Life Cycle), and 1.6 (Basic Pathology).
- Exclusion criteria: Students who were not present during the MCQ remedial exams in blocks 1.1, 1.2, 1.3, 1.4, 1.5, and 1.6.

The passing grades of this research were obtained from the academic regulations of the Medical Faculty in Universitas Andalas and Chancellor's Regulation of Universitas Andalas Number 7 Year 2022. These criteria are used to group students who 'did not pass' (score <50) and students who 'surpassed the passing grade' (score ≥ 50) in each pre-remedial block MCQ.¹² This research used a Total Sampling technique to include the entire population and adjust the inclusion and exclusion criteria to ensure representativeness.

Data obtained were scores of pre and post-remedial MCQ exam scores, which were further processed and analyzed using a computerized program. The research data were initially tested for normality with the Kolmogorov-Smirnov test. If the data were normally distributed, they were then tested using a paired T-test (dependent T-Test). Moreover, the following analyses were also performed:

- Univariate analysis: This was carried out to determine and describe each research variable, aiming to determine the frequency, mean, minimum, maximum, and standard deviation of each variable studied.
- Bivariate analysis: This was used to examine the differences between two variables, i.e., the dependent and independent variables. The aim was to evaluate the pre-remedial MCQ score as the independent variable and the post-remedial score as the dependent variable.

RESULTS AND DISCUSSION

The average pre-remedial MCQ and post-remedial MCQ scores for first-year students from the class of 2022 during the 2022/2023 academic year are presented in

Figure 1. The data reveal that the highest average pre-remedial score was obtained in Block 1.6 (Basic Pathology), with an average score of 53.8, involving a total of 105 students taking the remedial MCQ exam in this block. The highest average remedial MCQ score was obtained in Block 1.1 (Biomedical), with an average score of 65.4, involving a total of 204 students taking the remedial exam. Meanwhile, the lowest average scores pre and post-remedial MCQ were obtained in Block 1.4 (Metabolism), with average scores of 46.2 and 44.5, respectively, involving 78 students taking the remedial MCQ exam.

The average MCQ score for students in Blocks 1.1 to 1.4 in pre-remedial exams is below the passing grades (scores <50). Various factors can contribute to the low average scores among first-year medical students.^{8,10} According to studies by Silva (2023) and Picton (2022), new students often struggle with the transition from high school to university, facing significant differences in learning environments and systems at these levels. Interviews with students revealed that many found it difficult to adapt to the learning methods in the Medical Education Study Program, aligning with the aforementioned research.

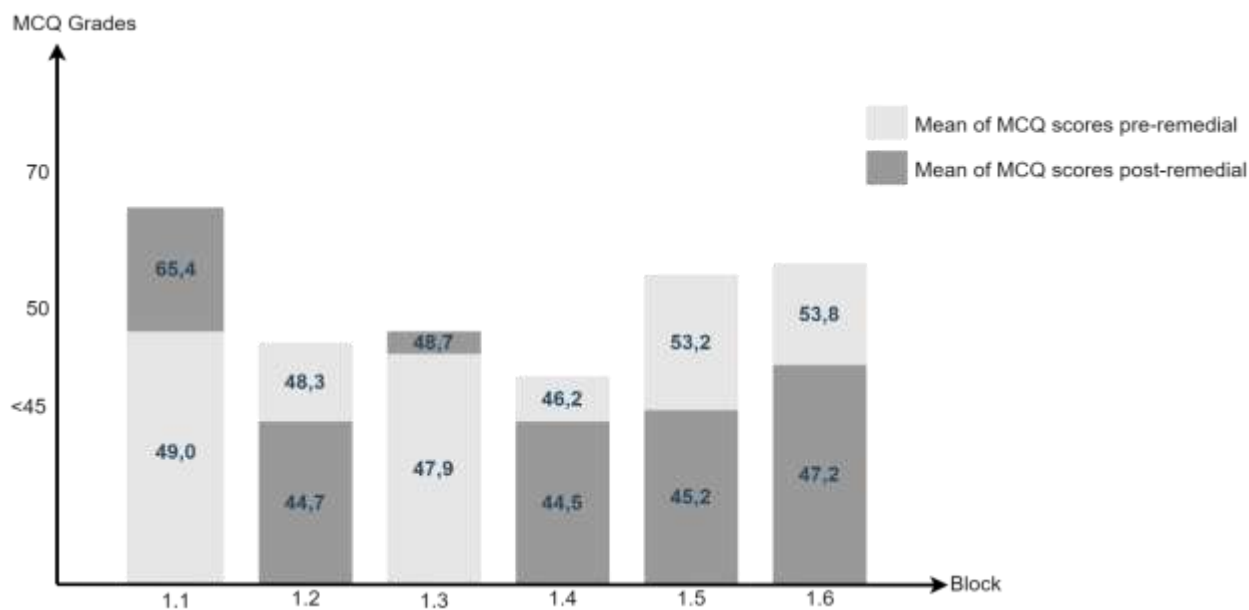


Figure 1. Mean of students' MCQ scores pre and post-remedial

Adapting to this new learning environment requires an effective introductory program. Research by Ruprai (2020) highlights the benefits of a student orientation module program that introduces the basics of Medical Education through activities such as visits to community health centers, patient introduction programs, learning local languages, developing interpersonal relationships and communication skills, and acquiring study skills, time and stress management techniques, IT proficiency, understanding national health policies, and learning about ethics, professionalism, and

collaborations. Ruprai's research indicates that such orientation modules enhance student satisfaction and participation due to improved interactions between teachers and students. However, the implementation of this learning module in the Medical Education program in Blocks 1.1, 1.2, and 1.3 seems to be ineffective. Many students reported difficulties in finding effective study methods. Additionally, students face various challenges during their first semester in the Medical Education program.

Academic challenges can generally be categorized into three areas: student factors, teacher factors, and learning environment (system) factors. Silva (2023) noted that new students often struggle with subjects such as anatomy, histology, and physiology, as well as the overall learning system in lectures.¹⁴ This is consistent with the high number of remedial exam participants in Blocks 1.1, 1.2, and 1.3, where students particularly struggled with the organ systems content in Blocks 1.2 and 1.3. First-year students also mentioned that the way lecturers delivered lectures significantly affected their motivation and understanding. Lecturers who presented material in an unengaging manner often caused students to feel sleepy and confused. Lacasse (2019) supports this, citing Steinert's (2013) idea that the interaction between students, teachers, and the educational system greatly influences academic difficulties.

In addition to teacher-student factors, student-system (environment) interactions also contribute to first-year students' challenges.¹⁰ Interviews with several students from the class of 2022 revealed that they experienced fatigue, burnout, and major learning difficulties due to numerous extracurricular activities. These activities are mandatory and often enforced by seniors. The pressure to participate in these activities led to stress, burnout, and exhaustion, negatively impacting students' study time. Tight (2023) describes such repetitive and deliberate actions that disturb individuals or groups as a form of bullying in higher education.

Academic difficulties can stem from academic factors, psychological factors, and social-contextual factors. The first-year medical curriculum is dense and challenging, often overwhelming students with the volume and complexity of the material to learn and remember. This is compounded by psychological and social issues, making it even harder for students to succeed academically. After conducting interviews, it was found that some students lacked high motivation to study in their first year in the Medical Education program. They explained that the substantial volume of lessons and extracurricular activities caused them to feel highly stressed and exhausted, leading to frequent remedial exams during the first-year blocks. At this stage, the predominant type of motivation that encourages them to continue learning is external motivation, such as support from parents, family, or close associates. Only a minority of students reported feeling self-motivated (internal).

In the second semester, it was observed that the average MCQ scores in pre-remedial exams for students in blocks 1.4, 1.5, and 1.6 were higher than in post-remedial exams. According to the students, they felt less fatigue or burnout in semester 2 due to the lower density of extracurricular activities compared to semester 1. Students also

mentioned that the post-remedial MCQ exam questions were significantly more challenging than the pre-remedial exams. This phenomenon is in line with research findings indicating lower average scores for post-remedial exams in blocks 1.4 (44.5), 1.5 (45.2), and 1.6 (47.2). Therefore, further evaluation is necessary regarding the validity and reliability of the MCQ questions in both block exams and remedial exams. In theory, MCQ exam questions should demonstrate good validity and reliability by containing relevant content covered during lectures and ensuring equivalent question points.¹⁷

Table 1. Distribution of first-year medical students surpass the passing grades in the academic year 2022/2023 based on MCQ scores <50 and ≥50

Block	Scores	Pre-remedial		Post-remedial		N
		f	(%)	f	(%)	
Block 1.1 Biomedical	Failed	91	44,6	14	6,9	204
	Passed	113	55,4	190	93,1	
Block 1.2 Circulation and Respiration	Failed	108	50,9	139	65,6	212
	Passed	104	49,1	73	34,4	
Block 1.3 Hormone and Nervous system	Failed	76	51,3	70	47,3	148
	Passed	72	48,7	78	52,7	
Block 1.4 Metabolism	Failed	43	55,1	58	74,4	78
	Passed	35	44,9	20	25,6	
Block 1.5 Life Cycle	Failed	11	24,4	32	71,1	45
	Passed	34	75,6	13	28,9	
Block 1.6 Basic Pathology	Failed	27	25,7	63	60,0	105
	Passed	78	74,3	42	40,0	

The distribution of first-year medical students surpasses the passing grades in the academic year 2022/2023 based on MCQ scores <50 and ≥50 are presented in Table 1. In this research, it was discovered that in semester 1, the highest number of students who passed in post-remedial exam was in Block 1.1, with 190 students passing. Conversely, the highest number of students who did not pass in post-remedial exam was in Block 1.2, with 139 students failing. In Block 1.3, 78 students (52.7%) passed and 70 students (47.3%) failed the post-remedial exam.

In Block 1.1, students learn the basics of medical biology, which is easier for them to grasp as they have prior knowledge from high school. However, in Block 1.2 and Block 1.3, students encounter more complex subjects related to organ systems. These blocks cover anatomical structures, histology, physiological processes, and other foundational topics in Medical Education. The complexity of the materials can significantly increase the difficulty level of MCQ exams in Blocks 1.2 and 1.3, both for pre and post-remedial exams. Beyond the challenging learning content, the high failure rate in Block 1.2 could also be attributed to the MCQ questions themselves. Interviews with students revealed

that many found the questions in Block 1.2, as well as some in Blocks 1.3 and 1.6, difficult to comprehend. This issue aligns with the concept of item-writing flaws (IWFs), which refer to various errors in crafting MCQ questions that can make them ambiguous and negatively impact student performance.

In Block 1.6, it was found that more students failed in the post-remedial exam (63 students) than the pre-remedial exam (27 students). This may be due to the remedial exam questions being more difficult than the initial MCQ exam questions, as mentioned by students during interviews. Additionally, the high number of students taking remedial exams in Block 1.6 could be attributed to the transition from basic material to more clinically oriented (pathological) content. This research indicates that the transition period significantly impacts the academic performance of Medical Education students.

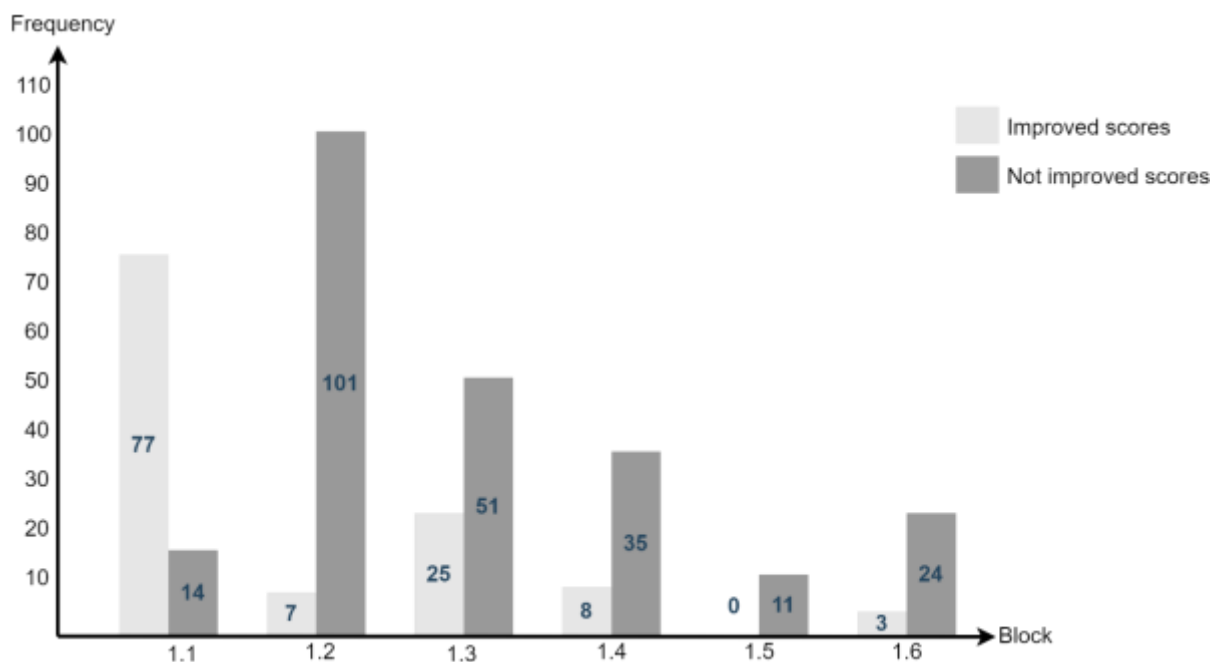


Figure 2. Post-remedial MCQ scores improvement of first-year medical students who failed the pre-remedial MCQ

Data depicting changes in scores in pre and post-remedial exams for first-year students of the class of 2022 during the 2022/2023 academic year, specifically for the group of students who did not pass in pre-remedial exam, can be seen in Figure 2. This research reveals that the highest frequency of score improvement (scores > 50) in the post-remedial exam was in Block 1.1 (Biomedical), with 77 out of 91 students (84%) who initially did not pass improving their scores. Conversely, the highest frequency of scores that did not improve (score ≤ 50) was in Block 1.2 (Circulation and Respiration), with 101 out of 108 students (93.5%) who initially did not pass failing to improve their scores in the post-remedial exam.

In Block 1.5 (Life Cycle), it was observed that none of the 11 students who did not pass the MCQ in the pre-remedial exam improved their scores in the post-remedial exam. Overall, the data indicates that apart from Block 1.1, the frequency of students whose scores did not improve in post-remedial exams was higher than the frequency of those whose scores did improve. In the group of students who did not pass the MCQ in pre-remedial exams, the highest number of students with improved scores was found in Block 1.1 (77 students). The material studied in Block 1.1 is quite familiar to new students because they have already learned some of the basics in high school, such as basic medical biology including cells, tissues, and so on. This familiarity makes it easier for students to re-study the material in this block. According to interviews, the large number of students taking remedial courses in this block is due to their initial struggle to adapt to the lecture-based learning environment, manage the heavy workload, acclimate to the new cultural environment, and cope with the busy activities outside of lectures. To improve their scores on the remedial exam, students often review previous exam questions that are likely to appear again on the remedial exam.

In Blocks 1.2 and 1.3, the frequency of students' scores not improving was greater than that of those who did improve, with 101 students and 51 students respectively (Figure 5.3). The initial material in Medical Education, particularly in these blocks, requires students to deepen their knowledge of human anatomy, which demands a high capacity for memorization and understanding¹⁹. This high level of cognitive demand must be complemented by the ability to apply and analyze information, which are higher-level cognitive skills. Without an appropriate learning and guidance system, students may struggle to master the material in these blocks. Consistent with this theory, students reported during interviews that they had too much material to memorize in a short period.

In Blocks 1.4, 1.5, and 1.6, the group of students who took remedial exams tended to experience scores that did not improve. Specifically, 35 students in Block 1.4, 11 students in Block 1.5, and 24 students in Block 1.6 did not show improvement (Figure 2). Notably, none of the 11 students who did not pass the MCQ in the pre-remedial exam in Block 1.5 improved their scores in the post-remedial exam. The total number of students who took the remedial exam in Block 1.5 was significantly lower than in other blocks, with 45 students in total—11 who did not pass MCQ in pre-remedial and 34 who passed the pre-remedial exam. It is crucial to investigate further the specific challenges faced by students in Block 1.5.

The material in Block 1.5 (Life Cycle) covers the stages of human growth and development, both physically and mentally, throughout the life cycle. This content tends to be easier to understand than other blocks because it primarily requires the ability to understand and recall information. According to Bloom's taxonomy, memorization and understanding are considered lower-order cognitive processes. Therefore, the MCQ exams in Block 1.5 are expected to be easier as they mainly assess low-level thinking abilities. Contrary to this theory, the students from the class of 2022 were not able to

improve their scores in Block 1.5. Institutions need to identify students with academic challenges individually. Students with unsatisfactory academic performance in previous blocks are likely to struggle in subsequent blocks due to the cumulative nature of prior knowledge's influence on the learning process. Students with academic difficulties should receive special assistance, such as academic support services, to enhance their learning performance.

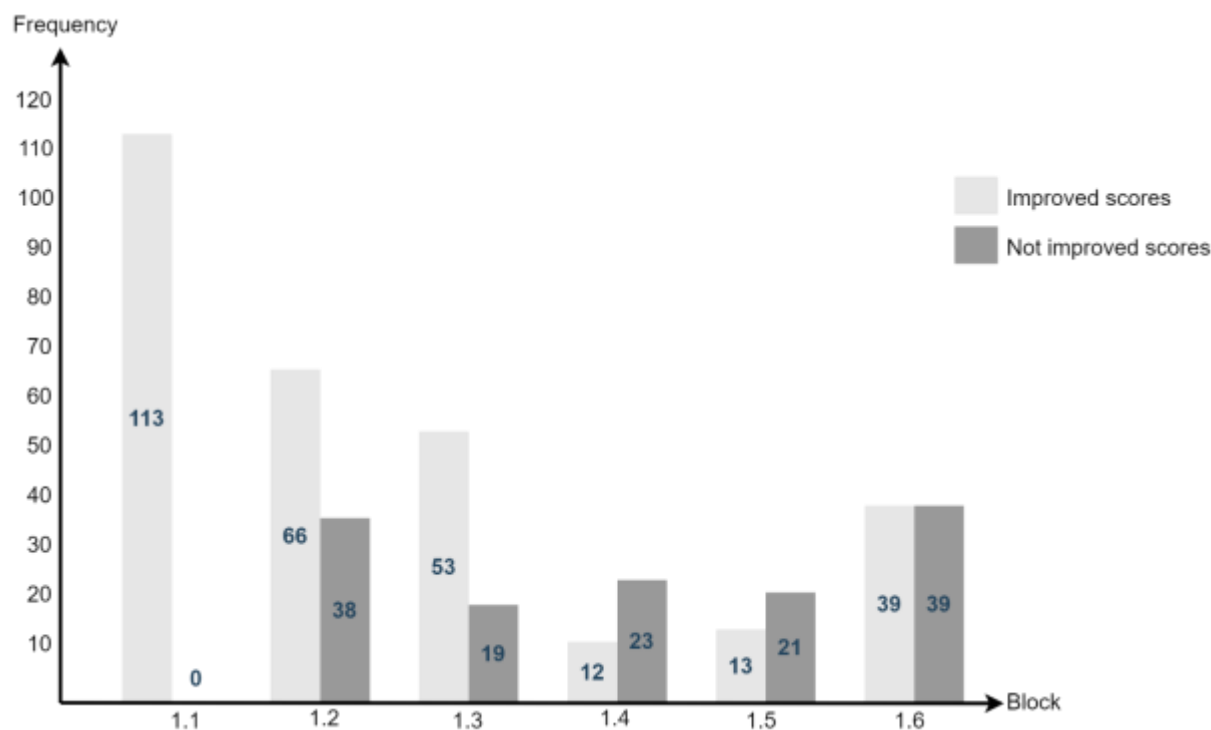


Figure 3. Post-remedial MCQ scores improvement of first-year medical students who passed the pre-remedial MCQ

Data depicting changes in scores of pre-remedial and post-remedial blocks for the first year of students class of 2022 for the 2022/2023 academic year in the group of students who pass in pre-remedial can be seen in Figure 3. It is known that in the post-remedial exam, the frequency of students in block 1.1 (Biomedical) who previously passed the MCQ in pre-remedial experienced an increase in their scores in post-remedial, with 113 students (100%) showing improvement. In blocks 1.4, 1.5, and 1.6, students' MCQ scores in post-remedial tended not to increase. The highest percentage of non-increasing scores was observed in block 1.4 (Metabolism), with 65.7% or 23 out of 35 students who passed the MCQ in pre-remedial and took the remedial MCQ exam not showing an improvement.

Based on this research data, it is known that the group of students who previously passed the MCQ exam in pre-remedial in block 1.1 (Biomedical) all experienced an

increase in their scores, totaling 113 people (100%). These results suggest that students who previously scored above the passing limit (≥ 50) in block 1.1 (Biomedical) find it easier to improve their scores in the post-remedial MCQ exam. This can be attributed to the fact that students who have already passed the MCQ block exam in pre-remedial are likely to have greater motivation to improve their scores than those who previously did not pass the MCQ in block 1.1. This aligns with the role of correlated motivation in encouraging students to enhance their learning performance.

In block 1.4 (Metabolism), the total number of students who took the remedial MCQ exam was 78. Out of the 35 students who had previously passed the MCQ in pre-remedial, it was found that 23 students (65.7%) did not show an improvement (Figure 5.4). This indicates difficulties for students in improving their scores in this block. The decline in score performance in post-remedial MCQ exams can be attributed to multiple factors, one of which is the fear of failure among students.

Based on the results of interviews, nearly all students have engaged in procrastination, and some exhibit negative motivation patterns, such as the motivation to avoid failure. Some students mentioned that they were motivated by the fear of having to take remedial training again in the next block. This motivation to avoid failure causes students to psychologically try to 'protect themselves' from failure. These efforts can manifest as self-handicapping behaviors or making excuses for self-justification. Procrastination is a form of self-justification due to the fear of failure. Apart from learning factors, the higher level of difficulty of remedial MCQ exam questions and the presence of distractors or irrelevant information in the questions also contribute to students' difficulties in answering exam questions. Motivational factors, fear of failure (FoF), and various other factors can also hinder students when studying and taking MCQ exams.

In the learning process, most of the block 1.4 courses focus on exploring the complex human metabolic system, starting from the smallest structures and biochemical metabolic pathways in the human body. Creative teaching strategies and appropriate learning methods are essential to help students understand biochemistry or metabolism courses. According to research by Kanani et al. (2020), a combination of lecture-based learning, video-based learning, group-based learning, and case-based learning significantly helps students understand biochemical (metabolism) material through active learning.

If first-year students, especially those taking block 1.4, have not mastered the basic knowledge from previous blocks or have not adapted to new learning methods, they will tend to be overwhelmed by the learning material in this block. This can lead to burnout and a loss of motivation to improve their MCQ block scores. This is consistent with various theories and previous research that highlight the complexities of academic challenges and the impact of educational level transitions on students, necessitating appropriate strategies to achieve academic targets.

Overall, it can be observed that in the second-semester blocks, especially for blocks 1.4, 1.5, and 1.6, the frequency of scores of students who previously passed the MCQ block in pre-remedial tended not to increase. Based on the interview results, besides the higher difficulty level of the remedial MCQ questions, students also complained about receiving their previous MCQ score results only about two days before the remedial exam. This lack of time to study the remedial block material adequately was a significant concern. Students also expressed a desire for transparency in the results of specific MCQ exams to understand where they made mistakes. This aligns with research by Jiang et al. (2022), which found that closely scheduled exams and lack of feedback are disappointing for students as they shift the focus from learning and knowledge acquisition to merely obtaining exam scores.

The issue of forgetting studied material during MCQ exams only to remember it afterward is a common challenge faced by students. This emphasizes the need for feedback after the pre-remedial MCQ block exam. Feedback plays a crucial role in facilitating the learning process. Conducting MCQ exams through Computer-Based Testing (CBT) allows for easier provision of feedback to students regarding their mistakes during the exam. Institutions should consider providing feedback to students after exams to help them identify areas of improvement.

Some students also reported experiencing burnout during the second semester, although not as severely as in the first semester. The causes of academic problems among first-year students vary, stemming from both internal and external factors. For instance, some students expressed feeling homesick due to being away from their families, which negatively affects their learning performance. Research by Boddy (2020) indicates that students who experience loneliness and homesickness, especially in their first year, tend to lack motivation for their studies and may contemplate leaving university.

Additionally, personal issues such as economic difficulties and a lack of support systems also contribute to students' lack of enthusiasm for learning. This is consistent with various previous studies highlighting how personal, familial, and financial issues influence students' academic performance. Therefore, it is imperative for institutions like Universitas Andalas to consider providing academic support services to assist students facing such challenges. These support services can offer both academic and emotional support, helping students overcome obstacles and improve their learning performance.

The research employed paired-samples t-test analysis, which necessitates that the data adhere to a normal distribution. Following the normality testing of the data, it was confirmed that the data indeed followed a normal distribution, enabling the utilization of a comparison test. Table 3 presents the comparison between the MCQ scores in pre and post-remedial exams for 2022 Medical Education students in the 2022/2023 Academic Year, specifically in block 1.1 (Biomedical), using a t-test. The results were highly significant ($p < 0.001$). This analysis leads to the conclusion that remedial exams effectively enhance students' MCQ block scores in block 1.1 (Biomedical).

In contrast, for blocks 1.2 to 1.6, the results of the t-test analysis were not significant (p -value > 0.05). This lack of significance suggests the absence of a notable difference or increase in average scores between the pre-remedial and remedial MCQ exams. This implies that the remedial MCQ exam does not contribute to an increase in students' passing MCQ block scores in blocks 1.2 (Circulation and Respiration), 1.3 (Hormones and Nerves), 1.4 (Metabolism), 1.5 (Life Cycle), and 1.6 (Basic Pathology).

Table 2. Statistical comparison test with paired-samples t-test of pre and post-remedial MCQ scores of first-year medical students in the academic year 2022/2023

Block	Variables	Mean	SD	SE	P-value	N
Block 1.1 Biomedical	Score					
	Pre-remedial	49,0	8,97	0,628	<0,001	204
	Post-remedial	65,4	10,05	0,704		
Block 1.2 Circulation and Respiration	Score					
	Pre-remedial	48,3	10,10	0,694	1,000	212
	Post-remedial	44,7	9,71	0,667		
Block 1.3 Hormone and Nervous system	Score					
	Pre-remedial	47,9	9,86	0,810	0,121	148
	Post-remedial	48,7	10,20	0,839		
Block 1.4 Metabolism	Score					
	Pre-remedial	46,2	9,30	1,053	0,970	78
	Post-remedial	44,5	7,49	0,848		
Block 1.5 Life Cycle	Score					
	Pre-remedial	53,2	7,56	1,127	1,000	45
	Post-remedial	45,2	6,68	0,997		
Blok 1.6 Basic Pathology	Score					
	Pre-remedial	53,8	7,54	0,736	1,000	105
	Post-remedial	47,2	6,77	0,661		

The findings of this research suggest that the remediation method through remedial MCQ exams is not entirely effective in enhancing students' academic achievements, particularly their MCQ block scores. However, this method solely focuses on conducting re-examinations without incorporating interventions such as additional classes or assignments. Ideally, strategies for improving students' academic achievement and passing MCQ scores should encompass providing feedback, facilitating academic assistance programs and mentorship to enhance student motivation, and offering tailored additional learning based on individual needs. Upon implementing these interventions, students can reassess their academic achievements through a summative MCQ exam.

CONCLUSION

This research concludes that The MCQ remedial exam can effectively increase the students' scores to surpass the passing grade of block 1.1 (Biomedical) first-year block exams of the 2022/2023 academic year. However, the MCQ remedial exam cannot effectively improve students' scores to surpass the passing grades on MCQ block 1.2 (Circulation and Respiration), block 1.3 (Hormones and Nerves), block 1.4 (Metabolism), block 1.5 (Life Cycle), and block 1.6 (Basic Pathology). However, this research solely focuses on a sample of first-year scores of students in the Medical Education program. Thus, it only provides insights into first-year academic performance and cannot fully capture students' overall academic performance throughout their studies in the Medical Education program at Universitas Andalas.

This study investigates the factors affecting student achievement in medical programs. It highlights that alongside academic performance, research should consider demographic factors, student's background, student campus activities, and even interpersonal issues. The authors recommend future studies to conduct in-depth interviews to understand these influences better. We also suggest expanding the research scope by including more variables aside from MCQ scores on block exams and remedial tests.

AUHOR'S CONTRIBUTION

Ulfa Cicilia Dwinanda – developing a research proposal, collecting data, data analysis, and publication manuscript.

Yulistini – developing research concepts, proposal and collecting data.

Fika Tri Anggraini – developing research concepts and script editing.

Al Hafiz – contributing to the script development.

Ulya Uti Fasrini – contributing to script editing.

Rahmani Welan – contributing to script editing.

REFERENCES

- Alabduljabbar A, Almana L, Almansour A, Alshunaifi A, Alobaid N, Alothaim N, et al. Assessment of Fear of Failure Among Medical Students at King Saud University. *Frontiers in Psychology*. 2022;13(March):1–7.
- Boddy C. Lonely, homesick and struggling: undergraduate students and intention to quit university. *Qual Assur Educ*. 2020;28(4):239–53.
- Cecilio-Fernandes D, Kerdijk W, Bremers AJ, Aalders W, Tio RA. Comparison of level of cognitive process between case-based items and non-case-based items of the interuniversity progress test of medicine in the Netherlands. *J Educ Eval Health Prof*. 2018;15:28.
- Cheung CC, Bridges SM, Tipoe GL. Why is Anatomy Difficult to Learn? The Implications for Undergraduate Medical Curricula. *Anat Sci Educ*. 2021;14(6):752–63.
- Cui D, Moxham BJ. A core syllabus for histology within the medical curriculum—The cell and basic tissues. *Clin Anat*. 2021;34(3):483–95.

- Cui D, Moxham BJ. A core syllabus for histology within the medical curriculum – The cardiovascular and lymphoid systems, the respiratory and digestive systems, and the integument. *Clin Anat*. 2023;36(6):915–25.
- Dekan Fakultas Kedokteran Universitas Andalas. Peraturan Akademik Program Studi Kedokteran dan Program Studi Pendidikan Profesi Dokter Fakultas Kedokteran Universitas Andalas. 2018. 1–48.
- Dent J, Harden R, Hunt D. *A Practical Guide for Medical Teachers*, E-Book. Elsevier Health Sciences; 2021.
- Dong A, Jong MSY, King RB. How Does Prior Knowledge Influence Learning Engagement? The Mediating Roles of Cognitive Load and Help-Seeking. *Front Psychol*. 2020;11(October):1–10.
- Elshama SS. How to Use and Apply Assessment Tools in Medical Education?. *Iberoamerican Journal of Medicine*. 2020;04:351–9.
- Harmon KS, Gonzales AD, Fenn NE. Remediation and reassessment methods in pharmacy education: A systematic review. *Curr Pharm Teach Learn* [Internet]. 2021;13(1):81–90. Available from: <https://doi.org/10.1016/j.cptl.2020.07.005>
- Ismail SM, Rahul DR, Patra I, Rezvani E. Formative vs. summative assessment: impacts on academic motivation, attitude toward learning, test anxiety, and self-regulation skill. *Language Testing in Asia*. 2022;12(1). Available from: <https://doi.org/10.1186/s40468-022-00191-4>.
- Ismail SM, Rahul DR, Patra I, Rezvani E. Formative vs. summative assessment: impacts on academic motivation, attitude toward learning, test anxiety, and self-regulation skill. *Language Testing in Asia*. 2022;12(1). Available from: <https://doi.org/10.1186/s40468-022-00191-4>
- Javaeed A. Assessment of Higher Ordered Thinking in Medical Education: Multiple Choice Questions and Modified Essay Questions. *MedEdPublish* [Internet]. 2018 Jun 12;7:128. Available from: <https://mededpublish.org/articles/7-128>.
- Jiang Q, Horta H, Yuen M. International medical students' perspectives on factors affecting their academic success in China: a qualitative study. *BMC Med Educ* [Internet]. 2022;22(1):1–16. Available from: <https://doi.org/10.1186/s12909-022-03597-z>
- Kanani D, Mishra A, Patel V, Patel A, Patel N. Learning medical biochemistry by combination of traditional & modern teaching methods: students perceptions. *Int J Clin Biochem Res*. 2020;7(1):25–9.
- Kirtchuk D, Wells G, Levett T, Castledine C, de Visser R. Understanding the impact of academic difficulties among medical students: A scoping review. *Medical Education*. 2022;56(3):262–9.
- Konsil Kedokteran Indonesia. *Standar Nasional Pendidikan Profesi Dokter Indonesia*. Jakarta: Indonesian Medical Council; 2019;50–1.
- Lacasse M, Audétat M claudie, Boileau É, Caire N, Dufour M hélène, Laferrière M claudie, et al. Interventions for undergraduate and postgraduate medical learners with academic

- difficulties : A BEME systematic review : BEME guide no. 56. *Medical Teacher*. 2019;0(0):1–21. Available from: <https://doi.org/10.1080/0142159X.2019.1596239>.
- Lestari I. Konsep Dasar Perkembangan Manusia. Fauzi D, editor. *Psikologi Perkembangan Anak & Remaja*. Erzatama Karya Abadi; 2018. 27 p.
- Moore S, Fang E, Nguyen HA, Stamper J. Crowdsourcing the Evaluation of Multiple-Choice Questions Using Item-Writing Flaws and Bloom’s Taxonomy. *Learning at Scale (L@S’23) - Proceedings of the 10th ACM Conference on Learning @ Scale*. 2023;25–34.
- Picton A, Greenfield S, Parry J. Why do students struggle in their first year of medical school? A qualitative study of student voices. *BMC Med Educ [Internet]*. 2022;22(1):1–13. Available from: <https://doi.org/10.1186/s12909-022-03158-4>
- Ruprai R, Ruprai B. A study on reflection of entry-level foundation course by the first year medical students. *Natl J Physiol Pharm Pharmacol*. 2020;10(0):1.
- Saadat S, Noori M, Alipour-anbarani M, Mousavi N. Students ’ challenge in answer-changing on multiple-choice exams ; Doubting the answer or not ? A systematic review. 2020;1(2):104–11.
- Sarabia H, Enriquez LE, Rodriguez VE, Zaragoza L, Tinoco S. What Helps Students Get Help?: An Exploratory Analysis of Factors that Shape Undocumented College Students’ Use of Academic Support Services. *Journal of Latinos and Education*. 2021;20(3):290–303. Available from: <https://doi.org/10.1080/15348431.2021.1949994>.
- Sarabia H, Enriquez LE, Rodriguez VE, Zaragoza L, Tinoco S. What Helps Students Get Help?: An Exploratory Analysis of Factors that Shape Undocumented College Students’ Use of Academic Support Services. *Journal of Latinos and Education*. 2021;20(3):290–303. Available from: <https://doi.org/10.1080/15348431.2021.1949994>
- Silva A. Academic Transition from High School to an Undergraduate Medical Program Using Active Methodologies Within an Integrated Curriculum One Qualitative Research. *Res Sq*. 2023;1–17.
- Stringer JK, Santen SA, Lee E, Rawls M, Bailey J, Richards A, et al. Examining Bloom’s Taxonomy in Multiple Choice Questions: Students’ Approach to Questions. *Med Sci Educ [Internet]*. 2021;31(4):1311–7. Available from: <https://doi.org/10.1007/s40670-021-01305-y>
- Tight M. Bullying in higher education: an endemic problem? *Tert Educ Manag [Internet]*. 2023;29(2):123–37. Available from: <https://doi.org/10.1007/s11233-023-09124-z>
- Wahab R, Tjhin P. Program remedial dan angka putus studi mahasiswa kedokteran. *Jurnal Biomedika dan Kesehatan*. 2021;4(2):50–6.