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Research article

Impact of external accreditation on students' performance: Insights from a full accreditation cycle

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ABSTRACT

Background: The process of external academic accreditation involves quality control and auditing measures that focus on the design, delivery, and outcomes of education. It is a demanding and disruptive process in terms of effort, time, money, and human resources. Nevertheless, the extent to which external quality assurance and accreditation procedures affect students' performance at the end of the learning cycle has not been well studied thus far.

Methods: A retrospective quantitative secondary data analysis was conducted in The King Saud University (KSU) undergraduate medical program, with a before–after comparison research design to assess the impact of external accreditation on students' mean grade scores during an accreditation cycle.

Results: Overall, the data pertaining to 1090 students who attended 32,677 examination encounters were included in the analysis. The pre- and post-accreditation analysis revealed a statistically significant improvement in the students' mean scores—80 ± 9 (pre) versus 87 ± 11 (post), with a p-value of ($p = 0.003$) and a Cohen's d value of 0.591. On the other hand, there was no statistically significant difference in the students' mean passing percentages—96 ± 5 (pre) versus 96 ± 9 (post), with a p-value of ($p = 0.815$) and a Cohen's d value of 0.043.

Conclusion: The actions involved in the planning phase and the journey through the self-study evaluation not only verify the program's competencies but also functioned as critical boosters for quality improvement processes and, hence, students' learning experiences.

1. Introduction

Currently, medical education is facing major challenges such as medical student migration and increased medical school privatization caused by globalization and the proliferation of new medical schools as a noticeable global phenomenon. Standardization and quality assurance are among these important challenges and give rise to the essential role of academic accreditation [1]. Previous studies have highlighted the potential major role of accreditation-related activities in improving the quality of medical education [2].

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Accreditation is a process in which official external bodies evaluate the compliance of educational institutions with established sets of criteria, standards, and procedures, with the primary objective of guaranteeing that all institutions produce graduates who are equally highly capable; moreover, with regard to medical education, the accreditation process enhances the quality of care that physicians provide to their patients [3]. The goal of accreditation has moved from merely quality assurance to quality assurance along with quality improvement and maintaining the gained improvement, which not only encourages the active engagement of institutions in improvement practices but also promotes high-quality education experiences [4]. Although the process of accreditation is mandatory in most countries, a small number of countries have voluntary and independent accreditation systems that are authorized by their governments [5]. Further, all medical schools in the US and India are subject to accreditation systems, and approximately two-thirds of medical schools worldwide participate in internal or external accreditation processes [6]. These variable international accreditation practices create a need to study the different outcomes and impacts of accreditation at the international level and to validate findings at the national level, given national standards and the application of accreditation criteria [7].

1.1. International experience with accreditation as an academic quality tool

Accreditation systems are becoming a method of assessing educational institutions worldwide—including undergraduate and postgraduate levels as well as different college specialties, ranging from business to technology—and particularly for medicine as a highly regulated profession [8].

These systems play essential roles in ensuring continuous improvement within the medical field. Different goals are associated with accreditation systems, such as ensuring high-quality standards, creating equal opportunities for accredited programs in the global market, and promoting successful educational programs [5]. Numerous educators have emphasized the importance of accreditation, which not only helps evaluate the educational quality of new and established programs but also allows institutions to monitor and execute continuous improvements in their programs [9].

When these accreditation goals are met, their impacts are not limited to students' educational experiences; they also affect the academic staff and teachers. Systematic reviews and meta-analyses have examined the impacts of accreditation and found both positive and negative indirect effects on staff enthusiasm, student–teacher interaction, and educators' workload [10]. Additionally, the field of education is facing constant change; to ensure that the accreditation system continuously supports educational improvements, the system itself should be assessed after every accreditation cycle. For example, the Korean Institute of Medical Education and Evaluation has changed its standards and evaluation items over the last three cycles, from 2000 to 2019 [11]. A study published in 2021 revealed that 92 of 186 (49%) countries listed in the World Directory of Medical Schools have access to undergraduate accredited programs that employ requirements that are unique to the medical field such as medical ethics and medical research methods. Sixty-four percent of these were high-income countries, including Saudi Arabia, with a total of 35 medical schools listed in the World Directory [12]. Internationally, accreditation requirements have prompted significant changes in courses in Australia and New Zealand over the last decade. During this period, communication skills were emphasized and assessed, the curriculum was efficiently integrated, and student-centered learning was encouraged; moreover, there was more effective technology use in classes, more diversified evaluation methods, and regular course evaluation [13].

Accreditation is usually designed based on an institution's preference, ownership, and the aim of its programs; thus, it can vary widely across nations. There are different types of accreditation systems and one such system is program accreditation, which focuses on measuring the end results of a specific program using national quality standards. Another type is systematic accreditation, which deals mainly with institutions and not only programs. This type focuses on ensuring the capability of organizations to achieve international standards of educational quality using preset minimum accreditation standards [14].

The internationalization of the healthcare profession has highlighted the challenge of preserving medical practice through accreditation. There are economical and managerial repercussions—such as commercialization and privatization in a varied mix of for-profit and not-for-profit providers—of international expansion, global economic integration, and cross-border schooling, which is driven by the development of information and communication technology as well as by the pronounced migration of medical doctors [2]. However, establishing accreditation systems in institutions is not cheap; for example, the cost of accreditation-associated expenses for US undergraduate medical programs was estimated to be $220,000 in 1998, equivalent to approximately $465,000 in 2021. In contrast, in Canada, the cost of accreditation was between $300,000 and $1 million as of 2016 (for two years of preparation time) [1].

Recently, numerous researchers have raised the question of whether evidence drives accreditation or whether accreditation drives schools and medical education, particularly as numerous medical institutions have adopted the same accreditation approaches—with minimal changes—that other institutions. It is worth mentioning that the minimum guidance of standards enables greater flexibility and provides more room for innovation in institutions, particularly in fields in which practice is not fully supported by evidence; this situation leads to the pursuit of innovation and improvement in outcomes in these institutions, which is the primary goal of accreditation systems [15].

In terms of the perspectives of educators and college staff, they have been asked about the long-term effects of the accreditation system, and most of them expressed that they believed in its positive impact; however, many doubted the long-term effects of accreditation because they had witnessed it for decades, but found that no fundamental changes were achieved. Moreover, some believed that accreditation could help develop teaching methods and lead to sustainability in the development of teaching in colleges. With regard to its short-term effects, a few respondents expressed that they had no role or were partially involved in the process of accreditation; most of them considered the writing of lesson plans and the use of a more organized working approach as the short-term effects of accreditation [16].

1.2. Accreditation at the local level

As the country with the highest number of medical schools in the Gulf area, Saudi Arabia has witnessed a remarkable growth rate of medical schools—over 200% over the past five years. A rapid expansion of this magnitude presents significant challenges. One is ensuring the quality of outcomes, which explains the focus on accrediting undergraduate medical programs [17]. In 2004, the National Center for Academic Accreditation and Evaluation (NCAAA) was established in Saudi Arabia to serve as the highest accrediting authority for all undergraduate medical programs [18]. Before this, no accreditation was required in higher educational institutions. However, despite global trends indicating a greater emphasis on the caliber of educational programs, there is little information connecting accrediting practices with producing more highly qualified physicians and, ultimately, better patient care. Even if student performance has improved, how much of this can be attributed to accreditation processes remains unclear, as medical programs are notoriously complex [19]. A scoping review conducted in 2019 revealed that the Middle East is one of the geographical regions with the least published research on medical accreditation, and the evidence base supporting current undergraduate medical education accreditation practices or providing guidance for the creation or improvement of accreditation systems is limited; this implies that more research is required to shed light on the impact of accreditation processes on undergraduate medical programs in the region [20]. In addition, there are different accreditation practices despite common themes of accreditation standards, and there is a paucity of research addressing the relationship between accreditation and its impact on medical programs at the undergraduate level [5]. A study conducted in Saudi Arabia to determine the impact of the external academic accreditation of undergraduate medical programs on students' satisfaction revealed that the use of accreditation systems is associated with students' increased satisfaction scores. This indicates that more pre- and post-accreditation studies are required for a deeper comprehension of the implications of the accreditation process, including its effects on learners, teachers, and academic leaders [18]. In 2012, a study at Al-Qassim University, College of Medicine, was conducted to describe how and why the accreditation process affects the quality of medical education; the study found that most of the faculty members saw improvements in quality standards after accreditation. Moreover, they observed good student performance on the National Saudi Selection Exam (SLE), which is organized by the Saudi Commission for Health Specialties. The students also confirmed that assessment instruments have become more consolidated—that is, they integrate teaching methods, learning outcomes, and curriculum objectives to a greater extent, and the students can easily consult with their teachers through the establishment of an office hour system. Based on these findings, the authors concluded that the accreditation process improves medical education despite no significant changes in curriculum orientation and that improving the quality of medical education is possible by monitoring students' learning outcomes [21].

1.3. The current study

In Saudi Arabia, the NCAAA was established in 2004 as the organization responsible for setting standards and scales for higher education institutions; it is affiliated with the Education and Training Evaluation Commission (ETEC), which handles evaluation, assessment, and accreditation in the fields of education and training in both the public and private sectors [22]. It also licenses foreign entities—through rules approved by the Council—that engage directly or indirectly in evaluation, accreditation, measurement, or the setting of qualifications in education or training within Saudi Arabia. Prior to the establishment of the NCAAA, medical colleges and other higher education institutions did not require accreditation [23]. Based on our literature review, there is a lack of studies that consider longitudinal pre- and post-accreditation designs to measure the impact of accreditation on students' academic performance at a national level. Therefore, in the present study, we aim to examine the impact of accreditation in a longitudinal pattern, pre- and post-accreditation, on students' performance based on their final course grades.

2. Methodology

2.1. Study design

This study used a before–after comparison research design utilizing retrospective quantitative secondary data analysis.

2.2. Study setting

The data were retrieved through the King Saud University (KSU) undergraduate medical program's electronic records over the course of four academic years (2015–2018). This corresponds to the NCAAA's accreditation processes implemented in 2016–2017.

2.3. Institutional Review Board statement

The study was conducted according to the guidelines of the Declaration of Helsinki. Study approved by the Institutional Review Board (IRB) at KSU, Ref. No. 21/01227/IRB. Data obtained were anonymous; thus, the IRB office did not require informed consent as this was a secondary data analysis study.

2.4. Participants/study population

The KSU undergraduate medical program consists of five years (levels) after a preparatory year, with an average of 280–320

students per level. This study used students' grades and passing rates in the analysis, which is in accordance with the policy approved by the College of Medicine at KSU. The inclusion criteria were all students' final exam encounters, while reset exam encounters were excluded.

2.5. Sample size

We made the following assumptions: the null hypothesis is true, the one-sided alpha equals five, and the power is equal to 95% for the sample size calculation and the detection of differences in the mean student grades for one sample group before and after accreditation. Thus, the minimum number of courses to adequately represent the program, as an a priori assumption, was estimated to be 11 courses per academic year, including all curriculum levels. However, we aimed to retrieve and include almost all 30 courses of the program, including all curriculum levels, pre- and post-accreditation.

2.6. Data collection methods

The Academic Quality Unit at KSU's College of Medicine used electronic records to retrieve data. To analyze the relevant aspects influencing the prospective impact of accreditation, we evaluated the self-study reports and related preparatory materials of the accreditation. The pre-accreditation year variables reveal the overall student grades and exam results from the year before the accreditation. The washout phase was the two-year interim period during which accreditation activities became more intense. The post-accreditation year variables represent the students' average grades and exam results from the year after the accreditation.

2.7. Analysis

Descriptive analysis using means and standard deviations was applied to continuous variables, such as the students' average grades, whereas frequencies and percentages were used for categorical variables, such as the pass rates or percentages. In addition, the dependent samples *t*-test was used to compare the statistical mean differences of metric variables. The effect size of the mean difference in the dependent *t*-test was expressed as Cohen's D statistic. Significance was considered at the 0.050 level, and the open-access Jeffreys's Amazing Statistics Program (JASP) (version 0.14.1.0) was used for the data analysis and figure creation.

3. Results

The data analysis spanned four years; the first year was considered the pre-accreditation period, the last year was the post-accreditation period, and the middle two years were considered the washout period, during which accreditation activities were intensified and completed. Overall, the data of 1090 students who attended 32,677 exam encounters were included in the analysis. Their average scores for each year across the study period, along with their demographic data—such as curriculum level, number of courses, and gender—are summarized in Table 1. In addition, the students' passing percentages for each year during the study period, along with their demographic data—such as curriculum level, number of courses, and gender—are summarized in Table 2. The pre- and post-accreditation analysis revealed statistically significant improvements in the students' mean scores—80 ± 9 (pre) versus 87 ± 11 (post), with a p-value of ($p = 0.003$) and a Cohen's d value of 0.591. On the other hand, there were no statistically significant differences in the students' mean passing percentages—96 ± 5 (pre) versus 96 ± 9 (post), with a p-value of ($p = 0.815$) and a Cohen's d value of 0.043. These comparisons are plotted in Figs. 1 and 2, while the trends for the students' mean scores and mean passing percentages over the four years of the study are presented in Figs. 3 and 4, respectively.

4. Discussion

This study reports the positive impact of external accreditation on medical students' academic performance in terms of grades (without changes in passing rates) across all levels of the curriculum (years 1–5). Although a large number of medical schools have

Table 1
Descriptive statistics of the students' average scores during the study period.

		2015 N = 279		2016 N = 276		2017 N = 266		2018 N = 269	
	Courses N (%)	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Curriculum level									
1	6 (20)	77.35	±12.28	77.47	±10.00	80.30	±10.64	85.93	±9.88
2	5 (16.7)	83.77	±10.65	80.05	±9.16	84.09	±8.64	84.11	±15.26
3	8 (26.7)	79.77	±8.57	78.77	±9.80	78.64	±11.39	87.09	±15.94
4	8 (26.7)	79.83	±7.84	83.61	±7.46	82.81	±8.12	88.84	±4.97
5	3 (10)	84.43	±2.95	75.75	±1.46	80.99	±2.00	85.54	±4.41
Gender									
Male	30 (100)	79.49	±9.20	78.62	±8.83	79.55	±9.18	86.43	±8.77
Female	30 (100)	81.83	±10.12	81.37	±8.92	83.83	±8.97	90.02	±9.46
All	30 (100)	80.43	±8.97	79.71	±8.53	81.23	±9.02	86.67	±10.97

Table 2
Descriptive statistics of the students' passing percentages during the study period.

		2015 N = 279		2016 N = 276		2017 N = 266		2018 N = 269	
	Courses N (%)	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Curriculum level									
1	6 (20)	89.33	±5.01	89	±4.73	93.83	±2.48	94.5	±3.94
2	5 (16.7)	94.20	±4.09	95.00	±4.18	96.60	±3.13	87.2	±20.85
3	8 (26.7)	98.13	±2.59	98.25	±2.12	98.13	±2.36	98.00	±2.73
4	8 (26.7)	99.13	±0.99	99.63	±0.52	98.13	±1.2	98.88	±0.35
5	3 (10)	100	±0.00	99.33	±0.58	99.67	±0.58	99.00	±0.00
Gender									
Male	30 (100)	94.73	6.617	95.27	6.16	96.08	3.87	94.70	10.14
Female	30 (100)	98.63	2.30	98.23	2.86	99.10	1.52	97.73	7.79
All	30 (100)	96.17	4.88	96.33	4.88	97.17	2.77	95.83	9.09

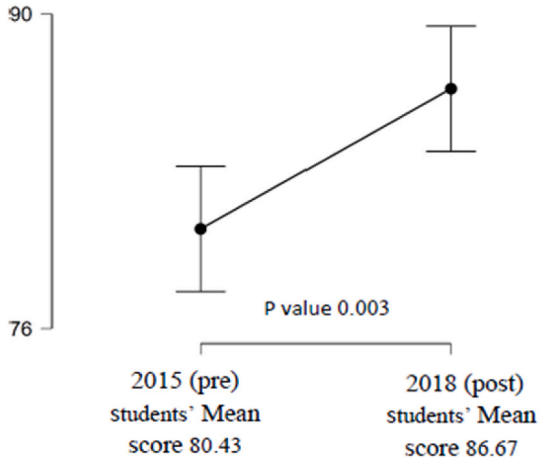

Fig. 1. Descriptive Plots for the Comparison of the Students' Average Scores Pre- and Post- Accreditation Using Student's t-test; 2015 (Pre) vs. 2018 (Post).

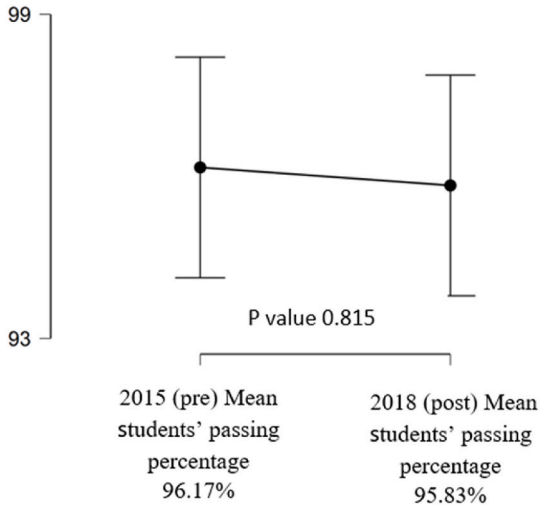

Fig. 2. Descriptive Plots for the Comparison of the Students' Passing Percentages Pre- and Post-Accreditation Using Student's t-test; 2015 (pre) vs. 2018 (post).

switched to a binary grading system (pass/fail), grades can provide meaningful feedback to students regarding their level of performance when grading systems are appropriately designed. Medical schools can also use grades as objective criteria for selecting exceptional learners for formal awards and for offering students scholarships to join distinguished fellowship programs [24].

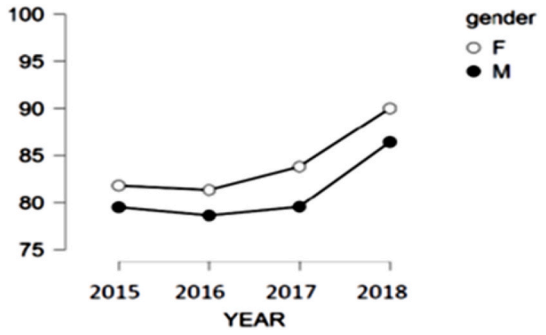

Fig. 3. Trend of the students' average scores during the study period.

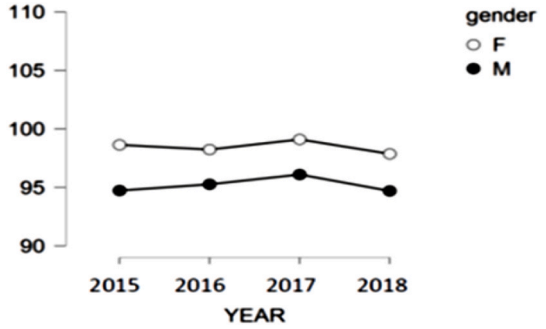

Fig. 4. Trend of the students' average passing percentages during the study period.

Moreover, grades can be used to assess how instructional innovation and curricular reform are working. They can be highly effective in studies aimed at improving admissions policies or addressing academic research issues, such as the value of lecture attendance or curriculum alignment with licensure results. For these reasons, grades are frequently used in institutions to make critical judgments on promotion and improvement [25]. Externally, grades serve as reporting mechanisms for external bodies—such as graduate and postgraduate medical school programs—to make informed residency selection decisions. In addition, grades are the most objective evidence available for assessing performance in medical schools that use traditional letter grading systems and overall grade point average (GPA) [26].

In our study, the students' average scores revealed noticeable improvements in the years during and following the accreditation compared with the pre-accreditation period—an upward trend in grades is evident and they consistently reached the maximum in the last year. It is interesting to see this trend, and we believe that it reflects the effort of different taskforce teams at the level of departments in the preparatory phase of accreditation. Moreover, how the change process makes an impact is theorized through a succession of three mechanisms; the accreditation process has the capacity to influence quality through coherence, administrative buy-in, and coordinated quality improvement actions [27]. This might lead to proposing that changes in the preparatory phase are indicators of department/organizational buy-in and, thus, could explain the improvements in students' performance, as coherence and quality improvement actions are usually developed at a later stage in the accreditation process. Similarly, the overall improvement in students' grades might reflect the impact of these three processes. Interestingly, despite the importance of accreditation in higher education, there is limited research on how accreditation influences programs or learning. Only a few studies have examined the impact of accreditation across institutions or programs despite the abundance of anecdotes regarding program and institutional responses to new accreditation standards; most of these studies chronicle institutional responses. Moreover, even fewer studies have attempted to measure the impact of external accreditation on students' educational achievements [27].

Not surprisingly, we found that both males and females showed improvements in their average scores during and after the accreditation process. We also noted higher average scores for females when compared to males. Although the curriculum and learning objectives are the same for males and females, the faculty is different—female faculty teaches females students in almost all the curriculums and vice versa for the male faculty. Moreover, the higher average scores for females can be explained by the fact that the number of available seats in a medical school is almost double for males; thus, a higher number of male students have a direct impact on the standard deviation. A Canadian study that explored the relationship between the accreditation cycle and licensing examination scores revealed that performance was highest during and directly after an accreditation visit [28]. Comparing our results with local data, we examined a qualitative study in Saudi Arabia that collected data from six medical schools in 2012–2013. In this study, different aspects were analyzed, such as students' and staff's perspectives of the actual benefits of accreditation, their concerns regarding the NCAAA's standards, and the role of internal quality assurance bodies in different institutes. The study found a strong association between assessment and accreditation purpose, engagement, and outcomes [18]. Additionally, in a Saudi university,

students believed that assessment methods and examinations became more appropriate and reflected teaching methods well after accreditation, and faculty members believed that there were substantial advancements in quality, such as students' learning outcomes [21]. Moreover, the study also revealed that the accreditation process improved the quality of medical education in the college, without extreme changes in the curriculum. After the accreditation process, the university observed improvements in the performance of its graduates in the SLE [21].

Accreditation systems have been shown to have positive impacts on universities in general; the changes are in the areas of teachers' performance; curriculum programs; performance of academic and support staff; and students' quality, satisfaction, and performance [29]. The recommendation by the education and health ministries to observe accreditation systems globally have led to positive outcomes, thereby encouraging institutions to enhance the quality and performance of their colleges and medical schools and to maintain established standards [5]. Furthermore, accreditation also affects performance in national license examinations. In one study, accreditation cycles formed a wave pattern; improvements in students' outcomes and performance on national licensing examinations revealed a steady increase pre-accreditation, a decrease post-accreditation, and then an increase again [28]. A study conducted in the US revealed that the odds of passing Step 1 Basic Science and Step 2 Clinical Skills were 1.8 and 1.3 higher, respectively, for individuals who graduated from accredited schools compared with the global group. In addition, students who graduated from medical schools with grade A accreditation had better performance than students who graduated from medical schools with grade B accreditation [19]. In Mexico and the Philippines, the pass rate on all United States Medical Licensing Examination (USMLE) components during the first attempt was higher for students who attended accredited medical schools. In addition, the success rates in obtaining an educational commission for foreign medical graduates certificate were higher in students who attended accredited medical schools [30].

These results can be used indirectly as evidence of improvements secondary to different accreditation standards, such as curriculum development, teaching strategies, learning resources, and appropriate guidance and counseling for students. Accreditation also ensures quality with the use of multiple methods, such as performance indicators and the analysis of annual evaluation data [31]. However, the long-term impact and sustainability of what medical schools could achieve during and after accreditation are not fully understood. Numerous African countries lack accreditation systems, whereas most of the minor European, South American, and Pacific countries can only receive general undergraduate accreditation. Additionally, the scope and organization of medical education certification agencies vary significantly across countries [12].

We found that there were no statistical differences in passing rates, regardless of gender, during accreditation. The dissociation between improvements in grades without changes in the pass rate is rather interesting and could be interpreted in more than one direction. For example, it may indicate the enhancement role of accreditation activities despite a relatively high pass rate, which could be difficult to push upward further. The lack of impact of accreditation on the pass rate may support the fact that this improvement in average grades is less likely to be attributed to changes in assessment methodology. It might also attest to the stability of the curriculum, as the present study was conducted in the oldest medical college in Saudi Arabia, which underwent similar accreditations in the past [32].

Further, the longitudinal design of this study carries important weight over other studies with single-point evaluations of accreditation impact. This study is also among the earliest studies to demonstrate the positive impact of NCAAA activities on students' average grades. However, the results need to be interpreted carefully in consideration of this study's limitation of being a single-center experience, and other improvements in curriculum and teaching methods and assessments in the school over those four years (2015–2018) that were not captured in our study. Although the quantitative approach has the advantage of being more objective, it lacks an in-depth qualitative analysis to explore the potential causal relationship or a mechanistic explanation for such an association between accreditation and its impact. Therefore, future qualitative analysis is warranted, as it is beyond the scope of the current study.

5. Conclusion

In this study, the accreditation cycle was associated with a significant improvement in students' performance. Activities throughout the planning stage and progressing through the self-study assessment not only enabled an assessment of the program's competencies but were also potential catalysts for accreditation-related quality improvements. Our study could serve as proof of concept for future research addressing the impact of medical school accreditation on national exams, such as the Saudi Medical Licensure Examination (SMLE), thereby enhancing the external validity of our study results at the national level.

5.1. Strengths, limitations, and future research directions

Our study obtained accurate results, as we collected data from all student courses, ranging from the most difficult ones to the easiest, and we included students in all five levels. Furthermore, our study results were not affected by COVID-19-related changes in assessment methods. However, one significant limitation of our study is the lack of a specific measurement tool to assess the impact of accreditation on the knowledge of medical students. Another important aspect is that while using students' GPAs to indicate the impact of accreditation is valuable, we must bear in mind that other factors external to accreditation standards affect students' grades, such as continuous changes in assessment methods, grade distribution from year to year, and changes in question banks; however, these changes were only made while ensuring that these changes themselves would not result in a major gap in students' performance, as their main goal is to continue to challenge students into becoming better physicians, rather than causing a discrimination in results over the years. Future research must aim to include as many of these variables as possible. We also recommend studying the impact of medical school accreditation on students' performance in national exams, such as the SMLE, which will likely enhance the validity of our results. We believe that our findings should not be generalized, as they represent the perspective of only one medical school.

Assessing the impact of accreditation on students' grades at the national level might provide a more in-depth picture.

Author contribution statement

Shuliweeh Alenezi; Ayman Al-Eyadhy: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Rana Barasain; Trad S AlWakeel; Abdullah AlEidan: Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Hadeel N Abohumid: Contributed reagents, materials, analysis tools or data.

Data availability statement

The authors do not have permission to share data.

Additional information

No additional information is available for this paper.

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