Education in Medicine Journal

ORIGINAL ARTICLE

Title: Dissecting the Correlation Between Pre-Professional and Professional Examination Marks in Forensic Medicine; a Gender, Residence, and Attendance Specific Comparison

Authors: Khalil Ur Rehman, Rizwan Faisal, Rizwan Qaisar

Submitted Date: 16-01-2025

Accepted Date: 27-05-2025

Please cite this article as: Rehman KU, Faisal R, Qaisar R. Dissecting the correlation between pre-professional and professional examination marks in forensic medicine; a gender, residence, and attendance specific comparison. Education in Medicine Journal. 2025 (early view).

Dissecting the Correlation Between Pre-Professional and Professional Examination Marks in Forensic Medicine; a Gender, Residence, and Attendance Specific Comparison

Khalil Ur Rehman[1], Rizwan Faisal[2], Rizwan Qaisar[3]

[1]Department of Forensic Medicine, Rehman Medical College, Peshawar, Khyber Pakhtunkhwa, Pakistan

[2]Department of Pharmacology, Rehman Medical College, Peshawar, Khyber Pakhtunkhwa, Pakistan

[3]Department of Basic Medical Sciences, University of Sharjah College of Medicine, Sharjah, United Arab Emirates

ABSTRACT

The current study was conducted at Rehman medical college from April to August 2021 to compare the academic performance of students in forensic medicine based on gender and residential status and to correlate class attendance with students' academic performance in pre-professional and professional examinations. A total of 469 students (male = 255 & female = 214) of third year MBBS were recruited via universal sampling. Both examinations consisted of two components: theory and viva voce. For academic differences based on gender and locality, students were assigned to five groups. The first consisted of students with marks <50%. Subsequent groups were constituted of students with marks in the ranges of 51-60%, 61-70%, 71-80% and >80%, in a progressive sequence. In an additional dimension focused on discerning the symbiotic relationship between frequency of classroom presence and scholastic prowess, students were demarcated into four separate groups: <75% attendance, 76-85%, 86-95% and >95%. Analytical procedures of a descriptive and comparative nature were conducted through SPSS version 22.0. A p-value not exceeding 0.05 was posited as the demarcation line for determining statistical relevance. The academic performance of most students improved in professional examination. However, the students with ≥70% marks in pre-professional examination had less robust, albeit statistically significant improvement in the professional examination. In terms of academic performance, significant difference was found based on gender and residential status which were compared in both examinations. A statistically significant correlation was found between class attendance and students' academic performance in pre-professional and professional examinations (all $p < 0.001$).

Keywords: *Academic performance, forensic medicine, class attendance, Boarders, Day scholars*

CORRESPONDING AUTHOR

Khalil Ur Rehman1, Department of Forensic Medicine, Rehman Medical College, Peshawar, Khyber Pakhtunkhwa, Pakistan

Email: Khalil.rehman@rmi.edu.pk

INTRODUCTION

Pre-professional examinations are usually taken before professional examinations which are crucial for helping students pinpoint their areas of deficiency, refining their preparation methodology and acclimating to the examination's format. Pre-professional prepares students for the board examination and is a sort of revision for all the classes they have attended throughout the session. These examinations equip students to comprehend and adjust to the time constraints and structural components intrinsic to professional assessments. While marks accrued in pre-professional settings do not directly influence professional examination scores, they are the indicators of the current level of preparation only. Pre-board will only prepare students to face the main board examination with confidence and enable them to score more (1). Medical students frequently undergo academic evaluation through yearly tests or Cumulative Grade Point Average in several universities in Pakistan as well as around the globe (2). A host of factors affect the academic performance. Individual traits and domestic conditions such as familial encouragement, domestic surroundings, cognitive aptitude and the caliber of antecedent scholastic experiences merge as pertinent determinants. Gender stands as another pivotal variable, currently eliciting substantial attention from educators and policy architects across the globe (3). Residential status, whether a student resides on campus as a boarder or commutes as a day scholar, also appears to wield influence over academic results, according to numerous studies. The inception of boarding schools, particularly by Roman Catholics and Anglicans in the 20th century, aimed to facilitate ease of access to educators for students, which ostensibly could influence scholastic achievement (4). Moreover, class attendance has frequently been identified as a decisive element for academic triumph. Common wisdom posits that students who partake in classes with regularity exhibit a greater propensity for success in their scholarly pursuits. But in this technological era where students have easy access to e-libraries, academic videos, and other mediums of learning, this concept needs reevaluation (2).

Contrary to widespread belief, low scores in pre-professional evaluations should not be hastily interpreted as indicative of impending failure in main examinations. Likewise, excelling in these preliminary assessments does not unequivocally guarantee to score more. To our knowledge, no study is conducted to compare student's marks in both pre-professional and professional examinations. Therefore, the present study aims to compare pre-professional and professional marks and further categorize the results based on gender, residential status, and class attendance. The findings of this research could potentially serve as the foundational framework for directing enhanced focus and efforts toward academically underperforming cohorts. Such targeted interventions might manifest in the form of supplemental instructional sessions, tutorials, or other pedagogical strategies tailored for those demonstrating deficiencies. Secondly, if those students who performed well both in pre-professional and professional examinations and vice versa then this study may be helpful for college's policymakers to design and implement multiple mini block examinations on the pattern of pre-professional examination to improve the academic performance of the students, especially the weaker ones.

METHODS

Conducted within the confines of Rehman Medical College in Peshawar, Pakistan, this descriptive study spanned from April to August 2021 and encompassed third-year medical students from the academic

sessions of 2013-18. Using universal sampling techniques, the study ensured the confidentiality of all participants (5, 6). The academic syllabus under scrutiny covered various topics within forensic medicine. These topics ranged from law and ethics, forensic aspects of trauma and thanatology, to personal identification, sexual offenses, forensic toxicology, forensic psychiatry, and forensic serology. It is worth noting that this identical course content appeared in both the pre-professional assessments of Rehman Medical College and the professional examinations of Khyber Medical University, Pakistan. The pattern of pre-professional examination was kept the same as that of professional examination.

Both examinations had two components, i.e., theory and viva voce. The theory paper was further divided into multiple-choice questions and short-essay questions. The record of the result of the pre-professional examination was already available in the department. In contrast, marks from the professional examination of individual students in forensic medicine were obtained from detailed marks certificates present at Student Affairs Department of the college. For theory paper, structured key was provided to the examiners to eliminate bias when the papers were evaluated (7).The list of boarder students was provided by the Student Affairs department and was also confirmed from individual students. A total of 469 students were included in the study; 255 students were male, while 214 were female. Those students who were found absent in either pre-professional or professional examination were excluded from the study.

For academic comparison based on gender and residential status, students were categorized into five groups; Group 1:<50% marks; Group 2: 51-60% marks, Group 3:61-70% marks, Group 4:71-80% marks and Group 5: >80% marks. To find the correlation between class attendance and academic performance students were divided in to four groups based on attendance;<75%, 76-85%, 86-95%, >95% (8). Confidentiality of the participants was maintained (9).

DATA ANALYSIS

Data were analyzed by SPSS 20.0. In addition to descriptive statistics, a linear regression analysis was performed to detect the relationship between various parameters and the academic performance of students in both pre-professional and professional examinations. The Chi-square test and Student's t-test were used to detect significant differences in gender and residential status for all analyses; $p \leq 0.05$ was considered statistically significant.

RESULTS

A total of 469 students of 3rd year MBBS were enrolled in the study; 255 students were male while 214 were female.

Overall academic performance of the students improved in professional examination, except for those who obtained more than 80% marks in pre-professional examination, although statistically insignificant, but there was a slight decline in their performance. Students performed much better in practical examinations than theory (Figure 1).

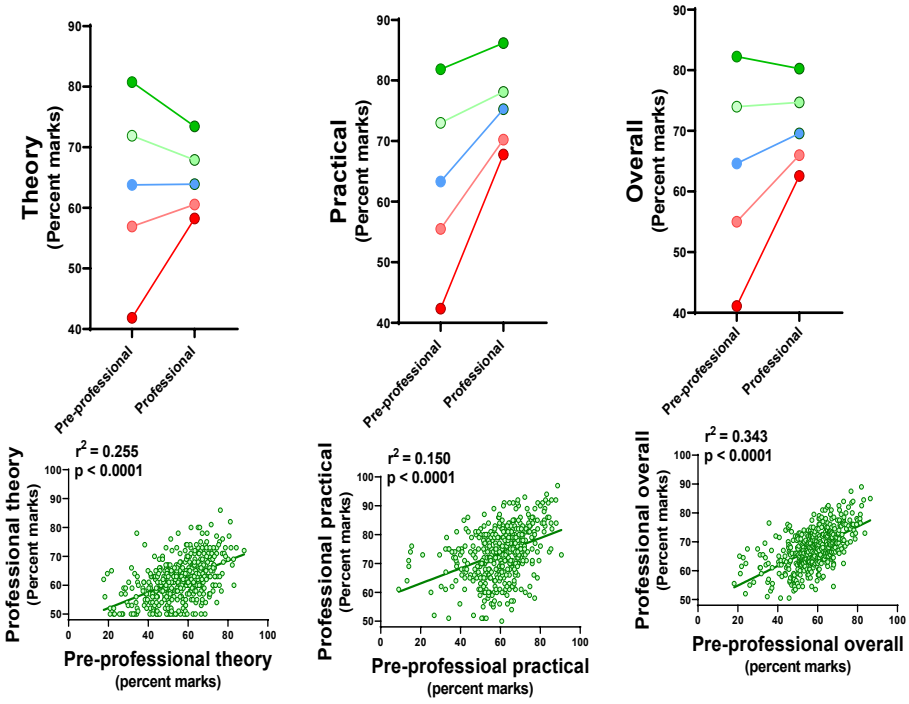

Figure 1: Theory and practical marks of students in pre-professional and professional examinations (Mean ± SD)

Both male and female students improved their academic performance in professional examinations, but males showed slightly more improvement than their female counterparts. A significant difference was found when the overall academic performance of each gender was compared in pre-professional and professional examinations (Figure 2).

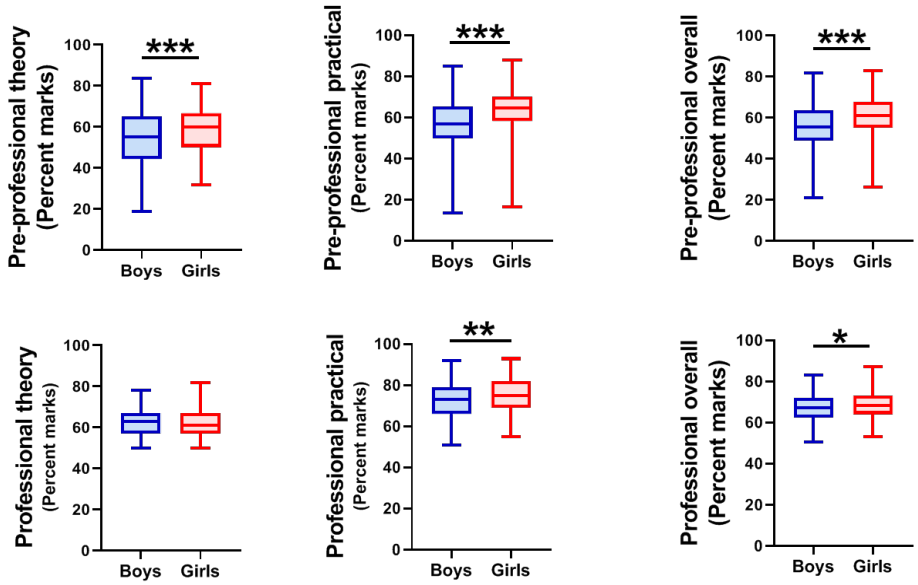

Figure 2: Box and Whisker graphs showing the comparisons of male and female students for marks in pre-professional and professional examinations, *p<0.05, **p<0.01, ***p<0.001.

Male students were found significantly high in <50% marks category and females in 60-69% marks category, while an insignificant difference was found in rest of the marks categories in pre-professional examination. Comparison of male and female students in different marks categories revealed a statically insignificant difference in professional examination (Figure 3).

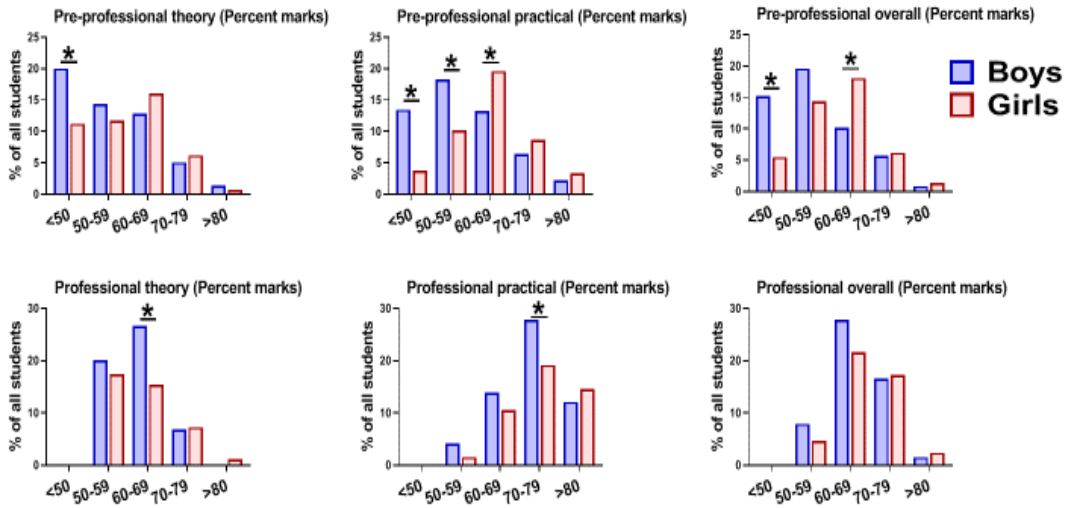

Figure 3: Comparison of academic performance (%) of male and female students based on marks categorization in pre-professional and professional examinations, *p<0.05.

Day scholars performed well both in theory and practical examinations of pre-professional and professional. A significant difference was found when the academic performance of male and female boarder students was compared with male and female day scholar students in pre-professional examination. An insignificant difference was found between male boarder and day scholar students in professional examination while a significant difference was found between female students based on residential status (Figure 4).

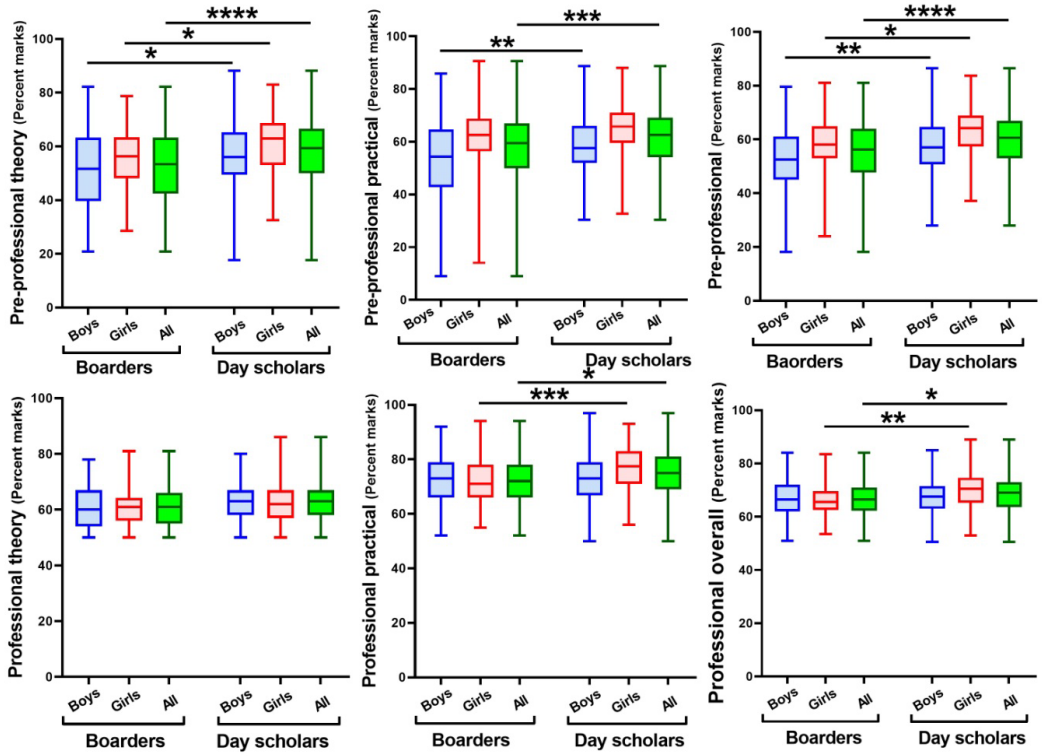

Figure 4: Comparison of academic performance (%) of boarders and day scholars in the pre-professional and professional examinations, **p<0.01, ***p<0.001, ****p<0.0001.

The majority of students 42.13% fell in the 76-85% attendance group followed by 40.57% in 86-95% group. 13.31% students had attendance more than 95% while remaining 3.99% were found below 75%.

Linear regression analysis was utilized to explore the relationship between class attendance and academic outcomes in pre-professional and professional examinations. Attendance correlated with outcomes in both theoretical and practical examinations of the pre-professional and professional, as indicated by all p-values being less than (all $p < 0.001$).Class attendance showed relatively less robust but statistically significant correlations with examinations performances (Figure 5& 6).

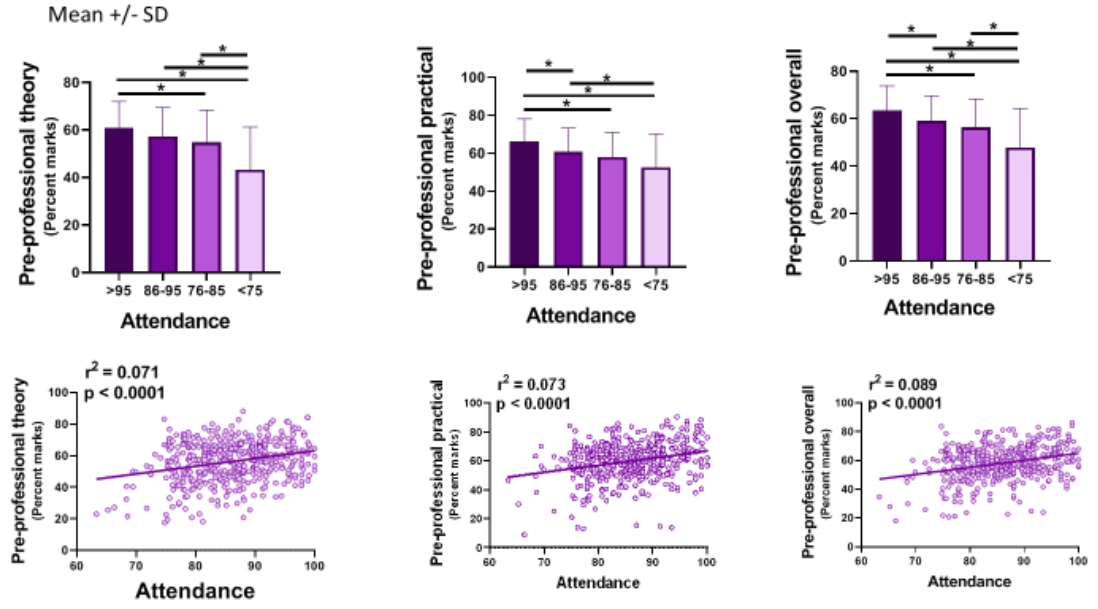

Figure 5: Bar graphs showing the percentage marks according to the attendance and the correlation graphs showing the associations of percentage marks with attendance in pre-professional examination, *p<0.05.

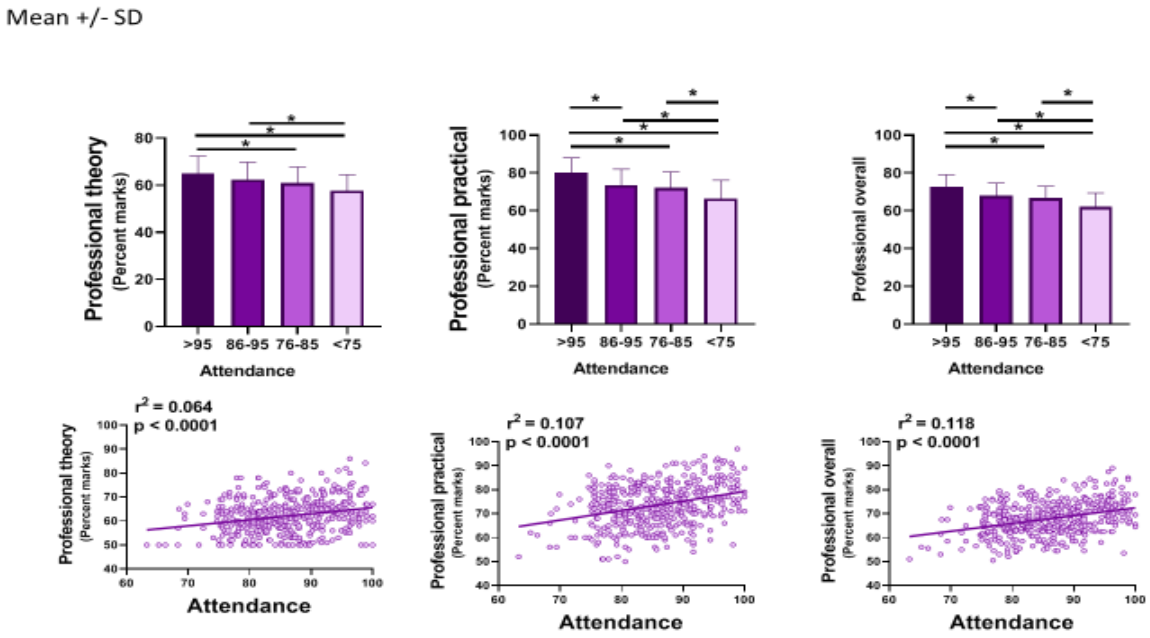

Figure 6: Bar graphs showing the percentage marks according to the attendance and the correlation graphs showing the associations of percentage marks with attendance in professional examination, *p<0.05.

DISCUSSION

Unquestionably, education stands as humanity's most potent tool for self-advancement. While societies across times and cultures have embraced education in multiple forms, the applications of this intellectual capital diverge widely. Scrutiny into the determinants affecting student academic performance has increased over time, intriguing educators and academics, investigators and institutional overseers alike. Among these influencing factors, gender, residence and class attendance have been spotlighted as significant determinants. Recent studies in developing countries have also shown marked improvement in female academic performance (10).

We report that the performance of most students in terms of academics improved in professional examination except for those who obtained ≥70% marks in the pre-professional examination. Students scored more in practical examinations than theory, possibly due to their active involvement in practicals during tutorials and small group discussions, reinforcement of theoretical knowledge in practicals, and repeated rehearsals. A clear variation was found when the performance of both genders was compared in pre-professional and professional examinations in terms of academics. Males showed a bit improvement over their female counter parts, probably because most of the boys tend to be less focused on academics during the active session but start concentrating more on studies during preparatory leaves. Similarly, a significant difference was also found when the academic performance of the day scholar and boarder students was compared in both pre-professional and professional examinations. However, both improved their academic performance in professional examinations. Class attendance had a positive impact on students' academic performance both in pre-professional and professional examinations.

Prior research studies on the differences in classroom performance between male and female students showed mixed results. While no differences existed in some studies, others showed significant differences. Results of some studies showed female gender to be better academically while the other suggests male gender (11). For instance, Conger and Long found that in a cluster of 11 public, four-year educational institutions in Florida, females outperformed males in terms of grades (12). Contradictorily, research emanating from Nigeria portrayed male students as outpacing their female peers in scholastic achievements (13).Osiah and Adejoke, and Abu-Bakr *et al.,* also reported the same results (14,15). Our study suggests that females have better academic performance than males in medical examinations.

Khan *et al.*, conducted a study at Rawalpindi Medical University, Pakistan, to compare the academic performance of boarders and day scholars. Total students included in the study were 287; 183 were boarder, and 104 were day scholars. When scrutinized for academic performance, day scholars were observed to outperform their boarder counterparts in various studies (16).An analogous inquiry in India corroborated these findings, presenting day scholars as academically superior (17). A study was conducted on the academic performance of the Somali students which revealed that the performance of day scholar students in academics was poor due to lack of parental contribution and support (18). Similarly, another study showed better academic performance of boarders over day scholars (19). It is believed that due to unsustainable home environment, the day scholars cannot study properly. In harsh weather conditions, the long distance to the school is another problem. Faisal *et al.,* performed a study at Rehman Medical College, Peshawar to compare academic performance of boarders and day scholars. Results showed no significant difference between the two groups (4). Another study also reported the same results (8). The results of the present study are in favor of day scholars.

In an academic inquiry emanating from SIMAD University in Moghadishu, a robust positive correlation between student attendance and scholastic achievement was observed(20).Neri and Meloche also probed this association, corroborating that class attendance indeed exerts a positive influence on academic outcomes (21). Gottfried's study yielded analogous findings, confirming that attendance plays a pivotal role in student academic success (22). Another study also discovered a meaningful relationship

between the two (23).Deane et al. conducted a similar investigation specifically targeting medical students and concluded that a positive linkage exists between attendance and academic performance. These recurrent findings amplify the argument that attendance is not merely a peripheral factor but rather a central determinant in the realm of academic achievements (24).As far as the correlation of attendance and academic performance is concerned, our findings are like the results of all the above-mentioned studies.

This study provides a good insight to the educationists, researchers, and policymakers to provide a comfortable environment at hostels with the availability of internet, libraries, and other resources, and to consider physical attendance of students in classes, especially in developing countries like Pakistan. The capacity for generalizing our data remains circumscribed due to its derivation from a singular educational institution. Factors such as assessment methodologies, faculty competencies, student demographics, curricular elements, and pedagogical approaches could manifest differently across various institutes. Nonetheless, our study contributes a meaningful building block to the existing corpus of academic research. As aptly stated, scrutinizing elements that influence academic outcomes constitutes an incremental process akin to bricklaying; no solitary study can purport to form the entire structure. Based on the results of this study, future studies are recommended to investigate the causes of better academic performance of female and day scholars in professional exams than in pre-professional exam. Similarly, correlation of academic performance of medical students to their preferred learning style can also be evaluated.

CONCLUSION

Overall academic performance of students significantly improved in professional examinations as compared to pre-professional examinations. A significant difference was found when the academic performance of male and female students was compared in pre-professional and professional examinations. The academic performance of day scholar and boarder students showed significant difference both in professional and pre-professional examinations; however, both improved their academic performance in professional examination. Class attendance was found to have a positive impact on students' academic performance both in pre-professional and professional examinations.

REFERENCES

1. India Today. Available at URL: https://www.indiatoday.in/education-today/featurephilia/story/board-exam-2017-959488-2017-02-07[Accessed on 22/4/2020]
2. Faisal R, Popalzai AJ, Sultana U, Abdullah Z.Class Attendance of Pharmacology Students of Rehman Medical College as a Determinant of Academic Performance. J Rehman Med Inst. 2017: 3(3-4): 11-15.
3. Faisal R, Shinwari L, Hussain SS. Academic performance of male in comparison with female undergraduate medical students in Pharmacology examinations. J Pak Med Assoc. 2017; 67(2):204-208.
4. Faisal R, Shinwari L, Izzat S. Academic performance of day scholars versus boarders in pharmacology examinations of a medical school in Pakistan. J Pak Med Assoc. 2016 ;66(9):1094-1097.
5. Faisal R, Shinwari L, Mateen H. Evaluation of the academic achievement of rural versus urban undergraduate medical students in Pharmacology examinations. Asian Pac J Reprod. 2016;5(4):317–20.https://doi.org/10.1016/j.apjr.2016.06.002

6. Rehman KU, Shah MM, Faisal R, Khan MSG. Academic performance of undergraduate medical students with and without preparatory leaves in the examinations of basic sciences. Journal Of Medical Sciences. 2017;25(2):205-8.
7. Faisal R, Laiyla S. Comparative assessment of students' academic performance in multiple choice questions versus short essay questions in pharmacology examinations of a medical college of Pakistan. J Rehman Med Inst. 2015;1(2):23-8.
8. Rehman KU, Faisal R,Qaisar R, Shah MM. Residential status of medical students as a factor affecting formative and summative academic performance in Forensic Medicine at Rehman Medical College, Peshawar, Pakistan. J Rehman Med Inst. 2020;6(1):7-10.
9. Faisal R, Shah SFA, Hussain M.Potential use of azithromycin alone and in combination with ivermectin in fighting against the symptoms of COVID-19.Professional Med J. 2021; 28 (05), 737-41.
10. Dania PO. Effect of gender on students academic achievement in secondary school social studies. J Educ Prac. 2014; 5(21): 78-84.
11. Wrigley-Asante C, Ackah CG, Frimpong LK. Gender differences in academic performance of students studying Science Technology Engineering and Mathematics (STEM) subjects at the University of Ghana. SN Social Sciences. 2023;3(1):12.doi: 10.1007/s43545-023-00608-8
12. Conger D, Long MC. Why are men falling behind? Gender gaps in college performance and persistence.Ann Am Acad Pol Soc Sci. 2010;627(1):184-214.doi:10.1177/0002716209348751.
13. Bassey SW, Joshua MT, Asim AE. Gender Differences and Mathematics Achievement of Rural Senior Secondary Students in Cross River State, Nigeria. Mathematics Connection. 2011; 10: 56-60.
14. Josiah O, Adejoke EO. Effect of Gender, Age and Mathematics Anxiety on College Students' Achievement in Algebra. Am J Educ Res. 2014; 2(7): 474-6. doi:10.12691/education-2-7-7
15. Abubakar RB, Bada, Adegboyega I. Age and gender as determinants of academic achievements in college mathematics. Asian J Nat App Sci. 2012; 1(2): 121-7.
16. Khan MS, Malik AR, Butt AUA, Khalid A, Maqbool S, Khan H, et al. Personality Dynamism and Academic Performance Among Boarders and Non-boarders Studying in a Medical University. Cureus. 2019;11(7). doi: 10.7759/cureus.5072
17. Aruna T, Srirupa H, Vangaveti S. Assessing altered sleep patterns among medical students. J Pharm Sci Innov. 2015;4(1):59-64.doi:10.7897/2277-4572.04114
18. Dermie F, Lewis K, McLeen C. Raising the achievement of somali public challenges and responses. London: Lambeth Research and Statistics Unit; 2007.
19. Rasool SG, Amjad F, Zuha A, Ahmad A. Health Status and Academic Progress Among Day Scholars Vs Hostelites in Allied Health Sciences Students: Health Status and Academic Progress Among Day Scholars Vs Hostilities. Pakistan BioMedical Journal. 2022; 5(7):66-9.https://doi.org/10.54393/pbmj.v5i7.625
20. Aden AA, Yahye ZA, Dahir AM. The effect of student's attendance on academic performance: a case study at Simad university mogadishu. AcadRes Int. 2013; 4(6):409-17.
21. Neri F, Meloche Y. The impact of lecture attendance on academic performance in a large first year economics course. [Internet]. 2007. Available from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=975573.http://dx.doi.org/10.2139/ssrn.975573
22. Gottfried MA. Evaluating the relationship between student attendance and achievement in urban elementary and middle schools: An instrumental variables approach. American Educational Research Journal. 2010 Jun;47(2):434-65.https://doi.org/10.3102/0002831209350494
23. Subramaniam BS, Hande S, Komattil R. Attendance and achievement in medicine: Investigating the impact of attendance policies on academic performance of medical students. Ann Med Health Sci Res. 2013;3(2):202–05.doi: 10.4103/2141-9248.113662
24. Deane RP, Murphy DJ. Student Attendance and Academic Performance in Undergraduate Obstetrics/Gynecology Clinical Rotations. JAMA. 2013;310(21):2282–2288. doi:10.1001/jama.2013.282228.