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EVALUATING THE IMPACT OF MENTORSHIP PROGRAMS ON MEDICAL STUDENTS: A COMPARATIVE ANALYSIS OF SELF-PERCEIVED AND ACTUAL EFFECTIVENESS

Original Research

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ABSTRACT

Background: Mentoring plays a pivotal role in the academic and professional development of healthcare students. It enhances knowledge acquisition, fosters academic motivation, and improves self-efficacy. Although formal mentoring programs have been widely recognized in medical education globally, there is limited evidence assessing their perceived versus actual impact in dental institutions, particularly in developing regions. Understanding how mentoring influences student outcomes is crucial for shaping effective educational strategies and promoting lifelong learning among future dental professionals.

Objective: To compare the self-perceived effectiveness of mentoring with the actual impact on academic performance among first-year Bachelor of Dental Surgery (BDS) students.

Methods: This prospective mixed-method study was conducted at the Dental Institute of Liaquat University of Medical and Health Sciences, Jamshoro, from February 2024 to August 2024. All first-year BDS students (n = 100) were included through purposive sampling. Data collection involved a two-part instrument: a pre-structured questionnaire for demographic and academic data and open-ended questions exploring perceptions of mentoring. Students were randomly divided into 10 groups, each assigned a mentor, and participated in scheduled mentoring sessions every 15 days over three months. Baseline academic scores were compared to post-mentoring module scores. Quantitative data were analyzed using SPSS version 22, applying paired t-tests to assess statistical significance, while thematic analysis was used for qualitative responses.

Results: The mean age of participants was 18.72 ± 0.74 years, with 35% males and 65% females. Mean baseline module scores were 69.52 ± 15.06, increasing to 72.26 ± 13.08 following the mentorship intervention, with a statistically significant mean difference of 2.74 ($p = 0.001$). Thematic analysis revealed key themes: enhanced understanding of subject matter and improved academic self-efficacy, including better stress management and academic motivation.

Conclusion: Mentorship significantly enhanced students' academic performance, subject comprehension, and self-confidence. Students who perceived mentoring as highly effective achieved better academic results. Further large-scale, multi-institutional studies are recommended to validate these findings and optimize mentoring frameworks in dental education.

Keywords: Academic Performance, Dental Education, Mentoring, Perceived Effectiveness, Self-Efficacy, Student Motivation, Undergraduate Students.

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INTRODUCTION

Mentoring is widely recognized as a pivotal relationship between a more experienced individual, known as a mentor, and a less experienced individual, referred to as a mentee. It is a purposeful connection where the primary aim is to foster personal and professional growth through guided support, experience sharing, and encouragement (1). Originating in the United States during the 1970s to assist junior employees in the private sector, the practice of mentoring expanded into healthcare settings by the 1990s, particularly within nursing disciplines. However, it was not until the late 1990s that structured mentoring programs specifically for medical students and doctors began to take formal shape (2). Formal mentoring programs (MPs) in medical education have demonstrated significant benefits for students, particularly during the critical transition from pre-university education to the demanding environment of medical school. Early-stage vulnerabilities, often arising from the challenges of adapting to an intense curriculum, can be effectively mitigated through structured mentorship. By offering guidance, role modeling, and emotional support, mentoring plays an essential role in the holistic development of medical students, contributing not only to academic success but also to the evolution of competent, empathetic clinicians (3). Core elements of effective formal mentoring programs include the facilitation of both short-term achievements and long-term career goals, the provision of credible role models, mutual benefit for mentors and mentees, and the maintenance of meaningful and purposeful interactions (4).

Research highlights the multifaceted impact of mentorship. According to Zerzan et al., structured mentoring relationships provide emotional and career guidance, bolster self-confidence, cultivate communication networks, and teach the crucial skill of "managing up"—that is, effectively navigating hierarchical relationships (5). Unlike coaching and counseling, mentoring is a cost-free, dynamic, collaborative, and reciprocal process centered on the mentee's overall development (5,6). Notably, mentorship has been instrumental in shaping the careers of high-level executives, with reports suggesting that approximately 70% credit their success to mentorship (6). In the academic medical context, an overwhelming 93% of medical residents acknowledged that mentoring significantly influenced their decision to pursue careers in academic medicine (7). Despite these demonstrated advantages, there is a notable paucity of research investigating the perceptions and effectiveness of mentoring within medical and dental colleges (8,9). Although formal mentoring programs are gradually becoming more prevalent globally, many institutions, particularly within developing countries, lag behind. Limited awareness regarding the profound benefits of mentoring in optimizing students' academic and professional potential remains a substantial barrier. In many local settings, including in Pakistan, the implementation of structured mentoring in medical colleges remains inconsistent, underscoring a critical need for evidence-based advocacy to integrate formal mentoring as a standard educational practice (10).

Given the apparent gap in existing literature and the lack of comparative studies examining both perceived and actual effectiveness of mentoring, this research is particularly timely. To the best of current knowledge, no studies have adequately explored this comparative dimension within the context of first-year Bachelor of Dental Surgery (BDS) students. Therefore, the present study, conducted at the Faculty of Dentistry, Liaquat University of Medical and Health Sciences, Jamshoro, seeks to address this gap. It aims to compare the perceived and actual effectiveness of formal mentoring among first-year BDS students, providing valuable insights for academic institutions, policy makers, mentors, and mentees. By doing so, it aspires to contribute to the future design and delivery of effective academic learning strategies, fostering lifelong learning, self-directed learning, enhanced career development, satisfaction, and improved career outcomes. The primary objective of this study is to determine whether students in formal mentoring relationships perceive greater career development and satisfaction compared to what is achieved through actual mentoring experiences.

METHODS

This study employed an Explanatory Sequential Design (Mixed Method) and was conducted at the Dental Institute of Liaquat University of Medical and Health Sciences (LUMHS), Jamshoro, over a six-month period from February 2024 to August 2024. Non-probability purposive sampling technique was utilized for the selection of participants. All students enrolled in the first year of the Bachelor of Dental Surgery (BDS) program during the study period were eligible for inclusion, resulting in a total sample size of 100 students. There was no exclusion criteria applied, ensuring comprehensive representation of the target population (11). Informed written consent was obtained from all participants before enrollment, and ethical approval was secured from the Ethical Review Committee of LUMHS

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Jamshoro. The data collection instrument comprises two parts. The first part involved a pre-structured questionnaire capturing demographic details such as name, age, roll number, email address, previous module result, post-mentoring module result, and attendance records. The second part consisted of open-ended questions designed to capture the perceptions of students regarding the effectiveness of formal mentoring. All responses were documented systematically on a predesigned proforma. Students were randomized into 10 groups using a random number table, and one mentor was assigned to each group by the institution. The students' previous module results served as baseline academic performance data for comparative analysis. The first formal meeting between mentors and mentees was conducted at the Department of Medical Education, LUMHS, at the start of the new academic module. Subsequent mentoring sessions were held every 15 days over a period of three months, coinciding with the duration of the academic module.

For qualitative analysis, perceptions of mentoring effectiveness were explored through a focus group discussion (FGD) approach using semi-structured and conversational interviews. Fifteen students were purposively selected for interviews based on academic performance stratification into high achievers, intermediate performers, and low scorers. Each interview lasted approximately 10 to 15 minutes and was conducted in a confidential environment to encourage open and honest sharing of experiences. Interviews were audio recorded using an Oppo Reno 11F mobile device, transcribed verbatim, and analyzed through thematic analysis. Codes and themes were extracted by grouping similar words, phrases, and statements aligned with the study objectives. Thematic analysis was performed using NVivo software. Prior to participation, students were briefed about the purpose and procedures of the study, and privacy was maintained by assigning codes instead of using real names. Quantitative data analysis involved assessing the actual academic effectiveness of mentoring by comparing pre- and post-mentoring module examination results. Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 22 (SPSS Inc., Chicago, IL, USA). Continuous variables such as age, pre-mentoring module scores, and post-mentoring module scores were expressed as mean and standard deviation. Categorical variables such as gender and attendance were presented as frequencies and percentages. Graphical representations for categorical data were displayed using pie charts and bar charts. The paired t-test was applied to evaluate the statistical significance of differences between pre- and post-mentoring academic scores, with a p-value of ≤ 0.05 considered statistically significant. Potential effect modifiers were controlled during analysis to ensure internal validity. Overall, the study followed rigorous methodological standards, with strict adherence to ethical guidelines and transparent reporting of all procedures and analyses conducted.

RESULTS

The results of this study were divided into two primary sections: the perception of students regarding the mentoring process and the actual effects of mentoring on academic performance. For the perception of mentoring, three focus group discussions (FGDs) were conducted, each comprising five participants, resulting in a total of 15 students. Among these participants, 6 were male (40%) and 9 were female (60%). The age range of participants was 18 to 24 years, with a mean age of 22.04 years and a standard deviation of 2.163 years. Thematic analysis of the qualitative data revealed two main themes: understanding of subject matter and academic self-efficacy.

1. Understanding of subject matter

On the aspect of understanding subject matter, the majority of students (12 out of 15) reported that mentoring significantly enhanced their comprehension of difficult concepts, improved critical thinking, and broadened their knowledge by relating theory to real-life scenarios presented by their mentors. However, three participants expressed uncertainty about the speculative aspects of mentoring, indicating some diversity in perceived benefit.

"Thanks to my mentor, I now have a much deeper understanding of the subject. Their explanations and insights have made everything so much clearer and easier to grasp."

2. Academic Self-Efficacy

2.1 Higher levels of academic motivation

Participants emphasized the positive role of the mentoring program in increasing academic motivation and persistence. They described the sessions as extremely useful, highlighting that, mentors provided guidance in overcoming academic challenges, shared effective study strategies, and served as inspiring role models. Eleven out of fifteen students concluded that mentoring helped them to set clear goals, monitor their progress, and develop critical skills for academic and professional success.

"During the mentoring process I realized that I hold high expectations for myself, particularly regarding my academic achievements."

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2.2 Stress Management

Thirteen participants reported that mentoring significantly reduced academic stress and feelings of isolation. They highlighted that mentor guidance fostered a sense of belonging and resilience, contributing positively to their educational experience.

"After talking to my mentor, I feel so much lighter. They really helped me see a clear path forward, and it feels like a huge weight has been lifted off my shoulders."

2.3 Improved academic performance

Students perceived that mentoring had a strong positive impact on their academic outcomes. All fifteen students acknowledged that personalized guidance from mentors improved their academic performance by enhancing study techniques, time management, and problem-solving strategies.

"Since I started working with my mentor, I've noticed a real improvement in my academic performance. Their guidance has helped me stay focused and approach my studies more effectively."

In terms of the actual effectiveness of mentoring on academic performance, the analysis included all 100 students enrolled in the first-year BDS program. The mean age of participants was 18.72 years with a standard deviation of 0.74 years. The gender distribution showed 35% males and 65% females. The baseline academic performance prior to the mentoring program revealed a mean module mark of 69.52 with a standard deviation of 15.06. After the mentoring intervention, the mean module mark increased to 72.26 with a standard deviation of 13.08. Attendance rates also demonstrated improvement, with the mean attendance prior to mentoring recorded at 75.57% (standard deviation 10.08) and post-mentoring attendance increasing to 78.05% (standard deviation 8.76). This indicated a positive trend in student engagement following the mentoring sessions. Descriptive analysis showed that the mentorship module achieved a slightly higher average score (mean = 72.26, SD = 13.08) compared to the baseline module (mean = 69.52, SD = 15.07). The consistency of scores also slightly improved after mentoring, as evidenced by the smaller standard deviation. A paired t-test conducted to compare students' academic performance before and after the mentoring program demonstrated a statistically significant improvement. The mean difference in scores was 2.74, with a p-value of 0.001, confirming that the enhancement in academic performance following mentoring was significant.

Table 1: Descriptive Statistics of age

	N	Minimum	Maximum	Mean	Std. Deviation
Age	100	18	21	18.72	0.740

Table 2: Descriptive Statistics of gender

		Frequency	Percent
Gender	Male	35	35.0
	Female	65	65.0
	Total	100	100.0

Table 3: Descriptive Statistics of Attendance of students

Attendance	N	Minimum	Maximum	Mean	Std. Deviation
Attendance 1	100	45.00	99.00	75.5700	10.08
Attendance 2	100	45.00	99.00	78.0500	8.76

Table 4: Descriptive Statistics of Baseline and Mentorship module marks

Baseline and Mentorship Marks	N	Minimum	Maximum	Mean	Std. Deviation
Base line module marks	100	0	89	69.52	15.067
Mentorship module marks	100	0	88	72.26	13.085

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Table 5: Comparison of Baseline Module Marks and Post Mentoring Module Marks by Paired t Test

	Mean	N	Std. Deviation	Mean difference	P value
Base line module marks	69.52	100	15.067	2.74	0.001
Mentorship module marks	72.26	100	13.085		

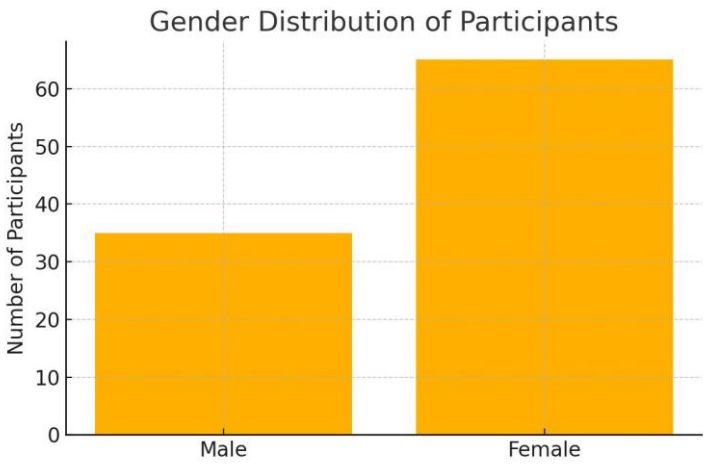


Figure 1 Gender Distribution of Participants

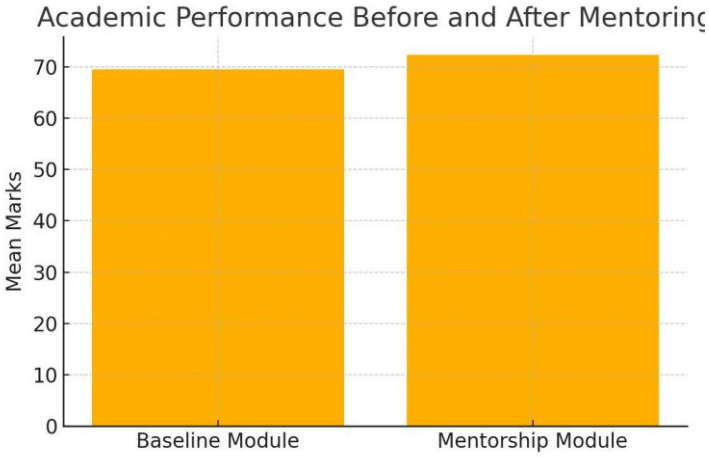


Figure 2 Academic Performance Before and After Mentoring

DISCUSSION

This study explored the perceptions of first-year BDS students regarding formal mentoring and assessed its actual impact on academic performance. The findings demonstrate that structured mentoring programs contribute significantly to enhancing students' understanding of subject matter, boosting academic self-efficacy, and ultimately improving academic outcomes. These results are in alignment with existing literature that recognizes mentorship as a critical component in promoting academic success and personal development among medical and dental students (12). A major theme that emerged from the qualitative analysis was the enhancement of subject matter comprehension. A substantial proportion of participants reported that mentoring clarified difficult concepts, fostered critical thinking, and linked theoretical knowledge to practical, real-world scenarios (13). This observation is consistent with earlier research where structured peer interactions and mentoring relationships were found to facilitate deeper academic learning and comprehension. Nonetheless, a minority of participants expressed uncertainty regarding the speculative benefits of mentoring, suggesting that the effectiveness of such programs may vary depending on individual learning preferences and the skill of the mentor. This finding highlights the importance of mentor training and standardized mentor-mentee matching processes to optimize outcomes across diverse learner profiles (14,15).

Academic self-efficacy was another significant outcome, with students reporting enhanced motivation, better stress management, and improved academic skills. The presence of a structured support system through mentoring appeared to empower students to set and achieve goals, monitor their progress effectively, and build essential skills for both academic and professional success (16,17). The improvement in academic motivation noted in this study resonates with previous evidence where mentorship was associated with increased retention, higher grade point averages, and overall academic persistence. Furthermore, stress management emerged as a crucial subtheme, as many students highlighted the emotional support and sense of belonging fostered through mentoring relationships (18). These findings underscore that the benefits of mentoring extend beyond academic performance, positively impacting the psychological well-being of students and contributing to a more resilient and engaged academic community. Quantitative analysis further supported qualitative perceptions. The statistically significant improvement in academic performance, with a mean difference of 2.74 marks between the baseline and post-mentoring module results ($p = 0.001$), provides robust evidence that formal mentoring programs have a tangible, positive effect on learning outcomes. This finding corroborates earlier studies where formal mentoring led to notable academic

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improvements among medical and dental students (19). An observed increase in attendance rates following the mentoring intervention also suggests improved engagement and commitment, reflecting the broader benefits of mentorship beyond mere academic scores (20). A notable strength of this study lies in its mixed-methods design, which allowed for a comprehensive understanding of both subjective experiences and objective academic outcomes. The inclusion of all first-year BDS students reduced selection bias and enhanced the generalizability of the findings within the studied institution. Additionally, the use of both pre- and post-intervention data enabled a direct comparison, strengthening the causal inference between mentoring and improved academic performance. However, certain limitations must be acknowledged. The study was conducted within a single institution, potentially limiting the external validity of the findings. Cultural, institutional, and curriculum-related factors unique to the setting may influence the generalizability of results to other medical or dental schools. The purposive sampling for qualitative interviews, although valuable for thematic depth, introduces the possibility of selection bias, as students who volunteered may have had particularly positive or negative experiences with mentoring. Furthermore, the duration of mentoring was limited to a single academic module, and long-term impacts on academic performance, career development, or professional competencies were not assessed. The reliance on self-reported perceptions in qualitative analysis, while rich in narrative, may also be subject to social desirability bias.

Future studies should consider multi-institutional designs with larger sample sizes to enhance generalizability. Longitudinal research is warranted to explore the sustained impact of mentoring on academic trajectories, career outcomes, and professional behavior. Incorporating mentor training programs, standardized assessment tools for mentoring effectiveness, and exploring the role of personality matching between mentors and mentees could provide further insights into optimizing mentorship strategies. The findings of this study affirm that formal mentoring programs can have a meaningful and statistically significant positive impact on academic performance and personal development among first-year dental students (21). Structured mentoring should therefore be integrated systematically into medical and dental curricula, with institutional support aimed at training mentors, monitoring progress, and continuously improving mentoring frameworks to maximize student potential.

CONCLUSION

This study concluded that positive perceptions of mentorship among first-year dental students were associated with better academic performance, affirming that students who viewed mentoring as highly effective achieved greater academic success. The overall improvement in academic outcomes following the mentorship intervention provides compelling evidence that structured mentoring enhances subject matter understanding, fosters academic self-efficacy, and supports broader educational development. These findings emphasize the critical role of formal mentorship programs in strengthening both the academic and personal growth of dental students. Integrating mentorship systematically within dental education can serve as a powerful strategy to cultivate motivated, confident, and capable future professionals. Further research with expanded scopes and larger cohorts is recommended to deepen understanding and optimize mentorship frameworks in medical and dental education.

AUTHOR CONTRIBUTION

Author	Contribution
Kashif Ali Channar*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published

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