

Association of different Factors with Academic Performance Among Optometry Students: A Cross-Sectional Study

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Abstract

Background: Academic performance among optometry students is influenced by multiple educational, institutional, and personal factors. Understanding these determinants is essential for improving educational quality and producing competent eye-care professionals. Limited evidence is available regarding factors affecting academic achievement among optometry students in India, particularly in Maharashtra. Aim of the study to correlate the different factors with academic performance of optometry students.

Methods: A cross-sectional analytical study was conducted among 461 optometry students enrolled in institutions across the Konkan division of Maharashtra. Data were collected using a structured questionnaire assessing academic resources, learning environment, student capacity to engage with learning, and course workload. Academic performance was categorized as unsatisfactory, fair, good, or excellent. Descriptive statistics and Chi-square tests were used to determine associations between educational determinants and academic performance.

Results: The mean age of participants was 21.15 ± 1.82 years, and 74.6% were females. Significant associations were observed between academic performance and all educational determinants studied. Academic resources demonstrated a strong association with academic achievement ($\chi^2=256.2$, $p<0.0001$). Students with higher scores in these domains consistently achieved better academic outcomes.

Conclusion: Academic performance among optometry students is significantly influenced by academic resources, learning environment, student engagement, and workload management. Student engagement emerged as the most influential determinant. Strengthening educational infrastructure, promoting active learning, and improving academic support systems may enhance academic outcomes and professional competency among optometry students.

Keywords: Optometry education, academic performance, learning environment, student engagement, educational resources, Konkan region, Maharashtra.

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Introduction

Vision is one of the most important sensory functions required for learning, communication, mobility, social interaction, and occupational productivity. Good vision significantly contributes to educational achievement, independence, psychosocial wellbeing, and overall quality of life. Conversely, visual impairment adversely affects physical, emotional, social, and economic aspects of life and imposes a considerable burden on individuals, families, and healthcare systems. According to the World Health Organization (WHO), approximately 2.2 billion people worldwide live with distance or near vision impairment, of which nearly one billion cases are preventable or remain unaddressed due to lack of timely intervention and access to eye-care services (1). Uncorrected refractive errors and cataracts continue to be the leading causes of avoidable visual impairment globally (2).

The burden of visual impairment is disproportionately higher in low- and middle-income countries, including India, where access to quality eye-care services remains uneven. Factors such as inadequate awareness, shortage of trained eye-care professionals, socioeconomic disparities, and limited healthcare infrastructure contribute to the persistence of avoidable blindness (3). To address this growing burden, strengthening the eye-care workforce has become a major public health priority. Among eye-care professionals, optometrists play a crucial role in providing primary eye care, refractive services, binocular vision assessment, low-vision rehabilitation, and early detection of ocular diseases (4).

Optometry is a specialized healthcare profession concerned with examination of the eye and visual system, diagnosis and correction of refractive errors, detection of visual abnormalities, and management of vision-related disorders. The World Council of Optometry defines optometrists as primary

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healthcare practitioners of the eye and visual system who provide comprehensive vision care services including refraction, contact lens practice, visual rehabilitation, and referral of ocular diseases when necessary (5). Over the past few decades, the scope of optometry has expanded considerably from traditional spectacle dispensing to comprehensive vision care encompassing pediatric optometry, binocular vision management, occupational vision care, and community eye health services.

The effectiveness of eye-care delivery is largely dependent upon the competency and preparedness of optometrists. Consequently, the quality of optometry education has become increasingly important. Modern optometry education requires integration of theoretical knowledge with practical clinical skills, evidence-based practice, communication abilities, and professional ethics (6). Educational institutions therefore have a responsibility to provide adequate academic infrastructure, faculty support, clinical exposure, and learning opportunities to prepare competent practitioners capable of meeting contemporary eye-care demands.

Globally, optometry education has evolved from apprenticeship-based training to structured university-based professional programs. In developed countries such as the United States, Australia, Canada, and the United Kingdom, optometry is recognized as an independent healthcare profession supported by standardized educational frameworks, accreditation systems, and competency-based curricula (5,6). These educational models emphasize development of clinical competence, diagnostic reasoning, critical thinking, and professional behavior.

In India, optometry education has witnessed significant growth over the last two decades due to increasing awareness regarding eye health and the demand for trained vision-care professionals. Numerous institutions now offer diploma, undergraduate, and postgraduate programs in optometry. Despite this expansion, substantial variation exists among institutions with regard to curriculum implementation, faculty availability, clinical exposure, infrastructure, and assessment methods (4,7). Such differences may influence learning experiences, professional competence, and academic outcomes among students. Furthermore, studies have reported that many students join optometry programs with limited awareness regarding the profession and its future opportunities, which may affect their motivation, engagement, and career satisfaction (8).

Academic performance is an important indicator of educational quality and student achievement in healthcare education. Traditionally, academic performance has been assessed through examination scores and grades. However, contemporary educational frameworks recognize academic

performance as a multidimensional construct involving theoretical knowledge, practical competence, communication skills, clinical reasoning, and professional behavior (9). In optometry education, academic performance reflects students' ability to integrate scientific concepts with clinical application and patient care responsibilities.

Academic achievement is influenced by a complex interaction of student-related, institutional, environmental, and psychological factors. Student-related determinants include motivation, learning attitude, attendance, study habits, self-directed learning, time management, and career awareness (10). Students who possess clear professional goals and positive attitudes toward learning are more likely to demonstrate better academic engagement and superior educational outcomes. Self-directed learning, in particular, has become increasingly important in health-professional education because students are expected to continuously update their knowledge and adapt to evolving clinical practices. Institutional factors also play a significant role in determining academic success. Faculty quality, mentorship, teaching methodologies, curriculum structure, and academic support services influence students' educational experiences and professional development (11). Studies evaluating learning environments have consistently demonstrated that supportive educational climates contribute positively to academic satisfaction, confidence, and performance among healthcare students (12,13). Effective teaching methods such as case-based learning, problem-based learning, simulation training, and interactive discussions encourage active participation and critical thinking.

Availability of academic resources is another important determinant of educational outcomes. Access to textbooks, scientific journals, internet facilities, digital learning platforms, laboratories, and clinical training opportunities facilitates evidence-based learning and professional competency development (14). In optometry education, practical exposure and hands-on clinical training are particularly important because proficiency in procedures such as refraction, slit-lamp examination, binocular vision assessment, and contact lens fitting requires repeated supervised practice (5).

Student engagement has emerged as one of the strongest predictors of academic success. Engagement encompasses cognitive, emotional, and behavioral participation in educational activities and reflects the degree to which students invest effort in learning (15). Active participation in lectures, seminars, workshops, journal clubs, and clinical postings promotes deeper understanding, critical thinking, and professional growth. Rajhans et al. reported that journal clubs significantly enhance student engagement, scientific discussion, and

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evidence-based learning among optometry students (16).

In addition, course workload and academic stress may substantially influence learning outcomes. Healthcare students often face challenges related to examinations, assignments, practical sessions, and clinical responsibilities. Excessive workload and psychological stress may negatively affect concentration, motivation, sleep quality, and academic performance (17,18). The COVID-19 pandemic further complicated healthcare education by reducing clinical exposure and necessitating a rapid transition toward online learning systems, creating additional educational challenges for optometry students (19,20).

Despite increasing research in healthcare education, limited studies have specifically evaluated determinants of academic performance among optometry students in India. Evidence regarding the influence of learning environment, academic resources, student engagement, and workload remains inadequate, particularly in Maharashtra. Therefore, the present study was undertaken to assess factors affecting academic performance among optometry students in the Konkan division of Maharashtra. Identification of these determinants may help educators and institutions develop evidence-based strategies to improve educational quality, academic outcomes, and professional competency among future optometrists.

Materials and Methods

Study Design & Population: A cross-sectional analytical study was conducted among 461 optometry students enrolled in institutions located within the Konkan division of Maharashtra.

Study Area: The study was carried out in recognized optometry colleges and institutions located within the Konkan division of Maharashtra. The selected institutions included ITM University, MGM University, Wavikar Eye Institute, SNDT University, Lotus College of Optometry, Laxmi Eye Institute, Aditya Jyot Eye Institute, and Municipal Eye Hospital.

Variables Assessed

Academic Resources: This domain included availability and accessibility of textbooks, journals, internet facilities, digital learning resources, clinical training opportunities, library facilities, and academic support systems.

Learning Environment: The learning environment domain assessed classroom atmosphere, faculty support, teaching methodologies, institutional climate, mentorship, and opportunities for academic interaction.

Student Engagement: Student engagement evaluated participation in learning activities, attendance, self-directed learning, academic involvement, classroom participation, and motivation toward clinical training.

Course Workload: Course workload assessed perceptions regarding academic burden, assignments, examinations, clinical postings, practical sessions, and stress associated with educational activities.

Statistical Analysis

Data were analyzed using descriptive and inferential statistical methods. Frequencies, percentages, means, standard deviations, medians, and interquartile ranges were calculated. Associations between educational determinants and academic performance were evaluated using Chi-square tests. A p-value less than 0.05 was considered statistically significant.

Results

Sociodemographic Characteristics

A total of 461 optometry students participated in the study. The mean age was 21.15 ± 1.82 years, with a median age of 21 years. Most participants belonged to the 20–21 years age group.

Female students constituted 74.6% of the study population, demonstrating a predominance of women in optometry education within the participating institutions.

The majority of participants were enrolled from SNDT Women's University (36.4%) and ITM University (36.2%), together accounting for more than 70% of the sample.

Table 1: Association of different factors with academic performance among optometry students by using chi-square statistics.

Category		Unsat isfact ory (n = 115)	Fair (n = 117)	Good (n = 115)	Excellent (n = 114)	Chi-Square test	P-Value
Academic Resources	Poor (0 - 5)	81	23	3	0	256.2	< 0.0001
	Moderate (6 - 10)	34	73	38	5		
	Average (11 - 15)	0	20	61	37		
	Excellent (16 - 20)	0	1	13	72		
Learning	Poor (0 - 4)	80	22	3	0	263.3	< 0.

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En vir on me nt	Mod erat e (5 - 8)	32	7 8	3 7	3	390. 8	< 0. 00 01
	Ave rage (9 - 12)	2	1 6	6 0	49		
	Exce llent (13 - 16)	0	1	1 5	62		
Le ar ning stu de nt's cap aci ty	Poor (0 - 4)	87	2 4	4	0	283. 51	< 0. 00 01
	Mod erat e (5 - 8)	27	7 3	3 5	3		
	Ave rage (9 - 12)	1	1 9	6 3	35		
	Exce llent (13 - 16)	0	1	1 3	76		
Co urs e wo rkl oa d	Poor (0 - 3)	78	3 1	5	1	283. 51	< 0. 00 01
	Mod erat e (4 - 6)	35	5 7	4 6	5		
	Ave rage (7 - 9)	2	2 7	4 4	43		
	Exce llent (10 - 12)	0	2	2 0	65		

Academic Resources and Academic Performance

A highly significant association was observed between academic resources and academic performance ($\chi^2=256.2$, $p<0.0001$). Students with poor academic resource scores predominantly demonstrated unsatisfactory academic performance (70.44%). Conversely, among students with excellent academic resource scores, 63.15% achieved excellent academic performance and none reported unsatisfactory performance. A progressive increase in academic achievement was observed with increasing resource availability, indicating that access to educational materials, digital resources, and institutional support contributes substantially to academic success.

Learning Environment and Academic Performance

Learning environment demonstrated a highly significant association with academic performance ($\chi^2=263.3$, $p<0.0001$). Among students reporting poor learning environments, 69.57% demonstrated unsatisfactory academic performance. In contrast, students reporting excellent learning environments predominantly achieved excellent academic performance (54.39%).

Student Engagement and Academic Performance

Student engagement emerged as the strongest determinant of academic performance ($\chi^2=390.8$, $p<0.0001$). Students with poor engagement scores predominantly exhibited unsatisfactory performance (75.65%), whereas 66.67% of students with excellent engagement scores achieved excellent academic performance.

Course Workload and Academic Performance

Course workload was significantly associated with academic performance ($\chi^2=283.51$, $p<0.0001$). Students with poor workload scores predominantly demonstrated unsatisfactory academic performance (67.83%). Among those with excellent workload scores, 57.02% achieved excellent academic performance.

These findings suggest that students who effectively manage academic demands, examinations, clinical postings, and assignments achieve superior educational outcomes.

Discussion

The present study demonstrated that academic performance among optometry students is significantly associated with academic resources, learning environment, student engagement, and course workload. Among these determinants, student engagement exhibited the strongest association with academic achievement.

Academic resources were found to have a significant positive influence on academic performance. Students with better access to educational materials, internet facilities, digital learning resources, and clinical exposure demonstrated superior academic outcomes. Similar findings were reported by Shah et al., who identified educational resources, clinical exposure, and institutional support as major determinants of academic performance among optometry students in Mozambique (21). Previous educational research has also emphasized the importance of access to academic resources in promoting self-directed learning and professional competency (22,23).

The learning environment was another significant determinant of academic performance. Students who perceived their educational environment positively achieved better academic outcomes. These findings are consistent with those reported by Pai et al. and Chellaiyan et al., who demonstrated that supportive educational environments improve student satisfaction, confidence, and academic achievement among health-professional students

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(12,13). Faculty support, mentorship, effective teaching methodologies, and positive institutional climate likely contribute to improved learning outcomes.

Student engagement emerged as the strongest predictor of academic performance in the present study. Students who actively participated in academic activities, attended classes regularly, and engaged in self-directed learning demonstrated significantly better academic outcomes. Similar observations have been reported in educational literature, where active learning, behavioral engagement, and cognitive involvement have been associated with improved academic success (16,24). Rajhans et al. further highlighted the importance of journal clubs and collaborative learning approaches in enhancing student participation and critical thinking skills (16).

Course workload was also significantly associated with academic performance. Healthcare education is characterized by extensive academic requirements, practical training, and clinical responsibilities. Excessive workload may contribute to stress, fatigue, and reduced academic efficiency. Das et al. identified comprehension difficulties, test anxiety, and poor concentration as important factors affecting academic achievement among medical students (25). Kumar et al. similarly reported that academic stress negatively influences learning outcomes and student wellbeing (18).

The findings of the present study support existing evidence indicating that academic performance is multifactorial and influenced by both institutional and individual determinants. Improving educational infrastructure, strengthening student support systems, enhancing faculty mentorship, and promoting active learning strategies may contribute substantially to improved academic outcomes and professional competency among optometry students.

Conclusion

The present study identified academic resources, learning environment, student engagement, and course workload as significant determinants of academic performance among optometry students in the Konkan division of Maharashtra.

Student engagement emerged as the strongest predictor of academic achievement, followed by course workload, learning environment, and academic resources. Students who reported better educational support, favourable learning environments, higher engagement, and effective workload management consistently achieved superior academic outcomes.

Improving these educational determinants may contribute substantially to enhancement of academic performance and professional competency among future optometrists.

Recommendations

1. Strengthen academic infrastructure including libraries, digital learning platforms, and clinical training facilities.
2. Promote student-centered teaching methods such as problem-based learning and case discussions.
3. Enhance mentorship and academic counseling services.
4. Encourage active student participation in research, seminars, workshops, and journal clubs.
5. Develop strategies for effective workload management and stress reduction.
6. Conduct periodic evaluation of educational environments to identify areas requiring improvement.

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Conflict of Interest:

The authors declare no conflict of interest.

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