

Perception Of MBBS Undergraduates Of Kashmir Division Towards Classroom Architecture And Academic Strain - An Observational Study

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Abstract

Background: The physical classroom environment influences students' concentration, stress levels, and academic performance. In medical education, where sustained attention is essential, poor infrastructure may contribute to academic strain and burnout. This study assessed the perception of MBBS undergraduates in Kashmir regarding classroom architecture and its association with concentration and burnout.

Methods: A descriptive cross-sectional study was conducted from August to September 2025 among 231 MBBS students (batches 2021–2024) from medical colleges in Kashmir. Data were collected using a semi-structured validated questionnaire administered via Google Forms. Variables included lighting, ventilation, seating arrangement, sound quality, and perceived academic effects. Data were analyzed using descriptive statistics and Chi-square tests to determine associations between poor classroom design and outcomes such as fatigue, anxiety, decreased concentration, and burnout.

Results: A majority of students reported inadequate ventilation (74%) and lighting difficulties (35.5%). Poor classroom design was perceived to increase stress in 71.9% of participants and cause fatigue in 87.9%. Decreased concentration and academic burnout were reported by 86% of students. Significant associations were observed between poor classroom architecture and fatigue ($p<0.0001$), anxiety ($p<0.0001$), decreased concentration ($p=0.0015$), and burnout ($p=0.0001$).

Conclusion: Classroom architecture significantly affects concentration, stress, and burnout among MBBS students. Improving ventilation, lighting, ergonomics, and acoustic quality may enhance academic performance and student well-being.

Keywords: Classroom environment, Academic burnout, Medical students, Learning infrastructure, Concentration

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INTRODUCTION:

The infrastructure of study centres is a crucial factor for student learning: a quality of infrastructure can improve attendance rates; adequate comfort conditions have a positive impact on academic results; and a resilient design guarantees the continuity of educational services in the face of extreme weather events exacerbated by climate change. ⁽¹⁾ The physical environment in which the educational process takes place has been the subject of study in recent years, given its direct impact on well-being and academic performance of students. Environmental conditions within classrooms, such as air quality, temperature, humidity, carbon dioxide (CO₂)

levels, the presence of particulate matter, and lighting, are factors that can influence students' ability to concentrate.

The concept of burnout:

If the tasks that an individual is expected to fulfil exceed his/her energy and power, the individual feels ineffective, disappointed and demotivated and thus experiences burnout (Freudenberg)

Maslach and Jackson (1981) define burnout as a three-dimensional structure that features emotional exhaustion, desensitization and a low sense of personal accomplishment ^[2]

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Academic burnout refers to the chronic stress that students experience due to course load, exam anxiety, and other psychological factors^[3]

The physical classroom environment includes ambient conditions (lighting, temperature, air quality and noise), the spatial layout and functionality (including furniture arrangement and learning centres) and the presence of signs, symbols, and decorations. A well- designed environment fosters comfort, engagement, and motivation, positively influencing student learning and participation.

The classroom's physical environment significantly affects student focus and burnout by influencing attention, stress, and overall well-being, with factors like lighting, acoustics, temperature and layout playing a crucial role in creating a conducive or distracting learning space. Temperature and ventilation systems inside the classroom are crucial factors that affect the classroom learning environment. Classrooms too cold or too hot negatively affect student performance and concentration as they feel uncomfortable in such conditions. High temperature and humidity create physiological and psychological problems which expedite fatigue, causing people to work more slowly, apply many efforts and make more mistakes and errors. Classroom lighting consists of undetectable light, illumination at students' desks, and lighting from the projection 4.

screens and windows. Improper lighting negatively affects academic achievement and promotes distress and obstruction for students in the classroom^[4]

The fact that students spend considerable time in classrooms makes the indoor environment a crucial aspect of their physical and mental well-being and of academic progress. Although academic conditions such as workload are commonly reviewed, the physical features of the classroom, such as lighting, noise, temperature and design, significantly affects behavior and performance of the students directly and greatly.

Although the physical environments are known to affect learning, a lot of classrooms still often include poor conditions, including poor lighting, poor air quality or excessive noise levels, among others^[5] These environments may result in a greater level of distractions, stress, and cause the feeling of exhaustion and disengagement, which may worsen academic burnout.

RATIONALE:

The importance of this study is to examine the impact of the physical classroom environment, including the lighting system, noise levels, temperature, and room design, on student attention. Since the attention of students is a direct result of academic performance, knowledge about the effects of the environment can result in the enhancement of classrooms and the improvement of the learning process. The study fills a research gap in the field of education by moving the focus of the research towards how maximizing physical space can be used to supplement cognitive activity, particularly in students with attention difficulties.

Considering the situation in Kashmir, where a medical college can be characterized by over-crowded classes, lack of lighting, and unsteady temperatures caused by seasonal changes, these factors can also contribute to the level of concentration and performance of medical students. Investigating this problem with medical students in Kashmir will be an insightful study because their academic program has high cognitive learning needs and requires a high degree of attention. The ability to make changes to classroom conditions in such institutions would positively impact the learning process, alleviate stress, and improve the future healthcare providers in the area.

REVIEW OF LITERATURE:

A cross-sectional study conducted at Umm Al-Qura University (Saudi Arabia), among medical (MBBS) students, to identify environmental factors contributing to stress, found that uncomfortable chairs were the top complaint, with 61.4% of students agreeing they were a stress source. Overcrowded classrooms were noted by 39.5% as stressful. Poor ventilation was identified by 34.3% of respondents. Unclean classrooms were cited by 35.7%.^[6]

A study conducted by Erdem in 2017 reveals that the classroom environment can influence student productivity. Failure to adjust these parameters to the recommended values can cause various problems that affect both health and performance, such as headaches, drowsiness and fatigue, which reduce the ability to concentrate. During the investigation, it was observed that in the unventilated classroom, the CO₂ level always exceeded the recommended limit of 1000 ppm, reaching approximately 1500 ppm. In addition, the temperature was slightly above the recommended maximum of 25 °C, while the relative humidity was just above the recommended minimum of 30%.^[7]

Barrett et al. (2015)^[8] in the Holistic Evidence and Design (HEAD) Project, found that classroom design factors such as lighting, temperature, air quality, and layout can account for up to 16% of the variation in academic achievement. Natural lighting, moderate temperatures, and well-ventilated rooms were particularly influential in enhancing cognitive performance.

A study conducted in the Institute of Education and research Kohat University of Science and technology Pakistan, in 2017 by Ayesha Kausar, Dr Almas Ikram Kayani^[9], through an experimental study of 50 secondary school students. It showed that the experimental group showed much better performance than the control group when provided with a proper and comfortable classroom environment.

A study by the University of Salford (2011-12)^[10] involving 750 students across 34 classrooms found that environmental factors of class, such as temperature, humidity, light, flexibility, and colour, can influence academic progress by 25% within a school year.

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A study conducted by the Heschong Mahone Group (1999), with follow-ups in 2002 involving over 9,000 students across three California school districts, found that students in classrooms with greater access to natural daylight showed 20-26% faster progress in reading and mathematics. Moreover, classrooms with larger windows were associated with better student outcomes.^[11]

AIM & OBJECTIVES:

Primary objective - To find how ug medical students doing MBBS in Kashmir perceive the design and structure of the classroom and its influence on their academic performance.

Secondary objective-

1. To study the different aspects of the classroom physical environment and the concentration level of ug medical students.
2. To assess the burnout (exhaustion and disengagement among Ug medical students).
3. To identify the environmental factors which contribute most significantly to reducing concentration and causing burnout.

METHODOLOGY:

Study design:

Our research is a descriptive type of research to assess how the classroom environment influences the concentration power of ug medical students and causes burnout.

Study participants:

Undergraduate medical students are doing MBBS in

various medical colleges of Kashmir. The participants of our study were from batches 2021 - 2024.

Study period:

The research was conducted over a period of 4 weeks from 18 August 2025 to 12 September 2025.

Study tool: The study was done via semi structured validated questionnaire that was developed with the consultation of subject experts and faculty members and was administered using Google Forms directly on the phone numbers of the research participants.

Variable selected: -

Classroom environment factors such as light, ventilation and temperature.

Sample size calculation:

Sample size was calculated using the formula $4pq/d^2$ Where p is the prevalence. d is allowable error. The total sample size calculated was 231.

DATA ANALYSIS: The data analysis is done using Microsoft Excel and OpenEpi, and the results were reported using descriptive statistics. Chi Square tests were done to represent association between poor classroom design and outcome variables.

RESULTS:

A total of 231 medical students participated in the questionnaire based on the perception of MBBS medical undergraduates of Kashmir towards classroom architecture and academic characteristics of study participants

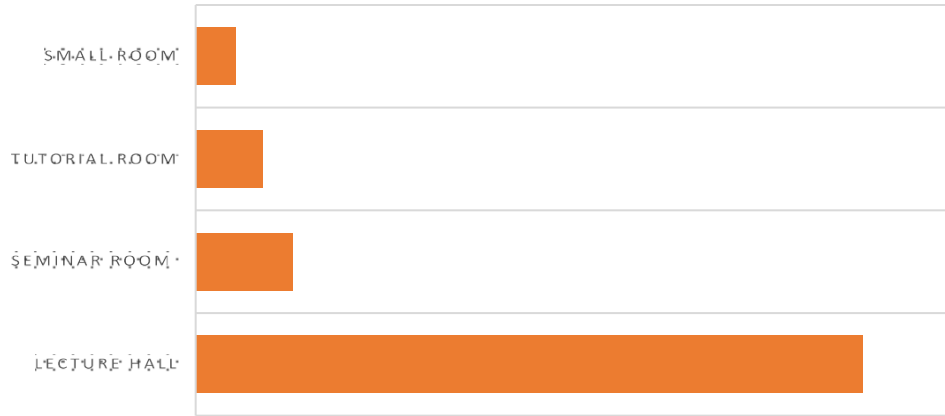
Table 1: Participant characteristics

<i>Characteristics</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Year of study		
<i>1st phase</i>	38	16.5 %
<i>2nd phase</i>	11	4.8 %
<i>3rd phase part 1</i>	168	72.7%
<i>3rd phase part 2</i>	18	7.8%
College name		
<i>GMC Srinagar</i>	186	80.5%
<i>GMC Anantnag</i>	31	13.4%
<i>GMC Baramulla</i>	4	1.7 %
<i>GMC Handwara</i>	7	3%
<i>SKIMS MEDICAL COLLEGE</i>	3	1.3%

The results of the table showed that most participants were from the 3rd phase part 1 (72.7%), and the majority studied at GMC Srinagar (80.5%).

Fig no. 1: Frequency of the classroom setting you usually have in your college. 9,

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The results of the study show that out of 231 participants, 219 students (94.8%) reported that they usually sit in a lecture hall, 32 students (13.9%) in a seminar room, 22 students (9.5%) in a tutorial room and

13 students (5.6%) in a small room. (Note that participants could have selected more than one option.)

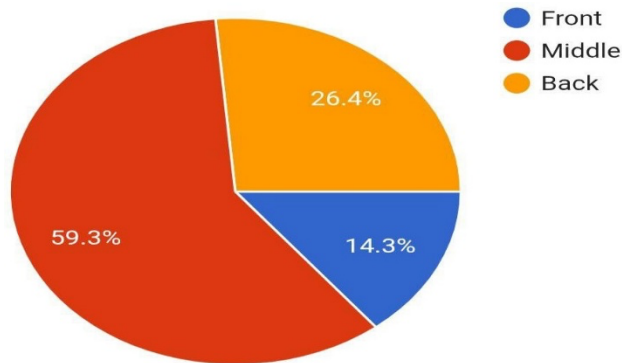


Fig no.2: Frequency distribution of students according to their preferred seating position in the classroom.

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The results showed that out of total responses 14.3% (33) of students preferred to sit in the front, 59.3% (137)

preferred to sit in the middle and 26.4% (61) preferred to sit at the back.

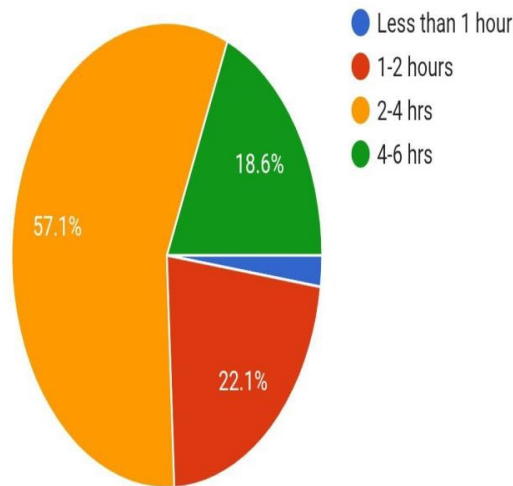


Fig no.3: distribution regarding no. of hours spent in classroom.

The results showed that out of total responses 2.2% (5) reported spending less than 1 hour, 22.1% (51) reported spending 1-2 hours in a classroom, 57.1% (132)

reported spending 2-4 hours in a classroom, 18.6% (43) reported spending 4-6 hours in a classroom.

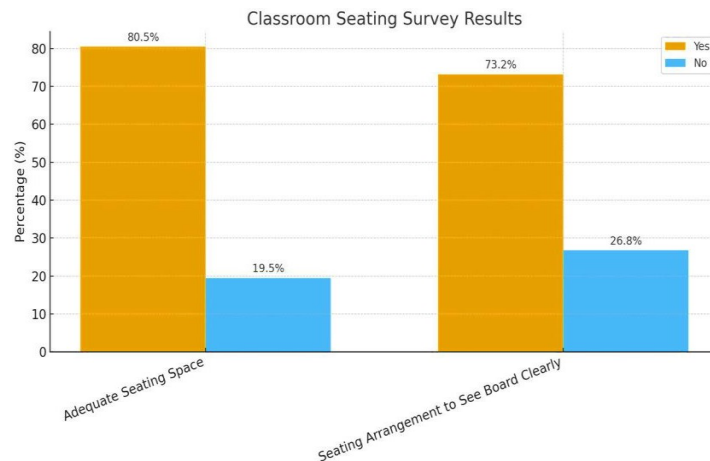


Fig no.4: Frequency distribution of students based on the availability of a seating space in the classroom and clarity of board visibility from their seating arrangement.

The results showed that out of total responses 80.5% (186) reported that the classroom adequate seating space while as 19.5% (45) felt it did not. Similarly, 73.2%

(169) reported that seating arrangement allows them to see the board clearly whereas 26.8% (62) indicated difficulties in viewing the board.

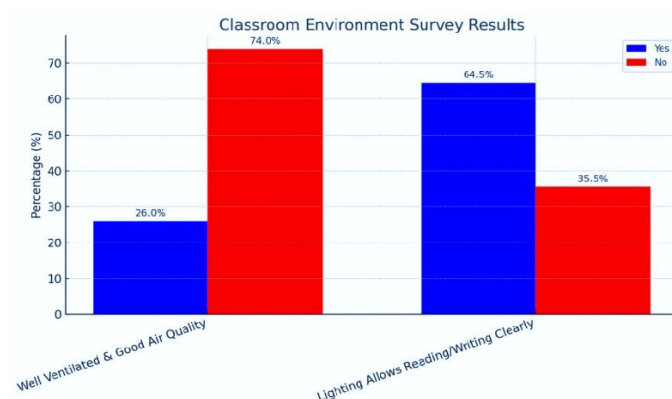


Fig no.5: Frequency distribution of classroom environment

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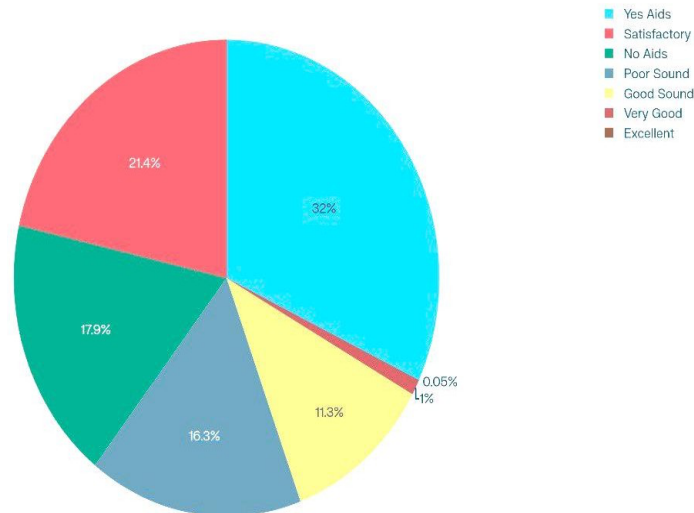


Fig no. 6: Rating of sound quality in classroom and Availability of teaching aids.

The results showed that out of total responses 26% (60) of students reported that the classroom is well ventilated with good air quality, while 74% (171) felt it was not. Similarly, 64.5% (149) of students reported that the lighting allows them to read and write clearly, whereas 35.5% (82) indicated difficulties with lighting.¹²

The results of the study show the responses of students regarding classroom facilities. Out of participants, when

asked about sound quality in the classroom, 75 students rated it as poor, 99 as satisfactory, 52 as good, 3 as very good, and only 2 students rated it as excellent. Regarding the availability of teaching aids (projector, whiteboard, mic), 148 students reported adequacy, whereas 83 students indicated inadequacy. The combined chart illustrates the distribution of responses for both these aspects.

Table no.2: Frequency distribution table showing do classroom design encourage interaction between students and teachers:

Response	Frequency	Percentage (%)
Yes	94	40.7%
No	137	59.3%

Table no. 3: frequency distribution table showing is the physical environment of classroom conducive to learning.

Response	Frequency	Percentage (%)
Yes	118	51.1%
No	113	48.9%

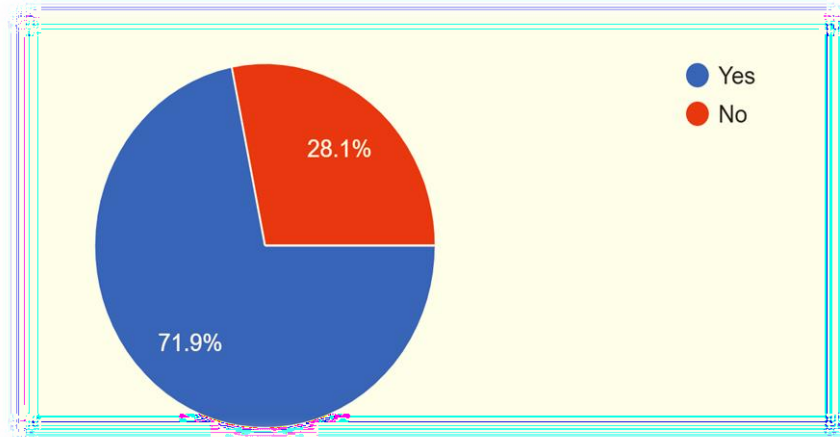


Fig no.7: Does poor classroom design increase your level of stress

The results of the study show the responses of students regarding the impact of poor classroom design on stress levels. Out of 231 participants, 71.9% (166 students)

reported that poor classroom design increases their level of stress, while 28.1% (65 students) stated that it does not.

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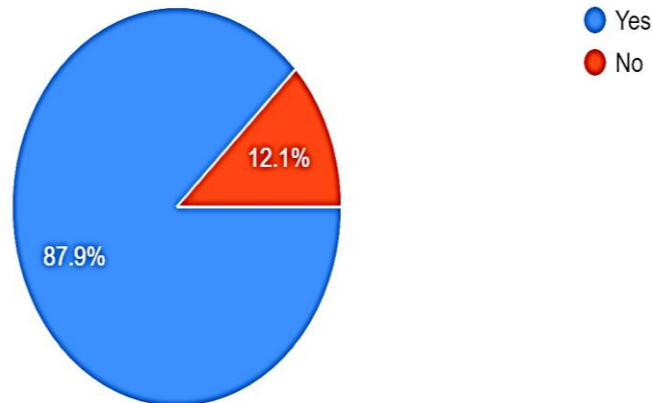


fig no.8: Frequency of sitting in crowded or poorly ventilated classroom make students feel fatigued.

The results of the study show the responses of students regarding the impact of sitting in crowded or poorly ventilated classrooms on fatigue. Out of 231

participants, 87.9% (203 students) reported that such conditions make them feel fatigued, while 12.1% (28 students) stated that they do not.

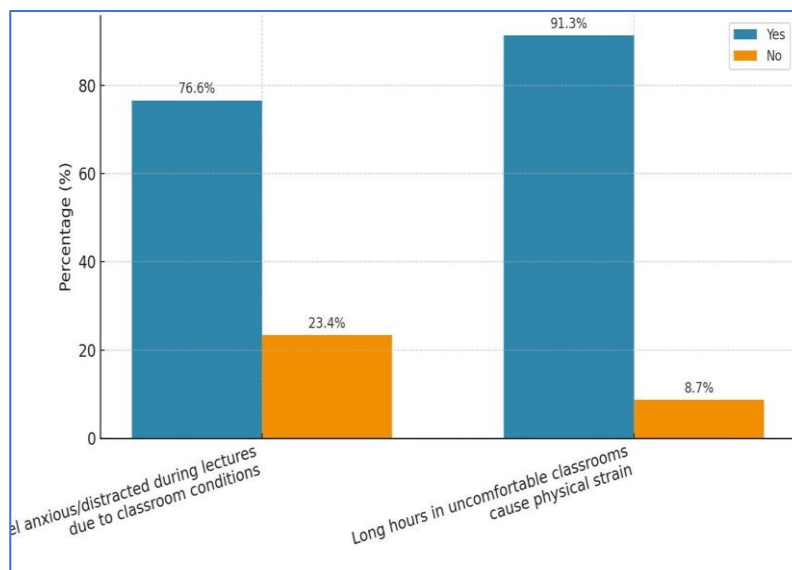


Fig no.9: Frequency of feeling anxious or distracted during lectures due to classroom conditions and long hours in uncomfortable classroom cause physical strain

The results showed that regarding feeling anxious and distracted during lectures, 76.6% of students reported experiencing these effects due to classroom conditions, while 23.4% did not. This corresponds to 177 students feeling anxious or distracted and 54 students not experiencing these effects.

Similarly physical strain from long hours in an uncomfortable classroom, 91.3% of students reported feeling fatigued, while 8.7% did not. This corresponds to 211 students experiencing physical strain and 20 students not affected 15.

Table 4: Perception regarding infrastructure on concentration and academic performance

Perception	Yes (N)	Yes (%)	No (N)	No (%)
Concentration levels dropped due to poorly designed classrooms	199	86	32	14
Academic burnout due to poor classroom environment	199	86	32	14
Academic performance increases due to improved architecture in classroom	187	81	44	19

Table 5 : Satisfaction level among respondents towards classroom architecture

	Frequency (N)	Percentage (%)
Satisfied	80	34.6
Not satisfied	151	65.4

The results show students overall satisfaction with the current classroom environment. A majority of 65.4% of students (80 students) reported being satisfied, while 34.6% (151 students) expressed dissatisfaction. This

indicates that a significant portion of students are not fully satisfied with their classroom environment, highlighting the need for improvements.

Table 6. Association between poor classroom architecture and outcomes

Outcome	Chi square value	P value
Fatigue	27.14	<0.0001
Anxiety	18.1	<0.0001
Physical strain	2.23	0.1351
Decreased concentration	10.08	0.0015
Burnout	16.18	0.0001

(Significant p value <0.05) (highly significant p value <0.01)

DISCUSSION:

This study examined how medical students viewed classroom architecture and how this attitude might contribute to academic burnout. The study indicates that there is an important correlation between learning institution setting and student well-being, and thus, the architectural design is crucial in academic life and psychological well-being.

According to the results of several response questionnaires, it was found that almost all the respondents, N=220 (94.8%), mostly occupied large lecture halls, with a very small percentage in seminar, N=11 (13.9%), tutorial (9.5%), and small rooms (5.6%). This abundance of lecture rooms might restrict individual interaction and adaptability. In addition, the seating preference of students was highly concentrated in the middle (59.3%), then the back (26.4%) and front (14.3) seating. Middle and back sitting, though cozy, may interfere with the view and reinforce the attitude of passive learning, which may increase the disengagement in cases when the lighting or acoustics are not optimal.

Another important factor that became critical was the time spent in classrooms. More than half of the students (57.1%) said the number of hours they spent in the classroom was 2-4, and almost a quarter of the total (18.6%) said they spent 4-6 hours. A prolonged stay in the same physical setting enhances the overall effect of any underperformance in the lighting, air quality, or the ergonomics of seating comfort, and thus the need to focus on prolonged comfort and not the short-term exposures. These findings are consistent with the findings of past studies that have shown that environmental design can either be an advantage or a disadvantage to cognitive ability, concentration and emotional control.

The sense of the sitting area and board visibility

highlight that the comfort in the body and visibility of the board are the basis of being attentive to the learning process. A solid majority (80.5%) agreed that there was sufficient seating space, but nearly one out of every five believed that he/she was confined. Equally, whereas 73.2% have said that they can see the board unhindered, over a quarter (26.8%) have had problems with adequate clarity. Such impaired perceptions probably interfere with taking notes and cognitive processing, increasing cognitive load and exhaustion.

Although the environmental conditions of the present study, like ventilation, temperature, and lighting levels, were not measured in this case, existing literature has a high correlation between poor indoor air quality and thermal discomfort and increased fatigue, headaches, and poor cognitive performance. Since the percentage of time students spend in closed lecture rooms is rather high, even minor shortfalls in the environment would significantly deteriorate concentration and increase stress.

Academic burnout:

In agreement with the literature, academic burnout was rife in medical students, which was described as emotional exhaustion, cynicism, and decreased academic efficacy.^[12]

Another significant observation is that there is a relationship between unfavorable classroom environments and increased reported burnout. Students who were in cramped, dark and uncomfortable classrooms complained of being more emotionally exhausted and detached. These results are consistent with the environmental stress theory, whereby an inactive physical environment may be a chronic stressor that wear out psychological well-being in the long run (Evans, 2003).^[13]

Collectively, these findings are consistent with the idea of academic burnout as a retaliatory mechanism to long-

term stressors beyond the coping ability of students. Students are more likely to be emotionally drained and disinterested when physical spaces do not align with their requirements in learning such as crowding, less than ideal sightlines, and a lack of ergonomic assistance. On the other hand, motivational and resilient conditions may be created in well-designed settings that provide clear visibility, relaxing seating, and space adequacy.

Design for interaction and learning

Only 40.7% of the students thought the design of the classroom promoted interaction with instructors, and only 51.1% of students felt that the physical learning environment was conducive to learning.

Stress fatigue and concentration deteriorate in a startling 71.9% of participants testified that an unfavorable classroom layout increased their stress levels, and 87.9% experienced fatigue when they sat in a crowded or stuffy area. Besides, 76.6% had anxiety or distraction during lectures because of environmental circumstances, and 91.3% suffered physical strain because of being exposed to unpleasant conditions. Therefore, 86.1% of those who admitted that their focus in poorly structured classes declined admitted that stressors associated with the environment add to the load of academic stress.

Perceived impact of improvement

Positively, 81% of students were of the view that improvement in classroom structures would boost their performance. This optimism means that specific interventions - replacing ventilation systems, introducing flexible lighting and acoustic optimization - can bring significant benefits in attention, comfort, and overall satisfaction 19

Implications

The research emphasizes that the face setting in the physical classroom is important in determining the concentration of the medical students, stress levels and susceptibility to the academic burnout. Poor ventilation, inappropriate lighting, inflexible seating designs and disturbing noise are some of the cumulative stressors that not only deteriorate cognitive functioning but also increase emotional exhaustion. These issues can be overcome using specific interventions, including building better ventilation, using adaptive lighting, integrating acoustic interventions, and installing flexible and student-friendly furniture, which will make learning environments more conducive. These are the necessary steps towards increased attention, burnout alleviation, and eventually, academic achievement and well-being of medical students.

RECOMMENDATIONS:

Proper lighting and ventilation should be provided. Ergonomic seating with adequate space between the students could be adopted for lesser strain and more comfort during classes or lectures.

Adequate natural light from large windows, supplemented with evenly distributed white LED lighting bulbs and lights should be installed.

Proper sound system with large bright slide boards should be installed and the class should be divided into sections so that the lectures become interactive and not overcrowded.

Recliner seats, air conditioners could also be provided for better classroom environment.

Repairs of the damaged and replacement of old broken benches should be carried out on immediate basis.

Additional coverings of windows which obstruct the flow of natural light like blankets, towels or any other erroneous materials should be removed. Ceiling fans should be replaced every 2-3 years and ensure the availability of high air flow ceiling fans having lesser noise and creaking sounds. Ensuring of timely paint, repair of walls and cleaning of furniture may also facilitate good learning experience for the students.

CONCLUSION:

The research indicates that the classroom physical environment is a key factor in determining the concentration, comfort and general academic well-being of MBBS undergraduates in Kashmir.

A high population of students, i.e. 74% reported the problem of bad ventilation, 35.5% reported low light and the poor quality of sound and overcrowding, which not only lowered the ability to work but also led to fatigue, stress and academic burnout. Over 71.9% (n=167) of participants said that they are more stressed when they are in the classroom when it is poorly designed, and more than 81.0% (n=188) of participants expressed that a better classroom design would have a positive impact on their grades. These findings imply that classroom design is not a simple infrastructural issue, but a significant factor that determines the student outcomes and mental condition in terms of learning. The findings show that there is an urgency for learning institutions to put in place better ventilation, lighting, seating arrangements, and sound quality to alleviate the stress, enhance concentration and help students to engage better in academics. By handling these issues, the student satisfaction will be improved, and burnouts will be mitigated to support healthier and more productive learning.

SUMMARY:

This is an observational study that investigated the influence of classroom physical environment on undergraduate medical students (231 of them) in four colleges based in Kashmir (batches 2021-2024) on their concentration and academic burnout. The study was carried out in four weeks in August-September 2025 with a Questionnaire in Google Forms to determine how students felt about classroom layout and how this affected their performance in school. It sought to determine the extent to which classroom design, seating patterns, and the environment help students to have positive learning experiences. The paper emphasizes the importance of viewing classroom infrastructure as a

critical part of medical education and outlines the necessity to design learning environments that help to enhance focus, decrease burnout, and help students to develop academically

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