

Research Article

Elective Choices by Undergraduate Medical Students: What do They Tell about the Future Physician Workforce?: A Cross-Sectional Study

*Sandhya Chauhan*¹, *Jaswinder Singh*², *M S Butola*³, *Neelima Mehrotra*⁴

¹Professor, Department of Paediatrics, Sri Ram Murti Smarak Institute of Medical Sciences, India.

²Professor, Department of Forensic Medicine, Sri Ram Murti Smarak Institute of Medical Sciences, India.

³Principal, Department of Medical Education, Sri Ram Murti Smarak Institute of Medical Sciences, India.

⁴Professor, Department of Ophthalmology, Sri Ram Murti Smarak Institute of Medical Sciences, India.

I N F O

Corresponding Author:

Sandhya Chauhan, Department of Paediatrics, Sri Ram Murti Smarak Institute of Medical Sciences, India.

E-mail Id:

drsandhyapedia@gmail.com

Orcid Id:

<https://orcid.org/0000-0002-0954-4245>

How to cite this article:

Chauhan S, Singh J, Butola M S, Mehrotra N. Elective Choices by Undergraduate Medical Students: What do They Tell about the Future Physician Workforce?: A Cross-Sectional Study. IAP J. Med. Educ. Res. 2024;1(1):3-9.

Date of Submission: 2023-10-11

Date of Acceptance: 2023-11-20

A B S T R A C T

Introduction: Graduate Medical Education Regulations 2019 has tried to create, in the MBBS curriculum itself, opportunities for the students to get individualized educational experiences, known as electives.

Aims:

1. To ascertain the choice of electives made by the students
2. To determine the factors that influence the student's choice of electives

Method: This is a cross-sectional questionnaire-based study conducted at the time of allotment of electives to MBBS Phase 3 Part 1 students. An online Google-based self-administered questionnaire in the English language was distributed to all 100 students of MBBS Phase 3 Part 1. The questionnaire consisted of elective choices from pre/ para clinical (Block 1) and clinical electives (Block 2). The students were asked to state their four preferences in each block. Frequencies and percentages were computed for all variables.

Results: All the 100 students of the MBBS 2019 batch participated in the study. The students were in the age group of 20–23 years with 49 males and 51 females. Among the electives offered in the pre/ para clinical subjects, those of Pathology were the most sought after and those offered by Anatomy and Physiology were chosen the least. Among the clinical electives, Medicine and Allied were the most opted ones followed by Surgery. Pediatrics and Psychiatry were the categories that turned out to be the least sought after. No student opted for electives in Community Medicine.

Conclusion: Understanding the thought processes, interests and aspirations of our students (the future workforce), and adapting accordingly, is very essential.

Keywords: Electives, Undergraduate Students, Block 1, Block 2

Introduction

The new MBBS program formulated after the changes in Graduate Medical Education Regulations 2019 aims to create a competent physician of first contact. Along with this, medical students and interns also need to explore learning beyond primary care in order to fulfil their self-interests and to be globally relevant. The whole academic format of medical education is more or less directive in approach with information overload leaving very little room and time for self-exploration. GMER 2019 has tried to create, in the MBBS curriculum itself, opportunities for the students to get individualized educational experiences known as electives.¹⁻³

Electives, which have been an integral part of the international medical curriculum, usually refer to a period during undergraduate training in which there is a significant element of student choice involved.⁴ In fact, they are learning experiences that are aimed to provide the learner with an opportunity to gain an immersive experience of a career stream, discipline or research project.¹

To achieve this aim, it is required that the institutions provide enabling environments to students for better learning. An insight into the choice of electives students make can assist the institutions in better planning and execution of the electives in future.

Aim and Objectives

1. To ascertain the choice of electives made by the students
2. To determine the factors that influence the student's choice of electives

Materials and Methods

Study Design and Participants

This cross-sectional questionnaire-based study was conducted among 100 students of MBBS Phase 3 Part 1 of the 2019 batch. A Google-based self-administered questionnaire in the English language was shared online with all 100 students. Participant's consent was obtained before beginning the survey.

Questionnaire

After obtaining ethical clearance from the Institutional

Ethics Committee, a link to the online Google Forms-based questionnaire was shared via the official class WhatsApp group and via an official email from the Principal's office. The questionnaire comprised two sections: The first section included choices of electives, both in Block A (pre/ para clinical) and Block B (clinical) and the marks (in percentage) scored by the students in Phase 2 professional examinations. The second section covered the students' reasons for choosing these programs.

Methodology

Study Period: 6 months

The Department of Medical Education of Sri Ram Murti Smarak Institute of Medical Sciences conducted a sensitization program for conducting electives in the institute which was attended by the members of the Department of Medical Education, Curriculum Committee members, Administrative Officers, Departmental Heads and the Undergraduate Teaching Incharges of the respective departments. After this, all the departments were requested to submit a list of possible electives that could be conducted in the respective departments.

After this, the aforementioned questionnaire was created. The survey was distributed through the official email id of the Principal's Office. Students were invited to participate via email. Each student was instructed to state four preferences regarding the choice of electives both in pre/ para clinical and in clinical blocks, separately. To decide the order of allotment of electives, a merit list of the MBBS Phase 2 professional examination was used. Non-responders were sent up to 5 follow-up emails.

Data Analysis

For data analysis, frequencies and percentages of all variables were computed.

Result

All the 100 students of the MBBS 2019 batch participated in the study. The students were in the age group of 20–23 years with 49 males and 51 females.

Among the electives offered in Block 1, those of Pathology were the most sought after and those offered by Anatomy and Physiology were chosen the least (Table 1).

Table 1. Electives Offered in Block I (Pre/ Para Clinical Departments)

Disciplines (Block A)	Elective Topics Offered	Out of 400 Choices		
		Total n (%)	Males	Females
Anatomy	Cadaveric surgery	18 (3.25)	10	8
	Histology			
Physiology	Research in physiology	8 (2.00)	6	2
Biochemistry	Clinical chemistry	22 (5.50)	9	13
	Basic biomedical research			

Pathology	Hematology	114 (28.50)	52	56
	Diagnostic cytopathology			
Microbiology	Virology	70 (17.50)	21	37
	Tuberculosis			
	Tinea infection			
	Sexually transmitted infections			
Forensic medicine	Clinical toxicology	87 (21.75)	46	41
	Medicolegal documentation			
Pharmacology	Drug utilization analysis	86 (21.50)	41	45
	Pharmacogenomics			
	Pharmacokinetics			
	Pharmacovigilance			

The most sought-after category of electives in Block 2 was Internal Medicine which accounted for 37% of all choices made. The electives offered were in the subspecialties of Diabetology (25%), Endocrinology (29.8%), GI Endoscopy (18.5%) and 2 superspecialities, Cardiology (26.6%) and Nephrology (19.3%) (Table 2).

Table 2. Electives Offered in Block 2 (Clinical)

Disciplines	Superspeciality Electives Offered	Out of 400 Choices Discipline wise			Out of 400 Choices (N)	Out of 400 Choices (%)
		Total n (%)	Males	Females		
Medicine	Cardiology	33 (26.60)	22	11	124	37
	Diabetology	31 (25.00)	14	17		
	Endocrinology	37 (29.80)	15	22		
	GI endoscopy	23 (18.50)	10	13		
	Nephrology	24 (19.30)	16	8		
Surgery	Cardiac surgery	18 (18.30)	16	2	98	24.5
	Plastic surgery	9 (9.18)	1	8		
	Pediatric surgery	3 (3.06)	1	2		
	Uro surgery	1 (1.02)	1	0		
	Onco surgery	23 (23.46)	11	12		
	Minimal invasive surgery	31 (31.60)	17	14		
	Neurosurgery	13 (13.26)	6	7		
OBG	In Vitro Fertilization Unit	21 (100)	2	19	21	5.25
Pediatrics	Neonatology	3 (50)	0	3	6	1.5
	Pediatric intensive care	2 (33.3)	0	2		
	Pediatric hematology	0	0	0		
	Pediatric neurology	0	0	0		
	Adolescent medicine	0	0	0		
	Research in pediatrics	0	0	0		
	Immunization	1 (16.7)	0	1		
Anaesthesia	Pain management	13 (61.9)	6	7	21	5.25
	Spinal anaesthesia	8 (38.1)	4	4		

Community Medicine	Community research	0	0	0	0	0
	Epidemiological studies	0	0	0		
	Integrated Management of Neonatal and Childhood Illnesses	0	0	0		
	School health program	0	0	0		
Dermatology	Community dermatology	0	0	0	17	4.25
	Leprosy	2(11.8)	1	1		
	Vitiligo	7(41.2)	3	4		
	Superficial Dermatophytosis	8(47.0)	3	5		
Psychiatry		2 (100)	0	2		0.5
Transfusion medicine		18(100)	6		12	4.5
Radiation oncology		13(100)	8		5	3.25
Emergency medicine		34(100)	19		15	8.5
Emergency surgery		18(100)	12		5	4.5

The next favourite category of electives was offered by General Surgery which accounted for 24.5% of all choices made. Among the electives offered, the most sought-after were Minimal Invasive Surgery and Onco Surgery followed by Cardiac Surgery and Neurosurgery.

Pediatrics and Psychiatry were the categories that turned out to be the least sought after in Block 2.

No student opted for electives in Community Medicine.

No significant difference was found among the males and females except for in Obstetrics and Pediatrics.

Academic pursuit was the basic driving force for selecting the elective with a desire to gain experience for a future career path (80.2%) as the most common reason stated for selecting the elective of choice. Exploring their self-interest areas (31.7%), exploring a new area out of curiosity (18.8%), the prestige associated with the speciality (8.9%), and working environment in the concerned speciality (15.8%) were also the reasons stated for the choice of electives. Family or social influence was the least common reason stated (Table 3).

Table 3. Factors determining the choice of Electives

Reason			n (%)
Intrinsic Factors			
1.	Academic pursuit	a) To fill the knowledge gap	40 (39.60)
		b) To gain experience for a future career path	81 (80.20)
		c) The choice pertains to the self-interest area	32 (31.70)
2.	Personal needs	a) To complete attendance	2 (2.00)
		b) Little effort required	1 (1.00)
		c) Time efficient, leaving a window for extracurricular activities	7 (6.90)
		d) Prestigious area	9 (8.90)
		e) To try out	19 (18.80)
		f) Too early to decide	7 (6.90)
3.	Personal experience/ incidents like (past illness of yourself/ parents/ siblings/ relatives)		10 (9.90)
Extrinsic factors			
1.	Family	a) In alignment with the parents' choice	1 (1.00)
		b) Parent's profession	2 (2.00)
2.	Institute	a) Better work environment in the institute in the chosen speciality	16 (15.80)
3.	Social	a) Any influence of your role model (personality/ person)	1 (1.00)
		b) Influence of media (TV serials/ web series/ Netflix/ etc.)	0 (0.00)

97% of students wanted to pursue postgraduation after an internship. As for their future plans, nearly 54.5% of students wanted to either establish their private practice or join an established healthcare set-up after that. 30.7% of students planned to join a medical college in future and nearly 10% planned to go abroad (Figure 1).

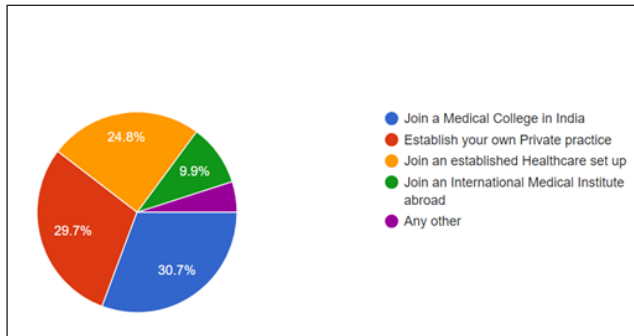


Figure 1. Future Plans of the Students

Discussion

Medical electives have been globally perceived as an important part of learning within contemporary medical education and have been found to have multiple benefits. They not only provide the opportunity to gain experience in diverse healthcare settings, but also provide direct exposure to alternative models of healthcare delivery and opportunities for personal and professional development.⁵ From this perspective, electives have the capability to bring about a change in medical students from novice dreamers to technically sound, socially responsible, and culturally competent graduates well-positioned to respond to contemporary healthcare challenges.⁵

But to extract all these benefits, the most essential element is the choice that students make.

Worldwide, various studies^{6,7} have tried to analyse students' preferences for electives with varied results. In the present study, electives were provided in pre/ para clinical and clinical subjects as per the National Medical Commission of India guidelines.

The most preferred specialities for electives in pre/ para clinical subjects (Basic Sciences) (Table 1) were Pathology (Hematology, Diagnostic Cytopathology) followed by Pharmacology and Forensic Medicine (Clinical Toxicology, Medicolegal Documentation). The least opted categories were Anatomy and Physiology. In clinical electives (Table 2), Medicine superspecialties (Cardiology, Nephrology, and Endocrinology) and Internal Medicine subspecialty (Diabetology) were the top choices. Surgical specialities were the next with Minimal Invasive Surgery and Onco Surgery as the most opted ones. Specialities like Pediatrics and Psychiatry were the least opted ones. No student opted for Community Medicine.

Pre/ para clinicals rolled out two and clinicals rolled out one research elective. While 2% of students opted for the research elective in Basic Sciences, none opted for research in clinical departments.

A desire to gain experience for future career paths (80.2%) was the most common reason stated for selecting the elective of choice in the present study (Table 3). Studies conducted to understand the reasons for elective choices made by students have associated three basic attributes with student choices i.e. perceived difficulty level of the elective, perceived interest of the student, and future career skills.⁶ As regards the future plans of students (Figure 1), nearly 55% of the students stated that they shall either go for private practice or join an already established healthcare unit.

Multiple available literature suggest that these choices of electives at the undergraduate level are an indirect reflection of the career choices students make in the future.^{8,9,10,11,12}

The choice of electives, in the present study, reveals some very interesting paradoxes. The subspecialties and superspecialties of Medicine were the most opted clinical electives but the subject dealing with the scientific and cognitive basis of treating the patients, i.e. Physiology, was the least opted Basic Science elective. Out of all the clinical electives, Surgical electives were the second most opted ones. For choosing Surgery and Allied as a career option, knowledge of Anatomy needs to be optimum but Anatomy was the least chosen elective in Basic Sciences. Clinician Scientists are known to be central to the basic discoveries in the field of Medicine, the clinical translation of such discoveries and the biotechnology advances that fuel the growth of the life-sciences industry.¹³ Still no student opted for clinical research elective. A lot of choices were there for Forensic Medicine giving an impression regarding the awareness of the importance of themes related to Forensic Medicine among Medical students. Available literature¹⁴⁻¹⁶ also shares this awareness regarding its importance and also adds to the contrast that worldwide Forensic Medicine is the least opted specialty for a future career. Nearly half of the students mentioned that they wanted to go into private practice in future but Community Medicine (having the elements of primary care and family-oriented care) which forms the foundation of successful private practice in the initial years was not opted for by any student.

An insight into the elective choices that students make reveals a lot of valuable information as summarised ahead:

(a) The choices might act as a surrogate for what medical students consider to be important in their learning and what they choose to prioritise, for instance, a low selection of Anatomy and Physiology might be the pointer that

students are not able to comprehend the relevance of Basic Sciences in clinical practice.¹⁷ Not selecting clinical research electives might imply that the concept of Clinical Scientists is perhaps non-existent among undergraduate students.^{18,19} Moreover, Clinical medicine and practical skills are given priority over research activities in the medical education curriculum. Although research activities in the form of Indian Council of Medical Research Short Term Student (ICMR STS) projects are there, hardly any weightage is given to them over numerous conflicting priorities in the undergraduate curriculum. Research-associated topics are generally considered additional issues and left to the student's personal interest.²⁰ Thus, it is not surprising that a career in medical research is hardly thought of at the undergraduate level. Elective choices with well-remunerated procedure-oriented specialties that allowed for private practice forming the major chunk of elective choices reveal that undergraduates seem to be very well aware of how lucrative and financially viable are the specialties while making these choices.²¹ Medical specialty choice emerges from the matching of perceptions of specialty characteristics with personal and social needs and that in turn depends on student values.

(b) This may also give a very important insight into the trends seen in society regarding the future choices of medical undergraduates. Some specialties face an overload of postgraduates while others do not get selected at all leading to maldistribution of physicians in different specialties. It might be that the medical curriculum, by and large, does not expose undergraduate students to a wide variety of specialties in depth. Therefore, initial student preference for specialty training usually does not align with the healthcare workforce demands and with available residency vacancies. As a result, specialties may either experience a shortage of residency applicants' primary choices, while the competition for other more popular specialties can be fierce.²²

(c) This might also act as a period where insight into the decision process might help healthcare leaders ascertain whether, when, and how to intervene and attempt to influence students' decisions, for instance, high demand for Surgical electives and low demand for Anatomy electives implies that a need exists to develop a clinically correlated Anatomy program²⁴ that will maximize the learning experience of the students, improve their performance and allow them to make more informed career choices.²¹ This information should be important for healthcare system leaders since specialty selection determines the future composition of the physician workforce.²¹

(d) Nonetheless this can definitely assist a university in an appropriate curriculum design, proper demand management and in the allocation of space and teaching resources,²⁴ for instance, even if the students choose not to pursue careers in medical research, they can be taught in their day to day

classrooms to perceive that research activities at this level have other benefits including the development of critical appraisal, information literacy, and critical thinking skills; and the opportunity to select an area of and form contacts for future success. Some interventions like planning the rollout of electives parallel to the submission of ICMR STS projects can be done. Similar to the concept of early clinical exposure in MBBS Phase 1, a concept of late Basic Science exposure can also be introduced in MBBS Phase 3 to reinforce the importance of pre-clinical disciplines and research in the survival of clinical disciplines.

Rationale of the Study

The findings of this study may be used as a base for developing and implementing better electives in accordance with the interests of students and community needs. Also, this can act as a starting point for initiating and implementing improvement in the existing electives.

Limitations of the Study

This study has been done in a private medical college in India. The profile and values of students might differ from the high-ranking students getting selected in government medical colleges. Thus the findings cannot be totally accepted to represent a generalization of the thought process of undergraduate medical students of India.

Secondly, this is a cross-sectional study representing students' interests at one point in time i.e. before they begin their final year of the MBBS curriculum. Students' interests and thereby their choices have been known to change with time and increasing experience.

Conclusion

The healthcare delivery systems have to adapt to the needs and expectations of society. In order to attain this objective successfully, new methodologies have to be introduced to prepare the workforce who are meant to deliver, but for the success of these methodologies, understanding the thought processes, interests and aspirations of our students (the future workforce), and adapting accordingly is extremely essential.

Source of Funding: None

Conflict of Interest: None

References

1. Medical Council of India [Internet]. Module on electives for Undergraduate Medical Education Program, 2020; [cited 2023 Aug 21]. p. 1-30. Available from: <https://www.nmc.org.in/wp-content/uploads/2020/05/Electives-Module-20-05-2020.pdf>
2. Mahajan R, Singh T. Electives in undergraduate health professions training: opportunities and utility. *Med J Armed Forces India.* 2021;77(Suppl 1):S12-5. [PubMed] [Google Scholar]

3. Mathur M, Mathur N, Verma A, Kaur M, Patyal A. Electives in Indian medical education: an opportunity to seize. *Adesh Univ J Med Sci Res.* 2022;4(2):53-5.
4. Lumb A, Murdoch-Eaton D. Electives in undergraduate medical education: AMEE Guide No. 88. *Med Teach.* 2014;36(7):557-72. [PubMed] [Google Scholar]
5. McCool J, Curtis E, MacCormick AD, Cavadino A, Smith M, Bagg W. Medical electives: exploring the determinants of placement and access variables between 2010 and 2016 at the University of Auckland. *BMC Med Educ.* 2019;19(1):398. [PubMed] [Google Scholar]
6. Ting DH, Lee CK. Understanding students' choice of electives and its implications. *Stud High Educ.* 2012;37(3):309-25. [Google Scholar]
7. Daly C, Last J. An analysis of free-choice electives in an undergraduate medical degree. *BMC Med Educ.* 2017;17(1):113. [PubMed] [Google Scholar]
8. Agarwal A, Wong S, Sarfaty S, Devaiah A, Hirsch AE. Elective courses for medical students during the preclinical curriculum: a systematic review and evaluation. *Med Educ Online.* 2015;20(1):26615. [PubMed] [Google Scholar]
9. Al-Taher R, Al-Ani R, Al-Ani A, Rashdan M, Al Manasra AR, Aborajooch E, Al-Balas H, Al-Balas H, Al-Balas M, Attiyat M, Qasem N. The clinical elective course and its effects on medical students and graduates of Jordanian medical schools. *BMC Med Educ.* 2022;22(1):716. [PubMed] [Google Scholar]
10. van den Broek WE, Wijnen-Meijer M, Cate OT, van Dijk M. Medical students' preparation for the transition to postgraduate training through final year elective rotations. *GMS J Med Educ.* 2017;34(5):Doc65. [PubMed] [Google Scholar]
11. Sheu L, Goglin S, Collins S, Cornett P, Clemons S, O'Sullivan PS. How do clinical electives during the clerkship year influence career exploration? A qualitative study. *Teach Learn Med.* 2022;34(2):187-97. [PubMed] [Google Scholar]
12. Levailant M, Levailant L, Lerolle N, Vallet B, Hamel-Broza JF. Factors influencing medical students' choice of specialization: a gender based systematic review. *EClinicalMedicine.* 2020;28:100589. [PubMed] [Google Scholar]
13. Moraes DW, Jotz M, Menegazzo WR, Menegazzo MS, Veloso S, Machry MC, Costanzi M, Pellanda LC. Interest in research among medical students: challenges for the undergraduate education. *Rev Assoc Méd Bras (1992).* 2016;62(7):652-8. [PubMed] [Google Scholar]
14. Jadav JC, Patel BN, Shah KA, Tandon RN. Knowledge and attitude of medical students on forensic autopsy in Ahmedabad city. *J Indian Acad Forensic Med.* 2013;35(1):26-8. [Google Scholar]
15. Alawad AA, Khan WS, Abdelrazig YM, Elzain YI, Khalil HO, Ahmed OB, Adam OA. Factors considered by undergraduate medical students when selecting specialty of their future careers. *Pan Afr Med J.* 2015;20(1):102. [PubMed] [Google Scholar]
16. Ibrahim IA, Soliman SS, Alzahrani HS. Awareness of medical students toward forensic medicine at Albaha University Medical College, Saudi Arabia. *J Pak Med Assoc.* 2019;69(12):1896-9. [PubMed] [Google Scholar]
17. Lynch C, Grant T, McLoughlin P, Last J. The relevance of basic sciences in undergraduate medical education. *Ir J Med Sci.* 2016;185(1):195-201. [PubMed] [Google Scholar]
18. Sobczuk P, Dzedziak J, Bierezowicz N, Kiziak M, Znajdek Z, Puchalska L, Mirowska-Guzel D, Cudnoch-Jędrzejewska A. Are medical students interested in research?—students' attitudes towards research. *Ann Med.* 2022;54(1):1538-47. [PubMed] [Google Scholar]
19. Noble K, Owens J, André F, Bakhom SF, Loi S, Reinhardt HC, Tuveson D, Swanton C. Securing the future of the clinician-scientist. *Nat Cancer.* 2020;1(2):139-41. [PubMed] [Google Scholar]
20. Houlden RL, Raja JB, Collier CP, Clark AF, Waugh JM. Medical students' perceptions of an undergraduate research elective. *Med Teach.* 2004;26(7):659-61. [PubMed] [Google Scholar]
21. Weissman C, Zisk-Rony RY, Schroeder JE, Weiss YG, Avidan A, Elchlal U, Tandeter H. Medical specialty considerations by medical students early in their clinical experience. *Isr J Health Policy Res.* 2012;1(1):13. [PubMed] [Google Scholar]
22. Querido SJ, Vergouw D, Wigersma L, Batenburg RS, De Rond ME, Ten Cate OT. Dynamics of career choice among students in undergraduate medical courses. A BEME systematic review: BEME Guide No. 33. *Med Teach.* 2016;38(1):18-29. [PubMed] [Google Scholar]
23. Haubert LM, Jones K, Moffatt-Bruce SD. Surgical clinical correlates in anatomy: design and implementation of a first-year medical school program. *Anat Sci Educ.* 2009;2(6):265-72. [PubMed] [Google Scholar]
24. Ramalho AR, Vieira-Marques PM, Magalhães-Alves C, Severo M, Ferreira MA, Falcao-Pires I. Electives in the medical curriculum – an opportunity to achieve students' satisfaction? *BMC Med Educ.* 2020;20(1):449. [PubMed] [Google Scholar]