

## BRIDGING THE GAP: ADDRESSING FACULTY SHORTAGES AND CAREER INTEREST IN PHASE I SUBJECTS UNDER THE COMPETENCY-BASED MEDICAL EDUCATION CURRICULUM

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### ABSTRACT

**Objectives:** Recently introduced competency-based medical education (CBME) curriculum necessitates a heavy presence of ably trained medical educators. Contrarily, Phase I subjects are facing a severe shortage of faculty, piloting a double setback to the system in the form of stress and burnout among faculty along with curtailed implementation of the much-needed CBME curriculum.

**Methods:** A cross-sectional, observational electronically distributed questionnaire-based study was conducted to analyze the perceptions of undergraduate students as well as doctors toward the importance of Phase I subjects in patient care as well as opting Phase I subjects as their career choice.

**Results:** A total of 3530 participants were included in the study, which concluded that despite 95% of participants acknowledging the importance of Phase I subjects in medical education and a whopping 90% agreeing to the significance of knowledge of these subjects in future patient care, only a meager 3.1% wanted to pursue the same as a career choice. The main constraints behind not choosing these subjects were a lack of direct patient care and relatively miniscule financial gains. It was also highlighted that only a handful of the participants were aware of future avenues like fellowship in embryology (Anatomy), super-specialty option (Biochemistry), and fellowship in chronomedicine (Physiology) apart from teaching roles post-specialization.

**Conclusion:** It was suggested that compulsory research hours, integrated teaching, and sensitizing students toward various avenues in Phase I disciplines could cultivate positive attitudes and foster interest in these subjects commanding a complete unified implementation of the much-needed CBME curriculum.

**Keywords:** Competency-based medical education, Phase I subjects, Perceptions, Specialization choice, Medical students.

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### INTRODUCTION

Competency-based medical education (CBME) has become the prevailing method of medical training worldwide and was implemented into undergraduate medical education in India from August 1<sup>st</sup> 2019, under the aegis of the National Medical Commission. Medical training in India spans for four and a half years, organized into three phases. Phase I encompasses subjects such as anatomy, physiology, and biochemistry. Phase II involves pathology, microbiology, and pharmacology. Phase III is divided into two parts: Part I covers community medicine, otorhinolaryngology, ophthalmology, and forensic medicine and toxicology while Part II includes general medicine, obstetrics and gynecology, pediatrics, and general surgery.

Apart from many attributes, CBME thrusts heavily upon unsurpassable collaboration among students and facilitators in a high facilitator-learner ratio, with an enormous emphasis on small group teaching-learning methodology, early clinical exposures, frequent formative assessments, and other novel instructional methods which necessitate a heavy presence of trained faculty [1,2]. Post-COVID Indian government has increased the number of medical seats through the expansion of medical colleges as well as funding of new ones necessitating a heavy presence of specialized medical educators for future medical professionals [3]. On the contrary, educators in Phase I are presently facing severe shortage struggles leading to the recruitment of doctorate research scholars with limited

clinical acumen. This leads to stress and burnout for Phase I faculties, as well as stressful transition of students from preclinical to clinical phase and further incomplete implementation of CBME curriculum [4,5].

This catapults for an urgent thoughtful mandate to comprehend the medical career decision-making process and to elucidate why certain specialties are chosen over others [6]. The Bland-Meurer model of medical specialty career choices suggests that “students rationally match perceptions of different specialty characteristics against a checklist of personal needs to form their specialty preferences.” These complex choices are multifactorial, dynamic, and influenced by their personality, coping strategy, gender, personal values, individual career choices, medical school characteristics as well as the undergraduate curriculum [7]. While individual characteristics may be relatively fixed, we can identify and address the gap in the medical curriculum, enabling the implementation of necessary changes.

Research about the career preferences of undergraduate students can aid in targeted manpower availability, setting priorities for health programs, avoiding lopsided supply in different specialties, planning and evaluation of medical education programs, and further effective implementation of the CBME curriculum. With this background the present study was designed to analyze the perspective of medical students as well as doctors regarding Phase I subjects and their importance in patient care and to determine whether individuals are

inclined toward or against pursuing Phase I subjects as a career path and elucidate the underlying motivations for their decision.

## METHODS

### Design and setting

This cross-sectional, observational electronically distributed questionnaire-based study was conducted from March 2023 to July 2023 across Andhra Pradesh and Telangana in India. Ethical approval was obtained from the Institutional Ethics Committee following the incorporation of recommended revisions (Ref IEC/MAMS/2023/037).

### Participants and sampling

All phases of medical students and interns from various medical colleges as well as Doctors (with a minimum of MBBS degree working as teaching faculty, consultants in corporate hospitals, and private practitioners) were reached out through various social media platforms for consent. Participants who did not give consent, students pursuing any medical postgraduate course at the time of study, and doctors with Phase I subject as specialization were excluded from the study. Sample selection was done on the basis of convenience sampling.

### Tools/instruments

A pre-validated and pre-tested 10-item questionnaire link was sent to the participants to their personal emails after taking prior informed consent. It assessed participants' interest, attitude, awareness of future career opportunities, and perceptions toward Phase I subjects as career options. It comprised of three sections: Section one gathered general demographic information such as age, gender, and highest qualification. Section two included items concerning interest in Phase I subjects and perceptions of them as career choices. Section three covered items regarding awareness of future career prospects in each Phase I subject. Items in the questionnaire were collected from previous studies and were modified according to the needs of our study [7,8].

### Data collection methods

The data collection process included disseminating the questionnaire to participants and receiving the completed forms through online link.

### Data analysis

The data were analyzed in the form of frequency, percentage for descriptive variables, mean, and standard deviation for continuous variables. Analysis was performed using SPSS software 21.0. Chi-square test was carried out to analyze the difference in perceptions toward Phase I subjects among the participants and to evaluate the significance. A  $p < 0.05$  was considered as significant. Conclusion was drawn based on the outcome of this statistical treatment.

## RESULTS

A total of 4000 participants were contacted, out of which 190 did not give consent to participate while 280 questionnaires were incompletely filled and thus were not included in the final analysis.

Out of a total of 3530 participants, 1910 (54.1%) were medical students studying in various phases of medical training from phase I to Internship while 1620 (45.9%) were doctors. Majority of the participants were females (55.76%) as depicted in Table 1.

While 92.8% of students and 95.5% of doctors recognize the importance of Phase I subjects in medical education, only 39.4% of students and 39% of doctors actively consider pursuing Phase I subjects as a career choice. Furthermore, it highlights a significant disparity in perception between students and doctors regarding Phase I subjects, with the difference being statistically significant ( $p < 0.005$ ) as depicted in Table 2.

The main drive for opting Phase I subjects as a career path encompassed individual interest in the subject, a dedication to research, and attractiveness of convenient work schedules. Conversely, the predominant reason for eliminating Phase I subjects as a career path was the lack of direct involvement in patient care and comparatively lesser financial rewards as highlighted in Table 3.

Majority of participants would opt for any Phase III subjects, a meager 3.1% wanted to choose Phase I subjects as a career of choice as shown in Table 4.

**Table 1: Demographic distribution of participants involved in the study, n (%)**

Age group (years)	Students		Doctors		Total, n (%)
	Males, n (%)	Females, n (%)	Males, n (%)	Females, n (%)	
<20	448 (23.4)	778 (40.7)	0	0	1227 (34.7)
21–30	382 (20)	301 (15.7)	93 (5.7)	80 (4.9)	856 (24.2)
31–40	0	0	251 (15.4)	428 (26.4)	679 (19.3)
>41	0	0	387 (23.8)	381 (23.5)	768 (21.8)
Total	831 (43.5)	1079 (56.4)	731 (45.1)	889 (54.8)	3530 (100)
	1910 (54.1)		1620 (45.9)		

**Table 2: Participant's response toward interest and importance of Phase I subjects in medical education and patient care n (%)**

Serial number	Items	Participants	Yes, n (%)	No, n (%)	Maybe, n (%)	$\chi^2$	P
1	Do you think Phase I subjects are important in medical education?	Students (n=1910)	1774 (92.8)	17 (0.9)	119 (6.2)	16.20	0.0003
		Doctors (n=1620)	1548 (95.5)	2 (0.1)	70 (4.3)		
2	Do you think knowledge of Phase I subjects is essential for understanding Phase II and Phase III subjects?	Students (n=1910)	1876 (98.2)	34 (1.8)	2 (0.1)	17.20	0.0001
		Doctors (n=1620)	1598 (98.6)	10 (0.6)	12 (0.7)		
3	Do you think Phase I subjects' knowledge is essential for patient care?	Students (n=1910)	1674 (87.6)	123 (6.4)	113 (5.9)	18.02	0.0001
		Doctors (n=1620)	1490 (91.9)	72 (4.4)	58 (3.5)		
4	Are you aware of the scope of research in each of these Phase I subjects	Students (n=1910)	962 (50.3)	941 (49.2)	7 (0.3)	11.04	0.004
		Doctors (n=1620)	904 (55.8)	708 (43.7)	8 (0.5)		
5	Would you like to receive more training sessions on research in Phase I subjects?	Students (n=1910)	873 (45.7)	335 (17.5)	702 (36.7)	10.99	0.004
		Doctors (n=1620)	826 (50.9)	276 (17)	518 (31.9)		
6	Will you consider choosing any of these subjects as a career option?	Students (n=1910)	753 (39.4)	956 (50)	211 (11)	16.5	0.0002
		Doctors (n=1620)	633 (39)	781 (48.2)	106 (6.5)		

$P < 0.05$  indicates a significant result.  $\chi^2$ : Chi-square test

While 80% of the total participants, including students and doctors were aware of teaching as the only future career option in Phase I subjects and were ignorant of other avenues comparatively as shown in Table 5.

## DISCUSSION

The aim of this questionnaire-based study was for the authors to comprehend more about the way students and doctors perceive the importance of Phase I disciplines in future patient care and as potential careers as well as the reasons behind a particular choice of specialization. Out of the 4000 participants contacted, a total of 3530 responded to the questionnaire, resulting in a response rate of 88.2%. The median age of the participants was 27.2 years. Among all respondents, both students as well as doctors, there was a female predominance, with a sex ratio of 1.2 females for every 1 male.

The results of our study highlighted that 92.8% of students and 95.5% of doctors recognized the significance of Phase I disciplines in medical education. In addition, 98.2% of students and 98.6% of doctors agreed on the importance of learning Phase I subjects for a comprehensive understanding of Phase II and Phase III subjects. Furthermore, 91.9% of students and 87.6% of doctors believed that phase I subjects form the

backbone for future wisdom in clinical patient care. These findings align with previous studies by Yamazaki *et al.* [9] and Steffes and Dulchavsky [10], which emphasized the increasing importance of a thorough knowledge of Phase I disciplines in medical training and practice which plays a decisive role in laying a strong scientifically grounded foundation and ably prepares clinically competent futuristic clinicians.

Regarding the awareness of the scope of research in Phase I disciplines, only 50.3% of students and 55.8% of doctors demonstrated awareness. Furthermore, 45.7% of students and 50.9% of doctors expressed a desire for additional training sessions in this area. These findings are consistent with previous studies by Yamazaki *et al.* [9] and Yathish *et al.* [7], which indicated that 67% and 89% of physicians, and 33% and 73% of students, respectively, expressed a similar desire for more research-related lectures in Phase I subjects.

In spite of the importance acknowledged by the participants about Phase I subjects, a mere 39.4% of students while 39% of doctors expressed an inclination toward pursuing career in Phase I disciplines. Among students, the primary motivators were passion for the subject and interest in research, whereas doctors predominantly cited a desire to teach and favorable working hours as prime instigator. These findings are consistent with those of Yamazaki *et al.* [9] and Javed *et al.* [11], where only 24.5% and 18% of participants, respectively, showed interest in choosing Phase I subjects as a career of choice.

Half of the students (50%) as well as doctors (48.2%) did not perceive Phase I subjects as a career option. In addition, 28.1% of doctors were unwilling to endorse their students' pursuit of careers in Phase I disciplines, with the majority indicating that none of the specialties directly involved patient care as their primary reason, whereas financial reward was the least cited justification. Despite prior studies [12-14] highlighting financial gain as a significant deterrent to choosing Phase I disciplines, it was the least favored justification among participants in this study. 21.8% of students and 25.8% of doctors expressed a belief that there was limited scope for future growth, suggesting a lack of awareness about the breadth of opportunities within Phase I branches. This aspect stands out as a significant finding of our study. Roughly 17.9% of students and 13.6% of doctors refrained from considering these subjects as a career choice due to familial pressure, highlighting the impact of external factors on individual career decisions.

The findings of the current study reveal that a considerable number of students (77%) revealed a preference for Phase III disciplines over Phase II (4.9%) and Phase I branches (3.1%), mirroring the results of Yamazaki *et al.* [9], likely due to the direct involvement with patient care. Furthermore, a significant portion of students (15%) wanted to opt for any available subject without prior planning. This behavior may stem from a lack of awareness regarding the employment opportunities within each branch of Phase I professions beyond teaching. While nearly 80% of participants were aware of teaching as the sole career choice

**Table 3: Rationalization of Phase I subjects as a career choice**

Items	Students (n=1910), n (%)	Doctors (n=1620), n (%)
Reasons for choosing the Phase I subjects		
Interest in subject	466 (62.1)	416 (42.2)
Interest in research	336 (44.7)	416 (42.2)
Interest in teaching	175 (23.3)	534 (54.2)
Inspired by faculty	176 (23.3)	202 (20.5)
Convenient working hours	161 (21.4)	536 (55.4)
Family pressure	15 (1.9)	131 (13.3)
Reasons for not choosing the Phase I subjects		
Not directly involved in patient care	794 (68.6)	500 (78.8)
Not interested in subject	305 (26.3)	86 (13.6)
Family pressure	267 (23.1)	202 (31.8)
No scope for future growth	252 (21.8)	164 (25.8)
Less financial benefit	207 (17.9)	86 (13.6)

**Table 4: Student's preferred choice of specialization during postgraduation course**

Preferred choice of subject	n=1910, n (%)
Any Phase III subject	1470 (77)
Any subject that I get	290 (15)
Any Phase II subject	90 (4.9)
Any Phase I subject	60 (3.1)

**Table 5: Awareness of participants toward future career options in Phase I subjects, n (%)**

Anatomy				
Teaching faculty	Research scientist		Fellowship in embryology	
2973 (84.2)	2136 (60.5)		882 (25)	
Biochemistry				
Teaching faculty	Research scientist	Consultant biochemist	Quality manager in diagnostic lab	DM super specialty in medical genetics
2820 (79.9)	2482 (70.3)	2386 (67.6)	1235 (35)	847 (24)
Physiology				
Teaching faculty	Research scientist	Fellowship in electrophysiology, neurophysiology	Exercise physiologist	Chronomedicine
2934 (83.1)	2418 (68.5)	741 (21)	826 (23.4)	473 (13.4)

across all three Phase I subjects, only 25% were aware of fellowship opportunities in embryology within Anatomy, 35% and 24% were aware of roles such as Quality Manager in diagnostic labs, and the potential for super specialization in Medical Genetics or Clinical Hematology within Biochemistry. In addition, a limited number of participants of the order of 13.4%, 21%, and 23.4% were aware of opportunities like Chrono Medicine, Fellowships in Electrophysiology and Neurophysiology and Exercise Physiology within physiology respectively, which offer both direct patient care involvement and the opportunity for better financial rewards.

Structured career guidance for the 15% of the participants who were unsure of their choice of specialization has the potential to steer them toward developing an interest in Phase I subjects. Both doctors and medical students unanimously were of the view that to foster interest in Phase I subjects, faculty members should actively encourage students to engage in research projects. By serving as role models, faculty members should also endeavor to make undergraduates aware of the potential options accessible following the level of specialty, which are both financially rewarding and entail patient care. Our study also emphasized that 68.2% of participants believed that adopting an integrated teaching method, 43.7% supported the compulsory inclusion of research projects (short-term studentships) at the undergraduate level, 44.6% favored allocating specific hours within the academic curriculum for research interests, and 56.6% endorsed providing opportunities for attending training sessions and hands-on workshops across all Phase I subjects, could cultivate positive attitudes among students toward these disciplines and potentially encourage medical students to actively pursue Phase I subjects as a career path. Study by Borgaonkar *et al* has also supported case-based learning to be an effective method to inculcate interest among students toward Phase I subjects [15]. Thus complete implementation of the CBME curriculum in full effect requires innovative pedagogical strategies to foster comprehensive learning among medical students which is curtailed by the shortage of faculty. It requires collaborative efforts by the regulatory bodies to address the challenges and navigate a smooth transition [16].

Furthermore, the authors also aim to emphasize the scarcity of super specialization in Biochemistry [17] and the complete absence of such avenues in physiology and anatomy could also be potential deterrents. They suggest that altering this landscape could potentially draw more students to pursue Phase I disciplines as a deliberate career choice rather than by mere happenstance.

Utilizing a mixed-method approach in future studies could represent a promising implication, offering deeper insights into the perspectives of individuals. The study is constrained by its cross-sectional design, hindering the establishment of causal relationships. A longitudinal prospective study would provide a more nuanced understanding of how perceptions and attitudes toward Phase I disciplines evolve over time. In addition, limitations include the potential for response bias due to reliance on self-reported data, which may introduce inaccuracies. The applicability of this study's findings cannot be generalized to a larger population. Finally, the study's narrow focus on perceptions and attitudes toward Phase I disciplines neglects other potential factors influencing career choices, such as personal interests and external influences.

## CONCLUSION

This study sheds light on the perceptions and preferences of medical students and doctors regarding Phase I disciplines as potential career paths. Despite widespread recognition of the importance of Phase I subjects in medical education and patient care, a significant proportion of participants displayed limited interest in pursuing careers in these fields. Key barriers included a lack of awareness of career opportunities beyond teaching and concerns about financial rewards. Structured career guidance, coupled with encouragement to engage in research projects and emphasize the practical application of Phase I knowledge in clinical

practice, emerged as vital strategies to foster interest among students. By addressing these challenges, the medical community can better prepare future healthcare professionals to excel in Phase I specialties, ultimately enhancing healthcare delivery and patient outcomes.

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## AUTHORS' CONTRIBUTIONS

All the authors have equally contributed to the work and also revised the same. ALL authors have approved the final form.

## CONFLICTS OF INTEREST

The authors declare that they have no actual or potential conflict of interest in relation to this article.

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