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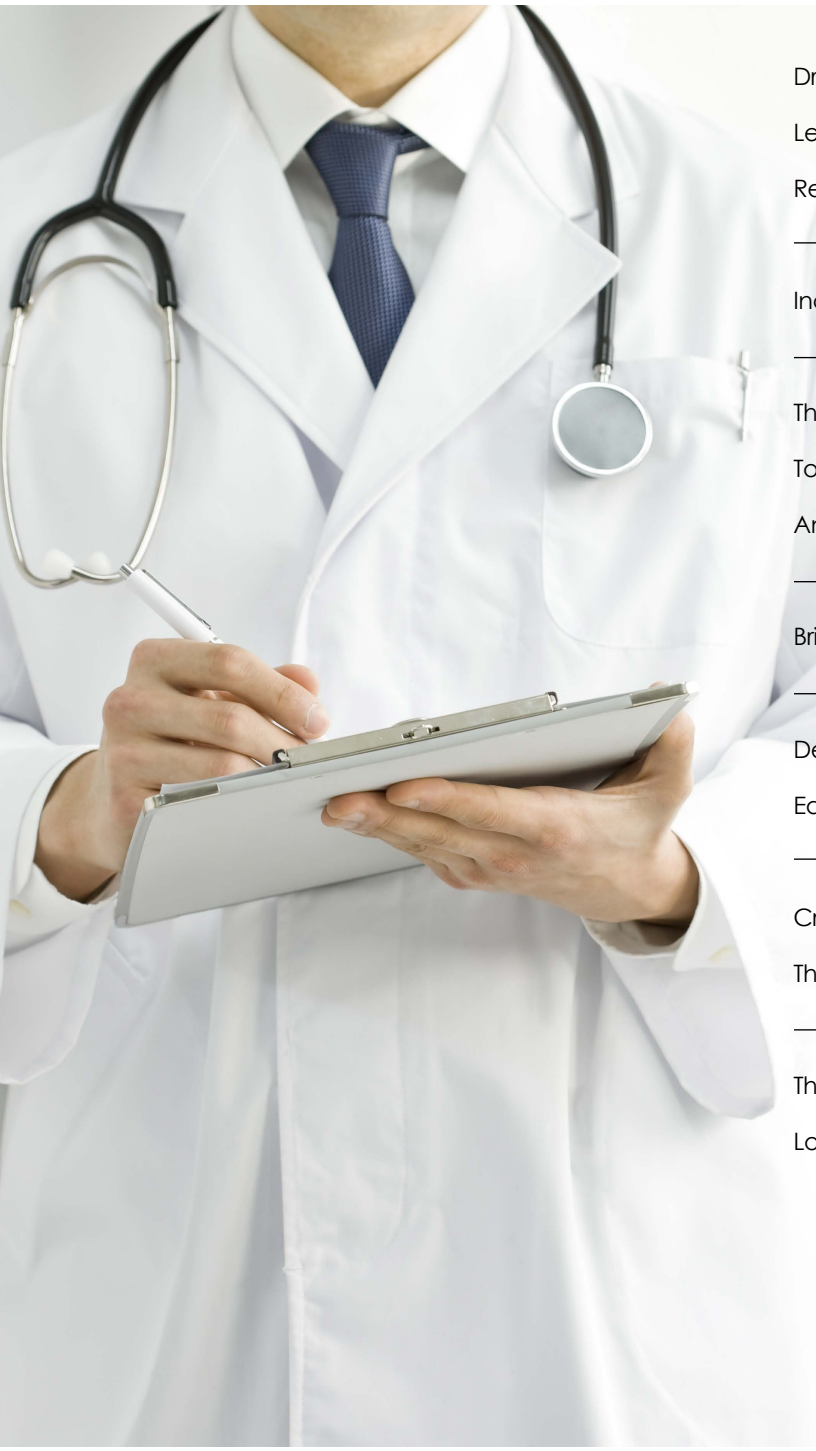

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Increase in PG Seats in Pharmacology: A Boon or a Bane?

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Abstract:
The realm of pharmacology is vital to medical science, encompassing drug development, therapeutic interventions, and pharmacovigilance. This review explores the effects of the recent increase in postgraduate (PG) pharmacology seats to meet the growing demand for skilled pharmacologists. Historically, Indian medical institutes have undervalued pharmacology postgraduate research training programmes, leading to a significant gap in quality and quantity. The NMC's initiative marks a crucial first step in addressing this issue, aiming to enhance the quality of healthcare and research in India.
An overview of the historical and current scenarios reveals a significant rise in pharmacology seats across India, with notable increments post-2020. This uneven distribution among institutions raises questions about resource allocation and the quality of education.
The review also highlights factors contributing to the increased demand for pharmacologists, including the growth of the healthcare industry, advancements in medical science and technology, and supportive government policies. Despite these positive aspects, the sudden influx of MD pharmacologists has led to potential exploitation by the industry and private medical institutions, resulting in compromised salaries, overburdening, and negative impacts on their physical, psychological, and social well-being.
The review concludes by acknowledging the policymakers' efforts to increase the skilled MD pharmacology workforce. Still, it emphasises the need for vigilance regarding real outcomes versus hypothetical ones. If outcomes are compromised, it is crucial to revisit, rethink, re-strategise, and reconsider the increase in MD pharmacology PG seats without compromising the quality of education.

Key Words:
Healthcare, MD Pharmacology, Medical Education, NMC Policies, PG Seats

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Introduction

The realm of pharmacology stands as a cornerstone in the edifice of medical science, offering right from the new drug development to the therapeutic interventions.[1] This itself is evident in the quality maintenance of pharmacology as a branch, which is a guarantee for quality therapeutics, new drug development, and the process in therapeutics, along with pharmacovigilance, which is covered directly or indirectly by pharmacologists.[2] This creates a need for optimal and dignified quality pharmacologists. Until now, most Indian medical institutes were giving less weightage to pharmacology postgraduate research training programmes in terms of quantity (and quality too).

The National Medical Commission (NMC) in India, keeping in mind the importance of the number of quality pharmacologists, has recently initiated the increase in postgraduate seats in medical institutions, a much-needed first attempt towards fulfilling the gap.

The significant increase in PG seats demonstrates the government's dedication to delivering accessible and high-quality healthcare to all citizens, reflecting the nation's strong commitment to improving public health.[3] This growth also invites careful consideration of its consequences, leading us to question whether the expansion of PG seats is ultimately beneficial or detrimental to the field.

In modern healthcare, pharmacology encounters various challenges, emphasising the necessity to integrate pharmacology education into clinical practice, rather than confining it to traditional lecture halls.[4] Pharmacology plays a vital role in finding solutions by connecting research with practical medicine.[5] However, the effectiveness of drug treatments depends on having skilled pharmacologists who know how to find, develop, and use medicines properly, not just on scientific knowledge alone.[6]

In this attempt, the NMC has issued several guidelines for the allotment and training of postgraduate medical students in institutions under the guidance of faculty members.[7] Relaxation of the number guided by each faculty member is one of them. Institutions started utilising this and getting sanction for more and more MD pharmacology seats based on the number of faculty members in the department (plus facility for research and teaching). Though it was a welcome and much-needed initiative from the NMC, it probably fails to justify the over-sanction of seats.

Every human has limitations, including an MD pharmacology guide. A faculty member can focus justifiably on a certain number of topics as well as scholars. We have reviewed in this, the advantages and possible disadvantages of increasing the MD pharmacology seats in medical institutions.

Historical Perspective

The journey of pharmacology as a discipline has seen substantial evolution. Initially, the number of institutions offering PG programmes in pharmacology in India was limited, with stringent admission criteria and fewer seats. Over the years, recognising the critical role of pharmacologists, educational institutions and governments have expanded the number of PG seats.

Current Scenario

In the previous decade, significant investments have been made to increase medical seats, with a 109% increase in PG seats since 2014, bringing the total to 65,335 PG seats across the country. To further increase PG seats, support has been extended to states in two phases. In phase I, 72 medical colleges in 21 States/UTs were approved for an increase of 4,058 PG seats, and in phase II, 60 colleges were approved for an increase of 3,858 PG seats.[8]

Current Scenario of Pharmacology Seats

In 2012, 553 MD Pharmacology seats were accredited by the Medical Council of India (MCI).[9] Currently, there are a total of 1,296 MD Pharmacology seats across India, with a notable increase in seats occurring in most colleges after 2020.[10]

Disparity in the Increase of PG Pharmacology Seats Among Colleges

Institutional dormant policy led to disparity in the number of PG seats in pharmacology in medical colleges. Not only this, but the over-enthusiasm shown by the institutions led to the sanction of a mammoth number of MD pharmacology postgraduate seats (in some institutions, more than 20 per year, with more than 70 postgraduates at one time in the department). As we can appreciate, the research and teaching facilities of institutions in India maintaining the quality research and teaching of more than 20 students (justifiable work allotment) become a huge challenge. This has started a deterioration in the quality of PG output candidates in day-to-day discipline, teaching, and research environment.

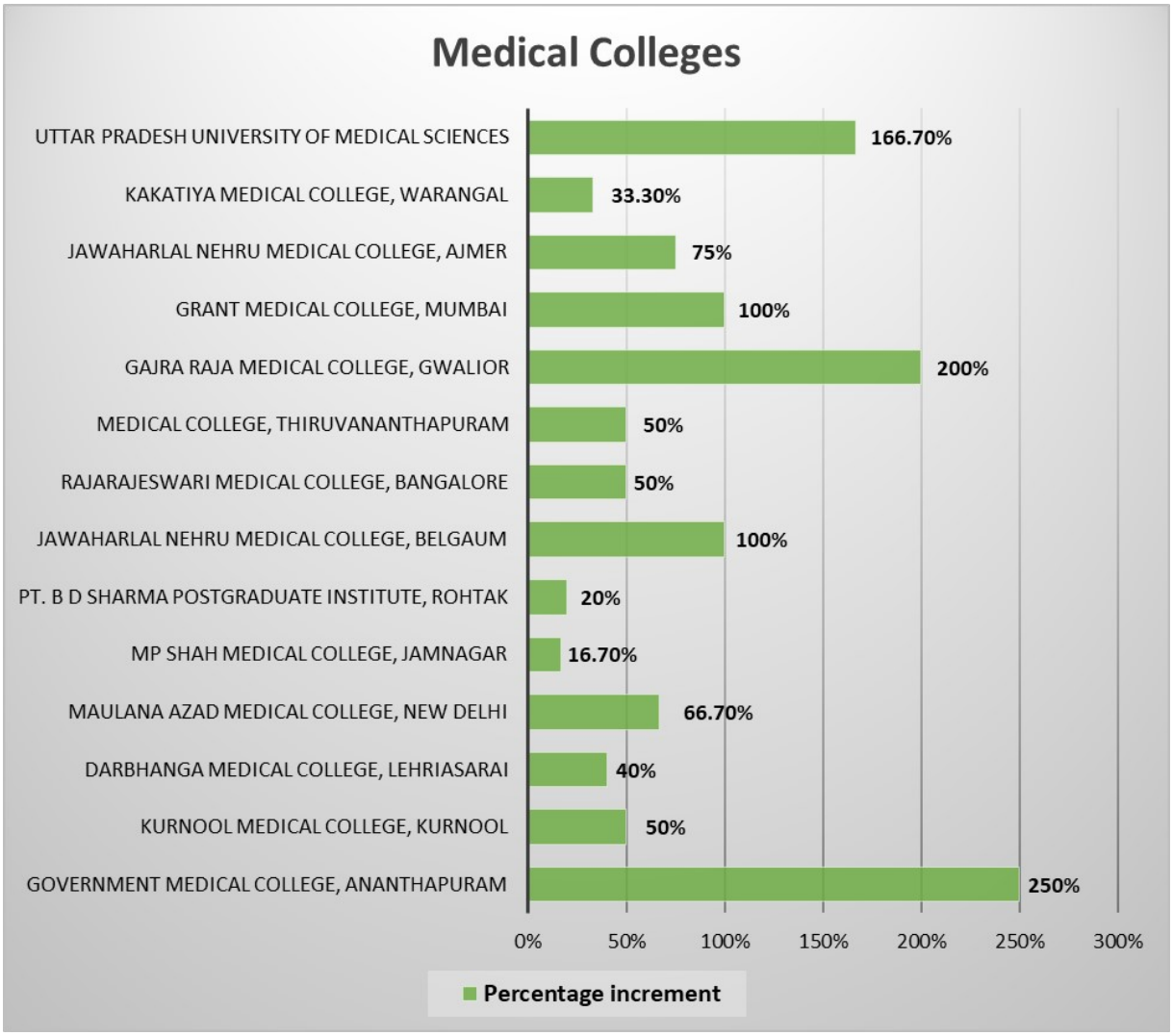
Overview of the Sudden Increase in PG Pharmacology Seats

The total has risen to 1,296 MD pharmacology seats nationwide. A significant portion of this increase has been observed after 2020, with certain colleges experiencing a more substantial rise than others. This uneven distribution raises questions about resource allocation, faculty availability, and the quality of education across different institutions.

S. No	College Name	State	Seats Previously Recognized	Seats Increased to (2023-2024)	Percentage Increase
1.	Government Medical College, Ananthapuram	Andhra Pradesh	2	7	250%
2.	Kurnool Medical College, Kurnool	Andhra Pradesh	2	3	50%
3.	Darbhanga Medical College, Lehriasarai	Bihar	5	7	40%
4.	Maulana Azad Medical College, New Delhi	Delhi	3	5	66.7%
5.	MP Shah Medical College, Jamnagar	Gujarat	6	7	16.7%
6.	Pt. B D Sharma Postgraduate Institute, Rohtak	Haryana	5	6	20%
7.	Jawaharlal Nehru Medical College, Belgaum	Karnataka	2	4	100%
8.	Rajarajeswari Medical College, Bangalore	Karnataka	4	6	50%
9.	Medical College, Thiruvananthapuram	Kerala	4	6	50%
10.	Gajra Raja Medical College, Gwalior	Madhya Pradesh	1	3	200%
11.	Grant Medical College, Mumbai	Maharashtra	3	6	100%
12.	Jawaharlal Nehru Medical College, Ajmer	Rajasthan	4	7	75%
13.	Kakatiya Medical College, Warangal	Telangana	3	4	33.3%
14.	Uttar Pradesh University of Medical Sciences	Uttar Pradesh	3	8	166.7%

Table 1: *Steady increment in PG Pharmacology Seats in Certain Colleges (2023-2024)*

The colleges listed in Table 1 show a steady and planned increase in the number of PG pharmacology seats. These increments generally range from 16.7% to 250%, reflecting a measured approach to expanding capacity, likely based on available resources and incremental adjustments.

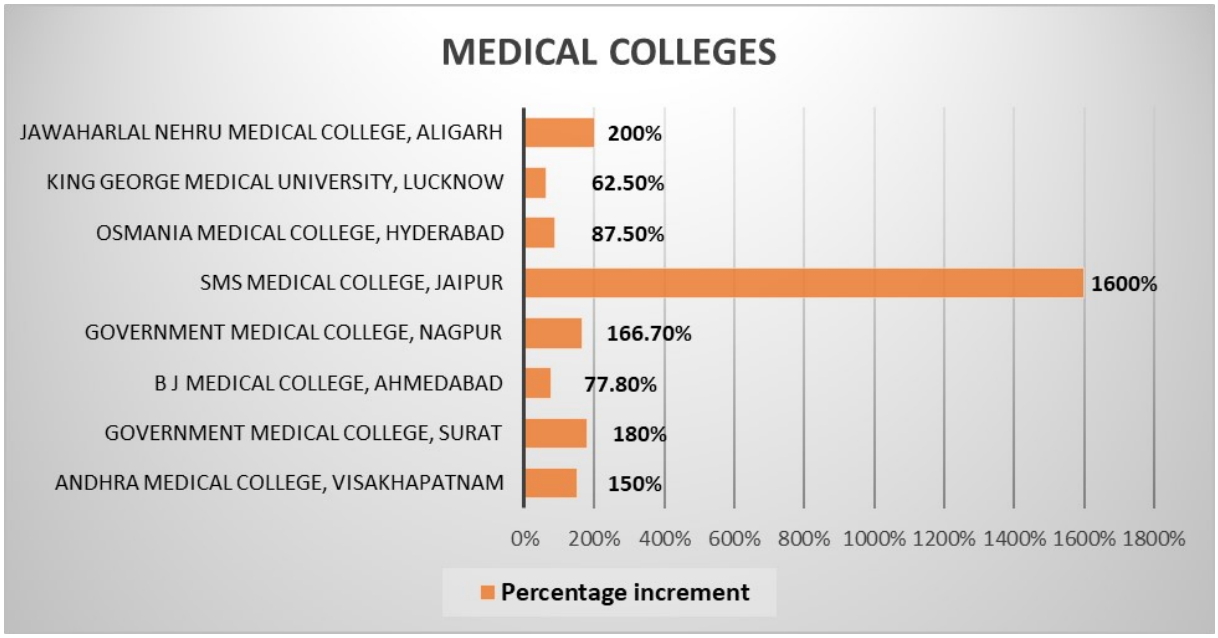


Graph 1: *Percentage Distribution of steady Increment in MD Pharmacology Seats Across Medical Colleges (2023-2024)*

S. No	College Name	State	Seats Previously Recognized	Seats Increased to (2023-2024)	Percentage Increase
1.	Andhra Medical College, Visakhapatnam	Andhra Pradesh	4	10	150%
2.	Government Medical College, Surat	Gujarat	5	14	180%
3.	B J Medical College, Ahmedabad	Gujarat	9	16	77.8%
4.	Government Medical College, Nagpur	Maharashtra	6	16	166.7%
5.	SMS Medical College, Jaipur	Rajasthan	1	17	1600%
6.	Osmania Medical College, Hyderabad	Telangana	8	15	87.5%
7.	King George Medical University, Lucknow	Uttar Pradesh	16	26	62.5%
8.	Jawaharlal Nehru Medical College, Aligarh	Uttar Pradesh	4	12	200%

Table 2: Misaligned Increment in PG Pharmacology Seats (2023-2024)[10]

The colleges listed in Table 2 experienced a more abrupt increase in PG pharmacology seats, with percentages ranging from 62.5% to an astonishing 1600%. These sudden increments might indicate a rapid response to increased demand, changes in policy, or a strategic push to quickly expand medical education capacity.



Graph 2: *Percentage Distribution of misaligned Increment in MD Pharmacology Seats Across Medical Colleges (2023-2024)*

Factors Contributing to the Increase

Demand and Supply: The significant growth of the healthcare industry has driven a higher demand for pharmacologists.[11] As medical treatments become more complex and evidence-based, there is a growing need for experts who can manage intricate medication therapies, conduct advanced pharmacological research, and contribute to the development of new drugs.[12] The expanding role of pharmacologists in clinical settings, pharmaceutical companies, pharmacovigilance and research institutions highlights the necessity for more trained professionals in this field.[13]

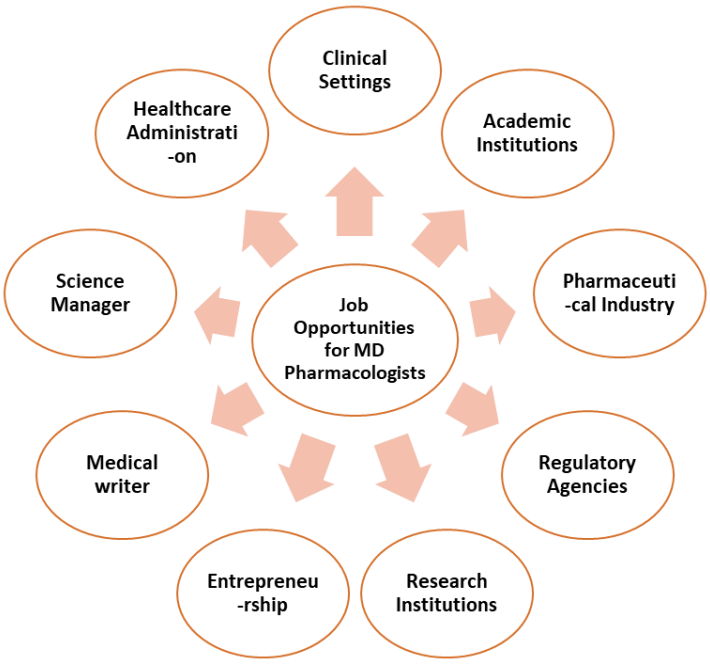


Figure 1: *Career Paths for MD Pharmacologists; Diverse Opportunities in Healthcare and Beyond*

According to the NMC, job prospects for medical pharmacologists include positions in academia, the pharmaceutical industry, clinical research organisations, government research institutions, regulatory bodies, and roles as scientific writers or science managers. Therefore, a postgraduate (MD) student in pharmacology should be well-prepared to fulfil the job requirements in these diverse fields.[14]

The goal of postgraduate education is to develop specialists who deliver high-quality healthcare and contribute to scientific progress through research and training.[14]

Government Policies

Various governmental initiatives and supportive policies have played a crucial role in the expansion of postgraduate (PG) seats in pharmacology. The NMC allows the initiation of post-graduate courses alongside undergraduate courses in medical colleges, as per the current regulations for new institutions, course additions, and seat increases. These regulations include:

1. The Post-Graduate Medical Education Regulations (PGMER)
2. Teachers Eligibility Qualifications
3. Minimum Standards of Requirements (MSR)
4. Curriculum needs as updated by the Post-Graduate Medical Education Board (PGMEB)

Non-teaching government hospitals can also start PG courses without an undergraduate programme if they meet these criteria. The procedures for increasing PG seats are the same as those for new course permissions, and such increases are automatically recognised for student registration. Standards of medical education are monitored annually, and colleges must pay fees for evaluation and affiliation. The MSR guidelines ensure the necessary infrastructure, staff, and clinical materials are in place for comprehensive PG training, with updates notified by PGMEB.[7]

Being human, the guide, as well as the postgraduate faculty, has their limitations in maintaining the quality of teaching, research, and discipline among postgraduate students. On the other hand, PG students are also human, and if not supervised properly, it leads to the development of poor quality in research, teaching, and discipline, resulting in output not up to the expectations.

Technological Advancements

Advances in medical science and technology have significantly broadened the scope of pharmacology.[15] The introduction of new therapeutic areas, such as gene therapy, personalised medicine, and biologics, along with innovative drug delivery systems, has created a demand for specialized knowledge and skills.[16] These advancements require a larger pool of trained pharmacologists who can navigate the complexities of modern drug development and therapeutic practices. However, the sudden increase has often resulted in poor outcomes due to insufficient faculty, inadequate infrastructure, and compromised training quality.

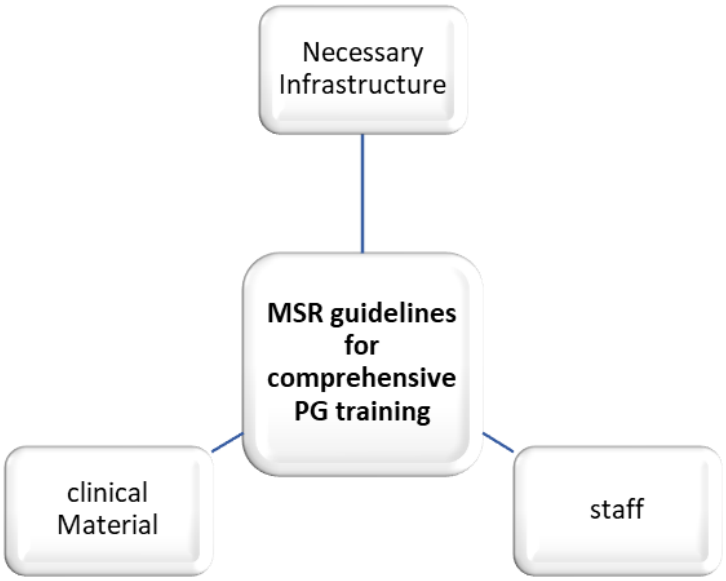


Figure 2: *Minimum requirements according MSR (Minimum Standards of Requirements) guidelines*

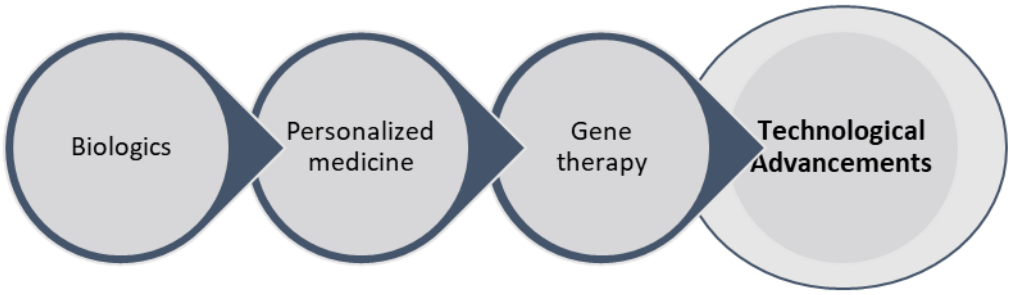


Figure 3: *Technological advancements in the field of Pharmacology*

These advancements require a larger pool of trained pharmacologists who can navigate the complexities of modern drug development and therapeutic practices. However, the sudden increase has often resulted in poor outcomes due to insufficient faculty, inadequate infrastructure, and compromised training quality.

The Possible Impacts of Sudden Increased Supply of MD Pharmacologists

Misalignments in the Training and the Job Expectation:

The possible exploitation of new budding pharmacologists by the industry and private medical institutions in the form of compromised salaries and perks and overburdening can lead to compromised self-esteem and negatively impact their physical, psychological, sociological, and social life. This will lead to:

1. Increased competition: With more MD pharmacologists entering the job market, competition for available positions would intensify, making it harder for individuals to secure desired jobs.

2. Lower salaries: An oversupply of pharmacologists could lead to downward pressure on salaries and benefits as employers take advantage of the larger pool of candidates.

3. Job market saturation: Some regions or institutions may experience an oversupply of pharmacologists, leading to underemployment or unemployment for some professionals.

Academic and Educational Effects:

1. Overcrowded programmes: An oversupply of pharmacologists can lead to overcrowded programmes and researches, potentially straining resources and diminishing the quality of education. Many medical colleges include "research institution" in their name for administrative purposes, yet their actual research activities are minimal.[17]

2. Balanced student-to-faculty ratio: An increased number of pharmacologists could improve the student-to-faculty ratio (provided good quality) in academic institutions, potentially leading to better educational outcomes. However, if not managed properly, it could also result in overcrowded programmes and strained resources, potentially impacting the quality of education.

Pharmaceutical Industry Effects:

1. Efficiency in trials: With more pharmacologists available, pharmaceutical companies could conduct clinical trials more efficiently and effectively, accelerating the time-to-market for new drugs.

2. Job security issues: Increased supply might lead to job cuts or reduced job security as companies try to balance workforce sizes with their needs**.**

3. Market saturation: Overabundance of pharmacologists can lead to saturation in certain areas, reducing job opportunities.

Economic and Societal Effects:

1. Healthcare cost reduction: Improved medication management and reduction in adverse drug reactions could lower overall healthcare costs, benefiting the economy and patients.

2. Migration issues: An oversupply in one region may lead to migration challenges as pharmacologists seek employment in other regions or countries.

Professional Development and Career Path Diversification:

1. Skill underutilisation: High competition may result in some pharmacologists working in positions that do not fully utilise their skills and training.

2. Career frustration: Increased difficulty in finding desirable positions may lead to professional dissatisfaction and frustration.

3. Entrepreneurial opportunities: Some pharmacologists might pursue entrepreneurial opportunities, such as starting their own consulting firms, research labs, or healthcare technology companies.

Institutional and Policy Effects:

1. Policy adjustments: Regulatory bodies and healthcare institutions might adjust policies and guidelines to accommodate the increased supply of pharmacologists, ensuring optimal utilisation of their

skills. However, increasing the number of doctors alone may not resolve the issue, as many are unwilling to work in the government health system, especially in rural and remote areas.[18]

2. Funding and grants: Increased competition for research funding and grants could arise, necessitating higher standards and more innovative proposals to secure financial support.

Colleges must now submit details on an NMC portal, which will be publicly accessible to ensure transparency and replace physical inspections. These measures aim to enhance transparency, efficiency, and accountability in assessing medical institutions, ensuring compliance with regulations.[22]

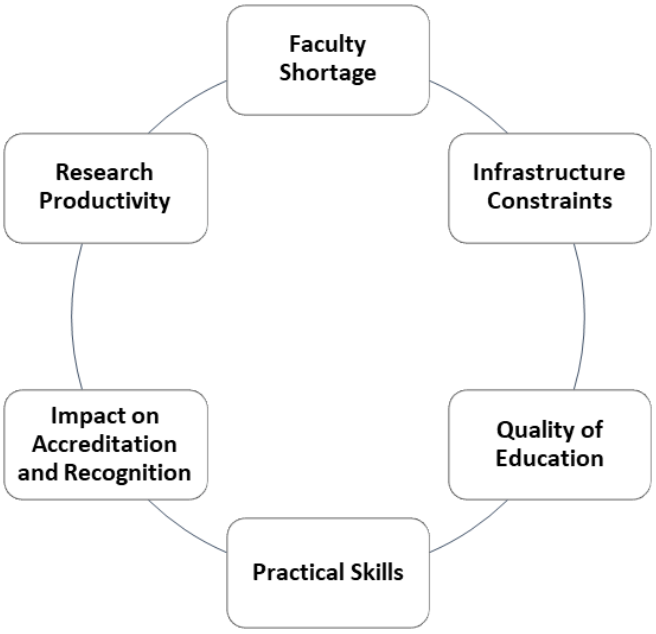


Figure 4: *Factors contributing to poor medical performance after sudden increase in MD Pharmacology Seats*

Factors Contributing to Poor Medical Performance After Sudden Increase in MD Pharmacology Seats

The sudden increase in PG pharmacology seats can lead to poor medical performance due to several factors. Faculty shortages may arise, resulting in compromised teaching quality and limited mentorship opportunities.[19] Infrastructure constraints, such as inadequate laboratory facilities and overcrowded classrooms, can hinder practical training and research experiences. This may affect the overall quality of education, leading to a gap between theoretical knowledge and practical skills. A good infrastructure is necessary for active research, which in turn exposes students to good research methods and practices.[20] Additionally, poor medical performance can jeopardise programme accreditation and recognition, impacting the institution's reputation and future prospects.[21]

NMC Introduces Stricter Penalties for False Information in Medical Colleges

Though NMC has started penalising the institutions for not adhering to the guidelines, this does not guarantee quality education and research specialisation for postgraduates.

Conclusion

The surge in postgraduate (PG) seats in pharmacology reflects both the growing demand for skilled professionals in healthcare and the government's commitment to expanding medical education. However, this expansion brings with it a myriad of challenges and considerations.

While the increase in PG seats presents opportunities for improved access to specialised care, enhanced research output, and economic benefits, it also raises concerns regarding job market saturation, compromised educational quality, and infrastructure deficiencies. The disparities in seat increments among institutions further highlight the need for equitable resource allocation and quality assurance measures.

Governmental initiatives, technological advancements, and regulatory actions play pivotal roles in shaping the landscape of pharmacology education. Stricter penalties for misinformation and enhanced transparency mechanisms introduced by the NMC signify a shift towards quality-focused evaluations.

In navigating the complex landscape of PG seat expansion in pharmacology, it is imperative for stakeholders to prioritise quality over quantity. Balancing the supply of trained pharmacologists with the demands of the healthcare sector requires strategic planning, robust infrastructure development, and continuous monitoring of educational standards. Ultimately, the success of this endeavor hinges on collaborative efforts between policymakers, academic institutions, healthcare professionals, and regulatory bodies. By fostering a culture of excellence and innovation, we can harness the full potential of pharmacology education to advance medical science and improve public health outcomes for all.

To conclude, the policymakers deserve appreciation for increasing the skilled MD pharmacology workforce, but they need to be more vigilant about the real outcomes versus the hypothetical ones. If the outcomes are compromised, it is the most appropriate time to revisit, rethink, re-strategise, and reconsider the increase in MD pharmacology PG seats without compromising the quality of education.

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