

Young microbiologist – The road ahead

Bhaskar Thakuria, Anita Pandey

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Abstract:

CONTEXT: Because of limited exposure to the vast field of microbiology in the undergraduate time, a notion is generated among young doctors that microbiology only deals with laboratory diagnosis and teaching. When a young medical graduate enrolls him/herself to microbiology and sees the vastness of the subject and shrinkage of known job prospects, a sense of uncertainty and scepticism about the future creeps into the student's mind. It has become a role of a postgraduate teacher to act as a mentor in such a moment of crisis.

AIM: The present article is aimed to explore the job prospect of a medical microbiologist in various fields, namely hospital setup, laboratory practice, research, corporate world, further studies and also to discuss the job profile, the challenges and future prospectus in each field.

CONCLUSIONS: Now, microbiology has evolved beyond a subject engaged in laboratory and teaching or research; in its current form, it has an immense role in patient care and treatment and it has a great market value in the corporate field.

Keywords:

Future of microbiologist, job prospects, medical microbiology

Introduction

Many young MBBS graduates are at crossroads regarding the subject they want to pursue for their postgraduation. At times, young microbiologists are confused and cannot foresee their future and hence underestimate the subject's vast role in contributing toward the medical science. To many, getting a respectable job seems tough. However, there is an increase in demand for microbiologists and a career in microbiology can be a proud option.

Our search of literature has revealed limited data addressing this issue; hence, we intended to write this article which specially addresses the common queries of young postgraduates regarding the prospects of a medical microbiologist in different fields and to formulate a positive road map.

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The future job prospects for medical microbiologists can be in different fields, in which the article tends to give insight with the possible job prospects, future and challenges ahead.

1. Hospital setup
2. Laboratory
3. Research
4. Corporate world
5. Further studies.

Subjects and Methods

Hospital setup and role of microbiologists

Awareness among the medical fraternity as well as the hospital management about the prospect of a microbiologist in a hospital setup was very poor until a few years back. Thus, the requirement of a microbiologist in a hospital setup was limited to laboratory work only. Recently, the subject has gained importance particularly due to high burden of healthcare-associated infections and mandatory requirement of microbiologists to look after infection control in hospitals, especially if hospitals are going in for

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Department of
Microbiology, Subharti
Medical College, Meerut,
Uttar Pradesh, India

Address for correspondence:

Dr. Bhaskar Thakuria,
Department of
Microbiology, Subharti
Medical College, NH 58
Meerut Bypass, Meerut,
Uttar Pradesh, India.
E-mail: bhaskarthakuria1@
rediffmail.com

accreditations such as National Accreditation Board for Hospitals and Healthcare Providers/National Accreditation Board for Testing and Calibration Laboratories (NABL). There is a constant dearth of microbiologists (only 903 Medical Council of India (MCI)-recognised seats/year)^[1] compared to the number of hospitals in India.

The job profile

In a hospital setup besides the routine laboratory work, a medical microbiologist has to work in close collaboration with the clinicians as follows:

- (a) Bridging the gap between the bed and the bench:
- A consultant microbiologist plays a pivotal role in patient care providing information on variety of microorganisms with clinical significance
 - Provide data on culture and their antibiotic susceptibility pattern which could help in initiating or optimising treatment
 - Communicate with the clinical departments about 'alert' or multidrug-resistant (MDR) strains such as methicillin-resistant *Staphylococcus aureus*, Vancomycin-resistant enterococcus, MDR tuberculosis, MDR pseudomonas spp., Extended-spectrum beta-lactamase producers and Carbapenemase producers
 - Formulate antibiotic policy and ensure its implementation and regular auditing
 - Educate the healthcare personnel about the pre-analytical problems
 - Develop procedures for quality assurance.
- (b) Infection control officer: Major responsibility towards:
- Surveillance: to detect and monitor the quality indicators of a hospital such as central line-associated blood stream infections, catheter-associated urinary tract infections, ventilator-associated pneumonia and surgical site infections (SSI) in collaboration with infection control nurse^[2,3]
 - Anticipate, investigate and manage outbreak
 - Antimicrobial stewardship
 - Developing disinfection policies for the hospital and ensure its implementation
 - Implementation of infection control policies in the hospital
 - Nodal officer in biomedical waste management in the hospital
 - Educate the healthcare personnel about infection control, diagnosis and its management.^[4]
- (c) Collaboration with Central Sterile supply Department (CSSD)
- Microbiologists have a huge responsibility in collaboration with the CSSD. Most of the corporate hospitals in bigger cities have recognised this

aspect where CSSD and microbiology works in tandem for proper functioning of the hospital.

The challenges

The above job profile has added a new dimension to the functioning of a microbiologist in a hospital setup, but the task is not easy and there are potential hurdles at every step, particularly with regard to changing the attitude of the hospital staff towards new mandatory guidelines and making them understand their importance. Thus, biggest challenge for a microbiologist working in a hospital is to lead this new necessary revolution in the field of hospital practice regarding infection control.

The future

With the increasing emergence of antimicrobial resistance, healthcare-associated infections and accreditations, young microbiologists have great challenges and opportunity in front of them in recent years as there is a big vacuum of young and energetic microbiologists in hospital sector.

Laboratory setup and role of a microbiologist

Working in a laboratory or self-employment is also an option for microbiologists to start their professional career. A pure microbiology laboratory of their own can be set up or they can work in a laboratory setup together with a pathologist/biochemist, which will help in diagnosing the complete spectrum of disease.

The job profile

Life of a microbiologist working purely in laboratory of a medical college, corporate hospital or diagnostic laboratory is far from being boring. At times, it can be as busy as any emergency duty, and gradually, the image where a microbiologist is seen only as a person reporting culture plates or reading serology reactions is changing. The new generation of microbiologists does not treat the sample but treat the patient as a whole and take proactive measures.

The challenge

Maintaining quality service 24 × 7 is the need of an hour. The microbiologist of today not only has to provide rapid, quality reports with clinical interpretation but also needs to communicate frequently with the clinicians; which is a big challenge. Due to constant change in technology, all laboratories and microbiologists need to change with time. Modern machines, new technology and incorporation of software need big investment. Communication either with the patient or the clinician is a big challenge for microbiologists to clarify doubts and emphasise relevance of microbiology investigations among other doctors.

The future

The laboratories are here to stay both in corporate sector and as small/medium laboratories. Moreover,

with surge of accreditation by the NABL, the College of American Pathologists and other accreditation bodies, a microbiologist is surely needed, and he/she has to give quality service to the laboratory.

Field of research

Research opportunities are plenty in each and every field of microbiology and golden opportunities wait for students who are pursuing their career as a researcher. Some of the best scientific research jobs are available in the field of microbiology. However, it is advisable that in order to excel that those with an aptitude for research pursue this career pathway. Due to the advancement in the field of science and technology, the scope of research in the field of microbiology has widened. There are large, private research institutes that conduct microbiological/epidemiological studies for government agencies. In India, we are yet to know the burden of many infectious diseases and their diagnostic, preventive and therapeutic aspects are yet to be explored. Those working in other fields such as hospitals and research laboratories are encouraged to do various kinds of research for which there are grants available (Indian Council of

Medical Research [ICMR], Department of Biotechnology [DBT], Department of Science and Technology and Wellcome Trust).

The job profile

There is abundance of scope both academically and monetarily if one opts for jobs in the field of research in centres such as ICMR, National Institute of Communicable Disease and other referral labs as junior research fellow, senior research fellow, scientist, etc. Similarly, there are good job prospects also in the research and development (R and D) sector in pharmaceutical industries.

The challenge

Research can be carried out in various fields of microbiology, provided the idea is original and useful to the community and the person continue to search the answer to the original question. Government funding agencies such as ICMR and DBT always encourage original research. The scope in the field of research is very challenging and the candidate should think in broader prospect beyond routine working hours to excel.

The future

The sky is the limit for a young microbiologist and the outcome might not be less than the Nobel Prize. Indeed, there are many scientists who have Nobel Prize in Medicine for their work in microbiology in the field of diagnosis, prevention and treatment infectious diseases. Examples include Robert Koch, Ronald Ross, Alexander Flemming, Paul Ehrlich and many others in recent times

such as Harald zur Hausen, Barry Marshall and Robin Warren, Stanley B. Prusiner, Baruch Blumberg and Carlton Gajdusek.

Faculty in medical college

India spends 1.4% of its GDP on health with only one doctor for every 1681 persons. Health and medical education requires significant development as today India ranks 112 in the World Health Organization (WHO) rating.^[4,5]

The efforts are on to change the image and this effort will start with opening of new medical colleges both in government and private sector. Hence, a paucity of new opening can be a myth as every year new medical colleges are coming up.

The job profile

The job to teach the undergraduates, postgraduates, technical staff and the nursing staff is just a tip of an iceberg. Besides teaching, there is a huge responsibility of laboratory reporting, hospital and research work as discussed in the above sections. The administrative and community duty assigned to microbiologists from the government and administration is significant such as investigation of an outbreak, responsibility of CSSD, Integrated Disease Surveillance Programme and Integrated Counselling and Testing Centre.

The challenge

The total number of faculty requirement for microbiology has not increased over the years in spite of massive increase in the workload as stated above. With the appointment of non-medical teachers to the extent of 30% as per the MCI,^[6] it is becoming difficult for medically trained microbiologists to get jobs in medical colleges. Biggest challenge is to maintain quality. Besides, it is our view that it is high time the curriculum is reviewed with more emphasis on disease-based clinical microbiology.

The future

The dynamics of a microbiologist has changed over the years, so young faculties have to undertake this challenge and become a better microbiologist, a better educator and a role model to the society as well as to the fellow medical fraternity.

Pursuing further studies

The road actually does not end only with an MD microbiology degree for many. New avenues are opening up in many reputed institutes of India and abroad. One can enrol him/herself for advanced courses such as postdoctoral course in infectious disease and in immunology. DM in infection control or pursuing a parallel DNB course in microbiology can be a very good option for upcoming microbiologists. A large number

of students go abroad to pursue PhD and postdoctoral studies after getting scholarships through GRE or TOEFL. After completion of PhD, they are usually employed by foreign universities or R and D wings of major pharmaceutical companies. Microbiologists work in many UK NHS hospitals, bioscience and food companies. They carry out research and develop new products or work in quality control to monitor manufacturing processes and check the microbiological safety of goods such as medicines, cosmetics, toiletries, biochemical, food and drink.

Conclusion

In the present paper, we have refrained from (i) the discussion on the monetary prospect of being a microbiologist as we believe that money should not be the criteria to select a job and (ii) commenting on less pressure, less responsibility and no night duty job of microbiologists.

It is true that career in microbiology is enriching not only due to its vast scope it offers but also because of the prospect of the subject offering new dimension in thinking, new dimension in education system and new dimension in the way the knowledge of microbiology is applied.

Today, microbiologists are required in top organisations such as National Aeronautics and Space Administration for identification of any life form for their various missions such as the recent Mars Curiosity mission and many more. The scope is immense; what is needed is right application of knowledge. With such a scope in microbiology, the students and professionals today need

a change of approach, knowledge, technology and its application will take care to make them successful. The job is a way to apply knowledge, but innovation and imagination is a way to destination. Einstein once said 'imagination is more important than knowledge.'

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Conflicts of interest

There are no conflicts of interest.

References

1. Mciindia.Org. Medical Council of India. Available from: <https://www.mciindia.org/CMS/information-desk/college-and-course-search>. [Last accessed on 2018 Apr 11].
2. Indicator Definition Formula Remarks. National Accreditation Board for Hospitals and Healthcare Providers. Available from: <http://www.nabh.co/Images/PDF/10MandatoryQI.pdf>. [Last accessed on 2018 Apr 11].
3. Nazir A, Kadri SM. An overview of hospital acquired infections and the role of the microbiology laboratory. *Int J Res Med Sci* 2017;2:21-7. Available from: <http://www.msjonline.org/index.php/ijrms/article/view/2048/1942>. [Last accessed on 2018 Apr 17].
4. Tandon A, Murray CJ, Lauer JA, Evans DB. Measuring Overall Health System Performance For 191 Countries GPE Discussion Paper Series: No 30. Available from: <http://www.who.int/healthinfo/paper30.pdf>. [Last accessed on 2018 Apr 16].
5. Health Expenditure, Public (% of GDP). Available from: <https://www.data.worldbank.org/indicator/SH.XPD.PUBL.ZS>. [Last accessed on 2018 Apr 16].
6. Minimum Standard Requirements for the Medical College for 100 Admissions Annually Regulations, 1999. Medical Council of India Document. January, 2017. p. 33. Available from: <https://www.mciindia.org/documents/informationDesk/Minimum%20Standard%20Requirements%20for%20100%20Admissions.pdf>. [Last accessed on 2018 Apr 18].