

In response to Nobel prize in physiology or medicine by the Indian medical education system: How far and how close?

("Medallists' aren't born, they have to be created with love, hard work & sincere efforts!")

Dear Editor,

We read your article "Nobel prize in physiology or medicine by the Indian medical education system: How far and how close" with immense curiosity. The article raises certain valid and significant issues about Indian medical education system and brings forth the same thoughts, which might have come to minds of many doctors in India at some points in their career in a similar time of the year when Nobel prizes are given away, like those during Olympics 10 years ago. "Why don't we win one?" We would like to explore the problem raised by you.

- Although India is one of the largest producers of undergraduate medical doctors and most of the medical schools in India are equipped to start basic research, the emphasis on research is not explicit unlike other branches of science like biotechnology.^[1] Even national medical commission (NMC) has not given much emphasis on research and innovation of undergraduate students in their mandates for Indian medical graduates.^[2] The medical graduates in a country like India take the field as a career choice mostly because of the earning potential and opportunity for a stable job rather than passion in innovation. Medical graduates also have severe dearth of role models among their teachers, who also could not pursue research because of the lack of necessary skills, resources, or interest.
- India has progressed to a great extent in manufacturing of generic drugs and active pharmaceutical formulations, but necessary investments in research and development are still lacking. The majority of the Indian pharmaceutical industry invest heavily on manufacturing, distribution, and promotion of the drugs as a way for profits. Most of the pharmaceutical companies in India use already patented molecules in the European Union or USA rather than their own development of newer drug molecules. The investment in research and development as a part of their annual turnover is almost half as compared to their international peers^[3,4] (reference Indian pharma investment in R&D). Here in India, mostly, we are

doing the repetitive kind of jobs, which do not give much chance for innovation. It is performed probably because of the availability of cheap work force in India and for maintaining the intellectual dominance by the developed countries.

- We agree with you that despite one of the largest capacities of manufacturing, our population of underserved and poor communities do not get the full benefit of low-cost treatment because of international patent rules. "Make in India" might be a short-term investment on capacity building, but the mid- and long-term vision must be to supplement it with innovation through research. Capacity building for research and an optimum ethical clinical trial platform is also a necessity, which can pay hefty dividends in the form of new drugs and diagnostic modalities, and it is already evident in the developed countries.
- The recalibration of industry and academia has huge untapped potential. The fruitful partnership of both has created wonders in the form of hugely successful vaccines of coronavirus disease 2019 (COVID-19) in Europe and USA. The partnership of NIV-Pune and Bharat Biotech for COVID-19 vaccine is a huge step forward, but at the same time, the partnership should also develop a viable self-sustained financial platform for future innovation. The lack of profit sharing between research institutes and the industry in COVAXIN development was a missed opportunity for the same.^[5,6]
- We also agree with the editor that although the minimum standards criteria by the highest governance body of medical education maintain a certain standard of undergraduate and postgraduate teaching, it has by far not been able to capitalize the best of minds which are selected through highly competitive pre-medical examinations. The intelligent minds which work very hard to get through the best of medical schools in the country gradually fall into a mundane routine of passing out as a medical graduate. The system does not induce any innovation barring some competition by Indian Council of Medical Research (ICMR) Short Term Studentship (STS). The continuous thought process of new product/technology development, concept of incubators, and innovation brainstorming in the form of enjoyment of hackathons which are present in peer engineering institutes such as the Indian Institute of Technology (IITs) and the National Institute of Technology (NITs) are missing in the medical education system. The medical education system also lacks any incentive for research and innovation for students during their hectic time sapping curriculum of theoretical teaching, clinical teaching, and practical teaching. If someone does some innovative research, still, we do not have much robust techniques to assess it or quantify it.

- Lastly, innovations for Nobel Prize require investment, which are multi-spectral. Only profit-driven market's need-based innovation will always be inadequate. Most of the cross-cutting innovations which rose to get Nobel prize were from publically funded grants in laboratory under the researcher inside a university.^[7] The new long-term grants under department of biotechnology (DBT), Department of Science and Technology, or ICMR should be strengthened to have any impact outcome of research, like acknowledging "SCIENTIFIC SOCIAL RESPONSIBILITY" of the researchers, and the deserving research fellows should get adequate job/funding which is necessary for innovation as per Maslow's Hierarchy of needs, and we need to remember that INNOVATION HAS NO BOUNDARIES; the cultivation and promotion of the intellectual minds is the ultimate key for success. The same holds true in the case of NOBEL PRIZE also.

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