Review article

Obstacles Facing Medical Students in the developing Countries as Scientific Researchers

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Abstract:

Objective and design: A review to summarize some obstacles facing medical students in developing countries as scientific researchers. We aim to highlight challenges that medical students face and find solutions.

Conclusions: Undergraduate research has a wide range of benefits. It acquaints students with the field of study and piques their interest in learning more. In addition, students' perspectives may be helpful and contribute to science. Unfortunately, there are numerous obstacles that undergraduates must overcome to complete a research project.

Keywords: Researchers, developing countries, Obstacles, Medical Students

Introduction:

Undergraduate medical research is critical not only for career advancement but also for learning, allowing students to gain experience in understanding and connect with a topic related to their field of study while exploring a wide range of career opportunities. However, there are barriers to undergraduate research, particularly in developing countries. Researchers in developing and low-socioeconomic countries face more challenges than those in developed countries. (1).

The primary reason for the lack of undergraduate research has been attributed to a lack of research training. However, other challenges can be both professional and personal. Personal barriers may include a lack of statistical skills, knowledge of research methodology, and a lack of time and money. Professional borders can consist of a lack of information, a lack of mentorship, and a lack of access to equipment. In addition, there is a scarcity of data available for research, particularly for medical students in developing countries (2).

These obstacles must be identified to make medical students in developing countries scientifically successful compared to their peers in developed countries. Undergraduate research also allows research advisors to assist students on their path to becoming professionals (3).

What exactly is research?

Research is a way of thinking that involves critically examining various aspects of your day-to-day work, comprehending and developing guidelines, and testing new theories that contribute to advancing your practice and profession. It is a practice of questioning what you do and a systematic examination of clinical observations to explain and find answers to what you perceive, to implement appropriate changes for a more effective professional service (4).

Barriers faced by undergraduate research students in research projects:

Research, by definition, is a difficult task for any learner, regardless of the level of study. Still, it is especially difficult for undergraduate students, who are first-time researchers for the most part. This is because each research is unique and necessitates a thorough investigation of the problem or phenomenon (5). In addition, undergraduate research is complicated for many people because it is typically carried out by a single student while requiring approval from many people, including supervisors, defense panels, faculty members, etc. Therefore, understanding the various aspects of research and arranging them in a meaningful way for all involved is also required (6).

Barriers facing medical students towards clinical research in Egyptian medical school

Positive attitudes toward clinical research were found among Egyptian medical students, but they were associated with relatively low knowledge scores. Although 86 percent of students agreed that undergraduates should participate in clinical research, only 23.8 percent reported participating in research activities. Students identified several barriers, including a lack of mentoring, funding, time, facilities, database inaccessibility, and a lack of research knowledge and interest. Our findings are consistent with other studies that discovered a gap between students' positive attitudes toward scientific research and their actual participation in research activities (7).

Gender differences did not significantly affect students' knowledge, attitudes, or participation in research activities (8).

Perceived barriers against participation in clinical research.

Students identified seven barriers: a lack of time, inadequate mentoring, a lack of necessary knowledge, a loss of interest, insufficient funding, and database accessibility (7).

Students from different academic years had varying results on the attitudes and knowledge scales, with fourth-year students having the highest knowledge scores and percentage of research participation. This is consistent with the findings of other longitudinal studies, which show that as students' progress through medical school, their knowledge and attitudes toward scientific research improve (7).

Student-Related Challenges

1-*Lack of interest:*

A lack of interest in research activities has deteriorated the healthcare system, depriving medical students of understanding and utilizing the most recent medical advances. Unfortunately, there have been a few studies on the lack of interest in research activities, including in Lahore, Pakistan (9).

2-*Time management:*

Students in developing countries do multiple things simultaneously, taught modules, assignments, tests, and exams together with a research project. They also do not have the skill of time management. This makes it challenging to keep up with research projects and the research supervisor's schedule (10).

3-*Confidence issues:*

Students in developing countries work on multiple projects simultaneously, including taught modules, assignments, tests, exams, and research projects. They also lack time management abilities. As a result, keeping up with research projects and the research supervisor's schedule is brutal (11).

4-*Quantity of literature:*

There are many studies available that students must go through to get the secondary data they need for their research which is a challenge for them. In addition, students are challenged by the sheer amount of literature out there (12).

5-*Working with deadlines:*

Undergraduate researchers face difficulties with the deadlines given for the project. Time management is an issue for undergraduates, especially with assignments and studying. This makes it difficult for them to adhere to the specified deadline and causes them to deliver the research work weeks after the deadline, owing to being

preoccupied with exams and other activities. Most times, they have six months from the start to finish the research (13).

6-*Data collection:*

Data collection is a crucial step for any research. However, this task is challenging for undergraduates as most people will refuse to give information to young students, they think would misuse it. Also, students do not know the best tool for collecting the needed information (14).

7-*Interpreting literature and data:*

The interpretation of research findings and results necessitates extensive knowledge of the subject under study. First, the researcher must have read all of the available papers on the same topic, and then he must identify the gaps that these papers were unable to fill. He must then develop a hypothesis and a question that his research findings will answer. Next, he must interpret these findings and how they serve the gaps in the available knowledge and what new knowledge his paper provides that the others do not. (15). He must also compare his paper's methodology to that of previous documents. He should also be able to use appropriate software to analyze the extracted data. Finally, the sample size must be sufficient, and the bias must be close to zero for the findings to be generalizable.

The preceding requirements are significant impediments and challenges for young students and undergraduates, particularly those from developing countries (16).

Mentor-student challenges

1-*Lack of scientific training:*

There is no official training or even available training on conducting a research project, either primary or secondary. There are only a few individuals or institutions that offer such training. Unfortunately, this training is insufficient as students face many problems when they apply what they learned in these courses in practice due to a lack of information and adequate training (17).

2-*Supervision challenges:*

Good supervisors and guidance should compensate for the lack of training, but some supervisors have poor communication and advice with their students. Students are new in the field of the research topic, and thus supervisors should be with them to teach them all they need about the subject of the study (18).

3-*Pacing of content:*

This can be a problem for undergraduates; if it is too slow, they may become bored or disinterested; if it is too fast, they may become devastated or disinterested. Supervisors must find a happy medium (19).

Institution-related challenges.

1-*Poorly equipped library:*

Undergraduates may waste their effort and time to get a paper of a piece of information needed in their research because their libraries are poorly equipped. Researchers identified the lack of a well-equipped library with open access resources and websites as a significant challenge facing undergraduate research students (20), except in Egypt, where the Egyptian bank of knowledge served as the world's most extensive digital library.

2-*Lack of access to resources:*

A lack of resources is another source of difficulty for undergraduate students. In most cases, undergraduate research is not funded by institutions instead of graduate students, and students may face financial problems. Medical students should understand that government bears at least some responsibility, and they cannot expect support to come to them. members of governments are mostly nonscientists, and scientists must go out and explain the significance of their research and what they hope to achieve. (21).

Many universities in developing countries don't support scientific research because they regard research as a sack into which money is poured, and nothing of apparent value comes out (22).

How to promote research?

An essential aspect of the research culture is an organization's approach to research integrity – the formal and informal ethics, standards, protocols, and policies researchers follow in their environment. Organizations are increasingly recognizing the importance of the role of research integrity (23).

1. *Small steps can make a big difference*

Facilitating open discussions can help foster a more collaborative environment by giving researchers the chance to share their experiences of their successes and their "failures." This helps build respect and trust within the research team by talking openly and supporting when things don't always go right (23).

2. *Establishing support systems can boost morale and enhance positive research*

Providing and promoting career counseling, coaching, and support services available to staff may help to reduce pressures within a research environment, which is imperative to staff well-being. This can help reduce stress and time constraints while also connecting researchers to other resources available at their institutions. (24).

3. *Ensure everyone is on the same page*

Research teams could openly discuss, amend and build on existing guidelines, to develop a consensus on their collective and individual behaviors and attitudes. This could be used to create a group standard or pledge, ensuring all team members know what is expected in the research environment (23).

4. *Research culture "cafes" are an excellent way to share best practice*

Encourage researchers and support staff to make time and space to meet to share ideas and experiences. Discussions can focus on improving research integrity and culture by involving other departments, institutions, and sectors and sharing best practices on what has worked, what hasn't, and the impact. (25).

5. *Organizational, departmental, and team leaders set a good example promoting great research culture.* So often seen as "role models" for their early-career peers, organizations, departments, and team leaders who are at the forefront of promoting positive research culture. Such as taking part in training, encouraging discussions to address complex questions openly and honestly, and having an open-door policy – setting a "norm" and redefining standards (26).

6. *Discuss training gaps for all team members*

Career progression is a critical factor in retention and enhances the quality of research for the institution and the research community as a whole. Researchers can feel more valued if their skill needs are assessed individually and collectively,

ensuring that they all have the necessary skills for their roles, such as statistics, data handling, proposal writing, and resource management (27).

7. *Embed research culture at an institutional level*

Highlight the importance of research culture and engage all staff across the organization by hosting a research culture and integrity day. Presentations, workshops, and panel discussions could be given across the organization (28).

Conclusion:

Research for undergraduates has many beneficial effects. It makes the students know more about the study field and makes them curious to learn more. Students' perspectives may also be constructive and add more to the science. Unfortunately, Undergraduates face numerous challenges when conducting a research project. Efforts should be made to address these issues and encourage undergraduates and pave the way for them in the research field before we lose their enthusiasm.

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