

Thesis writing in medical schools: Opportunity or liability

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A thesis is a comprehensive report of a student's research, created with the guidance of a supervisor and required for degree completion. It must be well-written to meet pre-defined standards and is often published in a peer-reviewed journal with the supervisor's help.¹ Thesis writing in medical science presents both major opportunities for significant discoveries and considerable challenges due to strict academic demands and the pursuit of new contributions.

Opportunities

1. Formulating research questions- Thesis-writing equips residents with the ability to frame a feasible, interesting and relevant research question that helps them select a meaningful, complex question suited to their competency.²
2. Selecting an appropriate study design- Choosing a study design is closely tied to the research question and is a valuable learning experience. Students learn to select a design that answers their question while considering time and resource constraints. They also face the challenge of crafting objectives that are specific, realistic, and time-bound.³
3. Conducting a comprehensive literature review- Literature review is crucial, as it both guides and is guided by the thesis direction. Students learn to search databases, filter out irrelevant publications, cite sources, and create bibliographies. More importantly, they develop the ability to critically analyse articles.⁴
4. Enhancing skills- Writing a thesis is a valuable way to cultivate essential skills. The process encompasses designing and performing experiments, analysing and interpreting data⁵ and nurture critical thinking, problem-solving, and analytical abilities. During data collection, students

enhance their organizational, problem-solving techniques and learn to work autonomously. Additionally, the academic procedure offers opportunities to improve scientific writing, communication and presentation skills. Additionally, they gain in-depth knowledge of a specific domain by acquiring new interventions.⁶

5. Escalating knowledge- Thesis writing in medical science offers a major opportunity to contribute significantly in the progress of the field. As medical science evolves with constant discoveries and innovations, original research conducted through a thesis can explore new areas, test novel hypotheses and address critical issues affecting public health and clinical practice. A thoughtfully designed thesis has the potential to yield groundbreaking results, enhance understanding of disease mechanisms, and even outline treatment approaches.⁷
6. Professional benefits and networking- A well-executed thesis can not only strengthen academic credentials but also equips individuals for future roles in research, academia, and healthcare and obtaining grant or funding.⁸ The thesis writing process often involves working closely with faculty, mentors, and peers that helps build professional relationships and expand one's network within the scientific community. This can lead to valuable collaborations, mentorship, and career support. Presenting thesis findings at conferences and seminars enhances professional visibility with other field expertise.⁹

Liability

1. Lack of evaluation criteria- There are no standardized criteria for evaluating a student's learning from the thesis process. This lack of criteria can lead to an outcome-oriented strategy

as opposed to a process-oriented one. As an example, a student may assign the entire statistical analysis to a fellow in the Biostatistics Department.¹⁰⁻¹¹

2. Stress and burnout: Writing a thesis can be highly stressful and demanding, often leading to burnout and mental-health issues. The pressure to deliver high-quality work within strict deadlines combined with long hours and balancing other responsibilities, can adversely affect personal well-being. Recognizing signs of stress and seeking support from institutional resources, counselling services, or peer networks are crucial for managing these challenges.¹²
3. Quality concern due to absence of timeline- Without intermediate deadlines, clinical and other responsibilities take priority, leading to procrastination, which compromises both the quality of learning and the thesis content.³ Rapid advancements can make a thesis appear outdated by the time it is completed. To mitigate this risk, it is important to conduct research with rigorous methods within a fixed timing, stay updated scientifically and regularly consult with advisors.
4. Ethical considerations- Conducting medical research involves navigating complex ethical issues, such as the use of human or animal subjects, data privacy, and informed consent.¹³ Adhering to ethical standards is essential to maintain research integrity and avoid legal and professional consequences. Researchers must be knowledgeable about ethical guidelines and secure necessary approvals.
5. Resource limitations- Access to specialized resources, such as lab equipment, research materials and funding is often required for thesis writing. Limited availability of these resources can impact the progress and quality of research. Securing adequate funding can be particularly challenging for early-career researchers, making institutional support and resource provision critical.
6. Plagiarism and data fabrication- Plagiarism and data fabrication are significant threats to the integrity of a thesis.^{3,11} Medical students are often overburdened with duties and may see others engaging in similar practices, might resort to these measures, especially in the absence of strong detection mechanisms. The overall workload and

absence of officially designated time for the thesis make it difficult for students to manage.¹⁴

7. Data manipulation and guide influence- Data manipulation to achieve "significant" results compromises scientific integrity.¹¹ The thesis guide may negatively impact learning if they lack sufficient experience in research and teaching.^{3,11} If a guide insists on a particular topic of personal interest, it can limit student's learning opportunities. In interventional studies, the required interventions might be ahead of the student's aptitude, leading them to outsource the tasks instead of performing them independently.¹¹

Successfully navigating the thesis writing process in medical science involves balancing the potential benefits with the challenges. Institutions play a vital role by offering resources, guidance, and a supportive environment. This includes providing mentorship, access to necessary tools, and mental health support. Individuals should also develop techniques for stress reduction and preserving a positive work-life balance. Effective time management, seeking support from mentors and peers, and practicing self-care can help address the challenges of thesis writing.

Conflict of Interest

None.

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