Title: Innovating Against Odds: A Medical Student's Research Journey in a Resource-Constrained Environment

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ABSTRACT.

"You need not know the R in Research to embark on the journey; a strong motivation is enough to set things in motion and let the journey unfold naturally." In this article, I share my journey as a medical student starting research in a Resource-Constrained Environment. I talk about the learning curve, milestones, setbacks, and presenting my research work. I've created a simple guide for fellow students in similar situations to do impactful research. Beyond studies, the shared journey with my research partner formed a lasting bond, showing how teamwork fosters understanding and innovation. I also discuss institutional barriers, especially the toxic research culture not talked about much. I stress the importance of raising awareness about these challenges for medical students and the need for a supportive and ethical research environment. It's crucial to create a space where aspiring researchers can thrive without unethical practices, emphasizing the value of knowledge pursuit over personal ambitions.

Key Words: *Medical Students, Research, Ethics Committees, Resilience, Failure, Workplace, Professional Burnout*

THE EXPERIENCE.

My journey into research was sparked by a 1-hour phone call with a peer, where a discussion on a clinical case unraveled disparities in healthcare access, particularly in the early detection of cases. The clinical case we discussed became a catalyst to address these inequities and embark on a journey toward achieving health equity. As we sifted through databases in search of research topics aligned with our interests, we encountered numerous ideas. However, we had to discard many due to non-feasibility with challenges like lack of facilities, high costs, and a limited flow of eligible patients.

The limited access to state-of-the-art laboratories and cutting-edge technologies forced me to explore unconventional avenues. Exploring local healthcare facilities unearthed a wealth of untapped data and patient insights, proving that groundbreaking discoveries could emerge from the most unexpected sources.

Balancing academic coursework, clinical postings, and the role of a principal investigator proved to be a formidable challenge as a medical student. The demands and stresses of these three facets necessitated the cultivation of meticulous planning, adaptability, collaboration, and a disciplined work ethic. Due to the finite nature of time, I had to prioritize tasks based on urgency and importance, allowing me to effectively manage research commitments alongside academic responsibilities.

The learning curve was steep, as theoretical classes on research methodology only provided a foundational understanding. However, theory alone could not prepare me for the practical world of research. The gap between theory and practice became apparent as I began literature reviews, proposal drafting, and hands-on project implementation. Under the guidance of mentors supplemented by online resources, each step became a learning opportunity, enhancing my skills in statistical analysis and scientific writing.

A pivotal factor in sustaining my research journey was the collaborative experience with my research partner. As a synergistic duo, we became an unstoppable team facing challenges head-on, celebrating shared triumphs, and and fueling each other's passions. Our collaboration extended beyond individual contributions, forging a partnership that remains a cornerstone of our achievements. This partnership not only accelerated the pace of research but also instilled resilience in facing challenges. Sharing the workload lightened individual burdens, making the research process more manageable and enjoyable. Beyond scientific exploration, we nurtured a connection that transcended the professional sphere, creating a foundation of trust, understanding, and unwavering support.

Our milestones echoed the progression of our research journey. From selecting impactful topics to securing ethical approval, collecting high-quality datasets, and proficiency in advanced statistical tools marked significant milestones. Presenting our research at conferences was a rewarding milestone, allowing us to share insights, receive constructive feedback, and establish credibility within the academic community.

Setbacks provided valuable lessons. Statistical challenges prompted extra efforts in attending online workshops and referring to YouTube videos to grasp the right statistical tests and their interpretation. The lack of specialized training opportunities highlighted the need for proactive skill acquisition. The issues of this research odyssey taught me the importance of effective communication and conflict resolution in maintaining a collaborative research environment.

In conclusion, my research journey from the inception of an idea born in a phone call to the presentation of research findings at conferences, each step has contributed to my growth, both academically and personally. Beyond academic pursuits, the shared odyssey with my research partner has created a lasting alliance that

transcends professional spheres, a testament to the power of collaborative exploration in the pursuit of greater understanding and innovation. Figure 1 illustrates a simple guide that students facing resource constraints can adopt to initiate their research journey in similar environments.

CRAFTING A PRESENCE

Completion of research objectives marks the transition to a phase where effective presentation skills become paramount. Medical conferences offer a valuable platform to share insights, gain exposure, and encourage collaboration. Many medical institutions host annual academic events that invite abstracts for paper presentations, case discussions, and poster presentations. Medical students must seize these opportunities and showcase their work to the wider scientific community.

A key aspect of impactful presentation lies in the creation of visually compelling slides that supplement the spoken narrative. Practicing the delivery of the presentation is equally vital, allowing for the refinement of timing, enhancement of clarity, and anticipation of potential questions. Stage fear can be overcome by thorough rehearsal, and presenting to fellow peers who offer insights to identify and rectify any shortcomings in the presentation. For those new to the stage, creating a script can serve as a backbone to the presentation. However, caution must be exercised to ensure that the script is not merely memorized and recited to the audience. Clear communication is imperative to tailor the message to resonate with the audience, steering clear of unnecessary jargon while maintaining scientific rigor.

Beyond the presentation itself, networking propels a researcher's career forward. Actively seeking opportunities to connect with peers, mentors, and professionals at conferences and academic gatherings not only provides avenues for collaboration but also contributes to the researcher's professional growth and exposure within the broader scientific community.

BREAKING DOWN BARRIERS.

Institutional barriers to research are multifaceted, as evidenced by a study indicating the prevalence of challenges such as lack of awareness (53%), interest (54%), insufficient funds (62%), time constraints (59%), and difficulties in patient follow-up (67%).[1] However, an infrequently discussed yet critical barrier lies in the toxic research culture that permeates many institutions.

Defined by a study,[2] a toxic research culture manifests through bullying and harassment, inadequate employment terms and conditions, a lack of emphasis on equality, diversity, inclusion, and belonging practices, escalating breaches of research integrity, and an almost pathological pursuit of higher league table positions, H-indices, and impact factors. This toxic environment also reveals instances of 'ghost authoring,' where senior researchers take credit for papers produced by junior staff who contributed significantly.

This toxic culture presents a challenge to medical students who are often early-stage researchers ane fall victim to its traps. The relentless pursuit of authorship particularly in top-order positions is driven by personal gains such as promotions. However, this pursuit can lead to the establishment of monopolies especially in the ethics committees that unfairly rejects research proposals. It has profound implications for medical students who are just beginning their journey in the field.

Its implications are far-reaching, extending beyond the immediate challenges of rejection and hindrances to research proposals. An environment emphasizing personal gains and hierarchical authorship compromises the genuine spirit of collaborative and ethical research jeopardizing the development of the next generation of medical researchers.

This poses a substantial challenge for medical students, as they may find themselves navigating a landscape where academic credit and recognition are unfairly distributed. The early stages of a research career are crucial for skill development, and cultivating a passion for scientific inquiry. When faced with a toxic culture the potential for disillusionment and disengagement among medical students is heightened. As medical students venture into the realm of research, it becomes imperative to raise awareness about the existence of this toxic culture and its potential pitfalls.

SUMMARY - ACCELERATING TRANSLATION

My research journey started with a phone call, discussing healthcare disparities. We faced challenges like limited facilities and high costs but found valuable data in local healthcare places. As a medical student, I balanced coursework, clinical duties, and being a principal investigator through careful planning. Learning from theory to practice was tough, but mentors and online help guided me. A key part was a strong partnership that sped up research and built resilience. We overcame setbacks and learned from milestones, leading to impactful conference presentations. The manuscript gives practical tips for similar situations, focusing on presenting well, networking, and overcoming barriers, especially the toxic research culture hurting early researchers. Raising awareness about these challenges for medical students is crucial for a supportive and ethical research environment. The shared journey with my research partner goes beyond work, showing how collaboration shapes both academic and personal growth.

REFERENCES.

1. Basavareddy A, Pallamparthy S. Knowledge, attitude, practice, and barriers toward research among medical students: A cross-sectional questionnaire-based survey. Perspect Clin Res [Internet]. 2019 [cited 2023 Dec 23];10(2):73. Available from: https://pubmed.ncbi.nlm.nih.gov/31008073/
2. McKenna HP. Toxic research cultures: The what, why and how. Int J Nurs Stud [Internet]. 2023;140(104449):104449. Available from: http://dx.doi.org/10.1016/j.ijnurstu.2023.104449

FIGURES AND TABLES.

Figure 1. A Simplified Flowchart for Students: A Practical Guide for Initiating Research in Resource-Constrained Environments