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addressing barriers and building research capacity**

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Citation:

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Mentorship in African health and clinical research: addressing barriers and building research capacity

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Abstract

Mentorship plays a vital role in building research capacity, advancing evidence-based medicine, and fostering innovation in clinical practice, particularly in Africa, where Human Resources for Health (HRH) remain a persistent and complex challenge. Health mentors offer invaluable support by guiding early-career researchers in both clinical and research domains, thereby contributing to the mitigation of healthcare challenges across the continent. Effective mentorship enhances productivity, research quality, and professional networking opportunities. Africa's HRH landscape is marked by significant obstacles, including the brain drain of experienced professionals, outdated research infrastructure, limited funding, and the absence of structured mentorship programs for emerging researchers. The shortage of skilled mentors deprives young professionals of critical guidance, hindering their ability to produce high-quality research and to effectively address pressing local health issues through evidence-based practice. To address these challenges, this article proposes innovative strategies to actively engage young African researchers and establish structured, sustainable mentorship programs that empower them to participate in research-driven decision-making. It also calls on the African Union to adopt policies that prioritize research and allocate dedicated funding for mentorship initiatives. Additionally, leveraging technology such as artificial intelligence (AI) and gamification can enhance mentorship effectiveness, accessibility, and engagement. Moreover, the promotion of international exchange programs would offer young African researchers valuable exposure, broaden their technical skills, and strengthen global networks. In conclusion, strengthening mentorship frameworks, improving research infrastructure, and investing in the next generation of researchers are critical steps toward addressing Africa's health challenges and advancing its scientific leadership.

Keywords Mentorship, Build capacity, Human resource, Clinical research, Young scholars, African, Clinical practice

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Background

Human Resources for Health (HRH) in Africa remains a complex and pressing challenge, characterized by a shortage of skilled health professionals, unequal distribution of resources, and limited investment in effective HRH management [1]. One promising approach to addressing these issues is the implementation of structured research mentoring programs within healthcare institutions. Such programs can foster the integration of research into clinical practice, ultimately contributing to the development and retention of a more capable health workforce [1].

Mentorship involves a dynamic relationship in which an experienced individual provides guidance, support, and encouragement to help mentees develop both professionally and personally. In the health sector, mentors play a critical role in supporting early-career professionals, particularly those embarking on research careers [2, 3]. They offer valuable oversight and direction, helping young researchers to refine their skills, navigate complex research environments, and contribute meaningfully to healthcare improvement. By strengthening the research capacity of emerging professionals, mentoring can directly address gaps created by HRH challenges, such as workforce shortages, inequitable resource allocation, and weak management systems [1].

Furthermore, mentors play a vital role in supporting the training and development of other professionals by drawing on their experience to guide mentees through complex decisions and challenges that arise in research and clinical practice [3]. Building research capacity through mentorship is crucial for effective knowledge transfer, the development of research skills, and the expansion of professional networks. These outcomes contribute to increased productivity, improved research quality, and more efficient transitions from grant writing to implementation, ultimately supporting evidence-based medicine and addressing gaps in effective HRH management [1, 3].

Mentorship also fosters a culture of innovation, entrepreneurship, and collaboration, all of which are essential for addressing the diverse and complex health challenges facing the African continent [4]. Evidence from high-income countries has shown that structured mentorship programs have a significant positive impact on research training, skill development, and career advancement [2, 3, 5, 6]. These studies highlight that mentorship not only enhances academic outcomes but also facilitates the formation of critical professional networks. Such networks can lead to collaborative research initiatives and increased access to funding and institutional resources.

Moreover, the mentor–mentee relationship provides a foundation for motivation, guidance, and strategic problem-solving, equipping early-career researchers

with the tools needed to navigate obstacles in their fields. This support accelerates both personal and professional growth and contributes to building a more resilient and capable research workforce [6].

Over time, mentorship has emerged as a transformative force in medical research, contributing significantly to advancements in the field and the development of a robust health workforce [2, 3]. A notable example is the Mayo Clinic Mentorship Program, which supports early-career researchers and faculty by pairing them with experienced mentors. These mentors provide strategic guidance on grant writing, research design, and career development, ultimately strengthening human resources for health.

In the African context, there is an urgent need for medical education systems to integrate structured mentorship mechanisms that directly address the persistent challenges within the human resources for health (HRH) landscape. Strengthening mentorship is essential not only for improving clinical and research capacity, but also for advancing innovation and evidence-based practice across the continent.

This paper explores how young African scholars can play a pivotal role in addressing HRH challenges, with a particular focus on the current state of mentorship in African healthcare systems. It examines the barriers that emerging researchers face, including lack of access to skilled mentors, limited funding, and inadequate institutional support, and highlights innovative strategies for bridging these gaps. Furthermore, the paper discusses how the absence of strong mentorship programs contributes to broader health system challenges and emphasizes the need to build supportive structures that empower the next generation of African health researchers.

Current state of mentorship in African health and clinical research

In Africa, a few mentorship programs aimed at strengthening health and clinical research have been established, particularly in response to the continent's ongoing health challenges and the need for a skilled research workforce [1, 5]. These programs are intended to provide young researchers with the support needed to enhance their research capabilities, refine their clinical practice, and address the pressing health issues affecting the continent. Some of the existing programs in Africa are The Health Research Capacity Strengthening (HRCS) Global Learning (HGL) program, The AIDS International Training and Research Program (AITRP), Centre for Translation and Implementation Research (CTAIR) Scholar Program-IVAN Research Institute, The Transforming Health Professions Education in Tanzania (THET) project, Fogarty International Center (FIC), The African Mental

Health Research Initiative (AMARI), the Consortium for Advanced Research Training in Africa (CARTA) program, The Sanitation and Hygiene Applied Research for Equity (SHARE) program, The Sexual Violence Research Initiative, The Medical Education Partnership Initiative—Medical Education for Equitable Services for All Ugandans (MEPI-MESAU) program, Young African Research Network (YARN) Mentorship Program, and African Scientist Mentorship Fellowship, International Federation of Biosafety Associations (IFBA) [7, 8] demonstrating a growing recognition of the role mentorship can play in advancing health research in Africa [8–12].

While these initiatives demonstrate a growing recognition of the importance of mentorship in health research, they remain unevenly distributed and often lack sustainability. Furthermore, many programs are concentrated in urban or well-resourced institutions, leaving significant gaps in access and effectiveness. These limitations highlight the need for a closer examination of the specific barriers that prevent mentorship from reaching its full potential, particularly for young African scholars who are at a critical stage of their academic and professional development.

Barriers affecting mentorship in health research for young African scholars

Young African scholars in health research face numerous challenges that hinder their growth and productivity. A significant obstacle is the scarcity of experienced mentors, largely due to the persistent brain drain that has seen many seasoned African researchers migrate to developed countries [5–8]. This shortage deprives emerging scholars of critical guidance on research design, methodology, and publication skills essential for producing high-quality research.

In addition to human resource limitations, inadequate research infrastructure compounds the problem [1]. Outdated laboratory equipment, insufficient information technology, and limited library resources all constrain rigorous research activities, making it difficult for mentors to provide hands-on training [13]. Moreover, inadequate funding restricts research grants, mentorship programs, and training opportunities, compelling many scholars to seek support outside Africa. The continuous loss of experienced professionals further perpetuates this cycle of limited mentorship and research capacity.

Furthermore, cultural and institutional challenges also persist. Hierarchical academic structures and limited digital access in under-resourced or rural areas hinder open communication and the delivery of remote mentorship. Many mentorship programs face logistical constraints that restrict the development of robust support systems for young researchers [6].

These barriers are not uniform across the continent. Research infrastructure and mentorship needs vary widely across Africa's diverse regions, requiring tailored, context-specific strategies to strengthen capacity. For instance, in West Africa, the Nigeria Implementation Science Alliance (NISA) fosters national and sub-regional collaboration focused on locally driven implementation research [9]. In East Africa, the Transforming Health Professions Education in Tanzania (THET) project adopts a tiered mentorship model where senior researchers guide peers, who then mentor undergraduate students, building a sustainable mentorship pipeline [12]. The African Mental Health Research Initiative (AMARI) operates across multiple African regions, including Southern Africa (Zimbabwe and South Africa), Southeast Africa (Malawi), and East Africa (Ethiopia). The program supports early-career researchers through structured mentorship and training at the Master's, PhD, and post-doctoral levels, aiming to strengthen research capacity and leadership in mental health [13, 14]. Additionally, the CARTA program, which includes universities across East, West, and Southern Africa, emphasizes doctoral-level mentorship through fellowships and cross-institutional collaboration [15]. Programs such as MEPI-MESAU in Uganda and SHARE have gone further to integrate mentorship into broader domains like grant writing, financial management, and violence prevention research [6, 16].

These geographically grounded examples highlight that a one-size-fits-all mentorship model is unlikely to succeed. Instead, scalable solutions must build on local strengths, institutional realities, and region-specific needs to develop sustainable research ecosystems across the continent. Despite the presence of such programs, barriers continue to impede the overall development of research capacity in Africa. As a result, many scholars remain unable to fully contribute to addressing the continent's health challenges [14, 17].

To truly support the next generation of researchers, governments and organizations must invest in modern infrastructure, adopt innovative funding models, and offer competitive career opportunities to retain and empower skilled mentors. Ultimately, overcoming these structural and contextual challenges is essential for fostering a thriving research ecosystem in Africa, one that translates evidence into practice, supports equity in global health, and improves health outcomes across the continent [18].

Innovative approach and recommendation

First, there is an urgent need to enhance the curriculum of African universities by incorporating grant writing and research training into both undergraduate and graduate programs in medical and health sciences.

This integration will equip students with essential research skills, foster a culture of evidence-based practice, and ultimately strengthen national health security. Furthermore, implementing structured early research mentorship programs at the undergraduate level is crucial. Such initiatives would guide students in making informed decisions about their research paths early in their academic careers, preparing them to contribute meaningfully to health research and innovation. Secondly, the African Union should develop and enforce policies to support research and mentorship, supported by dedicated funding mechanisms. These policies should prioritize research and development by allocating specific funds for mentorship programs and establishing standardized frameworks for mentoring young African researchers [19].

Fellowships should also be recognized as a key strategy in enhancing mentorship in Africa. Structured fellowships such as those offered by the Fogarty International Center, CARTA, and the African Postdoctoral Training Initiative (APTI) provide early-career African researchers with the opportunity to gain hands-on research experience, connect with experienced mentors, and engage in professional development activities [20, 21]. These programs foster the growth of future mentors by equipping fellows with leadership skills, research expertise, and the capacity to mentor others. Hence, investing in fellowships is very crucial.

Innovative strategies, such as gamification and incentives, can make mentorship more engaging. For example, mentorship challenges, competitions, and reward systems can motivate participants to actively engage in the mentorship process. Moreover, the integration of artificial intelligence (AI) and machine learning (ML) could enhance mentorship by providing personalized learning recommendations, improving mentor–mentee matching, and using predictive analytics to optimize mentorship outcomes. Experiential learning is another transformative approach, where mentees gain practical skills through projects, job shadowing, and internships [22]. This hands-on experience helps mentees build confidence, develop practical skills, and gain a deeper understanding of real-world applications. In addition, promoting international exchange programs can significantly strengthen mentorship efforts. By establishing competitive funding mechanisms, strategic partnerships, and robust support systems for these programs, African researchers can broaden their skills and networks, equipping them to address both local and global challenges effectively.

Conclusion

Mentorship remains a cornerstone for building research capacity in Africa, yet efforts to scale it across the continent often face structural and contextual barriers. This paper contributes to the literature by providing a regionally nuanced analysis of mentorship initiatives, identifying scalable, context-specific strategies from West, East, and Southern Africa. Unlike broader reviews, our work integrates examples such as NISA, THET, CARTA, and AMARI, illustrating how tailored mentorship frameworks, grounded in local realities, can accelerate health research development.

A key contribution of this manuscript lies in its emphasis on adapting mentorship to Africa's diverse research ecosystems, promoting fellowships as a mentorship strategy, and showcasing successful, localized programs that are often underrepresented in global discourse. These insights fill an important gap in existing literature, which tends to treat African research contexts as homogenous.

Moving forward, integrating research training into academic curricula, expanding access to fellowships, investing in regional mentorship networks, and developing robust evaluation mechanisms are all critical steps. Strategic collaborations must be rooted in African leadership and priorities. By building mentorship systems that are both responsive and sustainable, Africa can advance a new generation of scholars capable of driving scientific innovation and health system transformation both locally and globally.

Acknowledgements

The authors gratefully acknowledge the support and mentorship provided through the Youth in Research Hub. This manuscript is a product of collaborative engagement and capacity-building efforts led by the Hub to foster research leadership among early-career African scholars. We are especially thankful for the invaluable mentorship, guidance, and contributions of the many individuals who have significantly shaped our academic and research journey. In particular, we recognize Prof. Osaro Mgbere (University of Houston, USA); Dr. Babayemi Olakunde (University of North Texas Health Science Center, Fort Worth, USA & IVAN Research Institute, Nigeria); Dr. Temitope Ojo and Prof. Olusegun Afolabi (Obafemi Awolowo University, Nigeria); Prof. Paat Yok Fong (University of Texas at El Paso, TX, USA); Dr. Phindile Khumola (ICON plc); Prof. Ezeanolue Ezeanolue (IVAN Research Institute, Nigeria); Dr. John Olawepo (Northeastern University, Boston, USA & IVAN Research Institute, Nigeria); Dr. Olutayo Margaret Alese (College of Medicine, Ekiti State University, Nigeria); Prof. Tonia Onyeka and Dr. Ngozi (IVAN Research Institute, Nigeria); Prof. Cyril Dim, Prof. Chigbu Chibuike, Dr. Itanyi Ijeoma, Dr. Lasebikan Nwamaka, Dr. Ibuchukwu Nkeonyenasoya Orabueze and Dr. Ifeora Ijeoma (College of Medicine, University of Nigeria); Prof. Gregory Aarons (University of California, San Diego); Dr. Bembir Chinenye (IVAN Research Institute, Nigeria); Prof. Ehimario Igumbor and Prof. Rosemary Audu (Nigerian Institute of Medical Research); Dr. Nnakelu Eriobu and Dr. Ewaezi Okpokoro (Institute of Human Virology, Nigeria); Dr. Stanley Elemuo, Dr. Etoniru Izuchukwu and Dr. Agnes Nwakanma (Chukwuemeka Odumegwu Ojukwu University); Prof. Onyeka Iwuchukwu (National Open University of Nigeria); Prof. Chukwuocha Uchechukwu, Prof. JC Nwaokoro and Dr. Dozie Ugonma (Federal University of Technology, Owerri, Nigeria); Prof. Don Eliseo III Lucero-Prisno (London School of Hygiene & Tropical Medicine, UK); Stanley Chinedu Eneh (Obafemi Awolowo University, Nigeria & IVAN Research Institute, Nigeria); Dr. Victory Ekpini (University of Uyo Teaching Hospital, Uyo, Nigeria); Yusuf Adebisi (PhD Scholar, University of Glasgow, UK); Dr. Chijioke Kaduru (Corona Management Systems); Dr.

MaryJoy Umoke (Ebonyi State Ministry of Health, Nigeria); Dr. Prince Christian Iheanachor Umoke (mni) (University of Nigeria, Nsukka); Dr. Jennifer Amadi (University of Manitoba); Dr. Vivian Ogbonna (School of Public Health, University of Port Harcourt, Nigeria); and others whose insights and encouragement have left a lasting mark on our research journey so far. We deeply appreciate their mentorship and the profound impact they have had on our academic, research, and professional development.

Author contributions

SCE: conceptualized and wrote the manuscript, contributed to the critical revision of the manuscript. CN; FOO; CCA; OVI; SCE; TOO; MIN; PYS and OCC: wrote the manuscript, contributed to the critical revision of the manuscript. All authors read and approved the final manuscript.

Funding

No specific funding was received for the writing of this commentary.

Data availability

No datasets were generated or analyzed during the current study.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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Received: 21 December 2024 Accepted: 7 October 2025

Published online: 23 October 2025

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