



PUTTING HEALTH AND DISEASE IN PLACE: My Story and Legacy

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DEDICATION

To My Students: The Mapmakers of Tomorrow

To my First Generation: the Pioneers, who trusted a vision when the path was not yet written, and who proved that Geography could save lives.

To my Second Generation: the Methodologists and Collaborators, who became architects of the discipline, co-authoring the textbooks that will guide generations to come.

To my Third Generation: the current Doctoral and Master's Scholars, who are innovating in mental health, medical tourism, and the fight against cancer, hypertension, and chronic kidney disease. You are the new dawn.

This School endures not because of one individual, but because of the collective spirit of this community. It endures because of your courage to question, your passion to discover, and your commitment to heal.

This lecture is not mine alone. It is the symphony of our shared journey.

Thank you for the profound honour of being your teacher.

"As I reflect on the journey that brought me to this podium, I am reminded of Edward Relph's concept of place and placelessness. He argued that places are not merely locations on a map but centres of meaning, experience, and identity. The places where women give birth and die, where children grow and fall ill, where families seek care and sometimes find only death; these are not neutral spaces but are shaped by cultural meanings, social relations, economic conditions, and health system realities that together determine outcomes. The challenge of medical geography is to make these places visible, to understand their dynamics, and to transform them into places of healing rather than places of neglect."

Professor Yusuf M. Adamu,
Putting Health and Disease in Place: My Story and Legacy,
63rd Bayero University Kano Inaugural Lecture.

TABLE OF CONTENTS

DEDICATION	iv
SUMMARY OF PRESENTER’S PROFILE	xii
Protocol	1

SECTION ONE: ESTABLISHING THE CONTEXT AND FOUNDATIONAL STORY

The Discipline of Geography and its Sub-disciplines	4
Charting the Disciplinary Journey	4
The Humanist Turn: Place and Meaning	5
The Challenge of Defining Geography	6
The Four Traditions as a Lens for Medical Geography	6
Defining Medical Geography	7
Nomenclature Debates	8
A Working Definition	9
Medical Geography in the Nigerian Context	10
The Geography of Health and Disease	11
A Living Intellectual Tradition	12

SECTION TWO: MY PERSONAL JOURNEY

Geography and I: Following the Thread of my Story	13
The Skies and a Question of Scale	13
Journey to the Discipline of Geography	15
How I Became a Medical Geographer	15
The MSc Research: Obstetric Complications in Kano City	18

SECTION THREE: MY CONTRIBUTIONS TO MATERNAL MORTALITY STUDIES

The PhD Journey: From Geography of Illness to Geography of Death	23
Geography of Death: My Contributions in Maternal Mortality Studies ...	23
A New Perspective on Maternal Mortality	25
Publications from the Research	26
Key and Novel Findings of my PhD Work	28
Urban vs. Rural: Different Epidemics, Different Solutions	31
The Five-Stage Model of Seeking and Receiving Obstetric Care	33
Theoretical Integration: Building an Explanatory Scaffold	35
Thaddeus and Maine's Three Delays Framework	35
The Health Belief Model as Cognitive Engine	36

Medical Anthropology: Explanatory Models and Symbolic Capital.....	37
Gender Theory: The Quiet Architecture of Delay	37
The Enhanced Model: Zones, Loops, and Dynamics	38
Linking the Five-Stage Model to the "Place of Death" Finding	40
Barriers to Care: Quantifying the Obstacles	41
Health System Failures	42
Implications for Policy and Intervention	43
Recommended Interventions by Zone	44
Conclusion	45

SECTION FOUR: PLANTING THE SEEDS: STUDENTS' SUPERVISION

Temporal Distribution	54
Thematic Categorisation of All 67 Health Projects	54
Infectious Diseases: The Dominant Theme	56
Maternal and Child Health – The Second Pillar	57
Detailed breakdown:	57
Health Facilities Distribution – Nationwide Coverage	58
Non-Communicable Diseases: Early Evidence	59
Health-Care Seeking Behaviour and Barriers	60
Skin Diseases, Traditional Medicine, and Environmental Determinants ..	60
Regional Coverage of Undergraduate Research	61
Gender Analysis at Undergraduate Level	62
Selected Landmark Undergraduate Projects	63
Postgraduate Supervision: The Superstructure	64
Overview of Postgraduate Supervision	64
The Master in Environmental Management Cohort (1999–2012)	65
The MSc Land Resources Cohort (Administration) 2008–2011	65
The MSc Geography Cohort (2016–2025)	66
The PhD Cohort : The Flagship of Mentoring	70
The Evolution of PhD Research Themes	73
Current Doctoral Candidates: The Future	73
Geographic Coverage	75
Gender Analysis at Postgraduate Level	78
Comparative Analysis: Undergraduate Vs Postgraduate Supervision	79
Concluding Reflection on Supervision Legacy	80
The Single Thread That Runs Through	80
The Future	81

SECTION FIVE: BUILDING A RESEARCH TRADITION

The Importance of Mentorship in Academic Life	82
The Silence Before the Map	82
Building the Intellectual Infrastructure (1996-2008)	83
Establishing the Network (2008-2018)	84
The Mentorship Model And A Philosophy of Mentorship	84
The Three Pillars of Our Research School	85
The Mentorship-to-Legacy Pipeline	85
Acknowledging All Contributions	85
Introduction to the Collaborative Network	86
The Collaborative Network: A Ranking of Consistent Collaborators	86
Trend of Collaboration Over Time	91
Methodological Approaches and Evolution	96
Collective Contributions to Knowledge: A Synthesis	97
Independent Contributions: The Students' Achievements	98
The Ultimate Measure of Mentorship	99
Thematic Distribution	101
The Network Ecology: Analysing Collaborative Patterns	104
The Central Nodes in the Network	105

SECTION SIX: THE KANO SCHOOL OF HEALTH AND MEDICAL GEOGRAPHY

The Nature of the School: Formation, Identity, and Future	109
The Emergence of a School	109
What are the Defining Characteristics of the Kano School?	110
The Kano School's Methodological Signature	111
Core-Periphery Structure of Kano School Research	112
The Kano School's Intellectual Legacy	113
The Kano School's Institutional Legacy	114
Sustainability and Legacy	114
The Kano School's Future: Towards a Fifth Generation	115
Conclusion	116

SECTION SEVEN: VISION AND PROSPECTS OF HEALTH AND MEDICAL GEOGRAPHY IN NIGERIA

A Call for Mainstream Recognition and Strategic Partnerships	119
Why Recognition is Non-Negotiable	119
The Prospects: Building on Strong Foundations	120
Addressing Emerging Challenges Through a Geographical Lens	121
Why Development Partners Must Act Now	121

Sustaining the Legacy Through Institutionalisation 122

A Call to Action 123

Final word123

Acknowledgements 125

References 133

Appendix One: 100 Representative Publications From The Kano School. 138

Appendix Two: Bibliography of My Publications in Hausa Studies
Publications 145

Appendix Three: List of Past Inaugural Lectures 148

List of Tables

- Table 1. The Five-Stage Model of Seeking and Receiving Obstetric Care in Rural Kano
- Table 2. Pioneer Students in Medical Geography Research
- Table 3. Thematic Categorisation of Undergraduate Projects
- Table 4. Geo-Political Zones Coverage of the Undergraduate Projects
- Table 5. Selected Landmark Projects
- Table 6. MSc Land Resources Cohort (2008–2011)
- Table 7. MSc Geography Cohort (2016–2025)
- Table 8. PhD Cohort (2010–2026)
- Table 9. Ongoing Doctoral Works Under My Supervision
- Table 10. Thematic Evolution of Postgraduate Research
- Table 11. Comparative Summary of Undergraduate and Postgraduate Research Parameters
- Table 12. Core Researchers by Themes

List of Figures

- Figure 1. The Nature of the Discipline
- Figure 2. Administrative Zones of Kano State
- Figure 3. Spatial Distribution of Maternal Mortality Ratio
- Figure 4. Epidemic Curve for Maternal Mortality in Kano State, 1990–1999
- Figure 5. Five-Stage Model of Seeking and Receiving Obstetric Care in Rural Kano
- Figure 6. The Enhanced Model: Zones, Loops, and Dynamics
- Figure 7. Conceptual Framework of the Kano School of Health and Medical Geography
- Figure 8. Thematic Categorisation of Undergraduate Projects
- Figure 9. Geographical Spread of Undergraduate Projects
- Figure 10. Regional Coverage
- Figure 11. Master in Environmental Management Cohort (1999–2012)
- Figure 12. Geographical Spread of Master's Research
- Figure 13. Geographical Spread of Completed Doctoral Theses
- Figure 14. Geographical Spread of All Completed Postgraduate Research
- Figure 15. Ranking of Consistent Collaborators
- Figure 16. Ranking of Collaborators
- Figure 17. Thematic Distribution of Collaborative Research
- Figure 18. Horizontal Collaboration
- Figure 19. Key Metrics of Kano School Research Productivity
- Figure 20. Year-by-Year Distribution of Publications
- Figure 21. Thematic Distribution of Kano School Publications

Figure 22: Geographic Distribution of Collaborative Research
Figure 23. Dr. Abdulkaim's Collaborative Research Cluster
Figure 24. Dr. Yakudima's Collaborative Research Cluster
Figure 25. Dr. Zakari's Collaborative Research Cluster
Figure 26. Dr. Danbuzu's Collaborative Research Cluster
Figure 27. Core-Periphery Structure of Kano School

SUMMARY OF PRESENTER’S PROFILE

Professor Yusuf M. Adamu is a distinguished Nigerian scholar, Professor of Medical Geography, Fulbright Scholar, Social Science Academy of Nigeria Laureate, member, Nigeria Academy of Letters, Fellow, Association of Nigerian Authors, Fellow, Association of Nigerian Geographers, and acclaimed creative writer whose career exemplifies the power of interdisciplinary inquiry. With three decades of academic, administrative, and literary service, he has established himself as a versatile intellectual who seamlessly bridges the social sciences, medicine, and the humanities.

Born on March 9, 1968, in Katsina city, North-Central State of Nigeria, Professor Adamu is the eldest of 36 children. He was born to the late Alhaji Muhammad Nata’ala Adamu who hails from Tsafe, Zamfara State, and Hajiya Asiya Muhammadu Sambo. His early education began at Giginyu Primary School in Kano (1974–1980), after which he attended Government Secondary School, Koko, and Government Science Secondary School, Zuru, completing his secondary education in 1985.

He pursued his undergraduate studies at Usmanu Danfodiyo University, Sokoto, earning a B.Sc. (Hons) in Geography in 1990. His academic promise was evident early on, as demonstrated by his receipt of the University Merit Award in 1987. Continuing his advanced education, he obtained an M.Sc. in Geography from the University of Ibadan in 1994, followed by a PhD in Geography from Bayero University, Kano in 2004.

Professor Adamu’s professional journey at Bayero University, Kano, began in January 1995 when he was appointed Assistant Lecturer. Through consistent scholarly output and dedicated service, he advanced steadily through the academic ranks, attaining the position of Full Professor in 2010. His teaching portfolio is unusually broad; beyond core geography and environmental science, he has delivered courses across diverse departments, including Business Administration, Economics, Adult Education, Obstetrics & Gynaecology, Community Medicine, and Medical Microbiology. Since 2003, he has also contributed significantly to academic development at the Aliko Dangote University of Science and Technology, Wudil.

His doctoral research on maternal mortality in Kano State stands as a major landmark in Nigerian public health. One of his key publications emanating from his PhD published in *European Journal of Obstetrics and Gynecology and Reproductive Biology*, (2003), documented a regional maternal mortality ratio of 2,420 deaths per 100,000 live births, the highest recorded in the world at the time, and identified eclampsia as the leading cause, responsible for 31 percent of all maternal deaths. This empirical evidence provided the catalyst for action: in 2007, the Population Council (New York) launched a major clinical intervention introducing magnesium sulphate for the management of eclampsia across the North-Western geopolitical zone. This simple, cost-effective protocol has since saved thousands of maternal lives and fundamentally transformed regional obstetric care.

His PhD graduates, now dispersed across various universities and research institutions, represent a growing network of scholars trained in the rigorous application of geographical perspectives to health research. The establishment of the Kano School of Health and Medical Geography under his mentorship has produced over 230 publications, representing the most comprehensive body of geographical knowledge about health and disease in Nigeria. He is currently supervising 12 doctoral candidates with 11 working in health and medical geography.

Professor Adamu has held numerous administrative leadership roles within Bayero University, Kano. He served as Head of the Department of Geography from 2016 to 2018, was the pioneer Director of Bayero University Press, and served as Managing Editor of the *Bayero Journal of Interdisciplinary Studies*, Editor *African Journal of Earth and Environmental Sciences*, among others. He is also on the board of Within university governance, he fulfilled roles as Executive Secretary of the Strategic Planning Unit under whose leadership the famed Abubakar Rasheed's strategic plan was developed. He has served in many committees at the departmental, faculty and university levels including University Management Committee, University Research Ethics Committee, Inaugural Lecture Committee, Annual Report Committee, and the Professorial Chair and Endowments Committee. He has chaired the Abstract Documentation Committee and the Environmental Management Committee.

At the state, national, and international policy levels, he has served as Chairman of the Strategy and Development Committee for the Zamfara State Development Plan (2027-2038) and participated in many federal educational bodies, including the Nigerian Universities Needs Assessment Committee, the TETFund Research Committee, and National Universities Commission (NUC) accreditation panels among others. His international academic recognition includes a Fulbright Fellowship at the School of Public Health, University of Alabama at Birmingham (2001-2002), and an Honorary Visiting Fellowship at the University of Sussex (1998). He has engaged in consultancies and research partnerships with international institutions including the World Health Organization (WHO), Johns Hopkins/BASICS, dFID (PATHS), dRPC and PRRINN-MNCH. His sabbatical at the National Institute for Policy and Strategic Studies (NIPSS) as Directing Staff for SEC 47 (2025-2026) represents a pinnacle of his policy engagement.

Professor Adamu has established an impressive publication record spanning peer-reviewed journal articles, book chapters, and academic books. His research encompasses medical geography, maternal and child health, infectious and non-infectious diseases, health systems and service delivery, Hausa linguistics and literature and cultural studies, research methodology, and development studies. At as today, he has over 135 publications. including over 40 in Hausa literary studies. He edited two readers namely Hausa Prose-fiction: A Reader (2021) and Nazari A Kagaggun Labarai Na Hausa (2024) and co-edited seven books including Hausa Home Video: Technology, Economy and Society (2003), Corporate Survival, Competitiveness and Consumer Satisfaction in Nigerian Industries (2005), Readings in Social Science Research, (2006) and Introduction to Social Sciences, Issues in Youth Development in Nigeria (2010). He ranks among the top five most cited researchers at Bayero University for many years.

His most recent publications (2026) include:

1. **Adamu, Y.M.**, Hassan, N.I, Mohammed, U.M, Momale, S.B, Umar, N., Rabiou, A.C. (2026) A Guiding Light and Gentleman of the Academy; Celebrating Emeritus Professor J. Afolabi Falola. Kano, AJ Publishers,

2. **Adamu, Y.M.** (2026) From Sociolinguistics To Geolinguistics: Proposing A Unified Spatial Model Of Lexical Innovation in Hausa in

Almajir, T.S; Isma'il, M.A; Daudu, G.K.; Sani, H.U.; Ahmed, MY.M; Abba, T; Usman, S.D. (Eds) 2026 Language Endangerment, Documentation in the era of Artificial Intelligence, Festschrift in honour of Professor Mukhtar Abdulkadir Yusuf. Kano, Department of Linguistics, Bayero University.

3. **Adamu, Y.M.** and Isa, K.H.(2026) Self-Labeling Theory as a Framework for Analysing Strategic Identity Appropriation in Ododo, S.E. and Adeoyez, A.A. (2026), Eds, Humanities, National Politeics, and Society. Nigeria Academy of Letters.

4. **Adamu, Y.M.** (2026) Hadejia (a poem) in Wakili, H., Ed, Hadejia Emirate: A Centenary History of Colonial Resistance and Transformation. Makurdi, Aboki Publishers.

His creative body of work encompasses over 25 published books spanning poetry, fiction, and children's literature. His 2002 poem *Global Village* gained international educational prominence and is taught in secondary classrooms across Germany, Norway, and universities in the United States. He won the Kaduna State History and Culture Bureau literary prize for Hausa fiction with his manuscript *Dukan Ruwa* in 1989). His poetry collection *Places: A Poetic Geography* was a co-winner of the Association of Nigerian Authors (ANA/Shehu Sani Poetry Prize) in 2020.

Throughout his career, Professor Adamu has remained active in civic and literary organizations. He served as Kano State Branch Chairman and National Executive Committee member of the Association of Nigerian Authors (ANA), co-founded the Ilmi Trust, a foundation for educational development, co-established the *Kungiyar Matasa Marubuta* and led the Prevention of Maternal Mortality (PMM) initiative in Kano State from 2002 to 2008. he has served in many community based associations and has been duly recognised for his selfless services with numerous awards.

He is happily married to two extraordinary women, namely Hajiya Amina Ismail, a Nurse and Midwife, and Professor Rabi Abdulsalam Ibrahim, a Professor of English. He has nine beautiful children and four grand children.

What distinguishes Professor Adamu's career is his ability to bridge disciplines; between geography and public health, between social sciences and humanities, between academic scholarship and creative expression.

His research integrates quantitative spatial analysis with qualitative understanding of social and cultural factors shaping health outcomes. His career trajectory reflects a consistent commitment to research that serves society.

Professor Adamu presents a rare and remarkable case of academic versatility that defies conventional disciplinary boundaries. Few scholars in any country can claim such versatility or such impact across such diverse domains. He demonstrates that the modern academic need not choose between science and art, between rigorous analysis and creative expression, or between local engagement and international recognition. His career serves as a model for aspiring academics, demonstrating how scholarly excellence, public engagement, and community service can be integrated into a life of purpose and impact.

Bismillahir Rahmanir Rahim

Protocol

Assalamu Alaikum wa Rahmatullah

“Glory be to You, (Oh Allah), we have no knowledge except that You have taught us. Indeed, You alone are All-knowing, the All-wise.”
Qur'an 2:32

Praise be to Allah, the Maker of the universe and Originator of all knowledge, for making this day possible. May the peace and blessings of Allah be upon His Prophet and Messenger, his companions, family, and followers.

Today is a great day in the life of an academic; it is to me and to my students. I stand here to present the 63rd inaugural lecture of this prestigious university. This lecture is not merely an academic exercise. It is a narrative of intellectual discovery, a chronicle of disciplinary development, and a testament to the power of geography to illuminate the human condition. It is, above all, a story about putting health and disease in place, it is about understanding why some communities breathe easy while others cough, why one well gives life and another gives fever, why a woman in one village survives childbirth while her neighbour in the next village does not.

I am a writer. I write poems and stories, of lives lived on the page. A writer, above all, tells stories. Today, as I stand before this august gathering, it is my turn to share a specific account. I will set aside my other narratives and speak exclusively of my exploits in health and medical geography. These are the stories I have chosen to tell. The story I will tell you today, spans over three decades of research, teaching, and mentorship. It begins with a young boy in Kano who thought he could outrun the Almighty to Maiduguri and ends as a professor of medical geography. But the thread that runs through it all is a simple, persistent question: Where? Where do people fall ill? Where do they seek care? Where do they die? And, most importantly, why there, and not elsewhere?

Before I begin telling that story, I must first establish the intellectual context within which this lecture is squarely situated. The questions I have posed are questions about the distribution of health and disease, about access to care, about the environmental determinants of well-being. They are fundamentally, geographical questions. They require a disciplinary lens that takes space, place, and environment seriously. They require, in short, the discipline of geography and its sub-discipline, medical or health geography. It is to this contextual foundation that I now turn.

SECTION ONE

**ESTABLISHING THE CONTEXT AND
FOUNDATIONAL STORY**

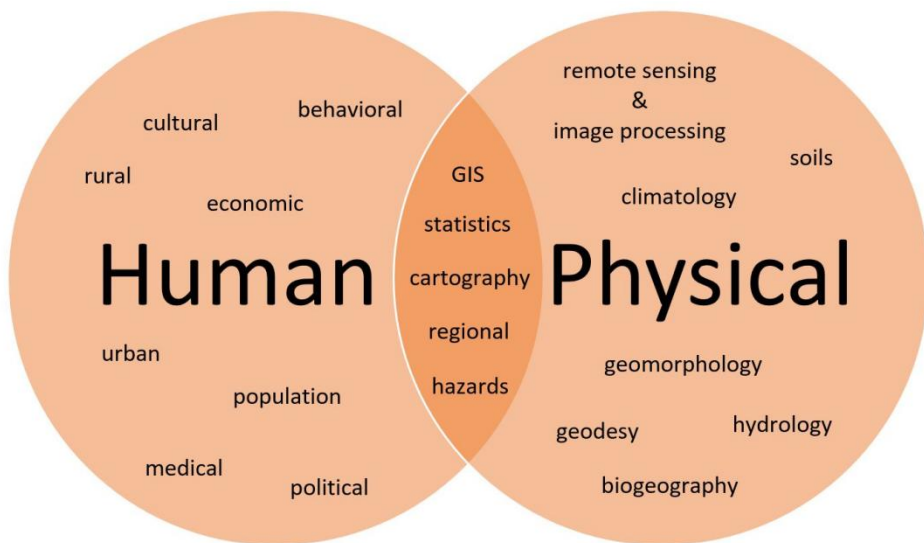


Figure 1: *The Nature of the Discipline*

The Discipline of Geography and its Sub-disciplines

When we consider the great intellectual journeys of human inquiry, few disciplines possess a pedigree as ancient or a purpose as urgent as geography. From the earliest human impulse to sketch maps in the ground to the sophisticated spatial analytics of our digital age, the quest to understand our surroundings has been fundamental to survival and civilisational progress. As Alexander B. Murphy (2018) reminds us in *Geography: Why It Matters*, this discipline provides a critical window into where things happen, why they happen where they do, and how geographical context influences environmental processes and human affairs (Murphy, 2018). Yet, for all its foundational importance, geography remains one of the most misunderstood and underappreciated intellectual endeavours of our time.

This is a paradox worth pondering as we begin our journey together today. The name of the discipline of geography emanates from the Greek word *geo* (earth) and *graphos* (to write) and is fundamentally about the relationship between humanity and our planetary home. It is concerned with the spatial organisation and interconnection of people, environments, and places. As history interprets temporal sequences, so also geography interprets spatial sequences and associations. It serves as a crucial bridge between the natural and social sciences, between the physical world of climate and landforms and the human world of culture, economy, and politics. This integrative capacity is not merely academic convenience but intellectual necessity, because the challenges confronting our world today refuse to respect disciplinary boundaries.

Charting the Disciplinary Journey

The modern discipline we inherit did not emerge fully formed. Its evolution represents a fascinating intellectual odyssey documented by scholars like Arild Holt-Jensen in *Geography: History and Concepts*. Holt-Jensen (2009) traces our journey from the speculative cosmographies of antiquity through the regional descriptions of the early modern period to the scientific revolutions of the twentieth century. In his magisterial survey *Geography and Geographers*, R.J. Johnston (2004) maps the contested terrain of Anglo-American human geography since 1945, demonstrating that what we study and how we study it has always been shaped by broader intellectual currents and social transformations.

Perhaps the most significant intellectual rupture in our recent history was the quantitative revolution of the 1950s and 1960s. This movement sought to transform geography from a primarily descriptive enterprise into a rigorous, law-making (nomothetic) science. The ambition was nothing less than to place geography alongside the established sciences, with systematic methodologies and testable hypotheses.

No figure better embodies this transformation than David Harvey, whose 1969 seminal work *Explanation in Geography* systematised the positivist approach, arguing for the importance of "space-time" as geography's unique object of study, the indivisible unity of pattern and process that could be subjected to objective causal analysis (Harvey, 1969). Harvey's intellectual trajectory, however, soon took a dramatic turn. As social justice movements erupted in the late 1960s, he recognised that the ivory tower pursuit of "scientific rigour" paled beside the urgency of understanding and addressing real-world inequality and oppression. This moment of intellectual awakening (from positivist to Marxist, from spatial science to social justice) reshaped the discipline profoundly.

The Humanist Turn: Place and Meaning

Yet another revolution was underway, one that would fundamentally enrich our understanding of the human condition. This was the humanistic turn, with its emphasis on subjective experience, meaning and the existential significance of place. Here we encounter the monumental contribution of Edward Relph and his classic text, *Place and Placelessness*. First published in 1976, this work introduced generations of geographers to the phenomenological basis of place, that is the idea that place is not merely a location on a map but a centre of meaning, experience, and identity (Relph, 2008). Relph's distinction between "insideness" and "outsideness," and his diagnosis of "placelessness" as a pathology of modern landscapes, offered a profound critique of the homogenising tendencies of industrial society.

The concept of place, Relph (2008) argued, has the potential to serve as a pragmatic foundation for addressing the profound local and global *challenges* of our era. This is a crucial insight for our purposes today. Place is not simply a backdrop to human activity but an active constituent of our identities, our communities, and our well-being. It is where the global meets the local, where abstract processes become concrete experience, and where health and disease (the focus of our lecture) unfold in all their complexity.

The Challenge of Defining Geography

The challenge of defining and explaining geography's sub-disciplines is compounded by a broader disciplinary challenge: geography itself has long struggled with a coherent identity. Geographers study an extraordinary range of phenomena on the earth's surface, from physical landscapes to human settlements, from economic systems to cultural practices and this breadth has placed them in close proximity to many other disciplines while simultaneously distancing them from their colleagues who profess geography. This diversity led, perhaps inevitably, to the famous observation by Johnston (1980) that *geography is what geographers do*. This observation, while somewhat tautological, captures the difficulty of defining a discipline whose practitioners are engaged in such varied pursuits.

This challenge of disciplinary definition prompted William D. Pattison, in his influential 1964 paper on the *Four Traditions of Geography*, to argue that the work of American geographers could be grouped into four interconnected traditions: the Spatial Tradition (concerned with geometry, movement, and the analysis of spatial patterns), the Area Studies Tradition (focusing on the nature and character of places), the Man-Land Tradition (examining human-environment relationships), and the Earth Science Tradition-studying the physical world, (Pattison, 1964). Pattison's framework was an attempt to bring coherence to the diverse activities of geographers (not only in America but around the world, since we all share the same challenges).

The Four Traditions as a Lens for Medical Geography

This lack of unity in defining geography's core purpose inevitably trickles down to its sub-disciplines, creating a similar complexity in defining medical geography. As Barrett (1986) astutely noted, the concept and definition given to a sub-discipline depend to a large measure on the concept and definition held of the parent discipline. This relationship between the broad, multifaceted nature of geography and the specific focus of its sub-fields places a considerable burden on medical geographers. Yet it is precisely this diversity that allows medical geography to draw upon the full richness of the parent discipline, and Pattison's four traditions provide a useful framework for understanding how this is achieved. Pattison (1964) argues that American geography operates through multiple paradigms and perspectives while remaining fundamentally geographical in nature.

For medical geography, these traditions offer a powerful lens through which it can view its own evolution and core areas of inquiry. When we study disease ecology, we draw heavily upon the Man-Land/Environment Tradition to explicate how the physical and social environment influences disease causation, spread, and distribution. Yet when we study the diffusion of that disease across a region, we shift our perspective and engage the Spatial Tradition, using tools of spatial analysis to understand the patterns of its movement. This interplay of traditions is not a source of weakness but a testament to the integrative power of the geographical approach to health and disease. Similarly, when examining the distribution and utilisation of health services, we employ both spatial analysis to understand service distribution and the area studies tradition to understand the local contexts that shape health-care access and utilization.

Defining Medical Geography

Given this varied intellectual heritage, it is no surprise that the sub-discipline itself is known by different names and has been defined in numerous ways. While terms like "medical geography," "health geography," and "geographies of health" are often used interchangeably, some scholars make important distinctions (Kearns & Collins, 2010). For instance, Robin Kearns (1993) championed the term "health geography" to signal a broader focus on well-being and the social experience of health and place, moving beyond a more traditional, medically-focused disease ecology. But, Barrett (1986), has insisted for the retention of "medical geography" based on its deep historical roots, tracing back to the work of Hippocrates and the foundational treatise *On Airs, Waters and Places*.

Indeed, the historical lineage of medical geography establishes a clear and prestigious pedigree for the field. Barrett's seminal work on the historical origins of medical geography has demonstrated that the ideas which today translate as medical geography started as far back as the 4th century B.C. with Hippocrates' *On Airs, Waters and Places* (Barrett, 1986). In this seminal text, Hippocrates (c. 400 B.C.) articulated that to "investigate medicine properly, one should first consider the seasons of the year, and what effects each of them produces... then the winds, the hot and the cold... [and] the qualities of the waters." The treatise established that environmental factors namely, winds, waters, terrain, and climate, were not merely background conditions but active determinants of health and disease. This ancient insight has proven remarkably durable, and it is this very tradition that modern medical geographers continue to develop and refine.

Furthermore, Barrett (1986) has chronicled the origin and growth of this sub-discipline, showing how it evolved from the work of physicians like Hippocrates, Leonhard Ludwig Finke (whose three-volume *Versuch einer allgemeinen medicinisch-praktischen Geographie* of 1792–1795 is commonly cited as the first to use the term "medical geography", and John Snow (whose 1854 mapping of cholera cases in London identified an unusual cluster of deaths around a single water pump, leading to the pump's closure and a dramatic drop in cases). Snow's work (1849), in particular, represented a watershed moment, demonstrating the power of spatial thinking in identifying disease causes and informing public health interventions.

Between the 1960s and 1970s and later years, trained geographers began to take a sustained interest in studying disease and health from a geographical standpoint. Early contributors such as Howe, Prothero, Hunter, McGlashan, Barrett, Learmonth, Mayer, Phillips, Kearns, Stock, Earickson, and Akhtar, to mention just a few, provided the foundation of what we now call modern medical geography, (Adamu, Abdulkarim, Sheshe, and Babatimehim, 2023). The debates and contributions of these scholars have been instrumental to all that we see today. It is worth noting that Jacques May (1950), often considered the father of medical geography in the United States, was the first to detail the methods and objectives of medical geography, producing global maps of the distribution of malnutrition and vector-transmitted diseases in the 1950s. May's work, produced in collaboration with the American Geographical Society, reflected the growing recognition that disease was a "geographical subject" requiring systematic spatial analysis.

Nomenclature Debates

From these early inceptions of modern medical geography, debates about its nature and scope, about what its concerns should be, and about what it should be called have continued to rage. Although in some cases "medical geography" and "health geography" are used interchangeably, the question of what geographers are truly studying and how they wish to name it remains important to the extent that some scholars see the two terms as distinctive (Kearns & Collins, 2010). While scholars like Barrett (1986) are comfortable with the umbrella term of "medical geography" and have argued in its favour, Barrett took time to examine the different arguments on the nature, scope, and name of the sub-discipline in greater detail. He justifies why the sub-discipline should be called medical geography by noting its historical roots: Finke (1792), Virey (1817), Boudin (1843), and

Fuchs (1853) all refer to it as medical geography; even in modern times, May (1950, 1954) also refers to it as medical geography. In addition, looking at the subject matter of the sub-discipline, geographers study the environmental conditions that influence disease; also, rather than studying health as a physical, mental, and social condition of people, we study facilities and services that help improve health.

However, some geographers are more comfortable with the term "health geography" or "geographies of health." Kearns (1993) argued for a reformed medical geography that would engage more deeply with social theory and the concept of place as a "zone of meaning and familiarity," shifting the focus from disease to broader questions of well-being and the social experience of health. Scholars such as Kearns and Collins (2010) have argued that the term "health geography" signals a broader focus on well-being and the social experience of health and place, moving beyond a more traditional, medically focused disease ecology. Mayer (2010) is of the opinion that the use of the term "medical geography" is misleading because, according to him, "medical" has to do with diagnosis, treatment, and prevention of diseases, while medical geography is not concerned with the first two, even though it may be concerned with prevention. May himself at some point, was of the opinion that the field should have been labelled "geography of disease" or "epidemiologic geography."

A Working Definition

In the light of the above, defining medical geography is fraught with different perspectives which led to varying definitions, this is why, in defining medical geography, one encounters many definitions, just as in the mother discipline. Earlier, Melvyn Howe defined medical geography as an interdisciplinary field of study concerned with spatial variation of disease incidence as expressed by mortality or morbidity indices and with the demonstration of possible cause-effect relationship with elements of physical, biological and socio cultural environment in space" (Howe, 1972). Later, a medical geography historian, Barrett (1986 p. 26) defines it as: "the analysis of the human-environmental relationship of disease, nutrition and medical care systems in order to elucidate its interrelationships in space." The sub-discipline in concept, as Barrett (1986, p. 27) explains, "consists of geographical relationships in three subsections: disease, nutrition, and medical (health) care." It can therefore be safely argued that it is built on three pillars: disease ecology, nutrition, and health care, (Adamu, *et al*, 2023). The first and last pillars have received more attention than the second, though recent research, including work in Nigeria, has increasingly focused on the geography of nutrition with Bayero University pioneering. So far Faiza Sheshe has pioneered research in

geography of nutrition (in northern Nigeria), completing her doctoral work in 2024, and two others are near completion covering Kogi (Eninibajo Ameh) and Jigawa (Khalifa Mukhtar) States.

The debate continues, and medical geographers from both camps continue to research and publish on disease ecology and health-care and, to some extent, nutrition, under different titles. What is important, as Phillips (1981) and Meade, M. S., & Emch, M. (2010) concluded, is that geographers are interested in, and contributing to, the understanding of human health and disease.

Medical Geography in the Nigerian Context

The development of medical geography in Nigeria reflects the broader disciplinary debates while also exhibiting distinctive regional characteristics shaped by local health challenges, institutional histories, and research priorities. As Adamu, *et al.*, (2023, p. 38) have documented, the teaching and research in medical geography in Nigeria can be traced through four distinct phases: the pre-1970 period which covers the pacesetter period; the 1970s–1980s with emphasis on the works of pioneers in medical geography in Nigeria, notably Professors Folasade Iyun, Stanley Okafor (University of Ibadan) and Dora Shehu (University of Sokoto); the 1990s, dubbed as the latency phase; and the millennial phase of expansion and popularisation of medical geography outside the University of Ibadan.

The Nigerian experience provides a compelling case study of how a sub-discipline evolves within a specific national context. The early pioneers namely Iyun, Okafor, and Shehu, established the foundational research agenda (Iyun, 1984) that would shape medical geography in Nigeria for decades, focusing on issues of health-care access, disease ecology, and the spatial dimensions of health service delivery (Adamu *et al.*, 2023, p. 38). Their work was responsive to the pressing health challenges facing post-independence Nigeria, including high maternal and child mortality, infectious disease burdens, and inequitable distribution of health-care resources.

This period of pioneering research established the University of Ibadan as the preeminent centre for medical geography training and research in Nigeria. The latency phase of the 1990s, however, saw a relative slowdown in scholarly output and training capacity, which Adamu *et al.* (2023, p. 44) attribute to several factors, including a shortage of trained

medical geographers in Nigerian universities at the time and limited scholarly interest in the sub-field among Nigerian geographers. The millennial phase, from 2000 onwards, has witnessed a remarkable expansion and popularisation of medical geography outside the University of Ibadan, with programmes emerging at Bayero University in particular and some universities in the south (Adamu *et al.*, 2023). This geographical dispersion of expertise has contributed to a more diverse and regionally responsive medical geography scholarship in Nigeria. It is gratifying that Bayero University is the epicentre of medical geography research in Nigeria today.

The Geography of Health and Disease

It is within this intellectual tradition (a discipline that has evolved from descriptive regionalism through scientific positivism to humanistic engagement) that our work on health and disease finds its natural home. Health geography, (as it is known by some) represents a vital sub-field that, as Gatrell (2023) argued, seeks to describe and explain how health (and well being, and illness and disease, and the determinants of such) varies from place to place. The roots of this inquiry lie in the ancient tradition of disease ecology, which explored how environmental conditions shape the incidence of illness, but the field has expanded dramatically.

Today, health geographers investigate a remarkable range of questions. They examine the experiences of those living with chronic illness at home, the ways access to resources affects well-being across different neighbourhoods, and the profound regional inequalities in morbidity and mortality. They traced the flow of people, materials, and infections across nation-states, exploring the historical, political, and economic linkages that determine the geography of health (Gatrell, 2023). The field embraces diverse methodological approaches from sophisticated quantitative spatial analysis using GIS to deeply qualitative phenomenological explorations of embodied experience.

Central to this endeavour is the recognition that health is not simply a biomedical phenomenon but is fundamentally shaped by spatial and place-based processes. Where one lives, works, and moves; the quality of one's neighbourhood environment; the accessibility of health services; the social and economic resources available in one's community as these geographical factors are as determinative of health outcomes as any pathogen or genetic predisposition. The body itself, as health geographers

increasingly recognise, can be understood as a "site" where social processes associated with health are expressed (Gatrell, 2023).

A Living Intellectual Tradition

As we prepare to embark on our exploration of health and disease in place, it is worth reflecting on the intellectual inheritance we carry. We stand on the shoulders of explorers and cartographers, of regionalists and quantitative revolutionaries, of humanists and critical theorists. We draw upon the integrative vision of a discipline that refuses to separate the physical from the human, the local from the global, the objective from the subjective. We are heirs to a tradition that insists on asking not only "where?" but "why there?" and "so what?"

Geography, as Murphy (2018) argues, matters more than ever in our rapidly changing world. The challenges of changing climate, global migration, urbanisation, and infectious disease demand precisely the kind of integrative, place-sensitive, spatially sophisticated thinking that geographers bring to the table. Within that broader disciplinary frame, health geography offers a particularly compelling lens, one that connects the most intimate experiences of bodily well-being to the most global patterns of environmental and social change.

Geographers in Nigeria are largely inclined towards the use of the term "medical geography" rather than "health geography," but their work spans the two main pillars. The practical, problem-solving nature of this work helps answer the common question, "What has geography got to do with disease?" by demonstrating geography's direct relevance to improving health systems and outcomes. Adamu *et al.* (2023, p. 59) conclude that despite some challenges, medical geographers are increasingly becoming important and their contributions are being recognised in the health research arena in Nigeria. This geographical perspective, rooted in the interplay of place, space, and human-environment interaction, is the foundation upon which our story and legacy in health research is built.

Today, as we consider putting health and disease in place, we are not simply applying geographical methods to medical questions. We are enacting the fundamental geographical imagination; the conviction that where things happen matters, that context is constitutive, and that understanding the spatial organisation of phenomena is essential to understanding the phenomena themselves. We are continuing a conversation that has spanned millennia.

SECTION TWO

MY PERSONAL JOURNEY

Geography and I: Following the Thread of my Story

After establishing the broader intellectual context of geography as a discipline and its relationship to medical geography, I now turn to the personal journey that brought me to this lecture today. This is story time, a narrative of how I discovered geographic knowledge without knowing it would become my lifelong companion. This section traces my path from the earliest inklings of spatial awareness through to my emergence as a medical geographer. It is, in many ways, a story shared by countless geographers: the gradual realisation that the questions we asked as children (where things are, why they are there, and what difference it makes) were not merely passing curiosities but the seeds of a disciplinary vocation.

The Skies and a Question of Scale

From the very moment of birth, we are thrust into our physical environment. We encounter the air, shifting temperatures, the warmth of solar energy, the built environment, and, of course, other humans. As we grow, we learn to crawl across the floors of our homes, taking those first tentative steps before venturing outside to map our surroundings. Decades later, this fundamental human experience of spatial awareness would culminate in a paper I co-authored with A.I. Tanko titled 'What is Where? Near or Far' (published in *Primary Geographer*, October 2004, by The Geographical Association). That childhood instinct to ask where things are, and how far, never left me; it simply found an academic voice.

School is the arena where we learn about life and ourselves in a systematic way. For a Muslim child, this education begins at home and extends to the Qur'anic school (*Makarantar Allo*), before the modern classroom expands our horizons even further. Each of these spaces leaves its own imprint on the mind. At home, the lessons are wrapped in love and warning; at the *Makarantar Allo*, in discipline and recitation; in the Western classroom, in facts and diagrams. Together, they shaped a geography of belonging that I carry to this day.

Our mere existence in this world is our first contact with geography. For me, the concepts of Heaven and Hell were my earliest introductions to geographic thought, the realisation of two distinct, ultimate places, each with its own coordinates, its own climate, its own rules of entry. At home, my grandmother of blessed memory, Hajiya Yaya, would lovingly warn me: "*Idan kana wasa da sallah, sai Allah ya konaka a wuta, ranar lahira.*" Sometimes, with the brazen innocence of childhood, I would respond: "*Ina zai ganni, sai in gudu Maiduguri.*" My assumption was simple: Maiduguri was incredibly far away, and surely beyond the reach of the Almighty. Distance, I believed, was a shield. But at *Makarantar Allo*, as I began to learn the omnipresent attributes of Allah, that He is closer to us than our own jugular vein, the idea of escaping to Maiduguri began to fizzle out. I realised the Divine would find me everywhere, even if I fled all the way to Ingila (England). Geography offered no refuge from theology.

Yet, these two realms continued to test the spatial imagination of that young boy. While the imagery of hellfire was terrifying, Paradise told a different, beautiful story. Its aesthetics, serenity, and unimaginable abundance encouraged every child to be good. For me, however, the fascination was not just in the wonders of Paradise; it was in its sheer scale. Our Yasayyadi (the Islamic teacher) would insist that the house of the poorest inhabitant of Paradise is seventy times larger than the Earth itself. Because Yasayyadi said it, I believed him. But deep inside, the budding geographer in me would ask a silent, practical question: "*Dubu saba'in, ina za a samu filin?*" (Seventy times, where would the land come from?)

Giginyu Primary School eventually answered that question for me. Our Integrated Science teacher, Mr. Olu, introduced us to something called the solar system. For the first time, my universe expanded. I realised there was more than one planet; there were entirely different worlds suspended in the sky, spinning in silence. My fascination deepened when the famous Hausa science book, *Ikon Allah*, R.M. East and Abubakar Imam (which my father gave me), formally introduced me to the awe-inspiring concept of skies. Suddenly, the seventy-fold mansion of Paradise did not seem impossible at all. It simply required a universe large enough to hold it. And I began to suspect that the universe was very large indeed. When I later learnt about galaxies and expanding universe, all things fall perfectly in place. That interest in the skies did not stop till date, I remain a student of astronomy and continue to appreciate the skies and pass the spirit to my

children Today, I am the convener of Kano Astronomical Society where people like me share knowledge and ideas about the skies.

Journey to the Discipline of Geography

It was at Government Secondary School Koko (then Sokoto State, now Kebbi State) that I truly began to see the night sky differently. Our Filipino science teacher, Mrs. Ortega, taught us that the tiny, flickering lamps we called stars were actually massive celestial objects. They were suns in their own right, some vastly larger than our own, which she explained was already thousands of times larger than the Earth. Under her guidance, our universe expanded further; she revealed Earth's delicate position within the solar system and the unique conditions that make it the only planet to harbour life: the right distance from the sun, liquid water, a protective atmosphere. For the first time, geography began to feel like a science of survival, not just a list of names on a map.

By Form Three, upon gaining admission to Government Science Secondary School Zuru, I encountered my first dedicated Geography textbook, *General Geography in Diagrams* authored by R.B. Burnett. It was here that my first Geography teacher, Mr. Kumara Siri (a Sri Lankan, if memory serves), officially opened the gates of the discipline for me. He did not simply teach us to locate rivers and capitals; he taught us to see patterns, why people settle where they do, how trade follows topography, why droughts visit some places and floods others. Guided by him and later a Corps member, Mr. Adeleke Akanbi, and most importantly Malam Bawa Zizi, I became fully immersed in a field of study that would not only become my life's profession but also my lifelong intellectual companion. Geography, I came to understand, was the art of asking where, and then never being satisfied with a simple answer.

How I Became a Medical Geographer

My father, of blessed memory, grew up in Tsafe where he met a missionary nurse popularly known as Mai Jinya. He would tell us stories of her selfless service, how she treated strangers like family, how she never asked for payment, how her hands seemed to carry both medicine and mercy. That image stayed with him. Then he worked with the WHO Malaria Project in Kankia from 1967 to 1970. There, he met an international team of experts such as entomologists, physicians, logisticians, and fieldworkers, each bringing a different weapon to the war against malaria. These two influences put a lot of desire in him to have some of his children study health sciences. When I gained admission into

Science School, even though from the very beginning I had secretly wanted to be a historian (because my father told us a lot of and about history), my father saw a perfect opportunity. He began to gently, persistently encourage me to read medicine.

I obliged to his wish, like every good child would respect the wish of his parents (not necessarily because they are interested). But my heart remained artistic. While my classmates dissected equations, I started writing a historic novel in Hausa on February 13, 1983, it was initially titled *Bi da Maza* and later changed to *Maza Gumbar Dutse*, (thanks to my brother Abdulhakim Ibrahim who gave me the new title) the book was published in 2007. I was filling my notebooks with characters who lived only in my imagination. Then came 1985. After our secondary school graduation, WAEC disappointed many of us in that break-dancing year (those who know, know). I had no single F9, but I also had no credits in Physics, Chemistry, and Mathematics. The sciences had closed their doors. So I applied for two things: a pre-degree programme at the then University of Sokoto (UNISOK), and a diploma in Agricultural Mechanisation and Irrigation Engineering at Kaduna Polytechnic. To my surprise, I was accepted into both.

But there was a twist. UNISOK admitted me to Matriculation Arts. Kaduna Polytechnic accepted me to read Agric Mech. Here I was, a boy trained to be a scientist, now holding an arts offer in one hand and an engineering offer in the other. I wanted Kaduna. My father insisted on Sokoto. In the end, I yielded.

Since I was admitted to read arts, I decided to go fully arts. I registered for Hausa, History, and Islamic Studies. I filled the form, when destiny walked in wearing a familiar face. Nasiru Warra, a schoolmate from secondary school, spotted me. He had also been admitted into the matriculation programme and was planning to read Geography. He glanced at my form. "What have you filled?" I told him. He laughed. "I know you," he said. "You were the best geography student in your class. Why don't you go for geography?" We talked. We argued. We remembered the debates about erosion and settlement patterns, the way geography had always felt less like a subject and more like a lens. I corrected my form on the spot. I replaced History and Islamic Studies with Geography and Sociology. And the rest, as they say, is history.

During my undergraduate years, I was first fascinated by physical geography, the drama of landforms, the poetry of rivers carving valleys. But by the time I reached 300 level, my interest had shifted. Human geography called louder (perhaps influenced by my interest in Sociology). I wanted to understand not just the shape of the earth, but the lives lived upon it.

Then came the project year. We were asked to choose topics. I consulted with a very close friend, Musa Abubakar Zaki, (with whom we were planning to become lecturers) and we made a pact: after service, we would pursue further education together. We agreed to apply to the University of Ibadan. That single decision shaped my project choice.

At that time, Malam Atiku Nuhu Koko had just returned with an MSc from Ibadan. He was rigorous, brilliant, and feared by students. I wanted him as my supervisor. So I submitted a topic in industrial geography, hoping he would bite. My project became *A Geographical Analysis of Food Processing Industries in Kano City*. However, by the time I started my fieldwork for my undergraduate project, I discovered maternal health at the serial section of the Library where I stumbled upon two newsletters, namely *Synergy*, a Canadian Health Newsletter, and a WHO newsletter, *Safe Motherhood newsletter*. Although it was late for me to change, these two newsletters opened my eyes to maternal health, and discussions about what I read with my wife being a nurse/midwife, sustained my interests in studying maternal health.

My undergraduate project connected me to Adamu Tanko. Tanko was a classmate of Balarabe Garba who was my classmate at UDUS. Balarabe introduced us. Tanko's own project (1989) had focused on water quality studies around Salanta stream, which covered the Sharada Industrial Estate. When I read his work, I found a map, and on that map, I saw something Tanko had not emphasised: health risks. I used his map in my own project, raising questions about pollution, proximity, and disease. I became the first person to cite Tanko's research. Neither of us knew then that we would one become very close friends and colleagues.

I went to Government Science Secondary School, Dutsin Ma (Katsina State) for my NYSC. There, I met D.D. Ajayi, (now a professor) a Geography graduate from the University of Ibadan. We taught together. We talked late into the evenings about our futures. One night, he mentioned a name: Dr. B.F. Iyun. He told me about her medical

geography projects, how she was mapping disease, tracing the geography of illness, asking why some communities stayed healthy while others suffered. "It's very interesting and promising area," he said. "You may wish to apply since you are interested in studying maternal health." I listened.

Then an opportunity arrived. At Government Science Secondary School Dutsin Ma, I had started a club Forum for Arts and Sciences (FAS), where I encouraged students to read books and helped fire their imaginations through art, innovation and public lectures. When the annual Junior Engineers, Technicians, and Scientists (JETS) competition came, I naturally took over. The students I coached won the state competition in Katsina. The prize? A trip to Ibadan, southern Nigeria, which I had never seen. I escorted my students, and while in Ibadan, I used the chance to visit Dr. Iyun.

I introduced myself. I told her my interests in medical geography. She was so happy and secretly nearly lifted off her chair (as she told me years later at Louisville, US). "Someone from the North," she said, "coming to study medical geography?" She had been struggling to attract students to the field. And here I was, arriving like a gift on a platter of gold. What pleased her most, was when I told her that I was a student of Professor Dora J. Shehu, she said to me Dora was her friend. After our National Youth Service Corps (NYSC), Zaki and I prepared to apply for our MSc. But Zaki changed course and chose UNILAG instead. I applied. I was admitted.

The day after my graduation, I began calling myself a Medical Geographer. But I did not stop there. I had seen something, an area of research that could directly impact human health, a space where geography could save lives rather than simply describe them. I wanted to develop it beyond what it was, having been fully grounded in the discipline itself owing to my studies at Ibadan. So in the 1997/1998 academic session, I introduced Medical Geography as an undergraduate course in the Department of Geography: GEO 4315 now GEO 4338. Thanks to the late Professor Kabiru Ahmed of blessed memory. That is how the journey began. And today? Today, I will tell you the rest of the story.

The MSc Research: Obstetric Complications in Kano City

Before discussing my key and novel contributions to maternal mortality study in Nigeria, I must return to my MSc research, the work that first

immersed me in the geographical study of maternal health. Completed at the University of Ibadan under the supervision of Professor B.F. Iyun (to whom I remain deeply grateful for agreeing to supervise a young scholar working on a topic far outside the mainstream of Nigerian human geography at the time), my Master's thesis was titled *A Geographical Perspective of Obstetric Complications in Kano City* (1994).

The study focused on two major obstetric complications that were, and remain, critical public health issues in Kano: vesico-vaginal fistula (VVF) and eclampsia. VVF (a debilitating condition involving a hole between the bladder and vagina, leading to continuous urinary incontinence) is most often caused by prolonged obstructed labour. Beyond its physical toll, VVF carries profound social consequences: affected women are frequently abandoned, ostracised, and unable to participate in community life. In the 1990s, VVF attracted significant international attention, with donor-funded campaigns and repair centres established across Africa, including Northern Nigeria (at Babbar Ruga Fistula Centre, Katsina). However, my research revealed a troubling disparity: while VVF was visible and well-funded, eclampsia was silently claiming more lives without attracting comparable concern.

Eclampsia (seizures occurring in pregnant women with high blood pressure) is a leading cause of maternal mortality worldwide. According to the World Health Organization (WHO), hypertensive disorders of pregnancy, including preeclampsia and eclampsia, are among the leading causes of maternal deaths globally, accounting for nearly 10-15% of all maternal fatalities, Duley, (1992). Although treatable with magnesium sulphate and timely delivery, effective care requires access to facilities with trained personnel, a luxury far from universal in 1990s Kano. The severity of eclampsia was so pronounced that a dedicated ward, known locally as *Dakin Duhu* (the Dark Room), existed at the Murtala Mohammed Specialist Hospital, which once housed West Africa's largest maternity ward. During my fieldwork, I visited this sombre space, dimly lit, heavy with quiet anxiety, where women lay under close observation and families waited in fear. The darkness was both literal and metaphorical: a place where mothers died, families fractured, and households plunged into grief and economic hardship.

My MSc research relied entirely on hospital records, case files and mortality registers from Murtala Mohammed Specialists Hospital. I spent weeks extracting data on thousands of women, recording ages, parity,

addresses, diagnoses, treatments, and outcomes. This painstaking work yielded several key findings (Adamu, 1994). First, regarding age, I found that women aged 15-19 carry highest risk of developing eclampsia and VVF. However, women in age groups 20-24 also carry risk. Second, on parity, my findings show that primigravidae account for 70% of all reported cases of eclampsia while para 1-2 accounted for 20.07%. As for VVF, there was no sufficient data available to warrant any serious analysis and so was ignored. Third, the data reveal a clear seasonal pattern in Kano, with deliveries peaking sharply between May and August. This mid-year concentration likely reflects agricultural and cultural rhythms (such as harvest cycles, religious festivals, and seasonal marriage patterns) that shape the timing of births. Whatever the precise causes, the seasonality has profound implications for maternal health services.

Both VVF and eclampsia rise and fall in close tandem with delivery volumes. While this is partly expected, the consistency of the relationship suggests a more troubling reality: complication rates do not improve during peak periods, indicating that health facilities may be overwhelmed. When maternity wards are stretched, monitoring falters, delays increase, and women are less likely to receive timely emergency care.

Equally significant is the relative burden of the two complications. Although both peak in the mid-year, eclampsia appears more prominent in May and June. This aligns with the observation that eclampsia was killing more women than VVF, even though VVF attracted greater international attention. Eclampsia can kill within hours, whereas VVF though devastating, is rarely fatal. The data thus reinforce the argument that research and funding priorities do not always match actual health burdens, and that eclampsia, being less visible, may have been dangerously neglected.

The seasonal concentration of complications points to clear intervention strategies. Rather than maintaining year-round uniformity, health planners should adopt a dynamic approach that anticipates the annual surge. This means increasing staffing, securing adequate supplies of magnesium sulphate, and strengthening emergency obstetric care before and during the peak months of May through August. Community-based awareness programmes should also encourage women to deliver in health facilities during these high-risk periods. Ultimately, the geography of maternal complications in Kano is patterned and predictable and therefore preventable. By acting on these seasonal signals, policymakers can shift

from reactive to proactive care, saving lives that might otherwise be lost to the quiet rhythm of maternal death.

The spatial analysis of the data shows that the spatial concentration of complications is pronounced. Nearly half of all cases occur in the City/Municipal district, the urban core. This may reflect distance decay; women closer to the main referral hospital are more likely to be admitted and recorded or it may indicate a true higher risk in the densely populated, low-income core, where poverty, overcrowding, and limited antenatal care converge.

Next, the residents outside the city categories reveal the importance of population mobility in shaping health outcomes. Residents in Waje and in Nassarawa bear a disproportionate burden of complications compared to local populations, pointing to a vulnerability gradient linked to social integration, economic status, and access to care. This implies that interventions must be targeted to specific districts and population subgroups, rather than applied uniformly across the city.

Finally, the data raise questions about access and utilisation. The low number of cases recorded in Waje may not indicate low incidence but rather low health facility utilisation. If women in that district prefer traditional birth attendants or delivery at home, their complications would not appear in hospital records. This highlights a classic problem in medical geography: the distinction between disease occurrence and disease reporting. The geography of recorded complications is always, in part, a geography of health-seeking behaviour and health system access.

After I joined the services of Bayero University, I had to start academic writing. My first academic paper was *'The Development of Hausa Neologisms: The Role of Urban Spaces'* which was presented at the Fifth International Conference of Hausa Language, Literature and Culture, organised by the Centre for the Study of Nigerian Languages, Bayero University, Kano in 1995. That paper (unknowingly to me) was the beginning of a life time journey in Hausa Studies, today, I have 39 publications in Hausa Studies and counting (but I chose not to talk about that, see appendix two if you are interested). The second was in medical geography titled *'A Geographical Distribution of VVF in Kano City'* at a conference on VVF in Zaria, having earlier presented the same work at the Nigerian Geographical Association conference in Benin. The ABU audience included many clinicians (obstetricians, gynaecologists, and

surgeons) and I was the only geographer present. I recall with clarity how one young doctor dismissively asked what I was doing there, joking with a colleague about whether "medical geography" even existed. They laughed and turned away. Rather than deter me, this scepticism fueled my resolve. I chose not to argue but to prove, through rigorous research, that geography had a valuable contribution to make to health.

Instead, I approached the most respected scholar in the room (a man known for his intellectual rigour and kindness). I introduced myself and showed him my poorly typed paper. He browsed the paper, saw the maps, then said, "This is a new perspective." We spoke for nearly ten minutes. At the end, he wrote down my address and promised to send me papers that might help if I chose to pursue a PhD. That man was Professor Kelsey Harrison. True to his word, he later sent me a package of classic papers on obstetrics, maternal health, and mortality. His writings transformed my thinking, moving me from a purely descriptive mapping approach to a more analytical, theoretically informed understanding of the ecological and social processes shaping mortality patterns. That single act of encouragement shifted my focus from the geography of illness to the geography of death. I resolved to study maternal mortality itself: where women died in childbirth, why, and what geography could do to prevent those deaths.

SECTION THREE

MY CONTRIBUTIONS TO MATERNAL MORTALITY STUDIES

The PhD Journey: From Geography of Illness to Geography of Death

The next challenge was finding a doctoral supervisor. Professor Iyun had left Ibadan, and Professor Shehu was no longer at Sokoto at the time. I needed a supervisor at Bayero who was qualified and willing to guide a student working on a topic outside mainstream Nigerian geography. In November 1997, I approached Professor J. Afolabi Falola. Though trained in the spatial tradition, I did not know if he would see value in medical geography or maternal mortality research. I explained my project, showed him my MSc thesis, recounted Dr. Harrison's encouragement, and shared my vision for mapping maternal mortality in Kano and analysing its determinants. He listened intently, asked probing questions, and gave no sign of dismissal. Instead, he said, "This is an important work. I will supervise you." That moment, Professor Falola's openness to new directions and his commitment to supporting exploratory student research, made my PhD possible. His willingness to supervise work beyond his own specialty sowed the seeds of medical geography in my career.

I remain profoundly grateful to him for taking the risk and for continuously being there over the years to examine a large number of the students I supervised, adding quality and substance.

Geography of Death: My Contributions in Maternal Mortality Studies

The concept of the "geography of death" represents a core intellectual pursuit within medical geography, a sub-discipline concerned with the spatial analysis of disease patterns, mortality and their environmental and socio-cultural determinants. The British geographer G. Melvyn Howe stands as a foundational figure in this field, having demonstrated through his pioneering cartographic work that mortality is not a haphazard phenomenon but one with a distinct spatial and place logic.

Howe (1963) established this paradigm with his *National Atlas of Disease Mortality in the United Kingdom*, which mapped mortality patterns to reveal critical public health insights and demonstrated the power of spatial analysis in understanding health outcomes. In a landmark article titled "The geography of death," Howe (1968) applied this framework specifically to examine variations in mortality from ischaemic heart disease in Glasgow, linking death patterns to environmental factors such as soft water supply, thereby illustrating how place-based characteristics fundamentally shape mortality risk.

The theoretical foundation for understanding why place matters in health outcomes draws substantially from the work of Edward Relph (1976) in *Place and Placelessness*. Relph argues that places are not just locations on a map but are "fusions of human and natural order" that constitute significant centres of our immediate experiences of the world. This conceptualisation is critical for medical geography because it establishes that health outcomes are not simply distributed across space but are fundamentally shaped by the meaning and experience of particular places. Places, Relph contends, are defined less by unique locations, landscape, and communities than by the focusing of experiences and intentions onto particular settings. They are important sources of individual and communal identity, and are often profound centres of human existence to which people have deep emotional and psychological ties.

The relevance of Relph's framework to maternal mortality is profound. The places where women live, give birth, and die are not neutral settings but are imbued with cultural meanings, social structures, and power relations that fundamentally shape health-seeking behaviour and outcomes. As Relph (1976) notes, to be rooted is perhaps the most important and least recognised need of the human soul, and this rootedness in place carries profound implications for how communities understand health, illness, and appropriate responses to medical emergencies.

Furthermore, Relph's concept of "placelessness" refereing to the the weakening of the identity of places to the point where they not only look alike but feel alike and offer the same bland possibilities for experience, provides a critical lens for understanding how modern health systems can fail to engage with the deep cultural and experiential realities of the communities they serve. When health facilities are designed and operated without sensitivity to local meanings of place, they become what Relph terms "inauthentic" settings that lack the deep and symbolic significances

of places. This inauthenticity manifests in the trust deficits, cultural disconnects, and ultimately, the fatal delays documented in rural and urban Kano.

A New Perspective on Maternal Mortality

The Zaria incident and the intervention by Professor Kelsey Harrison, inspired me to embark on another research journey to understand and explain maternal death driven by a singular question: Why does maternal mortality remain persistently high in northern Nigeria despite decades of health interventions? The answer, I found challenged conventional wisdom and required me to look beyond the hospital walls into the very fabric of rural communities, their beliefs, their struggles, and their deeply entrenched pathways to care.

What emerged from my doctoral work was not merely a set of statistics, but a comprehensive understanding of maternal death as a structured process, a tragic journey shaped by poverty, patriarchy, cultural beliefs, and systemic failures. This understanding fundamentally requires a geographical and place-based perspective. As Relph (1976) argues, places are whole entities, syntheses of natural and man-made objects, activities and functions, and meanings given by intentions. The places of maternal death, whether the home in a rural village or the admission room of an urban health facility, cannot be understood simply as physical locations; they must be understood as complex syntheses of cultural meanings, social relations, and health system realities.

The phenomenological basis of this approach is critical. Relph (1976) argues that "geographical science has in fact a phenomenological basis; that is to say, it derives from a geographical consciousness." This consciousness (the direct experiences and awareness of place) is precisely what my research sought to document and explain. The Five-Stage Model of Seeking and Receiving Obstetric Care which I developed during my doctoral work is, in essence, a phenomenological account of how women and their families experience the places of care, both traditional and biomedical.

Publications from the Research

The following publications emerged from this doctoral work:

- i. Adamu, Y. M. and Salihu, H. (2002). Barriers to antenatal care and obstetric services in rural Kano State, Nigeria. *Journal of Obstetric and Gynaecology*, 22(6), 600-603.
- ii. Adamu, Y. M., Salihu, H. M., Sathiakumar, N., & Alexander, G. R. (2003). Maternal mortality in Northern Nigeria: A population-based study. *European Journal of Obstetrics and Gynaecology and Reproductive Biology*, 109, 153-159.
- iii. Adamu, Y. M., Salihu, H., Aliyu, M. H., & Aliyu, Z. Y. (2004). Pregnancy-associated morbidity in Northern Nigeria. *Journal of Obstetric and Gynaecology*, 24(4), 367-371.
- iv. Adamu, Y. M. (2005). Patterns of maternal mortality and morbidity in Kano State: A geographical analysis. *Journal of Social and Management Sciences*, Special Edition, 196-221.
- v. Adamu, Y. M. (2007). Attractions and barriers to the utilisation of antenatal care services in urban Kano. *Kano Studies*, New Series, 1(1), 45-63.
- vi. Adamu, Y. M. (2008). Maternal health issues in Kano Region. In E. A. Olofin, A. B. Nabegu, & A. D. Dambazau (Eds.), *Wudil Within Kano Region: A Geographical Synthesis* (pp. 112-131). Department of Geography, KUST, Wudil.
- vii. Adamu, Y. M. (2010). Maternal mortality in Nigeria: The case of Kano State. *VDM Verlag*.

At this stage, it is pertinent to note that during my doctoral studies, I was awarded a Fulbright Scholarship at the School of Public Health, University of Alabama at Birmingham. I initially worked in the Department of International Health and later transitioned to the Department of Maternal and Child Health. This fellowship was instrumental in advancing my research and significantly enhancing my analytical capabilities in public health. The experience directly led to three of my major publications on maternal health (listed as 1–3 above). I owe a debt of gratitude to Prof. Hamisu Salihu and all my collaborators for their guidance.

Before discussing my major contributions to maternal mortality studies in Kano State, it is necessary to clarify my scale of analysis. Contrary to the current practice of employing senatorial districts in state-level analyses, I adapted the former administrative zones of Kano State, as shown on figure 2, and categorised as follows:

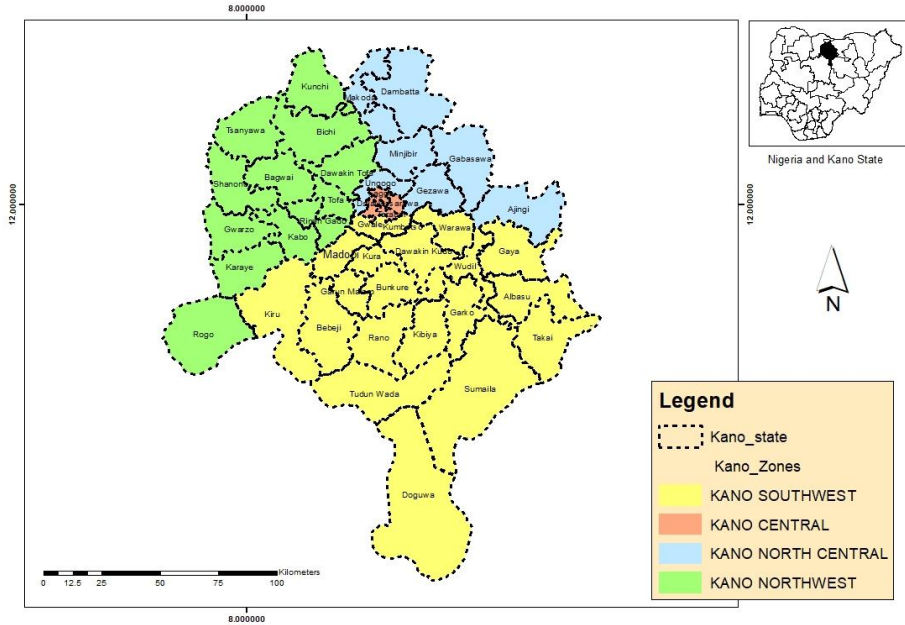


Figure 2: *Administrative Zones of Kano State*

- i) Kano Central Zone, comprising the six metropolitan local governments: Municipal, Dala, Tarauni, Nassarawa, Gwale, and Fagge.
- ii) Kano North-Central Zone, comprising Danbatta, Ungoggo, Gezawa, Gabasawa, Makoda, and Minjibir local governments.
- a) Kano North-West Zone, comprising Gwarzo, Dawakin Tofa, Tofa, Rimin Gado, Bichi, Tsanyawa, Kunchi, Rogo, Shanono, Bagwai, Kabo, and Karaye local governments.
- b) Kano Southwest Zone, comprising Rano Wudil, Dawakin Kudu, Kiru, Doguwa, Tudun Wada, Sumaila, Bunkure, Kura, Madobi, Bebeji, Albasu, Warawa, Ajingi, Takai, Kumbotso, Kibiya Garun Malam, Garko, and Gaya local governments.

Kano Metropolis comprising six core Local Government areas namely Municipal, Dala, Gwale, Nassarawa, Tarauni and Fagge formed the study site covering the urban part of the study.

The rural study site was Kausani Ward in Wudil Local Government Area. Kausani, the main settlement in the rural Kano study area, is an ancient walled settlement established during the pre-jihad period. It was brought under Kano even before the Sokoto Jihad, (Muhammad, 2016). The majority of the populace are Hausas, Fulani, and Kanuri. It has eight settlements, namely Hurumi (Kausani), Kirikasamma, Gurbo, Muncika, Masama, Turari, Rege, and Manga.

Key and Novel Findings of my PhD Work

Mr. Vice Chancellor, distinguished guest, My doctoral work makes novel contributions to the study of maternal health in Northern Nigeria and the country more broadly. Although I was highly drilled, I was particularly elated when my external examiner, Professor D.J. Shehu, described it as a seminal work on maternal mortality in Nigeria. Below are five key contributions of my work:

i. Filling a Critical Geographic and Empirical Gap

The study is the first systematic geographical analysis of maternal mortality covering both urban and rural areas of Kano State. Prior to this research, the region was largely excluded from comprehensive maternal mortality studies despite its significant population and socio-economic importance. By documenting an average Maternal Mortality Ratio (MMR) of 2,420 per 100,000 deliveries for the decade 1990-1999, the research provides essential baseline data that quantifies the scale of the crisis, revealing one of the highest population-based MMRs ever reported globally, far exceeding the African continental average of 1,000 per 100,000.

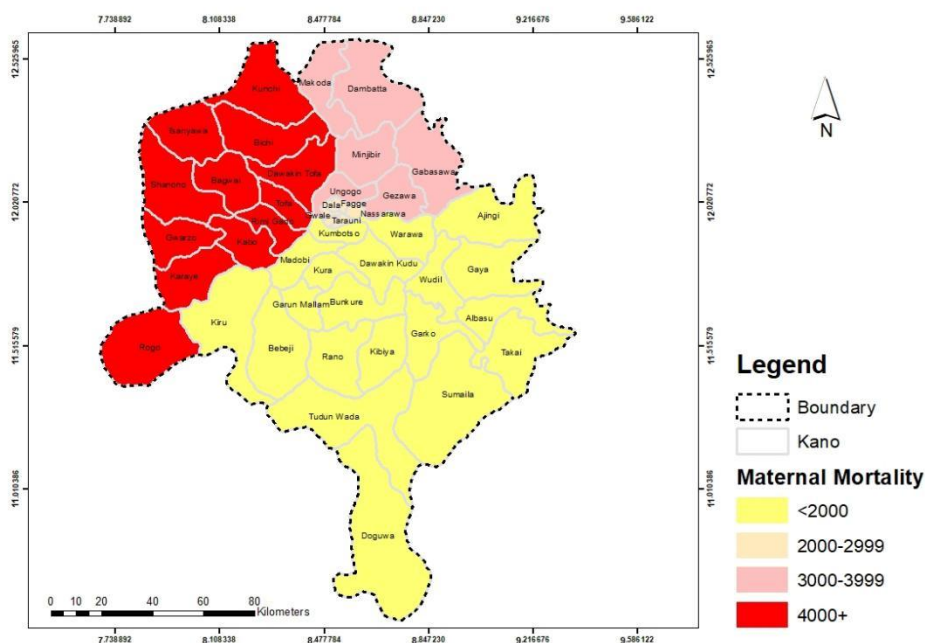


Figure 3: *Spatial Distribution of Maternal Mortality Ratio*

The geographical perspective here is foundational. As Relph (1976) notes, geographical space is a reflection of man's basic awareness of the world, his experiences and intentional links with his environment. The documentation of maternal mortality patterns is not merely an epidemiological exercise but a mapping of the places where life and death are most profoundly experienced. The spatial distribution of maternal death reveal the geography of vulnerability showing the places where women are most at risk precisely because of where they live as illustrated in figure 3.

ii. The "Epidemic Curve" Phenomenon: Challenging Static Equilibrium

A central theoretical contribution is the identification of an "epidemic curve" in maternal mortality occurrence, see figure 3. Rather than a static or stable trend, data from Kano State revealed pronounced volatility, with the MMR peaking at 3,638 per 100,000 in 1992 and plummeting to 1,026 per 100,000 in 1995.

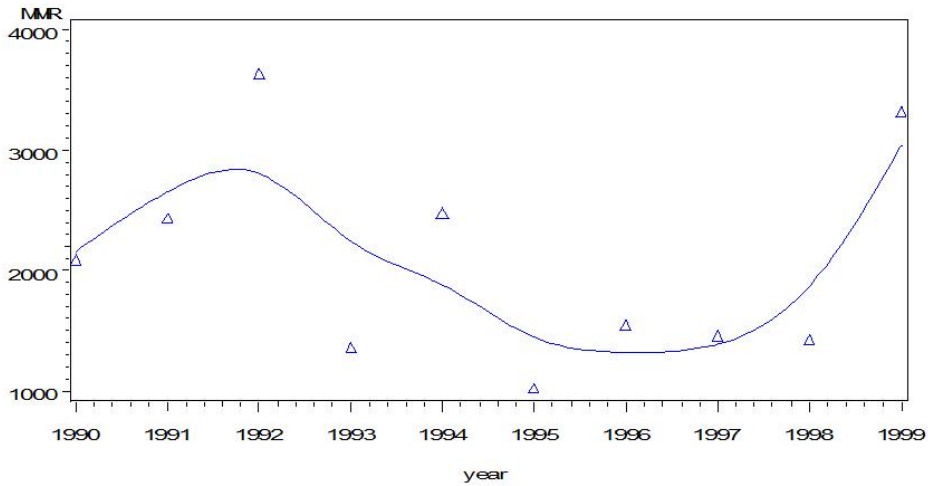


Figure 4: *Epidemic curve for maternal mortality in Kano State, 1990-1999*

This finding challenges the prevailing assumption of a "static equilibrium" and re-conceptualizes maternal mortality as a dynamic, responsive phenomenon, see figure 4. This paradigm shift advocates for moving beyond simplistic annual averages toward a surveillance-based approach that tracks maternal deaths as a process with identifiable triggers and opportunities for intervention. The epidemic curve serves as a critical signal that systemic changes carry life-or-death consequences, demanding the same rigour in monitoring and response applied to infectious disease outbreaks.

This dynamic conceptualisation resonates with Relph's (1976) observation that places are "emerging or becoming", they are not static entities but are "with historical and cultural change new elements are added and old elements disappear. Thus places have a distinct historical component." Maternal mortality in Kano is not a fixed characteristic of the place but a dynamic outcome of ongoing changes in health systems, economic conditions, and social relations within those places. The epidemic curve reveals that place-based health outcomes are responsive to intervention, making the identification of appropriate, place-sensitive interventions all the more critical.

iii.Spatial Disparity and the Geography of Risk

The spatial analysis revealed a stark and troubling geography of risk. health-care utilization was heavily skewed toward urban centres, with Kano Central Zone (Urban): Captured 68.4% of all hospital deliveries and Kano North-West Zone (Rural): Recorded the highest mortality risk with an MMR of 4,477/100,000 and a Case Fatality Rate of 9.2%

This disparity is diagnostic, illustrating that a woman's chance of survival was tragically determined by her location, with rural areas suffering the highest risk precisely because of the poorest access to emergency obstetric care. This was not merely a health system problem but a humanitarian crisis unfolding silently in homes, villages, and the admission rooms of overburdened hospitals.

The spatial disparity documented here exemplifies what Relph (1976) identifies as the "spirit of a place",the "invisible constant" that shapes the character and possibilities of a location. For rural women in Kano State, the spirit of their place is one of profound vulnerability, where the physical and social geography conspire to make survival a matter of tragic chance. The place itself (the rural area) is not merely a backdrop to maternal death but an active determinant of it.

Furthermore, this finding illustrates Relph's (1976) concept of "districts or regions of particular significance, defined by the interests and experiences of the groups concerned." The rural zones of Kano constitute a region of particular significance for maternal mortality precisely because the interests and experiences of the women there (shaped by poverty, cultural norms, and limited access to care) create a geography of exceptional risk.

Urban vs. Rural: Different Epidemics, Different Solutions

A critical contribution of my research is the discovery that maternal mortality manifests differently in urban and rural settings, requiring distinct intervention strategies.

Urban Kano - The Eclampsia Epidemic

The leading direct obstetric cause of death in urban areas was Eclampsia, accounting for 31.3% of certified deaths. This indicates that while urban women had better access to facilities, they were still dying from preventable complications requiring timely, quality emergency care. The urban epidemic is one of quality of care because once a women reach the facility, the system must be equipped to manage hypertensive emergencies.

This novel finding, published in the 2003 article in the *European Journal of Obstetrics and Gynaecology and Reproductive Biology* (109:153-159), directly informed the Population Council New York's intervention on the use of Magnesium Sulphate for treating Eclampsia and Obstetric Haemorrhage in Northern Nigeria from 2007. I was formally invited during the launching of the intervention in Kaduna and introduced as the author of the paper that attracted their attention and ultimate intervention. The use of magnesium sulphate in the treatment of eclampsia has saved many lives. Today, the figures have declined and fewer women die from this fatal complication. If this is all I have done, I am highly satisfied with my contributions.

The urban-rural distinction in maternal mortality patterns demonstrates what Relph describes as the "inside-outside" dimension of place experience. Urban women are "inside" the health system to a greater degree and they have access to facilities, attend antenatal care, and deliver in hospitals. Yet they experience a different kind of "outsideness", they are inside the system but are not adequately served by its quality. This relates to Relph's concept of "behavioural insideness", being in a place and seeing it as a set of objects, views, and activities, which is a more superficial form of place experience. The urban women may be behaviourally inside the health facility, but the quality of care fails to provide empathetic insideness. the deeper, more meaningful experience that comes from genuine engagement with the place's potential.

Rural Kano - The Anaemia Burden

In stark contrast, the leading cause of death in rural areas was anaemia (an indirect cause), responsible for 38.8% of deaths, followed by prolonged/obstructed labour at 13.4%. This distinction is critical. Anaemia as a leading cause of death signals the underlying poverty and malnutrition that characterise rural life. Women in rural areas are not dying primarily from obstetric complications; they are dying from chronic deprivation that makes them vulnerable to complications that would otherwise be survivable. Addressing rural maternal mortality requires tackling the fundamental determinants of health: nutrition, poverty, and access to basic care. My MSc student, (Maimuna Nabegu) from ADUST, Wudil is currently conducting study in Kausani to see what changes have occurred or not occurred after twenty-six years of the earlier study.

The rural phenomenon reflects a profound alienation from the places and systems that could provide care or what is termed as "existential

outsideness". Rural women are not merely physically distant from health facilities; they are existentially outside the world of modern health-care because their material conditions, cultural frameworks, and social structures do not align with those of the formal health system. This is not simply a matter of distance but of meaning; the health facility holds little significance in the lived geography of rural women and their families.

The Five-Stage Model of Seeking and Receiving Obstetric Care

Another invaluable contribution to the understanding of non-medical determinants of maternal death, developed from my doctoral work and updated fifteen years later, is the culturally specific "Five-Stage Model of Seeking and Receiving Obstetric Care in Rural Kano." I developed through a series of Focus Group Discussions, interviews and also in-depth interviews, and women (and men too) of reproductive age across all the eight settlements in Kausani ward, It describes the sequential pathway a pregnant woman in rural Kano typically follows when experiencing a complication, explaining why delays are so pervasive and fatal. This model was inspired by and built upon the architecture of the Three Phases of Delay Model (Thaddeus and Maine, 1994).

The model is fundamentally about the journey through different settings of care (the home, the traditional healer's compound, the chemist shop, and the health facility) each possessing its own meaning, significance, and limitations as shown on Table 1.

Table 1: *The Five-Stage Model of Seeking and Receiving Obstetric Care in Rural Kano*

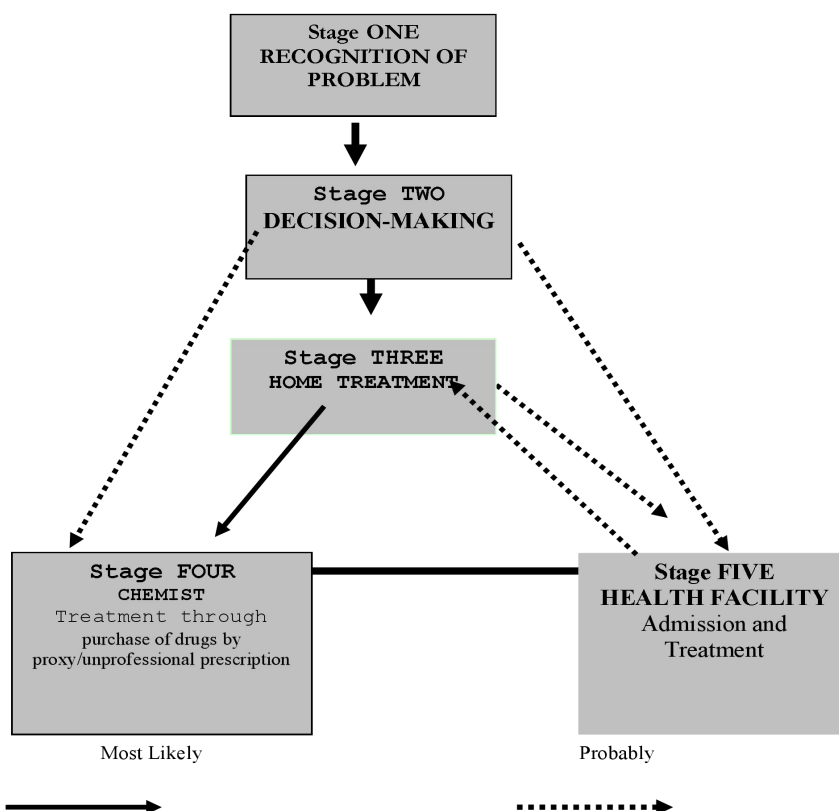
Stage	Name	Description
i	Recognition of the Problem	The process begins with the identification of a health problem.
ii	Decision Making	Decisions are made regarding short-term and long-term actions.
iii	Traditional/Religious Treatment	Initial efforts involve local medication such as rubutu (Qur'anic verses), tofi (incantations), or herbal mixtures.
iv	Chemist	If no improvement occurs, care is often sought by proxy at patent medicine stores for drug purchase and self-administration. (Most Likely path)

Stage	Name	Description
v	Health Centre Admission/Treatment	Seeking formal medical attention from a hospital, which serves as the final resort. (Probable path)

The Five-Stage Model documents the immediate experiences of women and their families as they navigate these places, a journey that is both a geographical and an experiential process shaping outcomes. The central insight is that women do not perceive the health facility as their first option but as the final stage in a progression.

The model shows a progression: Recognition of Problem → Decision-Making → Home Treatment (*Rubutu*/herbs) → Chemist (by proxy) → Health Facility (as a last resort). This sequential journey explains the fatal delays at the community level, see figure 5.

Conceptually, this can be understood as a shift from "insideness" to "outsideness." The family begins "inside" the home and community, where traditional and religious practices are meaningful and familiar. The health facility, by contrast, represents an "outside" referring to a place that is culturally distant, unfamiliar, and often untrusted. The journey through the five stages is not merely a physical movement but a progression from one set of cultural meanings to another, carrying all the tensions and barriers that this entails.



Stages III and IV are not a separate delay but an active prolongation of Delay I, during which families pursue culturally sanctioned alternatives, filling the 24-48 hours of perceived "normal" labour with *rubutu*, herbs, and chemist visits.

Stage V represents the transition to Delay II (transport) and, upon arrival, vulnerability to Delay III (facility quality).

The integration of the Three Delays Framework with the place-based understanding of the Five-Stage Model reveals how the meaning of a place shapes delay. Delay I is a product of the home and community, where 24 hours of labour is not recognised as a delay because it is culturally understood as normal. Delay II is shaped by the physical geography of the region, the distance to the health facility and the condition of roads. Delay III is shaped by the institutional geography of the health facility itself.

The Health Belief Model as Cognitive Engine

Rosenstock's (1974) Health Belief Model explains the cognitive processes at each stage:

Perceived Susceptibility: Does the family believe this woman is at genuine risk? For a 15-year-old primigravida in her 20th hour of labour, the answer is often no.

- i. Perceived Severity: Is a 24-hour labour framed as dangerous or as normal? Data show 88.8% consider 24 hours normal, drastically lowering perceived severity.
- ii. Perceived Benefits of Action: What is gained by hospital delivery? A live baby? A surviving mother? But what is lost? Dignity, modesty, community approval, financial security.
- iii. Perceived Barriers to Action: Cost (44.8% cite financial constraints), distance, husband's permission (17.2%), health worker attitudes, and fear of Caesarean section.

Applied within this place-based framework, the Health Belief Model reveals that these cognitive perceptions are not abstract calculations but are fundamentally conditioned by the cultural meanings, social relations, and material conditions of the places where women live.

Medical Anthropology: Explanatory Models and Symbolic Capital

Kleinman (1980) teaches that every health system is embedded in an explanatory model, a culturally specific account of what causes illness, what constitutes appropriate treatment, and who holds authority to heal. In rural Kano, the family's choice of treatment is not irrational but is a coherent match of treatment to aetiology:

- i. A spiritual aetiology (*iskoki/aljanu*, maita/sorcery) requires a spiritual treatment (*rubutu, tofi*).
- ii. A structural aetiology (*Kakanda*) requires a structural intervention (incision or fasting).
- iii. A biomedical aetiology (haemorrhage, infection) requires a biomedical response (hospital).

The tragedy is that this framework misclassifies many biomedical emergencies as spiritual or structural. Bourdieu's (1986) concept of symbolic capital further explains why the Malam (Qur'anic scholar) is trusted more than the doctor. The Malam commands moral authority, community embeddedness, and religious piety, while the doctor commands technical expertise but possesses no symbolic capital in the community. The family's choice is, therefore, a choice between competing economies of trust.

Gender Theory: The Quiet Architecture of Delay

The model also makes visible a gendered architecture of delay that is often invisible in quantitative surveys:

- i. Financial Control: Women rarely control financial resources. When asked why they do not attend antenatal care, 44.8% cited financial constraints but the money is not theirs to spend.
- ii. Husband's Permission: Cited by 17.2% of women as a barrier. Even when husbands are willing, their fathers may overrule them.
- iii. Purdah (Seclusion): Restricts women's movement; some men do not allow their wives to leave the compound for any reason, including antenatal care.
- iv. Gori (Public Shame): The fear of being labelled a coward disciplines women's behaviour. A woman who delivers in the health facility may be scolded: "*Ba ta yi haihuwar dadi ba*" (she had a bitter delivery).

This gendered architecture is a geography of power, shaping the spaces women can access and the pathways to care available to them, which is central to understanding why maternal mortality persists.

The Enhanced Model: Zones, Loops, and Dynamics

Integrating the empirical data with these theoretical frameworks yields an updated and enhanced model with three critical zones and a crucial feedback loop. It is illustrated in figure 6.

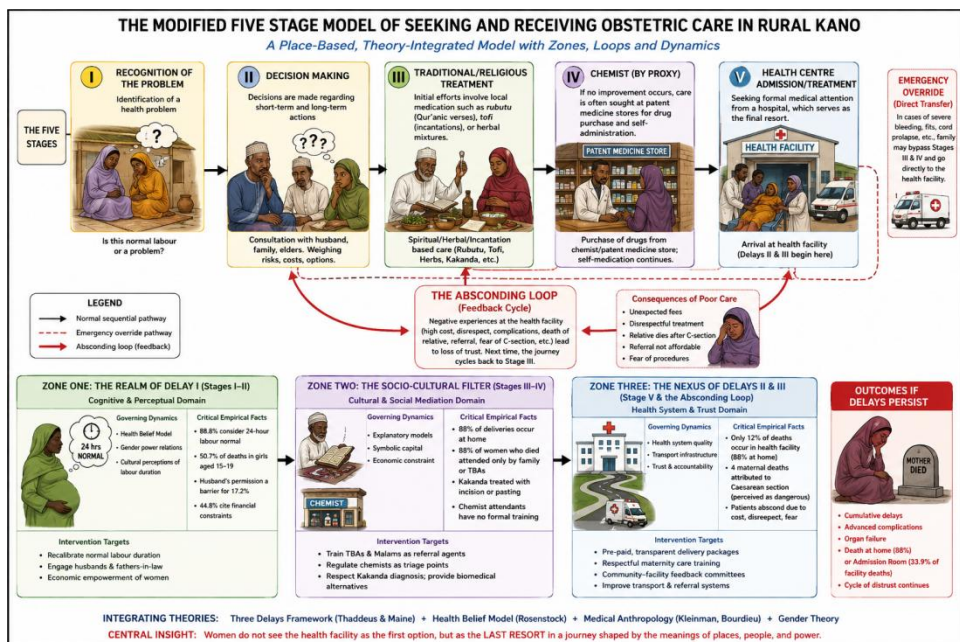


Figure 6: The Enhanced Model: Zones, Loops, and Dynamics

The features of the improved model are as follows:

a. The Absconding Loop

The most consequential addition is a feedback cycle. When a woman experiences poor treatment at the facility such as unexpected fees, disrespectful staff, a relative's death following a Caesarean section, or a referral she cannot afford, she returns home with a powerful lesson: the health facility is not safe. Her next pregnancy will not skip from Stage II to Stage V. It will cycle back to Stage III, with the previous failure now serving as empirical proof that traditional care is superior.

Of the 67 maternal deaths, 4 were attributed to Caesarean section complications, reinforcing community fears that C-section is dangerous. Among the 107 pregnant women, fear of health facility procedures was a

recurring theme. This absconding loop is the central mechanism by which Delay III (poor quality care) perpetuates Delay I (failure to seek care). Breaking it requires not merely building more clinics but rebuilding trust in the clinics that exist.

b. The Emergency Override

Not all journeys follow the sequential path. In unambiguous, visible emergencies such as heavy haemorrhage, a prolapsed cord, a seizure families sometimes bypass Stages III and IV entirely, moving directly from problem recognition to facility care. This override is activated by signs that the explanatory model codes as unequivocally biomedical rather than spiritual. However, data suggest that such overrides are rare. Only 12% of women who died did so in the health facility; 88% died at home, indicating that most families never activated the emergency override, or activated it too late.

iii. Three Theoretical Zones

The enhanced model can be understood in three zones, each with its own governing dynamics and intervention targets as follows:

Zone One: The Realm of Delay I (Stages I-II)

Governing Dynamics: Health Belief Model, gender power, cultural perceptions of labour duration.

Critical Empirical Facts: 88.8% of women consider 24-hour labour normal; 50.7% of maternal deaths occur in girls aged 15-19; husband's permission is a barrier for 17.2%; 44.8% cite financial constraints.

Intervention Targets: Recalibrate perceived normal labour duration; engage husbands and fathers-in-law as champions; economic empowerment of women.

Zone Two: The Socio-Cultural Filter (Stages III-IV)

Governing Dynamics: Explanatory models, symbolic capital, economic constraint.

Critical Empirical Facts: 88% of deliveries occur at home; 88% of women who died were attended only by family or TBAs; Kakanda is culturally real and treated with incision or pasting; chemist attendants have no formal training.

Intervention Targets: Train TBAs and Malams as referral agents; regulate chemists as triage points; respect Kakanda as a cultural diagnosis while providing biomedical alternatives.

Zone Three: The Nexus of Delays II and III (Stage V and the Absconding Loop)

Governing Dynamics: Health system quality, transport infrastructure, trust.
Critical Empirical Facts: Only 12% of deaths occurred in the health facility (88% at home); 4 maternal deaths attributed to Caesarean section (perceived as dangerous); patients abscond due to cost, disrespect, or fear.
Intervention Targets: Pre-paid, transparent delivery packages; respectful maternity care training; community-facility feedback committees.

Linking the Five-Stage Model to the "Place of Death" Finding

While the model was developed to explain delays in rural settings, it also provides a powerful explanation for the "Place of Death" finding, even in urban settings.

In rural Kano, 88.0% of the women who passed on died at home; only 12% died at the hospital in Wudil. In urban Kano, where 41% of women deliver at home despite 84.7% antenatal visits, the study found a significant cluster of deaths in the Admission Room of Murtala Mohammed Specialist Hospital (33.9% of facility deaths). The linkage is explained by:

Cumulative Delay: The sequential journey through Stages I–IV creates a massive, cumulative delay. Days of indecision, home remedies, and ineffective treatments at the chemist are compounded. By the time the family decides to go to the health facility, the woman is often in a state of irreversible organ failure.

Health Facility as a "Last Resort": The model shows that the health facility is not considered a first or even second option, but a final resort. Women are not brought for preventative or early-intervention care; they are brought only when the situation is visibly desperate.

Admission Room as the "End Point": When these critically ill women finally arrive, they are admitted to the Admission Room for initial evaluation. However, because of the extensive pre-health facility delays, their conditions are already so severe that they die during this initial assessment. The admission process itself is too late because the "race" against time was lost long before they reached the facility.

Phase III Delay on Arrival: Even if a woman has a chance, the bureaucracy of the Admission Room (waiting for doctors, purchasing drugs/blood) introduces a Phase III delay. This final, health facility-based delay is the last fatal link in a chain that began days earlier in the village.

In essence, the Five-Stage Model explains the "why" behind the "Place of Death" statistic. The high proportion of deaths in the Admission Room is not merely a health facility problem; it is a direct and tragic consequence of the deep-rooted socio-cultural and economic barriers that force women through a long, dangerous, and ultimately fatal pathway to care. The model reveals that the Admission Room is the endpoint of a failed journey, the tragic intersection where cumulative delays from the community meet the final, often fatal, delays within the health system itself.

Barriers to Care: Quantifying the Obstacles

The research identified and quantified the key socio-cultural and economic barriers preventing women from accessing antenatal and delivery care.

Rural Areas

In rural areas, the barriers were most severe and interconnected:

- i. Financial constraints: 44.8% of women cited cost as a barrier to accessing care.
- ii. Distance to facilities: Women in rural areas faced long distances to the nearest health facility.
- iii. Lack of transport: Even when facilities were accessible, transport was often unavailable or unaffordable
- iv. Cultural norms: Traditional practices and beliefs shaped health-seeking behaviour.
- v. Gender dynamics: Husbands' permission was required for care-seeking (17.2% cited this as a barrier).

Urban Areas

In urban areas, the barriers were different but equally significant:

- i. Quality of care concerns: Women cited disrespectful treatment, long waiting times, and perceived poor quality.
- ii. Unexpected costs: Even when women planned to deliver in facilities, unexpected fees were common.
- iii. Health worker attitudes: Poor attitudes of health workers discouraged women from using facilities.
- iv. Fear of procedures: Fear of Caesarean section and other interventions deterred facility delivery.

Cultural Practices

The study documented the influence of harmful traditional practices, including:

- a. Early marriage: Rural women marry as early as 10-14 years
- b. *Kakanda* cut: Traditional incision on the vaginal wall.
- c. *Juriya* (endurance): Cultural norm that encourages women to tolerate pain and delay seeking help.

These barriers are fundamentally about the meaning of place. The financial constraints, the cultural norms, the gendered power relations, all of these shape how women experience the place of the health facility and whether they can access it. Relph (1976) notes that the meanings of places may be rooted in the physical setting and objects and activities, but they are not a property of them, rather they are a property of human intentions and experiences. The barriers to care documented in this research are not merely features of the health system but are products of the meanings that women and their families attach to the places of care, meanings that are shaped by culture, gender, and economic circumstance.

Health System Failures

The Rural-Urban Utilisation Paradox

In the Kano South-West zone, a striking paradox was found: the number of women reporting to health facilities with complications was higher than the number who actually delivered there. This indicates that many women only use the formal health system when complications arise, rather than for delivery itself. The health system is being used as a rescue service, not as a preventive or supportive service.

This paradox reveals a fundamental misalignment between the health system and the cultural geography of place. The health system is designed as a place for all deliveries, but it is experienced by women as a place of last resort. This misalignment is not an accident but a product of the meanings that women and their families attach to the health facility, meanings shaped by cultural distance, financial constraints, and experiences of disrespect or poor quality care.

Place of Death: The Admission Room as a Graveyard

A significant finding was that 33.9% of urban maternal deaths at the Murtala Mohammed Specialist Hospital occurred in the Admission Room. This highlights the impact of:

Phase III delay: Delay in receiving adequate and appropriate care upon arrival at a facility.

Late arrival: Women arriving already critically ill after extensive pre-health facility delays.

The Admission Room as a place of death is a powerful symbol of the failure of the health system to engage with the cultural geography of maternal care. It is the place where the cumulative delays of the Five-Stage Model converge with the institutional delays of the health system. It is a place where women are physically present but existentially absent; their bodies are in the health facility, but their fate was sealed long before they arrived.

This can be seen from the concept of "existential outsidership" as involving a self-conscious and reflective uninvolvedness, an alienation from people and places, homelessness, a sense of the unreality of the world, and of not belonging. The women who die in the Admission Room experience a profound existential outsidership, they do not belong in the health facility, and the health facility does not belong to them. The system's failure to provide timely, respectful, and effective care is not just a technical problem but a failure of place, a failure of the health facility to become a meaningful place of care for the women it is meant to serve.

Implications for Policy and Intervention

If the enhanced model is correct, several conventional intervention strategies are misdirected.

What Does Not Work

- a. Blaming women or their families for "late coming" is unjust and ineffective.
- b. Generic awareness campaigns that list danger signs in clinical English or Hausa without embedding them in local explanatory models do not change behaviour.
- c. Condemning *Kakanda* or *rubutu* while offering no culturally credible alternative only drives care further underground.
- d. Dismissing "God's will" as a reason for not attending ANC ignores the theological framework that must be engaged, not dismissed.

These ineffective interventions share a common feature: they fail to engage with the place-based meanings that shape health-seeking behaviour. As Relph (1976) argues, sense of place may be authentic and genuine, or it

can be inauthentic and contrived or artificial. Interventions that fail to engage with authentic local meanings are themselves inauthentic, they operate from an outside perspective that does not grasp the lived experience of the community. Such interventions are likely to fail because they attempt to impose a logic that is foreign to the place.

Recommended Interventions by Zone

Zone One Interventions:

- a. Recalibrate perceived normal labour duration through community education.
- b. Engage husbands and fathers-in-law as champions for maternal health.
- c. Economic empowerment of women.
- d. Community-based education on danger signs using culturally appropriate messaging.

Zone Two Interventions:

- a. Train TBAs and Malams as referral agents rather than competitors.
- b. Regulate chemists as triage points with basic training.
- c. Respect Kakanda as a cultural diagnosis while providing biomedical alternatives.
- d. Engage religious leaders in health promotion.

Zone Three Interventions:

- a. Pre-paid, transparent delivery packages to eliminate unexpected costs.
- b. Respectful maternity care training for all health workers.
- c. Community-facility feedback committees to rebuild trust.
- d. Improve transport and referral systems.

These interventions are fundamentally about transforming the meaning of place, therefore, making the health facility a place of trust rather than fear, a place where women belong rather than a place of last resort. The possibilities for maintaining and reviving man's sense of place do not lie in the preservation of old places that would be museumisation; nor can they lie in a selfconscious return to the traditional ways of place-making that would require the regaining of a lost state of innocence. Instead, *placelessness* must be transcended.

The interventions recommended here are attempts to transcend the placelessness of the current health system to make the health facility a place that is meaningfully connected to the community it serves. This requires not just technical improvements but a fundamental reorientation

of the health system toward engagement with local cultures, economies, and gender relations.

Conclusion

This model moves beyond simply describing the magnitude of the problem. It provides:

- i. A new conceptual framework (the epidemic curve) that challenges the assumption of static equilibrium in maternal mortality.
- ii. Empirical documentation of one of the highest population-based MMRs ever reported globally.
- iii. A systematic geographical analysis exposing profound inequalities in the geography of care.
- iv. Differentiation of the nature of the crisis between urban and rural areas.
- v. A culturally specific Five-Stage Model explaining the pathway to care and the fatal delays at the community level.
- vi. Theoretical integration with four established frameworks to build a more powerful explanatory model.
- vii. Identification of the "absconding loop" as the central mechanism by which health system failures perpetuate community-level delays.
- viii. Quantification of barriers to care in both rural and urban settings.

The urban findings, in particular, led to a targeted, life-saving intervention for eclampsia through the Population Council's introduction of Magnesium Sulphate in Northern Nigeria from 2007, demonstrating the direct and impactful application of this research.

The model clearly show that addressing maternal mortality in Kano State requires not merely building more clinics but rebuilding trust in the clinics that exist; not merely listing danger signs but engaging the explanatory models that govern health-seeking behaviour; and not merely blaming women for late arrival but dismantling the gendered architecture of delay that begins long before the first symptom appears.

The Geography of Death in Place

My fundamental argument is that maternal mortality is not only a medical problem but a geographical one, a problem of place. The places where women live, give birth, and die are not neutral settings but are shaped by cultural meanings, social relations, economic conditions, and health system realities that together determine outcomes. Relph's (1976) concept

of place and placelessness provides a powerful framework for understanding these dynamics. The places of maternal care in Kano are not simply locations on a map but are centres of meaning, identity, and experience that profoundly shape health-seeking behaviour and outcomes.

The Five-Stage Model reveals the cultural geography of maternal care, the journey through different places, each with its own meanings and constraints. The "absconding loop" reveals how health system failures can transform the meaning of the health facility from a place of healing to a place of danger. The spatial disparity between urban and rural areas reveals how the geography of risk is shaped by the geography of care. The high proportion of deaths in the Admission Room reveals how the health facility can be a place of death rather than a place of life.

Addressing maternal mortality requires more than technical interventions; it requires a transformation of the geography of care by making the health facility a place where women belong, where they are respected, and where they can receive the care they need in time. This is a geographical project as much as a medical one, it is a project of creating meaningful places of care that are integrated into the lived geography of communities.

As Relph (1976) insisted, a deep human need exists for associations with significant places. If we choose to ignore that need, and to allow the forces of placelessness to continue unchallenged, then the future can only hold an environment in which places simply do not matter. If, on the other hand, we choose to respond to that need and to transcend placelessness, then the potential exists for the development of an environment in which places are for man, reflecting and enhancing the variety of human experience.

In the context of maternal mortality, this means creating health facilities that are not just buildings but are meaningful places; places where women belong, where they are respected, and where they can receive the care they need in time. This is the fundamental challenge that this research illuminates and the fundamental opportunity it presents.

SECTION FOUR

PLANTING THE SEEDS: STUDENTS’ SUPERVISION



Figure 7: Conceptual framework of the Kano School of Health and Medical Geography

Mr. Vice Chancellor, distinguished guests, this section of the lecture focuses on the foundation of health and medical research in Bayero University Kano. I will discuss the students I have supervised at undergraduate to postgraduate levels and the output of their research through publications. This is important because it is the foundation that built the legacy.

Before I tell the story of the students I supervised, I will share with you a brief about how I supervise my students and the kind of relationship we keep. From the very beginning, I have viewed my supervisees not just as students, but as ambassadors of medical geography. I don't ask where you come from, I don't ask about your religion or see your gender, what I see is a medical geographer in the making. I ensure they master their subject matter completely, they must understand the medical and health dimensions of their work and know precisely how to situate them within

geographic thought. For my undergraduate students, while I encourage innovation, I also provide clear, step-by-step guidance on what to do and how to do it. This structure has consistently helped them achieve excellent grades.

My postgraduate students, spread across different levels, have had to endure my rigorous mentoring system. Yet, they find consolation in my genuine commitment to their growth. From day one, I make it clear: they must work, and they must earn their degrees. Their work is their own; I am simply a guide, showing them the right path. For my doctoral candidates, I emphasize that a PhD is serious business. Like all true scholars, they must master their art and become experts in their own right.

When a student is assigned to me, I lay out my terms and conditions openly and give them the freedom to choose another supervisor if they feel my approach is not for them. I give them my numbers and usually tell them, I don't like calls, but they can text me any time. I also encourage them to always follow up when they submit their work, this keeps me on my toes, it helps me always. My students are used to me telling them "You must be able to explain any aspect of your work when someone wakes you up in the middle of the night," and for doctoral students I often tell them, "You must earn your doctorate, so that when others call you 'Doctor,' you feel it deep in your heart." Though I provide every necessary assistance and guidance (sometimes sending them to other experts within or outside the department for areas beyond my expertise) my doctoral students have 24/7 access to my office, see plate 1. There is always a spare key and chair for a PhD candidate, (see plate 1) a quiet space they can use whenever they choose, to give them comfort and focus. Occasionally, I invite some of them to teach topics in my classes.



Plate 1: *Extra chair for doctoral candidates*

Academically, I am tough. But on personal challenges, I am soft and considerate. I often serve as a counsellor, and we share an understanding that everything we do during their studies is meant to make them better. Still, there will always be students who misunderstand me, until they finish their work and call back, thanking me. It is because of this unique bond that three of my former postgraduate students have honoured me in the most profound way: they named their children after me, as shown in Plate 2. It is gratifying to see the three Yusufs represent the North; Yusuf Kolo from the North-East, Yusuf Mahmud from the North-Central, and Yusuf Al-Mustapha from the North-West. Perhaps they will take this legacy into the distant future.



Plate 2: *My namesakes*

The children are called "Prof." I pray these children will prosper and excel wherever life takes them. I wish to express my deepest gratitude to Prof. Mahmud Abubakar (NSUK), Prof. Mustapha Adam Kolo (UNIMAID), and Dr. Muhammad Mustpha (SLU) for this lasting tribute. Their trust and recognition mean more to me than any award.

Before I speak about our research and what we have achieved, let me pause to honour those who made it all possible. I pay tribute to the pioneer students, those whose project was in medical geography and those who were the first to register for the course at Bayero University, Kano. These young men and women volunteered into an unknown territory. They were bold. They were courageous. They trusted a vision that had no precedent, no guarantees, only possibility.

In my first year of active recruitment (1995), I was fortunate to convince five courageous students to become the guinea pigs of undergraduate medical geography research at BUK. They accepted the risk of venturing into an uncharted academic territory, with no guarantee of success or high marks. These five pioneers and their projects are listed on table 2.

Table 2: Pioneer Students in Medical Geography Research

S/N	Student Name	Project Title
1	Muhammed Sule	Spatio-temporal patterns of measles in urban Kano, Nigeria
2	Tolani Abayomi	Tuberculosis in urban Kano: A geographical perspective
3	Etinge Lilian Ngobeh (Caeroonian)	Sickle-Cell Disease in urban Kano: A geographical perspective
4	Usman Rabi Mudi	Spatio-temporal patterns of Cerebro-Spinal Meningitis in urban Kano
5	Solomon Okopi	The Utilisation of the Maternity Unit of Uturpko General Hospital, Benue State

I did not have a course to teach them. I did not have a template to give them. I had only some guidance and strong conviction that geography had something urgent to say about why people fall sick and where they go for help. These five students trusted that conviction. I remain indebted to them.

I remain deeply grateful to them for opening the gates. They were the first to venture into medical geography research. Then the second group who were the first to be formally taught medical geography, and from them, all other things follow. Hundreds of students have since walked the path they carved. It is worth noting that we had already begun research in this field even before we began teaching it at undergraduate level. The field was being born even as we were still learning to name it. While those who are the first to do research are listed on Table 2, the first set to be taught are listed below.

1. Murtala Muhammad Badamasi (now Professor-BUK)
2. Auwal Farouk Abdulsalam (now Professor-KASU)
3. Adeniyi Solomon Omolola
4. Abosede Lawal
5. Adenike Ajibade (PhD)
6. Kabir Idris (Associate Professor)
7. Abosede Omotayo Ogundele
8. Murtala Rabi (PhD)
9. Rabilu Garba Abdulkadir

10. Mahmoud Hassan
11. Rabi'u Abubakar Rabi'u
12. Bilkisu Musa Ahmed
13. Bashir Inuwa
14. Emmanuel Ogbumbada
15. Henry Enefom

Unfortunately, we could not trace the group photograph. The next are shown on plate 2.



Standing (L-R) Saude Abdulkareem, Mal. Muktar, Adeola Akosile, Olatilewa Oladipo, Kayinde, Salisu Lawal Halliru (Officer), Muhammad Yahaya, Ify Abomele, Mustafa, Abubakar Adamu. Sitting (L-R) Khadija Muhammed, Nnasha Yusuf, Prof. Yusuf Muhammad Adamu (course lecturer), Fatima B.M. Sani, Esther Luka. Squatting (L-R) Abdulkadir Sani, Binta Zakari.

Plate 3: *The Second Class of Medical Geography at Bayero University, Kano (2000)*

Plate 3 captures them, frozen in time, yet alive in legacy. Look at their faces. You will see not just students, but founders. Not just learners, but pioneers. They were among the first seeds of a lineage that continues to grow and bear fruit across Nigeria and beyond. To them and two sets before them, every single one, I say thank you. Your courage was not in vain.

Among the pioneers (both research students and those I taught), three stand out, who have remained steadfast to this day. One of them, Associate Professor Nura A. Yaro (NWU, Kano), was a pioneering research student who worked on medical waste and completed his PhD under my supervision. Another is Professor Faruk Abdulsalam (KASU), from the pioneer class. Though a climatologist, he has maintained a keen interest in medical geography; his doctoral work: *Climate Influences on Infectious Diseases in North-West Nigeria*, testifies to that. Then there is Binta Zakari. She returned to BUK for her MSc in Medical Geography, which I supervised, and today she is pursuing her PhD in Medical Geography (working on chronic kidney disease) at Aliko Dangote University of Science and Technology, Wudil, co-supervised by my former student, Dr. Ismaila Ibrahim Yakudima. They are proofs that the pioneer spirit does not fade. It endures. It grows. It gives back.

For over thirty years (from 1995 to 2026), I have watched young researchers walk into my office with a question. Often a simple question about public health issue or their community. About a disease they saw affecting their neighbours. About a clinic a mother could not reach. About a child who was sick for reasons no one could explain. I have watched them walk out years later as PhD holders, as university lecturers, as public health experts, policymakers, and as leaders in health research across Nigeria. Today, I honour their work. Because mentoring is not a side activity in a university professor's life. It is the primary way we multiply ourselves.

Let me tell this story in two parts. First, the foundation: my undergraduate students. Second, the superstructure: my postgraduate scholars. Together, they represent a research tradition that has put health and disease in place for three decades.

Undergraduate Supervision: The Foundation

Overview and Scale

Between 1995 and 2023, I supervised over 200 undergraduate projects while about 110 are exclusively in Health and Medical Geography (in addition to more in other areas). I have supervised all kinds of BSc research projects studying spatial patterns of ‘Yan daba, football clubs supporters, cemeteries, primary schools, Islamiyya schools, Qur’anic schools and many other weird phenomena. For this lecture, I have selected 67 of them, exclusively those in medical geography (because they are the only records I have), as representative of the full corpus.

Let me say that again. 110 undergraduate projects. That is not a number but a movement. It confirms that medical geography has been the dominant thread of my mentorship at the undergraduate level, not occasionally, not incidentally, but consistently for three decades. All 67 projects examine the spatial, environmental, behavioural, or service-related dimensions of health and disease across Nigeria.

Temporal Distribution

The peak came between 2000 and 2004, with 22 projects, 34%. That was no accident. It coincided with renewed national interest in health facility distribution, maternal mortality reduction, and barrier analysis for antenatal care, themes that later became central to Nigeria's Millennium Development Goals. My students were not just doing assignments. They were doing policy-relevant geography before that phrase became fashionable.

Between 2005 and 2009, 12 projects – 19%. And between 2010 and 2016, another 12 projects – 19%, reflecting the emergence of my supervision at Kano University of Science and Technology, Wudil, and renewed attention to non-communicable diseases and maternal mortality.

Thematic Categorisation of All 67 Health Projects

The projects covered many themes ranging from infectious to non-infectious diseases, beyond that to other aspects of health and diseases such as maternal and child health and health facility distribution, addressing two major traditions of medical geography. Table 3 provides a summary while Figure 8 provides a graphic representation.

Table 3: *Thematic Categorisation of Undergraduate Projects*

S/N	Theme	Number	Percentage	Representative Titles
1	Infectious Diseases	19	28.4%	Malaria (6), Tuberculosis (4), Leprosy (3), CSM (2), STDs (1), Polio (1), Guinea worm (1), HIV/AIDS (1)
2	Maternal and Child Health	15	22.4%	Maternal mortality (2), Hospital delivery

S/N	Theme	Number	Percentage	Representative Titles
3	Health Facilities Distribution & Utilisation	12	17.9%	(4), ANC barriers (4), Obstetric complications (2), VVF (1), Eclampsia (1), Immunisation (1) Statewide facility distribution (18+ states), Private facilities, Pharmaceutical outlets, Islamic chemists, Traditional bonesetters
4	Non-Communicable Diseases (NCDs)	8	11.9%	Stroke (2), Breast cancer (1), Diabetes (1), Sickle-cell (1), Mental disorder (1), Dental (1), Pneumonia/asthma (1)
5	health-care Seeking Behaviour & Barriers	5	7.5%	Health seeking (Dutse), ANC barriers (Dawakin Kudu, Keffi, Borno)
6	Skin Diseases	3	4.5%	Skin diseases (Lagos, Asaba, urban Kano)
7	Traditional & Alternative Medicine	3	4.5%	Traditional bonesetters, Islamic chemists, Traditional medical services
8	Environmental Determinants	2	3.0%	Malaria determinants (Gezawa), Dam health implications

S/N	Theme	Number	Percentage	Representative Titles (Tafa LGA)
	Total	67	100.0%	

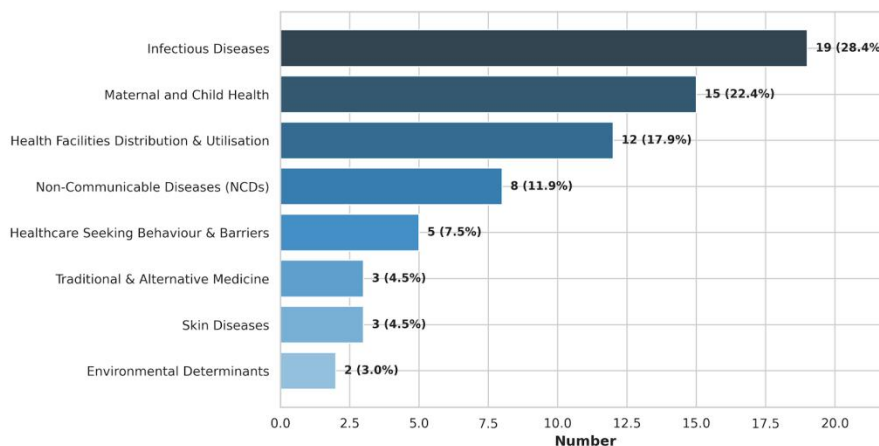


Figure 8: *Thematic Categorisation of Undergraduate Projects*

Infectious Diseases: The Dominant Theme

Infectious diseases dominated with 19 projects (30%). That makes sense. Malaria, tuberculosis, leprosy, meningitis, these were the killers of the 1990s and 2000s. My students mapped them, counted them, asked why they clustered in some places and not others.

Among these 19, malaria received the most attention – six projects. That reflects its status as Nigeria's leading cause of morbidity. But let me highlight one project in particular: the 2007 study on Environmental Determinants of Malaria in Gezawa Local Government Area, Kano State. Why? Because it marks a methodological shift in my supervision. Before 2007, most projects were descriptive – what diseases exist, how many cases. After 2007, my students began asking why – what environmental factors produce disease. That shift changed everything.

My students also studied tuberculosis, four projects, across Kano Metropolis, Bauchi State, and Lagos State. They studied leprosy (three projects), in Bauchi and Kano, a disease most researchers had abandoned. They studied cerebro-spinal meningitis in urban Kano – in 1995 and again in 2004. They studied sexually transmitted diseases in urban Kano in 1996 – a highly sensitive topic at the time.

They studied poliomyelitis in urban Kano in 1997 (Kehinde). They studied Guinea worm in Kano State in 1997 (Nura Yaro), now eradicated, but my student's work remains a historical record. They studied HIV/AIDS mother-to-child transmission in Kano State in 2008 (Faiza Sheshe) at a time when stigma kept many researchers away. My students went where others feared to go.

Maternal and Child Health – The Second Pillar

The second major theme was maternal and child health – 15 projects (23%). Fifteen projects on mothers and children Maternal mortality. Hospital delivery. Antenatal care barriers. Obstetric complications. Vesico-vaginal fistula. Eclampsia. My students were asking: Why do women die giving life? And why does geography have an answer?

Detailed breakdown:

Hospital delivery has 4 projects: factors influencing whether women give birth in health facilities, across Jos, Zaria, Lokoja, and urban Kano.

Barriers to antenatal care has 4 projects: in Dawakin Kudu (rural Kano), Keffi (Nassarawa), Borno State, and determinants of ANC utilisation in Daura, Katsina. This was comparative health geography thinking before I had a name for it. My students and I were asking: Are the barriers to maternal care the same everywhere? Or does place change the answer?

Maternal mortality has 3 projects: in urban Kano (1996), Zaria (2002), and at Murtala Muhammad Specialist Hospital in Kano (2016) – the only clinical facility-based study among all sixty-seven undergraduate projects.

Obstetric complications has 2 projects: one in Bauchi Town (1998) with a spatio-temporal approach, one in Agege Local Government Area, Lagos (2000) mapping spatial patterns.

Single pioneering projects: A 2005 study on the spatial distribution of Vesico-Vaginal Fistula patients in Kano – a condition so stigmatised that

most researchers avoid it entirely. A 1996 geographical perspective on eclampsia in urban Kano. A 2006 study on socio-demographic factors influencing child immunisation in Zaria. And a 2015 KUST project on utilisation of antenatal and obstetric care services in Wudil Local Government Area, Kano. Geography does not get to choose which problems are comfortable and my students understood that.

Health Facilities Distribution – Nationwide Coverage

The third major theme was health facilities distribution and utilisation, twelve projects (19%), (if I remember very well, we have covered over thirty states, but I lost the record). These projects mapped public and private health facilities across eighteen Nigerian states plus the Federal Capital Territory. From Kebbi to Borno, from Lagos to Adamawa, my students walked, measured, mapped, and asked: Where are the clinics? And who is left behind?

The list of states covered is extraordinary: Kebbi, Borno, Bauchi, Jigawa, Nassarawa, Lagos, Plateau, Ogun, Kaduna, Oyo, Ekiti, Osun, Adamawa, Taraba, Sokoto, Zamfara, Niger, Benue, and the FCT Abuja. My undergraduate students, not PhDs, not post-doctoral, did this work. They travelled. They counted. They came back with data that still informs planning today. See figure 9 for the geographical spread of the distribution.

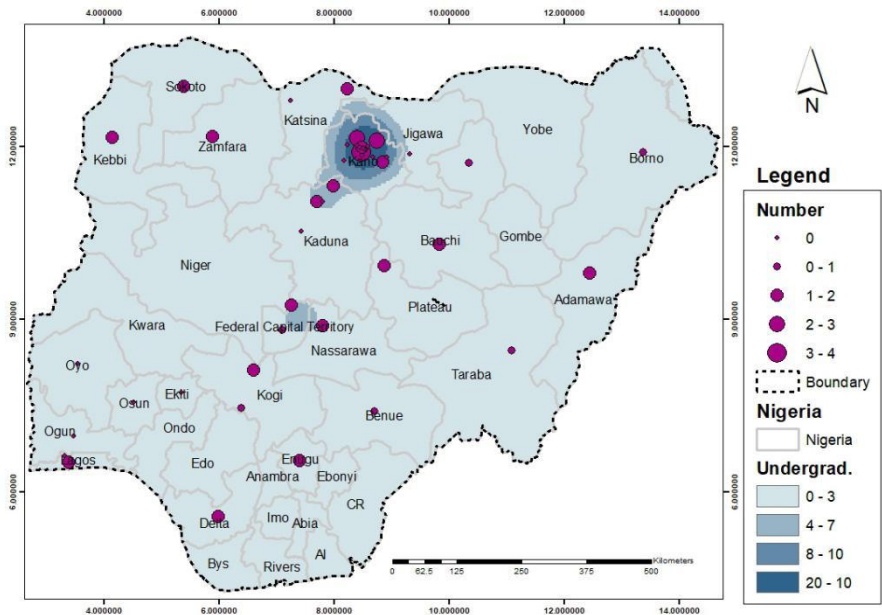


Figure 9: Geographical Spread of Undergraduate Projects

Beyond statewide distributions, my students studied public primary health facilities in Katagum Local Government Area, Bauchi State, in 2011. They studied health centres in Makarfi Local Government Area, Kaduna State, in 2014. They mapped private health facilities in urban Kano in 2000. They mapped pharmaceutical outlets in selected areas of urban Kano in 2004, a geography of drugs availability. They mapped Islamic chemists in Gwale Local Government Area, Kano State, in 2016, the first mapping of informal pharmaceutical providers operating within Islamic traditions. My student Muhammad Shu'aibu Muhammad did something no one else had thought to do. He mapped traditional medical services in urban Kano in 2000, an acknowledgment that in Nigeria, medical pluralism is not alternative but a necessity. One other student even studied the utilisation of health-care services at Bayero University Kano itself, in 2007.

My students taught me that the formal health system is only half the story.

Non-Communicable Diseases: Early Evidence

The fourth theme, and one I am particularly proud of, is non-communicable diseases – eight projects (12%). Now let me make a claim that might surprise you. I supervised projects on stroke, breast cancer, and diabetes as early as 1995 and 1996. That is fifteen years before non-communicable diseases became a recognised health priority in Nigeria.

Specifically:

- i. Two projects on stroke – one in urban Kano (1996), one in Kano Metropolis (2015).
- ii. One project on breast cancer in urban Kano (1996).
- iii. One project on diabetes in urban Kano (1996).
- iv. One project on sickle-cell disease in urban Kano (1995).
- v. One project on mental disorder in Kano State (2015) – supervised at KUST, this is the first undergraduate mental health geography study in the entire dataset.
- vi. One project on dental diseases in Zamfara State (2005).
- vii. One project on pneumonia and asthma in Lagos State (2002), studied alongside tuberculosis.

In 1995 and 1996, while most health geography in Nigeria was focused on malaria, measles, and meningitis, my students were asking about sickle-cell, stroke, breast cancer, and diabetes. Why? Because they saw these diseases in their communities. And I told them: Geography has something to say about every disease – not just the infectious ones. Long before "mental health" became a global concern, my undergraduate student Muhammad Sani Usman was mapping mental disorder in Kano State.

Health-Care Seeking Behaviour and Barriers

The fifth theme was health-care seeking behaviour and barriers: five projects (8%): A 2000 study on health seeking behaviour in Dutse, Jigawa State, A cluster of three barrier studies in 2004 – in Dawakin Kudu, Keffi, and Borno – representing a deliberate comparative design across ecological and cultural zones. A 2004 study on factors affecting health-care utilisation among women in Dawakin Tofa, Kano, by Hafsat Bala Muhammed. My students and I were doing comparative health systems research before that term was common.

Skin Diseases, Traditional Medicine, and Environmental Determinants

Skin diseases – three projects (5%):

- i. A 1999 study in Asaba, Delta State, by Nwabueze Patrick – among the the first project outside northern Nigeria.
- ii. A 1999 study in Lagos State by Adeniyi Solomon Omolola.
- iii. A 2003 study in urban Kano.
- iv. Traditional and alternative medicine – three projects (5%):
- v. A 2000 study on traditional bone-setters in urban Kano by M.I. Abdul-Qadeer.
- vi. A 2000 study on traditional medical services in urban Kano.

Environmental determinants has two projects (3%): The 2007 study on environmental determinants of malaria in Gezawa Local Government Area, Kano State – the first explanatory, not merely descriptive, disease ecology project in my supervision. A 2015 study on the health implications of a dam in Tafa Local Government Area, Niger State (Ishaq A. Bala now a doctiral candidate under my supervision) a unique focus on water infrastructure and disease

Regional Coverage of Undergraduate Research

Let me give you the geographic footprint:

Table 4: *Geo-political Zones Coverage of the Undergraduate Projects*

Zone	Locations Covered (Summary)	No.	%
North-West	Kano Metro, Gezawa, Dawakin Tofa/Kudu, Gwale, Wudil, Daura (Katsina), Zaria, Makarfi (Kaduna), Sokoto, Kebbi, Zamfara, Dutse (Jigawa)	33	49.3%
North-Central	Keffi (Nasarawa), Jos (Plateau), Okene, Lokoja (Kogi), Tafa (Niger), FCT Abuja, Benue	12	17.9%
South-West	Lagos Mainland, Agege, Ogun, Oyo, Osun, Ekiti	10	14.9%
North-East	Bauchi Town, Katagum (Bauchi), Borno, Adamawa, Taraba	8	11.9%
South-South	Asaba (Delta)	2	3.0%
South-East	Enugu Town	2	3.0%
Total		67	100.0%

The details in Table 4 is not my footprint. That is their courage. My students travelled from Kano to Asaba, from Lagos to Bauchi, from Enugu to Sokoto as presented on Figure 10. They collected data in places I had never been. They returned with stories and maps and questions that shaped my research agenda for decades.



Figure 10: Regional Coverage

Gender Analysis at Undergraduate Level

Of the sixty-seven undergraduate health projects I selected, fifteen were female students, thirty-four per cent. Let me name them, because their names deserve to be spoken:

- i. Esther Luka: Hospital delivery in Jos (2002).
- ii. Olatilewa J. Oladipo: Obstetric complications in Agege, Lagos (2000)
- iii. Hafsat Bala Muhammed: health-care utilisation among women in Dawakin Tofa (2004).
- iv. Aishat Muhammad Nasir: Tuberculosis in Kano Metropolis (2015).
- v. Hauwa Bala Babah – Stroke in Kano Metropolis (2015).
- vi. Fatima Mustapha Umar: Contraception among female students at BUK (2005).
- vii. Aishatu Abdullahi: STDs in urban Kano (1996), later completed MLR, and now doing PhD under me.
- viii. Maryam Yakubu: Obstetric complications in Bauchi Town (1998).
- ix. Fatima I. Zakari: VVF in Kano (2005).
- x. Rabiya Ovosuahi Shedu: Malaria in Okene (1999).
- xi. Aisha Ali Mahmood: Health facilities in Kebbi (2002).
- xii. Amina Bello Balarabe: Antenatal and obstetric care in Wudil (2015) at KUST.
- xiii. Faiza Isa Sheshe: Mother-to-child HIV transmission in Kano State (2008) – later completed MLR, and PhD under me.
- xiv. Ifeanyi Nkiru Theresa Abomeli: Hospital delivery in Zaria (2000).
- xv. Halima Oiza Baiye: Health facilities in Kogi (2002).

Twenty-two per cent female participation at undergraduate level. This is an impressive feat for me at that time.

Selected Landmark Undergraduate Projects

Let me acknowledge the pioneering projects that broke new ground, shown on Table 5.

Table 5: *Selected Landmark Projects*

Year	Student	Title	Why Landmark
1995	(Multiple)	Measles, TB, Sick-cell, CSM	First batch of medical geography projects at BUK – the founding cohort
1996	Aishatu Abdullahi	STDs in urban Kano	First UG project on STDs – highly sensitive topic
1996	(Multiple)	Stroke, Breast cancer, Diabetes	Earliest NCD projects in Nigerian undergraduate geography – predating national NCD awareness by 15 years
1999	Nwabueze Patrick	Skin disease in Asaba	First project outside northern Nigeria (South-South)
2000	Olatilewa J. Oladipo	Obstetric complications in Agege, Lagos	Urban obstetric geography in a megacity – methodological innovation
2002	Aisha Ali Mahmood	Distribution of health facilities in Kebbi	First of over 20 state-level facility mapping projects
2004	Ibrahim Abdulkadir	CSM in urban Kano	Second work on CSM in Kano
2005	Fatima I. Zakari	VVF in Kano	First UG project on obstetric fistula – a neglected condition
2007	Shu'aibu Musa	Environmental determinants of malaria in Gezawa	First explanatory disease ecology project
2008	Faiza Isa Sheshe	Mother-to-child HIV transmission, Kano State	First UG project on HIV/AIDS geography
2015	Muhammad Sani Usman	Mental disorder in Kano State	First UG mental health geography project – pioneering

Year	Student	Title	Why Landmark
2015	Hauwa Bala Babah	Stroke in Kano Metropolis	Second work on Stroke (after Maharazu Abdulkadir, 1998) I supervised
2016	Muhammad Shu'aibu Muhammad	Islamic chemists in Gwale LGA	First mapped

My students walked into communities that many academics feared to enter, rural Dawakin Tofa for maternal health, the backstreets of Agege for obstetric complications, the Qur'anic schools of Dutse for health-seeking behaviour, the dam-affected villages of Tofa for environmental health. They returned with data, maps, and stories that shaped my own research agenda for thirty years.

Today, some of these undergraduates are PhDs, planners, and policymakers. But in 1995, they were simply geography students who believed that health had a geography. I remain grateful to each of them (named and unnamed) for trusting me with their first scholarly steps. This is our story. This is where our legacy begins. Now let me turn to the postgraduate students who built on this foundation.

Postgraduate Supervision: The Superstructure

Overview of Postgraduate Supervision

Mr. Vice Chancellor, distinguished guest, my postgraduate supervision programme has trained thirty-five students at Master's (MSc, MLR and MEM) and Doctoral levels, with a strong focus on medical geography, spatial epidemiology, and health services utilisation across northern Nigeria. The 17 doctoral students are not entirely in health and medical geography, three covers geography of religion, geography of disaster and climate change and food security.¹ The supervision spans from 2006 to 2026.

¹ 2.014: A Geographical Analysis of Religious Landscapes in Kano Metropolis, Kano State by Ibrahim Badamasi Lambu (Co-supervisor Prof. J. Afolabi Falola), 2021: Spatio-temporal Analysis of Fire Disaster and Response Optimization in Kano Metropolis, Nigeria by Sulaiman Yunus (Co-supervisor J. Afolabi Falola)], and 2024: Climate Trends and Smallholder Farmers' Livelihood Vulnerability to Climate Change and Variability in Jimma and East Shewa Zones of Oromia Regional State, Ethiopia by Fenet Belay Daba.(Co-supervisor, Bello Gambo)

The Master in Environmental Management Cohort (1999–2012)

This is a professional masters programme. Between 1999 and 2012, I supervised fifteen students in the Master in Environmental Management programme, and this group taught me something important. They taught me that environmental management is not just about trees and water. It is about cigarette smoking among youth; it is about the living conditions of Almajirai children; it is about self-medication in Quranic schools and more as summarised in Figure 11.

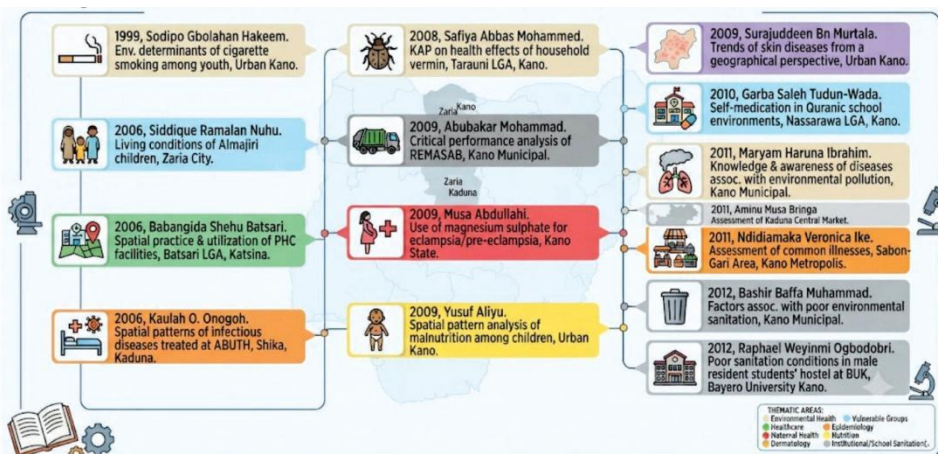


Figure 11: *Master in Environmental Management Cohort (1999–2012)*

What did I learn from the MEM cohort? I learned that health geography must go where people actually live – not just to hospitals, but to schools, to markets, to Makarantun Allo, to homes with vermin and poor sanitation. The MEM students taught me that the environment is not a backdrop. It is a driver.

The MSc Land Resources Cohort (Administration) 2008–2011

Between 2008 and 2011, I supervised three students in health geography (although I supervised more in other areas) in the MSc Land Resources programme. These were foundational studies, see Table 6.

Table 6: *MSc Land Resources Cohort (2008–2011)*

Year	Researcher	Topic / Focus	Location	Key Theme
2008	Mahmud	Housing quality	Keffi,	Housing-disease

Year	Researcher	Topic / Focus	Location	Key Theme
	Abubakar	and disease patterns	Nassarawa	linkage – now a professor at NSUK
2011	Hafizu Darda'u	Distribution of health facilities	Katsina State	Spatial equity of health access – now senior lecturer at UMYU
2011	Faiza Isa Sheshe	Distribution and utilisation of health facilities	Tofa LGA, Kano	Local government scale analysis – now senior lecturer at BUK

Three students; three studies. But here is what matters: Two of them, Darda'u and Sheshe, would later return to complete PhDs under my supervision. Abubakar continued to be mentored and has completed his doctoral and is now a full professor of medical geography. Most importantly, we continue to collaborate and are fully in touch. That is what mentorship looks like. Not a one-time transaction, but a lifetime relationship.

The MSc Geography Cohort (2016–2025)

By 2016, something had changed. My students were no longer only asking what diseases exist. They were asking where, why, and how to measure. Table 7 provides comprehensive list.

Table 7: *MSc Geography Cohort (2016–2025)*

Year	Researcher	Topic / Focus	Location	Key Theme / Innovation
2016	Mohammed Buba Hassan	Geographical analysis of diabetes	Kano Metropolis	Early NCD focus
2016	Zainab Bello	Childhood immunisation coverage	Kano State	Vaccine coverage geography
2016	Muhammed	Spatial	Kano	Medical

Year	Researcher	Topic / Focus	Location	Key Theme / Innovation
	Ibrahim Hussein	distribution and patronage of traditional bone setters	Metropolis	pluralism & traditional providers
2016	Ameh Eninibajo	Maternal mortality analysis	Daura Emirate, Katsina	Maternal health geography
2017	Abubakar Bello Usman	Analysis of Islamic health centres	Kano Metropolis	Faith-based health-care institutions
2017	Nafisa Auwal Muhammad	Analysis of cardiovascular diseases	Gombe State	Regional chronic disease mapping
2017	Nasiru Musa	Maternal mortality analysis	Jigawa North Senatorial District	Administrative-level health mapping
2017	Muhammad Abdulkadir	Maternal mortality analysis	Jigawa Central Senatorial District	Administrative-level health mapping
2018	Binta Zakari	Analysis of peptic ulcers	Kano Metropolis	Chronic disease mapping
2018	Buhari Othman	Maternal mortality analysis	Ningi Emirate, Bauchi	Regional variation in maternal health
2018	Jafar Muazu	Utilisation of antenatal and obstetric care services	Kano North Senatorial District	Political-administrative health geography
2021	Ahmed	Contraception	Katagum	Reproductive

Year	Researcher	Topic / Focus	Location	Key Theme / Innovation
	Ibrahim	among women	Emirate, Bauchi	health geography
2023	Amina Hussaini Hayatu	Spatio-temporal analysis of trachoma	Kano State	NTD with advanced methods
2023	Felicia Elejo James	Climatic variability and effects on cholera	Kano Metropolis	Climate-health linkage framework
2024	Ruqayya Ahmad Isa	Spatio-temporal analysis of viral Hepatitis	Kano Metropolis	Infectious disease tracking using GIS
2025	James Terngu Ihua	Geography of HIV/AIDS	Urban Makurdi, Benue	Regional expansion of geographic scope
Ongoing (ADUST, Wudil)	Maimuna Nabegu	Anaemia in pregnant women	Kausani Ward, Wudil LGA	Fine-scale, ward-level health mapping

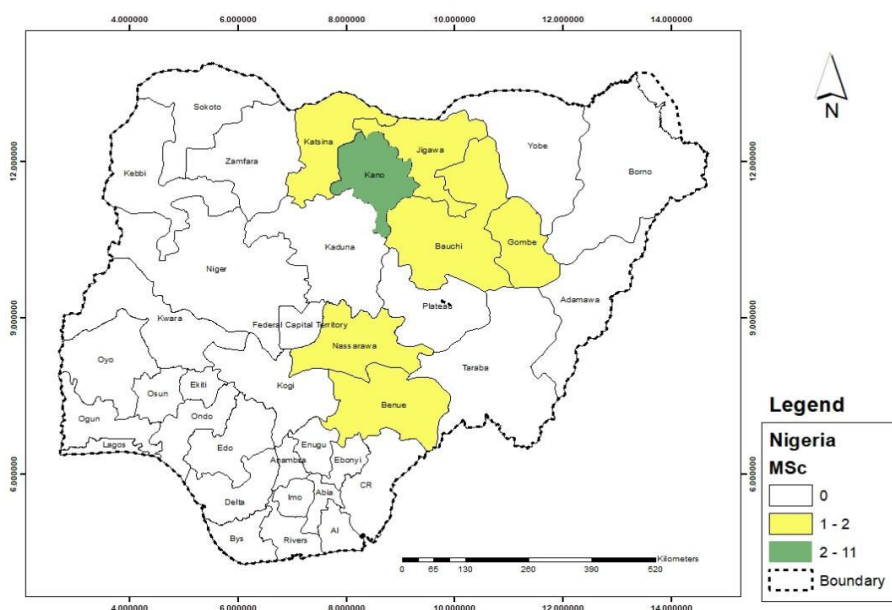


Figure 12: *Geographical spread of Master's Research*

As shown on Figure 12, the spread is not even, but it is representative of northern Nigeria as all the three geo-political zones have been represented. Looking at the diseases and health issues covered, it is clear that it is broad. From Table 5, three phases of evolution are visible:

- i. Descriptive Spatial Mapping (2016–2018): Early work focused on establishing baseline distributions of NCDs, recognising medical pluralism, and mapping regional maternal mortality.
- ii. Methodological Sophistication (2021–2024): The introduction of spatio-temporal analysis (adding time to space) and environmental data sets linking climate variability directly to disease outbreaks.
- iii. Granular Micro-Mapping (Ongoing): Shifting focus from large senatorial districts and emirates down to highly localized, ward-level fine scales.

This is what mentorship looks like over time. You start with simple maps. Then you add statistics. Then you add time. Then you add climate data. Each student stands on the work of the previous one. And note the pipeline: Muhamamed Buba Hassan, (Late) Zainab Bello, Ameh Eninibajo, Nafisa Auwal Mohammed, and Binta Zakari all moved from this MSc cohort into PhD programmes under my supervision. That is not accidental. That is intentional mentoring.

The PhD Cohort : The Flagship of Mentoring

Now let me turn to the flagship of my mentoring, the PhDs. I have had seventeen completed doctoral dissertations between 2010 and 2026 (of these number, three are not in health and medical geography.) This is where my mentoring has produced its most lasting impact. These are the researchers who will train the next generation. In Table 8, details of their names, topics, location of studies and key themes have been provided..

Table 8: *PhD Cohort (2010–2026)*

Year	Researcher	Topic / Focus	Location	Key Theme / Innovation
2010	Abubakar Kawu Monguno	Geographical Analysis of Immunisation Coverage in Borno State	Borno State	Pre-insurgency baseline data
2015	Mustapha Adam Kolo	Geographical Analysis of Maternal Mortality in Borno State	Borno State	Research resilience in conflict terrain
2015	Uba Lawal	A Geographical Analysis of Cholera in Adamawa State	Adamawa State	Waterborne disease epidemic and spatial patterns
2016	Bilkisu Ahmed Yayaji	Geographical Analysis of Maternal health-care Services in Gombe State, Northeastern Nigeria	Gombe State	health-care access and utilization mapping
2018	Nura Alhaji Yaro	An Assessment of health-care Waste Management Kano State, Nigeria	Kano State	Creative focus on institutional medical waste

Year	Researcher	Topic / Focus	Location	Key Theme / Innovation
2019	Ishaq A. Aliyu	A Geographical Analysis of Typhoid Fever in Kano State, Nigeria	Kano State	Enteric fever spatial mapping
2021	L.A.S. Danbuzu	Geographical Analysis of Tuberculosis in Kano State	Kano State	Respiratory infection geography
2021	Nafi'u Zakari	Spatiotemporal Assessment of Cerebro-spinal Meningitis in Kano State, Nigeria	Kano State	Major Sahelian epidemic tracking
2021	Mustapha Sani	Spatial Distribution, Accessibility and Utilisation of Health Services in Sokoto State, Nigeria	Sokoto State	Distribution and patterns of health care services/Regional extension to the Northwest
2021	Hafizu Darda'u	Social Justice, Distribution and Utilisation of Health Services in Katsina State	Katsina State	Theoretical Shift: Introduction of Marxist/critical geography
2023	Ismaila Ibrahim Yakudima	Spatio-temporal Cluster Analysis of Malaria Prevalence in Jigawa State	Jigawa State	Methodological Shift: Statistical cluster modelling across space and time
2024	Faiza Isa Sheshe	Geographies of Under-five Malnutrition in Kano State	Kano State	Long-term academic journey (2008–2024); mentorship

Year	Researcher	Topic / Focus	Location	Key Theme / Innovation
				reproduction
2025	Jamila Garba Abdullahi	Ecological Assessment of Malaria Risk in Kano Metropolis, Kano State, Nigeria	Kano Metropolis	Advanced ecological & GIS risk modelling
2026	Yunusa Yahuza	Geographies of Anxiety and Depression in Kano State, Nigeria.	Kano State	The Frontier: Pioneering work in mental health geography

The Significance of the PhD Research

Mr. Vice Chancellor, distinguished dignitaries here present, Let me walk you through the significance of these PhDs. The doctoral works listed represent a foundational and transformative body of research for geographical and health sciences in Northeastern Nigeria.

Collectively, they establish a crucial, place-based evidence base for a region historically underserved by data, shifting the focus from generalized national health metrics to granular, sub-national spatial realities. The significance is threefold: empirically, they provide the first rigorous spatial mappings for diseases like cholera, typhoid, and meningitis, alongside critical analyses of health-care access and waste management. Methodologically, this research demonstrates a clear evolution from descriptive spatial analysis to advanced statistical and ecological modeling, as seen in the later works on malaria cluster analysis and risk modelling, providing sophisticated tools for predictive public health planning.

Beyond the academic, corpus holds profound human and theoretical significance. It documents remarkable research resilience, with scholars like Mustapha Adam Kolo producing vital maternal health data within the active conflict of Borno State, proving that rigorous science can be conducted in the most challenging terrains. This body of work also pioneers a much-needed theoretical expansion, as Hafizu

Darda'u's introduction of Marxist and critical geography challenges traditional, apolitical health models. Most importantly, the final entry on mental health geography breaks entirely new grounds, opening a frontier for a topic that remains heavily stigmatized. This research not only solves immediate health mapping problems but also builds an institutional legacy through mentorship, ensuring the sustained, locally-led, and increasingly holistic interrogation of health inequalities in Nigeria.

The Evolution of PhD Research Themes

This final phase of the compilation underscores the peak of academic mentorship and theoretical maturity:

- i. Pioneering Conflict Baselines (2010–2015): Establishing critical, irreplaceable health data in the Northeast (Borno and Adamawa) before and during the height of regional instability.
- ii. The Radical Shift (2021): Moving beyond liberal descriptive mapping (where inequality is simply pointed out) into Radical Geography, which explicitly interrogates the structural, political, and economic forces that create health disparities.
- iii. Methodological & Frontier Expansion (2023–2026): Transitioning into predictive statistical modeling (spatio-temporal clustering and ecological risk modeling) and ultimately pushing the boundary into Mental Health Geography, mapping the invisible landscape of anxiety and depression among youth.

Current Doctoral Candidates: The Future

I am currently supervising twelve doctoral students from two universities (Bayero University, Kano, and ADUST, Wudil) and their topics tell you where health geography is heading to as shown on Table 9.

Table 9: *Ongoing Doctoral Works under my Supervision*

Researcher	Working Title	Location	Significance
Fatima Salihu (ADUST, Wudil)	Geographies of Breast Cancer	Kano	Cancer geography is almost non-existent in Nigeria – her work will save lives
Aisha Abdullahi	Geographic Study of Under-five mortality	Metropolitan Kano	Child survival

Researcher	Working Title	Location	Significance
Ameh Eninibajo	Environment and under-five malnutrition.	Kogi State	From MSc to PhD pipeline
Christopher Azahan	Environmental risk factors and hypertension	Makurdi, Benue State	Urban NCDs
Muhammed Buba Hassan	Environmental risk factors and cardiovascular diseases	Kano Metropolis	Urban NCDs
Babaraus Iliya	Hypertension and environment	Kaduna State	Replication across states
Mukhtar Khalifa	Geographies of under-five child malnutrition	Jigawa State	Continuing the malnutrition series
Nafisa Auwal	Spatial mismatch and therapeutic landscapes : Ageo-spatial analysis of equitable diabetes care.	Gombe State	Beyond spatial patterns to therapeutic landscapes
Garkuwa Muhammad Iliya	Health risk assessment of potentially toxic elements	Maiganga, Akko LGA, Gombe State	Environmental health risks
Muhammad Bello Shuaibu (ADUST, Wudil)	Inbound medical tourism	Kano Metropolis	Unique question – why do people come to Kano for health-care?
Binta Zakari (ADUST, Wudil)	Spatio-temporal analysis of chronic kidney diseases	Hadejia-Nguru Wetlands (Jigawa and Yobe States)	Disease ecology expansion, from peptic ulcer to CKD
Muhamamd	Geographies of	Kano State	Non health work.

Researcher	Working Title	Location	Significance
Aminu Jibril (ADUST, Wudil)	General Elections		

The doctoral research portfolio reveals a strong emphasis on non-communicable diseases (NCDs), with three projects directly addressing hypertension and cardiovascular conditions (Christopher Azahan, Muhammed Buba Hassan, Babaraus Iliya) and one focusing on diabetes mellitus (Nafisa Auwal). Maternal and child health constitutes another major cluster, covering under-five mortality (Aisha Abdullahi), child malnutrition (Mukhtar Khalifa), and the environment-malnutrition-childhood diseases nexus (Ameh Eninibajo). Environmental health risks feature prominently through studies on potentially toxic elements (Garkuwa Muhammad Iliya) and chronic kidney diseases (Binta Zakari). Two projects stand out for their unique angles: cancer geography (Fatima Salihu) and inbound medical tourism (Muhammad Bello Shuaibu). Notably, one candidate (Muhamamd Aminu Jibril) departs from health geography entirely, focusing on electoral geography – a significant diversification of the research group's scope.

Geographic Coverage

The research is concentrated in northern Nigeria, with Kano State receiving the most attention (five projects), followed by Jigawa State (two), Gombe State (two), and single studies in Kaduna, Kogi, and Benue states. The geographic spread captures a mix of metropolitan (Kano Metropolis, Makurdi), and mixed settings, allowing for comparative urban-rural health analyses. The inclusion of northeastern Nigeria (Gombe) is particularly relevant given the region's security and environmental challenges. However, the portfolio shows no coverage of southern or western Nigeria, reflecting a regional specialization that may limit generalisability but enables deep contextual understanding of health dynamics in the country's most populous and diverse northern region. See Figure 13.

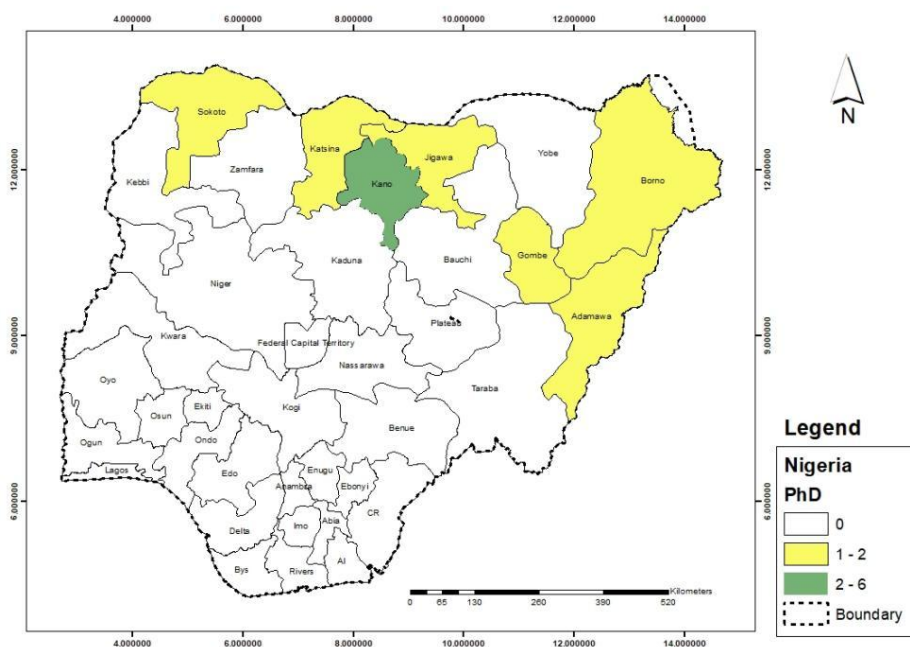


Figure 13: *Geographical Spread of Completed Doctoral Theses*

Geographic Spread of Postgraduate Research

Putting all my postgraduate students together, indicated that there is an overwhelming concentration of studies conducted in the Northwest zone. Kano is the most studied, accounting for 51%, with Kaduna, Sokoto and Jigawa the Northwest zone accounting for 78%. Kano is studied by many including those who are not from Kano and this is understandable. Borno, Bauchi, Gombe and Adamawa from Northeast together accounted for 14% while the North-central is also represented by Benue, Nassarawa and Kogi accounting 8% as shown on Figure 14.

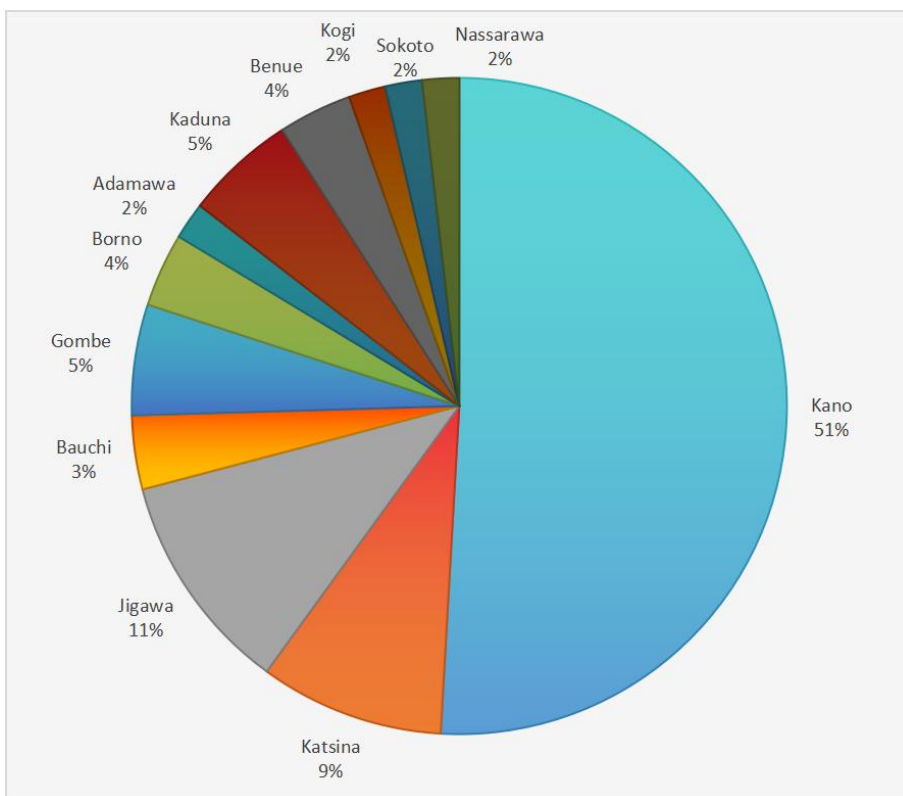


Figure 14: *Geographical Spread of all the Completed Postgraduate Research*

The spread is what makes it impressive. From Sokoto and Katsina in the northwest Grassland zone where meningitis and malnutrition are endemic, to Borno and Adamawa in the northeast conflict zones, where data collection is extremely dangerous, to Kogi and Benue in central Nigeria's rural areas with different disease ecologies, no place is too far or impossible.

That is not my footprint. That is their courage. My students went where the problems are. They did not take the easy option.

On the thematic Evolution of Postgraduate Research, the evolution is the history of our field, from descriptive medical geography to analytical health geography to predictive spatial epidemiology. And my students made that transition happen in Kano, in Nigeria, without leaving our context behind as shown on Table 10.

Table 10: *Thematic Evolution of Postgraduate Research*

Period	Research Focus	Methods	Geographic Scope
1999–2008	Infectious and sanitation-related diseases	Descriptive surveys	Urban Kano, Almajiri schools, conventional schools
2009–2015	Spatial patterns and utilization studies; maternal/child health, meningitis, stroke	Pattern analysis	LGAs, hospitals, markets
2016–2020	NCDs, maternal mortality, immunization	Analytical – pre-GIS	Senatorial districts, emirates
2021–2026	Malaria, Hepatitis, trachoma, CKD, mental health	Spatio-temporal analysis, GIS, clustering	Metropolis to state-wide

Gender Analysis at Postgraduate Level

Of my thirty-six postgraduate students that have successfully completed their programme, twelve are women – 34.2%. Let me name them:

- i. Maryam Haruna Ibrahim (MEM, 2011)
- ii. Safiya Abbas Mohammed (MEM, 2008)
- iii. Ndidiamaka Veronica Ike (MEM, 2011)
- iv. Zainab Bello (MSc Geography, 2016)
- v. Faiza Isa Sheshe (MLR 2011 → PhD 2024)
- vi. Bilkisu Ahmed Yayaji (PhD, 2016)
- vii. Amina Hussaini Hayatu (MSc, 2023)
- viii. Ruqayya Ahmad Isa (MSc, 2024)
- ix. Felicia Eleojo James (MSc, 2023)
- x. Jamila Garba Abdullahi (PhD, 2025)
- xi. Hauwa Bala Babah (MEM, 2015)
- xii. Kaulah O. Onogoh (MEM, 2006)

In a field that has historically been male-dominated, I am proud that my supervision has supported so many brilliant female researchers. They are not exceptions. They are the rule of excellence. And some of them are now supervising their own students. That is how we change the face of the academy.

The percentage of women in both undergraduate and postgraduate level is equal, an indication of sustainability and resilience. It is worthy of note that the interest of female student in health and medical geography has been maintained.

Comparative Analysis: Undergraduate Vs Postgraduate Supervision

Comparing Undergraduate Vs Postgraduate Supervision as shown on Table 11 captures health research projects across themes, volume, and demographics. From Table 11, it is clear that postgraduate period starts later but overlaps minimally, reflecting a more contemporary focus. Undergraduate work was nationally distributed, whereas postgraduate research is heavily regionally focused (North-West/North-East and to some extent north-central).

Table 11: *Comparative Summary of Undergraduate and Postgraduate Research Parameters*

Parameter	Undergraduate (BSc)	Postgraduate (MSc/PhD)
Time Span	1995 – 2016 (21 years)	2006 – 2026 (20 years)
Project Volume	67 selected (out of 110 total)	35 total
Dominant Theme	Infectious diseases (30%)	Maternal & Child Health
Second Theme	Maternal health (23%)	Infectious diseases & NCDs
Geographic Spread	National (18+ states + FCT)	Predominantly Kano, Jigawa, Gombe, Borno
Female Participation	23%	34%
Methodology	Descriptive mapping, barriers analysis	Spatial analysis, GIS, risk factor modelling
Early NCD Adoption	1995–1996 (stroke, breast cancer, diabetes)	2015 onwards (hypertension, CKD, anxiety/depression)

There is a clear transition from descriptive/qualitative approaches to advanced spatial and quantitative modelling. While the Non Communicable Disease Trajectory show that both levels show early adoption of NCD research, but postgraduate work expands the scope to include mental health (anxiety/depression) and chronic kidney disease (CKD).

Concluding Reflection on Supervision Legacy

So what is the legacy here? It is not the one hundred and ten undergraduate projects, though each one represents a young person's first scholarly steps. It is not the thirty-five postgraduate theses, though each one represents years of labour. It is not the eleven states, though each study expanded our geographic knowledge. It is not even the publications that will come from this work, though they will advance the field.

The Legacy: When a young person walks into my office with a question about their community, about a disease they have seen, a clinic they cannot reach, a child who is malnourished, a mother who died in childbirth, a father whose cough will not stop, I do not give them an answer, I give them a method, a map, permission to ask hard questions and the tools of geography, spatial thinking, environmental analysis, critical theory, GIS. And then I stand behind them as they find their own answers. This is mentoring, and that is what I have tried to do for thirty-one years, from my first undergraduate students in 1995 to my doctoral students completing in 2026.

The Single Thread That Runs Through

From the first undergraduate project in 1995 to the doctoral students completing in 2026, the thread has remained constant. It is a conviction that place matters in health. My students have mapped diseases across Nigeria's geopolitical zones, asked why some communities suffer while others thrive, and produced evidence that has shaped policy and practice.

The sixty-seven undergraduate projects selected for this presentation represent the empirical bedrock of my research career. Every postgraduate thesis I later supervised draws in some way from the questions first asked by those undergraduate students. They taught me that students rise to the expectations set for them, that fieldwork is always unpredictable and

always worth doing, and that the best research questions come not from journals but from communities.

The thirty-five postgraduate students (eighteen Master's graduates, fifteen Doctoral graduates), and eleven doctoral candidates (in health) still in progress represent the maturation of my research school. From the first doctoral cohort of 2010 to 2016 that established the methodological framework, through the second wave from 2017 to 2021 that consolidated the "Kano School" of health and medical geography, to the third wave from 2022 to 2026 that has achieved theoretical integration and international visibility, my students have become colleagues, co-authors, and now supervisors themselves.

The Future

If I have done it well, then long after I have left this podium, my students will be standing on podiums like this one, training the next generation:

Professors. Monguno and Abubakar will be there; Dr. Kolo will be there; Dr. Abdulkarim will be there; Dr. Yakudima will be there; Dr. Zakari will be there; Dr. Yaro will be there (all of them Associate Professors); Dr. LAS Danbuzu will be there; Dr. Jamila will be there; Dr. Yahuza will be there; Nafisa will be there; Binta and the rest of them will be there. And many more of them and they will say, "My supervisor taught me that geography saves lives.

Now let me show you how. I am confident that those who come after me, my students, my students' students, will continue to put health and disease in place, in Kano, in Nigeria, and in the world.

Mr. Vice Chancellor, distinguished guests, I have spent the last several minutes celebrating the remarkable work of my students, from my very first undergraduate in 1995 to the doctoral candidates of 2026. Now, I turn to the enduring impact of these relationships. This sustained mentorship has not only resulted in numerous co-authored publications but has also culminated in the establishment of the Kano School of Health and Medical Geography. It is a lasting legacy that I will forever cherish.

SECTION FIVE

BUILDING A RESEARCH TRADITION

A scholar's legacy is not measured solely by the volume of publications bearing their name. It is measured by the scholars they nurture, the networks they build, and the intellectual traditions they establish that outlive their direct involvement. This fundamental conviction has guided my three decades of teaching and research at Bayero University, Kano.

The Importance of Mentorship in Academic Life

The realisation that supervision is not complete when a student defends their thesis has been central to my approach. It is complete when their findings enter the scholarly conversation, when their maps become publications, their surveys become cited papers, their local insights become theoretical contributions. This section documents the mentorship network I have cultivated; a network of postgraduate students who have not only contributed to the corpus of health and medical geography in Nigeria but have themselves become leaders, mentors, and independent scholars in their own right.

The Silence Before the Map

Let me start with the very beginning. I joined Bayero University, Kano (BUK) as an Assistant Lecturer in January 1995. In 1996, fourteen years before my first doctoral student defended, twelve years before the research ecosystem I have described began to take shape, I published a paper on health facility distribution in urban Kano, using the radical perspective (thanks to Prof. S.I. Okafor for his inspiration). It appeared in the proceedings of the 39th Annual Conference of the Nigerian Geographical Association, held at the University of Maiduguri. The paper was modest, a few pages, a few maps, a few tables. It did not break new theoretical ground. It did not use sophisticated statistical methods. It simply asked: where are the health facilities in urban Kano, and are they distributed equitably across the city's neighbourhoods?

If I were to search the academic databases that year for "health geography, Northern Nigeria," the screen would return almost nothing else except Prof. Dora Shehu's work on maternal health. A scattering of papers by

physicians reporting disease incidence, but those papers did not map the diseases, did not analyse their spatial patterns, did not ask the geographical questions that were, for me, the most interesting and important questions. The field was almost a blank space. Not empty because there was no disease, Northern Nigeria has always had malaria, meningitis, malnutrition, tuberculosis, guinea worm, polio, and a host of other conditions that kill and sicken millions. Not empty because there were no health facilities; Kano alone had dozens of clinics, hospitals, pharmacies, and traditional medicine centres. Not empty because there were no data; the Ministry of Health collected statistics, the health facilities kept records, the World Health Organisation published reports.

Empty because no one had mapped these diseases geographically. Epidemiologists counted cases, they could tell you how many people had malaria in Kano State, but not where those people lived, not whether the cases clustered in certain neighbourhoods, not whether distance to a health facility predicted treatment or outcome. Clinicians treated patients; they could tell you about the clinical course of a disease, about the effectiveness of different treatments, about the complications that arise in severe cases, but not about the spatial patterns that might reveal environmental or social determinants of disease. Health planners allocated resources; they could tell you how many beds were available, how many doctors were employed, how many vaccines were distributed, but not whether the distribution of facilities matched the distribution of population, not whether some communities were systematically underserved. No one had asked: Why here? Why not there? What does place have to do with health?

I became, by necessity, a cartographer of the invisible. I began mapping what others had counted but not located. I began asking spatial questions about health problems that others had analysed only in terms of their clinical or epidemiological dimensions. I began building, paper by paper, study by study, the intellectual infrastructure that would later support the research of 35 students and the publication of over two hundred papers.

Building the Intellectual Infrastructure (1996-2008)

Between 1996 and 2008, I published the foundational studies that would later become the intellectual infrastructure for everything my students built. They attracted citations at the time; they did not make me famous. But they did something more important: they established that health geography in Northern Nigeria was possible. They demonstrated that a

geographer with a good map, a clear question, and a willingness to do fieldwork could contribute to understanding and addressing the region's most pressing health challenges. And they provided the methodological templates that my students would later refine, extend, and apply to new diseases, new locations, and new questions.

Establishing the Network (2008-2018)

Initially, I created an informal network of my students. When I began supervising postgraduate students, I seized the opportunity to establish an informal group for upcoming medical geographers under my mentorship. We remained in touch and continued to collaborate; I ensured they knew each other and maintained their working relationships.

In 2018, we culminated our efforts by forming the Medical Geography Study Group under the Association of Nigerian Geographers, which now serves as a network for all medical geographers in Nigeria. We all now have the opportunity to work together and I had the privilege of examining the doctoral works of some members and also assess some for the professorial cadre across the country. This network keeps us connected and informed about everyone's ongoing work. Furthermore, my postgraduate class group keeps both my former and current students in constant touch.

Dr. Mustapha of SLU Kadin Hausa further strengthened our bonds by establishing the YMA Research Network, which brought us all together and made concerted efforts to internationalise the group, networking with colleagues from Malaysia, Singapore, Saudi Arabia, and beyond. These cumulative efforts laid the foundation of what is now called the Kano School of Health and Medical Geography.

The Mentorship Model And A Philosophy of Mentorship

My approach to mentorship has been guided by a simple, locally-grounded principle: to guide my students in identifying the most pressing, often neglected, public health crises within their own immediate environments, the silent emergencies of maternal mortality, the seasonal terror of meningitis, the slow violence of child malnutrition and to equip them, systematically, with the rigorous tools of geographical perspective. The classroom and the field become one laboratory; the publication is not the final product, but a milestone on a longer road toward policy impact and scholarly independence.

The Three Pillars of Our Research School

What you will see in the evidence before you is not a random collection of co-authored papers. It is a deliberate, longitudinal, and systematic strategy to build a self-sustaining research school in Medical Geography focused on the savanna belt of Northern Nigeria. This school is built on three pillars:

- i. Methodological rigour (spatial and temporal analysis)
- ii. Thematic continuity (from reproductive health to infectious diseases to systems of care)
- iii. Intellectual succession: creating independent researchers who maintain productive collaborative relationships while developing their own research identities

The Mentorship-to-Legacy Pipeline

The mentorship model documented here provides a replicable template for building research capacity in resource-constrained settings. By combining rigorous supervision, systematic encouragement to publish, and sustained collaboration after graduation, I have created what might be termed a *mentorship-to-legacy pipeline*; a sustainable research ecology that ensures our scholarly contributions will continue to evolve and expand through multiple generations of researchers.

Acknowledging All Contributions

Before I present the evidence of our collaborative work, it is important to acknowledge a fundamental reality of academic mentorship: not every student one supervises will pursue an academic career. Over the course of my career, I have had the privilege of supervising many postgraduate students, some at the Masters level, others at the Doctoral level. Many of them have gone on to distinguished careers in teaching, public service, health-care administration, and other professions. Some have published from their theses or dissertations; others have not. Some have remained in academic life; others have chosen different paths. This is the natural order of things, and I take equal pride in all of my students, regardless of the career trajectories they have chosen.

Among those who have remained in academia, not all have continued to collaborate with me after graduation. Some have established their own independent research identities and have chosen to publish autonomously. Others have collaborated sporadically. A smaller number have remained consistent and committed collaborators, continuing to publish with me

long after their formal supervision ended. It is this latter group that forms the core of the research school documented in this lecture.

I must also acknowledge the contributions of all my postgraduate students, those who have published with me, those who have published independently, and those who have chosen careers outside academic publishing. Dr. Uba Lawal for instance (who has worked on cholera in Adamawa State) has continued to work on water and sanitation with UNICEF, bringing his Health Geography knowledge to bear.

Zainab Bello, who had registered for a PhD under my supervision and was working on low vision covering many eye diseases in Kano State, having already collected data on more than 10,000 cases before her untimely death due to childbirth. As her MSc supervisor, I can testify that Zainab was one of the most hardworking and brilliant postgraduate students I have supervised. May Allah grant her Jannah. Her loss is a reminder that our work as mentors is not only about publications but about the lives we touch and the futures we help build, however briefly.

Introduction to the Collaborative Network

Here, I examine the publications that emerged from collaboration with my students, the joint papers that form the foundation of our collective scholarly output. The collaboration is sometimes with me and one author; in others, two or three of my former students collaborate with me in the same paper. All of them have been essential to the building of this research school.

The Collaborative Network: A Ranking of Consistent Collaborators

The heart of this research school lies in a core group of scholars who have remained consistent and committed collaborators over many years. The following ranking reflects the frequency of co-publication with me across the period 2008–2026.

This ranking is not merely a numerical exercise; it reveals the structure, depth, and thematic diversity of our collaborative network. I present it here not as a hierarchy of importance, but as a map of the collaborative relationships that have sustained this research school. While we have published a little over thirty papers with fifteen students, five of them appeared to be my top collaborators as shown in Figure 15.



Figure 15: Ranking of Consistent Collaborators

The Most Frequent Collaborator: Dr. Ishaq Aliyu Abdulkarim, BUK (13 Co-Publications)

Dr. Abdulkarim stands as my most frequent collaborator, with thirteen co-authored publications spanning a remarkable range of thematic areas. The collaboration covers typhoid fever, malaria, diabetes, tuberculosis, immunization coverage for BCG and measles, and the broader disciplinary history of Medical Geography in Nigeria. His contributions to the Springer volume on Health and Medical Geography in Africa (2023) his emergence as a scholar of international standing.

What is particularly noteworthy about Dr. Abdulkarim's collaboration is its breadth. He has moved fluidly between infectious disease epidemiology and non-communicable disease analysis, between primary research and disciplinary consolidation. This thematic versatility reflects the comprehensive training he received during his postgraduate studies and his subsequent development as an independent scholar who can address multiple dimensions of the health challenges facing Northern Nigeria. His colleagues often call him Halifa.

The Second Most Frequent Collaborator: Dr. Ismail Ibrahim Yakudima, ADUST, Wudil (8 Co-Publications)

Dr. Yakudima, our malaria guru, has been a central figure in our malaria research programme, with eight co-authored publications focusing on spatial clustering, prevalence among children and pregnant women, and environmental determinants of malaria transmission in Kano and Jigawa States. His work on hotspot detection has been particularly influential, providing actionable intelligence for malaria control programmes in North-Western Nigeria.

Dr. Yakudima's collaboration exemplifies the methodological progression that has characterised our research school. He began with foundational spatial analysis and has advanced to sophisticated cluster detection

algorithms and multi-factor environmental modelling. His work on malaria among pregnant women represents a critical contribution to maternal and child health, bridging the thematic areas of infectious disease epidemiology and reproductive health.

The Third Most Frequent Collaborator: Dr. Faiza Isa Sheshe (7 Co-Publications)

Dr. Sheshe's seven co-authored publications focus on health facility distribution, health-care utilization, typhoid fever, and the disciplinary history of medical geography. Her doctoral work on under-five child malnutrition in Kano State represents the culmination of our group's evolving focus on health systems as the critical mediating variable between environmental risk and health outcome.

Dr. Sheshe's collaboration is particularly significant for its methodological rigour and its emphasis on health systems analysis. Her foundational work on health facility mapping and utilisation in Tofa Local Government Area established the empirical basis for understanding the local geography of health-care access, which became essential for her doctoral research on malnutrition. Her co-authored chapter in the Springer volume demonstrates her potential for disciplinary leadership.

The Fourth Most Frequent Collaborator: Dr. Nafi'u Zakari (6 Co-Publications)

Dr. Zakari's six co-authored publications have focused exclusively on cerebrospinal meningitis (CSM) in Kano State, examining trends, diffusion patterns, and community knowledge and attitudes. His work represents the most comprehensive geographical analysis of meningitis in Northern Nigeria, spanning both quantitative spatial analysis and qualitative behavioural inquiry.

What distinguishes Dr. Zakari's collaboration is its depth and its methodological evolution. He began with foundational spatial analysis, advanced to sophisticated quantitative diffusion modelling using Inverse Distance Weighting and Linear Trend Surface analysis, and culminated in a deliberate turn to qualitative methods to understand community perceptions and barriers to vaccination. This methodological arc (from describing patterns to understanding determinants) is a model of how medical geography should be practised.

The Fifth Most Frequent Collaborator: Dr. L.A.S. Danbuzu (5 Co-Publications)

Dr. Danbuzu's five co-authored publications have examined urban solid waste and health risks, spatio-temporal trends and climatic drivers of tuberculosis, and the theoretical foundations of disease ecology. His work represents a more theoretically ambitious wing of our research school, engaging with the legacy of Jacques May and its relevance to contemporary global health challenges.

Dr. Danbuzu's collaboration has evolved from empirical environmental health analysis to theoretical contributions on disease ecology and structural violence. His most recent work on "The geography of neglect: Structural violence and Rural health-care Inequities in LMICs" represents a significant contribution to critical medical geography, engaging with the political economy of health in ways that extend beyond our earlier applied spatial analysis.

It would also interest you, our dear guest, to note that our collaboration with Dr. Danbuzu extends beyond health and medical geography into my other scholarly endeavours. We have a joint paper on Dr. Mamman Shata, the legendary Nigerian musician and cultural icon, which explores the geography travel songs (Wakar Habu Darma), see Appendix II. This interdisciplinary collaboration demonstrates the breadth of our intellectual engagement and the versatility of our research network, spanning not only the sciences of health and disease but also the humanities and cultural geography. It is a testament to how the Kano School's collaborative ethos and methodological rigour can be fruitfully applied across diverse scholarly domains, enriching both our understanding of health and our appreciation of the cultural fabric that shapes the societies we study.

In Figure 16, we can see the whole picture of the main contributor who have maintained consistent collaboration over the years, each contributing to distinct thematic areas.

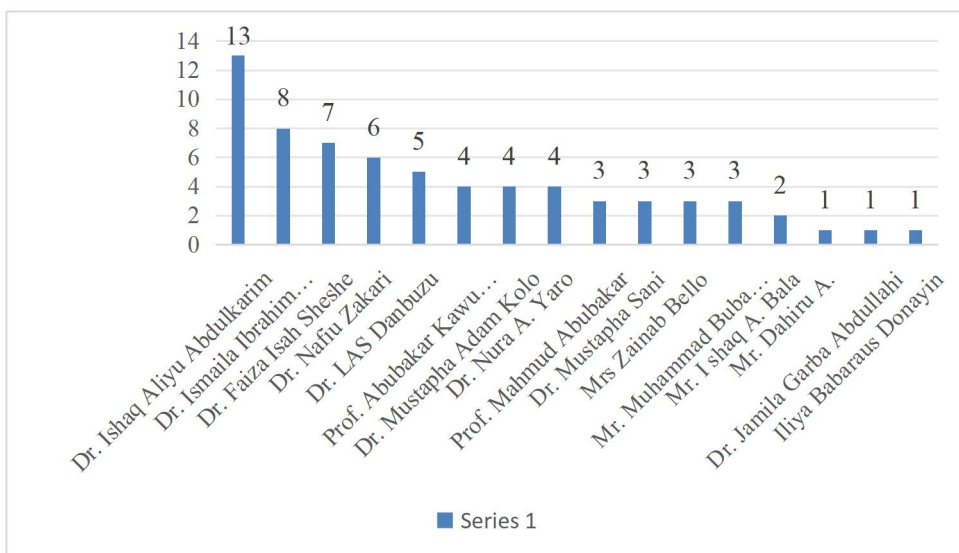


Figure 16: Ranking of Collaborators

They include those with up to three joint collaborations with me. Brief about them is provided below:

Prof. A.K. Monguno (4 Co-Publications) has focused on the Expanded Programme on Immunisation, distribution of public health facilities, and maternal and child mortality. His early work in Borno State established foundational knowledge on immunization coverage that has informed subsequent research.

Dr. M.A. Kolo (4 Co-Publications) has been central to our maternal mortality research, examining socio-cultural and demographic determinants, and spatial and temporal variations of maternal deaths in Borno State. His doctoral work established the template for our research school's methodological approach.

Dr. N.A. Yaro (4 Co-Publications) has collaborated on tuberculosis research and disease ecology, contributing to our understanding of climatic drivers of disease transmission.

Prof. Mahmud Abubakar (3 Co-Publications) works are based in Nassarawa State, central Nigeria where he examined the Spatial and Temporal Patterns of Disease Incidence and Distribution in Keffi, Patterns of Modern Health Care Facilities Utilization in and application of GIS Application for Local Health Care Planning.

Dr. M. Sani (3 Co-Publications) has examined health-care services provision and challenges, and community knowledge and attitudes toward meningitis. His work in Sokoto State has extended our research programme into North-Western Nigeria.

Zainab Bello (3 Co-Publications) examined BCG and measles immunization coverage in Kano State before her untimely death. Her work was foundational to our understanding of immunization coverage patterns in Kano State.

M.B. Hassan (3 Co-Publications) has focused on diabetes mellitus, examining spatio-temporal patterns and demographic and occupational risk factors in Kano Metropolis. His work represents our research school's expansion into non-communicable diseases.

There are also other namely Ishaq A. Bala with 2 co-publications. Then there are Dahiru I. Abba and Dr. Jamila G. Abdullahi and Iliya B. Donayin with one co-publication each.

Trend of Collaboration Over Time

The collaboration documented in this report has evolved through four distinct phases, each building upon the achievements of the previous. The trajectory reveals a deliberate and systematic approach to research capacity building that has transformed a modest beginning into a robust and sustainable research network.

Phase 1: Foundation and Early Career (2008–2010)

The earliest publications emerged during a period when the research agenda was being established. The initial work focused on foundational geographic and epidemiological research, with early contributions introducing GIS applications for health-care planning and assessing immunization programmes in Borno State. During this period, the research network was small, comprising primarily established collaborators such as Dr. Monguno and a few early postgraduate students. The publications from this phase, though limited in number, laid the groundwork for the thematic and methodological directions that would follow.

This was the period of planting seeds, for establishing the credibility, the disciplinary focus, and the collaborative ethos that would characterize the entire research programme.

Phase 2: Consolidation and Expansion (2011–2017)

This period witnessed significant growth in both the volume and thematic diversity of publications. The research agenda expanded to include more focused studies on maternal mortality determinants, with the collaboration with Dr. M.A. Kolo on maternal health research in Borno State proving particularly fruitful. During this phase, the network began to attract more postgraduate students, and the research themes diversified to include spatial analysis of disease patterns and health systems research. The methodological sophistication increased noticeably, with studies moving beyond descriptive analysis to more robust analytical approaches. The collaborations during this period established the credibility of the research group and attracted increasing attention from the academic community in Northern Nigeria.

Phase 3: Methodological Advancement and Student Integration (2018–2020)

This phase marked a deliberate and strategic expansion to include a growing cohort of postgraduate students as active contributors to the research programme. The emergence of scholars such as the late Zainab Bello, Drs. Abdulkarim, Zakari, Yakudima, Danbuzu and Sheshe, as first authors on multiple publications demonstrates the successful integration of students into the research network. This was not accidental but reflected a conscious mentorship strategy, students who had completed their theses and dissertations under supervision were systematically encouraged and supported to publish their findings. Methodological sophistication increased significantly during this period, with advanced GIS techniques including Inverse Distance Weighting and Linear Trend Surface analysis appearing in publications. The research group was no longer simply producing research; it was producing researchers.

Phase 4: Maturation and Sustained Collaboration (2021–2026)

The most recent phase represents the maturation of the mentorship model. The consistent collaborators identified in the ranking above have continued to publish with me, while also developing their own independent research identities. The publication output during this period is the highest, with increasing contributions from former students now serving as lead investigators on their own research projects.

Notably, contributions to the Springer volume on Health and Medical Geography in Africa (2023) (where I was first author in one chapter and Abdulkarim in the other) demonstrate the international recognition that the

research network has achieved. This phase confirms that the mentorship model has achieved its ultimate objective of creating independent researchers who can sustain and expand the research agenda while maintaining collaborative relationships with their mentor.

Thematic Analysis of Collaborative Research

The research output demonstrates four dominant thematic clusters that together constitute a comprehensive research agenda addressing the most pressing health challenges in Northern Nigeria. These themes reflect both the evolution of the research programme and the responsiveness to emerging health priorities in the region as shown on Figure 17.

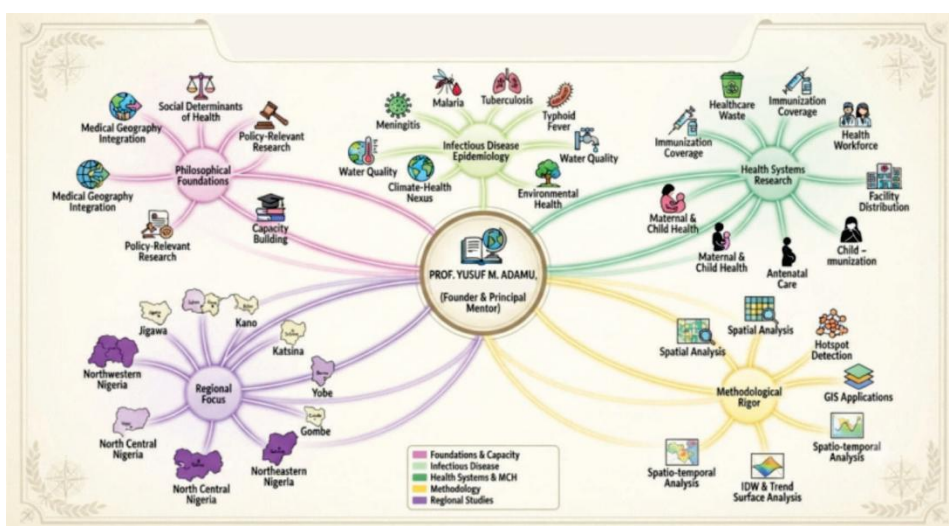


Figure 17: *Thematic Distribution of Collaborative Research*

i. Maternal and Child Health

This constitutes the core thematic area and represents the foundational contribution of the research programme. The work in this area reflects my doctoral focus on maternal mortality in Northern Nigeria and has evolved into one of the most comprehensive examinations of maternal health in the region. Dr. Kolo and Dr. Monguno have been central to this thematic area, with Dr. Kolo's doctoral work on maternal mortality in Borno State establishing the methodological template for our research school.

The research has examined socio-cultural and demographic determinants of maternal mortality through population-based studies in North-Eastern Nigeria, providing empirical evidence that has informed policy discussions and intervention design. Immunization coverage has been

systematically analysed across multiple states, with studies in Borno and Kano States providing crucial evidence for programme evaluation and improvement.

The spatial and temporal patterns of maternal deaths have been mapped and analysed, establishing the geographic dimensions of maternal mortality that had previously been overlooked. Perhaps most significantly, the research has examined the intersection of religion and health outcomes through critical reviews of maternal and child mortality patterns among Muslims in Nigeria, addressing the cultural and religious dimensions that are essential for effective intervention design in the region. This body of work represents a sustained and systematic engagement with one of the most intractable health challenges in Nigeria.

ii. Infectious Disease Epidemiology

This thematic cluster demonstrates sophisticated spatial and temporal analysis of communicable diseases and has grown substantially over the course of the research programme. Drs. Abdulkarim, Yakudima, Zakari, Danbuzu, and Ms Ruqayya Isah have been central to this thematic area. The research on malaria has been particularly comprehensive, with geospatial analysis of prevalence, hotspot detection, and environmental factor analysis conducted across multiple states in North-Western Nigeria.

Studies on typhoid fever have examined spatio-temporal patterns and demographic distribution, providing critical evidence for disease surveillance and intervention targeting in endemic areas. Cerebrospinal meningitis has been the subject of longitudinal analysis in Kano State, including not only epidemiological patterns but also community knowledge and attitudes (a contribution that bridges epidemiological and behavioural research).

Tuberculosis research has examined spatio-temporal trends and climatic drivers, with recent work integrating environmental data with disease incidence patterns to understand the seasonal and climatic determinants of transmission. Hepatitis research represents the most recent addition to this thematic cluster, with studies on spatio-temporal distribution and case fatality patterns in Kano Metropolis.

Collectively, this research has generated critical evidence for disease surveillance and intervention targeting, with practical implications for health system planning in endemic areas.

iii. Health Systems and Facilities Distribution

This thematic area examines the infrastructure and workforce dimensions of health-care delivery and addresses the structural factors that underpin poor health outcomes in Northern Nigeria. Drs. Sani, Sheshe, Mr. Abba, Mr. A.B. Ishaq, and Mr. Iliya B. Donayin have been central to this thematic area. The research has systematically analysed the distribution of public health facilities across multiple states, revealing patterns of inequity and accessibility challenges that have direct implications for health policy. health-care workforce distribution has been examined in Niger State, identifying areas of shortage that undermine service delivery.

Primary health care facilities have been subject to geographical analysis in Kano Metropolis, providing evidence for the strengthening of the primary care system. This work has also contributed to health-care planning through the use of GIS applications that enable evidence-based decision-making about facility location and resource allocation. The significance of this thematic area lies in its contribution to an evidence base for health system strengthening and equitable distribution of health-care resources, particularly relevant for rural and underserved areas that have historically been neglected.

iv. Environmental Health and Non-Communicable Diseases

This emerging thematic area addresses broader environmental determinants of health and reflects the expansion of the research programme into the evolving health challenges facing the region. Dr. Danbuzu and Mr. Hassan have been central to this thematic area. The research has examined the health risks associated with urban solid waste in Kano Metropolis, contributing to understanding of the environmental dimensions of urban health. Diabetes mellitus has been the subject of spatio-temporal analysis and demographic risk assessment in Kano Metropolis, addressing the growing burden of non-communicable diseases in urban areas. Most recently, the research has contributed theoretical work on disease ecology, engaging with the legacy of Jacques May and its relevance to contemporary global health challenges. The significance of this body of work lies in its demonstration of the research programme's expansion beyond infectious diseases into non-communicable and environmentally-mediated conditions, reflecting the evolving health challenges in the region and the research group's capacity to adapt to emerging priorities.

Methodological Approaches and Evolution

The methodological trajectory of the research programme reveals a systematic progression from foundational techniques to increasingly sophisticated analytical approaches. This evolution reflects both the growth of the research group's capabilities and the deliberate capacity building that has occurred through successive cohorts of postgraduate students.

i. Early Methodologies (2008–2012)

The early phase of the research programme primarily employed descriptive statistical approaches, including frequencies, percentages, and basic measures of central tendency. The introduction of GIS applications for health-care planning represented an important methodological innovation during this period, establishing the spatial analytical orientation that would characterise much of the subsequent research.

Cross-sectional survey designs were the predominant approach for data collection, with literature reviews also contributing to the early knowledge base. These foundational methods, while relatively straightforward, established the empirical orientation and the geographic perspective that would define the research programme.

ii. Intermediate Methodological Development (2013–2019)

This period saw substantial methodological advancement across multiple dimensions. Institutional-based study designs, involving the analysis of health facility records, complemented population-based studies that employed community-based surveys. The introduction of Inverse Distance Weighting and Linear Trend Surface analysis represented a significant advancement in spatial analytical capability, enabling more sophisticated mapping and interpolation of disease patterns.

Spatio-temporal analysis became increasingly common, with studies examining both spatial and temporal dimensions of disease incidence. The methodological diversification during this period reflected both the growing sophistication of the research group and the increasing complexity of the research questions being addressed.

iii. Current Methodological Sophistication (2020–2026)

Recent publications demonstrate advanced methodological capabilities that position the research group at the forefront of medical geography research in Nigeria. Hotspot detection using cluster detection algorithms

has enabled the identification of priority areas for intervention. Multivariate analytical approaches have been employed to identify independent determinants of health outcomes. The integration of qualitative and quantitative methods has enriched the research, enabling exploration not only of epidemiological patterns but also of community knowledge, attitudes, and practices.

Climatic driver analysis has integrated environmental data with disease incidence patterns, enabling understanding of the environmental determinants of disease transmission. Demographic and occupational risk profiling has provided detailed understanding of the populations most vulnerable to specific health conditions. The theoretical contributions on disease ecology represent the most recent methodological development, engaging with disciplinary theory and demonstrating the research group's capacity for conceptual as well as empirical contributions.

Collective Contributions to Knowledge: A Synthesis

Through this structured, multi-generational mentorship, our collective contributions spanning co-authored and collaborative publications can be synthesised under five major headings.

i. Methodological Rigour and Innovation as a Shared Language: We have collectively championed the use of spatial and temporal analysis (Inverse Distance Weighting, linear trend surface analysis, Geographic Information Systems, hotspot detection using Getis-Ord Gi, and multi-criteria decision analysis) to move beyond simple descriptions of disease burden.

Our work consistently applies these tools to map risk, identify clusters, understand diffusion patterns, and predict future outbreaks. This is not methodological fetishism; it is the production of actionable intelligence for public health interventions. A map of a meningitis hotspot is not an academic artefact; it is a directive to the State Ministry of Health to deploy vaccines.

ii. A Thematic Continuum Across the Leading Causes of Morbidity and Mortality in Northern Nigeria: Our publications trace a logical, almost encyclopaedic, progression across interconnected public health challenges. The work spans reproductive and maternal health (Dr. Monguno, Dr. Kolo), infectious diseases including meningitis, malaria, typhoid, tuberculosis, and Hepatitis (Drs. Zakari, Dr. Yakudima, Dr. Abdulkarim, Dr. Danbuzu, and Ms. Ruqayya Isah), child health and nutrition (Dr.

Sheshe, the late Zainab Bello, Dr. Ahmed), and health systems and access (Dr. Sani, Dr. Sheshe, Mr. Abba and Mr. Ishaq). Each scholar has contributed to a specific dimension of this thematic continuum, creating a comprehensive research agenda.

iii. Integration of Quantitative and Qualitative Approaches as a Pedagogical Commitment: Our early work was necessarily heavily quantitative, establishing the spatial patterns. But as our mentorship matured, we deliberately fostered the integration of qualitative methods. Dr. Zakari's work on meningitis is the clearest example: having mapped the where of meningitis, we returned to ask the why through focus groups and in-depth interviews. This two-stage approach is now a standard feature of our group's methodology, training students to be mixed-methods researchers capable of speaking to epidemiologists, anthropologists, and policymakers alike.

iv. Disciplinary Consolidation and the Building of Intellectual Infrastructure: Our Springer chapters on Health and Medical Geography in Africa:(2023) represents a collective step back to reflect on and formalise the state of the field. This is a contribution not of primary research but of intellectual infrastructure, it helps to define the field for the next generation, establish a canon of Nigerian medical geography, and position our work within the broader African and global discourse. A research school that does not reflect on its own intellectual history is a school without a future.

v. A Sustainable, Self-Replicating Model of Collaborative Scholarship: The progression from my early work to the doctoral work of Drs. Kolo, Zakari, and Sheshe, and to the sustained collaborations of Drs. Abdulkarim, Yakudima, Danbuzu, and others, illustrates a self-sustaining research ecosystem. This model ensures continuity in addressing the region's persistent health challenges while continuously fostering a new generation of geographers.

Independent Contributions: The Students' Achievements

Next is the second phase of the successful story of mentorship and the ultimate legacy. Here, we examine the independent contributions of my mentees to health and medical geography of the savanna belt of Nigeria. The collaborations are now horizontal among former students, no longer requiring my vertical supervision. This is the definition of a successful research school: when the scholars you have trained begin to collaborate

with each other, and you become, not the centre, but one node in a distributed network. Figure 18 presents a graphic representation of the horizontal nature of their collaborations.

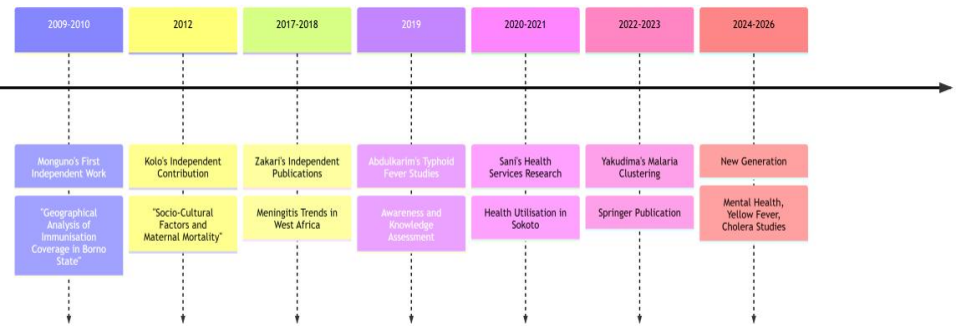


Figure 18: *Horizontal Collaboration*

The Ultimate Measure of Mentorship

Mr. Vice Chancellor, distinguished colleagues and guests, the most gratifying evidence of a successful mentorship programme is the work that my former students produce without my name on it. The list of independent publications presented here is, to me, more meaningful than any of the co-authored papers we have discussed. It represents scholars who have not only learned the tools but have developed their own research questions, formed their own collaborations, and are now contributing to the discipline autonomously.

What is particularly remarkable about this collection is not merely its volume, but the ecology of collaboration it reveals. My former students have not scattered to the winds; they have created a dense, interconnected network of scholars who collaborate with each other, build on each other's work, and extend the geographical and thematic reach of our collective research agenda. This is the definition of a successful research school: when the scholars you have trained begin to train and collaborate with each other, and you become, not the centre, but one node in a distributed network.

Scale and Scope: The Numbers

The scale and scope of the Kano School's scholarly output are presented in Figure 19, which summarises key metrics of our research productivity:

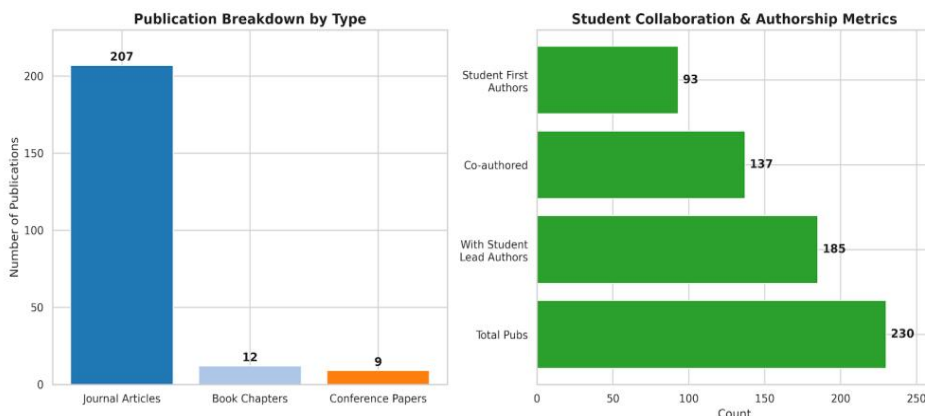


Figure 19: Key Metrics of Kano School Research Productivity

Publication Trends Over Time

A year-by-year distribution of publications by the Kano School is shown on Figure 20, revealing important temporal patterns.

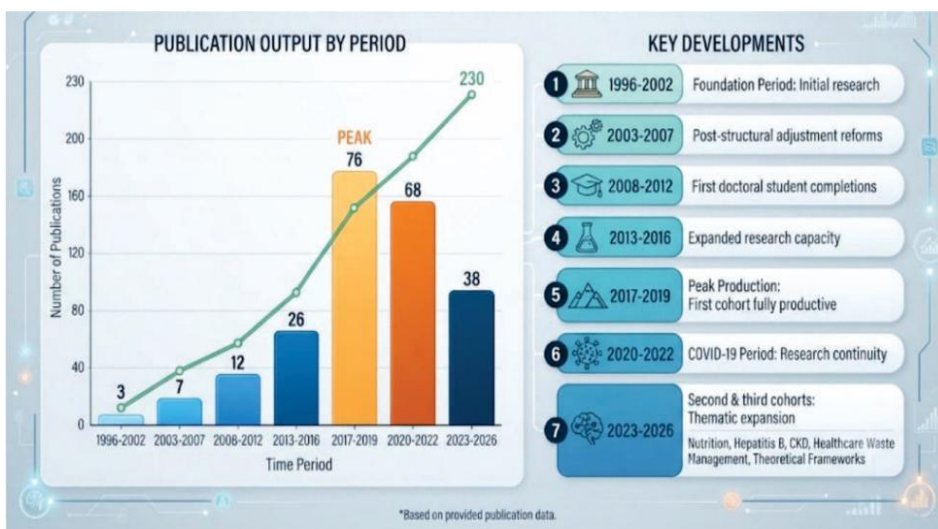


Figure 20: Year by year Distribution of Publications

Several important patterns emerge from this temporal analysis:

Acceleration. The rate of publication has accelerated dramatically over time. The period 2017-2022 (six years) produced 144 publications, more than all previous years combined. This acceleration reflects the growing capacity of the Kano School, the increasing number of active researchers, and the maturation of the research programme.

Sustained productivity. Even during the COVID-19 pandemic (2020-2022), the Kano School maintained high levels of productivity (68 publications). This resilience demonstrates the sustainability of the research programme.

Growing momentum. The most recent period (2023-2026) has continued the pattern of high productivity, with publications addressing new diseases (yellow fever, COVID-19, Ebola modelling), new thematic areas (severe acute malnutrition, chronic kidney disease, health-care waste management), and new locations (Yobe State, Katsina State).

Thematic Distribution

Table 1 categorises the Kano School's publications (through students) by thematic area, revealing the intellectual priorities and research strengths of the programme. New papers on child undernutrition and others significantly add to multiple thematic areas, particularly Infectious Diseases, Environmental Health, and Non-Communicable Disease. While Figure 21 shows the visuals of the thematic distribution of the publications emanating from different theme, table 12 gives details of the core researchers in each theme.

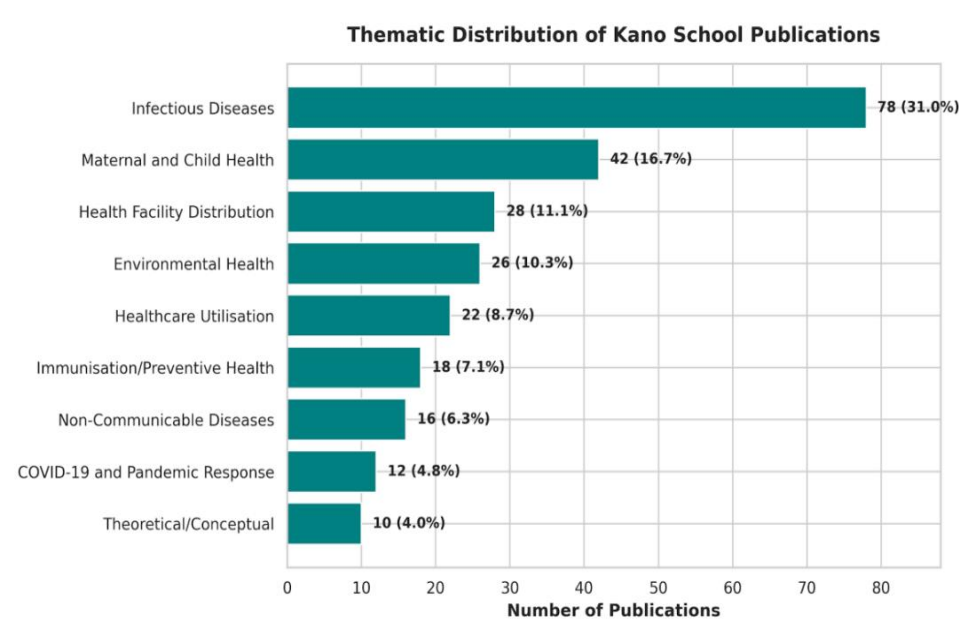


Figure 21: *Thematic Distribution of Kano School Publications*

An analysis of the thematic distribution is presented below:

- i. Infectious Diseases continues to dominate the research portfolio (33.9%), reflecting the epidemiological reality of Northern Nigeria. Within this theme, malaria, meningitis, typhoid, tuberculosis, and Hepatitis have been the most studied. The recent work by R.A. Isa on the spatio-temporal distribution of Hepatitis in Kano Metropolis further demonstrates the School's sustained focus on viral hepatitis. Dr. Yaro's contributions to this theme include work on tuberculosis spatio-temporal trends (Danbuzu *et al.* 2020), malaria infection among pregnant women (Abdulkarim *et al.* 2023), and temporal analysis of climatic drivers of tuberculosis (Danbuzu *et al.* 2024).
- ii. Maternal and Child Health has grown to become the second largest theme (18.3%), reflecting the region's persistently high maternal mortality ratios and child mortality rates. This theme now encompasses Dr. Sheshe's recent work on the geography of child under-nutrition, specifically the prevalence of marasmus and kwashiorkor, representing one of the Kano School's most significant contributions to health policy and practice, see Table 12.

Table 12: *Core Researchers by themes*

Theme	Publications	Percentage	Core Researchers
Maternal and Child Health	42	18.3%	Monguno, Kolo, Abdulkadir, Ahmed, Sheshe
Infectious Diseases	78	33.9%	Yakudima, Zakari, Abdulkarim, Danbuzu, Yaro
Health Facility Distribution	28	12.2%	Sani, Monguno, Sheshe, Darda'u
health-care Utilisation	22	9.6%	Sani, Ahmed, Ishaq, Sheshe
Environmental Health	26	11.3%	Monguno, Yakudima, Zakari, Yaro, Bello, Kyari
Immunisation/Preventive Health	18	7.8%	Monguno, Abdulkadir, Bello, Yaro, Idris

Theme		Publications	Percentage	Core Researchers	
COVID-19 and Pandemic Response		12	5.2%	Kolo, Mukhtar	Chutiyaami,
Non-Communicable Diseases		16	7.0%	Hassan, Nafisat, Yaro	Abdulkadir, Baffa, Kyari,
Theoretical/Conceptual		10	4.3%	Danbuzu, Abdulkarim	Yaro,
Total		230	100%		

Health Facility Distribution (12.2%) and health-care Utilisation (9.6%) together constitute nearly a quarter of the Kano School's output, demonstrating the sustained commitment to health systems research and the policy-oriented approach that characterises the School.

Environmental Health (11.3%) and Immunisation/Preventive Health (7.8%) reflect the School's attention to the environmental determinants of health and to preventive health interventions. Dr. Yaro's significant contributions to environmental health include research on health-care waste management practices (Yaro *et al.* 2023), open defecation practices (Bello *et al.* 2023), water quality risk factors and CKD (Kyari *et al.* 2024), and community-led total sanitation (Idris *et al.* 2026).

Non-Communicable Diseases (7.0%) has grown substantially, with Hassan's work on diabetes (Hassan *et al.*, 2019), Auwal's work on cardiovascular diseases (Auwal, *et al.* 2020), Dr. Yaro's work on chronic kidney disease (Baffa *et al.* 2021; Kyari *et al.* 2024) adding a critical dimension to the School's research portfolio on the growing burden of NCDs in Northern Nigeria.

Theoretical/Conceptual Contributions (4.3%) represent a new and important dimension of the Kano School's work. Dr. Danbuzu has made significant theoretical contributions through publications on shifting ecologies of disease (Danbuzu *et al.* 2025), reframing disease ecology through Jacques May's contributions (Danbuzu *et al.* 2026), and the geography of neglect and structural violence in rural health-care (Danbuzu *et al.* 2026).

The Network Ecology: Analysing Collaborative Patterns

From Figure 22, we can see clearly their independent studies have covered all three geo-political zones of Northern Nigeria, maintaining geographical spread. Kano remains the most studied state for obvious reasons.

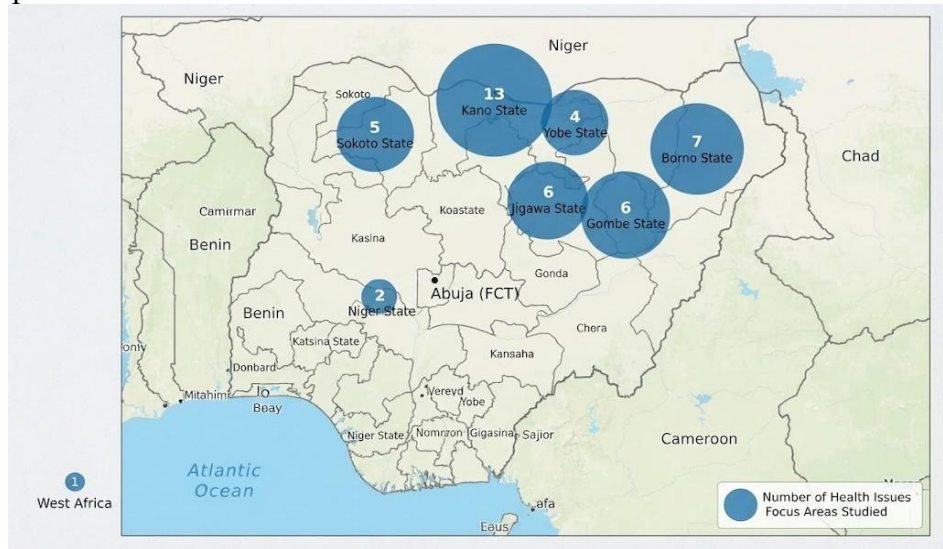


Figure 22: *Geographic Distribution of Collaborative Research*

While a study by Zakari covers a wider scale (West Africa), the interesting aspect is how my former students are collaborating among themselves, as well as with their own students (the students of my students) and other collaborators. The involvement of collaborators who are not directly from the Kano School is a deliberate attempt to incorporate them and ensure the diffusion of the research ecology. What truly distinguishes this group of scholars is the self-sustaining research ecosystem they have built among themselves one that no longer requires any direct involvement from me.

Figure 19 provides a powerful visual summary of an academic network's impact, with the geographical spread being a central and critical component of its story. The map of Northern Nigeria is not just a locator; it is a testament to reach. The network distributed across a wide area including states like Kano, Sokoto, Kaduna, and Nassarawa, shows that the network's influence is not confined to a single institution or city. This deliberate decentralization is its greatest strength. By incorporating scholars and students from diverse locations, the network fosters a rich exchange of ideas, cultural perspectives, and localized knowledge. It prevents academic silos and ensures that the research produced is relevant to the varied contexts of Northern Nigeria.

This broad geographical spread is the cornerstone of the network's long-term sustainability. It does this in two key ways, first through Human Resource Diversification: A network spread across multiple states is more resilient than one centered on a single location. It is less vulnerable to local disruptions (e.g., institutional closures, regional instability). Then by engaging students and scholars from across the region, the network creates a wide and deep talent pool. This ensures a steady influx of fresh ideas and future leaders, preventing the network from becoming stagnant. The geographic diversity acts as a self-renewing mechanism.

Furthermore, this extensive geographical footprint ensures a lasting legacy. The impact is not ephemeral. Each pin on the map represents a node of influence. Scholars and students trained within this system return to their home institutions and communities, carrying the network's ethos of collaboration, rigorous research, and interdisciplinary thinking with them. This creates a multiplier effect, embedding a culture of excellence and cooperation that will endure far beyond the life of the initial project. The legacy is a strengthened and interconnected academic ecosystem across Northern Nigeria.

The Central Nodes in the Network

Dr. Ishaq Aliyu Abdulkarim emerges as the primary central node, see figure 23. His strategic collaborations bridge clinical researchers with those focusing on health-care access, connecting widely across studies on malaria, typhoid, hepatitis, and tuberculosis with colleagues like Dr. Ismaila Ibrahim Yakudima, Dr. L.A.S. Danbuzu, Dr. Nafi'u Zakari, Dr. Faiza Isa Sheshe, and A.B. Ishaq.

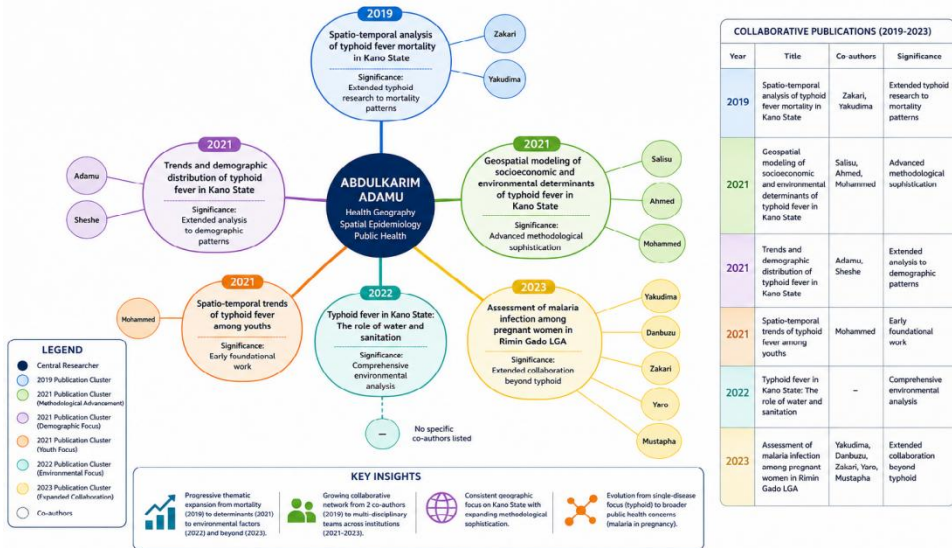


Figure 23: Dr. Abdulkarim's Collaborative Research Cluster

Dr. Ismaila Ibrahim Yakudima acts as our network multiplier. His remarkable collaborative breadth spans infectious diseases to health policy, joining forces with Abdulkarim, Zakari, Danbuzu, Abdulkadir, A.B. Ishaq, and B.Y. Ahmed, see figure 24.

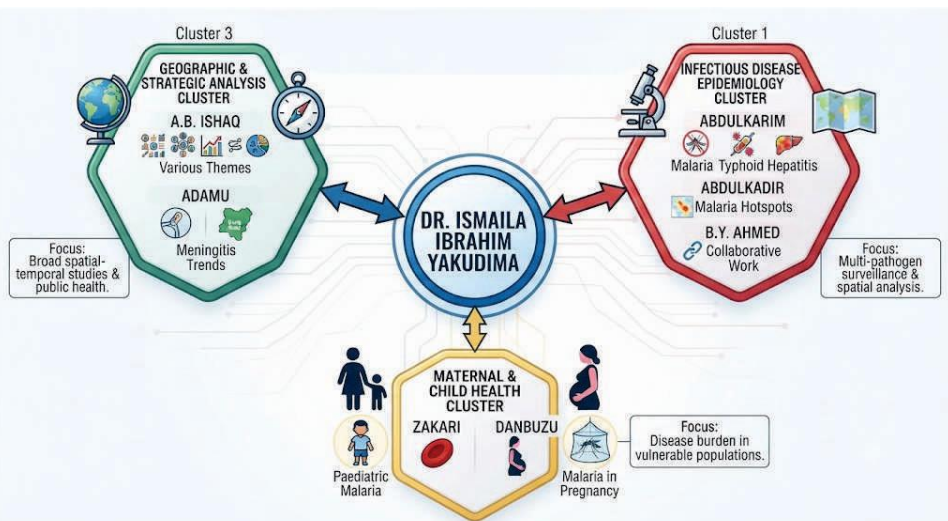


Figure 24: Dr. Yakudima's Collaborative Research Cluster

Dr. Nafi'u Zakari functions as a vital bridge, connecting the central clinical hub to specialized investigations into meningitis and cholera. His collaborations with Darda'u on cholera risk factors demonstrate how the network extends into emerging research territories as shown on figure 25.

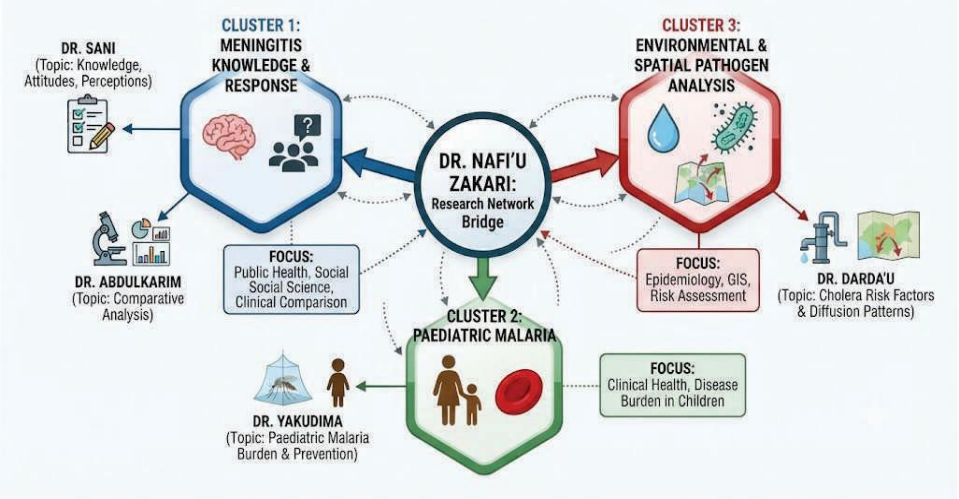


Figure 25: *Dr. Zakari's Collaborative Research Cluster*

Dr. L.A.S. Danbuzu represents our theoretically ambitious wing. By connecting practical and clinical research to broader "disease ecology" models, structural violence, and the critical framework of Jacques May, Danbuzu provides profound academic depth to our collaborative output, see figure 26.

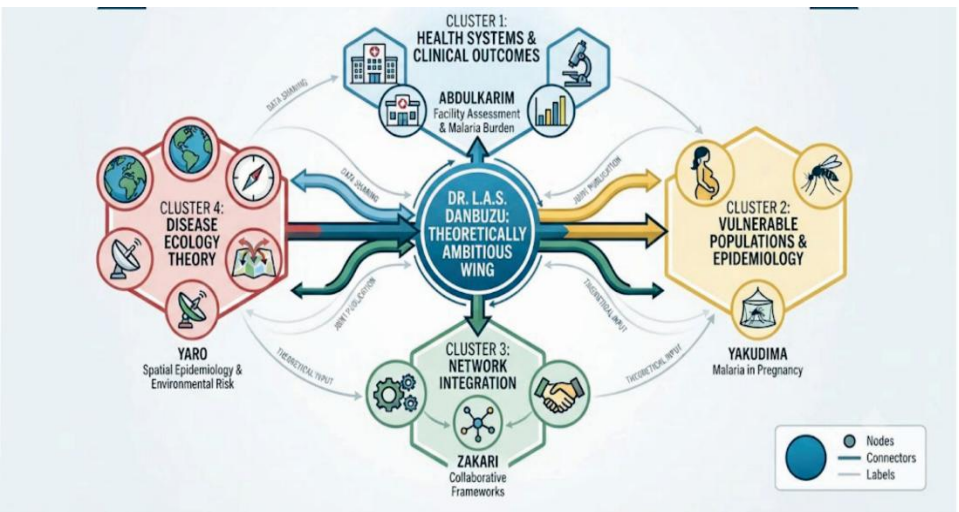


Figure 26: *Dr. Danbuzu's Collaborative Research Cluster*

Professor Mahmud Abubakar (Nasarawa State University, Keffi) represents a significant expansion of our research school into North-Central Nigeria. With over fifteen publications spanning maternal and child health, malaria treatment-seeking behaviour, HIV/AIDS, Hepatitis C, and health-care facility distribution, Abubakar has established himself as a formidable independent scholar. His work on the determinants of community-based health-care interventions for infants and children in Nasarawa State (2022) and his studies on hypertensive disorders among pregnant women in Abuja (2021) demonstrate the same rigorous spatial and social analysis that defines our research tradition. Although he did not collaborate with other members of the school, except myself, he has built his own secondary extension in central Nigeria.

SECTION SIX

THE KANO SCHOOL OF HEALTH AND MEDICAL GEOGRAPHY

The Nature of the School: Formation, Identity, and Future

Finally, Mr. Vice Chancellor, distinguished guests, my respected colleagues, former students, I arrive at the legacy, the heart of my story: The Kano School of Health and Medical Geography. And this afternoon, here in this hall, I formally inaugurate it.

The Emergence of a School

What I termed in this lecture "The Kano School of Health and Medical Geography" began to take shape when the idea itself was not even born. All I knew at the time was that I had introduced a new course and research area in geography at Bayero University, Kano, that I was passionate about it, and that I wanted to develop and expand it until it became a mainstream sub-discipline. I guarded this vision with everything I had.

The foundation of the Kano School of Health and Medical Geography traces back to the introduction of medical geography at Bayero University Kano during the 1997/98 academic session. Undergraduate projects served as the seeds, followed by Master's research, and ultimately, doctoral works. However, it was publishing the outputs of these conducted researches, combined with the strong network and collaboration of the students under my mentorship, that ultimately culminated in the formation of the school we are formalising today.

The period from 2008 to 2016 witnessed the emergence of the Kano School as a distinctive and productive research programme. Several factors converged during this period:

- i. *The maturation of the first cohort:* My first doctoral students, particularly A.K. Monguno (2010), M.A. Kolo (2015), and others began to publish their research, extending the spatial analytical tradition into new diseases, new locations, and new questions.

- ii. *The GIS revolution:* Geographic Information Systems became more accessible and more powerful during this period, enabling more sophisticated spatial analyses than had previously been possible.
- iii. *The expansion of the research agenda:* The Kano School began to investigate an increasingly wide range of health problems, from maternal mortality to meningitis, from immunisation coverage to health-care utilisation, from environmental health to infectious disease.
- iv. *The institutionalisation of the School:* Through seminars, conferences, and collaborative research, the Kano School began to establish itself as a recognised centre of health geography research.

What are the Defining Characteristics of the Kano School?

The Kano School of Health and Medical Geography refers to the sustained, systematic, and transformative research programme in health and medical geography that emerged from Bayero University, Kano, under my mentorship. It is distinguished by several defining characteristics:

First, the empirical focus on Northern Nigeria. The Kano School has generated the most comprehensive body of geographical knowledge about health, disease, and health-care in Northern Nigeria. Our studies cover Kano, Borno, Jigawa, Sokoto, Katsina, Gombe, Yobe, Niger, Nassarawa, Kogi, and Benue States, a vast region that has been historically underrepresented in health research.

Second, the theoretical commitment to spatial analysis. We have consistently asked spatial questions, not merely describing disease patterns, but explaining them through the lens of place, location, distance, accessibility, clustering, diffusion, and environmental determinants.

Third, the methodological innovation. We have adapted the application of geographic information systems (GIS), spatial statistics, and participatory mapping to health research in Northern Nigeria. Our students have used inverse distance weighting (IDW), linear trend surface analysis, hotspot detection, and multivariate statistical techniques to reveal patterns that would otherwise remain hidden.

Fourth, the substantive breadth. Our research covers maternal and child health, infectious diseases (malaria, meningitis, typhoid, tuberculosis, Hepatitis, yellow fever, cholera), non-communicable diseases, health facility distribution, immunisation coverage, health-care utilisation, and

the environmental determinants of health. More recently, this has expanded to include the geography of nutrition and mental health.

Fifth, the policy orientation. Our research has been designed not merely for academic publication but for informing health policy, planning, and practice in Northern Nigeria and beyond.

The Kano School's Methodological Signature

The Kano School is distinguished by its methodological approach, which combines:

- i. **Geographic Information Systems (GIS):** All Kano School researchers employ GIS to map, analyse, and visualise health data. This has enabled sophisticated spatial analysis and visualisation that was previously impossible. Dr. Yaro's work on GIS-based analysis of water quality risk factors and CKD (Kyari *et al.* 2024) and Dr. Jamila Garba Abdullahi's thesis on malaria modelling exemplify this methodological commitment.
- ii. **Spatial Statistics:** Techniques such as inverse distance weighting (IDW), linear trend surface analysis, hotspot detection, and clustering analysis are standard in Kano School research. Dr. Zakari's thesis on meningitis (2021) and Dr. Yakudima's thesis on malaria (2023) demonstrate advanced application of these methods.
- iii. **Mixed Methods:** The Kano School employs both quantitative (spatial statistics, epidemiological analysis) and qualitative (knowledge, attitudes, and practices studies) methods. Dr. Yaro's research on health-care waste management practices (Yaro *et al.* 2023) and open defecation practices (Bello *et al.* 2023) demonstrates the integration of quantitative and qualitative approaches.
- iv. **Interdisciplinary Collaboration:** Kano School researchers collaborate with public health professionals, clinicians, epidemiologists, and other specialists. Dr. Yaro's extensive collaborations with colleagues across multiple institutions and Dr. Yusuf's co-supervision with Prof. J. Afolabi Falola exemplify this interdisciplinary approach.

Core-Periphery Structure of Kano School Research

The Kano School's research exhibits a clear core-periphery structure:

The Core: Kano State - Kano State is the geographic and intellectual heart of the Kano School. The concentration of research here reflects the depth of the School's engagement with the state, the availability of data, and the institutional location of the School at Bayero University, Kano. The newest research on under-five child malnutrition, Hepatitis case fatality, health-care waste management, mental health further solidifies this core. Doctoral theses on Kano State include Yaro (2018), Abdulkarim (2019), Zakari (2021), Danbuzu (2021), Sheshe (2024), Garba (2025) and Yahuza (2026).

The Inner Periphery: Jigawa, Borno, Sokoto, and Katsina States - Research has extended to neighbouring states, each with its own distinctive health challenges and research priorities. These states represent the expanding frontier of the Kano School's research. Dr. Yaro's work in Jigawa State on CKD (Baffa *et al.* 2021), Dr. Yakudima's thesis on malaria in Jigawa (2023), Dr. Monguno's thesis on immunisation in Borno (2010), Dr. Kolo's thesis on maternal mortality in Borno (2015), Dr. Sani's thesis on health services in Sokoto (2021), and Dr. Darda'u's thesis on health services in Katsina (2021), demonstrate this expansion.

The Outer Periphery: Gombe, Yobe, Adamawa, Niger States - Research has extended further afield to these states, demonstrating the School's growing reach and influence. Dr. Yayaji's thesis on maternal health services in Gombe (2016), Dr. Lawal's thesis on cholera in Adamawa (2015), Dr. Yaro's collaborative work in Yobe State on water quality risk factors and CKD (Kyari *et al.* 2024) and malaria determinants (Usur *et al.* 2024), and Ishaq's work in Niger State demonstrate this outward expansion. The structure is graphically illustrated in figure 27.

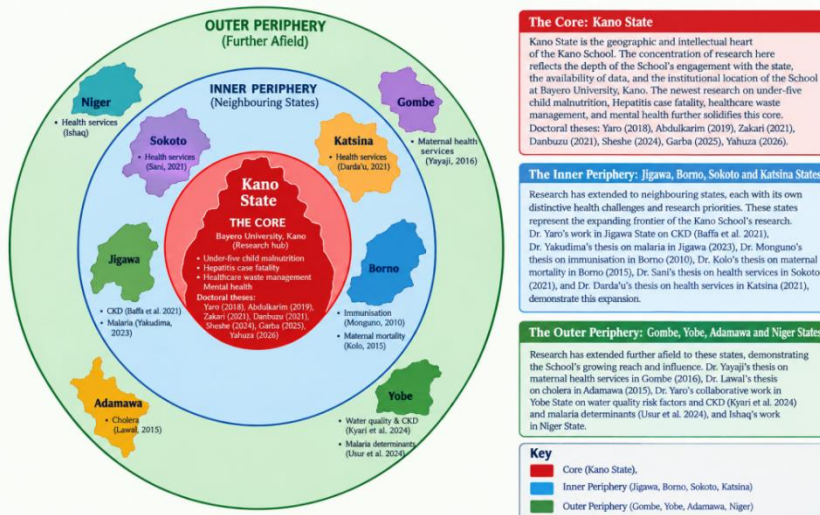


Figure 27: Core-Periphery Structure of Kano School

The Kano School's Intellectual Legacy

The Kano School has established several enduring intellectual legacies which include the recognition of health geography as a legitimate field of research in Northern Nigeria. Before the Kano School, health geography was virtually unknown in the region. Today, it is a recognised and respected field, with a growing number of researchers, publications, and courses. This transformation is the School's most fundamental achievement.

So also the establishment of the spatial analytical paradigm. The Kano School has demonstrated the value and importance of spatial analysis for understanding health and disease in Northern Nigeria. This paradigm, which asks spatial questions, applies spatial methods, and generates spatial knowledge has been widely adopted and extended.

The integration of geographical and epidemiological approaches is also part of the institutional legacy.. The Kano School has shown that geography and epidemiology are complementary, not competing, disciplines. By combining geographical methods with epidemiological approaches, the School has generated knowledge that is both spatially and clinically relevant.

The development of a distinctive research tradition. The Kano School has developed a distinctive research tradition that combines rigorous spatial analysis, policy relevance, and a commitment to understanding the health

challenges of Northern Nigeria. This tradition has been passed down through generations of students. The recent theoretical contributions by Danbuzu, Yaro, and colleagues (2025, 2026) represent important intellectual maturation, engaging with foundational concepts in medical geography and positioning the School within broader global debates.

The Kano School's Institutional Legacy

The Kano School has also left an important institutional legacy:

A pipeline of trained researchers. The 14 doctoral students (in health/medical geography) I supervised to completion represent a pipeline of trained health geography researchers who are working across Nigeria and beyond. These researchers are applying the Kano School's methods, questions, and research culture in new locations and new contexts. Drs. Yakudima and Garba's exhaustive work on malaria in the Kano region and Dr. Yahuza's pioneering detailed work on mental health geography exemplify the success of this pipeline.

A body of scholarly literature. The 230 publications produced by the Kano School constitute a comprehensive scholarly literature on health and medical geography in Northern Nigeria. This literature is consulted by researchers, policymakers, and practitioners working on health in the region.

A model for research mentorship. The Kano School has demonstrated the power of sustained, systematic mentorship in building research capacity. My students have, in turn, become mentors to their own students, extending the School's influence across generations.

Sustainability and Legacy

The most significant achievement of the mentorship model is the creation of a sustainable research ecology that ensures the continuation and expansion of the research agenda beyond my direct involvement. The consistent collaborators identified in this lecture demonstrate that the model has achieved its ultimate goal: creating independent researchers who maintain productive collaborative relationships with their mentor while also developing their own research identities.

Multi-generational collaboration ensures that knowledge and skills are transmitted across successive cohorts of researchers. Institutional embeddedness across multiple Nigerian universities, from Maiduguri in

the northeast to Sokoto in the northwest, from Kano in the centre to Katsina and Jigawa, from Nassarawa to Niger states in north-central Nigeria ensures that research capacity is institutionally dispersed and resilient. International integration through collaborations and international publications positions the network within the global academic community. Theoretical contributions, such as Dr. Danbuzu's work on disease ecology, demonstrate that the network is now capable of shaping disciplinary discourse rather than merely contributing empirical findings.

The Kano School's Future: Towards a Fifth Generation

As the Kano School enters its fourth decade, several directions for future development are apparent:

Expansion to new diseases - The Kano School should continue to expand its disease coverage to include emerging and re-emerging diseases, as well as non-communicable diseases that are becoming increasingly important in Northern Nigeria. Dr. Yahuza's work on mental health (2026), Binta Zakari's ongoing work on CKD, Fatima Salihu's ongoing work on breast cancer and represent important steps in this direction, and future research should expand to include other NCDs such as sickle-cell disease, respiratory diseases, and neurological conditions.

Expansion to new locations - The Kano School should continue to expand its geographic coverage to include all of Northern Nigeria and beyond. Dr. Lawal's research in Adamawa State (2015), and Dr. Yayaji's research in Gombe State (2016) exemplify this geographic expansion. However, the School need to attract students and or co-researchers across the Niger River.

Methodological innovation - The Kano School should continue to develop and adopt new methods, including machine learning, big data analytics, and participatory methods.

Policy engagement- The Kano School should strengthen its engagement with health policymakers and practitioners, ensuring that its research has maximum impact on health policy and practice. Dr. Sheshe's research on child malnutrition, Eninibajo's and Mukhtar's ongoing similar work in Kogi and Jigawa and Dr. Yahuza's research on youth mental health have direct policy implications that should be actively disseminated to policymakers.

Mentorship and capacity building - The Kano School should continue to mentor and train the next generation of health geography researchers. The emergence of researchers like Prof. Monguno, Abubakar, Drs. Abdulkarim, Yakudima, Zakari, and others who are now contributing to multiple thematic areas and mentoring their own students, demonstrates the sustainability of the School's mentorship model.

Conclusion

I began this narrative by describing the silence before the map, the period before health geography existed as a field of research in Northern Nigeria. I became a cartographer of the invisible, mapping what others had counted but not located. I asked spatial questions about health problems that others had analysed only in their clinical or epidemiological dimensions. I built, paper by paper, study by study, the intellectual infrastructure that would later support the research of fourteen doctoral students and the publication of two hundred and thirty papers.

Looking back over three decades, I see that the silence has been broken. The blank space on the map has been filled with data, analysis, and understanding. The invisible has been made visible. The spatial questions that no one was asking have been asked and answered.

The chronology of doctoral supervision tells a story of intellectual evolution. From Monguno's foundational work on immunisation in Borno (2010) to Yahuza's pioneering research on youth mental health in Metropolitan Kano (2026), the Kano School has progressively expanded its thematic and geographical scope. Each doctoral thesis has built upon the foundations laid by its predecessors, extending the spatial analytical tradition into new diseases, new locations, and new questions.

The recent work of Dr. Sheshe on child malnutrition and R.A. Isa on Hepatitis exemplifies the dynamic and evolving nature of the School. Dr. Sheshe has taken the methodological toolkit we built for mapping health services and brilliantly applied it to a new, critical frontier: the geography of nutrition. Her work is not just a new set of maps; it represents a conceptual expansion of what we consider a "health geography" problem. It demonstrates that our methods can be a powerful lens for understanding the spatial drivers and patterns of food insecurity and malnutrition, directly informing the fight against one of Northern Nigeria's most devastating health crises. Similarly, R.A. Isa's analysis of case fatality patterns for Hepatitis adds a crucial dimension of health system

performance and disease severity to our ongoing work on infectious diseases.

Dr. Nura Alhaji Yaro's contributions (through aggressive collaborations) represent another dimension of the School's evolution. His work spans environmental health (health-care waste management, open defecation, community-led sanitation), non-communicable diseases (chronic kidney disease), infectious diseases (tuberculosis, malaria), and theoretical medical geography (disease ecology, structural violence). This thematic breadth, combined with geographic coverage spanning Kano, Jigawa, Yobe, and Katsina States, demonstrates the maturation and diversification of the Kano School's research programme.

Dr. Danbuzu's theoretical contributions, particularly the work on reframing disease ecology and the geography of neglect, positions the School within broader global debates in health and medical geography, ensuring that our empirical research is grounded in and contributes to foundational disciplinary concepts.

Dr. Yunusa Yahuza's doctoral thesis on the geographies of anxiety and depression among youth in Kano State (2026) represents the Kano School's strategic expansion into mental health geography, a field of growing importance in Northern Nigeria where mental health services remain severely under-resourced. His work opens new frontiers for the School's research programme and demonstrates the versatility of our spatial analytical methods in addressing emerging health challenges.

But the legacy of the Kano School is not only the knowledge we have produced, but the researchers we have trained and the research culture we have built. The sixteen doctoral students I have supervised have become researchers, teachers, and mentors in their own right. They are applying the Kano School's methods, questions, and research culture in new locations and new contexts. They are training the next generation of health geography researchers. They are continuing to fill the map with new data, new analysis, and new understanding.

My legacy is not only the maps we produce, but the mapmakers I train. Not only the knowledge we generate, but the generations of researchers we inspire.

The Kano School of Health and Medical Geography is not a building, a department, or a formal institution. It is a community of scholars (past, present, and future) united by a shared commitment to understand and address the health challenges of Northern Nigeria through rigorous spatial analysis. It is a research tradition that has been built over three decades, through the sustained effort of one researcher and the cumulative contributions of many. And it is a legacy that will continue to grow, evolve, and produce new knowledge for decades to come. Because the heart of the school is here in Bayero University, we expect huge support from the university management to make it greater.

SECTION SEVEN

VISION AND PROSPECTS OF HEALTH AND MEDICAL GEOGRAPHY IN NIGERIA

A Call for Mainstream Recognition and Strategic Partnerships

The Kano School of Health and Medical Geography has demonstrated that rigorous spatial analysis can be conducted in resource-constrained settings, producing knowledge that saves lives. Yet despite proven contributions (from identifying eclampsia as urban Kano's leading maternal killer to mapping facility distribution and developing the Five-Stage Model of Obstetric Care) medical and health geographers remain marginalised within Nigeria's health policy and research mainstream. This invisibility is not merely an academic oversight; it is a public health failure that costs lives. The vision for the field therefore rests on a critical imperative: medical geography must be recognised, integrated, and resourced as an essential component of national health planning and intervention design.

Why Recognition is Non-Negotiable

Most current policy decisions are spatially blind. Health interventions are planned and resources allocated without systematic geographical intelligence. This leads to misdirected investments, overlooked high-risk populations, and failure to account for environmental and social contexts that shape disease patterns. The Five-Stage Model, though robust, remains underutilised precisely because geographical perspectives are not institutionalised in health ministries or development agencies.

Health data systems remain spatially impoverished. Nigeria collects vast amounts of health data, but the "where" is rarely analysed systematically. Medical geographers possess the tools to transform routine data into actionable spatial intelligence such as hotspot detection, access modelling, ecological forecasting, yet without integration into data architecture, this potential is wasted.

Interventions fail to address place-based determinants. Urban-rural inequalities, climate-sensitive diseases, nutrition "food deserts," and

mental health service gaps all have profound spatial dimensions. Designing programmes as if place were a neutral backdrop guarantees that many interventions miss their mark and exacerbate inequities.

Medical geography offers unique, complementary capabilities because:

- i. Spatial pattern recognition reveals clusters and gradients that pure statistics cannot detect.
- ii. Ecological modelling enables early warning systems for meningitis, malaria, and other climate-linked outbreaks.
- iii. Participatory mapping bridges technical analysis with community engagement, fostering culturally appropriate solutions.

These are not academic luxuries, they are practical tools for improving health outcomes. Yet they remain under utilised because the field lacks mainstream recognition.

The Prospects: Building on Strong Foundations

The Kano School's mentorship model has produced 110 undergraduate projects, scores of master's theses, and 14 doctoral graduates. The Medical Geography Study Group under the Association of Nigerian Geographers provides a national platform, and the YMA Research Network connects Nigerian scholars with peers in Malaysia, Singapore, and Saudi Arabia. This intellectual pipeline must now translate into institutional presence.

To achieve mainstream integration, we must:

- i. Engage health ministries systematically by producing policy briefs, technical reports, and direct briefings in accessible formats aligned with policy cycles.
- ii. Secure representation in research consortia and funding and ensure medical and health geography is included in national health research agendas, ethics committees, and donor portfolios.
- iii. Reform health curricula and integrate spatial thinking into medical, public health, and health policy training so that every practitioner can ask "where?" and interpret the answers.
- iv. Institutionalise spatial analysis in health information systems, embed geographical modules into the National Health Management Information System (NHMIS) and the National Health Insurance Authority (NHIA) and other data repositories, and train health officers in basic GIS.

The existing policy impact such as the magnesium sulphate intervention informed by Kano's eclampsia mapping must be amplified through co-production with policymakers, translation of findings into implementation tool-kits, and rigorous evaluation of how geographical evidence changes outcomes.

Addressing Emerging Challenges Through a Geographical Lens

The health landscape is evolving rapidly, and every trend demands spatial analysis:

- i. Climate change will shift the ecological niches of meningitis, malaria, and other diseases. Medical geographers can model these shifts and guide adaptation.
- ii. Urbanisation will intensify health inequalities, with slums and peri-urban areas becoming disease epicentres. Mapping vulnerability is essential for targeted action.
- iii. Epidemiological transition brings rising non-communicable diseases, mental health conditions, and injuries, all with spatial dimensions (access to screening, environmental exposures, lifestyle contexts).
- iv. Nutrition geography (food deserts, food insecurity) and mental health geography (anxiety, depression) are new frontiers pioneered by Kano scholars; they must become central pillars of national health programming.
- v. Diabetes, Chronic kidney disease, sickle-cell disease, and respiratory conditions also require systematic spatial investigation to guide resource allocation and environmental policy.

The Kano School has already demonstrated thematic diversification and methodological innovation, it is ready to address these challenges, provided its expertise is recognised and utilised.

Why Development Partners Must Act Now

Development partners (bilateral agencies, UN bodies, foundations, and multilateral banks) invest billions in Nigerian health. Yet much of this investment is spatially blind; facilities are sited, interventions rolled out, and budgets allocated without rigorous geographical analysis. This is a missed opportunity for efficiency, equity, and impact. Medical and health geographers can answer critical questions for partners such as:

- i. Where are the greatest unmet needs?
- ii. Where are service coverage gaps?
- iii. Where should new facilities be located to maximise access?
- iv. Where are emerging hotspots requiring rapid response?
- v. Where are climate- vulnerable zones needing adaptation support?
- vi. Where are nutritional and mental health deserts?

Geographical analysis maximises every naira by targeting interventions to the most vulnerable and monitoring impact through spatial metrics. Participatory mapping builds community ownership and sustainability. Early warning systems shift partners from reactive emergency response to proactive, cost- effective prevention.

Concrete opportunities include:

- i. Replicating the Population Council's success with magnesium sulphate by embedding geographers in maternal health programmes.
- ii. Integrating spatial analysis into WHO, UNICEF, and bilateral health system strengthening portfolios.
- iii. Investing in health geography research and capacity building through foundations like Dangote, MacArthur and Wellcome Trust and of course government agencies like TETFUND and big NGOs such as dRPC
- iv. Using spatial tools to guide World Bank and AfDB health infrastructure investments.

Partners who ignore geographical intelligence are not only wasting resources rather they are failing the populations they aim to serve.

Sustaining the Legacy Through Institutionalisation

The Kano School's intellectual genealogy (from Founders to Expanders to Diversifiers to Emerging Scholars) shows that the tradition is not dependent on any single individual. However, sustainability requires institutional recognition: universities must recognise and reward health geography; the NUC must include it a core course in health curricula; health ministries must create geographer positions; and the national research committee must prioritise spatial analysis. The Association of Nigerian Geographers must continue its advocacy.

A Call to Action

The geography of health and disease is not only an academic pursuit, rather it is a matter of life and death. Every intervention designed without spatial intelligence, every facility located without access modelling, and every resource allocated without geographical evidence represents a preventable loss. Recognition of medical and health geography is not a luxury; it is a necessity for achieving health equity and the SDGs.

To Nigerian academia, government, and development partners: invest in health data systems, geospatial infrastructure, and human capacity. Embed geographical analysis in every stage of health planning. Engage medical and health geographers as essential partners, not peripheral commentators.

The maps drawn, analyses conducted, and researchers trained serve one purpose: to make visible the invisible geographies of health and disease, and to use that visibility to build a healthier, more just, and more equitable Nigeria. This is the vision. The prospects are within reach. The work continues but only if we are finally seen, heard, and trusted.

Final word

My legacy is not only the maps produced but the mapmakers trained; not only the knowledge generated but the generations of researchers inspired. The Kano School of Health and Medical Geography is a community of scholars (past, present, and future) united by a shared commitment to understanding and addressing the health challenges of Northern Nigeria through rigorous spatial analysis. It is a research tradition built over three decades, through the sustained effort of one researcher and the cumulative contributions of many. It is a legacy that will continue to grow, evolve, and produce new knowledge for decades to come.

As I reflect on the journey that brought me to this podium, I am reminded of Edward Relph's concept of place and placelessness. Relph argued that places are not merely locations on a map but centres of meaning, experience, and identity. The places where women give birth and die, where children grow and fall ill, where families seek care and sometimes find only death; these are not neutral spaces but are shaped by cultural meanings, social relations, economic conditions, and health system realities that together determine outcomes. The challenge of medical geography is to make these places visible, to understand their dynamics, and to transform them into places of healing rather than places of neglect.

The Kano School has been my contribution to this transformation. It has been my way of putting health and disease in place; of understanding why some communities breathe easy while others cough, why one well gives life and another gives fever, why a woman in one village survives childbirth while her neighbour in the next village does not. And it has been my way of ensuring that this work continues long after I leave the podium.

Mr. Vice Chancellor, distinguished guests, ladies and gentlemen, I have told you my story. I have shown you the maps we have made, the researchers we have trained, and the knowledge we have generated. But the story does not end here. The maps we have made are not just maps of disease. They are maps of hope; hope that understanding the geography of health can help us build a healthier, more just, more equitable Nigeria. The maps will continue to be drawn. The researchers will continue to ask questions. The knowledge will continue to grow, and the geography of health and disease will continue to matter, perhaps now more than ever.

I want to conclude by arguing that the fight against disease is yet to be won, but we are now better equipped to locate it, understand it, and combat it.

*... And of Knowledge, You (Mankind) Have Been Given Only a Little
Qur'an 17:85*

Thank you all for your attention.

ACKNOWLEDGEMENTS

There are countless souls who have woven themselves into the fabric of my story, too many to name, and perhaps some I may inadvertently overlook. Such is the human condition, but my heart holds each of you close, even when my words fall short.

I begin by thanking Allah the Almighty for the gift of life that pulses through me, for the intellect that illuminates my path, for the wisdom that guides my steps, and for the health that sustains my journey. Every achievement is but a reflection of His will and benevolence, and to Him belongs all praise, today and always.

My deepest gratitude flows first to my late father, Alhaji Muhammadu Nata'ala Adamu Joji: a visionary, a father without parallel, and the architect of my character. I still ache for his presence at this celebration, yet I find comfort in knowing Allah loved him best. This remarkable man raised thirty-six children, with me as his firstborn, and his investment in our education and moral foundation has yielded eighteen graduates and counting, including two PhDs. Baba, you remain etched in our hearts and carried in our prayers eternally. May Allah grant you the highest Jannah, amin.

My mother, Hajiya Asiya, is a fortress of strength, a pillar of compassion, and a woman of substance who shaped my world with firmness and love; her vision for her children remains unparalleled. Gwaggo, may Allah grant you continued health and blessings, amin.

I also honour my stepmothers: late Gwaggo Maimuna, Hajiya 'Yamma, and Maman Dada. Gwaggo Maimuna was my first storytelling teacher; she taught me how to weave narratives, and I learned a vast Hausa vocabulary from her. May Allah's mercy surround her always.

My immediate family has been my sanctuary, my peace, and my reason for striving. I owe special thanks to my two remarkable wives, my Makkah and Medina: Hajiya Amina Ismail and Professor Rabi Abdulsalam Ibrahim. They are rare gems, extraordinary women whose kindness and unwavering support have been my anchor. Without them, this story would have been written very differently. May Allah continue to bless them both, and may our bond remain unbroken in this life and in the afterlife, amin. These are women I will marry again and again.

God has also blessed me with nine beautiful children: Hadiza, Muhammad, Abdurashid, Ismail, Bilkisu, Yusuf, Abdulsalam, Asiya, and Maryam. They are the pride of my heart and the blessings that make every challenge worthwhile. Allah ya yi muku albarka, amin.

The foundation of my religious and moral life was laid by my Qur'anic and Islamiyya teachers, who planted seeds of faith that continue to blossom. Though I cannot name each one, I must honor the late Malam Idi Mai Makarantar Mangwaro, as well as my teachers at Giginyu Islamiyya School: Malam Muhammadu, Malam Shafi'i (*Malam mai marangwadiya*), Alhaji Uba, and the rest of them. At Giginyu Primary School, I fondly remember Yasayyadi, Mr. Olu, Malam Isa Mato, Malama Hassana, and of course *Malam mai-taka-wuya*, and all those whose names time has dimmed but whose impact time cannot erase. My secondary school teachers, already acknowledged elsewhere in my lectures, live on in my very being. We can never thank our teachers enough; throughout our lives, we carry them in our genes, and we appreciate them endlessly. Allah ya saka muku da mafificin alheri, amin.

My journey into higher education began at Usmanu Danfodiyo University, Sokoto, where I obtained my first degree in Geography. I owe a great debt to Professors D.J. Shehu, M.A. Iliya, A.B. Mamman, Ofori-Sarpong, Dei, Benin, A.G. Fada, and Alfa, as well as A.N. Koko, S.A. Kwabe, John Grolle (a Fulbright Scholar), and L.F. Buba, who was borrowed from BUK after Dr.. Sarpong left to teach us climatology.

At the University of Ibadan (the furnace where my intellectual mettle was tested) I must recognise my late medical geography mentor, Professor B.F. Iyun, who opened worlds I never knew existed, and Professor S.I. Okafor, who walked us through the fire of geographic thought and introduced us to the radical geography tradition. I also thank Professors Ikporiko, Bola Ayeni, Afolayan, Gbadagesin, Ayoade, Layi Igunjobi, Filani, and Aluko, and especially Professor Faniran, whose persistent question, "What is geography in your presentation?" taught me to constantly interrogate my craft.

To my uncles and aunties: I acknowledge you all. You have been pillars of support throughout my journey, contributing in countless meaningful ways to see me succeed. May Allah grant Jannah to Yaya ta Bauchi, Baba Manu, Baba Sani, Baba Sanda, and Baba Namada, Baba Rufa'i, Gwaggo Ma'u and Gwaggo Abule. To Baba Ali, who taught me how to read, I

remain deeply grateful; you have always been my academic role model. To my aunties; Gwaggo Delu, Gwaggo Dala, Gwaggo Asmau, Gwaggo Halima, Gwaggo Amina, and Gwaggo Abu, Allah kara lafiya, amin.

After my MSc from Ibadan, my father, in his wisdom, sought a civil service career for me and submitted my CV to Barrister M.B. Wali, a brilliant, learned, and visionary lawyer. M.B. Wali studied my credentials and declared, "This boy is university material. Let him work in the university and pursue a PhD. If he wishes to leave afterward, so be it." Those words ignited a dream I had harbored in secret. He sent me with a letter to the then Vice-Chancellor, Professor M.S. Zaharaddeen, who redirected me to the Faculty of Medicine (where they rejected me due to my medical geography background) and finally to the Geography Department. There, Malam Kabiru Ahmed, of blessed memory, served as Head of Department, and my friend Malam Adamu Tanko had just joined. The rest, as they say, is history. To all those who made that dream a reality: your vision has multiplied beyond measure. May Allah bless and reward you abundantly.

My doctoral work was a labor of love, made possible first and foremost by my supervisor and lifelong mentor, Professor J. Afolabi Falola. Sir, while I did the foot soldiering, you made the medical geographer who stands before you today.

The Kano State Hospital Management Board granted me access to ten years of hospital data, and I thank Malam Ubale Rano, Malam Tsoho, and others who extended helping hands. During my MSc data collection, many assisted me: Muhammad Hassan Maradun (Danburan of Maradun), my late brother Usman, my wife Amina, the records officers at Murtala Mohammed Specialist Hospital, Malam Maikudi Arzai, Abbas, Kurma, the then Head of O&G (late Dr.. Sadauki), as well as Drs. Saidu and Kees. Thank you most sincerely.

For Kausani village, where I spent two weeks in a cozy hut with my wife and child, I must thank the late Sarkin Kausani, Alhaji Muhammadu Dankausani, for his hospitality and generosity, Allah ya jikan Sarki. I thank Kawu, the then Mai unguwa of Hurumi, who served as our guide and gatekeeper and remains loyal and supportive to this day; Allah saka da alheri, amin. I also acknowledge Engineer Shehu, the current Sarkin Kausani, for his support, and many others who helped in their own ways in settlements like Dan Ta-dabo, Afto, Ramai, Isimuha (the TBAs), Alhaji

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My wife Amina, who served as both interviewer and provider of antenatal care to 107 women, deserves my deepest thanks, as does my late brother Usman, my driver and field assistant during fieldwork, may Allah grant you Jannah Usman, I missed you dearly. I must also acknowledge my younger brother, Alhaji Kabiru, who lent his car for the entire duration of the rural fieldwork, which made a monumental difference. Finally, I extend my gratitude to all the women and men who participated in my study across all the settlements in Kausani and places in urban Kano. My thanks also go to the then Chairman of Wudil LGA (October 2000) and Baba Lawan, who facilitated everything at the Local Government Secretariat.

Early in my quest for recognition and legitimacy in medical geography, I had the privilege of corresponding with giants in the field: Professor N.D. McGlashan of the University of Tasmania, Australia, who reviewed my research proposal with invaluable insights; Professor John Hunter, of River Volta river blindness fame, who shared materials that enriched my work; and the late Professor R. Mansell Prothero, whom I eventually met in person at the University of Manchester, UK, through the British Council's BUK-Sussex linkage (thanks also to Professor Tony Binns for facilitating that visit). The books and papers Professor Prothero personally donated to me form the foundational literature that built the Kano School.

The Department of Geography has been my intellectual home for many years, where I experienced the best learning under true masters of the discipline. Our senior colleagues were not only gentlemen and visionaries, but also character-building mentors. Most have passed on, but I and all those they mentored remain forever grateful. My gratitude and prayers go to the late Professors E.A. Olofin, Kabiru Ahmed, Ahmadu Abdulkadir, Sabastian Patrick, Mr. Noah Oyeniyi, Malam A.D. Maiwada, and most recently Dr. M.A. Liman. Others I wish to recognize include Professors Essiet, L.F. Buba and of course Malam M.M. Saidu and Dr.. (Mrs.) A.T. Ibrahim. Professor Tanko, we have come a long way, we shared the same office, we have been to Sweet-Sixteen, Kurra Falls and every field together, thank you for the friendship. You are all my seniors from whom I learned immensely.

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I am indebted to all the Vice-Chancellors under whom I have served, along with members of their management teams, beginning with Professor M.S. Zaharaddeen, who employed me and offered great encouragement in my scholarly pursuits. My prayers are with the late Professor Musa Abdullahi, and my gratitude goes to Professor Attahiru Jega; together, they set the dream in motion. I must especially acknowledge the architect, Professor Abubakar Adamu Rasheed, mni, for his outstanding leadership, under whose tenure I attained the rank of Professor. I also appreciate Professor Muhammad Yahuza Bello (the German Machine) for his contributions and unmatched humility, and, of course, his successor, Professor Sagir Adamu Abbas. I appreciate our amiable Comrade Vice-Chancellor, Professor Haruna Musa, fsi, who has been managing both the left and right frontiers with great wisdom.

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The document you are reading looks far better because others took the time to review it and point out details I had overlooked. I am, therefore, grateful to my wife, Professor Rabi Abdulsalam, for her usual meticulous editorial work. Mr. Kunle (the editor), Baba Salihu (the graphics artist), other editorial staff, Malam Abdulkadir Badsha Mukhtar and Abdullahi Ismail and of course the graphic and administrative staff at the University Press deserve my thanks for their wonderful work. Finally, I wish to thank my colleagues namely Drs. Ishaq, Faiza, and Nura for reading through the earlier draft and offering excellent advice. Dr. Muhammad Ahmad graciously produce some of the maps that makes the work truly geographic. I also extend my sincere gratitude to the Inaugural Lecture Committee especially the chairman and secretary for their stellar work.

I am a man of the people, and I have had the privilege to mingle and associate with so many individuals from my childhood and throughout my

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To all my students, especially, medical geography students: I have saved you for last, not because you are least, but because this acknowledgment is as much yours as it is mine. Thank you for journeying with me, for sharing my vision, and for building the Kano School of Health and Medical Geography. Today, among your ranks, we have two full Professors, six Associate Professors and counting, many Senior Lecturers, and those on the cusp of crossing the bar. I cannot name you all, but I must honour those currently carrying the flag: Professor Abubakar Kawu Monguno, the eldest son, who examined at least six of my PhD students; Drs. Mustapha Adam Kolo, Uba Lawal, Bilkisu Ahmed Yayaji, Nura A. Yaro, Ishaq Aliyu Abdulkarim (Halifa), Nafiu Zakari, L.A.S. Danbuzu, Mustapha Sani, Hafiz Dardau, Ismaila Ibrahim Yakudima, Faiza Isa Sheshe, Jamila Garba Abdullahi, and Yunusa Yahuza; and Professor Mahmud Abubakar. To those still at the front of the furnace: a ci gaba da gashi, keep moving forward and make us proud. The future of the School belongs to those coming after as much as it belongs to you.

As I bring this to a close, I express my gratitude for the many opportunities afforded to me by the British Council, WHO, DFID, dRPC, and PRINN to undertake studies and further my professional development. In particular, I wish to recognize Dr.. Judith-Ann Walker for her unwavering support.

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APPENDIX ONE

100 REPRESENTATIVE PUBLICATIONS FROM THE KANO SCHOOL

1. Abubakar, M., Sangari, D. U., & Adamu, Y. M. (2008). Creating GIS application for local health care planning in Nassarawa State. *Indian Journal of Multidisciplinary Research*, 4(4), 577-592.
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APPENDIX TWO

BIBLIOGRAPHY OF MY PUBLICATIONS IN HAUSA STUDIES PUBLICATIONS

Journal articles, book chapters and conference proceedings

1. Adamu, Y. M. (1994). Hausa novel at the cross-roads. *ANA Review: Journal of the Association of Nigerian Authors*.
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4. Adamu, Y. M. (2002). Between the word and the screen: A historical perspective on the Hausa literary movement and home video invasion. *Journal of African Cultural Studies*, 15(2), 203–213.
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6. Adamu, Y. M. (2003). Bulungudu: Space and coinage in the Hausa home video industry. In A. U. Adamu, Y. M. Adamu, & U. F. Jibril (Eds.), *Hausa home video: Society, economy and society*. Centre for Hausa Cultural Studies.
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16. Adamu, Y. M., & Ibrahim, R. A. (2018). Spheres and spaces and divorcees in Zawarawa (A Hausa movie): Towards a new paradigm of examining divorcees in Hausa society. In M. O. Bhadmous (Ed.), *The Nigerian cinema: Gender, politics and sexuality in Nigerian motion pictures*.
17. Adamu, Y. M. (2021). The place of place in Balewa's Shaihu Umar. In Y. M. Adamu (Ed.), *Hausa prose-fiction: A reader*. Bayero University Press.
18. Adamu, Y. M., Danbuzu, A. S. L., & Umar, N. (2018). Mu zagaya yawo: A geographical analysis of Dr. Mamman Shata's Wakar Habu Darma. In S. M. Gusau, A. Danmaigoro, & B. A. Abu Sabe (Eds.), *Studies in the songs of Dr. Mamman Shata*. Department of Nigerian Languages, Umaru Musa Yar'adua University.
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21. Adamu, Y. M. (2025). The need for an academic association for Hausa studies. *HIMMA: Journal of Contemporary Hausa Studies*, 10(1), 45–54.
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Scholarly books

29. Adamu, A. U., Adamu, Y. M., & Jibril, U. F. (Eds.). (2003). *Hausa home video: Technology, economy and society*. Center for Hausa Cultural Studies.
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Creative writings

32. Adamu, Y. M. (1989). *Idan so cuta ne* [Hausa novel]. A.J. Publishers.
33. Adamu, Y. M. (2000). *Ummul-Khairi* [Hausa novella]. A.J. Publishers.
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Teach your self book

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Work in Progress

1. Adamu, Y. M. (n.d). *Sama-sama dai, sama Apollo 11: Tafiyyar kumbo Apollo 11 ta fuskar Alh (Dk) Mamman Shata da Mamman Gawo Filinge. [Paper being submitted for publication]*
2. Adamu, Y. M. (n.d). *Shari'ar Muslunci da Turawan Mulkin Mallaka a Daular Sakkwato. [Paper being submitted for publication]*
3. Adamu, Y. M., & Ibrahim, R. A. (n.d.). *The spheres and spaces model: A geosocial framework for understanding the life course and agency of Hausa women [Manuscript submitted for publication]*. Ibadan Journal of Social Sciences. Special issue in honour of Professor Stanley Okafor at 80.
4. Adamu, Y. M. *The geography of pilgrimage: A geographical reading of ALA's Allah Ya Kyautata Niyyarmu [Paper submitted for presentation]*. First International Conference on Aminu Ladan Abubakar, Federal University Dutsin-Ma, Katsina State, Nigeria.

APPENDIX THREE

LIST OF PAST INAUGURAL LECTURES

S/N	NAME	DEPT	DATE	TOPIC
1 st	Emmanuel Ajayi Olofin	Geography	4 th March, 1992	The Gains and Pains of Putting a Water Lock on the Face of the Drylands of Nigeria
2 nd	Garba Dahuwa Azare	Education	24 th June, 2000	BASIC CONCERNS: Revitalizing Nigeria's Primary Education in the New Millennium
3 rd	Dajuma Abubakar Maiwada	Education	29 th July, 2000	Improving Teaching and Learning in University Education with Particular Reference to Bayero University, Kano
4 th	Majekodun mi Oladeji Fatope	Chemistry	7 th July, 2001	NATURAL PRODUCTS SCIENCE: Looking Back and Looking Forward
5 th	Muazu Alhaji Zaria Sani	Nigerian Languages	13 th October, 2001	A focus on Some Segmental and Suprasegmental Features in Hausa Phonology
6 th	Isa Hashim	Political Sciences	20 th March, 2004	Planning and Budget Implementation in the Health Sector
7 th	Abdulla Uba Adamu	Education	24 th April, 2004	SUNSET AT DAWN, DARKNESS AT NOON: Reconstructing the Mechanisms of Literacy in indigenous Communities

S/N	NAME	DEPT	DATE	TOPIC
8 th	Auwalu Hamisu Yadudu	Private and Commercial Law	5 th June, 2004	LAW AS INTERPRETATION: An Exploratory inquiry from Islamic Law Jurisprudence
9 th	Mohammed Sanni Abdulkadir	History	31 st July, 2004	STRUCTURING, STRUGGLING AND SURVIVING ECONOMIC DEPRESSION IN NORTHERN NIGERIA: The 1930s As Preview of the present
10 th	Muhammad Sani Sule	Bio-chemistry	23 rd March, 2013	Enzymology and Radiation Biology in the Understanding of Biochemistry
11 th	Essiet Unanaowo Essiet	Agriculture	22 nd May, 2013	AGRICULTURE SUSTAINABILITY IN THE DRYLAND OF NIGERIA: Realities and Prospects
12 th	Aliyu Kamal	English Studies	5 th March, 2014	The Islamic Novel Style and Structure
13 th	Abdu Ahmed Manga	Agriculture	9 th April, 2014	Horticulture as a Panacea for Food Insecurity and Unemployment
14 th	Sa'idu Muhammad Gusau	Nigerian Languages	26 th May, 2014	Wakar Baka Bahaushiya (The Hausa Oral Songs)
15 th	Abdallah Uba Adamu	Mass Comm- unication	9 th July, 2014	IMPERIALISM FROM BELOW: Media Contra- Flows and Emergence of Metro-Sexual Hausa Visual Culture

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16 th	Ghaji Abubakar Badawi	Library and Information Sciences	29 th July, 2015	THE ROLE OF PUBLIC LIBRARIES AS CENTERS OF INFORMATION TO DISADVANTAGED GROUPS: A 2004 - 2014 Study of the Information Needs of Gada Prostitutes in Dawakin Kudu Local Government Area of Kano State, Nigeria.
17 th	Mohammed Kabir	Community Medicine	16 th September, 2015	Public Health Concern for Chronic Non- Communicable Diseases Surpasses Anxiety Over Most Infections
18 th	T.I. Oyeyi	Biological Sciences	30th March 2017	LINKING SCHISTOSOMIASIS AND WATER RESOURCES DEVELOPMENT IN KANO STATE NIGERIA: Public Health Impact and Mitigation
19 th	Abdulrazaq G. Habib	Medicine	27th April, 2017	MEDICINE, SCIENCE AND SOCIETY: The Global Health Imperative
20 th	S. Y. Mudi	Chemistry	6th July, 2017	NATURAL PRODUCTS: Plants as Potential Sources of Drugs
21 st	Sani Ibrahim	Biological Sciences	27th July, 2017	BETWEEN LIFE AND DEATH: Water Quality and Resource Evaluation - The Place of Hydrobiologists

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22 nd	J. Afolabi Falola	Geography	26th October, 2017	The Poor We Have With Us Always
23 rd	Umar G. Danbatta	Electrical Engineering	2 nd November, 2017	GETTING OUT OF THE WOODS: Diversifying Nigeria's Economy Through the Telecommunications Sector
24 th	Adelani W. Tijani	Nursing	23rd November, 2017	WHOLESOME ALIMENTATION: Path to Radiant Health
25 th	Juwayriya Badamasiuy	Private and Commercial Law	21st December, 2017	UNCOVERING PATRIARCHY IN THE LAW: Feminist Movement for Re-Interpretation of Islamic Law in Focus.
26 th	Isa Mukhtar	Nigerian Language	25 th January, 2018	STYLISTIC THEORIES AND THE LINGUISTICS OF HAUSA PROSE TEXTS: the (SFL) approach.
27 th	Ganiyu Sokunbi	Physiotherapy	29 th March, 2018	TODAY IT HURTS, TOMORROW IT WORKS: Complimentary and Alternative Therapy for Failed Back Syndrome
28 th	Aminu K. Kurfi	Business Admin. and Entrepreneurship	19 th April, 2018	Micro-finance as an Elixir for Poverty Alleviation and Wealth Creation in Nigeria
29 th	Muhammad S. Khamisu	Arabic	17 th May, 2018	Substitution in Arabic Languages Rules and Types
30 th	Habu Nuhu Aliyu	Pure and Industrial Chemistry	21 st June, 2018	SCHIFF BASES AND THEIR TRANSITION METAL COMPLEXES: The Drug for the Next Generation

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31 st	Hashim M. Alhassan	Civil Engineering	19 th July, 2018	EASING THE BURDEN OF TRAVEL: Can Roadway Capacity Modeling Help?
32 nd	Habu Mohammed	Political Science	13 th September, 2018	TUG OF WAR OR ECHO IN THE DARK? Civil Society Organizations (CSOs) and the Fight Against Corruption in the Era of Change Mantra in Nigeria
33 rd	Bello Idrith Tijjani	Physics	20 th September, 2018	NAVIGATING THE DATA LABYRINTH: Application of Some Advanced Statistical Analysis in Atmospheric Physics
34 th	Mohammed Ajiya	Electrical Engineering	18 th October, 2018	SEAMLESS GLOBAL CONNECTIVITY AT THE SPEED OF LIGHT: Converting Intrinsic Phenomena in Optical Fibers to Capacity Increase.
35 th	Abdulrahman Abdul Audu	Pure and Industrial Chemistry	25 th October, 2018	My Academic Voyage in Water into the World of Heavy Metals
36 th	Ibrahim Rakson Muhammad	Animal Science	21 st February, 2019	FORAGE AND FODDER PRODUCTION IN NIGERIA: Its Sensitivity in Sustainable Ranching.
37 th	Muhammad Bashir Ibrahim	Department of Pure and Industrial Chemistry	14 th March, 2019	WATER POLLUTION AND THE QUEST FOR ITS REMEDIATION: The Natural Resource Option

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38 th	Oyerinde O. Oyeseun	Department of Physical and Health Education,	4 th April, 2019	MAN DOES NOT DIE BUT KILLS HIMSELF: The Dilemma of the Health Educator and the Moderating Influence of Health Education
39 th	Danladi Ibrahim Musa	Department of Physical and Health Education	25 th April, 2019	WAGING WAR ON THE DEADLY QUARTET AND ITS CO-MORBIDITIES: A Physical Activity Panacea
40 th	Kabiru Isa Dandago	Department of Accounting	2 nd May, 2019	The Accounting in Humanity Knows No Bounds
41 st	Mustapha Hassan Bichi	Department of Civil Engineering	20 th June, 2019	MAN, ENVIRONMENT AND WATER: The <i>Moringa oleifera</i> (Zogale) Intervention
42 nd	Mustapha Muktar	Department of Economics	27 th June, 2019	PEOPLE, PLANET AND PROFIT: Peaceful Bed Fellows at the Best of Times But Strange Roommates at Present - The Economist's Approach to a Peaceful and Sustainable Co-Existence
43 rd	Mohammed Atiku Kano	Dept.of Biochemistry	25 th July, 2019	SERUM LIPIDS AND LIPOPROTEINS: A Curse or a Blessing?
44 th	Rabi'u Mohammed	Department of Physical and Health Education	8 th July, 2019	EXERCISE AND SPORTS FOR THE ATYPICAL PERSONS: A Multidimensional Analysis
45 th	Yahaya, D.B.	Department of Mechanical Engineering	12 th December 2019	GETTING OUT OF THE DARKNESS: The Solar Energy Solution
46 th	Shehu Alhaji Musa	Department of Agricultural Economics & Extension	22 nd April 2021	CROSSING THE CHASMS OF AGRICULTURAL DEVELOPMENT IN NIGERIA: Consumer Preference Studies: Market

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				Integration Syntheses and Value Chain Diagnoses to the Rescue
47 th	Shehu U.R. Aliyu	Department of Economics	24 th June, 2021	WHAT HAVE WE LEARNT FROM MODELLING STOCK RETURNS IN NIGERIA: Higgledy-Piggledy?
48 th	Kamilu Sani Fage	Department of Political Science	8 th July, 2021	FROM DIVIDEND'S OPTIMISM TO DASHED HOPES: The Imperatives of Leadership Re-Engineering in Nigeria
49 th	Babatunde Olamide Bamgbose	Department of Oral Diagnostic Sciences	9 th Sept., 2021	MATRIX OF THE KNOWLEDGE OF LIGHT AND KNIFE: The Journey of a Maxillofacial Surgeon into Imaging
50 th	Umar Ibrahim Gaya	Department of Pure and Industrial Chemistry	4 th Nov., 2021	IN SEARCH OF CATALYSTS...
51 st	Ahmad Muhammad Tsauni	Department of Economics	19 th December, 2024	Economic Progress on a Tightrope
52 nd	Bashir Muhammad Fagge	Department of Animal Science	30 th January 2025	AN ODYSSEY INTO FOODS OF ANIMAL ORIGIN: Fortification and Modifications for Health and Sustainable National Development
53 rd	Mu utassim Ibrahim	Department of Pediatrics,	27 th February, 2025	PATHWAYS TO PROGRESS: Pediatrics Care, Child Health and Medical Education in Nigeria.
54 th	Lawal Yazid Ibrahim	Department of Physical & Health Education	27 th March 2025	SPORT IS WAR; WAR IS SPORT: Ethical and Integrity Concerns

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55 th	Mahmoud Ibrahim Daneji	Department of Agricultural Economics and Extension	7 th August, 2025	DIVERSIFYING THE NIGERIAN ECONOMY: Analysis of Extension Advisory Services as Critical Component of Sustainable Agricultural Development
56 th	Abdulwahab Lawan	Department of Infor. Tech. Faculty of Computing Bayero University, Kano	6 th November 2025	BRIDGING THE DIGITAL DIVIDE: Using A Modified Unified Theory of Acceptance and Use of Technology to Predict the Determinants of Telecentre Adoption
57 ^h	Abdullahi Sule-Kano	Department of Political Science, Faculty of Social Sciences, BUK	29 th January 2026	The Political Economy of Malnutrition and the Unliberatable Capitalist Transformation of the Nigerian Food Culture
58 th	Arabi Suleiman Abdullahi	Department of Geology, Faculty of Earth and Environmental Sciences (FEES), Bayero University, Kano	26 th March 2026	RADON IN HOMES AND WORKPLACES: Understanding the Invisible Threat Beneath Our Feet
59 th	Adamu Idris Tanko	Department of Geography, Faculty of Earth and Environmental Sciences (FEES)	30 th April 2026	ONE WORLD DIFFERENT NATIONS...AND THE MANY LESSONS TO LEARN

S/N	NAME	DEPT	DATE	TOPIC
60 th	Ismaila Zango Mohammed	Department of Sociology, Faculty of Social Sciences	11 th June 2026	POPULATION GROWTH AND NIGERIA'S YOUTH BULGE: A Potential for Demographic Dividend or Burden?
61 st	Hassana Sani Darma	Department of Special Education Faculty of Education		REJIGGING COGNITIVE, BEHAVIOURAL AND COORDINATION FUNCTIONS: Nutrient Supplementation for Neurodivergent Disorders
62 nd	ALKALI IBRAHIM ABUBAKAR	Department of Architecture Faculty of Earth and Environmental Sciences Bayero University, Kano	3 rd September 2026	DESIGN FOR HEALING: The Architect's Intervention in Transforming Healthcare Environments in Nigeria