



Understanding the drivers of brain drain: A study of migration intention among medical students in Nigeria

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Abstract

Context: Health workforce migration from low- and middle-income countries remains a major global health challenge. Nigeria, one of the largest contributors to the global medical workforce, faces increasing loss of physicians.

Objective: This study examined the prevalence and determinants of migration intention among Nigerian medical students.

Materials and Methods: A descriptive cross-sectional study was conducted among 1,299 medical students in Kano State, Nigeria, using a semi-structured, self-administered online questionnaire. Statistical analysis was done using IBM SPSS v27. Binary logistic regression identified independent predictors of migration at $p < 0.05$.

Results: Eight hundred and thirty respondents (63.9%) intended to practice medicine abroad. The most preferred destinations were the United States (375;45.2%), Canada (369;44.5%), and the United Kingdom (363;43.7%). Interest in international practice was high (mean 3.98 ± 0.74), while awareness of licensure pathways was relatively low (mean 2.35 ± 0.96). Major drivers included better remuneration and improved medical infrastructure. Financial constraints (807;62.1%) was the leading barrier. Migration intention was significantly associated with motivation for studying medicine ($p = 0.004$), participation in international programs ($p < 0.001$), and prior exploration of certification processes ($p < 0.001$). Independent predictors of migration intention included higher interest in international practice (AOR = 2.59; 95% CI: 2.1–3.1) and

greater awareness of licensure pathways (AOR = 2.34; 95% CI: 2.0–2.8).

Conclusion: A substantial proportion of Nigerian medical students intend to migrate, reflecting systemic push factors and pull dynamics. Early, targeted retention strategies within medical training

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DOI: 10.61386/imj.v19i4.1380

and health system reforms are urgently needed to mitigate future workforce losses.

Keywords: Physician migration; migration intention; medical students; health workforce; brain drain; retention strategies; licensure pathways

1.0 Introduction

Nigeria continues to face a critical shortage of healthcare workers, largely driven by the migration of trained physicians to high-income countries. This is reflected in the fact that although over 80,000 doctors are registered with the Medical and Dental Council of Nigeria (MDCN), fewer than 50% are currently practicing within the country.¹ This depletion of human resources has significantly strained the quality and accessibility of healthcare services, adversely affecting both patients and the remaining workforce.² Many citizens are compelled to seek care in expensive private facilities or face poor outcomes in under-resourced public hospitals, contributing to unfavorable health indices, including Nigeria's disproportionately high maternal mortality burden.³

Despite this shortage, the desire to emigrate remains high among Nigerian doctors. Previous studies show that 74.4% of doctors intend to specialize abroad, compared to only 13.9% who plan to remain in Nigeria.⁴ Importantly, migration intentions often develop early, during undergraduate training. Medical students are increasingly exposed to both the challenges of local practice and opportunities abroad, shaping their career aspirations². Studies have demonstrated that many students already consider international practice as a primary career goal even before graduation.⁴

Globally, the increasing mobility of healthcare professionals reflects broader trends in the globalization of healthcare. However, in Nigeria, systemic challenges including poor remuneration, inadequate infrastructure, and limited postgraduate training opportunities serve as strong push factors.⁸ Conversely, pull factors such as better working conditions, advanced medical technology, structured residency programs, higher income, and improved quality of life attract students to high-income countries.^{9,10} The perception that residency training abroad is better structured and more supportive further reinforces this trend.⁹

Migration intentions among medical students are

important early indicators of future workforce losses. Evidence suggests that up to 40% of Nigerian medical graduates migrate within 10 years of graduation, while as many as 88% of practicing doctors actively seek opportunities abroad.⁴ Structural limitations within Nigeria's healthcare system, including inadequate specialist training capacity, further drive this trend, particularly among students interested in procedure-intensive specialties.⁴

The implications of this sustained migration are profound. Nigeria's doctor-to-patient ratio remains critically low at approximately 1:9,083, far below the recommended 1:600.¹¹ More broadly, Africa bears 24% of the global disease burden but accounts for only 2% of the global health workforce.¹⁴ Continued emigration risks worsening health outcomes and undermining efforts toward Universal Health Coverage.¹

While existing studies have examined migration among practicing doctors, there is limited evidence on the patterns and determinants of migration intention among medical students in Northern Nigeria. Understanding these early intentions is essential for designing targeted retention strategies. This study therefore aims to assess migration intentions and their determinants among medical students, providing evidence to inform policy and workforce planning in Nigeria.

2. Materials and Methods

2.1 Study design

This study adopted a descriptive cross-sectional design to assess the proportion of medical students in Kano State, Nigeria, who intend to practice medicine abroad, their preferred destination countries, and the factors influencing their migration intentions.

2.2 Study setting and participants

The study was conducted among medical students from the two major accredited medical schools in Kano State: Bayero University and North West University. Bayero University, Kano, is a major public university in Nigeria with a College of Health Sciences, offering a six-year MBBS programme comprising preliminary, preclinical, and clinical phases. North West University, a public university in Kano though state owned, also hosts a College of Health Sciences and runs a similar medical curriculum structure. Both institutions provide

structured medical training that progresses from foundational sciences to clinical rotations in affiliated teaching hospitals

The MBBS programme spans six years, beginning with a preliminary year focused on foundational sciences, followed by two preclinical years covering basic medical sciences, and concluding with three clinical years involving hospital-based training and rotations.

Participation was limited to consenting undergraduate students enrolled in the Bachelor of Medicine, Bachelor of Surgery (MBBS) programme.

Sample size determination

The minimum sample size for the study was determined using Cochran's formula for estimating proportions:

$$n = (Z^2 p(1-p)) / d^2$$

where $Z = 1.96$ (95% confidence level), $p = 0.628$ (proportion of migration intention from a previous study),⁵ and $d = 0.05$ (margin of error).

Since the study population was finite, the sample size was adjusted using the finite population correction formula:

$$n_f = n / (1 + (n-1)/N)$$

where N represents the estimated total number of medical students across both institutions ($N \approx 1,573$). The resulting sample size was further adjusted for a 10% non-response rate, yielding a minimum required sample size of approximately 324. To ensure proportional representation of students from the two institutions, the sample was allocated proportionately based on their respective student populations, with Bayero University Kano (BUK) and Northwest University (NWU) contributing participants in an approximate 2:1 ratio. To improve statistical precision and enhance representativeness, recruitment was extended beyond the minimum sample size. A total of 1,299 valid responses were ultimately obtained and included in the analysis.

Research instrument and data collection

Data were collected using a self-administered, semi-structured questionnaire developed in English and distributed via Google Forms between March 2026 and June 2026. The instrument captured information

on socio-demographic characteristics, migration intentions, interest in international medical practice, awareness of licensure requirements and processes, preferred destination countries, and perceived barriers to practicing medicine abroad.

The questionnaire was adapted from a previously validated instrument used by Adeniran et al.⁵ to assess migration intention among undergraduate medical students. Minor modifications were made to suit the study context and the final version was validated for face, content and construct by a public health expert.

Ethical approval and consent to participate

The study adhered strictly to international ethical guidelines as enshrined in the Declaration of Helsinki. Ethical approval for this study was obtained from the Health Research Ethics Committee of the Kano State Ministry of Health (approval number: NHREC/17/03/2018). Participation in the study was voluntary, and informed consent was obtained electronically from all participants prior to data collection. Anonymity and confidentiality of respondents' information were strictly maintained throughout the study.

2.3 Data analysis

Data were analyzed using IBM SPSS Statistics v27. Descriptive statistics, including means and standard deviations for quantitative data and frequencies and percentages for categorical data, were used to summarize participants' characteristics and key study variables. Associations between migration intention and independent variables were assessed using the chi-square test. Variables with statistical significance at $p < 0.05$ were considered for further analysis. Binary logistic regression analysis was performed to identify independent predictors of migration intention, and adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were reported.

3. Results

3.1 Socio-demographic characteristics of respondents

The socio-demographic characteristics of respondents are presented in Table 1. The respondents had a mean age of 21.63 ± 3 years, with the majority (64.1%) aged 18–22 years. Females constituted a slight majority (51.4%). Most participants were Muslims (88.2%), and the

predominant ethnic group was Hausa (47.3%). Slightly more than half of the respondents were in their clinical years (51.1%), and the majority were enrolled at Bayero University Kano (69%).

Table 1: Socio-demographic characteristics of respondents (n=1,299)

Variable	Frequency (n)	Percent (%)
Age		
<18 years	54	4.2
18-22 years	833	64.1
23-27 years	359	27.6
≥28	53	4.1
Gender		
Female	668	51.4
Male	631	48.6
Religion		
Islam	1,146	88.2
Christianity	153	11.8
Ethnicity		
Hausa	615	47.3
Fulani	237	18.2
Igbira	126	9.7
Others	321	24.7
Year of Study		
Pre-clinicals	636	48.9
Clinicals	663	51.1
School		
NWU	403	31.0
BUK	896	69.0

Key: BUK - Bayero University Kano; NWU - North West University

Table 2 shows the migration intention and career-related characteristics of the study participants. A majority of respondents (63.9%) expressed an intention to migrate and practice medicine abroad. Despite this high level of interest, preparedness for international practice was limited: only 31.9% had explored certification pathways, and 46.9% were aware of visa and immigration requirements. The primary motivation for studying medicine was personal interest and passion (74.5%), while external influences such as financial motives and family pressure were relatively less common.

3.3 Preferred destination countries and drivers of migration

Among respondents intending to migrate (Table 3), the most preferred destinations were the United States (45.2%), Canada (44.5%), and the United Kingdom (43.7%), with fewer selecting Australia (26.0%). Most respondents indicated flexibility to work in alternative countries if better opportunities were available. Key drivers of destination choice

Table 2: Migration intention and career-related characteristics of respondents (n=1,299)

Variable	Frequency(n)	Percent(%)
Have you actively researched or considered options for practicing?		
Yes	830	63.9
No	469	36.1
Motivation for studying medicine		
Family Pressure	94	7.2
Money	116	8.9
Curiosity & Passion for the medical profession	968	74.5
Others	121	9.3
Have you participated in any international medical programs (e.g. conferences, electives, exchanges)		
Yes	197	15.1
No	1102	84.9
Are you aware of the visa and immigration requirements for working as a doctor abroad?		
Yes	609	46.9
No	690	53.1
Have you explored the certification process for practicing medicine in any specific foreign country?		
Yes	414	31.9
No	885	68.1
Do you personally know any Nigerian doctors currently practicing medicine overseas?		
Yes	900	69.3
No	399	30.7

Table 3: Preferred destination countries and factors influencing migration choice (n=1,299)

Variable	Frequency(n)	Percent(%)
^aPreferred countries		
UK	363	43.7
USA	375	45.2
Canada	369	44.5
Australia	216	26.0
Others	126	15.2
^aFactors influencing choice of country		
Salary and benefits	635	76.5
Work life balance	531	64.0
Medical infrastructure and technology	616	74.2
Cultural factors	201	24.2
Proximity to Nigeria	60	7.2
Family or friends in the country	205	24.7
^bAre you open to working in a country other than your preferred region if better opportunities arise		
Yes	793	95.5
No	37	4.5
^aFactors influencing migration intention		
Higher salary	486	58.5
Better working conditions	577	69.5
Career advancement opportunities	510	61.4
Access to better medical technology	550	66.3
Personal reasons	232	28.0

^aMultiple answers allowed: bn=830 (subset of participants intending to practice abroad)

included better remuneration, access to advanced medical infrastructure, and improved work-life balance, while social and geographic factors were less influential.

3.4 Interest, awareness, and perceived barriers to international medical practice

Results from Table 4 reveals that respondents demonstrated a high level of interest in international medical practice (mean score: 3.98 ± 0.74), with 65.8% expressing a desire to practice abroad and 85.6% perceiving better professional opportunities outside Nigeria. In contrast, awareness of licensure pathways was low (mean score: 2.35 ± 0.96), with only 19.3% familiar with required examinations such as USMLE or PLAB. Perceived barriers were moderate overall (mean score: 2.95 ± 0.69), with financial constraints identified as the most prominent challenge (62.1%).

Table 4: Participants' interest, awareness and perceived barriers towards international medical practice (n=1,299)

Variable	SD n (%)	D n (%)	N n (%)	A n (%)	SA n (%)
Degree of interest in international medical practice (Mean $\pm$ SD = 3.98 ± 0.74)					
Are you interested in practicing medicine outside Nigeria after completing your studies	49 (3.8)	112 (8.6)	283 (21.3)	400 (30.8)	455 (35.0)
Do you believe practicing abroad offers better professional opportunities than in Nigeria	24 (1.8)	23 (1.8)	140 (10.8)	458 (35.3)	654 (50.3)
How important is international work experience in your career aspirations	27 (2.1)	83 (6.4)	335 (25.8)	572 (44.0)	281 (21.6)
How likely are you to apply for international medical exchange programs if given the opportunity	29 (2.2)	84 (6.5)	220 (16.9)	476 (36.6)	490 (37.7)
Degree of Awareness of international medical practice pathways (Mean $\pm$ SD = 2.35 ± 0.96)					
How familiar are you with the licensure exams required to practice medicine overseas (e.g. USMLE, PLAB)	315 (24.2)	309 (23.8)	424 (32.6)	186 (14.3)	65 (5.0)
How knowledgeable are you about the residency or internship programs needed to practice medicine overseas	389 (29.9)	428 (32.9)	358 (27.6)	88 (6.8)	36 (2.8)
Barriers influencing migration intention (Mean $\pm$ SD = 2.95 ± 0.69)					
How significant do you perceive financial constraints (e.g., examination fees, visa application costs) in your pursuit of practicing medicine overseas	50 (3.8)	121 (9.3)	321 (24.7)	542 (41.7)	265 (20.4)
How challenging do you find the licensing processes (e.g., examinations, credential verification) for practicing medicine overseas	43 (3.3)	153 (11.8)	528 (40.6)	452 (34.8)	104 (8.0)
Do cultural differences (e.g., language, lifestyle, social norms) pose a barrier to your decision to practice overseas?	402 (30.9)	299 (23.0)	355 (27.3)	187 (14.4)	55 (4.2)
How much do concerns about adapting to a different healthcare system affect your decision to work abroad	274 (21.1)	365 (28.1)	482 (37.1)	138 (10.6)	39 (3.0)

Key: SD is Strongly disagree, D is Disagree, N is Neutral, A is Agree, SA is Strongly agree

3.5 Factors influencing migration intention

Among respondents intending to migrate (Table 5), job security and long-term career prospects, as well as political stability in destination countries, were the most influential factors (mean scores: 3.7 ± 1.0 and 3.7 ± 1.14 , respectively). In contrast, family or peer

influence was less significant, with the majority of respondents indicating that it did not play a role in their decision to practice medicine abroad.

Table 5: Factors influencing migration intention of respondents who intend to practice medicine overseas

Variable	SD n (%)	D n (%)	N n (%)	A n (%)	SA n (%)	Mean $\pm$ SD
Has family or peer influence played a role in your decision to practice medicine overseas	343 (41.3)	274 (33.0)	11 (1.33)	147 (17.71)	55 (6.63)	2.15
How much do job security and long-term career prospects influence decision to migrate	25 (3.0)	75 (9.0)	225 (27.1)	336 (40.5)	169 (20.4)	3.7
Does the political stability of a country impact your decision to practice medicine overseas	52 (6.27)	69 (8.3)	176 (21.2)	301 (36.3)	232 (28)	3.7
How much does mentorship from doctors abroad affect your decision	136 (16.4)	161 (19.4)	248 (29.9)	214 (25.8)	71 (8.6)	2.91
Gaps in Nigerian medical training influence my decision	20 (2.4)	55 (6.6)	263 (31.7)	317 (38.2)	175 (21.1)	3.69

Key: SD is Strongly Disagree, D is Disagree, N is Neutral, A is Agree, SA is Strongly Agree

Table 6: Bivariate analysis of factors associated with migration intention among respondents

Variable	Intention to migrate		Statistics
	Yes N (%)	No N (%)	
Age			
<18	36(66.7)	18(33.3)	
18-22	520(62.4)	313(37.6)	$X^2 = 2.23$
23-27	238(66.3)	121(33.7)	$p = 0.526$
≥ 28	36(67.9)	17(32.1)	
Gender			
Female	433(64.8)	235(35.2)	$X^2 = 0.510$
Male	397(62.9)	234(37.1)	$p = 0.475$
Ethnicity			
Hausa	390(63.4)	225(36.6)	
Fulani	154(65.0)	83(35.0)	$X^2 = 0.512$
Igbira	78(61.9)	48(38.1)	$p = 0.916$
Others	208(64.8)	113(35.2)	
Year of Study			
Pre-Clinicals	396(62.4)	239(37.6)	$X^2 = 1.221$
Clinicals	433(65.3)	230(34.7)	$p = 0.269$
Motivation for studying medicine			
Family pressure	49(52.1)	45(47.9)	
Money	77(66.4)	39(33.6)	$X^2 = 13.265$
Curiosity & Passion for the medical profession	639(66.0)	329(34.0)	$p = 0.004^*$
Others	65(53.7)	56(46.3)	
Have you participated in any international medical programs			
Yes	151(77.0)	45(23.0)	$X^2 = 17.360$
No	678(61.5)	424(38.5)	$p = <0.001^*$
Have you explored the certification process for practicing medicine overseas			
Yes	368(88.9)	46(11.1)	$X^2 =$
No	462(52.2)	423(47.8)	164.547
			$p = <0.001^*$

*Statistically significant at $p < 0.05$

3.6 Bivariate analysis of factors associated with migration intention

Results from Table 6 reveals that motivation for

studying medicine was associated with migration intention ($p = 0.004$), with higher proportions observed among students motivated by personal interest or financial reasons compared to those influenced by family or other factors. Participation in international medical programs was strongly associated with migration intention ($p < 0.001$), with a substantially higher proportion of exposed students intending to migrate. Similarly, prior exploration of overseas certification pathways was significantly associated with migration intention ($p < 0.001$), with markedly higher migration intent among those who had explored these processes.

Table 7: Multivariable logistic regression analysis of factors associated with migration intention

Variable	AOR	95% CI	p-value
Age			
<18 years	Reference		
18–22 years	0.96	0.50–1.90	0.91
23–27 years	1.11	0.50–2.30	0.774
≥28 years	1.98	0.70–5.40	0.181
Gender			
Male	Reference		
Female	1.21	0.90–1.60	0.16
Religion			
Islam	Reference		
Christianity	0.76	0.60–1.00	0.053
Ethnicity			
Others	Reference		
Fulani	0.91	0.60–1.40	0.655
Igbira	0.78	0.50–1.30	0.322
Hausa	0.94	0.70–1.30	0.732
Year of study			
Pre-clinical	Reference		
Clinical	0.8	0.60–1.10	0.161
Motivation for studying medicine			
Family pressure	Reference		
Money	1.51	0.80–2.90	0.212
Curiosity/passion	1.74	1.10–2.80	0.028*
Others	1.17	0.60–2.20	0.631
Participation in international programs			
No	Reference		
Yes	1.53	1.00–2.30	0.45
^aPerceived barriers	0.88	0.70–1.10	<0.001*
^aInterest in international practice	2.59	2.10–3.10	<0.001*
^aAwareness of licensure pathways	2.34	2.00–2.80	<0.001*

^aComposite scores for interest, awareness, and perceived barriers were treated as continuous variables in the regression analysis; *Statistically significant at $p < 0.05$

3.7 Multivariable predictors of migration intention

In the adjusted analysis (Table 7), motivation for studying medicine was independently associated with migration intention. Respondents motivated by curiosity and passion had higher odds of intending to

migrate compared with those influenced by family pressure (AOR: 1.74; 95% CI: 1.1–2.8; $p = 0.028$), while motivations related to financial or other reasons were not significant. Participation in international medical programs was not independently associated with migration intention after adjustment. Higher levels of interest in international medical practice (AOR: 2.59; 95% CI: 2.1–3.1; $p < 0.001$) and greater awareness of licensure pathways (AOR: 2.34; 95% CI: 2.0–2.8; $p < 0.001$) were strong independent predictors of migration intention. Conversely, higher perceived barriers were associated with reduced likelihood of intending to migrate (AOR: 0.88; 95% CI: 0.7–1.1; $p < 0.001$).

4. Discussion

The study found a high prevalence of migration intention among Nigerian medical students, with nearly two-thirds expressing a desire to practice medicine abroad. This reflects a continuing trend of medical workforce emigration and highlights concerns about the sustainability of the Nigerian healthcare system, consistent with previous studies.^{4,15} Similar proportions have been reported among both medical students and doctors in training in Nigeria, where 74.4% of students preferred to specialize abroad and 74.2% of doctors undergoing training expressed migration intentions,^{4,15} suggesting that migration intention develops early and persists across different stages of medical training. Despite this strong intention, awareness of migration pathways such as licensure examinations and residency requirements was low, indicating a clear gap between aspiration and preparedness. This contrasts with findings among doctors in training, where a substantial proportion had already initiated migration plans,¹⁵ suggesting that while intention begins early, it becomes more structured and actionable with professional progression. This suggests that for many students, migration intention may be driven more by dissatisfaction with local training and practice conditions than by structured career planning.⁴

Multivariate analysis showed that socio-demographic factors, including age, gender, ethnicity, religion, and year of study, were not significantly associated with migration intention. This indicates that migration intention cuts across diverse student subgroups and is not influenced by

demographic or academic characteristics. Rather, it reflects broader systemic and professional concerns, supporting the view that migration in low- and middle-income countries is often driven by perceived professional risk and the search for better practice environments with improved medical infrastructure and technology.^{16,17} The most preferred destination countries were the USA, Canada, and the UK, which is consistent with previous studies that similarly identified these countries as leading destinations for Nigerian medical trainees.^{4,15} Key factors influencing destination choice included salary and benefits, medical infrastructure and technology, and work-life balance, while proximity to Nigeria was of minimal importance, further reinforcing the dominance of professional and economic considerations over geographic or social ties.

Migration intention was further shaped by a combination of push and pull factors. The main pull factors included expectations of higher salaries, improved working conditions, better work-life balance, advanced medical infrastructure, and increased career advancement opportunities. These findings are consistent with global trends in health workforce migration, where professionals seek environments offering both financial stability and modern healthcare systems.^{18,19} This is particularly relevant within the African context, where documented shortages and maldistribution of health workers continue to drive outward migration pressures.¹⁸ On the other hand, push factors included concerns about long-term career prospects and perceived gaps in the Nigerian medical training system. The influence of political stability and job security (both Mean = 3.7) further suggests that migration is driven not only by income considerations but also by the need for systemic stability. This is consistent with a previous study that reported that recurrent industrial actions and instability in the Nigerian healthcare system contribute to professional uncertainty.¹

Social influence appeared to play a limited role in migration decisions. Although exposure to doctors practicing abroad was relatively high (69.3%), family and peer influence had the lowest mean score (2.15), suggesting that migration intention is largely an individual, career-driven decision rather than one shaped by direct social pressure. This aligns with Toyin-Thomas et al.¹⁷ who reported that modern

migration drivers among healthcare workers in low- and middle-income countries are increasingly centered on career advancement and access to better technology rather than traditional social influences.

Despite the high level of migration intention, several barriers to actual migration were identified. Financial constraints were the most significant obstacle, with over 60% of respondents indicating that limited resources could hinder migration plans. This aligns with evidence that migration costs represent a major barrier among individuals in Sub-Saharan Africa.²⁰ In contrast, cultural differences and concerns about adaptation to foreign healthcare systems were not considered major barriers by most respondents. Additionally, regression analysis indicated that perceived barriers significantly reduced the likelihood of migration intention, highlighting their moderating effect on migration decisions.

This study has some limitations. It identified important predictors of migration such as interest in international medical practice and awareness of migration pathways; however, it did not deeply explore broader social, cultural, and institutional determinants shaping these intentions. Future studies should therefore adopt mixed-methods approaches, combining quantitative surveys with qualitative interviews or focus group discussions, to provide deeper insight into migration decision-making processes. Furthermore, research should evaluate the impact of policy interventions aimed at improving retention, including enhancements in residency training quality, working conditions, and career development pathways. Such evidence would be valuable in guiding strategies to strengthen Nigeria's healthcare system and reduce the long-term impact of physician migration.

Conclusions

This study reveals a high prevalence of migration intention among Nigerian medical students, underscoring the threat of physician emigration to the health workforce. Intention was driven mainly by interest in international practice, awareness of overseas training and licensure pathways, and the prospect of better remuneration, working conditions, career advancement, and advanced medical technology. Financial constraints and licensure barriers may delay actual migration.

Policymakers should prioritize evidence-based

retention strategies, including improved remuneration and working conditions, strengthened healthcare infrastructure, better postgraduate and residency training, transparent career progression, and targeted financial support such as loan schemes for students and early-career doctors.

List of abbreviations

AOR – Adjusted Odds Ratio

BUK – Bayero University Kano

CI – Confidence Interval

LMICs – Low- and Middle-Income Countries

M.B.B.S – Bachelor of Medicine, Bachelor of Surgery

MDCN – Medical and Dental Council of Nigeria

NWU – North West University

PLAB – Professional and Linguistic Assessments Board

SD – Standard Deviation

USMLE – United States Medical Licensing Examination

USA – United States of America

UK – United Kingdom

WHO – World Health Organization

Statements and Declarations

Consent for publication

Not applicable

Availability of data and materials

The datasets supporting the conclusions of this article are included within the article (and its additional files).

Competing interests

The authors declare that they have no competing interests.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Code availability

Not applicable

Authors' contribution

Ededa Emmanuel Matthew and Garba Joshua Adamu jointly contributed to the conceptualization of the study, development of the methodology,

formal data analysis and interpretation, funding acquisition, project administration, and drafting of the original manuscript. Ajala Oladunsi Esther, Ugwu Felicia Oyare, and Ejeh Ene Ayomide contributed to manuscript review, critical revision, sub-committee coordination, and data oversight. Cydney John Akpan and Beede Miracle Chichetaram contributed to manuscript review, critical revision, and editorial support. Onyeama Royale Kelechi, Shagbaor Jeremiah Ushahemba, Fatukasi Sarah Pelumi, Yusuf Maryam, Emeagui Makuochukwu Kelvin, Hamzat Abdulmuiz Ayodele, Ologbonyo Temitope, and Hassan Oladipupo Ismail contributed to manuscript review. Rukayya Muhammad Hassan, Yanmida Gbenga, Paul Febian, Musa Hezekiah Sokolayam, Daniel Abraham Adebayo, and Khadija Dahira Baba contributed to data collection, data entry, and documentation. Luke Oche Peter revised the final manuscript. All authors read and approved the final manuscript.

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