

# Sociodemographic Factors and Clerkship Experience Influence Ibadan Medical Students' Preference for Radiology Specialty

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## INTRODUCTION

Over the years, there has been a significant rise in the number of graduates from medical schools in sub-Saharan Africa. A recent study of 105 selected medical schools found an increase from about 8,000 graduates in 2008 to >18,000 in 2011 [1]. Despite the large number of medical graduates produced, there are challenges in terms of the migration of these new doctors to developed nations, with an attendant shortfall in health care manpower. It is estimated that as many as a quarter of medical graduates migrate out of their home countries within 5 years of graduation [2].

Radiology and similar specialties less preferred by medical students (eg, psychiatry, anesthesia, pathology) could suffer acute manpower shortages because of the continued migration of medical graduates. Several studies from sub-Saharan Africa [3-5] and Asia [6-9] have reported that more students preferred surgery, internal medicine, pediatrics, and obstetrics and gynecology as specialties. In a survey of medical students from 6 sub-Saharan countries, the top 3 specialties preferred were surgery (20%), internal medicine (16.7%), and pediatrics (9%) [3]. Radiology ranks low among medical students' choices of specialties, with <12% choosing the specialty in most studies [4,5,7,9].

Reports from the United Kingdom indicate modest increases in the proportion of trained junior doctors signifying interest in radiology [10], but the percentages are still quite low. Elsewhere, some of

the reasons given for interest in radiology include the wide range of clinical work and the combination of technology and medicine [11], while lack of direct patient contact has been mentioned as a reason for not choosing radiology [12]. In Nigeria, a previous study among medical students reported misconceptions such as ionizing radiation being harmful for women and enormous workloads for radiologists [13]. The state of the radiology residency training in Nigeria is less than satisfactory; for example, a recent study revealed that the majority of radiology residents in Nigeria lamented the poor state of teaching facilities and the inadequate exposure to modern imaging methods [14].

A Nigerian study of residents in postgraduate training revealed that medical students' decisions regarding careers in radiology seem to be made more often after leaving medical school [14], but real opportunities exist for influencing career choices while students are in medical school. It has been shown that early introduction to some specialties in preclinical years could stimulate interest in these specialties [15]. Students' preferences concerning radiology as a specialty could depend on background characteristics and medical school experiences, and the latter characteristics could guide counselors, mentors, and radiologists in their relationships with medical students, especially in the early clerkship years.

However, few studies have examined medical students' socio-

demographic characteristics and experiences before medical school and how these may influence students' choice of radiology as a career. Previous studies on career choice have focused mainly on gender differences in the choice of radiology [16] or examined the perceptions of medical students related to radiology as a career, such as residency training, salary, and working hours [12,17]. However, background characteristics such as parents' education, students' levels of exposure to Western media, and students' experiences in medical school could influence whether medical students consider careers in radiology. In this study, we examined associations among medical students' sociodemographic characteristics, experiences with clinical training, and preferences for radiology as specialty.

## METHODS

A cross-sectional study of undergraduate students in the last 2 years of medical training at the College of Medicine at University of Ibadan (Ibadan, Nigeria) was conducted in 2011. Nigeria is located at the eastern edge of the West African region; it is a tropical country diverse in climate and topography. The country's economic strength is derived largely from its oil and gas reserves, and its gross domestic product growth rate was 6% in 2006. The population of the country, according to the 2006 census, was about 140 million, with a national growth rate estimated at 3.2%. Nigeria is the most populous

**Table 1.** Sociodemographic characteristics of students

Variable	n (%)
Age (y)	
<25	180 (72.3)
≥25	69 (27.7)
Gender	
Male	156 (62.7)
Female	93 (37.3)
Parents' level of education	
Tertiary	205 (82.3)
Other	44 (17.7)
Either parent a doctor or nurse	
Yes	40 (16.1)
No	209 (83.9)
Has a doctor or nurse in the family	
Yes	82 (32.9)
No	167 (67.1)
Intended place of practice	
Nigeria	35 (14.1)
Abroad	159 (63.9)
Undecided	55 (22.1)
Satisfaction with medical training	
Dissatisfied	31 (12.4)
Fairly satisfied	198 (79.5)
Very satisfied	22 (8.0)

nation in Africa. The current total fertility rate is 5.7 [18].

Nigeria has one of the poorest health indicators in the world. The 2008 estimate of infant mortality was 75 deaths per 1,000 live births, while the maternal mortality rate was 545 per 100,000. The prevalence of modern contraceptive use by currently married women was only 10% [18].

The University of Ibadan is the premier university in Nigeria, and its College of Medicine, established in 1948, is the oldest and the top-ranked medical school in the country. The Ibadan medical school has trained more doctors than any other school in sub-Saharan Africa. The College of Medicine is made up of 4 faculties: the Faculty of Basic Medical Sciences, the Faculty of Clinical Sciences, the Faculty of Public Health, and the Faculty of Dentistry [19].

Students in the last 2 years of their medical training were recruited because they would have had their radiology posting, which comes relatively early in the clerkship. Sampling was done in the res-

idence halls, where most students (>95%) reside. The total number of students in the penultimate and final years was 292. In selecting the 249 students eventually studied, 10 of every 12 rooms were randomly selected and the students in those rooms studied. Proportional allocation on the basis of the ratio of male to female students was done during sampling. All those approached agreed to participate, and for those rooms from which students were absent, multiple callbacks (up to 5) were made. In all cases in which callbacks were made, the students were eventually found.

Self-administered, semistructured questionnaires were used to obtain information on students' demographics, family histories, parents' information, experiences in medical school (including ever having to sit a second time for an examination, satisfaction with training, and mentoring), sources of information about radiology, and perceptions concerning choosing radiology as a career. All specialties were listed, and students were asked to select and rank their

top 3 specialties in order of preference.

SPSS version 16 (SPSS, Inc, Chicago, Illinois) was used for data analysis. Associations between radiology as first, second, or third choice and variables were tested using  $\chi^2$  tests. Those variables significant at 10% on  $\chi^2$  tests were subsequently entered into a multiple logistic regression. For the regression analysis, the "enter" option in SPSS was used, which removes all variables in a single step. The level of significance for all tests was 5%.

## RESULTS

The mean age of the students was  $24.1 \pm 2.6$  years. Table 1 shows the sociodemographic characteristics of the students. About 72% were aged < 25 years, and 62.7% were men. Most of the students (82.3%) had ≥1 parent with tertiary level of education. The proportion of students with 1 parent who worked as a doctor or nurse was about 16.1%, while 32.9% had doctors in the family. Concerning plans after medical training, about two-thirds of respondents (63.9%) intended to practice medicine abroad. Most (79.5%) were fairly satisfied with medical training, about 12.4% were dissatisfied, and 8% were very satisfied.

Concerning the position of the respondent in the family, about one-third were the firstborn children and 22.9% the last. About half of respondents (51.4%) received monthly allowances of <20,000 naira (about \$125). More than half of the students attended government-owned schools, followed by privately owned (30.9%) and religious (6%) institutions. The highest proportion (46.6%) of the students rated their computer skills as good, while 11.2% rated their computer skills as excellent and 25.7% as very good. Fewer than one-third (27.7%) reported having mentors or academic advisors. The

**Table 2.** Association between choice of radiology as career and selected characteristics

Variable	% Who Chose Radiology	Number in Category	$\chi^2$	P
Age (y)			4.111	.043
<25	10.6	180		
≥25	20.3	69		
Gender			0.262	.609
Male	14.1	156		
Female	11.1	93		
Parents' level of education			4.173	.041
Tertiary	11.2	205		
Other	22.7	44		
Has a doctor or nurse in the family			0.552	.458
Yes	11.0	82		
No	14.4	167		
Intended place of practice			0.175	.916
Nigeria	14.3	35		
Abroad	12.6	159		
Undecided	14.5	55		
Satisfaction with medical training			7.668	.006
Dissatisfied	29.0	31		
Satisfied	11.0	218		
Ever failed an examination			3.504	.061
Yes	9.8	143		
No	17.9	106		

most common source of initial information about radiology was from lecturers (45.8%), followed by reading (28.5%) and television (10.8%).

Concerning radiology as career choice, 10 students (4%) selected radiology as their first choice, 8 (3.2%) as their second choice, and 15 (6%) as their third choice, for a total of 33 students (13.3%) with this intention. Among the 10 students who preferred radiology as their first choice, 8 of the 10 stated salary and flexible working hours as the main reasons, while 7 of the 10 mentioned the use of emerging technology in the specialty as their main reasons. Table 2 shows associations between choice of radiology and selected variables. There were significant associations between choice of radiology and age, parents' levels of education, and satisfaction with medical training. A higher proportion of older students, those whose parents had

lower levels of education, and those dissatisfied with medical training chose radiology as a specialty area. There were no significant associations between choice of radiology and other sociodemographic variables collected in this study.

The findings of multiple logistic regression analysis of choice of radiology as career on variables significant at 10% on cross-tabulations are shown in Table 3. Parents' levels of education and satisfaction with medical training remained significant. Students whose parents had higher levels of education were less likely to choose radiology than those whose parents had lower levels (odds ratio, 0.39; 95% confidence interval, 0.16-0.96), and those who were dissatisfied with their medical training were about 4 times more likely to prefer radiology than those who were satisfied (odds ratio, 4.37; 95% confidence interval, 1.68-11.37).

## DISCUSSION

This study confirms the low level of preference for radiology as a specialty. Also, parents' level of education and students' satisfaction with their training in medical school were negatively associated with choosing radiology as a career. There are few studies, to our knowledge, that have examined students' sociodemographic characteristics and variables related to students' experience with medical training in relation to the choice of radiology as a career. About 4% of the medical students in this study preferred radiology as a first choice, similar to the <5% found in a previous study [8]. The low preference for radiology has been reported since the early 1990s in Nigeria [20], an indication that interest in the specialty by medical students has not changed over the years.

The intention to practice abroad was reported by almost two-thirds of the students studied. Similar intentions to emigrate after medical training have been reported among medical students in some sub-Saharan African countries [3,21,22]. A number of factors have been mentioned in previous reports on why Nigerian medical graduates would prefer to live and work abroad. These include inadequate employment opportunities, poor salaries for doctors at the primary and secondary levels of care, the poor state of infrastructural facilities, and inadequate financing of health institutions [19]. The continued emigration of doctors has serious implications for the fight against the ever rising disease burden in sub-Saharan countries such as Nigeria, and measures to reverse this trend are urgently needed.

The factors found to be significantly independently associated with preference for radiology as a specialty on multiple logistic regression were dissatisfaction with medical school training and having

**Table 3.** Logistic regression analysis of choice of radiology as career and selected characteristics

Variable	Odds Ratio	95% Confidence Interval	P
Age (y)			.126
<25	0.53	0.23-1.20	
≥25	1		
Parents' level of education			.040
Tertiary	0.39	0.16-0.96	
Other	1		
Satisfaction with medical training			.002
Dissatisfied	4.37	1.68-11.37	
Satisfied	1		
Ever failed an examination			.217
Yes	0.61	0.28-1.33	
No	1		

parents with lower educational levels. Satisfaction with medical school training in the context of this study refers to how a student perceives the facilities available and the style of teaching. Studies conducted in Nigeria [23] have shown excessive workload and other stressors as affecting medical students in the country. Also, the postings of the core specialties, such as medicine, surgery, and pediatrics, are usually more stressful, demanding longer durations compared with the relatively shorter radiology postings. In addition, radiology is an adjunct and not one of the core specialties. Hence, one could conjecture that those students more affected by the stress of medical school and who would be more dissatisfied will prefer specialties, such as radiology, in which they experienced less stress and difficulty. This argument is also supported by the fact that a higher proportion of those who had ever failed examinations in medical school (and perhaps have had more stressful medical experiences) preferred radiology, although the association was not significant at 5% on cross-tabulations or on multiple logistic regression. Early identification and exposure of exceptional medical students to radiology in medical

training could serve as a means of attracting them to the specialty, as introduction of radiology early in the clerkship years has been shown to be beneficial in other settings [15,24,25].

The logistic regression also showed that students whose parents had lower levels of education preferred radiology compared with those whose parents had tertiary education. Parents' levels of education could translate to students' levels of exposure to electronic and print media in which medical students have read or heard about imaging techniques such as CT scans and MRI. It could then be inferred that those less exposed to such media preferred radiology. This indicates that even students from highly educated parents might not get enough exposure to radiology or other careers using high-level medical technology and could instead prefer the core specialties.

Gender differences in preferences for medical specialties have been the subject of many studies on career intentions [4,7,26]. A number of studies have investigated the reasons for the preponderance of men in radiology [16,17]. In Nigeria, there seems to be a higher proportion of men in the radiology profession. A recent study conducted among radiology residents found 3 times as many men compared with women [14]. Our present study

did not find a significant difference in medical students' interest in radiology as a specialty, as confirmed by most other studies [12,16,17].

One study finding that deserves some comment is the similarities in preferences between men and women compared with the higher proportion of men who eventually practice radiology as reported from other studies. After graduation from medical school, female doctors who get married have the additional stress of childbearing and caring for the family. Less career support has been reported by female radiologists in some settings, forcing them to work part-time compared with their male counterparts [11]. Another possible explanation for the male preponderance is the misconception among medical students about the adverse effects of ionizing radiation on pregnancy [13]. More so, most communities in Africa are male dominated, so even when married female radiologists are aware that there are no risks to pregnancy, their husbands, who may not be in medical practice, could disagree with their wives' choice of radiology. The disparity in gender ratio before and after medical training is confirmed by previous reports that preferences in medical school could differ from actual specialty choice years later [27].

The finding of no significant association between having a parent or other relative who is a doctor or nurse and interest in radiology disagrees with a previous study that found more interest among those with parents in medical and paramedical fields [25]. The fact that more doctors in practice are in the core medical specialties in Nigeria suggests that older relatives in medicine are more likely to discuss these core specialties with medical students.

A potential limitation of this study is recall bias resulting from the medical students' inability to remember their radiology postings

accurately. However, it is unlikely that this bias could markedly affect their career choices.

## CONCLUSIONS

This study highlights the low preference for a career in radiology by medical students in Nigeria and the need to encourage more medical students to consider the specialty. There is a clear need to stimulate the level of interest of medical students in the specialty, which has remained relatively low over the years. In particular, students who are satisfied with medical training or seem to be performing better in medical school deserve more attention when program coordinators consider which students to encourage to choose a radiology career.

## TAKE-HOME POINTS

- The preference for radiology as a career is still low among medical students in Ibadan, Nigeria, as reported in other settings.
- The background and clerkship experiences of medical students should be considered in counseling for a career choice in radiology.

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