

What Factors Influence the Choice of Anesthesiology in a Moroccan Medical School?

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Abstract

Objective: To determine factors influencing anesthesiology choice among resident doctors at the medical school of Marrakech. **Materials and Methods:** We have conducted a descriptive cross-sectional study based on an anonymous questionnaire. **Results:** A total of 406/672 questionnaires were returned, with a female/male sex ratio of 1.07. The duration of the training (OR: 3.3; CI 95%: 1.74 - 6.23; $p < 0.001$), intellectual challenge (OR: 3.02; CI 95%: 1.69 - 5.37; $p < 0.001$), doctor-patient relationship (OR: 2.22; CI 95%: 1.02 - 4.84; $p: 0.04$), and financial aspects (OR: 2.14; CI 95%: 1.09 - 4.21; $p: 0.02$) were independent factors that influenced the choice of anesthesiology. **Conclusion:** we recommend the succeeding: 1) Support students in their choice; 2) Correct misconceptions about certain specialties; 3) Promote clinical clerkship; 4) Encourage mentorship; 5) Increase the salary of at-risk specialties.

Keywords

Anesthesiology, Career Choice, Influencing Factors, Resident Doctor

1. Introduction

Any health policy with good performance indicators and responsiveness to critical situations is conditioned by the availability of human resources in sufficient quantity and quality. The Moroccan Ministry of Health has published a health map that gives an overview of the healthcare workers in 2019 for 35,478,393 inhabitants [1]. In the public sector, the number of doctors was 12,034, including 3857 general practitioners, 7559 specialist doctors, 458 dentists, and 160 phar-

macists. Morocco faces a shortage of medical specialists in the public sector. This sector has counted only 492 pediatricians, 456 gynecologists, 439 anesthesiologists, 402 radiologists, 350 traumatologists, 344 visceral surgeons, 330 ophthalmologists, 309 cardiologists, 255 nephrologists, 222 psychiatrists, 211 dermatologists, and 185 urologists. For some specialties, the situation is alarming, particularly for neurosurgery (134 physicians), oncology (107 physicians), hematology (63 physicians), nuclear medicine (47 physicians), and critical care medicine (42 physicians).

According to social background, many factors affect anesthesiology choice as a career; these factors vary from one country to another. In a sizeable Brazilian cohort among 4601 medical students, Guilloux *et al.* [2] identified the factors that impacted the decision to pursue anesthesiology as a career: gender male ($p = 0.000$), other medical doctors in the family ($p = 0.014$), prefer to work in the hospital ($p = 0.002$), prestige ($p = 0.018$), and the social responsibility ($p = 0.030$).

It would be interesting to know the criteria determining the career choice to provide well-founded elements for decision-makers to correct the imbalance in the distribution of different specialties. Consequently, we surveyed resident doctors of the Faculty of Medicine and Pharmacy of Marrakech to highlight the factors influencing anesthesiology choice.

2. Materials and Methods

2.1. Setting

The setting of this study was the Faculty of Medicine and Pharmacy of Marrakech, Morocco. It produces general practitioners and surgical/medical specialists. The medical curriculum includes three cycles; the first lasts two years, the second lasts three years, and the third lasts two years, followed by 2-year internship and residency programs of varying lengths of time according to specialty. The residency program is also accessible for non-intern students after the three cycles and thesis defense.

2.2. Study Design

We performed a cross-sectional observational study on the residents' perceptions to determine factors influencing their choice over four months (June to September 2019). We included all residents of our institution in grades 1 through 4/5 in a self-administered survey. We conceived and adapted the questionnaire based on the Murdoch *et al.* study [3]. It comprehended two sections; the first contained socio-demographic data and information about specialty and the second contained factors influencing their choice. It was distributed at clinical training wards by a resident doctor. We used a 5-Likert scale ranging from strongly disagree (1) to strongly agree (5).

Reliability coefficients for the questionnaires were determined, resulting in an alpha Cronbach (α) of 0.817.

2.3. Statistical Analysis

The data were analyzed using the SPSS 10.0 software package (IBM, Armonk, NY). Statistical analysis was descriptive, univariate, and multivariate. Qualitative variables were presented by numbers (n) and percentages (%), and quantitative variables by means (m) and standard deviations S.D. (\pm). For comparing categorical variables, we used: Fisher Exact test or Chi-square test in univariate analysis and binary logistic regression in multivariate analysis for anesthesiology. A p-value of <0.05 was considered significant.

2.4. Ethical Aspects

Ethically, participation was voluntary and anonymous, and the confidentiality of the information collected during the study was guaranteed. We afforded information notes to all participants before filling the questionnaire.

3. Results

Of the 672 questionnaires distributed, 406 were returned (60.4%). The mean age was 29 ± 2.2 years, and the female/male sex ratio was 1.07. **Table 1** summarizes the remaining socio-demographic characteristics of the 406 resident doctors.

In the univariate analysis, duration of the training ($p < 0.001$), interest in the practice of procedures ($p < 0.001$), intellectual challenge ($p = 0.01$), and financial aspects ($p = 0.03$) were the influencing factors. In the multivariate analysis, duration of the training, intellectual challenge, doctor-patient relationship, and financial aspects were independent factors that influenced anesthesiology choice. Besides, the participants did not choose it because of the absence of a mentor model, overloading work, and lack of time for family (**Table 2**).

4. Discussion

In Morocco, we have had 1.2 anesthetists/100,000 inhabitants, according to the recent statistics in 2019 [1]. However, the goal of the World Health Organization, the World Federation of Societies of Anesthesiologists, and the Lancet Commission on Global Surgery is at least 20 SAO (surgeon-anesthetist-obstetrician) per 100,000 population by 2030 to ensure safe anesthesia [4] [5].

Factors affecting the choice of anesthesiology as a career vary from one country to another and according to social background. In our context, these factors were duration of the training (four years for medical specialties compared to surgical ones), intellectual challenge, doctor-patient relationship, and financial aspects. Oku *et al.* [6], in Nigeria among 105 graduating medical students at the University of Calabar, stated that the predictors for choosing anesthesia were personal interests in 81%, future job opportunities in 63%, the requirement of specialized skill in 62%, and influence by a mentor in 30%. Among 183 undergraduate final-year students of the University of Ghana School of Medicine and Dentistry, Abdul-Rahman *et al.* [7] showed that causes for not choosing anesthesia were anesthesia is “boring and not interesting”, “complex and difficult to understand”, “delicate and risky” and very “demanding”.

Table 1. Socio-demographic characteristics of the 406 participants.

Variables		Number (n)	Percentage (%)
Geographic origin	Rural	49	12
	Urban	357	88
Home medical school	Marrakech	366	90
	Others	40	10
Marital status	Single	274	67.5
	Married	132	32.5
Father's education level	Illiterate	24	6
	Primary	21	5
	Secondary	24	6
	High school	53	13
	University	284	70
Mother's education level	Illiterate	61	15
	Primary	42	10
	Secondary	32	8
	High school	49	12
	University	222	55
Parents' profession	Healthcare worker	69	17
	Physician	35	51 (35/69)
Year of the residency study	First	162	40
	Second	101	25
	Third	61	15
	Fourth	65	16
	Fifth	17	4
Specialty	Obstetric Gynecology	37	9
	Anesthesiology	32	8
	Traumatology	20	5
	Ophthalmology	20	5
	Pediatrics	20	5
	Cardiology	20	5
	Visceral surgery	20	5
	Radiology	20	5
	Biology	16	4
	Endocrinology	16	4

Continued

Gastrohepatology	16	4
Oncology-Radiotherapy	16	4
Psychiatry	12	3
Urology	12	3
Neurosurgery	12	3
Nephrology	12	3
Dermatology	12	3
Maxillo-facial surgery	12	3
Ear nose and throat	12	3
Neurology	12	3
Pneumology	12	3
Hemato	9	2
Pathology	9	2
Rheumatology	9	2
Internal medicine	9	2
Others	9	2

Table 2. Independent factors for the choice of anesthesiology.

Factors	Odds ratio	95% CI	p
Duration of the training	3.3	1.74 - 6.23	<0.001
Doctor-patient relationship	3.02	1.69 - 5.37	<0.001
Intellectual challenge	2.22	1.02 - 4.84	0.04
Financial aspects	2.14	1.09 - 4.21	0.02
Influence of mentor model	0.20	0.07 - 0.57	0.003
Work overload	0.25	0.12 - 0.54	<0.001
Time for the family	0.22	0.10 - 0.46	<0.001

In Punjab and among 185 post-graduate students and consultants, Asad *et al.* [8] indicated that the most frequent factors that influenced the choice were the opportunity to do procedures in 65.9%, promotion prospects in 58.4%, time for family in 58.4%, the chance of an overseas job in 55.7%, the diversity of clinical specter in 54.6%, and intellectual challenge in 50.8%. In Saudi Arabia at the King bin Abdulaziz University for Health Sciences and among 236 medical students in the 5th and 6th years, Alkhilawi *et al.* [9] mentioned that lifestyle in 30%, influence from family/peers in 19%, patient care aspects in 17%, fundamental science/research aspect in 15%, and financial aspect in 14% affected the decision for anesthesiology. In India, among 190 post-graduate anaesthesiology students at

the UCMS and GTB Hospital-Delhi, Tyagi *et al.* [10] reported that income in 67.7%, the opportunity to perform procedures in 64.1%, the diversity of clinical specter in 63.8%, the chance of overseas work in 57.2%, time for family in 53.7%, intellectual challenge in 51.6%, and the inaccessibility of other specialties in 50% were the affecting factors.

In Brazil, Guilloux *et al.* [2] conducted a national survey among 4601 new medical school graduates in 2015. They noted that the factors that impacted the decision to pursue anesthesiology as a career were gender male (RR: 1.394; 95% CI: 1.234 - 1.574; $p = 0.000$), other medical doctors in the family (RR: 1.431; 95% CI: 1.081 - 1.896; $p = 0.014$), prefer to work in the hospital (RR: 4.583; 95% CI: 1.632 - 12.871; $p = 0.002$), prestige (RR: 1.312; 95% CI: 1.052 - 1.637; $p = 0.018$), and the social responsibility (RR: 1.297; 95% CI: 1.026 - 1.638; $p = 0.030$).

In Scotland, using a mixed-method design including a questionnaire survey and qualitative interviews among 42 new registered core and Acute Care Common Stem anesthesia trainees, Moore *et al.* [11] observed that the most critical determinants were the quality of training, personal health, senior support, staffing level, sustainability of working conditions, the morale of the team, future job prospects, and the equity of payment. In the USA, among 55 residents in the anesthesiology residency at Mayo Clinic in Rochester in 2011, Augustin *et al.* [12] found that the most important reasons for choosing anesthesiology were a “hands-on” specialty in 49%, acute critical care in 33%, opportunity to perform invasive procedures in 31%, immediate gratification in work in 31%, and the involvement of physiology and pharmacology in practice in 21%.

This study had some limitations. First, it was monocentric. A national survey could be interesting to compare with other countries. Secondly, we used the questionnaire as a method for this study. A mixed-method design with qualitative reviews can clarify further item details. Thirdly, our subjects were resident doctors. A survey including medical students of the first cycle is interesting given that some traits could be changed over the years.

5. Conclusion

We recommend the succeeding: 1) Support students in their choice; 2) Correct misconceptions about certain specialties; 3) Promote clinical clerkship; 4) Encourage mentorship; 5) Increase the salary of at-risk specialties.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix: Questionnaire

A) Socio-demographic characteristics:

- 1) Age: ...years Gender: M F
- 2) Geographic origin: urban rural
- 3) Faculty of medicine: Faculty of Marrakech Other faculties
- 4) Marital status: Married Single
- 5) Father's education level: illiterate Primary Secondary High school University
- 6) Mother's education level: illiterate Primary Secondary High school University
- 7) Do your mother or father is a healthcare worker? No Yes , if yes: Physician Other
- 8) Year of the residency training: 1st 2nd 3rd 4th 5th
- 9) Specialty: ...

B) Criteria influencing the choice: Please rate each of the following items on a scale from 1 to 5 (1-Strongly disagree, 2-Disagree, 3-Neither disagree nor agree, 4-Agree, 5-Strongly agree) regarding their influence on your choice.

	1	2	3	4	5
Hospital training completed during the externship					
Content and quality of teaching of lectures					
Attended workshops, round tables and conferences					
Training during the intership					
Duration of the residency training					
Prestige and status of the specialty					
Intellectual challenge					
Desire practice in academic setting					
Enjoy tending to patients' social and psychological needs					
Interest in procedures and surgical techniques					
Occupational risks (radiation, infectious diseases)					
Medico-legal risks					
The pedagogical approach of the teachers of the department					
Ward atmosphere (organization, medical and paramedical staff, etc.)					
Shift pace and workload					
Flexible working hours					
Availability of employment in the liberal sector					
Assignment at the end of the specialty training					
Financial aspects					

Continued

Your spouse's career and location

Personal profile (stress, etc.)

Socio-economic level (requirement of significant investment)

Influence of someone (parents, relatives, friends)

Life experience/Emotional shock

Health reason

Lifestyle
