Determinants of the Medical Speciality Choice of Residents at University Hospital

Dalila Chrystiana Batista Costa Melo[1], Janine Lemos de Melo Lobo Jofili Lopes[2], Ítalo Luciann Lima Monteiro[3], Edmund Chada Baracat[4], Eduardo Vieira da Motta[5], Lia Cruz Vaz da Costa Damásio[6]

**Corresponding author:** Ms Janine Lemos de Melo Lobo Jofili Lopes janinejofili@hotmail.com

**Institution:** 1. Universidade Federal do Piauí, 2. Universidade Federal do Piauí, 3. Universidade Federal do Piauí, 4. Universidade de São Paulo, 5. Universidade de São Paulo, 6. Universidade Federal do Piauí

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**Abstract**

Choosing a medical specialty involves multifactorial components and is personally and socially important, determining professional performance and satisfaction. This cross-sectional study aimed to analyze the factors related to the choice of medical specialty of residents at University Hospital of the Federal University of Piauí (HU-UFPI) from 2014 to 2016. We used electronic questionnaire to evaluate the residents. Residents who either refused to participate of the survey or dropped out of medical residency were excluded. 86 questionnaires were sent. The response rate was 73.2%. According to the survey 74.6% were single at admission to medical residency; 87.1% were childless; 55.6% were 25-30 years old when started their residency. 60.3% of the residents chose HU-UFPI medical residency program due to the quality of education offered by the institution. Such factors may explain differences in medical specialty distribution and how those choices affect healthcare dynamics. The main domain of reasons that influenced the choice of medical specialty was "preference and personal identification". The least influential domain in the choice of medical residency was "educational system. Thus, multiple factors affect medical residents’ choice of specialty. Such factors may be used to understand differences in medical specialty distribution and how those choices affect healthcare dynamics.

**Keywords:** medical education, medical residency, medical specialty

**Introduction**

The choice of medical specialty involves multifactorial components and is personally and socially important,
determining professional performance and satisfaction. The factors analyzed in this choice include variables intrinsic and extrinsic to the physician (Sousa, 2014).

Conditions related to student life, that is, relating to the academic period, and not only to the student's professional skills and preferences, are among these factors (Wright et al, 2004; Takeda et al, 2013).

New trends in the choice of medical specialty have been observed worldwide, with declines in the choice of some medical specialties and increases in others. Several factors account for this variation, including controllable lifestyle, compensation, study time, educator models and others (Sousa, 2014; Cooper, 2016).

Controllable lifestyle specialties include the following: anesthesiology, dermatology, neurology, ophthalmology, otorhinolaryngology, pathology, psychiatry, radiology and medical emergency. These specialties have been increasingly chosen by medical students, as shown since 1989 (Wright et al, 2004). Conversely, non-controllable lifestyle specialties, including gynecology and obstetrics, pediatrics, internal medicine, general surgery, orthopedics and urology, have been increasingly chosen over controllable lifestyle specialties (Starfield et al, 2005; Knox et al, 2008; Xu, 2015; Saigal et al, 2013). This trend has been sustained in recent decades.

Most non-controllable lifestyle specialties compose the primary level of healthcare (gynecology and obstetrics, family medicine, internal medicine and pediatrics) (Dorsey et al, 2003). This composition may reflect not only the dissatisfaction of physicians with basic healthcare but also the increase in technological innovation and increased demand for specialized care (Wetterneck et al, 2002; Starfield et al, 2005; Newton, 2013).

This topic is crucial for medical education, and the process must be further understood to develop strategies promoting a balanced medical workforce distribution (Cooper, 2002; Olson et al, 2011).

The new physician distribution according to medical specialty and the factors related to the choice of medical specialty have been poorly studied in Brazil. However, some studies have been conducted to clarify this subject in other countries, including the United States and Canada (Cooper, 2002).

**Objectives**

The aims of the present study are to analyze the factors related to the choice of medical specialty of residents of the University Hospital of the Federal University of Piauí (Hospital Universitário da Universidade Federal do Piauí – HU-UFPI) from 2014 to 2016, to compare the determinants of the specialty choice of Gynecology and Obstetrics medical residents with other groups of residents and to identify the social profile of HU-UFPI residents.

**Materials and Methods**

This study had an analytical cross-sectional design and was conducted in the HU-UFPI medical residency program. The study population included physicians working in the medical residency program of the institution. The study sample consisted of residents who met the following inclusion criteria: having been admitted to the medical residency program between 2014 and 2016 and being regularly active in program activities. Residents who dropped out of medical residency before graduating were excluded. A total of 87 questionnaires were emailed, and 63 (72.4%) residents replied; these residents composed the study sample.
An electronic questionnaire consisting of two sections was emailed to the HU-UFPI residents. The first section included socio-educational variables (age, marital status, children, family income, parental education, type of secondary and higher education institutions from which the resident graduated, undergraduate activities, institution in which the resident intends to work and reason for choosing the HU-UFPI for their residency). The second section consisted of an assessment of the reasons for choosing the medical specialty, whose four domains were identified and statistically organized through exploratory factor analysis: prestige and professional success (6 items), preference and personal identification (3 items), family and peer influence (3 items) and educational system (2 items).

The influence level of each dimension (IL\(_D\)), according to the evaluations of the medical residents, was calculated by adding the scores obtained in the reasons of the dimension (E\(_i\)) with the values on an ordinal scale ranging from 0 (no influence) to 4 (maximum influence) points and by adding the maximum scores possible for each item of this dimension (Emax\(_i\)), represented by the following formula:

\[
IL_D = \frac{\sum_{i=1}^{n} E_i}{\sum_{i=1}^{n} E_{max_i}}
\]

The arithmetic mean of the measurements of the levels obtained in the four dimensions was used to calculate the global influence level (IL\(_G\)) of each participant’s reasons for choosing their medical specialty. The questionnaire had no missing results in the evaluation of the residents. The final score may range from 0 to 1 (0% to 100%).

Data were processed using IBM® SPSS®, version 21.0. Descriptive statistics, including the mean, standard deviation, minimum and maximum, were calculated for quantitative variables and frequencies for qualitative variables. The Kolmogorov-Smirnov test was performed to assess data normality. The Mann-Whitney test was used for dichotomous variables, and the Kruskal-Wallis test was used for polytomous variables to assess differences between influence levels by questionnaire dimension. All tests were performed at a 5% significance level.

Results

A total of 87 questionnaires were emailed to HU-UFPI residents, and 63 (72.4%) were returned. Residents were divided into gynecology, 18 (28.6%), and other specialties, 45 (71.4%) (Figure 1), and were characterized regarding socio-educational aspects (Table 1). The domain scores and the overall score obtained in each resident’s evaluation (Figure 1) and the response levels according to each domain established – prestige and professional success, preference and personal identification, family and peer influence and educational system – are outlined in Table 2.
Table 1 – Socio-educational profile of medical residents (n=63). Teresina, PI, Brazil, 2016

Figure 1 – Frequency distribution of residents according to medical specialty (n=63). Teresina, Piauí (PI), Brazil, 2016

Figure 2 – Mean influence scores of the reasons for choosing the medical specialty according to the residents (n=63). Teresina, PI, Brazil, 2016
| Characteristic                                      | n  | %    |
|----------------------------------------------------|----|------|
| **Type of secondary school completed**             |    |      |
| Public                                             | 6  | 9.5  |
| Private                                            | 57 | 90.5 |
| **Marital status when starting medical residency** |    |      |
| Single                                             | 47 | 74.6 |
| Married/ cohabitation                               | 16 | 25.4 |
| **Type of university completed**                   |    |      |
| Public                                             | 49 | 77.8 |
| Private                                            | 14 | 22.2 |
| **Children**                                       |    |      |
| Yes                                                | 10 | 15.9 |
| No                                                 | 53 | 84.1 |
| **Family income**                                  |    |      |
| 1 to 5 minimum wages                                | 5  | 7.9  |
| 5 to 10 minimum wages                               | 17 | 27.0 |
| Higher than 10 minimum wages                        | 41 | 65.1 |
| **Maternal education level**                        |    |      |
| Primary education                                   | 2  | 3.2  |
| Secondary education                                 | 19 | 30.2 |
| Undergraduate education                             | 37 | 58.7 |
| Graduate education (masters/doctorate)              | 5  | 7.9  |
| **Paternal education level**                        |    |      |
| Primary education                                   | 18 | 28.6 |
| Secondary education                                 | 9  | 14.3 |
| Undergraduate education                             | 33 | 52.4 |
| Graduate education (masters/doctorate)              | 3  | 4.8  |
| **Physician parents**                              |    |      |
| Yes, both                                          | 2  | 3.2  |
| Yes, only one                                      | 4  | 6.3  |
| No                                                 | 57 | 90.5 |
| **Participation in student associations or peer tutoring programs** | |
| Yes          | 27  | 42.9 |
| No           | 36  | 57.1 |

**Age when starting residency**

| Age category                        | Count | Percentage |
|-------------------------------------|-------|------------|
| Younger than 25 years               | 23    | 36.5       |
| Between 25 and 30 years             | 35    | 55.6       |
| Older than 30 years                 | 5     | 7.9        |

**Type of institution in which the resident intends to work**

| Type of institution | Count | Percentage |
|---------------------|-------|------------|
| Public              | 1     | 1.6        |
| Private             | 1     | 1.6        |
| Both                | 61    | 96.8       |

**Reason for choosing the host institution of medical residency**

| Reason                                                     | Count | Percentage |
|------------------------------------------------------------|-------|------------|
| Quality of education                                       | 38    | 60.3       |
| Not accepted to another institution                        | 2     | 3.2        |
| Inability to leave the city at the time                    | 17    | 27.0       |
| Quality of education and proximity to family               | 5     | 7.9        |
| Practical workload and employment possibilities             | 1     | 1.6        |
| **Total**                                                  | 63    | 100.0      |

Table 2 – Response levels of medical residents (n=63) for the reasons for choice of medical specialty. Teresina, PI, Brazil, 2016
Residents of other specialties were concentrated in the medical specialties of internal medicine, 10 (15.9%), general surgery, 7 (11.1%), ophthalmology, 6 (9.5%), orthopedics, 4 (6.3%), radiology, 4 (6.3%), dermatology, 4 (6.3%), cardiology, 4 (6.3%), anesthesiology, 2 (3.2%), endocrinology, 2 (3.2%), plastic surgery, 1 (1.6%), and rheumatology, 1 (1.6%), as shown in Figure 1.

According to the survey, the respondents were predominantly residents who graduated from private secondary schools, 57 (90.5%); were single at the time of admission to medical residency, 47 (74.6%); graduated from public institutions, 49 (77.8%); were childless, 53 (87.1%); had a family income higher than 10 minimum wages, 41 (65.1%); were 25-30 years old when starting their residency, 35 (55.6%); intended to work in public and private institutions, 61 (96.8%); had parents who had undergraduate educations: mother, 37 (58.7%), father, 33 (52.4%) and who were mostly not physicians, 57 (90.5%). More than 38 (60.3%) residents chose the medical residency program at the HU-UFPI due to the quality of education offered by the institution. The second reason indicated by the respondents was the inability to leave the city at the time, corresponding to 17 (27%) residents. Lastly, most residents, 36 (57.1%), did not participate in student associations or peer tutoring programs (Table 1).

The domain of reasons that most influenced the choice of medical specialty was "preference and personal identification," with 65.6% (±20.0%), 8.0% minimum and 100.0% maximum. The least influential domain in the
choice of medical residency was "educational system," with 42.2%, 0.0% minimum and 100% maximum. Considering all reasons included in the questionnaire, the final mean influence was 53.3% (±0.1), ranging from 29.0% to 79.0% (Figure 2).

In the "preference and personal identification" domain, the main reasons that influenced the choice at a high or maximum level were aptitude, 53 (84.1%), and social responsibility, 28 (44.4%). Among the reasons representing "prestige and professional success", the work method of the specialty, 48 (76.2%), autonomy potential, 41 (65.1%), and variable daily routine, 39 (61.9%), had high or maximum levels of influence. The following reasons had the least influence on the choice of medical specialty: family influence, 46 (73.1%), research opportunities, 40 (63.6%), and experience or development of academic work, 30 (47.6%), considering the evaluations up to the low level (Table 2).

Significant differences in influence level distributions were observed between the "educational system" domain and family income (p=0.026), between "preference and personal identification" and maternal education level (p=0.029) and between the "family and peer influence" dimension and participation in student associations or peer tutoring programs (p=0.047). The following median family incomes were obtained according to the categories: 37.5% (±0.1) for 1 to 5 minimum wages, 50.0% (±0.4) for 5 to 10 minimum wages and 37.5% (±0.3) for higher than 10 minimum wages.

In the "preference and personal identification" dimension, the median influence levels were higher for medical residents whose mothers had up to primary education, 91.7% (±0.0), followed by those with graduate education (masters/doctorate), 75.0% (±0.3), secondary education, 66.7% (±0.2), and undergraduate education, 58.3% (±0.3). Considering the evaluations of "family and peer influence", a higher median influence level was observed for residents who participated in student associations or peer tutoring programs, 50.0% (±0.3), compared with those who did not participate, 41.7% (±0.3).

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In the "preference and personal identification" dimension, the median influence levels were highest for residents whose mothers had an education level up to primary education, 91.7% (±0.0), followed by those with graduate education (masters/doctorate), 75.0% (±0.3), secondary education, 66.7% (±0.2), and undergraduate education, 58.3% (±0.3). Considering the evaluations of "family and peer influence", a higher median influence level was observed for residents who participated in student associations or medical specialty monitoring, 50.0% (±0.3), compared with those who did not participate, 41.7% (±0.3).

Discussion

A critical step in academic medical training involves choosing the medical specialty and what factors determine this choice. The decision involves alternatives and the assessment of several variables that may influence the choice of medical specialty (Xu, 2011). Some studies have been conducted to determine which factors most influence this decision, mainly involving medical students. To date, no study assessing the choice of medical specialty of resident physicians has been published.
Regarding the independent variables assessed, the present study identifies the profile of HU-UFPI residents as consisting mostly of physicians from private secondary schools, who graduated in Medicine from public university, whose parents are not physicians, with family income higher than 10 minimum wages, single, childless, aged from 25-30 years and who intend to work in public and private institutions.

Most questionnaire respondents are residents of the Gynecology and Obstetrics medical specialty because they account for the group with the highest number of residents (18 individuals) and are one of the groups with a 100% response rate.

Response rates of 100% were also obtained from the following groups of residents: Anesthesiology, Endoscopy, Radiology and Diagnostic Imaging, Rheumatology and Endocrinology.

Age is a variable that varies considerably among medical students in various countries, along with the percentage of married students; these factors are closely correlated (Senf et al., 1997; Hauer et al., 2008).

The mean age of medical students when starting medical school has increased from 18 to 20.45 years, and the mean age in the last year of medical school is 27.7 years (Shapiro et al., 2000). The present study found that 35 (55.6%) residents were between 25 and 30 years of age, and 16 (25.4%) were married when starting their residency.

The questionnaire showed that the most frequent family income was higher than 10 minimum wages. This finding corroborates the study with students from the Federal University of Minas Gerais (Universidade Federal de Minas Gerais – UFMG) conducted by Ferreira et al. (2008), who found that more than half of the medical students belong to family income Class B. This family income profile may influence the medical specialty preference, leading students to choose specialties with higher compensations.

The results relating to the parental education level revealed that more than half of the mothers, 57 (58.7%), and more than half of the fathers, 33 (52.4%), had undergraduate educations; furthermore, the percentage of mothers, 5 (7.9%), with graduate education was higher than the percentage of fathers, 3 (4.8%). This finding shows that physicians are still a privileged part of the population – although the sample does not encompass all resident physicians in the country.

Interestingly, 57 (90.5%) residents have no physician parents, only 4 (6.3%) have one physician parent, and 2 (3.2%) have two physician parents. These data somewhat contrast the data published in the literature, which indicated that most medical students have physician parents (Cruz et al., 2010). Conversely, specifically in the HU-UFPI context, having physician parents had no influence in the choice of medical specialty of the residents, which was also observed when analyzing the family influence factor of domain 4 – "family and peer influence". This factor was evaluated as a minimum influence by 41 (65.2%) residents interviewed.

Most residents failed to report the profession of the father, 47 (74.6%), and mother, 49 (74.6%). This failure complicates the assessment of the influence of parental profession on the medical specialty choice.

A total of 38 (60.3%) residents chose the HU-UFPI as their host institution due to the quality of education. Only 2 (3.2%) enrolled in this institution because they were not admitted to other universities. This finding indicates the quality and credibility of the education offered by the HU-UFPI, despite its short operating time.

In the present study, the factors that most influenced the choice of medical specialty were autonomy potential, variable daily routine, work method of the specialty, aptitude and financial reasons. The most influential domain was "preference and personal identification". This finding corroborates other studies, which show that affinity with the
medical specialty is a key factor in the choice of medical specialty, followed by physician lifestyle, preferences for the type of patient care and greater exposure to the disciplines related to the specialty in medical school. The answers that most differed from the literature were related to factors of family influence and experience/academic work in the field, which had lower influence levels than those found in other studies (Arnaldo et al, 2010).

This finding suggests that different motivations influence the choice of different medical specialties at various sites and institutions. Another explanation is that the non-specific conceptualization of influencing motives may have generated different meanings, leading to reflections that are different from the expected in relation to the influence of this variable.

Thus, including financial reasons and family influence in the same domain is an example. The non-conceptualization of family influence may be interpreted as a financial success model present in the family rather than having been related to a professional or social responsibility model. Importantly, this grouping was based on statistical psychometric analyses.

The present study found a difference between Gynecology and Obstetrics residents and the others. The former had higher numbers of answers in the "preference and personal identification" and "educational system" domains than the residents from the other medical specialties. This difference may be explained by the fact that the Gynecology and Obstetrics internship involves very close contact with the practical side of the specialty, which may have aroused greater interest from the residents in this internship and those who chose this medical specialty. The UFPI, for example, has extracurricular internships in the field of Gynecology and Obstetrics and in other fields, including Internal Medicine, General Surgery and Neonatology.

Medical students construct their professional identity in a process involving socialization, patients and other students, in addition to their own social and cultural constructions (Sobral et al, 2008; Saigal et al, 2013). During medical school, contact with curricular and extracurricular experiences and with healthcare professionals who serve as models guide and provide a perspective on the experience of some specialties and contribute to the medical residency choice (Knox et al, 2008; Saigal et al, 2013).

Saigal et al (2007) conducted a qualitative study in Japan and found that factors such as curricular experiences and aspects of patient care were relevant to the medical specialty choice.

Thus, the relevance of the practical characteristics of the medical specialty and the value of how the student is exposed to them during medical training (which greatly reflect the factors of the domains "preference and personal identification" and "educational system") are corroborated.

Despite the differences among medical specialties, the participants of the study conducted at the HU-UFPI mostly had a very low frequency of participation in extracurricular activities; additionally, 36 (57.1%) of them had not participated in student associations or peer tutoring programs in medical school (Table 1). This finding was not observed in other studies, including the cross-sectional study performed at the University of São Paulo (Universidade de São Paulo – USP) with first- to fourth-year students in 1999 and 2002. In that study, only 8% of the students performed no extracurricular activities, whereas 73% students reported participating in student associations, 31.5% participated in scientific initiation internships and 31% volunteered for shifts (Vieira et al, 2004).

It is interesting that extracurricular activities were not included in the daily routines of most HU-UFPI resident
physicians, as participation in these activities may be a strong influencer of their preferences and choices.

However, it is important to note that Gynecology and Obstetrics residents showed a stronger influence from the item "experience and academic work in the field"; that is, although little participation in extracurricular activities was reported (Table 1 – item "participation in student associations or peer tutoring programs"), those few experiences may have been key factors for these residents.

It is important to note that during these extracurricular activities, the student may confirm, discard or choose their medical specialty. However, there is not necessarily a cause-and-effect relationship because the student may decide to participate in the extracurricular activity after deciding to follow a particular specialty, or the activity may be the cause of the student's choice (Souza, 2014).

It should not be forgotten that student associations are complementary to the medical curriculum, although they may favor early attraction for medical student specialization, alienating students from other fields (Gonçalves et al, 2009).

Lastly, these results show that measurements of attraction to specific medical specialties may result from not only curricular but also extracurricular activities in the fields of affinity.

Conclusions

The results of the present study show that the factors that most influenced the choice of medical specialty of the group of HU-UFPI resident physicians from 2014 to 2016 were autonomy potential, variable daily routine, work method of the specialty and aptitude. The least influential factors were family influence and experience/academic work. This study was unprecedented at the local level and examined the topic addressed to clarify these issues.

This study highlights a key evaluation of how physician profiles may change and how medical institutions may enable the best knowledge and pedagogical and care planning for the residents of the institution.

Further studies are needed to correlate more factors with each medical specialty or group of related specialties to improve the intake and training of medical professionals.

Take Home Messages

- Autonomy potential, variable daily routine and aptitude most influenced residents
- Family influence and experience/academic work least influenced residents
- Family influence and experience/academic work in the field had low influence levels
- Residents had low frequency of participation in extracurricular activities
- Gynecology and Obstetrics residents showed a stronger influence from the item "experience and academic work in the field"

Notes On Contributors

- Dalila C. B. C. Melo – 3rd year Gynecology and Obstetrics resident at Federal University of Piauí.
- Janine L. de M. L. J. Lopes – 6th year medical student at Federal University of Piauí. Currently is taking the
Gynecology and Obstetrics Rotation at University Hospital. Member of the extension program of Integral Care on Women's Health.

- **Ítalo L. L. Monteiro** – Medical student at Federal University of Piauí.
- **Edmund C. Baracat** – MD. Gynecologist/Obstetrician. Professor of the Gynecology /Obstetrics medical course at University of São Paulo.
- **Eduardo V. da Motta** - MD, PhD. Gynecologist/Obstetrician from University of São Paulo. Professor of the Gynecology /Obstetrics medical course at University of São Paulo.
- **Lia Cruz V. da C. Damásio** – MD, PhD. Gynecologist/Obstetrician from University of São Paulo. Attending at University Hospital. Professor of the Gynecology /Obstetrics medical course at Federal University of Piauí. Coordinator of the extension program of Integral Care on Women's Health.

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Appendices

Declaration of Interest

The author has declared that there are no conflicts of interest.