

Factors associated with career intention in primary health care among medical students

Fatores associados à intenção de carreira na atenção primária à saúde entre estudantes de Medicina

Camila Zamban de Miranda¹ camilazamban@gmail.com
Franchesca Fripp dos Santos² franchescafripp@gmail.com
Karina Cenci Pertile¹ kapertile@gmail.com
Simone de Melo Costa² smelocosta@gmail.com
Antônio Prates Caldeira² antonio.caldeira@unimontes.br
Mariane Silveira Barbosa² msb.mariane@gmail.com

ABSTRACT

Introduction: Health assistance reorganization has been oriented, since the Unified Health System (SUS) creation, by a proposal of expansion and strengthening of Primary Health Care (PHC). In this context, the scarcity of trained professionals is considered one of the main challenges for PHC consolidation. Among the career options after graduation, most physicians choose to seek focal specializations to work in other health care levels.

Objective: Therefore, this quantitative study aims to analyze the prevalence and associated factors of medical students' interest in following a career in PHC.

Method: A cross-sectional study was conducted with medical students attending the last two years in four medical schools in the state of Minas Gerais, Brazil. A total of 524 students participated by answering a self-administered questionnaire, which was prepared by the authors, including questions regarding sociodemographic and economic profile, interaction with PHC during undergraduate school, career intention and intention to attend the Family and Community Medicine Residency (FCMR) program.

Results: The results showed that 26.3% of the respondents indicated interest in following a career in PHC, a higher percentage when compared to previous studies. Regarding PHC being a temporary work choice, 79,3% of the participants indicated that they intend to work in this field after graduation. Ten percent of the students informed they intend to attend the FCMR program. Among the factors associated with the intention to work in PHC, a successful PHC experience during undergraduate school stands out.

Conclusion: The results should be taken into consideration by health and medical education managers, fostering strategies that promote successful PHC experiences, encouraging learning-service integration and including students in a consolidated PHC network during undergraduate school. Initiatives such as increasing the workload in PHC during undergraduate school, increasing the number of FMC specialized teachers and health network improvement in the municipalities where these Higher Education Institutions are located can be powerful actions toward increasing the graduating students' interest to work in PHC.

Keywords: Medical Students; Primary Health Care; Career Choice.

RESUMO

Introdução: A reorganização da assistência à saúde a partir da criação do Sistema Único de Saúde (SUS) tem sido orientada por uma proposta de expansão e fortalecimento da atenção primária à saúde (APS). Nesse cenário, a escassez de profissionais capacitados é considerado um dos principais desafios para a consolidação da APS. Dentre as possibilidades de carreira após a conclusão da graduação, a maioria dos médicos optam por buscar especialidades focais para atuar em outros níveis de atenção.

Objetivo: Assim, este artigo, de natureza quantitativa, se propõe a analisar a prevalência e os fatores associados ao interesse de estudantes de Medicina em seguir carreira na APS.

Método: Foi realizado um estudo transversal, com estudantes de Medicina dos dois últimos anos do curso, em quatro escolas médicas do estado de Minas Gerais, no Brasil. Participaram 524 estudantes que responderam a um questionário autoaplicado, elaborado pelos autores, com questões que incluíam os perfis sociodemográfico e econômico do estudante, a interação com a APS ao longo do curso, a intenção de carreira e o desejo de cursar Residência em Medicina de Família e Comunidade (RMFC).

Resultado: Os resultados evidenciaram que 26,3% dos entrevistados referiram interesse em seguir carreira na APS, percentual mais alto que o registrado em estudos anteriores. Quanto ao fato de a APS ser uma opção de trabalho temporária, 79,3% dos participantes referiram que pretendem atuar nesse campo após o término da graduação. Dez por cento dos estudantes informaram que pretendem cursar RMFC. Entre os fatores associados à intenção de atuar na APS, destaca-se a vivência de uma experiência exitosa na APS ao longo da graduação.

Conclusão: Os resultados devem ser considerados por gestores da área da saúde e da educação médica, fomentando estratégias que propiciem experiências exitosas na APS, com maior incentivo à integração ensino-serviço e à inserção de estudantes, ao longo da graduação, em uma rede de APS fortalecida. Iniciativas como ampliação de carga horária na APS durante a graduação, aumento do número de professores especialistas em MFC e qualificação da rede de saúde dos municípios onde essas instituições de ensino superior estão inseridas podem ser potentes no sentido de aumentar o interesse dos formandos de atuar na APS.

Palavras-chave: Estudantes de Medicina; Atenção Primária à Saúde; Escolha da Profissão.

¹ Universidade Federal dos Vales do Jequitinhonha e Mucuri, Diamantina, Minas Gerais, Brazil.

² Universidade Estadual de Montes Claros, Montes Claros, Minas Gerais, Brazil.

Chief Editor: Rosiane Viana Zuza Diniz. | Associate Editor: Rosana Alves

Received on 09/20/20; Accepted on 05/12/21. | Evaluated by double blind review process.

INTRODUCTION

The reorganization of health care since the creation of the Brazilian Unified Health System (SUS, *Sistema Único de Saúde*) has been guided by a proposal to expand and strengthen Primary Health Care (PHC). This process was a specific one in Brazil, with the implementation of multiprofessional health teams consisting of general practitioner, a nurse, a nursing technician and community health agents, who are responsible for the comprehensive care of a certain population, a model called the 'Family Health Strategy' (FHS), which has been consolidated as the main organization strategy for the Brazilian PHC¹.

The scarcity of physicians to work in the FHS teams is considered one of the main challenges for the consolidation of PHC in Brazil²⁻⁴. In addition to the scarcity of physicians, these professionals are often poorly geographically distributed, concentrated in cities with larger populations, located in more economically developed regions⁴. However, this is not a situation unique to Brazil, as other countries also have difficulties in providing physicians within the scope of PHC⁵⁻⁸.

Some countries have taken steps to increase training vacancies for general practitioners, such as Canada, which doubled training vacancies in family medicine between 2000 and 2013, as part of an effort to increase access to primary health care. However, in most countries of the Organization for Economic Cooperation and Development (OECD), specialist physicians earn more than general practitioners, thus financially encouraging medical doctors to become specialists⁹.

In Brazil, several intervention proposals for the training of human resources in health have been recognized as promoting a new social mission of medical schools in undergraduate and postgraduate courses¹⁰. In 2014, the Ministry of Education implemented the new National Curriculum Guidelines (NCG) for medical courses, which reinforce the need for training medical professionals aimed at the population's needs and recommend the student's inclusion in health service networks throughout the undergraduate course. Aiming at a more appropriate inclusion of students in PHC, it was necessary to establish a closer relationship between medical schools and health services¹¹, and the federal government started to adopt, from that moment onward, policies that promoted the teaching-service integration, introducing programs to encourage curricular changes¹².

Other important initiatives in relation to the training and provision of physicians for Brazil were the 'More Doctors Program' (PMM, *Programa Mais Médicos*) and the incentive to the increase of vacancies in the Family and Community Medicine Residency (FCMR) program. The PMM was created in 2013, aiming at increasing the density of physicians in Brazil based on three main actions: increase in the number of vacancies in

undergraduate courses, increase in the number of vacancies in medical residency programs in the priority areas for the Unified Health System (SUS) and provision of physicians in Primary Care on the outskirts of large cities and in the countryside of the states¹³. A recent study that assessed the PMM impact recorded a substantial increase in the provision of physicians to work in PHC, which contributed to reducing the number of municipalities with a scarcity of these professionals¹⁴.

Despite the initiatives to provide human resources in priority areas for health systems, there is an inconsistency regarding the need for medical training and the individual career choices of medical professionals, not only in Brazil, but in several countries¹⁵, indicating that, while seeking to redirect health systems, some countries show a decline in the choice of careers linked to PHC¹⁶.

In recent years, the opening of new medical schools and the prominence achieved by the PMM defined a new scenario, with an appreciation of the space in primary care practices. In this sense, the present study aimed to identify the prevalence and factors associated with the interest of medical students in pursuing a professional career in Primary Health Care.

METHODS

This is a cross-sectional, analytical study, carried out with the participation of medical students attending the last two years of undergraduate medical school at four Higher Education Institutions (HEIs) in the state of Minas Gerais, Brazil. The state has 46 medical schools and, considering the logistical difficulty of a sampling approach to achieve the necessary representativeness among all institutions, a convenience sampling was chosen by selecting four HEIs, one in the capital and three in the countryside of the state, with interviews of all students regularly enrolled in the 5th or 6th years in these selected HEIs. The data collection instrument consisted of a self-administered questionnaire, created by the authors and based on the study objectives, with questions that included the sociodemographic and economic profile of the students, interaction with PHC throughout the course, career intention and intention to attend the FCMR program. After creating the instrument, face and content validation was carried out by six experts in the area, in addition to a pilot study with 5th-year students from another medical school in the state of Minas Gerais, not included in the study.

The questionnaire was applied as hard copy and in a virtual environment. The in-person contact with the students was carried out by scientific initiation (undergraduate) students, after the project was presented to the HEI by the researchers. The data collection team was specially trained and periodically visited the selected HEIs, identifying and approaching students

attending the last years of the undergraduate course. Several visits were made to the HEIs, aiming to reach a larger number of students. After three visits to each class or sub-class, the students who did not agree to participate or who were not found were considered losses, regardless of the alleged reason.

Aiming to increase the number of participants, a list of the students' electronic contacts was requested from the HEIs and the data collection instrument, in digital format, was sent by e-mail to the students, with a brief explanation about the research. All students aged 18 or over, regularly enrolled in the 5th or 6th years of the surveyed medical schools were considered eligible for the study. Exclusion criteria were not defined.

All data were submitted to statistical treatment using IBM SPSS software, version 22.0. A descriptive statistical analysis was performed by calculating the proportions and the bivariate analysis using Pearson's chi-square test. The variables shown to be statistically associated with the assessed outcome ("interest in pursuing a professional career in PHC") up to the level of 20% ($p \leq 0.20$) were assessed jointly through logistic regression. A significance level of 5% ($p < 0.05$) was considered for the final model, and the Odds Ratio (OR values) and their respective 95% Confidence Intervals (95% CI) were included.

The present study was approved by the Research Ethics Committee involving human beings at Universidade Estadual de Montes Claros/MG (Unimontes), in compliance with Resolution N. 466/2012 of the National Health Council, Ministry of Health. The anonymity of all information provided by the students was guaranteed and all participants signed the Free and Informed Consent Form. The research project was approved by the Research Ethics Committee of one of the institutions participating in the study under Opinion N. 2,426,972.

RESULTS

A total of 524 students participated in the study, which constitutes a response rate of 45% of the elective population for the study. Most respondents were females, aged between 21 and 25 years, single, with self-reported white ethnicity. More than half attended high school in private schools and informed the parents had attended HEIs. These and other characteristics of the group are shown in Table 1.

There was a greater number of participants among the students attending the sixth year of the medical course, comprising the 11th and 12th course semesters. Just over half (55.5%) of the interviewees reported having already chosen the area they wanted to specialize in, after completing the course, and of these, 58.3% reported having greater aptitude for clinical specialties (Table 2). The majority (78.5%) of the interviewees reported having had a positive experience in PHC during the undergraduate course. More than half of the

Table 1. Characterization of the sociodemographic profile of students attending the last two years of the medical course; Minas Gerais Brazil.

Variable	n	%
Age (years)		
≤ 25	349	66.7
> 25	174	33.3
Gender		
Female	298	57.0
Male	225	43.0
Marital status		
Single	480	91.8
Married / Common-law marriage	40	7.6
Skin color/ethnicity (self-reported)		
White	277	54.7
Yellow	8	1.6
Brown	194	38.3
Black	27	5.3
Type of high school attended		
Public	108	20.7
Private	415	79.3
Paternal level of schooling		
Illiterate	1	0.2
Elementary School	79	15.2
High School	169	32.6
Higher Education or Postgraduate School	270	52.0
Maternal level of schooling		
Elementary School	32	6.1
High School	121	23.1
Higher education or Postgraduate School	370	70.8
Has a previous degree in another course		
Yes	54	10.3
No	469	89.7
Type of HEI*		
Public	321	61.3
Private	202	38.7
HEI located in the state countryside/capital		
Countryside	355	67.9
Capital	168	32.1
Admission modality in the HEI		
Prouni**	35	6.7
ENEM***/ Entrance Exam	476	91.5
Internal transfer	9	1.7

(*) HEI: Higher Education Institution; (**) Prouni: Programa Universidade para Todos (University for All Program); (***) ENEM: Exame Nacional do Ensino Médio (National High School Exam).

students participated in at least one academic league, with only 4.8% (n = 14) of these participating in academic leagues related to FCM. As for PHC being a work option after graduation, even if temporary, 79.3% of the participants reported that they intended to work in PHC after graduation, even without attending the FCMR program (Table 2).

The main determinant factor for working in PHC immediately after graduation was the fact that PHC was a temporary work option until they entered medical residency in another area (78.6%). This factor was followed by the availability of vacancies in the job market (47.3%) and having successful

experiences in PHC during undergraduate school, with the latter showing less influential power, with 29.9% of respondents. Of the 20.7% that did not consider PHC as a career option after graduation, 66.7% reported that the main reason for this choice was the option of attending residency in a particular specialty without working in PHC before starting residency. The other most often mentioned determinant factors regarding the choice of not working in PHC after graduation were the lack of a career plan (39%) and poor remuneration (33.3%) (Table 3).

When asked about their intentions to attend residency in FCM, 10% of students reported that they intended to

Table 2. Characterization of the academic profile of students attending the last two years of the medical course; Minas Gerais Brazil.

Variable	n	%
Undergraduate course semester		
9 th	93	18,0
10 th	87	16,8
11 th	221	42,7
12 th	117	22,6
Have you chosen which specialty you want to study?		
Yes	289	55,5
No	232	44,5
Do you have a greater aptitude for clinical or surgical specialties?		
Clinical	304	58,3
Surgical	164	31,4
I do not know	54	10,3
PHC** experience during undergraduate school		
Excellent/Good	408	78,5
Regular	92	17,7
Poor/Very Bad	20	3,8
Do/Did you participate in academic leagues?		
Yes	290	55,6
No	232	44,4
Interest in FCMR* after graduation		
Yes	52	10,0
No	363	69,8
I do not know	105	20,2
Interested in pursuing a career in PHC?		
Yes	136	26,3
No	382	73,7
Interest in working at PHC after graduation		
Yes	402	79,3
No	105	20,7

(*) FCMR: Family and Community Medicine Residency; (**) PHC: Primary Health Care.

Table 3. Determinant factors related to the choice of working or not in Primary Health Care after graduation for students attending the last two years of medical school; Minas Gerais, Brazil.

Determinant Factors related to the Choice	(n)	(%)*
To work in PHC** after graduation (n=402)		
Work option until approved in a medical residency in another area	316	78.6
Job market has great availability of vacancies	190	47.3
Successful experience in PHC in the curriculum	120	29.9
Good remuneration	107	26.6
Possibility of longitudinal care	99	24.6
Possibility of being hired as public servant	92	22.9
A good teacher/tutor during the PHC experience	82	20.4
Commitment to SUS***	76	18.9
I had successful PHC experience outside the curriculum	32	8.0
Others	10	2.5
For NOT working in PHC after graduation (n=105)		
I intend to attend residency in a specific specialty without working in PHC before the residency	70	66.7
Lack of a career plan	41	39.0
Poor remuneration	35	33.3
I had an unsuccessful PHC experience in the curriculum	24	22.9
Workload and number of working hours (40 hours, 5 days a week)	19	18.1
Preference for eventual and not longitudinal clinical care	19	18.1
Little social acknowledgement	12	11.4
Work overload	11	10.4
Preference for not attending people from different age ranges	9	8.6
Job market with few vacancies	5	4.8
Others	11	10.4

(*) The sum of the percentages is greater than 100% because respondents could give more than one answer; (**) PHC: Primary Health Care; (***) SUS: *Sistema Único de Saúde* (Unified Health System).

attend this residency after graduating and 20.2% reported that they still did not know whether they intended to attend this residency or not. About the intention of pursuing a professional career in PHC, 26.3% of the respondents answered affirmatively.

Table 4 shows the results of the bivariate analyses of the factors associated with the intention to pursue a career in PHC. After the multiple analysis, it was recorded that the variables female gender, having a previous university degree, entering the HEI through the *Programa Universidade para Todos* (University for All Program) (Prouni), greater aptitude for clinical specialties and positive experience in PHC during undergraduate school remained associated with a greater chance of pursuing a career in PHC. The variables age, marital status and maternal education were not significantly associated with pursuing a career in PHC.

DISCUSSION

The percentage of undergraduate students interested in pursuing a career in PHC observed in this study is close to that found in several countries, and in some, such as the United States (USA), Germany and France, the intention to work in PHC is even lower. A study carried out in 2019 in the USA showed that, in the country, only 14% of medical students entering the National Residency Program attend the residency in primary care¹⁷. In Germany, in 2015, 12% of the interviewed undergraduate students stated that they had chosen a career as General Practitioners (GP) in PHC¹⁸. In France, another study showed that about 20% of students chose a career in PHC after graduation¹⁹. In Pakistan, the result was similar to the present study: in a survey of 1,400 final-year medical students, in eight medical schools, it was verified that 24.1% of the respondents reported an interest in working in PHC²⁰.

Table 4. Factors associated with the intention to pursue a career in Primary Health Care after graduation for students attending the last two years of medical school; Minas Gerais, Brazil.

Variable	Interest in PHC career				p value ¹	p value ²	OR (95%CI)*
	Yes		No				
	n	%	n	%			
Gender					<0.001	<0.001	
Female	100	33.7	197	66.3			2.30 (1.45 – 3.65)
Male	36	16.3	185	83.7			1.00
Admission modality					0.101	0.027	
Prouni	13	37.1	22	62.9			2.40 (1.11 – 5.20)
Enem/ Entrance Exam	126	24.6	335	75.4			1.00
Has previous graduation					0.003	0.010	
Yes	23	43.4	30	56.6			2.51 (1.25 – 5.04)
No	113	24.3	352	75.7			1.00
Has greater aptitude for specialties:					<0.001	<0.001	
Clinical	109	36.1	193	63.9			2.95 (1.81 – 4.80)
Surgical / I do not know	27	12.5	189	87.5			1.00
PHC experience during graduation					0.003	0.017	
Excellent/Good	119	29.3	287	70.7			2.07 (1.14 – 3.77)
Regular/Poor/Very bad	17	15.2	95	84.8			1.00
Age (years)					0.019	0.404	
> 25	56	32.7	115	67.3			-
≤ 25	80	23.1	266	76.9			-
Marital status					0.092	0.919	
Married / Common-law marriage	15	37.5	25	62.5			-
Not married	121	25.3	357	74.7			-
Maternal schooling					0.056	0.941	
Up to Elementary School	13	40.6	19	59.4			-
High School or higher	123	25.3	363	74.7			-

(1) Crude analysis (chi-square test); (2) Adjusted analysis (chi-square test); (*) OR: Odds Ratio; 95% CI: Confidence Interval.

Although some countries, such as Canada, show an upward trend in the choice for FCMR, with an increase in demand that reached 38.5% of the students who selected Family Medicine as the first choice²¹, all of them show evidence of a lack of alignment between the needs of the health system and the students' intentions²². In the United Kingdom, for instance, the Department of Health estimated that, in 2013, it would be necessary for 50% of graduates to become GPs when, in 2009, only 28% of undergraduate students said they intended to work in PHC²³.

In Brazil, a 2016 study at Universidade de São Paulo showed that 47% of students in the sixth year of a medical course intended to work in the PHC of SUS¹². These results have already been shown to be well above those found in another 2011 study, in which only 20% of the undergraduate students had the possibility of working with PHC after graduating²⁴. A 2012 study of over 1,000 Brazilian medical students and physicians showed that 26% of the respondents chose specialties in the PHC group; however, only 1.2% chose family medicine as their first option for specialization²⁵.

Although the challenge of achieving an adequate PHC workforce has been reported in several countries, the magnitude and complexity of SUS, which is the largest universal health system in the world, means that there are no internationally comparable data or countries similar to Brazil. Nevertheless, these international studies show a similarity with the result of this investigation, with similar percentages of professionals choosing PHC as a career, which is lower than what is needed by the health systems of each country. Several initiatives have been developed to address this problem. At the end of 2014, the Family Medicine for America's Health (FMAHealth) Workforce Education and Development Tactic Team (WEDTT) was created in the United States, aiming at increasing the percentage of US medical students choosing family medicine from 12% to 25% by the year 2030, to meet the country's needs. The WEDTT has developed a package of ideas for change based on its theory of what will direct the achievement of "25 x 2030", which has led to specific projects completed by WEDTT and key collaborators. Among the WEDTT recommendations are policies to improve the social responsibility of medical schools in the USA, strategies focused on the wishes of the younger generations and early involvement of young individuals with their careers²⁶.

In Brazil, several initiatives have been implemented to encourage medical training with a PHC profile, the most recent being the PMM which, in addition to the emergency provision of doctors, sought to stimulate the training of PHC professionals¹³. From 2013 to 2016, with the start of the PMM, an increase of more than 1,700 FCMR program vacancies was observed; however, unfilled vacancies remained at around 70%²⁷. This

unfilled vacancy rate has remained constant since 2011²⁸. Even among the professionals who work at the PMM, many are not interested in pursuing a career in PHC, as evidenced by a study carried out in 2015 at the four largest public universities in Minas Gerais, with newly admitted residents in all areas of medical residency. The aforementioned study identified that, of the residents who had already worked in PHC (most of them in PHC incentive programs such as PROVAB and PMM), only 3.7% had pursuing a career in PHC as motivation when entering these programs. The same study showed that 36% of the interviewed residents considered choosing some specialty in primary care during undergraduate school, and 61% of them chose this area after graduating²⁹. The data show there is still a fragility in the mechanisms to encourage the choice and fixation of medical professionals in PHC. It may be necessary for these incentives to incorporate career planning strategies, adaptation of structures and distance support mechanisms for these professionals^{30,31}.

The association between the intention to pursue a career in PHC and the female gender is in line with other Brazilian and international studies^{18,29,32}. A study carried out in Minas Gerais showed that women are 2.9 times more likely to choose a career in PHC²⁹, a result very similar to that found by this investigation. Some studies also identified factors that interfere with the choice of specialty by women, among which the hours of work, quality of life and time to dedicate to the family are highlighted, in addition to focus on public health, doctor-patient relationship and personal satisfaction^{33,34}.

Admission to the university through Prouni, a federal government program that offers partial or full scholarships in private HEIs for low-income students, was also identified as an associated factor. No other studies that evaluated or identified the same association were found; however, some studies indicate that family income is associated with the choice of medical specialization³⁴. A study carried out in 2016 at the Universidade Estadual de Campinas (Unicamp), shortly after changing the entrance exam process, with the implementation of a bonus policy for students from public schools and self-declared black ethnicity, points to a change in the choice of career and medical specialty, with an increase in the intention to work only in SUS after graduation³⁵. The authors infer that this association may also be related to the perception of a debt that must be paid back to society, due to the fact that they attended graduation through a scholarship granted by the government. However, more specific studies are required for this association to be evaluated. Based on this association, it can also be inferred that policies for access to higher education, such as the Prouni, can also contribute to the training of professionals for the SUS demands.

Students with a previous degree showed greater interest in pursuing a career in PHC, but the reasons that lead graduates

to start a new undergraduate course in medicine are little investigated. Among the factors that may influence the search for this new training, and which come close to the choice of pursuing a career in PHC, are the search for greater personal and professional appreciation, not achieved in the first course, in addition to better remuneration and employability. The remuneration and the job market in PHC, with the availability of vacancies, can justify this association³⁶.

A self-reported aptitude for clinical specialties was another factor associated with the intention of having a career in PHC. An international study shows that students who report greater interest in clinical diagnostic reasoning tend to choose careers more often in PHC²⁰. Although other studies with similar analyses have not been identified, the association with the interest in clinical areas seems to be obvious, considering the main activities developed in PHC. A previous study has already pointed out that interest in PHC during University increases the chance of choosing this career at the end of the course by more than 4 times²⁹. Considering the possibility of a career in PHC since the moment of enrollment is also associated with this option after graduation¹⁸.

The association of a good experience in PHC during the curriculum with the preference for a career in PHC is in line with other studies, which demonstrated the importance of both a positive experience in PHC, as well as greater exposure to FCM during the curriculum, in addition to experiences with family doctors during undergraduate school, in encouraging the choice of careers in this area^{5,12,25,37}. In 2009, a literature review on medical students' interest in pursuing a career as family doctors, indicated the little experience in PHC during undergraduate school, or even the experience in Family Medicine with an unmotivated and frustrated professional, as one of the reasons for the lack of interest in pursuing this career. The most recent NCGs of the undergraduate medical course, published in 2014, stimulated curricular changes that included the initial and more prolonged inclusion of the students into PHC practice³⁸. Therefore, it corroborates the considerations made by Cavalcante Neto, Lira and Miranda (2009), that the successful experience in PHC, in fact, can be a motivating factor to lead young doctors to pursue a career in this area¹⁰.

Although the curricular changes, regarding the inclusion of students in PHC since the beginning of undergraduate school, reflect positively on the choice of doctors' career in PHC, the organization of medical courses in traditional active learning methodologies does not seem to have an impact on choosing to work in PHC. A study carried out in Rio de Janeiro, which investigated the impact of curricular changes using active methodologies, in addition to the initial inclusion of students in PHC, associating it to the 5th-year students'

intention of choosing FCM as a specialty, showed that the changes in the course were well evaluated by students, but did not have an impact on the choice of careers in PHC, which remains poorly appreciated³⁹.

Other factors not evaluated in this study have been described in the literature as positive influences on intention to pursue a career in PHC, such as: commitment and empathic attitudes^{25,40}, interactions with patients, with health professionals^{28,41} and with the community^{20,41,42}, financial issues^{41,42}, good balance between professional and personal life^{42,43}, appreciation of long-term doctor-patient relationships^{18,28,43}, providing care at different stages of life^{18,42}, experience of providing care in rural areas^{5,18} and the possibility of working with preventive medicine²⁰.

Authors have highlighted some factors as negative influences for choosing a career in PHC, such as the prejudice and stigma perceived in medical schools regarding work in PHC and the low remuneration^{10,31,42,44}, adverse working conditions, and low social and professional status^{10,28,31}.

The results of this study must be considered in the light of some limitations. It was carried out with a convenience sample, which restricts the generalization of data. It is possible that the selected institutions do not adequately represent medical graduates from all over the country (either because of socioeconomic characteristics or job perspectives and opportunities, aspects that may interfere in the choice of the field of work after graduation). However, the number of respondents is significant, and the results are quite relevant and should not be disregarded. The fact that there is no standardized and valid instrument (nationally or internationally) may also limit the process of comparing the results with other studies. Still, the studies on the subject address a particular construct, which portrays the respondent's interest, and indicates aspects that must be considered in the organization of public policies that contribute to the interest of medical professionals in working in priority areas for the health system.

Thus, it is understood that the results of this study should be considered by health and medical education managers, encouraging new proposals for professional training aimed at SUS, with greater incentive for teaching-service integration and with the inclusion of students into a strengthened PHC network throughout undergraduate school. Some strategies can be implemented aiming to increase the number of doctors who wish to work in PHC, including increasing the workload in PHC during undergraduate school, increasing the number of teachers who are FCM specialists and qualification of the health network in the municipalities where these HEIs are located. Furthermore, initiatives such as a career plan, investment in health network infrastructure and valuing the professionals

who work in the area can contribute to increase this interest among medical school graduates. Programs such as the PMM have an impact on the emergency provision of doctors and on the increase in the number of undergraduate medical students; however, what shows the greatest impact on the training of professionals with a profile directed at SUS and the interest of students in working in PHC are positive experiences in this area during undergraduate school.

CONCLUSION

The results of this research show that more than a quarter of medical students from the assessed universities intend to work in PHC after finishing the course, a higher percentage than that recorded in previous studies, but still below what is required by SUS. Among the factors associated with the intention to work in PHC, a successful experience in PHC during undergraduate school is noteworthy, as it is a modifiable factor. Thus, strategies such as increasing the PHC workload during undergraduate school, increasing the number of teachers who are FCM specialists and the qualification of the health network in the municipalities where these HEIs are located, can be effective to increase the interest of medical graduates to work in PHC.

Entering the university through Prouni is also a factor associated with the intention to work in PHC that deserves to be highlighted, leading to the consideration that higher education access policies can contribute to the training of professionals to meet SUS needs. Considering that no studies were identified that evaluated the same association, it is suggested that further studies be carried out aiming to understand the factors that interfere with this result.

Although the study did not investigate the relationship between students' choices and the social, political and economic context of the country, it is possible that the results reflect, at least in part, the students' insecurity regarding their careers in PHC. Some international studies have investigated students' motivations for career choices, but there are few Brazilian studies on this subject in the literature. Understanding that this choice is related, among other issues, to the country's political and economic scenario, it is also suggested that studies be carried out looking for associations with career choices, aiming to contribute with the proposal of new strategies for the resolution of this problem.

AUTHOR'S CONTRIBUTION

Franchesca Fripp dos Santos, Camila Zamban de Miranda and Karina Cenci Pertile participated in the study design; data collection and analysis; drafting of the initial and final versions of the article; critical review of the text. Simone de Melo Costa

and Antônio Prates Caldeira guided all stages of the study and the development of this manuscript; participated in data collection and analysis; drafting of the initial and final versions of the article; critical review of the text. Mariane Silveira Barbosa participated in data collection and analysis; critical review of the text.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

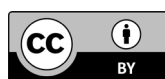
FUNDING

The authors declare no sources of funding.

REFERENCES

1. Brasil. Política Nacional de Atenção Básica. Brasília: Ministério da Saúde; 2012.
2. Póvoa L, Andrade MV. Distribuição geográfica dos médicos no Brasil: uma análise a partir de um modelo de escolha locacional. *Cad Saude Publica*. 2006;22(8):1555-64 [access in 12 jun 2016]. Available from: https://www.scielo.org/scielo.php?pid=S0102-311X2006000800004&script=sci_arttext&lng=pt.
3. Campos FE, Machado MH, Girardo SN. A fixação de profissionais de saúde em regiões de necessidades. *Divulg Saúde Debate*. 2009;44:13-24 [access in 12 jun 2016]. Available from: http://www.cnts.org.br/public/arquivos/Artigo_Campos.pdf.
4. Girardi SN, Carvalho CL, Araújo JF, Farah JM, Wan der Maas L, Campos LAD. Índice de escassez de médicos no Brasil: estudo exploratório no âmbito da atenção primária. In: Pierantoni CR, Dal Poz MR, França TO, organizadores. *O trabalho em saúde: abordagens quantitativas e qualitativas*. Rio de Janeiro: Cepesc, IMS, Uerj-ObservaRH; 2011. p. 171-86.
5. Alavi M, Ho T, Stisher C, Richardson E, Kelly C, McCrory K, et al. Factors that influence student choice in family medicine. *Fam Med*. 2019;51(2):143-8.
6. Petterson SM, Liaw WR, Tran C, Bazemore AW. Estimating the residency expansion required to avoid projected primary care physician shortages by 2035. *Ann Fam Med*. 2015;13(2):107-14.
7. Kawamoto R, Ninomiya D, Kasai Y, Kusunoki T, Ohtsuka N, Kumagi T, et al. Gender difference in preference of specialty as a career choice among Japanese medical students. *BMC Med Educ*. 2016;16(1):288-96.
8. Kirch DG, Henderson MK, Dill MJ. Physician workforce projections in an era of health care reform. *Annu Rev Med*. 2012;63(1):435-45.
9. CAPER – Canadian Post-M.D. Education Registry. Field of Post-M.D. Training by Faculty of Medicine Providing Post-M.D. Training 2013-2014. 2015;3 [access in 13 jun 2016]. Available from: www.caper.ca.
10. Cavalcante Neto PG, Lira GV, Miranda AS. Interesse dos estudantes pela medicina de família: estado da questão e agenda de pesquisa. *Rev Bras Educ Med*. 2009;33(2):198-204.
11. Anjos RMP, Gianini RJ, Minari FC, de Luca AHS, Rodrigues MP. "Vivendo o SUS": uma experiência prática no cenário da atenção básica. *Rev Bras Educ Med*. 2010;34(1):172-83.
12. Campedelli-lobes AM, Bicudo AM, Antonio MARG. A evolução do interesse do estudante de Medicina a respeito da atenção primária no decorrer da graduação. *Rev Bras Educ Med*. 2016;40(4):621-6.
13. Brasil. Lei nº 12.871, de 22 de outubro de 2013. Institui o Programa Mais Médicos, altera as Leis no 8.745, de 9 de dezembro de 1993, e nº 6.932, de 7 de julho de 1981, e dá outras providências. *Diário Oficial da União*; 23 out 2013.
14. Girardi SN, Stralen ACDSV, Cella JN, Wan Der Maas L, Carvalho CL, Faria EDO. Impacto do Programa Mais Médicos na redução da escassez de médicos em atenção primária à saúde. *Cien Saude Colet*. 2016;21(9):2675-84.

15. Pffrwallner E, Sommer J, Chung C, Maisonneuve H, Nendaz M, Perron NJ, et al. Impact of interventions to increase the proportion of medical students choosing a primary care career: a systematic review. *J Gen Intern Med*. 2015;30(9):1349-58.
16. Mello GA, Mattos ATRD, Souto BGA, Fontanella BJB, Demarzo MMP. Médico de família: ser ou não ser? Dilemas envolvidos na escolha desta carreira. *Rev Bras Educ Med*. 2009;33(3):475-82.
17. Kost A, Bentley A, Phillips J, Kelly C, Prunuske J, Morley C. Graduating medical student perspectives on factors influencing specialty choice. *Fam Med*. 2019;51(2):129-36.
18. Deutsch T, Lippmann S, Frese T, Sandholzer H. Who wants to become a general practitioner? Student and curriculum factors associated with choosing a GP career – a multivariable analysis with particular consideration of practice-orientated GP courses. *Scand J Prim Health Care*. 2015;33(1):47-53.
19. Lefevre JH, Roupret M, Kerneis S, Karila L. Career choices of medical students: a national survey of 1780 students. *Med Educ*. 2010;44(6):603-12.
20. Bilal M, Haseeb A, Mari A, Arshad MH, Khan MRA, Ahmed A, et al. Factors determining Pakistani medical students' career preference for general practice residency training. *Cureus*. 2018;10(8):e3114.
21. Eggertson L. More medical graduates than ever choosing family practice. *Can Med Assoc J*. 2015;187(9):644.
22. Mirvis DM. Choosing a medical specialty: the difference between what students want and what society needs. *Isr J Health Policy Res*. 2013;2(1):18-25.
23. Svirko E, Goldacre MJ, Lambert T. Career choices of the United Kingdom medical graduates of 2005, 2008 and 2009: questionnaire surveys. *Med Teach*. 2013;35(5):365-75.
24. Oliveira NA, Alves LA. Ensino médico, SUS e início da profissão: como se sente quem está se formando? *Rev Bras Educ Med*. 2011;35(1):26-36.
25. Souza LCL, Mendonça VR, Garcia GB, Brandão EC, Barral-Netto M. Medical specialty choice and related factors of Brazilian medical students and recent doctors. *PLoS One*. 2015;10(7):10-8.
26. Kelly C, Coutinho A, Goldgar C, Gonsalves W, Gutkin C, Kellerman R, et al. Collaborating to achieve the optimal family medicine workforce. *Fam Med*. 2019;51(2):149-58.
27. Trindade TG, Batista SR. Medicina de Família e Comunidade: agora mais do que nunca! *Cien Saude Colet*. 2016;21(9):2667-9.
28. Rolim TV, Queiroz OS, Monteiro ABC, Asfor ATP, Sousa TS. Especialização em Medicina de Família e Comunidade: visão dos acadêmicos de Sobral. *Anais do 12º Congresso Brasileiro Medicina Família Comunidade*; 2013; Belém, Brasil. Belém: Sociedade Brasileira de Medicina de Família e Comunidade; 2013.
29. Oliveira PRBP. A escolha da especialidade por ingressantes na residência médica do estado de Minas Gerais [dissertação]. Campinas: Universidade Estadual de Campinas; 2015.
30. Ney MS, Rodrigues PHA. Fatores críticos para a fixação do médico na Estratégia Saúde da Família. *Physis*. 2012;22(4):1293-1311 [access in 14 jun 2017]. Available from: https://www.scielo.org/scielo.php?pid=S0103-73312012000400003&script=sci_arttext&tlng=en.
31. Tinoco AS, Oliveira IC, Cutolo LRA, Maeyama MA. Percepção dos estudantes de medicina acerca da Residência em Medicina de Família e Comunidade. *Revista Brasileira de Tecnologias Sociais*. 2017;4(1):75-87.
32. Kiobassa K, Miksch A, Hermann K, Loh A, Szecsenyi J, Joos S, et al. Becoming a general practitioner: which factors have most impact on career choice of medical students? *BMC Fam Pract*. 2011;12(1):327-45.
33. Corsi PR, Fernandes EL, Intelizano PM, Montagnini CCB, Baracat FI, Ribeiro MCSA. Fatores que influenciam o aluno na escolha da especialidade médica. *Rev Bras Educ Med*. 2014;38(2):213-20 [access in 7 sep 2018]. Available from: https://www.researchgate.net/profile/Paulo_Corsi/publication/316004128_Fatores_que_influenciam_o_aluno_na_escolha_da_especialidade_medica/links/5946e9c20f7e9b6910f72b4d/Fatores-que-influenciam-o-aluno-na-escolha-da-especialidade-medica.pdf.
34. Sousa IQ, Silva CP, Caldas CAM. Especialidade médica: escolhas e influências. *Rev Bras Educ Med*. 2014;38(1):79-86.
35. Silva MLADM, Amaral E, Machado HDC, Passeri SMRR, Bragança JF. Influência de políticas de ação afirmativa no perfil sociodemográfico de estudantes de Medicina de universidade brasileira. *Rev Bras Educ Med*. 2018;42(3):36-48.
36. Corrêa RD, Gonçalves RCB, Oliveira LSD, Silva VCM, Ribeiro MMF. Medicina como nova graduação: motivações, dificuldades e expectativas. *Rev Bras Educ Med*. 2016;40(2):226-33.
37. Issa AHTM, Garcia-Zapata MTA, Rocha CA, Sandré BB, Dutra ACF, Martins ILO, et al. Fatores influenciadores na escolha pela medicina de família segundo estudantes numa região neotropical do Brasil. *Rev Educ Saúde*. 2017;5(2):56-65.
38. Brasil. Parecer CES/CNE nº 116/2014. *Diário Oficial da União*; 6 jun 2014. Seção 1, p. 17.
39. Costa JRB, Romano VF, Costa RR, Gomes AP, Alves LA, Batista RS. A transformação curricular e a escolha da especialidade médica. *Rev Bras Educ Med*. 2014;38(1):47-58.
40. Ster M, Selic P. Intended career choice in family medicine in Slovenia: an issue of gender, family background or empathic attitudes in final year medical students? *Mater Sociomed*. 2017;29(2):143-8.
41. Weiland G, Cox K, Sweeney MK, Belue M, Snyder ED, Curry WD, et al. What attracts medical students to primary care? A nominal group evaluation. *South Med J*. 2019;112(2):76-82.
42. Merrett A, Jones D, Sein K, Green T, Macleod U. Attitudes of newly qualified doctors towards a career in general practice: a qualitative focus group study. *Br J Gen Pract*. 2017;67(657):253-9.
43. Osborn HA, Glicksman JT, Brandt MG, Doyle PC, Fung, K. Primary care specialty career choice among Canadian medical students: understanding the factors that influence their decisions. *Can Fam Physician*. 2017;63:107-13.
44. Magalhães TN, Belmonte TSA, Luna CAA. Medicina de família na educação médica: um núcleo de ensino na atenção terciária para a aprendizagem em atenção primária. *Cad Bras Med*. 2014;27(3):1-58.



This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.