Original Article

A National Survey on the characteristics of Iranian General Practitioners and Their Preferred Specialty: A Need to Transition toward Preventive Medicine

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Abstract

Background: The shortage and unbalanced distribution of physicians has adverse effects on the provision of equitable services at all levels of health care and especially at the prevention and primary care levels. The choice of specialty can seriously change the structure and composition of the physician workforce. Therefore, this study aimed to investigate the relationship between background characteristics of Iranian general practitioners' (GPs) and their preferred specialty fields. **Methods:** In this mixed-method study, first, 12 medical doctors participated in a nominal group technique to determine the most important background characteristics that affect GPs' preferences for specialty selection. In the second phase, we conducted a survey among 680 GPs in six provinces from different geographic regions. We gathered data using a researcher-made checklist and analyzed them using an adjusted multivariate regression. **Results:** The adjusted analysis showed that being female, being married, being in an older age group, having children, graduation from universities located in the provincial centers, and decision for living and practicing in the less-populated areas were significantly associated with the Iranian GPs' preferences for non-surgical specialties. **Conclusions:** This study provided evidence that could inform national health workforce policy-makers to avoid unbalanced distribution of physicians and accordingly to ensure the provision of equitable services at all levels of healthcare and especially at the primary care level. Other effective factors on the selection of specialty should be evaluated at the national level using specific surveys and econometrics studies such as discrete selection experiment to move toward preventive medicine.

Keywords: *Career, choice, factors, medical, preventive medicine, socioeconomic, specialty*

Introduction

Provision of health services at the right time, in the right place, and with the desired quality is one of the most important objectives of health systems.[1] All activities performed to achieve this goal pave the way for equitable access to health services at all levels of care.[2] The success of health systems in this area depends largely on the health workforce.[3] An adequate number of the health workforce that is well trained and equitably distributed is of utmost importance to ensure the success of health systems in achieving their fundamental goals such as universal health coverage.[4]

The shortage and imbalance of the health workforce and especially physicians has severely affected the performance of health systems in some countries.[5] This situation is worse in developing countries due to the persistent underlying problems.[6] One factor that can seriously change the structure and composition of the physician workforce is the choice of specialty.[7] The selection of specialty can lead to an unbalanced distribution of physicians in various specialty fields and across different geographical regions[8, 9] and thus may restrict access to the necessary services at different levels of health care.[10,11]

The tendency toward particular types of medical specialty could result in impaired access to services in other fields. For example, preference for hospital-related specialties such as surgical careers may cause a shortage of physician workforce in other areas, particularly in primary health care specialties.[5] On the other hand, some studies indicated that prolonged exposure of medical students to primary health care fields resulted in a decreased preference for the selection of surgical specialties.

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Accordingly, this has restricted provision of services at the second and third levels of health care.[12-15]

Identifying factors related to the choice of specialty is necessary to provide the essential evidence for physician workforce policy and planning.[16] This information could inform policies for the provision of equitable service at all levels of health care.[17,18] Studies have reported various factors as influential determinants of specialty selection. Career-related factors,[19-21] demographic and background characteristics,[22-24] personal aspects,[20,23,24] and educational factors[23,24] are among the leading effective factors reported.

Iran, as a middle-income developing country, faces chronic challenges regarding the shortage and unbalanced distribution of the physician workforce.[25] Statistics show that in July 2020, there were 88040 general practitioners and 51399 specialist physicians with professional qualification license in Iran.[26] At the same time, national reports indicated that the physician-to-population ratio in Iran was 1.6 per 1000, while this ratio should be at least 2.5.[27] It is also reported that the composition of physicians in terms of different specialty fields has an unbalanced distribution in the country.[28-30]

Due to the significant impact of specialty choice on the potential of a health system in providing adequate and appropriate health services, factors that influence the choice of specialty as a career should be investigated based on the specific context of each country.[10] Up to the best of our knowledge, no comprehensive study in Iran has examined the effect of contextual variables on the choice of specialty. Therefore, in this national survey, we aimed to investigate the association between background characteristics of Iranian general practitioners (GPs) and their preferred specialty fields that are categorized as surgical and non-surgical ones.

Materials and Methods

Study setting

This mixed-method study was designed in two sequential phases. In the first phase (qualitative phase), we used a Nominal Group Technique (NGT) to determine the most important background characteristics that affect the choice of specialty. We used the results of the NGT to develop a checklist for the quantitative study. In the second stage, we conducted a questionnaire-based survey among Iranian GPs from March to June 2020. We carried out the survey in the six provinces from different regions of the country, including Tehran in the north, Khorasan Razavi in the northeast, Fars in the south, Kerman in the southeast, Khuzestan in the southwest, and Kermanshah in the west of the country. We selected these provinces with diverse socio-economic contexts to ensure maximum possible variability. The target population in these six provinces was equivalent to 56.1% (number of GPs = 48964) of the national GPs' population at the time of this study (June 2020).

Qualitative phase

In this step, 12 participants from three groups participated in the NGT session. These groups include medical students, recently graduated GPs, and medical residents from Shiraz University of Medical Sciences. We used purposeful convenient sampling to recruit samples from different groups in order to obtain heterogeneous opinions. Because the number of participants in a NGT affects the quality of results, we targeted a sample size of 12 based on the guidelines provided for NGT.[31] In addition, we selected more residents because of their recent experience in the selection of specialty. Willingness to participate in the NGT was considered as an inclusion criterion. We made phone calls to the individuals based on the information provided by the university and asked them to participate in the study. All those who agreed to participate in the study were included in the NGT. The first group consisted of three medical students in the sixth and seventh years of the training course. We selected medical interns because clinical experiences could influence the choice of specialty.[7] The second group was included four recently graduated GPs who were preparing for the national medical residency exam. We selected those GPs who had almost made decisions about their favorite specialty fields. The last group was comprised of five first-year medical residents who were selected because of their recent experiences in the selection of specialty. Two residents were from surgical fields and three others from non-surgical majors. All participants completed an informed consent form before the study. We held the NGT session at the most convenient time and place for the participants. The NGT session lasted about an hour and a half. We used a five-step process proposed by Potter *et al*. for NGT, including 1. Introduction, 2. Silent idea generation, 3. Record of ideas, 4. Discussion of ideas, and 5. Rating the ideas.[31]

In the first step, we explained the objectives of the study and provided detailed information on the process of the NGT to the participants. In the second stage, the research question was presented to the group members. In this regard, we asked the participants: "What are the most important background characteristics influencing the choice of specialty? Please write them down without discussing or consulting with other members". In the third part, one of the authors (as a facilitator) recorded all ideas in a flip board word by word and without any discussion. The recording process continued until all ideas have been recorded. In the fourth step, we asked the group members to discuss those characteristics that were not clear to them. The participants were also requested to suggest new characteristics and combine them into main categories if it was necessary. No characteristic was eliminated in this step. In the last part, we asked participants to prioritize recorded characteristics using a simple scoring technique. Accordingly, after adequate discussions, all participants rated the characteristics between 1 (least important)

and 5 (highest important). Finally, the group selected 12 characteristics with an average score above half of the total score (i.e., 30). We used the items selected in this step to develop a checklist for the quantitative study.

Quantitative phase

The quantitative phase of the study was conducted among Iranian GPs from six provinces. In this regard, we carried out a multistage random cluster sampling. Firstly, we obtained a complete list of GPs in the six provinces from the Medical Council of the Islamic Republic of Iran (IRIMC). In the second stage, geographic regions within each province were clustered based on their population. Thirdly, we divided each cluster into two groups based on gender status. Finally, we performed a proportional random sampling in each gender group. Willingness to attend to a specialty course and preparing to take the medical residency exam were considered as inclusion criteria. The desire to withdraw from the study at any stage of the data collection process was considered as exclusion criteria.

We estimated the sample size according to the calculation of the rule of the thumb. Based on the Sudman Rule, a maximum of 100 sample units would be sufficient per 10,000 target population.[32] Because the number of GPs in the six provinces was 48964, the recruitment of 480 participants was suffice for this study. However, we targeted a sample size of 680 to improve the power of estimations.

We gathered data using a researcher-made checklist. The checklist consisted of some descriptions about the aim of the study, 12 questions about background characteristics, and one question on GPs' preferred specialty field. For data gathering, we made phone calls to the GPs based on the information provided by IRIMC and determined those who were eligible and accepted to participate in the study. Participants then completed the checklists provided to them by one of the research colleagues. Before gathering the data, all participants completed an informed consent form.

We analyzed data using Statistical Package for the Social Sciences Version 21.0 (SPSS Inc., Chicago, IL, USA). To investigate the univariate association between GPs' background characteristics and their preferred specialty fields, we used odds ratio (OR) and corresponding %95 confidence interval (%95 CI). We also estimated the adjusted ORs using backward multiple logistic regression to control the effect of possible confounders. Variables with a *P* value of equal to or greater than 0.2 in the univariate analysis were not included in the multivariate model. The significance level considered for all test was less than 0.05.

This study was approved by the ethics committee of Shiraz University of Medical Sciences under the code IR.SUMS.REC.1398.940.

Results

Twelve participants attended to the NGT session with a mean age of 26.7 + 4.367 and fifty percent of them were women. Table 1 shows the characteristics of the participants in the NGT.

During the NGT session, participants provided a comprehensive list of background characteristics regarding the choice of specialty. Thereupon, those characteristics that scored above half of the total score (i.e., 30) were selected by the group. We used the selected characteristics to develop a checklist for the quantitative phase of the study. Table 2 indicates the selected characteristics and their scores.

A total of 682 GPs participated in the quantitative study, ranging in age from 26 to 45 years. Slightly more than 53% of respondents were male (N: 362), and 71.4% of them (N: 487) were living in provincial centers. Table 3 indicates the univariate and adjusted association between GPs' background characteristics and their preferred specialty fields. The univariate results showed a significant association between preferences for non-surgical specialties and being female (OR: 1.84, 95% CI: 1.35 to 2.51), being married (OR: 4.85, 95% CI: 3.38 to 6.96), having children (OR: 2.36, 95% CI: 1.59 to 3.49), being in the older age group (OR: 5.11, 95% CI: 3.37 to 7.73), living in areas with a population of more than 100,000 (OR: 2.17, 95% CI: 1.44 to 3.26), living in areas with a population of less than 100,000 (OR: 1.28, 95% CI: 1.13 to 2.95), working in areas with a population more than 100,000 (OR: 1.79, 95% CI: 1.06 to 3.04), graduating from universities located in provincial centers (OR: 2.22, 95% CI: 1.45 to 3.41), preference for living in areas with a population more than 100,000 (OR: 10.42, 95% CI: 3.67 to 29.57), and preference for living in areas with a population less than 100,000 (OR: 5.40, 95% CI: 1.85 to 15.82). However, after adjustment, a significant association was not observed for living location and working location.

Finally, the results of Multiple backward logistic regression indicated that female GPs ($P < 0.0001$), married

Table 1: Characteristics of the participants in the nominal group technique

Participants	Age*	Gender†		Living Location†	
		Male	Female	Rural Areas or Small Cities	Big Cities
Medical students	24 (23-25)	1 (33)	2 (67)	2 (67)	1 (33)
Junior Doctors	27 (26-29)	2 (50)	2 (50)	1 (25)	3 (75)
Medical residents	29 (28-30)	3 (60)	2 (40)	2 (40)	3 (60)

*Mean (Range). †Frequency (Percent)

Table 2: Selected background characteristics and their scores

Background Characteristics	Dimensions	Total Score (Range)
Gender	Male, Female	55 (3-5)
Marital status	Married, Single	54 (3-5)
Having children	Yes, No	52 (3-5)
Age	26-35, 36-45	49 (2-5)
Living location	Pop <100000†, Pop>100000, Provincial centers	48 (2-5)
Spouse job	Physician, Other jobs	45 (2-5)
Parents job	Physician, Other jobs	44 (2-5)
Job location	Pop <100000†, Pop >100000, Provincial centers	43 (2-5)
Family physician	Yes, No	41 (2-5)
Graduation place	Provincial centers, Other cities	39 (2-5)
Practice setting	Salaried, self-employed, No job	38 (2-5)
Preferred living and job location	Pop <100000†, Pop >100000, Provincial centers, Other countries	34 (1-5)

†Living in an area with a population of less than 10,0000

GPs (P < 0.0001), those who had children (P < 0.0001), GPs in the older age group (P: 0.001), GPs graduated from universities located in provincial centers (P: 0.037), those who preferred to live in areas with a population more than 100,000 (P: 0.008), and GPs preferred to live in areas with a population less than 100,000 (P: 0.001) were more likely to prefer non-surgical specialties [Table 4].

Discussions

The choice of specialty has a significant impact on the provision of services at different levels of healthcare, especially at the primary care level. Physician workforce policy should be informed by evidence on the factors influencing the choice of specialty to ensure equitable distribution of services at the prevention, treatment, and rehabilitation levels. In this mixed-method study, we investigated the association between GPs' preferred specialty fields and their background characteristics as important determinants of specialty choice.

The findings of this study indicated that gender was significantly associated with the preferred specialty type, so that female GPs were more likely to prefer non-surgical specialties. This finding is in line with many other studies that showed there is a gender difference in the specialty preferences.[33-35] The results of several studies indicated that female physicians were more inclined to non-surgical careers and particularly primary health care specialties because of different reasons such as lifestyle,[5,13,36] working conditions,[37-39] gender-based discriminations, lack of role models,[40] as well as empathy and people-orientation attitudes.[35] Generally, gender has been described as a potential deterrent for surgical specialties.[41-43] On the contrary, the study of Scanlan *et al*. among foundation doctors in the UK suggested that the traditional gender gap in specialty selection may be narrowing.[44] Furthermore, Baschera women *et al*. discussed that gender might not be a significant determinant of preference for non-surgical specialties.[45] It seems that differences and changes in cultural values could explain these discrepancies in various societies.[46] It is also suggested that changes in the female-to-male physicians' ratio in some countries may justify the higher rate of females in surgical specialties.[45] It could be hypothesized that surgical fields in countries such as Iran are male-dominated, which may convince women to select non-surgical specialties.

The current study revealed that being married and having children were associated with non-surgical specialty preferences. These results confirm findings of other studies reported that marital status[47-49] and child-rearing status[38,50,51] are background factors that can significantly explain physicians' preferences for specialty selection. Some review studies reported that married physicians[52-54] and those who have children[55,56] were more likely to choose specialties that ensure work-life balance. A review study conducted by Puertas *et al*. indicated that being married and work-family balance are two correlated factors that directly affect the selection of primary care specialties.[5] Most studies have analyzed the impact of work-life balance on the choice of specialty concerning gender.[38,57,58] However, findings of the current study using multivariate analysis showed that marital status and having children were independently associated with the preferred specialty. These findings are consistent with the results of some studies that reported the importance of work-life balance is increasing for men as well.[59-61] It is suggested that these discrepancies may be due to generational changes and cultural differences.[37,62-64]

We found that GPs in the older age group were more likely to prefer non-surgical specialties. Studies have shown conflicting results regarding the effect of age on the choice of specialty. However, the majority of studies have pointed to age as an effective determinant. Although some studies have not reported a relationship between age and the choice of specialty,[65,66] many other studies indicated that age is associated with the specialty preferences.[36,67-69] It seems that these discrepancies may be related to the different samples and specialty fields investigated

Table 3: Univariate and adjusted associations between GPs' background characteristics and preferred specialty field

Characteristics	Preferred specialty field		*P*†	OR (95% CI)‡	OR (95% CI)§
	Surgical	Non-surgical			
Gender					
Male	237 (59.4)*	125 (44.2)	<0.0001	1	1
Female	162 (40.6)	158 (55.8)		1.84 (1.35-2.51)	4.77 (2.63-8.65)
Marital status					
Married	193 (48.4)	232 (82.0)	<0.0001	4.85 (3.38-6.96)	5.79 (3.96-9.21)
Single	206 (51.6)	51 (18.0)		1	1
Having children					
Yes	87 (45.1)	153 (65.9)	<0.0001	2.36 (1.59-3.49)	4.44 (2.06-9.56)
No	106 (54.9)	79 (34.1)		1	1
Age					
26-35	361 (90.5)	184 (65.0)	<0.0001	1	1
36-45	38 (9.5)	99 (35.5)		5.11 (3.37-7.73)	2.90 (1.55-5.42)
Living location					
Pop <100,000	38 (9.5)	40 (14.1)	<0.0001	1.82 (1.13-2.95)	0.51 (0.09-2.89)
Pop >100,000	52 (13.0)	65 (23.0)		2.17 (1.44-3.26)	0.87 (0.25-2.93)
Provincial centers	309 (77.4)	178 (62.9)		1	1
Spouse job‖					
Physician	94 (48.7)	120 (51.7)	0.5300	1.28 (0.77-1.65)	
Other jobs	99 (51.3)	112 (48.3)		1	
Parents job					
Physician	36 (9.0)	16 (5.7)	0.1000	0.60 (0.32-1.12)	0.73 (0.24-2.18)
Other jobs	363 (91.0)	267 (94.3)		1	1
Job location					
Pop <100,000	82 (25.8)	66 (28.6)	<0.0001	1	1
Pop >100,000	38 (11.9)	55 (23.8)		1.79 (1.06-3.04)	0.58 (0.18-1.80)
Provincial centers	198 (62.3)	110 (47.6)		0.69 (0.46-1.02)	0.45 (0.19-1.07)
Family physician‖					
Yes	98 (30.8)	62 (26.8)	0.3100	0.82 (0.56-1.19)	
No	220 (69.2)	169 (73.2)		1	
Graduation place					
Provincial centers	306 (76.7)	249 (88.0)	<0.0001	2.22 (1.45-3.41)	0.38 (0.17-0.89)
Other cities	93 (23.3)	34 (12.0)		1	1
Practice setting					
Salaried	179 (44.9)	144 (50.9)	0.2900	1	
Self-employed	139 (34.8)	87 (30.7)		1.25 (0.83-1.89)	
No job	81 (20.3)	52 (18.4)		0.97 (0.62-1.51)	
Preferred living and job location					
Pop <100,000	19 (4.8)	28 (9.9)	<0.0001	5.40 (1.85-15.82)	21.73 (2.33-102.85)
Pop >100,000	19 (4.8)	54 (19.1)		10.42 (3.67-29.57)	6.77 (1.29-35.45)
Provincial centers	339 (85.0)	195 (68.9)		2.10 (0.84-5.29)	1.73 (0.41-7.29)
Other countries (Migration)	22 (5.5)	6 (2.1)		1	1

*Number (Percent), †Using Chi-square test, ‡Univariate odds ratio and corresponding 95% confidence interval, §Adjusted odds ratio and corresponding 95% confidence interval using multiple logistic regression, ‖The variable is not included in the adjusted model due to the amount of *P* value in the univariate analysis

in various studies. It is also suggested that generational changes in the attitudes and values of individuals may explain the differences.[36] Consistent with the result of our research, Bland *et al*.[70] and Puertas *et al*.[5] found in their review studies that age (and specifically being older) is an effective factor in the selection of primary care specialties. It could be concluded that because older physicians may place more importance to the personal life, flexibility of work schedules, and work-life balance, they would prefer to choose non-surgical specialties.[36,71]

The present study indicated that preference for particular specialty had a significant association with the physicians' graduation place. Therefore, those who graduated from universities located in the provincial centers were more likely to prefer non-surgical specialties. This finding is in line with other studies reported that place of graduation

Table 4: Adjusted associations between GPs' background characteristics and preferred specialty field using backward logistic regression

Background Characteristics	OR (95% CI)*	*P*
Gender		
Male	1	
Female	4.81 (2.68-8.64)	<0.0001
Marital status		
Married	4.97 (2.73-9.12)	<0.0001
Single	1	
Having children		
Yes	3.49 (1.74-7.00)	<0.0001
No	1	
Age		
26-35	1	
36-45	2.76 (1.49-5.11)	0.0010
Graduation place		
Provincial centers	0.43 (0.19-0.95)	0.0370
Other cities	1	
Preferred living & job location		
Pop <100000	20.06 (3.42-117.72)	0.0010
Pop >100000	7.88 (1.69-36.61)	0.0080
Provincial centers	1.78 (0.44-7.09)	0.4130
Other countries (Migration)	1	

*Adjusted odds ratio and corresponding 95% confidence interval using backward logistic regression

is associated with the selection of specialty. Kim *et al*. reported in their cross-sectional study in Korea that medical students from metropolitan medical schools were less likely to follow a non-surgical specialty.[72] A qualitative study by Farahmand *et al*. in Iran showed that the place of graduation is a determinant of selecting emergency medicine.[73] It seems that university norms,[74] the content of the curriculum and its focus on specific fields,[5] the influence of educational environments,[75] and educational experiences[7] are some components that could explain the effect of different universities on the development of preferences toward particular specialty fields.

Finally, this study showed that non-surgical specialties were more likely to be chosen by GPs who wanted to live and work in sparsely populated cities compared to those physicians who interested to immigrate to other countries or planned to live and practice in provincial centers. Plenty of studies reported that future living and practice location is an effective factor in the choice of specialty.[20,76-78] Two review studies reported that interest in living in less-populated areas is an effective factor in the preferences of primary care specialties such as family physician.[5,74] Furthermore, Ricketts *et al*. reported that primary care physicians were less likely to immigrate to other countries.[79] It could be assumed that the possibility of more specialized practice, potential for connection with the academic medical centers,[80] and better job opportunities are some causes that explain the relationship between GPs' preference for surgical specialties and their decision to live and practice in provincial centers and other countries.

Strengths and limitations of the study

In this study, we used a mixed-method design that could provide a more depth insight into the topic. Another strength of the current study is that we conducted the survey in different geographical parts of the country to ensure the generalizability of the results. The main limitation of this study is that we focused only on the background characteristics, and therefore, career-related factors and other personal aspects such as personality traits, economic interests, cultural values, as well as personal attitudes were not considered. It is noteworthy that because of the importance of background characteristics and due to the lack of a comprehensive study in the country, we aimed to investigate the association between these factors and the preference for particular specialty fields. It is evident that the impact of other determinants should be investigated through studies specific to each factor. In this regard, preference elicitation studies such as discrete choice experiment could be used to analyze the importance of career-related features. Moreover, specific qualitative and cross-sectional studies are required to explore the effect of other personal determinants.

Conclusions

This mixed-method study indicated that being female, being married, being in an older age group, having children, graduation from universities located in the provincial centers, and decision for living and practicing in the less-populated areas were significantly associated with the Iranian GPs' preferences for non-surgical specialties. This evidence could inform national health workforce policy makers to avoid imbalanced distribution of physicians across different specialty fields and accordingly to ensure the provision of equitable services at all levels of health care and especially at the prevention and primary care levels. Other factors that affect physicians' preferences in choosing a specialty should be evaluated at the national level using qualitative approaches, factor-specific cross-sectional surveys, and econometrics studies such as discrete selection experiment.

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Conflict of interest

There are no conflicts of interest.

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