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Intentions to move abroad among medical students: a cross-sectional study to investigate determinants and opinions

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Abstract

Aim. *The lack of health professionals and the physicians' migration trend represents a challenging issue for the health systems' sustainability worldwide. The current study aims to evaluate the intentions of Italian medical students to pursue their own careers abroad by investigating the push and pull factors of migration.*

Subject and Methods. *A cross-sectional study was performed among Italian medical students through a self-administered questionnaire. Primary and secondary outcomes were established as the intention of moving abroad after graduation and knowledge about residency programmes, application, quality training and remuneration in the country of interest. Descriptive analysis for all variables and univariable and multivariable regression for primary and secondary outcomes were performed.*

Results. *Overall, 307 medical students took part in the study. More than half of the sample considered moving abroad after graduation, mainly to find a higher quality training programme. Regression analysis highlighted a significant association between the primary outcome and general personal and professional reasons, as well as previous experiences abroad, whereas bureaucratic procedures were perceived as the main barrier. Perceived better knowledge about residency programmes and quality of training related to sources of information such as the Internet (blogs, forums, websites) and medical associations.*

Conclusion. *Retention policies are necessary to meet the expectations and requests of future generations of doctors by allocating financial resources to offer high-quality training and broad career opportunities, together with appropriate wages, as crucial factors for discouraging the migration of healthcare professionals.*

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Introduction

Worldwide skilled healthcare workers (HCWs) as doctors and nurses have increased, reducing the global health workforce shortage (1). Nevertheless, the lack of health professionals remains a crucial issue in both high-income countries (HICs) and low-income and middle-income countries (LMICs), although graduates mostly come from HICs (2). Worldwide, about 15% of healthcare professionals have moved to a foreign country either to apply for a job or to pursue their education. Moreover, many countries experience a spotty distribution of health workforce (3,4). Recently, a report from the World Health Organization (WHO) promoted "The decent Employment Agenda" to improve the performance and motivation of health workers through attraction and retention policies addressing job security, a manageable workload, supportive supervision, and professional development opportunities (5).

For decades, physician migration flows have been an emerging issue across countries belonging to the Organization for Economic Cooperation and Development (OECD). Worldwide, catalyzing reasons are diverse, as training purposes, acquirement of additional professional qualifications, professional development opportunities, and financial incentives (1,3,6).

Recent findings revealed an increase in domestic medical graduates and the proportion of foreign-born or foreign-trained doctors across OECD countries (7). The extreme urgency to control the COVID-19 pandemic overflow pushed this trend further by inducing governments to foster policies for facilitating emigration flows of health professionals and providing for shortage of personnel and emerging workload (8).

Previous studies assessed several factors associated with health workforce migration, identifying the key ones as individual, organizational, healthcare system, and general environmental factors. Many potential reasons and conditions belong to these main categories, encompassing every aspect of personal and professional life, from age to compensation to human resource policies to health services funding (9).

In 2020, practicing physicians in the European Union (EU) were approximately 1.75 million, and 60% were recorded in Germany, Italy, Spain, and France. Nevertheless, Greece recorded the highest number of physicians (619.5) per 100,000 inhabitants, Italy recorded 400.1 per 100,000, and Germany 446.8 per 100,000. Between 2015 and 2020, the number of physicians per 100,000 inhabitants increased in all EU countries, due to a simultaneous increase in the absolute number of physicians and a decrease in population (10). This trend accounts for demographic shifts, such as the ageing of populations and higher demand for social and healthcare services.

Furthermore, in most EU Member States, physicians aged 55 years and over are between 22% and 37% of the overall, whereas in Italy, this age group represents more than 50% of the healthcare workforce (10).

Therefore, facing this massive shortage of HCWs and its forthcoming worsening in the coming years, every country should establish a national plan based on its population's healthcare needs. For instance, in Italy, the availability of residency training positions increased from 2019 to 2021 by 21%; however, this will be insufficient to address the demand for population health needs for the years to come (10,11). In this context, understanding the expectations and demands of the future healthcare workforce can contribute to depicting the current situation to find determinants of HCWs migration and the entity of such phenomenon. In this regard, the evaluation of opinions and intentions among medical students helps analyze the relationships between push and pull factors for looking for an excellent job position abroad (12).

The current study analyzed Italian medical students' intentions to pursue their professional qualification abroad. The primary purpose of this research was to understand the driving factors of moving to a foreign country, entailing personal, educational, and professional reasons, to explore prevalence and patterns across the medical undergraduate population. Secondarily, knowledge about training programmes, prerequisites, and applications for accessing a medical residency was explored. Identifying the pushing motivations of the youngest doctor generations is crucial to achieving effective interventions for strategic workforce planning and implementing attractive policies and training opportunities for both retention and immigration of health professionals.

Materials and methods

A cross-sectional study was carried out between the 21st of November and the 2nd of December 2022 among the students enrolled in the Medical School of the University of Turin. A paper-based self-administered questionnaire was disseminated during the immunisation campaign against influenza addressed to the medical students.

Attending the 4th, 5th, and 6th year and over (for those who had not completed all exams within the set period) of the School of Medicine was the inclusion criteria. International students attending the Erasmus+ programme at the Medical School of the University of Turin were excluded.

An invitation letter was delivered via email informing about the purpose of the study and clarifying that the questionnaire was completely anonymous and voluntary.

All procedures followed the 1964 Helsinki Declaration and its subsequent amendments. The Ethics Committee of the University of Turin granted ethical approval (Protocol no. 0183621 from 15 March 2023). Informed consent was necessary to access the questionnaire.

Overall, 307 participants completed a questionnaire with 24 items. Nobody refused to take part in the investigation.

The questionnaire was developed based on a review of the scientific literature and existing evidence about the main topic (13–16). The survey was divided into four sections, focusing on socio-demographics, intentions and preferences about residency programmes, attitudes regarding moving abroad for medical specialization, and perceived knowledge concerning foreign residency programmes.

Age, gender, nationality, socio-economic status, year of study, educational level and marital status were investigated. Specialty goals, reasons for specialty choice and previous experiences abroad were investigated in the second section. In the third section, questions focused on attitudes toward moving abroad after graduation, considering personal, educational, and professional factors for a variable period (from less than one year to lifelong). Peculiar personal reasons were reported, such as quality of life and social condition abroad, family support for moving abroad, and coming back at the end to one's own country of origin. Educational reasons were analyzed through specific questions, such as the availability of high-quality training and access to the medical speciality of choice in case of failing the Italian national exam for applying to a residency programme. Further questions focussed on professional reasons, such as engagement at work, higher career and research opportunities, health system management and salary. Such opinions and attitudes were measured through a 4-point like-Likert scale to rate the degree of agreement (from "1=at all" to "4=not at all"). Factors inducing medical students' migration were assessed by reviewing similar previous studies (13-20). In addition, perceived knowledge of foreign languages, application, structure, quality and remuneration of residency programmes abroad were explored. Finally, barriers to moving and working abroad were scrutinised (recognition of degree, language barrier, adaptability to different work environments, colleagues, weather conditions, separation from the family, and distance from social contacts). The fourth section was organised in 4-point like-Likert scale questions (scoring from "1=not at all" to "4=at all"). Finally, types of information sources consulted to find out details about such topics were investigated.

Data analysis

All variables were described through a descriptive quantitative analysis. For continuous variables, median and interquartile range (IQR) were reported by the significance of the Shapiro-Wilk test for normality assumption.

The study's primary outcome was the intention of working abroad after graduation for a variable period. The secondary outcomes focused on participants' knowledge about residency application, quality residency training, residency programmes and remuneration in the destination country. The primary and secondary outcomes were converted into binary variables by reorganising the 4-point like-Likert scale into dichotomous categories, where negative (1 and 2) and positive (3 and 4) responses were merged, respectively. Positive responses were associated with the willingness to move abroad for the primary outcome. Positive responses also outlined good perceived knowledge of foreign residency programmes, thus measuring the secondary outcomes.

Chi-square and Mann-Whitney tests were performed to detect differences between groups defined by primary and secondary outcomes for categorical and continuous variables, respectively.

Univariable and multivariable logistic regressions assessed relationships between independent variables and the binary outcomes. Using univariable logistic regression, p-value< .25 was the pre-filtering criterion for variable selection to the multivariable model (21). Two multivariable models were identified for the primary outcome: the first was about socio-demographic characteristics, and the second referred to reasons for emigration. Both models were adjusted for age and gender. The following independent variables were selected for the first model: age, gender, experiences abroad during high school and medical studies, socio-economic status, and marital status. The second model analyzed associations with personal, educational, and

professional reasons for moving abroad after graduation, perceived barriers and facilitators of moving abroad to attend the residency programme of choice. Secondary outcomes were analysed through multivariable models, adjusted for age and gender. The following independent variables were selected: socio-economic status, level of foreign language proficiency, experience abroad during high school and medical studies, intention to attend a surgery speciality or family medicine or others, and the information sources consulted, such as family and friends, social networks, blogs and forums, websites, and medical associations.

StataSE 17 (StataCorp. 2021. Stata: Release 17. Statistical Software. College Station, TX: StataCorp LLC.) Software was used for all analyses. Missing values were excluded. Statistical significance required *p-value*<.05.

Results

Overall, 307 responses were collected. Table 1 shows the main characteristics of participants. One foreign participant was attending the Erasmus+ project at the Medical School of the University of Turin and therefore was excluded.

Median age was 24 (IQR 23-25), and almost 70% of the interviewees were female. Participants attending the 4th, 5th and 6th academic year or over were homogeneously distributed. Participants' residency intent was unanimously stated, and medical specialities were the most popular compared with surgery, family medicine, and others (diagnostics, occupational medicine, anaesthesiology, etc.). However, 13% of them showed uncertainty. More than 40% of the sample had experienced already moving abroad temporarily during high school or college. Overall, 52% of the sample answered that they would consider moving abroad after graduation. Almost 70% considered it for a few years, like one or two, and less than 50% would stay till specialist certification. Scrutinizing reasons to move abroad, more than 80% of students mentioned better quality of life and social conditions. More than 90% of them were encouraged to migrate because of higher quality educational and training programmes. Furthermore, increased chances of getting into residency programmes and failing the Italian entrance exam were also considered worthy reasons to migrate.

Almost 54% considered personal motivation to seek a job abroad. Nevertheless, the percentage markedly changed when participants were asked about educational (72.9%) and professional reasons (72.5%) for moving abroad and being admitted to a residency programme. Further, moving to a foreign country as a specialist was a good alternative for most respondents (68.1%). Assessing the duration of living abroad after graduation, less than one year and a maximum of 2 years were considered convenient timeframes to attend the residency programme abroad (66.8% and 68.6%, respectively). Few participants would remain abroad after a speciality degree or even for a lifetime (34.3% vs 17.3%).

Significant associations with the primary outcome ("willingness of moving abroad after graduation") resulted for being single, having earlier experiences abroad during high school and/or college, and being uncertain about the choice of specialty after graduation. Pushing factors such as personal, educational, and professional reasons were positively associated with the intention to migrate abroad after graduation. Exploring peculiar aspects highlighted that quality of life abroad, family support, professional engagement, team building, and failing the national exam to access any residency programme were considered appropriate reasons for seeking a job abroad. Language proficiency, separation from family and friends, and getting used to an unknown work environment (colleagues, workplace, and tasks) were perceived as the main difficulties for moving abroad (see Table 2).

Knowledge about the organization and quality of residency programmes and information sources were investigated. The relative results are shown in supplementary tables (S1, S2). Almost 80% of participants stated low knowledge about the application and medical specialties programmes abroad, and about 70% were not informed about remuneration and quality training. More than 40% of students found information about residency admission, programme, quality of training, and remuneration mainly from relatives and friends, social networks, and websites. Medical associations were consulted by less than 30%, whereas other information sources were scarcely considered.

Multivariable regression models

Multivariable regression of primary outcome highlighted that medical students were more likely to move abroad and seek a job as residents for personal and professional reasons and return to their country of origin. Those who had experiences abroad during high school or college tended to move abroad after graduation. Finally, knowledge about applying for a residency programme was associated positively with

Table 1 - Characteristics of participants and relation with the primary outcome

Characteristics		Willingness of migrating		
	Overall **N** n=307	**No** **n (%)** n=146	**Yes** **n (%)** n=161	p-value
Age	**Median** 24	**IQR** 23-25		**0.022**
Gender				
Male	98 (32.0)	44 (30.3)	54 (33.5)	0.550
Female	208 (68.0)	101 (69.7)	107 (66.5)	
Nationality				
Italian	294 (96.1)	141 (97.2)	153 (95.0)	0.320
Foreign	12 (3.9)	4 (2.8)	8 (5.0)	
Socio-economic status				
Very high-high	261 (85.0)	127 (88.2)	134 (83.2)	0.218
Medium-low	46 (15.0)	17 (11.8)	27 (16.8)	
Marital status				
Single	136 (44.3)	55 (33.2)	81 (50.3)	**0.034**
Engaged-married	171 (55.7)	89 (61.8)	80 (49.7)	
Academic year				
4th	57 (18.7)	22 (15.3)	35 (21.7)	0.231
5th	74 (24.3)	32 (22.2)	42 (26.1)	
6th	103 (33.8)	56 (38.9)	47 (29.2)	
over	71 (23.3)	34 (23.6)	37 (23.0)	
Education				
High school	298 (97.4)	.	.	
College	8 (2.6)	.	.	
Willing to medical speciality				
Yes	307 (100.0)	.	.	
No	0 (0)	.	.	
Residency of choice				
Family medicine	20 (6.5)	10 (6.8)	10 (6.2)	0.821
Clinical service	154 (50.2)	80 (54.8)	74 (45.0)	0.122
Surgery	84 (27.4)	38 (26.0)	46 (28.6)	0.618
Others	22 (7.2)	9 (6.2)	13 (8.1)	0.517
Uncertain	40 (13.0)	13 (8.9)	27 (16.8)	**0.041**
Reasons for residency of choice*				
Doctor-patient relationship	222 (72.3)	.	.	
No doctor-patient relationship	18 (5.9)	.	.	
Social esteem	33 (10.7)	.	.	
Intensive workload	51 (16.6)	.	.	
Flexible work time	114 (37.1)	.	.	
Income	78 (25.4)	.	.	
Favourable supply/demand	56 (18.29)	.	.	
Multifaceted discipline	193 (62.9)	.	.	
Experiences abroad				
Yes	125 (40.8)	48 (32.9)	77 (48.1)	**0.007**
During High school	95 (76.0)	.	.	
During College	38 (30.4)	.	.	

Note: *Multi select multiple choice question; p-value<0.05; IQR – Interquartile Range

Table 2 - Pushing factors and barriers for moving abroad and association with primary outcome

Characteristic			Willingness of migrating	
	Overall N n=307	**No n (%)** n=146	**Yes n (%)** n=161	**p-value**
Pushing factors				
Personal reason				
No	141 (46.1)	110 (75.3)	31 (19.4)	**<0.001**
Yes	165 (53.9)	36 (24.7)	129 (80.6)	
Quality of life				
No	54 (17.6)	36 (24.7)	18 (11.2)	**0.002**
Yes	253 (82.4)	110 (75.3)	143 (82.8)	
Social condition				
No	48 (15.6)	29 (19.9)	19 (11.8)	0.052
Yes	259 (84.7)	117 (80.1)	142 (88.2)	
Family support				
No	115 (37.5)	66 (45.2)	49 (30.4)	**0.008**
Yes	192 (62.5)	80 (54.8)	112 (69.6)	
Reunion (with family, friends, partner)				
No	128 (42.1)	57 (39.3)	71 (44.6)	0.346
Yes	176 (57.9)	88 (60.7)	88 (55.3)	
Coming back to country of origin				
No	190 (62.5)	77 (53.1)	113 (71.0)	**0.001**
Yes	114 (37.5)	48 (46.9)	46 (28.9)	
Educational reason				
No	83 (27.1)	71 (48.6)	75 (51.4)	**<0.001**
Yes	223 (72.9)	12 (7.5)	148 (92.5)	
High quality programme				
No	27 (8.8)	14 (9.6)	13 (8.0)	0.640
Yes	280 (91.2)	132 (90.4)	148 (91.9)	
Good chance to get into residency programme				
No	96 (31.4)	53 (36.5)	43 (26.7)	0.064
Yes	210 (68.6)	92 (63.4)	118 (73.3)	
Failed exams in Italy				
No	155 (50.5)	65 (44.5)	90 (55.9)	**0.046**
Yes	152 (49.5)	81 (55.5)	71 (44.1)	
Professional reason				
No	84 (27.4)	80 (54.8)	4 (2.5)	**<0.001**
Yes	222 (72.5)	66 (45.2)	156 (97.5)	
Acceptable workload				
No	65 (21.6)	33 (23.1)	32 (20.2)	0.552
Yes	236 (78.4)	110 (76.9)	126 (79.7)	
High professional involvement and appreciation				
No	35 (11.5)	24 (16.7)	11 (6.9)	**0.008**
Yes	268 (88.4)	120 (83.3)	148 (93.1)	
Career opportunities				
No	43 (14.2)	26 (18.1)	17 (10.7)	0.067
Yes	260 (85.1)	118 (81.9)	142 (89.3)	
Research opportunities				
No	74 (24.5)	37 (25.9)	37 (23.3)	
Yes	228 (75.5)	106 (74.1)	122 (76.7)	
Organization of health care delivery				
No	133 (44.0)	70 (48.9)	63 (39.6)	0.103
Yes	169 (56.0)	73 (51.0)	96 (60.4)	

Centre of excellence				
No	81 (26.8)	42 (29.49	39 (24.5)	0.343
Yes	221 (73.2)	101 (70.6)	120 (75.5)	
Income				
No	25 (8.3)	19 (13.29	6 (3.8)	**0.003**
Yes	277 (91.7)	125 (86.8)	152 (96.2)	
Migration as trained specialist				
No	98 (32.0)	82 (56.2)	16 (10.0)	**<0.001**
Yes	208 (68.0)	64 (43.9)	144 (90.0)	
Barriers				
Bureaucratic procedures				
No	79 (25.7)	42 (28.8)	37 (23.0)	0.247
Yes	228 (74.3)	104 (71.2)	124 (77.0)	
Language barriers				
No	131 (43.7)	49 (34.5)	82 (51.9)	**0.002**
Yes	169 856.3)	93 (65.5)	76 (48.1)	
Family-friends separation				
No	72 824.2)	20 (14.2)	52 (33.1)	**<0.001**
Yes	226 (75.8)	121 (85.8)	105 (66.9)	
Colleagues relationships				
No	205 (69.0)	87 (62.6)	118 (74.7)	**0.025**
Yes	92 (31.0)	52 (37.4)	40 (25.3)	
Workload and work time				
No	233 (77.9)	109 (77.3)		0.807
Yes	66 (22.1)	32 (22.7)	34 (21.5)	
Methods and procedures at work				
No	184 (61.5)	78 (55.3)	106 (67.1)	**0.037**
Yes	115 (38.5)	63 (44.7)	52 (32.9)	
Weather conditions				
No	202 (67.6)	88 (62.4)	114 (72.1)	0.073
Yes	97 (32.4)	53 (37.6)	44 (27.8)	

Note: p-value<0.05

the primary outcome, albeit bureaucratic procedures were significantly perceived as a barrier to emigration (see Table 3).

Multivariable models for secondary outcomes suggested exciting results, mainly related to sources of information. Perceived knowledge about the application for the residency programme was higher among medical students who had experiences abroad during college or high school and among those who sought information online and from medical associations. More profound knowledge about the residency programme resulted in medical students interested in surgery and among those who sought information on blogs and forums, as well as from medical associations. Moreover, students who had experience abroad also knew about better residency programmes.

Our results showed that female students were less informed about the residency programme quality, whereas those fascinated with surgery showed better knowledge about it. Medical students who gathered information on social networks, blogs, and forums were better informed. In addition, seeking information from family and friends, as well as from medical associations, was positively related to a higher knowledge about the quality of the residency programme. Finally, higher foreign language proficiency was linked to higher knowledge. Regarding economic remuneration, students who showed higher knowledge sought information on websites and through medical associations (see Table 4).

Discussion

The WHO reported that 15% of HCWs currently work outside their country of origin, and such migration flow is emphasised among LMICs. As a

Table 3 - Multiple regression model for primary outcome and socio-demographic characteristics

Willingness of migrating	adjOR	p-value	95% CI
Age	0.9	0.112	0.8 -1.0
Gender	0.9	0.674	0.5 - 1.5
Clinical service for the residency programme	0.7	0.25	0.5 -1.2
Experiences abroad	1.9	**0.008**	1.1 -3.1
Socio-economic status	0.6	0.15	0.3 - 1.1
Marital status	0.6	0.052	0.4 - 1.0
Perceived barriers and facilitators	adjOR	p-value	95% CI
Personal reasons	8.1	**0.000**	3.6 - 18.3
Educational reasons	2.8	0.073	0.9-8.7
Professional reasons	8.3	**0.007**	1.8 - 38.2
Emigration as specialist	2.6	0.102	0.8 - 8.2
Quality of life	1.6	0.477	0.4 - 6.0
Social conditions	0.8	0.713	0.2 - 3.2
Family support	1.4	0.390	0.5 - 3.4
Coming back to the country of origin	0.2	**0.001**	0.1 - 0.5
Reunion with family or friends	2.6	0.086	0.9 - 7.9
Good chance to get into a residency programme	1.3	0.572	0.5-3.6
Failed exams in Italy	0.6	0.182	0.2-1.3
High professional involvement and appreciation	1.6	0.549	0.3-7.5
Career opportunities	0.6	0.512	0.1-2.7
Organisation of health care delivery	0.8	0.590	0.3-1.8
Income	1.2	0.836	0.1-11.1
Bureaucratic procedures	3.4	**0.012**	1.3-8.8
Language barriers	0.6	0.232	0.3-1.4
Family-friends separation	0.6	0.275	0.2-1.5
Colleagues relationships	0.6	0.218	0.2-1.4
Methods and procedures at work	0.5	0.068	0.2-1.0
Weather conditions	0.5	0.143	0.2-1.2
Knowledge about getting into a residency programme	14.5	**0.002**	2.7-78.8
Knowledge about the residency programme	0.7	0.606	0.2-2.9
Knowledge about the quality of the residency programme	0.9	0.933	0.3-2.9
Knowledge about income as a medical resident	1.2	0.650	0.5-3.3

Note: adjOR – adjusted Odds Ratio; p-value<0.05; CI – Confidence Interval

consequence of such phenomenon, countries of birth of migrating doctors and nurses have to face significant financial losses from their education and training investment before graduation (12).

Overall, the United States, the United Kingdom and Germany are the most popular OECD countries among migrating HCWs for numerous reasons, such as higher salaries, high-quality training and better career opportunities, besides socio-economic and political stability and safety (6,22).

The current survey can be considered the first Italian study to investigate medical students' opinions about migrating after graduation and assess their level of information about post-graduate residency programmes outside Italy. The literature reports the main findings from projects carried out in LMCIs, which significantly differ from HICs in terms of economic and political situations. Analyses about the brain drain phenomenon focus mainly on qualified HCWs such as physicians and nurses. Therefore, the opinions and intentions of medical students can be influenced by several factors, such as gossip, others' experiences, and mass media, excluding direct, first-hand involvement in the healthcare world of work.

According to our analysis, more than half of the surveyed students intended to move abroad after graduation. Similar results were obtained from cross-sectional research in Croatia (13). In contrast, almost 70% of Turkish medical students and more than 80% of Irish, Serbian and Romanian medical students stated they want to pursue their careers abroad (14-17). A multicentre research conducted in five Polish medical

Table 4 - Multiple regression model for secondary outcomes and sociodemographic characteristics

Knowledge about:	Access to the residency programme			Quality of training		
	Adj OR	p-value	IC (95%)	Adj OR	p-value	IC (95%)
Age	1.0	0.997	0.9 ; 1.1	0.9	0.495	0.8 ; 1.1
Gender	0.6	0.214	0.3 ; 1.3	0.3	**0.001**	0.2 ; 0.6
Socio-economical status	0.6	0.246	0.2 ; 1.4	0.7	0.420	0.3 ; 1.7
Experience abroad	2.6	**0.008**	1.3 ; 5.4	1.5	0.239	0.8 ; 2.8
Level of language proficiency	2.4	0.067	0.9 ; 6.4	2.4	**0.044**	1.1 ; 5.5
Residency of choice						
Family medicine	1.3	0.714	0.3 ; 5.2	3.1	0.070	0.9 ; 10.3
Surgery	1.4	0.342	0.6 ; 3.1	2.7	**0.006**	1.3 ; 5.5
Others	1.7	0.454	0.4 ; 7.0	0.7	0.570	0.2 ; 2.7
Source of Information						
Relatives and friends	1.3	0.454	0.6 ; 2.7	2.0	**0.040**	1.1 ; 3.8
Social Networks	0.8	0.613	0.4 ; 1.7	2.3	**0.014**	1.2 ; 4.7
Blogs and forums	4.0	**0.002**	1.6 ; 10.2	2.8	**0.025**	1.1 ; 6.8
Websites	2.5	**0.011**	1.2 ; 5.3	1.8	**0.009**	1.2 ; 5.1
Medical associations	5.0	**<0.001**	2.4 ; 10.5	2.5	**0.009**	1.2 ; 5.1
Knowledge about:	Residency programme			Compensation		
	Adj OR	p-value	IC (95%)	Adj OR	p-value	IC (95%)
Age	0.9	0.910	0.9 ; 1.1	0.99	0.971	0.9 ; 1.1
Gender	0.5	0.060	0.2 ; 1.1	0.7	0.344	0.4, 1.3
Socio-economical status	0.7	0.428	0.2 ; 1.7	0.7	0.320	0.3 ; 3.3
Experience abroad	2.8	**0.003**	1.4 ; 5.7	2.0	**0.014**	1.1 ; 3.6
Level of language proficiency	2.8	0.034	1.1 ; 7.5	0.7	0.275	0.3 ; 1.3
Residency of choice						
Family medicine	1.1	0.935	0.2 ; 4.4	0.3	0.102	0.1 ; 1.2
Surgery	2.4	0.190	0.6 ; 9.5	1.3	0.379	0.7 ; 2.5
Others	2.5	0.190	0.6 ; 9.5	1.1	0.987	0.3, 3.3
Source of Information						
Relatives and friends	1.6	0.175	0.8 ; 3.3	1.5	0.177	0.8 ; 2.6
Social Networks	1.2	0.559	0.6, 2.6	1.6	0.140	0.9 ; 2.8
Blogs and forums	3.0	**0.016**	1.2 ; 7.5	1.3	0.550	0.6 ; 2.9
Websites	1.6	0.187	0.8 ; 3.2	2.4	**0.002**	1.4 ; 4.4
Medical associations	3.3	**0.001**	1.6 ; 6.9	2.8	**0.002**	1.5 ; 5.3

Note: adjOR – adjusted Odds Ratio; p-value<0.05; CI – Confidence Interval

schools reported that 62% of respondents planned to continue their professional training abroad (18).

The comparability among these data reflects a widespread sense of dissatisfaction and uncertainty about the prospect of living in one's own home country in the future. Since Italy belongs, according to the World Bank, to the category of HICs (23), the willingness to migrate among Italian medical students represents a paradoxical situation compared with other countries. A similar situation was observed in Ireland, where previous studies highlighted emigration intentions comparable to those of students from LMICs, such as in India, Lebanon, and Pakistan. According to Gouda et al., these similarities could be ascribed to limited postgraduate training positions and scarce career advancement possibilities (19). Indeed, the Chi-Square test (i.e. not confirmed by the regression model) associated migration intent with failing the national exam to get into a residency programme. Similarly, in a national-wide survey carried out among Portuguese junior doctors, the score of the National Medical Exam was identified as a convincing reason to work abroad (20).

In Italy, an increase of 21% of job positions in residency programmes was registered from 2019 to 2021 (11). Limiting access to the residency programme so

strictly over the past years may have exacerbated the frustration among freshly graduated physicians who experience high-stress levels due to limited specialization opportunities (24). Consequently, the limited access may have induced some of them to consider finding a job abroad. However, such relevant changes in the number of medical training positions and the automatic recognition of professional qualification after graduation (25) were probably the result of political choices driven by the serious difficulties reported by HCWs regarding the severe personnel shortage that emerged during the COVID-19 pandemic. Plausibly, these policies will have to handle criticism from medical categories for lacking and inadequate planning strategies and supply of healthcare resources.

Focussing on pushing factors of emigration, the multivariable regression model highlighted that personal reasons, such as returning to the country of origin, and professional ones, were significantly associated with migration intent. In addition, past experiences abroad were positively associated with emigration intentions. A case study on Serbian medical students highlighted that having been abroad before might be considered a potential predictor; gender and age did not seem to relate to willingness to migrate, as confirmed by our analyses (16).

A previous experience abroad during high school and medical studies has positive effects, enhancing language proficiency and prompting self-efficacy beliefs (26). Accordingly, international mobility is highly fostered within the EU area by reducing barriers by recognizing qualifications and active recruitment strategies in some medical schools to attract international students (7). For instance, participation in the Erasmus+ Programme represents a life-changing opportunity to develop skills and knowledge that effectively help tackle our society's challenges. In recent years, Italian participants in this project have notably increased in developing European cooperation projects (27). Hence, having experienced a period abroad can effectively enhance the attitude to pursue medical speciality training in other countries, supported by a higher level of self-confidence in language skills and a more robust adaptability to enjoy living and work-life abroad.

About peculiarities of personal motivation, the Chi-Square test identified as a predictor of migrating intentions a better quality of life in the country of destination, the concurrent familiar and social support to move abroad, and the possibility of being professionally appreciated and engaged at work, including a higher income. However, regression analysis did not confirm any significance for these items and generally considered personal and professional reasons can be hardly analyzed and discussed as predictors of migration.

Regarding economic compensation, financial dissatisfaction does not represent a pushing factor among Italian students, probably due to the financial support offered by their parents and the lack of economic and other obligations. On the contrary, financial factors were relevant for medical students from Ireland, Croatia, and Lithuania (13,19,28).

Among the barriers to migration intentions, bureaucratic obstacles outweigh other personal factors, such as separation from family and friends. Despite the equipollence of the medical degree throughout the EU and the automatic recognition of the basic medical training for general practitioner and specialist qualifications, working abroad as a HCW requires collecting broad documentation and obtaining a high-level language certification, besides eventually the recognition of the professional qualification. Once these steps are completed, the fulfilment of other selection criteria is necessary to find a suitable job position.

Indeed, solid incentives and determination, along with substantial economic and time investments, are crucial to start such procedures, especially after completing an already demanding study programme.

Further research should better analyze both predictors and barriers of migration intentions among medical students. Accordingly, evaluating specific determinants of the brain drain phenomenon since the beginning of one's medical career could help plan targeted strategies and implement retention policies.

The current study showed some limitations, such as the small sample. In addition, the questionnaire was not validated and a pilot study for testing it was not performed. However, all students who attended the vaccination campaign agreed to participate. Generalising the current findings is arduous since the sample included only students from the medical school of Turin. In addition, social and mobility restrictions experienced during the pandemic and the different organisation of clinical internships over the past years could represent a relevant bias about the current opinion of moving abroad after graduation.

Notwithstanding, this is the first Italian investigation into medical students' opinions and intentions about their next postgraduate training, aiming to early identify needs and problems affecting the future medical workforce. Further analyses involving a higher number of participants and potentially more medical schools could provide a prompt warning for upcoming migration trends.

Previous considerations from Italian research about the impact of medical migration on the Italian National Health Service explored the challenges faced by the Italian medical workforce. Every year, 1000 medical doctors leave Italy to seek employment abroad; this phenomenon substantially affects the medical workforce shortage, in addition to the impending massive retirement of Italian doctors expected over the last decade. Economic and residential factors such as obtaining appropriate wages and housing and professional requirements were perceived barriers, whereas a significant motivator was the long career and professional advancement duration (29). Therefore, the drivers of moving abroad among medical students and doctors seem similar before graduation and after beginning their professional careers. It is reasonable to consider them as concrete factors influencing HCWs' migration. These findings match Maslow's theory of motivation, which identified financial safety needs, self-actualisation, and professional and educational development as significant contributors to migration. Retention in the country of origin can be encouraged by creating desirable employment opportunities via local and international partnerships. When financial needs are met, interventions should increase education and professional opportunities (3).

Conclusion

Current and future political decisions should urgently address the needs and requirements of the medical workforce by allocating financial resources to make the offer from the Italian National Health System competitive and attractive. Investments should involve infrastructures, technologies, human resources, and national collective agreement. Innovative reforms should finally embrace undergraduate and postgraduate training to improve physicians' skills and competencies. Efforts must be agreed between multiple stakeholders, involving politicians, academics and even medical associations, which often gain acceptance from students and specialists.

Riassunto

Indagine trasversale sui determinanti e sui pareri degli studenti di medicina circa lo svolgimento all'estero della professione medica

Background. La carenza di professionisti in ambito sanitario e la loro tendenza a migrare all'estero rappresentano alcuni dei problemi cruciali dei sistemi sanitari in molti paesi del mondo. Lo scopo di questo studio è la valutazione delle intenzioni di un campione di studenti di medicina italiani a proseguire la propria formazione professionale all'estero, analizzando i fattori favorenti e bloccanti di tale fenomeno.

Disegno dello studio e metodi. È stato condotto uno studio osservazionale cross-sectional tramite la somministrazione di un questionario ad un campione di studenti iscritti al secondo triennio e fuori corso del corso di laurea in Medicina e Chirurgia dell'Università di Torino. Sono state valutate le intenzioni di emigrare in seguito alla laurea come outcome primario. Il livello di conoscenza in merito ai programmi di specializzazione, alle modalità di iscrizione, alla qualità del percorso formativo e alla remunerazione economica è stato considerato come outcome secondario. È stata condotta un'analisi descrittiva per tutte le variabili, e sono stati elaborati dei modelli di regressione univariabile e multivariabile per la valutazione degli outcome primario e secondario.

Risultati. In totale, sono stati raccolti 307 questionari. Più della metà del campione ha dichiarato di voler migrare all'estero dopo la laurea, principalmente alla ricerca di un percorso di formazione di alta qualità. Il modello di regressione ha evidenziato un'associazione significativa tra l'outcome primario e le motivazioni personale e professionale. Una precedente esperienza all'estero (Erasmus, lavorativa o altro) è risultata associata ad una maggiore intenzione di emigrare, mentre le difficoltà burocratiche sono state considerate come principale ostacolo alla realizzazione di un percorso professionale all'estero. Una migliore conoscenza rispetto a caratteristiche e qualità dei programmi di specializzazione è risultata per coloro che si sono informati online su siti web, forum e blog e tra coloro che hanno consultato delle associazioni dedicate.

Conclusioni. Risulta fondamentale l'attuazione di politiche che incitino le future generazioni di medici a rimanere nel proprio paese di origine, finalizzando interventi e strategie mirate ad offrire percorsi formative di alta qualità e prospettive di carriera accattivanti, insieme ad una remunerazione economica appropriata e competitiva rispetto a paesi esteri meta di giovani professionisti.

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