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Push and Pull Factors of Why Medical Students Want to Leave Türkiye: A Countrywide Multicenter Study

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GROUNDWORK

Push and Pull Factors of Why Medical Students Want to Leave Türkiye: A Countrywide Multicenter Study

Erhan Eser[a], Elif Cil[a], Nesibe Efruz Sen Gundogan[a], Meltem Col[b], Elif Nur Yildirim Ozturk[b], David Terence Thomas[c,d], Ahmet Tevfik Sunter[e], Hatice Nilden Arslan[e], Riza Citil[f], Yalcin Onder[f], Metin Picakciefe[g], Bahadir Dede[g], Can Demirel[h,i], Neriman Aydin[i,j], Cigdem Caglayan[k], Ahmet Alp Aker[k], Arda Borlu[l], Hasan Durmus[l], Gunay Can[m], Esin Siddikoglu[m], Ergun Haldun Sumer[n], Tunahan Uygun[n], Seval Alkoy[o], Kubra Aktas Aycan[o], İbrahim Koruk[p], Rustem Kuzan[p], Lutfi Saltuk Demir[q], Esra Hacilar[q], Hidir Sari[r], Zehra Kilinc[r], Ozgur Onal[s], Edanur Dogan[s], Mestan Emek[t], Rıdvan Terzioglu[t], Gulcin Yapici[u], Deniz Erdal[u], Sultan Eser[v], Emine Ayhan Akman[v], Zahide Kosan[w], Sinan Yilmaz[w], Ferruh Niyazi Ayoglu[x], Bilgehan Acikgoz[x], Berna Musal[y], Ahmet Furkan Suner[z], Aysegul Erdogan[aa], İdris Cilburunoglu[aa], Meral Saygun[bb], Didem Daymaz[bb], Didem Arslantas[cc], Muhammed Fatih Onsuz[cc], Nazim Ercument Beyhun[dd], Medine Gozde Ustundag[dd], Galip Ekuklu[ee], Fulya Ozder Tas[ee], Filiz Abacigil[ff], Selcen Oncu[gg], Seyhan Hıdıroğlu[hh], Ayse Nilufer Ozaydin[hh], Edibe Pirincci[ii], Irem Bulut[ii], Mustafa Tozun[jj], Muzaffer Eskiocak[kk,ll], Pinar Gunel[ll,mm], Sebahat Dilek Torun[nn], Melike Yavuz[nn], Metin Hasde[oo], Derya Camur[oo], Gulsen Gunes[pp], Burak Kurt[pp], Nuket Guler Baysoy[qq], Nadi Bakirci[rr], Figen Demir[rr], Binali Catak[ss], Ferda Ozyurda[tt] and Mustafa Turan[uu]

[a]Department of Public Health, Manisa Celal Bayar University, Manisa, Türkiye; [b]Department of Public Health, Ankara University, Ankara, Türkiye; [c]Department of Pediatric Surgery, Maltepe University, Istanbul, Türkiye; [d]Department of Medical Education, Maltepe University, Istanbul, Türkiye; [e]Department of Public Health, Ondokuz Mayis University, Samsun, Türkiye; [f]Department of Public Health, Tokat Gaziosmanpaşa University, Tokat, Türkiye; [g]Department of Public Health, Mugla Sitki Kocman University, Mugla, Türkiye; [h]Department of Biophysics, Gaziantep University, Gaziantep, Türkiye; [i]Department of Medical Education, Gaziantep University, Gaziantep, Türkiye; [j]Department of Public Health, Gaziantep University, Gaziantep, Türkiye; [k]Department of Public Health, Kocaeli University, Kocaeli, Türkiye; [l]Department of Public Health, Erciyes University, Kayseri, Türkiye; [m]Department of Public Health, Istanbul University-Cerrahpasa, Istanbul, Türkiye; [n]Department of Public Health, Sivas Cumhuriyet University, Sivas, Türkiye; [o]Department of Public Health, Bolu Abant İzzet Baysal University, Bolu, Türkiye; [p]Department of Public Health, Harran University, Sanliurfa, Türkiye; [q]Department of Public Health, Necmettin Erbakan University Meram, Konya, Türkiye; [r]Department of Public Health, Dicle University, Diyarbakir, Türkiye; [s]Department of Public Health, Suleyman Demirel University, Isparta, Türkiye; [t]Department of Public Health, Akdeniz University, Antalya, Türkiye; [u]Department of Public Health, Mersin University, Mersin, Türkiye; [v]Department of Public Health, Balikesir University, Balikesir, Türkiye; [w]Department of Public Health, Ataturk University, Erzurum, Türkiye; [x]Department of Public Health, Zonguldak Bulent Ecevit Universitesi, Zonguldak, Türkiye; [y]Department of Medical Education, Dokuz Eylul University Izmir, Türkiye; [z]Department of Public Health, Dokuz Eylul University, Izmir, Türkiye; [aa]Department of Public Health, Kahramanmaras Sutcu Imam University, Kahramanmaras, Türkiye; [bb]Department of Public Health, Kirikkale University, Kirikkale, Türkiye; [cc]Department of Public Health, Eskisehir Osmangazi University, Eskisehir, Türkiye; [dd]Department of Public Health, Karadeniz Technical University, Trabzon, Türkiye; [ee]Department of Public Health, Trakya University, Edirne, Türkiye; [ff]Department of Public Health, Adnan Menderes University, Aydin, Türkiye; [gg]Department of Medical Education, Adnan Menderes University, Aydin, Türkiye; [hh]Department of Public Health, Marmara University, Istanbul, Türkiye; [ii]Department of Public Health, Firat University, Elazig, Türkiye; [jj]Department of Public Health, Izmir Katip Celebi University, Izmir, Türkiye; [kk]Department of Public Health, SANKO University, Gaziantep, Türkiye; [ll]Department of Medical Education, SANKO University, Gaziantep, Türkiye; [mm]Department of Biostatistics, SANKO University, Gaziantep, Türkiye; [nn]Department of Public Health, Bahcesehir University, Istanbul, Türkiye; [oo]Department of Public Health, University of Health Sciences - Gulhane Faculty of Medicine, Ankara, Türkiye; [pp]Department of Public Health, Yuksek Ihtisas University, Ankara, Türkiye; [qq]Department of Public Health, Biruni University, Istanbul, Türkiye; [rr]Department of Public Health, Acibadem University, Istanbul, Türkiye; [ss]Department of Public Health, Kafkas University, Kars, Türkiye; [tt]Department of Public Health, TOBB University of Economics and Technology, Ankara, Türkiye; [uu]Department of Medical Education, TOBB University of Economics and Technology University, Ankara, Türkiye

ABSTRACT

Phenomenon: Physician immigration from other countries is increasing as developed countries continue to be desirable destinations for physicians; however, the determinants of Turkish physicians' migration decisions are still unclear. Despite its wide coverage in the media and among physicians in Türkiye, and being the subject of much debate, there is insufficient data to justify this attention. With this study, we aimed to investigate the tendency of senior medical students in Türkiye to pursue their professional careers abroad and its related factors.

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CONTACT Elif Cil elifcilmd@gmail.com Halk Sağlığı Anabilim Dalı, Manisa Celal Bayar Üniversitesi Tıp Fakültesi, Uncubozköy Mh. Mimar Sinan Bulvarı No: 187, Yunusemre, Manisa, Türkiye.

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Approach: This cross-sectional study involved 9881 senior medical students from 39 different medical schools in Türkiye in 2022. Besides participants' migration decision, we evaluated the push and pull factors related to working, social environment and lifestyle in Türkiye and abroad, medical school education inadequacy, and personal insufficiencies, as well as the socioeconomic variables that may affect the decision to migrate abroad. The analyses were carried out with a participation rate of at least 50%. ***Findings:*** Of the medical students, 70.7% had emigration intentions. Approximately 60% of those want to stay abroad permanently, and 61.5% of them took initiatives such as learning a foreign language abroad (54.5%) and taking relevant exams (18.9%). Those who wanted to work in the field of Research & Development were 1.37 (95% CI: 1.22–1.54) times more likely to emigrate. The push factor that was related to emigration intention was the "working conditions in the country" (OR: 1.89, 95% CI: 1.56–2.28) whereas the "social environment/lifestyle abroad" was the mere pull factor for the tendency of emigration (OR: 1.73, 95% CI: 1.45–2.06). In addition, the quality problem in medical schools also had a significant impact on students' decisions (OR: 2.20, 95% CI: 1.83–2.65). ***Insights:*** Although the percentage of those who want to emigrate "definitely" was at the same level as in the other developing countries, the tendency to migrate "permanently" was higher in Türkiye. Improving working conditions in the country and increasing the quality of medical faculties seem vital in preventing the migration of physicians.

Introduction

As of 2022, a total of 110,000 medical students receive education in 120 medical schools in Türkiye, and nearly 30,000 of them are in the 5th and 6th year of education. There are 1.9 doctors per 1000 people in Türkiye, which is less than many OECD (Organization for Economic Co-operation and Development) countries (USA: 2.6; UK: 3.0, Germany: 4.5, and France: 3.4) and well behind the OECD average of 3.5 per 1000.[1] Contrary to many European countries, the ratio of general practitioners to total physicians is extremely low in Türkiye. Of the current physicians, 70.9% are specialists or residents, and 29.1% are general practitioners.[2] In recent years, the migration of physicians to developed countries has been increasing due to the economic problems experienced by physicians, populist practices in the health sector, and the rise in violence against physicians. In a study conducted at a medical school in Türkiye in the early 2000s, 1.9% of medical students were reported to be inclined to go abroad,[3] while in another study conducted in 2009, 54.6% of newly graduated physicians were inclined to go abroad.[4] Moreover, according to the official figures of the Turkish Medical Association, the number of physicians who obtained "Certificate of Good Standing," which is necessary for Turkish physicians to work abroad, was 59 in 2012. This number increased by 45 times, reaching the highest number of all time, 2685 in 2022.[5]

In addition to the publications of researchers from many developing countries that show a high trend of emigration of medical students or physicians, similar trends in physicians' brain drain are also clearly indicated in reports from OECD countries. A significant proportion of medical students in Iraq (73%), Ethiopia (71%), and Uganda (45%) plan to leave the country after graduation.[6–8] The data from developed countries also seem to confirm this. The share of migrant physicians has been growing rapidly over the past two decades across OECD countries, and about two-thirds of all foreign-born or foreign-trained physicians come from the OECD region and upper-middle-income countries. Additionally, 30% of physicians come from non-OECD low-middle-income countries and 3–4% are from low-income countries. Since 2000/01, the number of foreign-born physicians working in OECD countries has increased by approximately 70%. In the same period, the total number of medical doctors increased by about 30% and the adult population of foreign nationals increased by about 50%.[1] Recently, articles investigating the migration trends of medical students and physicians have been published in many countries.[6–12]

Numerous social, economic, and professional variables contribute to the tendency of physicians to relocate overseas. In addition, several challenges are associated with the practice of medicine, such as lengthy working hours, numerous night shifts, a heavy workload, a stressful working environment, emotional contacts, inadequate hospital resources, conflicts with patients/patients' families, and economic issues.[13–17] Recently, the White Code, a system that healthcare professionals use to report past or developing cases of violence to security officials, has recently become a must for healthcare professionals and doctors in Türkiye.[18] While the number of white code calls was approximately 7.751 in 2017, this number increased to 101.984 in 2021 – a 13 fold increase in a short period of five years.[19]

The drivers of medical students' intentions to migrate differ even between neighboring countries. In a study comparing the intentions to migrate and its affecting factors of medical students in Madagascar and Tanzania, two sea neighboring African countries, the main reasons for the emigration of Malagasy students were the possibility to work in the research field and the heavy workload in their home country while the most influential factor for students of Tanzania was higher income potential.[12] In Egypt, the main factors that lead physicians to migrate abroad are not being valued enough in their own country, low wages, and violence by patients and their relatives.[11]

Results of a model created to examine the channels used by OECD countries to attract foreign physicians between 2000 and 2016 show that the phenomenon of physician migration responds differently to various determinants in target countries on a country basis. For example, physicians from African countries are particularly attracted to target countries that offer higher wages and countries where the concentration of physicians is relatively low. The high demand for health services and medical technology in the receiving country triggers the flow of physicians from Central and Eastern Europe, while Asian physicians seem to migrate to countries with better education systems.[20,21] There are also different causes within Eastern Europe regarding the tendency of physicians to migrate to more developed parts of Europe and the World. Two studies conducted in Greece, located in Southeastern Europe, revealed that the social identity of the homeland (e.g., social injustice and distrust of politicians), lack of prospects, unfavorable economic environment, and continuation of studies were the determinants in decision-making among physicians.[10,13] In Hungary, another example in Eastern Europe where 40% of medical students want to work abroad, unfavorable working conditions, insufficient wages, and general living conditions were the most determining factors in students' tendency to migrate abroad.[9] Whereas, the possible reason for the increased physician migration from Ireland to Australia in the 2008–2018 period was the negativities in the health system rather than low wages.[22]

The coverage of the emigration of Turkish physicians is increasing also in international written and visual media. Intense working conditions, violence against physicians, and increasing economic difficulties seem to play roles.[18,23] No study at the national level in Türkiye investigated this developing problem and the reasons that push physicians to migrate. Therefore, there is a need for a representative national survey assessing the tendency of Turkish medical students to study abroad. The aim of this multicenter study is to analyze the career preferences, as well as to examine the frequency and causes for the growing desire to work and reside abroad among physician candidates who are approaching graduation in Türkiye.

Methods

Working area characteristics

We conducted a cross-sectional study in Türkiye, a country in the WHO (World Health Organization) European region. In Türkiye, like in many countries, medical students must finish a six-year medical education program before earning the title of "medical doctor." Following graduation, physicians can pursue specialty training or work as physicians after completing their "compulsory service," which ranges from 300 to 600 days depending on the level of development of the region to which they are assigned.[24] Physicians who pass the central board examination immediately after graduating from medical school, on the other hand, are allowed to commence specialty training before completing "compulsory service."[25]

Study sample and inclusion/exclusion criteria

Ninety-four medical schools, of which 70 belong to the state and 24 to foundations, currently have 5th and 6th year (senior) medical students in Türkiye. The total number of 5th and 6th year students in the country is 27,731 (24,192 students in state schools, 3,539 students in foundation schools).[26] We planned to reach all the 5th and 6th year medical students without using any sampling. For this purpose, we invited the Public Health and Medical Education departments of these medical schools to participate in this study through professional social media groups. Of the medical schools, 43 (35 state and 8 foundation medical schools) consented to participate. There were two inclusion or exclusion criteria for the study: (1) In order to increase the generalizability of the research, we informed the study centers that the medical schools that fulfilled the inclusion criterion of at least a 50% participation rate would be accepted into the study. In this respect, the number of centers included in the study was 39 after the exclusion of four medical schools (3 state and 1 foundation medical school) that did not meet the criterion of at least a 50% participation rate. (2) Foreign students (who are not holders of official Turkish citizenship) were excluded as their motivations may differ from Turkish citizens.

Ultimately, we contacted 9881 students and included in the analyses, accounting for 68.1% (of 14511) of the 5th and 6th year students in 39 medical schools. In the study, we contacted 35.6% of all the 5th and 6th year medical students in Türkiye. The participation rate of medical schools ranged between 51% and 100% (Supplementary Material Table 1).

Variables and data collection form

We collected data between February and May 2022 by means of a paper and pencil and/or an online Google Forms questionnaire, the method of which was left to the decision of the participating medical school, as some schools were continuing hybrid education due to the ongoing pandemic measures. Researchers created the questionnaire form by reviewing the literature which consisted of four sections (Supplementary Material Survey Form). They were (1) sociodemographic variables, (2) variables for professional education, (3) preferences on professional career planning, and (4) preferences for studying/working abroad.

In the first section, we assessed the students' class, age, gender, number of siblings, current place of residence, perceived family income, type of graduating high school, education level of the parents, having a worker in healthcare/medical student in their family, taking an active role in any non-governmental organization (association, foundation, etc.), sports club, or student club at the university, participating in various social activities (theater, cinema, dance, sports, etc.), and having a partner.

The second section consisted of the factors affecting students' medical school choice, willingness to choose the medical school again if going back to the past possible, being included in any professional/vocational certificate program, and any scientific project during university education. This section also assessed any experience of attending any scientific meeting or congress (including student congresses) domestically or abroad. In addition, the medical schools were classified (1) according to their management type (state vs foundation university, state universities are tuition-free in Türkiye, however, more than 90% of the students of foundation universities pay tuition fees and they are generally in big cities, mostly in Istanbul, to make themselves attractive) and (2) the success ranking of the medical schools in the university entrance examination (enrollment in a medical school in Türkiye takes place through a central examination attended by approximately 3 million students each year, and according to the results of this examination; the students are ranked according to their success with being first the best. After students apply for universities, by making a selection list on a central electronic system, the ranking of the university is determined by the ranking of the last student accepted when the prespecified university quota was full. In our study, we categorized universities that accepted students from the top 12,000 rankings as "preferred" and universities that accepted students from 12,001 and higher rankings as "less preferred")

In the third section, we asked students about their long-term professional career choice (orientation) after graduation, perceived barriers to achieving the career they are aiming for and their thoughts about whether the barriers that the students think hinder will disappear soon or not were questioned.

In the fourth section, we asked participants about the presence of relatives/friends living abroad, being abroad before, and willingness to live abroad if all conditions were met. In this section, we also questioned their preparations for a career abroad, including the tendency to continue their professional career abroad and their perceived reasons for the recent tendency of physicians in our country to live and work abroad. Two questions, perceived barriers to achieving the career they are aiming for, and the perceived reasons for the recent tendency of physicians in our country to live and work abroad, had additionally open-ended "other (please specify)" options. In all analyses, we also combined those who said "yes, absolutely" and "yes, maybe" to continue their career abroad as "yes," the others were categorized as "no."

In related sections, we asked participants to rate their level of professional self-competency in terms of theoretical and practical skills, theoretical and practical medical education levels of medical school they study in terms of professional competency, and their own foreign language skills in the categories of reading-understanding, writing, and speaking.

We created six variables (push & pull factors related to working and social environment/lifestyle in the country and abroad, inadequacy in the education of the medical school studied, and personal insufficiencies) by grouping the options of two questions with more than one option selected and categorized these newly created variables according to the intensity of choosing the relevant options. We grouped push factors of the social environment/lifestyle in the country as non-effective for emigration and effective for emigration. Lastly, we grouped other newly created variables as non-effective for emigration, partly effective for emigration, and effective for emigration according to the intensity of choosing the relevant options (Table 1).

Statistical analysis

We gave frequency distributions and percentages for categorical variables and mean and standard deviation values to define continuous data (Supplementary Material Tables 2a and 2b). In univariate and multivariate (stepwise logistic regression analysis-backward Wald elimination) analyses, we calculated the odds ratios (OR) separately for those who said "Yes, absolutely," "Yes, maybe," and both combined as "Yes" to continue their career abroad. For these 3 groups, we included those with an OR greater than 1.50 in the multivariate logistic regression. All hypotheses were two-sided. Type 1 error was considered as <0.05 in all statistical analyses. IBM-SPSS version 24.0 was used for analyses.

Ethical approval

In our study, in which participation was voluntary, before filling out the questionnaires, we informed the participants about the purpose of the study and the fact that not participating in the study would not create any disadvantage for them and that the confidentiality of the information would be protected. The Ethics Committee of the University approved the study. (Ref: date/number:23.02.2022/20.478.486/1204).

Results

Descriptive results

The mean age of participants was 23.8 ± 1.8 years (Min–Max:18–60) and 52.6 of the respondents were female (Supplementary Table 2(a)). The rate of those who want to continue their career abroad was 70.7% (absolutely: 33.6% and maybe: 37.1%). Approximately 60% of those, wanted to stay abroad permanently, and 61.5% of them took initiatives such as learning a foreign language abroad (54.5%) and taking relevant exams (18.9%) (Table 2). Of the medical students, 74% belong to middle or higher-income families, and 89.9% graduated from highly qualified high schools. The participation frequency rate of social activities (membership of NGOs, sports clubs, and university clubs) was 20.6% always, 45.1% sometimes, and 34.3% seldom/never. 42.7% of the students have a partner, and 51.0% have a friend or relative abroad. (Supplementary Table 2(a)).

Table 1. Variables and their configurations.

Variables and related options used creating them	Category name and number of selected options for related category group
Variable: Pull factors related to working conditions abroad	
1. Positive professional work atmosphere 2. Better scientific research and education opportunities	• Non-effective for emigration→If zero (0) option is selected. • Partly effective for emigration→ If one (1) option is selected • Effective for emigration→If two (2) options are selected.
Variable: Push factors related to working conditions in the country	
1. The difficulty of TUS (Central Board Exam) 2. Merit problems 3. Insufficient diversity of employment areas 4. Violence against physicians 5. Health system and policies 6. The weight of medical education* 7. Heavy working conditions of residency trainings* 8. Mobbing*	• Non-effective for emigration→If 0-1 options are selected. • Partly effective for emigration→If 2-3 options are selected. • Effective for emigration→ If 4-8 options are selected.
Variable: Push factors of the social environment/lifestyle in the country	
1. Social/administrative conditions in the country* 2. Despair* 3. Economic concerns related to the country 4. Anxiety about the future	• Non-effective for emigration→ If 0-1 options are selected. • Partly effective/effective for emigration→ If 2-4 options are selected.
Variable: Pull factors of the social environment/lifestyle abroad	
1. Expectation of a freer life 2. The attractiveness of sociocultural life abroad	• Non-effective for emigration→ If 0 option is selected. • Partly effective for emigration→ If 1 option is selected. • Effective for emigration→ If 2 options are selected.
Variable: Inadequacy in the education of the school they are studying	
1. Lack of a career center/counseling unit in the school in terms of career development 2. Lack of gaining skills such as research and project development in the education process 3. Limited university facilities (library, laboratory, lack of scientific research funds, etc.) 4. Faculty members are not good role models	• Non-effective for emigration→ If 0 option is selected. • Partly effective for emigration→ If 1-2 options are selected. • Effective for emigration→ If 3-4 options are selected.
Variable: Individual(own) inadequacies	
1. Need to earn money as soon as possible/financial inadequacies 2. Lack of self-confidence/Lack of social relationship skills 3. Foreign language insufficiency/learning difficulty 4. Having a low-grade point average (GPA)	• Non-effective for emigration→ If 0 option is selected. • Partly effective for emigration→ If 1–2 options are selected. • Effective for emigration→ If 3–4 options are selected.

*It is one of the most frequently mentioned answers for the "Other (please specify)" option.

Table 2. Trends and initiatives to pursue the career abroad ($n = 9881$).

Variables	Total (%)
Willingness to live abroad ($n = 9863$)	
Yes, I would	73.8
No, I wouldn't	11.1
Indecisive	15.1
Willingness to pursue the career abroad ($n = 9833$)	
Yes, absolutely	33.6
Yes, maybe	37.1
No	13.7
Indecisive	15.6
Forecasts of those who want to continue their career abroad on duration of their stay abroad ($n = 6947$)	
Long-term/permanently	59.6
Short-term	21.5
Indecisive	18.9
Initiatives by those who want to continue their career abroad* ($n = 6947$)	
Tried to improve foreign language level (course, personal effort, etc.)	54.5
Took any international language exam or professional qualification exam abroad (IELTS, TOEFL, USMLE etc.)	18.9
Contacted an institution or professional abroad (Mentor etc.)	14.4
Got accepted from an institution abroad (Participant observation, etc.)	4.2
Have not made any attempt	38.5

*Multiple choice question.

Features related to medical education and preparations for studying abroad are shown in Table 3(b). When asked, "If you could go back to the past, would you choose medical school again?" 39.1% stated that they would not choose medical school again. The rate of participation in a professional certificate program during medical education was 18.8%, taking part in a scientific project was 24.4%, and participation in a scientific congress domestically or abroad was 57.0%. Of the students, 24.6% stated that they want to pursue their professional careers in the field of Research & Development (R&D) (Supplementary Table 2(b)). Of the students, % 78,6 believed that there are barriers to achieving their aimed careers and 81,5% of them do not think they will disappear soon.

Results of the Univariate analyses

Univariate analyses revealed that being male (OR: 1.31, 95% CI: 1.20–1.43), being a member of a family with an income less than their expenses (OR: 1.63, 95% CI: 1.46–1.81), living in an apartment (OR: 1.39, 95% CI: 1.22–1.59), and not having a partner (OR: 1.54, 95% CI: 1.41–1.69) increased the tendency of pursuing their career abroad. Additionally, those who participate more in civil society and social activities tend to emigrate more than others (Table 3(a)). While the higher level of the mother's education significantly increases the students' tendency of working abroad, the education level of the father does not play a role in causality. Also, those who graduated from high-quality high schools prefer to work abroad 1.2 times more than vocational high schools(Table 3(a)). Students who have a professional certificate, who take part in scientific projects during the university period, who attend scientific congresses in Türkiye or abroad, and those who are currently studying or studied a second major besides medicine, are statistically more likely to prefer a career abroad. Students who are studying in less preferred universities and those who want to pursue their careers in R&D also want to continue their careers abroad. Furthermore, having a relative or friend abroad, and being abroad before increased the willingness of working abroad (Table 3(b)).

Results of the multivariate analyses

In the multivariate analysis, contrary to pull factors related to working conditions abroad, the push factors related to the working conditions in the country are found effective on the decision of those who want to work abroad "definitely" (OR: 1.89, 95% CI: 1.56–2.28), "probably" (OR: 1.48, 95% CI: 1.26–1.75), or "either" (OR: 1.61, 95% CI: 1.39–1.88). When the push-pull effect of the social environment/lifestyle is examined, the pull effect of the social environment/lifestyle abroad, contrary to the working conditions, was statistically significant in all analyses. Those who say that they would not choose the medical school again are 2.5 times more likely to "definitely emigrate" than those who say that they would choose the medical school again. While the desire to work in R&D is statistically significant on the decision of those who would "definitely plan to migrate" (OR: 1.38, 95% CI: 1.20–1.59), it is insignificant for those who would "probably plan to migrate" and it was excluded in the regression analysis. The perceived quality of the education received at the medical school is effective for both those who "definitely" want to work abroad (OR:

Table 3. Factors affecting the participants' pursuing the career abroad

a. Sociodemographic characteristics *(n = 9881)*‡

Variables	Univariate Analysis for Career Choice Abroad†		
	Crude OR for "Yes, Absolutely" (95% CI)	Crude OR for "Yes, Maybe" (95% CI)	Crude OR for "Yes*" (95% CI)
Age*(n = 9876)*****	**1.06(1.03-1.09)**	1.02(0.99-1.05)	**1.04(1.01-1.07)**
Year of education*(n = 9880)*			*[Ref: 5th Year]*
5th year/ 6th year	**1.14(1.03-1.26)**	1.06(0.96-1.17)	**1.10(1.01-1.20)**
Gender*(n = 9881)*			*[Ref: Woman]*
Woman/Man	**1.53(1.38-1.69)**	**1.13(1.03-1.25)**	**1.31(1.20-1.43)**
Number of siblings*(n = 9880)*			*[Ref: Two and more]*
Zero or one/ Two and more	**1.11(1.01-1.23)**	1.08(0.98-1.19)	1.09(1.00-1.19)
Place of accommodation*(n = 9880)*			*[Ref: Dormitory]*
Apartment / Dormitory	**1.53(1.31-1.77)**	**1.29(1.11-1.50)**	**1.39(1.22-1.59)**
Perceived family income*(n = 9874)*			*[Ref: Income ≥ Expenditure]*
Income ≥ Expenditure	1		
Income < Expenditure	**1.99(1.77-2.23)**	**1.34(1.19-1.50)**	**1.63(1.46-1.81)**
Educational level of the mother*(n = 9877)*			*[Ref: Less than 8 years]*
Less than 8 years	1		
8-12 years	1.08(0.95-1.23)	1.04(0.92-1.18)	1.06(0.95-1.18)
12+ years	**1.35(1.20-1.53)**	1.10(0.97-1.24)	**1.21(1.09-1.35)**
Educational level of the father*(n = 9879)*			*[Ref: Less than 8 years]*
Less than 8 years	1		
8-12 years	0.92(0.78-1.08)	1.02(0.87-1.19)	0.97(0.85-1.11)
12+ years	1.10(0.95-1.27)	0.98(0.86-1.13)	1.04(0.92-1.17)
Type of the graduated high school*(n = 9868)*			*[Ref: Vocational high schools]*
Vocational high schools	1		
Qualified high schools	**1.30(1.10-1.53)**	1.17(1.00-1.37)	**1.23(1.07-1.41)**
Presence of a health worker in the family*(n = 9877)*			*[Ref: No]*
Yes/No	1.06(0.96-1.17)	1.09(0.98-1.20)	1.07(0.98-1.17)
Participation in civil society activities*(n = 9877)*			*[Ref: No]*
Yes/No	**1.45(1.28-1.64)**	1.10(0.98-1.25)	**1.26(1.13-1.41)**
Frequency of participating in social activities*(n = 9877)*			*[Ref: Seldom/never]*
Usually/always	**1.45(1.27-1.67)**	1.10(0.96-1.27)	**1.27(1.12-1.43)**
Often/sometimes	1.03(0.92-1.15)	1.08(0.97-1.21)	1.06(0.96-1.17)
Seldom/never	1		
Presence of a partner*(n = 9874)*			*[Ref: No]*
Yes/ No	**1.75(1.58-1.94)**	**1.37(1.24-1.52)**	**1.54(1.41-1.69)**

b. Medical education experience and relevant factors domestically or abroad *(n = 9881)*‡

Variables	Univariate Analysis†		
	Crude OR for "Yes, Absolutely" (95% CI)	Crude OR for "Yes, Maybe" (95% CI)	Crude OR for "Yes*" (95% CI)
Choosing to study medicine again*(n = 9876)*			*[Ref: Yes/probably yes]*
Yes/probably yes	1	1	1
Indecisive	**1.32(1.16-1.51)**	**1.46(1.29-1.65)**	**1.40(1.25-1.56)**
No/probably no	**2.81(2.50-3.16)**	**1.82(1.62-2.04)**	**2.25(2.03-2.49)**
Type of the university*(n = 9881)*			*[Ref: State]*
State/Foundation	1.04(0.85-1.27)	0.97(0.82-1.21)	1.02(0.85-1.21)
Inclusion in a professional certificate program/presence of a certificate*(n = 9876)*			*[Ref: No]*
Yes/No	**1.52(1.34-1.74)**	**1.34(1.17-1.53)**	**1.43(1.27-1.60)**
Participating in a scientific project during the university*(n = 9878)*			*[Ref: No]*
Yes/No	**1.39(1.28-1.57)**	**1.16(1.03-1.31)**	**1.27(1.14-1.41)**
Studying a second major outside of medical school*(n = 9878)*			*[Ref: No]*
Yes/No	**1.82(1.45-2.29)**	**1.28(1.01-1.63)**	**1.53(1.24-1.90)**
Participating in a domestic/abroad scientific congress*(n = 9875)*			*[Ref: No]*
Yes/No	**1.27(1.15-1.41)**	**1.32(1.19-1.46)**	**1.30(1.19-1.41)**
Self-Evaluated level of the theoretical and practical education*(n = 9879)*			*[Ref: Sufficient]*
Insufficient	0.90(0.79-1.04)	1.03(0.90-1.17)	**1.21(1.09-1.34)**
Moderate	**1.31(1.16-1.48)**	1.12(1.00-1.26)	0.97(0.86-1.09)
Sufficient	1		
Self-Evaluated level of own theoretical and practical skills*(n = 9879)*			*[Ref: Insufficient]*
Insufficient	1		
Moderate	0.80(0.71-0.90)	1.02(0.91-1.14)	0.91(0.82-1.01)
Sufficient	1.12(0.98-1.29)	0.99(0.86-1.13)	1.05(0.93-1.19)

Table 3. Continued.

a. Sociodemographic characteristics *(n = 9881)*[‡]

Variables	Univariate Analysis for Career Choice Abroad[†]		
	Crude OR for "Yes, Absolutely" (95% CI)	Crude OR for "Yes, Maybe" (95% CI)	Crude OR for "Yes*" (95% CI)
Self-Evaluated level of foreign language competency*(n = 9841)*			*[Ref: Insufficient]*
Insufficient	1		
Moderate	**1.55(1.37-1.76)**	**1.32(1.17-1.48)**	**1.41(1.27-1.57)**
Sufficient	**3.39(3.00-3.84)**	**1.71(1.52-1.93)**	**2.38(2.14-2.66)**
The success ranking of the medical school*(n = 9881)*			*[Ref:1-12.000]*
1-12.000/ 12.001 and above	**1.12(1.01-1.25)**	**1.12(1.02-1.24)**	**1.12(1.03-1.23)**
Professional orientation*(n = 9881)*			*[Ref: Working as a physician]*
Working as a physician	1		
R&D	**1.59(1.41-1.80)**	**1.39(1.24-1.57)**	**1.48(1.33-1.65)**
Others (Administration, pharmaceutical comp. etc.)	**1.63(1.33-1.98)**	1.21(0.98-1.48)	**1.40(1.17-1.67)**
Pull factors related to working conditions abroad*(n = 9832)*			*[Ref: Non-effective for emigration]*
Non-effective for emigration	1		
Partly effective for emigration	1.08(0.93-1.25)	**1.17(1.02-1.35)**	1.13(1.00-1.28)
Effective for emigration	**1.92(1.68-2.20)**	**1.50(1.32-1.72)**	**1.69(1.51-1.90)**
Push factors related to working conditions in the country (*n = 9853)*			*[Ref: Non-effective for emigration]*
Non-effective for emigration	1		
Partly effective for emigration	**2.59(2.28-2.95)**	**1.83(1.62-2.05)**	**2.13(1.91-2.36)**
Effective for emigration	**4.11(3.59-4.70)**	**2.44(2.14-2.77)**	**3.09(2.76-3.46)**
Push factors of social environment/lifestyle in the country *(n = 9853)*			*[Ref: Non-effective for emigration]*
Non-effective for emigration	**1.93(1.71-2.19)**	**1.61(1.43-1.80)**	**1.75(1.58-1.94)**
Effective for emigration	1		
Pull factors of the social environment/lifestyle abroad *(n = 9829)*			*[Ref: Non-effective for emigration]*
Non-effective for emigration	1		
Partly effective for emigration	**1.58(1.36-1.83)**	**1.44(1.26-1.65)**	**1.50(1.33-1.69)**
Effective for emigration	**2.90(2.52-3.32)**	**1.85(1.62-2.10)**	**2.27(2.03-2.55)**
Inadequacy in the education of the medical school studied*(n = 9881)*			*[Ref: Non-effective for emigration]*
Non-effective for emigration	1	1	
Partly effective for emigration	**2.04(1.82-2.28)**	**1.66(1.49-1.86)**	**1.82(1.65-2.01)**
Effective for emigration	**4.09(3.53-4.75)**	**2.44(2.10-2.83)**	**3.15(2.75-3.60)**
Personal insufficiencies (n = 9833)			*[Ref: Non-effective for emigration]*
Non-effective for emigration	1		
Partly effective for emigration	**1.95(1.75-2.16)**	**1.59(1.44-1.77)**	**1.75(1.60-1.92)**
Effective for emigration	**2.04(1.62-2.58)**	**1.88(1.50-2.37)**	**1.96(1.45-1.73)**
Presence of a relative or friend abroad (n = 9869)			*[Ref: No]*
Yes/ No	**1.82(1.64-2.01)**	**1.41(1.27-1.55)**	**1.59(1.45-1.73)**
Being abroad before (n = 9789)			*[Ref: No]*
Yes/ No	**1.72(1.55-1.92)**	**1.27(1.14-1.41)**	**1.47(1.34-1.62)**

[‡]Bolded values (OR > 1.0) are statistically, and gray-highlighted bolded values (OR > 1.5) are practically significant.
[†]Reference: No *"Yes, absolutely" and "yes, maybe" combined ** Continuous

2.20, 95%CI: 1.83–2.65) and also for those who "probably" want to work abroad (OR: 1.70, 95%CI: 1.44–2.02) (Table 4).

Discussion

The issue of the emigration of Turkish physicians has become an important agenda item in the country, yet very little scientific research has been conducted on this subject, and discussions are speculative and based on limited data. Knowledge of the extent and causes of emigration among Turkish physicians is essential for preventing emigration and developing policies that encourage future returns.

About three-quarters of medical students who are about to graduate want to live abroad, and 71% are absolutely or maybe considering pursuing their careers abroad. In many other countries, the willingness of medical students or physicians who have just started their profession to emigrate is also at substantial levels. For 16 European, Asian, and African countries for which data are available, this percentage is between 38% (Hungary) and 89% (Egypt).[9,11,27–38] Although the figures regarding the willingness of physicians to work abroad in Türkiye do not differ much from other countries, the main problem in Türkiye is that the tendency for permanent residency abroad among physicians is as high as 60%. This is an extremely high rate compared to many other countries. The figures in countries vary between 7.5% (Hungary) and 28% (Pakistan) of physicians' willingness to reside abroad permanently.[9,33,34,36,37] In our study, 61.5% of the

Table 4. Variables that affect the choice to pursue the career abroad (*Stepwise Logistic Regression, final reduced model*)[§‡].

Variables	*Nagelkerke's R^2: 0,30* aOR for "Yes, Absolutely" [†1] (95% CI)	*Nagelkerke's R^2:0,09* aOR for "Yes, Maybe" [†2] (95% CI)	*Nagelkerke's R^2:0,16* aOR for "Yes, combined*"[†3] (95% CI)
Choosing to study medicine again			*[Ref: Yes/probably yes]*
Indecisive	**1.41(1.21–1.64)**	**1.41(1.24–1.60)**	**1.42(1.26–1.61)**
No/probably no	**2.51(2.19–2.88)**	**1.65(1.47–1.87)**	**1.96(1.75–2.20)**
Professional orientation		*[Ref: Working as a physician in clinical practice]*	
R&D	**1.38(1.20–1.59)**	-[a]	**1.37(1.22–1.54)**
Others (Administration, pharmaceutical comp. etc.)	1.02(0.81–1.29)	-[a]	1.00(0.82–1.22)
Push factors related to working conditions in the country			*[Ref: Non-effective for emigration]*
Partly effective	**1.60(1.35–1.89)**	**1.28(1.10–1.48)**	**1.32(1.22–1.59)**
Effective	**1.89(1.56–2.28)**	**1.48(1.26–1.75)**	**1.61(1.39–1.88)**
Pull factors of the social environment/lifestyle abroad			*[Ref: Non-effective for emigration]*
Partly effective	**1.21(1.02–1.44)**	**1.22(1.06–1.41)**	**1.19(1.04–1.36)**
Effective	**1.73(1.45–2.06)**	**1.37(1.19–1.58)**	**1.47(1.28–1.67)**
Inadequacy in the education of the medical school studied			*[Ref: Non-effective for emigration]*
Partly effective	**1.38(1.20–1.59)**	**1.25(1.10–1.43)**	**1.28(1.14–1.44)**
Effective	**2.20(1.83–2.65)**	**1.70(1.44–2.02)**	**1.79(1.53–2.10)**
Personal insufficiencies			*[Ref: Non-effective for emigration]*
Partly effective	**1.30(1.13–1.49)**	**1.17(1.03–1.32)**	**1.22(1.08–1.36)**
Effective	**1.23(0.93–1.63)**	1.22(0.95–1.56)	1.26(1.00–1.60)

[‡]Bolded values (OR > 1.0) are statistically, and gray-highlighted bolded values (OR > 1.5) are practically significant.
[§]Backward Wald Elimination [†]Reference: No [a]Excluded in the final model.
*"Yes, absolutely" and "yes, maybe" combined.
[1]Adjusted for: Age, gender, place of accommodation, perceived family income, participation in civil society activities, presence of a partner, inclusion in a professional certificate program/presence of a certificate, studying a second major outside of medical school, self-evaluated level of foreign language competency, presence of a relative or friend abroad, being abroad before, push factors of the social environment/lifestyle in the country, pull factors related to working conditions abroad, $n = 6{,}046$.
[2]Adjusted for: Age, self-evaluated level of foreign language competency, push factors of the social environment/lifestyle in the country, pull factors related to working conditions abroad, $n = 6{,}452$.
[3]Adjusted for: Age, perceived family income, presence of a partner, studying a second major outside of medical school, self-evaluated level of foreign language competency, presence of a relative or friend abroad, being abroad before, push factors of the social environment/lifestyle in the country, pull factors related to working conditions abroad, $n = 9{,}658$.

medical students who wish to emigrate have made at least one attempt; 14.4% have contacted an institution or a professional abroad, and 4.2% have already received acceptance from an institution abroad. The rates of attempting to emigrate and receiving acceptance are similar for Romanians (any attempt, 75%)[36] and Hungarians (4% getting accepted).[9]

We discovered that the tendency to work abroad increases with age, but contradictory findings have been reported in the literature.[13,28] Consistent with our findings, in some studies, men have a higher tendency to migrate than women,[27,32,38] but in one study, investigating the reasons for Russian physicians to stay permanently in Finland, women favored more permanent residency.[39] In our study (not shown in the analyses), the preference for permanent residency rates in men was also higher than in women.

Having a low income, living with a large family (more siblings), and residing in a student dormitory are associated with the tendency to emigrate, emphasizing the socioeconomic aspect of emigration, as in many studies.[9,10,13,27,28,30–32,34,36,40–42] We questioned the income status of the students, taking into account the financial status of their families. While this is consistent with a study from Serbia that also took into account the family income of the medical students,[43] a study that did not take this into account in Lithuania[27] found that low-income had no effect on emigration intention.

In a study of medical students in Romania, researchers observed that those who are socially engaged (having a partner) are more prone to emigration.[36] On the contrary, studies from Lithuania,[27] Uganda,[8] and Nigeria[34] discuss that social ties in the home country make migration more difficult. Better R&D career opportunities are identified as a driving factor for emigration, not only in underdeveloped countries such as Madagascar[12] and developing countries such as Pakistan,[29] as in our study, but also in high-income and developed countries such as Portugal[44] and Germany.[45]

The subjective evaluations of the quality of the education and rankings of the medical schools affected emigration intention. Those who find the medical education of their school less qualified and those who study at a lower-ranked medical school are more likely to emigrate. These results contradict the assumption

that qualified physicians who graduated from more preferred medical schools in Türkiye tend to migrate abroad. As a matter of fact, students who would not have chosen to study medicine again are more likely to emigrate. Based on these issues, it can be interpreted that students who study at a more preferred medical school, who are more satisfied with the education they receive, and who are satisfied with choosing the medical profession, are still hopeful for their professional careers in Türkiye.

In our study, we assessed push & pull factors related to working/social conditions in the country and abroad together with inadequacies in medical education and personal inadequacies. The negative impact of the health system and working environment in Türkiye and the push factor of inadequacies in medical education were found to be effective for migration. The push factor of the working conditions in the country has universal components such as lack of diversity in employment areas, long shifts during residency training, and mobbing, and it has also components specific to Türkiye such as compulsory service obligation with a high probability of moving to a different city after medical school and specialty training (both average 1.5 years), and difficulty in the central board exam. The most possible key reason why the working conditions in the country were found significantly important in the multivariate analyses as a driving factor is probably that violence against physicians was also evaluated within this factor. Unfortunately, violence against physicians, which is frequently covered in the media, has worsened in recent years, even causing the death of doctors.[46] In a study conducted on doctors, nurses, midwives, and emergency medical technicians in Türkiye in 2017, 36.7% of the participants stated that they were exposed to physical violence and 88.8% to verbal abuse.[47] In Egypt, 49.8% of medical students were exposed to verbal abuse and 40.8% to physical violence.[11] These worrisome numbers in Türkiye are likely to be a factor, even in the emigration intentions of medical students who have not yet encountered violence themselves, given that they are a reflection of violence against physicians. The effects of violence against healthcare workers in the workplace on migration are reported not only in Türkiye but also in Egypt, Iraq, Pakistan, South Africa, China and even just as verbal abuse in Lithuania.[6,11,29,48,49]

Better working conditions in the receiving country have been found to be important in physician migration in many studies,[9,11,22,27,31,36] unlike our study. Interestingly, physicians from developed countries such as Ireland also migrate to developed countries such as Australia for attractive reasons such as good working conditions and good staffing levels.[22]

While living conditions (such as lack of prospects and unfavorable economic environment in the home country) are the driving factors for many countries such as Greece,[10,13] Hungary,[9] and Nigeria,[34] it was not associated with emigration in our study. Homeland socioeconomic and/or political situation was the most frequently cited factor for emigration in a study of 462 physicians in Canada who had immigrated from various regions of the world (Asia, Africa, the Caribbean, Middle East).[40] The answer "social problems in the country" was one of the most frequently written answers in the "other" option in the related question in our survey, however, the fact that we did not find the social environment/lifestyle in the country to be effective in our study may be due to our inability to measure it accurately.

In a comprehensive study examining the channels used by OECD countries to attract foreign physicians, it is reported that the reasons for the migration of African physicians are mostly financial concerns, for Asian physicians better educational systems, and for the Central and Eastern European physicians to work in a more qualified health system with higher technology.[20] The migration pattern of medical students in Türkiye was influenced by all these reasons. We found that medical students with a motivation to emigrate abroad were mostly composed of two groups. Students from families with lower socioeconomic status and studying at less preferred medical schools tend to migrate for financial reasons, and the other group of students who aim to improve their professional development and want to work in the field of research and development tend to migrate for better educational, professional, and health system opportunities.

The emigration of physicians in Türkiye is a critical problem that is deepening daily. Prevention of the issue should be handled from multiple perspectives. Some policy implications can be drawn from our study. We recommend that attempts can be made to alleviate the problem through two channels. The first should aim at physicians who are considering leaving the country. Considering the repulsive effect of working conditions in the country, revisions should be made to prompt those who think about immigration to reconsider, such as reorganizing domestic practices to reduce the workload of physicians, reshaping the health system, and preventing violence against physicians. Retention policies such as financial incentives (e.g. financial bonuses, salary increases, etc.) to prevent the migration of those with lower incomes and non-financial incentives related to working conditions and those who want to do

research (e.g. a widening the range of employment opportunities, work-life balance, research opportunities, etc.) might be implemented. The effects of the improvements made by the Ministry of Health in the summer of 2022 (post-shift leave, salary increase with additional payments) should be examined in future studies. In the second channel, for physicians who have already immigrated, an official database can be created to obtain data, and the factors that might enable them to return can be identified and acted upon. Lastly, universities should be made more competent in many aspects, such as the activation of career centers, the inclusion of students in research and development projects, and improvements in the physical conditions of universities.

Strengths and limitations

Our study has limitations. We may not have achieved (1) the inclusiveness of the medical schools in the country may not have been achieved since the research invitation was not made through official means (2) the participation rate of medical students who tend to study abroad may be higher than others (selection bias) (3) we assessed some variables such as income status, medical school education, and foreign language evaluations in the survey subjectively, not through objective measurements (4) the weighting of options when creating new composite variables as push and pull factors was not internationally standardized and could be further investigated in the future studies. Nevertheless, our study is the first to examine physician migration in Türkiye in the scheme of push-pull factors at the national level and is the largest to date in the country, involving 39 medical schools and high representativeness with a heterogeneous distribution.

Conclusion

The willingness of medical students to emigrate after graduation in Türkiye is at the same level as those in other developing countries, however, the tendency to migrate permanently is higher. Although the reasons for migration are similar to those in many other countries, the main push factors for Turkish medical students are the negativities in the health system/working environment and the quality problems in medical education. The main pull factor is the more organized and modern social environment and living conditions in the developed countries where they want to migrate. The fact that medical students studying at more preferred medical schools tend to migrate less than others, may offer opportunities to prevent physician migration from the country.

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ORCID

Erhan Eser http://orcid.org/0000-0002-2514-0056
Elif Cil http://orcid.org/0000-0002-0037-7786
Nesibe Efruz Sen Gundogan http://orcid.org/0000-0003-0308-0256
Meltem Col http://orcid.org/0000-0001-7089-1644
Elif Nur Yildirim Ozturk http://orcid.org/0000-0003-1447-9756
David Terence Thomas http://orcid.org/0000-0002-8278-5934
Ahmet Tevfik Sunter http://orcid.org/0000-0002-7264-9760
Hatice Nilden Arslan http://orcid.org/0000-0002-3237-7123
Riza Citil http://orcid.org/0000-0002-7198-0195
Yalcin Onder http://orcid.org/0000-0002-6216-513X
Metin Picakciefe http://orcid.org/0000-0002-2877-7714
Bahadir Dede http://orcid.org/0000-0003-3985-5973
Can Demirel http://orcid.org/0000-0003-04178327
Neriman Aydin http://orcid.org/0000-0003-4676-1780
Cigdem Caglayan http://orcid.org/0000-0003-4811-7059
Ahmet Alp Aker http://orcid.org/0000-0003-0697-7528
Arda Borlu http://orcid.org/0000-0002-1424-8037
Hasan Durmus http://orcid.org/0000-0001-5719-1475
Gunay Can http://orcid.org/0000-0001-5815-6700
Esin Siddikoglu http://orcid.org/0000-0001-6875-5272
Ergun Haldun Sumer http://orcid.org/0000-0001-6690-7658
Tunahan Uygun http://orcid.org/0000-0003-3560-2514
Seval Alkoy http://orcid.org/0000-0002-5181-1773
Kubra Aktas Aycan http://orcid.org/0000-0002-1280-6808
İbrahim Koruk http://orcid.org/0000-0001-9564-2214
Rustem Kuzan http://orcid.org/0000-0002-5284-0525
Lutfi Saltuk Demir http://orcid.org/0000-0002-8022-3962
Esra Hacilar http://orcid.org/0000-0001-8914-8199
Hidir Sari http://orcid.org/0000-0002-7466-6628
Zehra Kilinc http://orcid.org/0000-0003-2896-4912
Ozgur Onal http://orcid.org/0000-0001-6514-2120
Edanur Dogan http://orcid.org/0000-0002-0728-3408
Mestan Emek http://orcid.org/0000-0001-6843-4954
Rıdvan Terzioglu http://orcid.org/0000-0001-6158-5055
Gulcin Yapici http://orcid.org/0000-0002-8276-7701
Deniz Erdal http://orcid.org/0000-0001-7721-0653
Sultan Eser http://orcid.org/0000-0003-4427-4540
Emine Ayhan Akman http://orcid.org/0000-0001-8093-7116
Zahide Kosan http://orcid.org/0000-0002-1429-6207
Sinan Yilmaz http://orcid.org/0000-0001-7784-3274
Ferruh Niyazi Ayoglu http://orcid.org/0000-0003-3266-1519
Bilgehan Acikgoz http://orcid.org/0000-0002-1405-5841

Berna Musal http://orcid.org/0000-0002-2688-8357
Ahmet Furkan Suner http://orcid.org/0000-0003-1383-3215
Aysegul Erdogan http://orcid.org/0000-0002-0548-5911
İdris Cilburunoglu http://orcid.org/0000-0002-6382-0730
Meral Saygun http://orcid.org/0000-0003-4238-587X
Didem Daymaz http://orcid.org/0000-0001-5712-2082
Didem Arslantas http://orcid.org/0000-0002-5263-3710
Muhammed Fatih Onsuz http://orcid.org/0000-0001-7234-3385
Nazim Ercument Beyhun http://orcid.org/0000-0002-4664-9070
Medine Gozde Ustundag http://orcid.org/0000-0001-6089-9829
Galip Ekuklu http://orcid.org/0000-0002-8915-6970
Fulya Ozder Tas http://orcid.org/0000-0002-7809-7944
Filiz Abacigil http://orcid.org/0000-0003-4291-0013
Selcen Oncu http://orcid.org/0000-0001-6329-4227
Seyhan Hıdıroğlu http://orcid.org/0000-0001-8656-4613
Ayse Nilufer Ozaydin http://orcid.org/0000-0002-2616-0710
Edibe Pirincci http://orcid.org/0000-0002-1344-4562
Irem Bulut http://orcid.org/0000-0002-6954-7886
Mustafa Tozun http://orcid.org/0000-0002-7557-432X
Muzaffer Eskiocak http://orcid.org/0000-0002-4682-545X
Pinar Gunel http://orcid.org/0000-0003-3768-2351
Sebahat Dilek Torun http://orcid.org/0000-0001-9139-9325
Melike Yavuz http://orcid.org/0000-0001-9037-6770
Metin Hasde http://orcid.org/0000-0002-0465-5608
Derya Camur http://orcid.org/0000-0002-2970-674X
Gulsen Gunes http://orcid.org/0000-0003-2021-7103
Burak Kurt http://orcid.org/0000-0002-8185-2146
Nuket Guler Baysoy http://orcid.org/0000-0002-6027-2011
Nadi Bakirci http://orcid.org/0000-0002-1614-5517
Figen Demir http://orcid.org/0000-0001-6309-4540
Binali Catak http://orcid.org/0000-0003-2769-990X
Ferda Ozyurda http://orcid.org/0000-0002-3212-1830
Mustafa Turan http://orcid.org/0000-0003-4782-8596

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