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Perspectives of First-Year Medical Students on Physician Brain Drain and Associated Factors

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Abstract

Objective: Brain drain refers to the migration of qualified and educated professionals from developing or underdeveloped countries to developed ones, often without returning. It is a global issue, and Türkiye is among the most affected. This study aimed to examine first-year medical students' views on physician brain drain and identify factors associated with their intention to work abroad.

Materials and Methods: This cross-sectional study used a questionnaire including sociodemographic variables such as gender, age, socioeconomic status, and educational background. Participants were asked about their motivations to live and work abroad. Those who answered "Yes" or "No" to the question "Do you plan to go abroad after graduation?" were directed to different follow-up questions, including binary and 5-point Likert-type items. The minimum required sample size was calculated as 152 at a 95% confidence level. Data were collected online, and confidentiality was ensured. Analyses were conducted using SPSS 30.0. Categorical variables were presented as frequencies and percentages; Pearson's chi-square or Fisher's exact test was used for comparisons.

Results: A total of 156 first-year medical students participated (89 females, 57.1%; 67 males, 42.9%). Among them, 100 (64.1%) reported an intention to work abroad. A significant association was found between intention to go abroad and family economic status (p=0.029), with students reporting high economic status more likely to prefer continuing their careers in Türkiye. No significant associations were found with gender (p=0.089), foreign language proficiency (p=0.178), or previous experience abroad (p=0.417).

Conclusion: A considerable proportion of students expressed a desire to work abroad. Economic status appears to play a determining role, while gender, language proficiency, and international experience appeared to have lesser influence on the decision to work abroad.

Keywords: Brain drain, medical students, physicians

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INTRODUCTION

Medical brain drain refers to the loss of human capital resulting from the migration of highly educated individuals—particularly from developing to developed countries (1). Beyond individual preferences, this phenomenon reflects structural problems within healthcare systems and global inequalities, making it a multidimensional issue.

According to the Organisation for Economic Co-operation and Development (OECD) 2019 report, the proportion of physicians migrating to developed countries has been increasing each year. Countries such as India, Pakistan, and Nigeria are among the highest sources of physician migration, while the United States, the United Kingdom, Germany, and Canada are the main destination countries (2).

In countries such as Türkiye, where healthcare resources are relatively limited, unfavorable working conditions, heavy workload, and low income—known as "push" factors—have been shown to increase students' tendency to seek career opportunities abroad (3). About 18% of physicians in OECD countries were trained abroad, demonstrating the extent of workforce mobility and the resulting strain on source countries' health systems. (4). Moreover, systematic reviews indicate that while push factors such as low remuneration, limited career progression, and infrastructure deficits drive out-migration, "pull" factors like advanced technology access and favorable working conditions in destination countries exert significant influence as well (5).

A similar trend is observed in Türkiye. According to data from the Turkish Medical Association (*Türk Tabipleri Birliği*, TTB), applications for the "Certificate of Good Standing" increased from 1405 in 2021 to 3025 in 2023. This indicates physicians' dissatisfaction with current working conditions and their growing inclination to work abroad (6).

Studies conducted among medical students have shown a high desire to work abroad after graduation. For example, 52.9% of students at Pamukkale University and 77.5% of students at Çanakkale Onsekiz Mart University reported that they intend to pursue a career abroad after graduation (7,8). In a study carried out with students from Cumhuriyet University by Filiz et al. (10), students' attitudes toward brain drain were evaluated as one of the notable investigations on this topic, and the relationships between these attitudes and various sociodemographic variables were examined. Such studies are important for understanding the expectations and concerns of the young population regarding the future.

Thus, physician brain drain is not only an individual decision but also a societal and systemic indicator. Properly analyzing the causes of this phenomenon and developing solution-oriented policies are crucial for both Türkiye and global healthcare systems.

This study aimed to determine the perspectives of first-year medical students at Marmara University regarding migration as future physicians and the factors influencing these perspectives.

MATERIALS AND METHODS

This cross-sectional study was conducted among first-year students at the Marmara University Faculty of Medicine during the 2024–2025 academic year. The study population consisted of 255 students. Based on a prevalence rate of 50% and a 95% confidence level, the minimum sample size was calculated as 152; ultimately, 156 students participated. Eligible participants were all actively enrolled medical students during the data collection period. Students who declined participation, provided incomplete surveys, or were temporarily not enrolled (e.g., taking a leave of absence) were excluded from the analysis. Among the participants, 42.9% were male (n=67) and 57.1% were female (n=89), with no participant selecting the "other" option.

Data collection was carried out online. The questionnaire, developed by the research team, was distributed *via* the Google Forms. Items were generated based on a review of the existing literature on migration intentions among medical students and early-career physicians. Additional items were informed by expert input from faculty members in medical education and public health. The questionnaire was piloted with a small group of students (N=5) to ensure clarity and comprehensibility, and minor wording adjustments were made accordingly. The average completion time was approximately 10 minutes, and participation was entirely voluntary. No personal data were collected, and confidentiality principles were strictly observed. Verbal informed consent was obtained prior to participation.

The study was conducted in accordance with established ethical principles, and ethics approval was granted by the Marmara University Faculty of Medicine Non-Drug and Non-Medical Device Research Ethics Committee on March 21, 2025, with decision number 09.2025.25-0224.

The questionnaire consisted of two main sections. The first section included sociodemographic questions such as age, gender, parents' educational levels, family economic status, type of high school, and reasons for choosing the medical faculty. The second section focused on

evaluating students' willingness to live and work abroad after graduation. Participants were asked, "Would you like to pursue your professional career abroad after graduating from medical school?" and were divided into two groups ("Yes" and "No") according to their answers. For both groups, statements were presented in "Yes–No" format as well as on a five-point Likert scale. The Likert scale was rated as "no effect," "slightly effective," "moderately effective," "very effective," and "extremely effective."

Data analysis was performed using SPSS version 30.0 (IBM Corp., Armonk, NY, USA). Categorical variables were presented as frequencies and percentages, and relationships between variables were examined using the Pearson chi-square test. Fisher's exact test was applied when expected frequencies were insufficient. A p-value <0.05 was considered statistically significant.

Several variables were recoded prior to analysis. Categories with very small cell counts were merged to ensure adequate subgroup sizes, improve statistical stability, and allow for more meaningful comparisons. Recoding decisions were based solely on distributional considerations, and no conceptual categories were altered. During analysis, some variables were recategorized for clarity. Parental education levels were grouped as "primary," "secondary," and "higher education." Economic status was categorized as "low," "medium," "high," and "unknown/prefer not to answer." The reason for choosing medicine was classified as "voluntary" or "other," while the post-graduation career goal was divided into "specialization" and "other." Foreign language proficiency was coded as "low," "medium," and "high." Satisfaction with the healthcare system and quality of life was simplified into three categories: "satisfied," "neutral," and "dissatisfied." Responses from Likert-type items were merged into three categories: "not effective," "moderately effective," and "effective."

Microsoft Excel was used during data organization and tabulation, and all analyses were conducted by the research team. The study was designed based on scientific principles, including sample size determination, standardized data collection, and appropriate statistical analyses. It aims to objectively reveal the attitudes of Marmara University Faculty of Medicine students toward physician brain drain in relation to sociodemographic variables.

During the preparation of this work, the author(s) utilized ChatGPT version GPT-5.1 (OpenAI, San Francisco, CA, USA) to generate summaries of research articles related to the topic.

RESULTS

Most first-year medical students (64.1%) stated that they intend to pursue their professional careers abroad after graduation. In contrast, 35.9% reported that they wish to continue their careers in Türkiye.

A statistically significant relationship was found between family economic status and the preference for or against physician brain drain after graduation, based on the chi-square analysis (p=0.029). Specifically, students from low and middle-income families were more likely to prefer pursuing their professional careers abroad after graduation compared to those from high-income families. In the research survey, 6 participants chose to not disclose their family's economic status; these responses were excluded from the related analysis, and Table 1 reflects this adjustment.

Among the students who stated that they wish to pursue their professional careers abroad after graduation (N=100), the factors influencing their intention to emigrate were evaluated on a 5-point Likert scale. The highest mean scores were observed for the following factors: "the regulatory conditions in Türkiye" (mean=4.24), "the economic conditions in Türkiye" (mean=4.23), and "working conditions abroad" (mean=4.23) (Table 2).

Table 1. The most influential factors in brain drain intention.

Economic status	Students wishing brain drain n (%)	Students wishing to stay in Türkiye n (%)	Total n (%)	p-value*
Low	13 (76.5)	4 (23.5)	17 (100.0)	0.02
Moderate	54 (70.1)	23 (29.9)	77 (100.0)	
High	28 (50.0)	28 (50.0)	56 (100.0)	
Total	95 (63.3)	55 (36.7)	150 (100.0)	

*Pearson chi-square test; p<0.05 considered statistically significant.

Table 2. The most influential factors in brain drain intention.

Factor	Mean	Standard Deviation
The regulatory conditions in Türkiye	4.24	0.96
The economic conditions in Türkiye	4.23	0.85
Working conditions abroad	4.23	0.88
Economic expectations	4.22	0.82
Expectations regarding incidents of violence against healthcare workers and respect for healthcare professionals' rights	4.18	0.99
Social life and quality of life opportunities abroad	4.14	0.93
Opportunities for professional development and access to innovation abroad	3.91	1.03
Desire to live in a country that I consider more developed overall	3.90	1.11
Research and academic career opportunities abroad	3.87	1.11
The state of psychological comfort in working environments abroad	3.85	0.95
Workload abroad and the time available for individual patient follow-up	3.82	1.05
My general feelings about living in Türkiye	3.80	1.14
Comparison of burnout risks in medical professions in Türkiye and abroad	3.71	1.14
Current state of the healthcare system in Türkiye	3.62	1.09
Desire to experience different cultures	3.53	1.21
Opportunities abroad for my children / future family	3.51	1.36
Availability of medical technology abroad	3.40	1.07
Perceived professional prestige abroad	3.34	1.24
The desire to improve myself and return to my country	3.15	1.39

The table presents the mean and standard deviation scores of factors influencing the intention to pursue a medical career abroad among first-year medical students who stated that they wish to work abroad after graduation (N=100). These values were calculated using a 5-point Likert scale, where 1 indicates "Not influential at all" and 5 indicates "Extremely influential."

Among the students who stated that they wish to continue their professional careers in Türkiye after graduation (N=56), the highest mean scores for factors influencing their preference to remain in the country (based on a 5-point scale) were as follows: "my desire to stay close to my family and friends in Türkiye" (mean=4.73), "my liking for living in Türkiye" (mean=4.18), and "my cultural ties in Türkiye" (mean=4.14) (Table 3).

Gender-based differences in the factors influencing the intention to work abroad were also examined among students who wished to pursue their careers abroad (N=100).

Impact of violence in healthcare: 94.2% of female students rated this factor as "highly influential," compared with 56.3% of male students. This difference was statistically significant (p<0.001) (Table 4).

Access to professional development and innovation: 82.7% of female students and 54.2% of male students rated this factor as "highly influential," demonstrating a statistically significant difference (p=0.008) (Table 5).

Working conditions abroad: 90.4% of female students and 70.8% of male students rated this factor as "highly

Table 3. The most influential factors in the intention to stay in Türkiye.

Factor	Mean	Standard Deviation
My desire to stay close to my family and friends in Türkiye	4.73	0.82
My liking for living in Türkiye	4.18	1.20
My cultural ties in Türkiye	4.14	1.21
My belief that living abroad could cause the feeling of loneliness	4.14	1.32
My desire to serve my country	3.98	1.40
My sense of responsibility toward my country	3.98	1.40
The difficulties of living abroad	3.61	1.37
Family-related or personal reasons	3.48	1.57
The challenges of adapting to different healthcare procedures abroad	3.43	1.34
My desire to bring change to the healthcare system in Türkiye	3.32	1.55
The length and difficulty of the migration process	3.30	1.45
My wish to take a stance against brain drain	3.29	1.62
Immigration policies applied abroad	3.29	1.62
My state of satisfaction with the social life and quality of life conditions in Türkiye	3.18	1.37
Job opportunities in Türkiye after graduation	3.07	1.38
Financial reasons (moving abroad, costs of the process, etc.)	3.05	1.51
My state of satisfaction with working conditions for doctors in Türkiye	3.04	1.47
Language barrier	2.91	1.38
My level of trust in the healthcare system in Türkiye	2.84	1.39
Religious reasons	2.70	1.62
The difficulties of passing professional competency exams abroad	2.66	1.36

The table presents the mean scores of factors influencing the desire to remain in Türkiye among 56 first-year medical students who stated that they wish to pursue their professional careers in the country after graduation. The values were calculated using a 5-point Likert scale, where "1=Not influential at all" and "5=Extremely influential," and are reported along with their standard deviations.

influential," and the association was statistically significant (p=0.022).

The satisfaction levels of 156 first-year medical students with the healthcare system in Türkiye were measured using a 5-point Likert scale. The overall mean satisfaction score was calculated as 2.61 out of 5. When group differences were examined, the mean satisfaction score for students who wish to pursue their professional careers abroad after graduation was 2.52, whereas it was 2.77 for those who prefer to continue their careers in Türkiye.

The overall satisfaction levels of 156 first-year medical students regarding living in Türkiye were measured using a 5-point Likert scale. Based on the collected data, the overall mean satisfaction score was calculated as 2.58 out of 5. When comparing groups, the mean satisfaction score for students who wish to pursue their professional careers abroad after graduation was 2.29, whereas it was 3.09 for those who prefer to continue their careers in Türkiye.

No statistically significant relationship was found between the participants' gender and their preference to

Table 4. Impact of violence in healthcare on the decision of brain drain.

Level of the Impact	Female n (%)	Male n (%)	Total n (%)	*p*-value*
Low impact	0 (0.0)	5 (10.4)	5 (5.0)	0.001
Moderate impact	3 (5.8)	16 (33.3)	19 (19.0)	
High impact	49 (94.2)	27 (56.3)	76 (76.0)	
Total	52 (52.0)	48 (48.0)	100 (100.0)	

*Pearson chi-square test; $p<0.05$ considered statistically significant.

Table 5. Impact of the opportunities for professional development and access to innovation abroad on the decision of brain drain.

Level of the Impact	Female n (%)	Male n (%)	Total n (%)	*p*-value*
Low impact	3 (5.8)	9 (18.8)	12 (12.0)	0.008
Moderate impact	6 (11.5)	13 (27.1)	19 (19.0)	
High impact	43 (82.7)	26 (54.2)	69 (69.0)	
Total	52 (52.0)	48 (48.0)	100 (100.0)	

*Pearson chi-square test; $p<0.05$ considered statistically significant.

pursue their professional careers abroad after graduation, according to the chi-square analysis ($p=0.089$). Similarly, no statistically significant association was identified between participants' prior experience of living abroad and their intention to pursue physician brain drain after graduation ($p=0.417$). In addition, the chi-square analysis showed no statistically significant relationship between participants' foreign language proficiency and their preference to emigrate after graduation ($p=0.178$).

DISCUSSION

This study aimed to evaluate the attitudes of first-year medical students at Marmara University Faculty of Medicine toward brain drain and to identify the factors influencing these preferences. The findings shed light on the sociodemographic and structural determinants shaping students' decisions to work abroad.

Family economic status emerged as a key factor influencing the tendency toward brain drain. Students from middle- and low-income families showed a stronger desire to pursue a career abroad. This result is consistent with the findings of Altun Güzelderen et al. (9), who reported a relationship between income level and migration intention. Differences reported in other studies may be attributed to variations in sampling or measurement methods (10,11).

In our study, foreign language proficiency, prior experience abroad, and gender were found to have no statistically significant effect on migration preference. This finding contrasts with some studies that identified language proficiency as a decisive factor (10,11). The discrepancy may be explained by the fact that Marmara University provides medical education in English, which may reduce language-related barriers among its students. Regarding gender, the results indicated no significant effect on the decision to migrate, which aligns with previous studies reporting limited gender-based differences in brain drain decisions (1).

Among the factors influencing students' inclination to migrate, regulatory and economic factors in Türkiye, as well as working conditions abroad, were prominent. The increasing number of "Good Standing Certificate" applications reported by the TTB reflects this general trend

(9,12). In countries like Türkiye, where healthcare resources are relatively limited, unfavorable working conditions, heavy workload, and low income — known as "push" factors — have been shown to increase students' tendency to seek career opportunities abroad (13). Conversely, among those who preferred to stay in Türkiye, a sense of belonging to family, friends, and cultural ties was found to be a major determinant. This finding is consistent with studies emphasizing the mitigating role of social support in reducing brain drain (9,14).

Moreover, recent research in Türkiye indicates that not only structural factors like salary and workload, but also psychological and ethical dimensions contribute significantly to physicians' migration intentions. For instance, a qualitative study found that professional-ethical concerns such as maintaining autonomy, avoiding harm, and upholding beneficence in patient care play an important role in physicians' decisions to emigrate (15). This suggests that efforts to retain future physicians may benefit from addressing not only economic and systemic issues, but also professional values and workplace culture.

Another relevant observation from the literature is that mental health and stress levels among medical students and physicians are increasingly linked to migration intention. A cross-sectional study of Turkish medical students found that higher levels of depression and stress were significantly associated with the intention to migrate abroad (16). These findings underscore the need for retention strategies that incorporate psychosocial support, reduce burnout, and promote resilience among health-care students and professionals.

This study has several limitations. First, it was conducted at a single medical school, which may limit the generalizability of the findings to medical students in other regions or institutional contexts in Türkiye. Second, the sample consisted only of first-year students; migration intentions may evolve throughout medical training, and therefore the results may not reflect the perspectives of more advanced cohorts. Third, participation was voluntary, introducing the possibility of selection bias, as students with stronger opinions about studying or working abroad may have been more likely to participate. In addition, the data were based on self-reported measures, which are subject to recall bias and social desirability effects. The cross-sectional design also prevents causal inference. Finally, some unmeasured factors—family migration history—may have acted as potential confounders. Despite these limitations, the study provides important preliminary insights into early-stage brain drain intentions among medical students in Türkiye.

This study demonstrates that family economic status plays a decisive role in the intention to migrate, whereas individual characteristics such as language proficiency and gender have a more limited influence on migration decisions. Economic and working conditions in Türkiye and living standards abroad strengthen students' inclination to seek opportunities outside the country. Conversely, family ties, cultural belonging, and the desire to live in Türkiye emerge as protective factors supporting students' decisions to remain in their home country.

The findings indicate that the phenomenon of brain drain arises not solely from individual preferences but from the intersection of social, economic, and structural factors. Therefore, policies aimed at reducing brain drain should not only address financial conditions but also focus on broader dimensions such as overall life satisfaction, opportunities for academic advancement, and professional prestige.

Ensuring economic stability within the healthcare system, clarifying career pathways for young physicians, reducing workload and burnout, preventing workplace violence, and implementing fair wage policies may contribute to mitigating brain drain. Likewise, educational institutions can strengthen students' sense of belonging by offering programs that foster national commitment, mentorship systems, and career planning support, thereby enhancing young physicians' motivation to remain in Türkiye.

Future research should be designed to include students from different faculties and academic years and incorporate variables such as international experience, career goals, and professional satisfaction. Longitudinal studies could track changes in brain drain tendencies from medical education through post-graduation, providing a more comprehensive understanding of the process.

CONCLUSION

This study shows that the tendency toward brain drain among medical students is strongly shaped by socioeconomic background and perceptions of the national regulatory and economic climate. Students from middle- and low-income families expressed a greater desire to pursue careers abroad, highlighting the role of financial insecurity in shaping career aspirations. Additionally, dissatisfaction with local working conditions and perceived professional opportunities abroad further reinforced migration intentions.

These findings have several implications for policy and medical education. At the policy level, strategies aimed at improving economic stability, strengthening social support for students from lower-income families, and enhancing working conditions in the healthcare system

may help reduce the push factors driving young physicians to consider leaving the country. At the educational level, medical schools could integrate structured career counseling, mentorship programs, and well-being initiatives to help students navigate uncertainties, develop realistic career expectations, and foster a stronger sense of professional belonging within the national context. Addressing these factors in a coordinated and sustained manner may contribute to reducing the early formation of brain drain intentions among medical students.

Ethical Approval: The study was approved by the Marmara University Faculty of Medicine Non-Drug and Non-Medical Device Research Ethics Committee on March 21, 2025, with decision number 09.2025.25-0224.

Informed Consent: Verbal informed consent was obtained from all participants before data collection.

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