

GEOGRAPHICAL DISTRIBUTION AND CAREER PREFERENCES OF NEPALI MEDICAL GRADUATES- A CROSS SECTIONAL STUDY

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ABSTRACT

Nepal continues to face problems with the migration of its medical graduates both abroad and into major urban centers like Kathmandu Valley, worsening the already uneven distribution of doctors across the country. Despite years of expanding medical education with the goal of improving rural healthcare access, many graduates choose opportunities overseas or in cities, leaving rural and remote areas underserved. Understanding where Nepali medical graduates are practicing, and why, is essential for developing effective strategies to retain them and strengthen Nepal's healthcare system. A descriptive cross-sectional survey was conducted from June 2023 to January 2025 among 1,208 Nepali medical graduates (both undergraduate and postgraduate levels) using a self-constructed electronic questionnaire. Participants were recruited through online platforms and alumni networks across all medical colleges in Nepal. Among the 1,208 respondents, 75.3% were male and 24.7% female, with a steady rise in female representation over time from 8.1% before 2000 to 37.4% after 2020. The majority (67.8%) graduated from Tribhuvan University. Overall, 66.8% were practicing in Nepal, while 33.2% worked abroad, predominantly in the United States (74.31% of those abroad). Within Nepal, 62.3% of graduates were working in Kathmandu Valley, with Bagmati Province hosting the highest number of doctors. Male graduates were more likely than females to work outside Kathmandu Valley. A significant association was found between graduation year and current practice location ($p < 0.0001$), with post-2020 graduates showing the highest retention in Nepal. Gender disparities, university affiliation, and graduation year significantly influenced practice location. Addressing these challenges will require targeted policies that improve rural incentives, expand postgraduate opportunities outside urban centers, and create supportive, gender-sensitive work environments.

KEYWORDS

Brain drain, medical graduates, retention, rural healthcare, survey

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INTRODUCTION

According to the World Migration Report 2024, there were 281 million international migrants worldwide representing 3.6% of total global population as per the most recent global estimate in 2020. The most common preferred destination was United States of America.¹ Brain drain refers to the large scale migration of skilled workforce from one place or country to another with better living conditions and with better opportunities and higher earnings.² Brain drain occurs when people who pursue education abroad choose not to return to their home country after graduating, or when those who are educated domestically move abroad in search of better job opportunities or higher salaries.³ While it might bring positive effects like decrease in population, improve quality of education and introducing new technology, skill and new ideas brought back in the country by those who leave, overall it has repercussions and is a cause of concern.²

Nepal is a landlocked country with population of 29,164,578.⁴ There are 15 hospitals in Koshi province, 8 in Madhesh province, highest of all in Bagmati with 57 hospitals, 15 in Gandaki, 15 in Lumbini, only 2 hospitals in Karnali and 3 in Sudurpaschim province.⁵ Hence, to have a equitable and sustainable healthcare system in Nepal, brain drain of Nepali doctors should be managed. In this sense, this research might be helpful for the policy makers.

The geographical maldistribution of physicians is one of Nepal's most important public health issues.⁶ Doctors migrate from areas of less service to areas with better services, resulting in internal and external migration which leads to adverse outcomes in areas of origin.⁷ It is important to understand the factors influencing the decision of medical graduates to stay in their country and serve their place of origin, or travel to foreign countries, to formulate essential strategies for retention of doctors in Nepal.⁸ Nepal currently produces medical graduates from 19 medical colleges, all established with aim of serving the country's remote population.^{7,9,10} There are 34,910 registered doctors in Nepal, and this number continues to grow.¹¹ Ever since private medical schools were introduced in Nepal, the number of medical students has been increasing steadily. What started as a modest figure has grown nearly fifty times by 2011, and the numbers have continued to expand ever since.¹²

Factors influencing graduates to work in rural areas were identified as growing up rural, planning rural practice, and planning family

medicine and surprisingly, the rural origin of students was found to be the most important factor for retention of the rural health workforce.^{13,14} In contrast, some evidence suggested that despite being satisfied with their medical education in rural primary settings, the graduates still didn't want to practice in rural settings.¹⁵ Consequently, the willingness to practice in foreign countries is increasing in Nepal and is also evident in nearby countries of Nepal.¹⁶

As of date, the available data for mapping the number of graduates and their location is unsatisfactory, with the last known data of the first 22 batches of the medical doctors from the Institute of Medicine (IOM) being the primary source of reference. If the graduates can be mapped from all the eligible medical colleges of Nepal it could give a generalized picture of the thought process of Nepalese medical graduates which could help in retention of doctors in Nepal.

MATERIALS AND METHODS

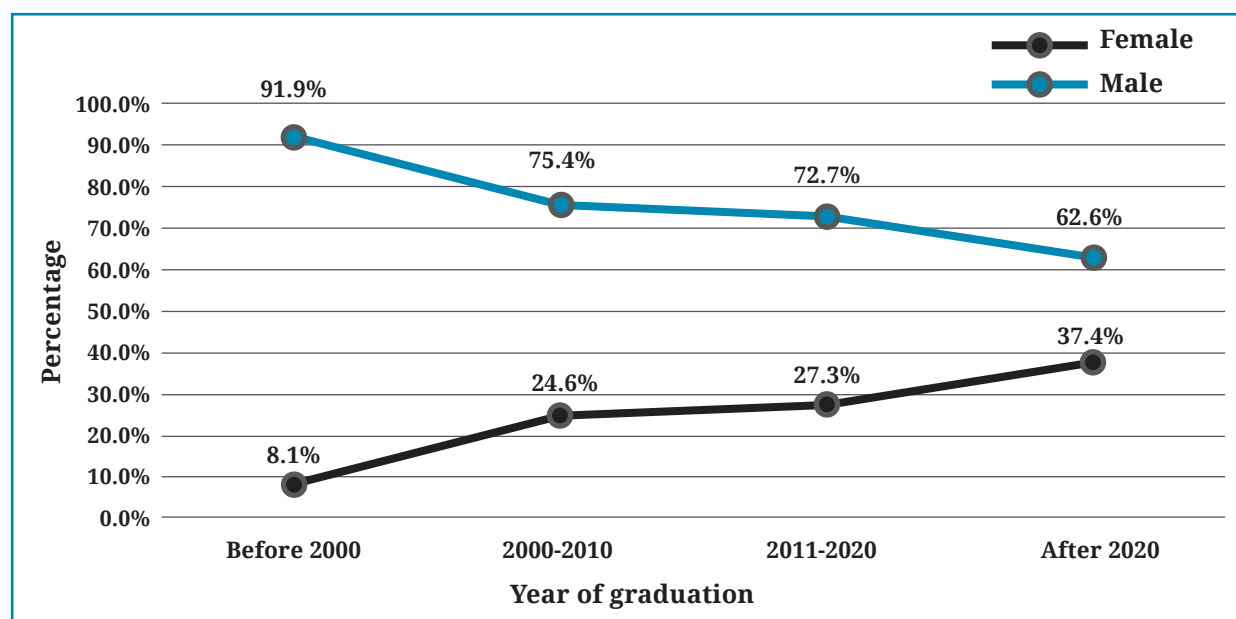
This was a descriptive cross sectional survey done from June 2023 till January 2025 with a self constructed questionnaire with medical graduates as our target population including both undergraduates and post-graduates. Data was collected through online google form after their consent via electronic proforma circulated in online portals and groups of all the medical colleges of Nepal and chiefly their alumni group. Ethical approval for the study was taken from the Institutional review committee of NMCTH (Ref. No: 46-081/082). We developed a two-page simple questionnaire with the help of Google Forms with a mandatory consent page at the front. We recruited the respondents chiefly through circulation of the proforma in Viber groups, emails, and online alumni forums of different medical colleges. Initially, the period of 3 months was established for data collection however with very few response we added 1 year in which we re-circulated the proforma every week in various social media platform. Incompletely filled questionnaires were omitted. The data from google document was entered into Microsoft excel and all statistical analysis of the data was done using SPSS-18.

RESULTS

A Chi-square test of independence was done to examine the association between year of graduation and current practice location (Nepal vs. abroad). The result was statistically

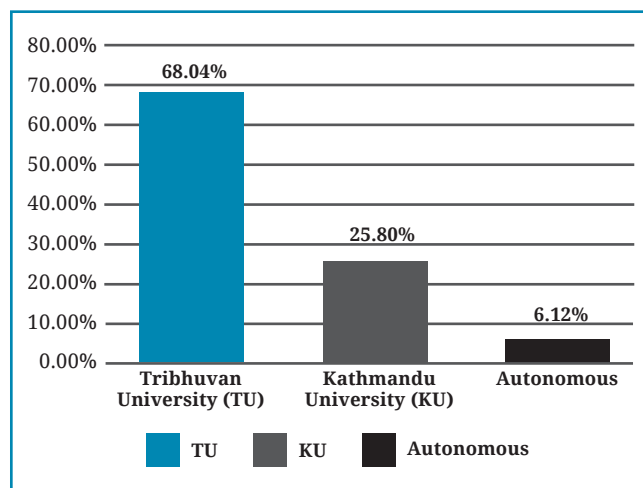
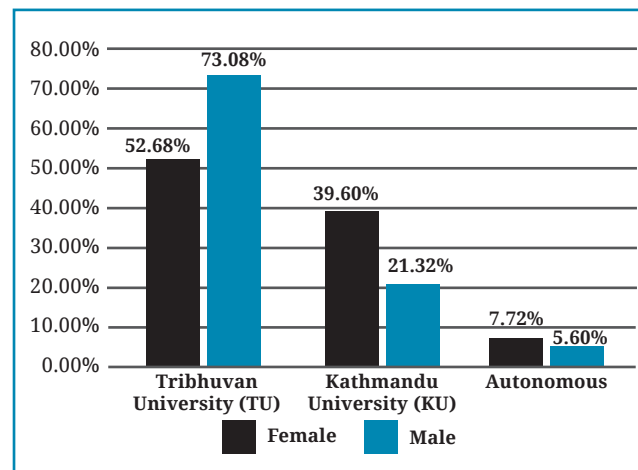
Table 1: Association between year of graduation and current practice location (Nepal or Abroad)

Year of Graduation	Nepal	Abroad	Total	P value
Before 2000	208 (88.50%)	27 (11.50%)	235 (100%)	<0.0001
2000-2010	114 (41.90%)	158 (58.10%)	272 (100%)	
2010-2020	282 (57.00%)	213 (43.00%)	495 (100%)	
After 2020	203 (98.50%)	3 (1.50%)	206 (100%)	
Total	807 (66.80%)	401 (33.20%)	1208 (100%)	

**Fig. 1:** Gender distribution of surveyed medical graduates over several periods.

significant, χ^2 (calculated) = 197.1, χ^2 (tabulated) = 11.345, df = 3, n = 1208, p < 0.0001, indicating a strong association between graduation year and practice location. Surveyed graduates from 2000–2010 were more likely to be practicing abroad, while nearly all graduates after 2020 were working in Nepal (Table.1).

In surveyed graduates before 2000, females accounted for 8.1% (19 graduates) and males for 91.9% (216 graduates) of the 235 total graduates. Between 2000 and 2010, the proportion of female graduates rose to 24.6% (67 graduates), while male graduates decreased to 75.4% (205 graduates) out of 272 total graduates. From

**Fig. 2:** Distribution of surveyed medical graduates across medical colleges**Fig. 3:** Gender distribution of surveyed medical graduates on the basis of University they graduated MBBS from.

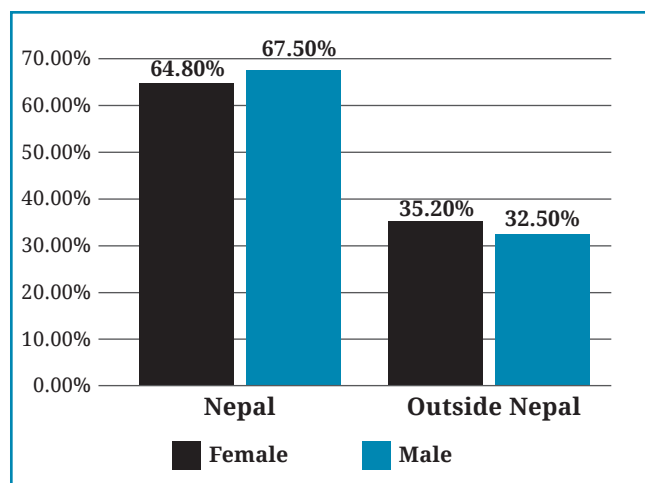


Fig. 4: Distribution of surveyed medical graduates based on their current practice location.

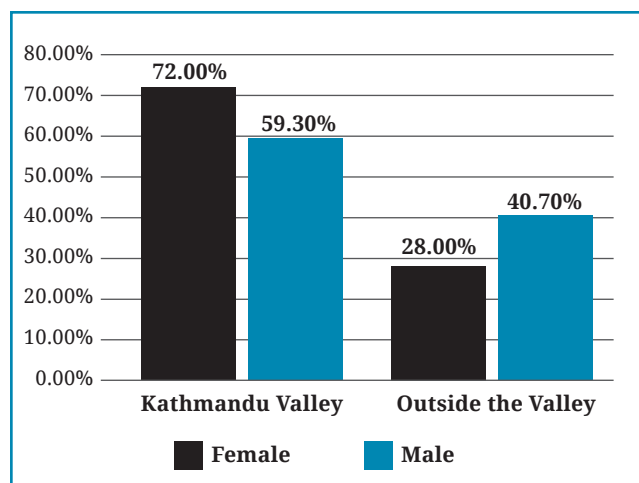


Fig. 6: Distribution of medical graduates working in Nepal on the basis of gender

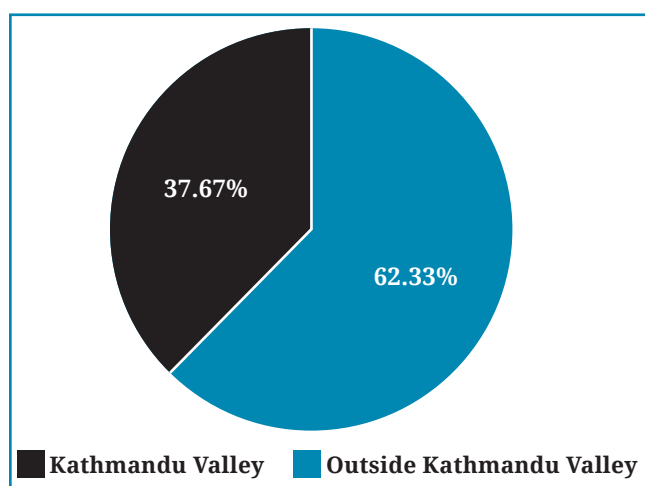


Fig. 5: Distribution of surveyed medical graduates working in Nepal

2011 to 2020, female graduates made up 27.3% (135 graduates) and male graduates 72.7% (360 graduates) of the 495 total graduates. After 2020, the percentage of female graduates continued to grow, reaching 37.4% (77 graduates), while male graduates comprised 62.6% (129 graduates) out of 206 total graduates. Overall, out of 1208 total graduates, 24.7% were female (298 graduates) and 75.3% were male (910 graduates) (Fig. 1).

A majority of surveyed graduates i.e 822 (67.8%) completed their education from Tribhuvan University (TU). This was followed by Kathmandu University (KU), which accounted for 312 (25.80%) graduates. The remaining 74 (6.12%) graduated from autonomous medical colleges (Fig. 2).

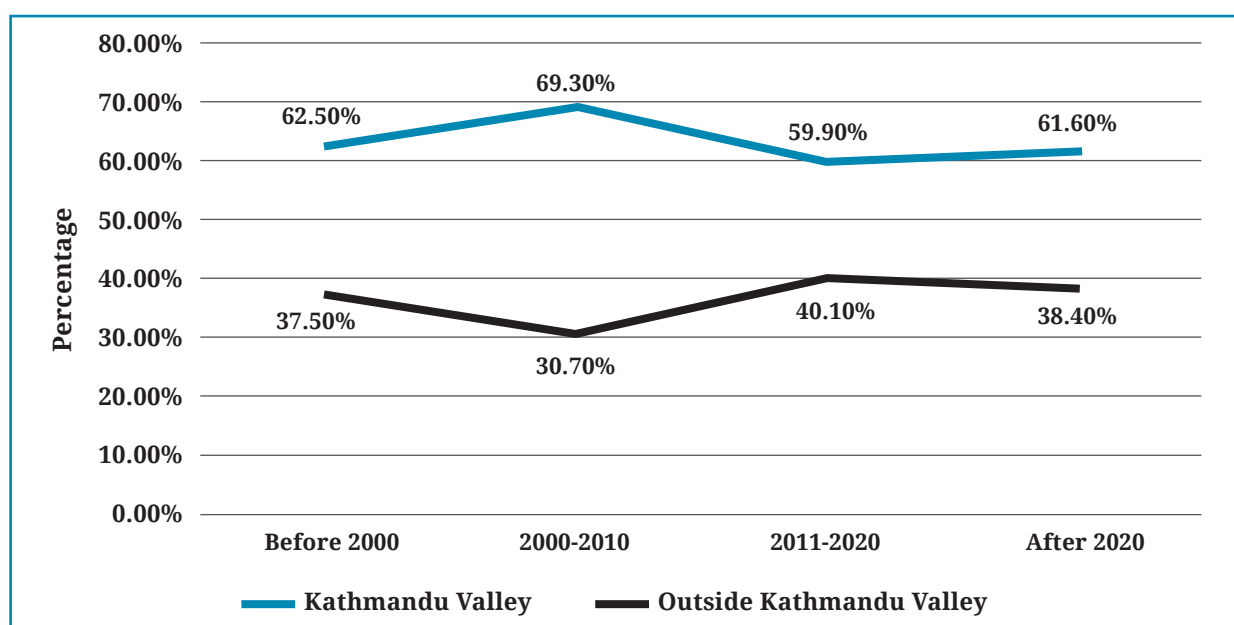


Fig. 7: Distribution of surveyed medical graduates according to year of graduation and current practice location within Nepal

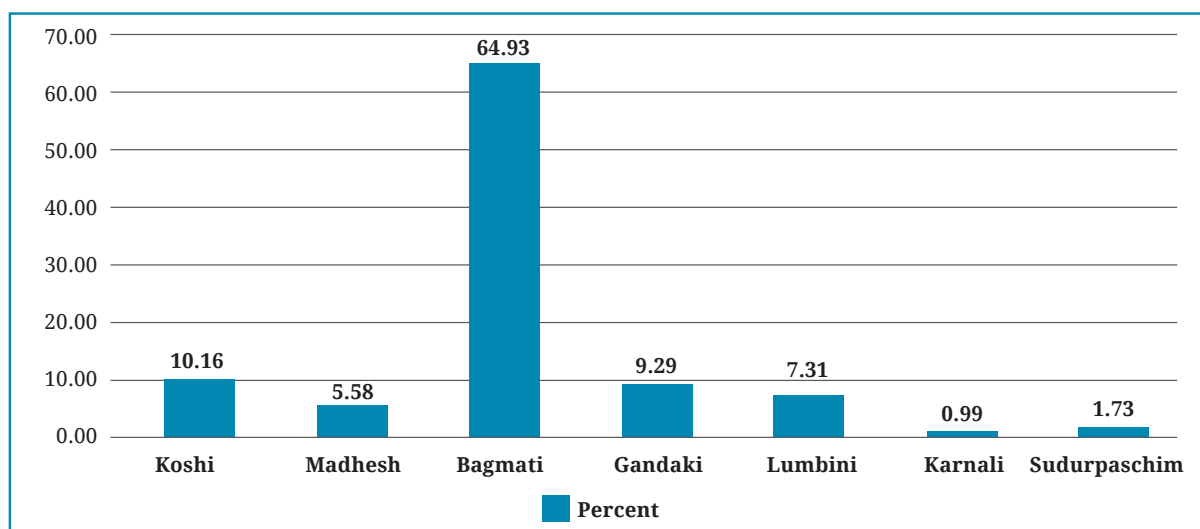


Fig 8: Distribution of surveyed medical graduates across different provinces

Among surveyed female graduates, 157 (52.68%) completed their MBBS from TU, 118 (39.60%) from KU, and 23 (7.72%) from autonomous institutions. In comparison, surveyed male graduates were more concentrated in TU i.e 665 (73.08%), followed by KU with 194 (21.32%) and autonomous institutions with 51 (5.60%) graduates. TU accounted for the highest proportion of graduates in both genders, with a noticeably greater percentage of male graduates than female. Conversely, KU contributed a larger share of female graduates compared to male graduates (Fig. 3).

Surveyed 193 females (64.80%) practiced in Nepal, while 105 females (35.20%) were practicing outside Nepal. For males, 614 (67.50%) practiced in Nepal, and 296 (32.50%) practiced outside Nepal. In total, 807 individuals (66.80% of total graduates) practiced in Nepal, while 401 individuals (33.20% of total graduates) practiced outside Nepal. The data indicates that a higher proportion of individuals, both male and female, were practicing within Nepal, with a notable portion of medical graduates practicing internationally (Fig. 4). Among the surveyed medical graduates, 62.33% (503) were working in the Kathmandu Valley while 37.67% (304) were working outside the valley (Fig. 5).

Within Kathmandu Valley, a notable 139 (72%) surveyed medical workforce were female, while males accounted for 364 (59.30%). In contrast, for regions outside Kathmandu Valley, the data indicated a higher representation of 250 (40.70%) males in the medical workforce compared to 54 (28.0%) surveyed females (Fig. 6).

For surveyed individuals who graduated before 2000, 130 (62.50%) of them were found working within Kathmandu Valley, with the remaining

78 (37.50%) who were working outside the valley. This concentration within Kathmandu Valley peaked for the graduates between 2000-2010, where 79 (69.30%) graduates worked in the valley and 35 (30.70%) worked elsewhere, representing the highest proportion within the valley among the observed periods. Subsequently, for the 2010-2020 graduating class, the proportion working in Kathmandu Valley decreased to 169 (59.90%) with the lowest among the cohorts, while 113 (40.10%) were located outside the valley. More recent graduates, those completing their studies after 2020, showed 125 (61.60%) surveyed graduates working in Kathmandu Valley and 78 (38.40%) employed outside. Across all periods, a majority of graduates were employed within Kathmandu Valley, though the proportion fluctuated, with the highest retention in the Valley observed for those graduating between 2000 and 2010 (Fig. 7).

Fig. 8 shows the distribution of surveyed medical graduates across different provinces of Nepal. The majority i.e 64.93% (524), were from Bagmati Province. Koshi Province followed with 10.16% (82), while Madhesh Province had 5.58% (45) of working medical graduates there. Gandaki Province contributed 9.29% (75), and Lumbini accounted for 7.31% (59). Smaller numbers were from Sudurpaschim Province (1.73%, 14) and least of all in Karnali Province with (0.99%, 8).

Fig. 9 illustrates the distribution of surveyed Nepali medical graduates working abroad. Of the 401 surveyed graduates working outside of Nepal, we received data on the specific country for all of them: 298 (74.31%) doctors were working in the United States, 41 (10.22%) in India, 23 (5.74%) in the United Kingdom, 12 (2.99%) in Maldives. Smaller groups are found

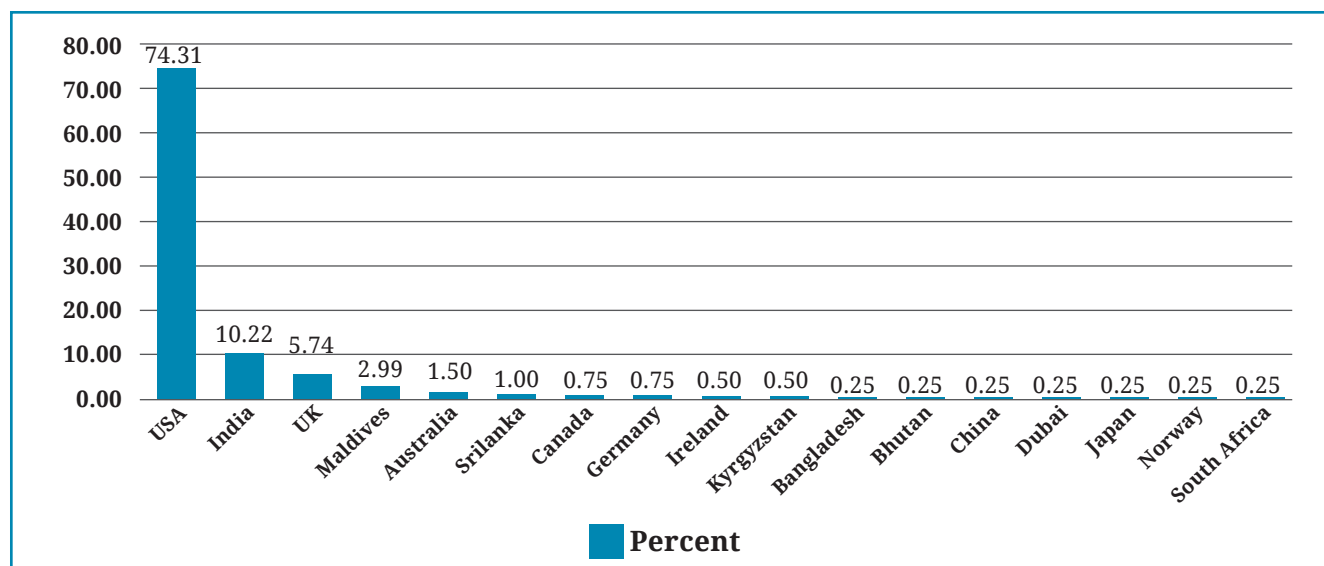


Fig. 9: Distribution of surveyed medical graduates working abroad

in Australia (1.50%, 6), Sri Lanka (1.00%, 4), and Canada and Germany (0.75%, 3 each). The remaining countries had just 1 individual each, contributing 0.25% each: Ireland, Kyrgyzstan, Bangladesh, Bhutan, China, Dubai, Japan, Norway, and South Africa (Fig. 9).

DISCUSSION

We traced the Nepal's medical graduates and their current practice location. Various modes of communications were used, via Internet and with strong alumni connection we were able to receive data from medical graduates from various universities. The study was conducted with objective of mapping the Nepali medical graduates in respect to different variables. There are 34,910 registered doctors in Nepal and our survey received responses from 1,208 doctors, representing just 3.4% of the total registered medical professionals in the country.¹¹ Of total 1208 surveyed medical graduates, 910 (75.3%) of respondents were male. The study revealed the disproportionate access to the medical education in terms of gender. With 298 (24.7%) respondents being female and 910 (75.3%) respondents being male which is consistent with National Survey of Nepal, 2021 that revealed an overall literacy rate of Nepal over the age of 5 years, with literacy rate of 69.4% in females and 83.6% in males.¹⁷ Similarly, for the first time, data from AAMC 2019 showed that women made up the majority of medical students in the USA, highlighting a steady increase in female representation in medical education with similar results observed in Bosnia and Herzegovina.^{18,19} In Bangladesh, females outnumbered males in both admission in medical colleges and in graduation from medical college.²⁰ A recent study in Canada

found that while women represented the majority of applicants, admissions, and graduates from medical school, men were more prevalent among practicing surgeons.²¹

There are total 1895 MBBS seats in Nepal per year with 750 seats in TU, 950 in KU, and 195 remaining seats in BP Koirala Institute of Health Sciences (BPKIHS), Patan Academy of Health Sciences (PAHS) and Karnali Academy of Health Sciences (KAHS) combined.²² Even though the highest number of seats for undergraduates available in is KU, the respondents from TU were highest in our survey.

In our study, 66.8% worked in Nepal while 33.2% worked outside Nepal. This trend with Nepali doctors opting for a workplace aside Nepal has been well documented.²³ This migration problem is also seen in our neighbouring countries. A study from Pakistan reported that 60.4% of 323 medical graduates intended to migrate abroad, with the United States of America being the most frequently preferred destination.²⁴ In a similar study conducted in India, 45% of 1,199 respondents indicated plans to pursue residency training outside the country.²⁵ Likewise, findings from Bangladesh revealed that 51% of 132 medical graduates expressed a preference for practicing internationally.¹⁶

There are 15 hospitals in Koshi province, 8 in Madhesh province, highest of all in Bagmati with 57 hospitals, 15 in Gandaki, 15 in Lumbini, only 2 hospitals in Karnali and 3 in Sudurpaschim province.⁵ Similarly, our study found that maximum medical doctors were situated in Bagmati province where the capital city Kathmandu is located.

A study done in Nepal showed association of medical students with rural birthplace, graduation from rural high school were more inclined to work in rural areas and it was found that males had more rural retention than females.⁷ This was similar to what was found to be prevalent in Kenya and other countries.^{14,26} Although the factor associated with working in rural places were not evaluated in this study, men were found to be working more in areas outside Kathmandu compared to females.

A study done in 2011, among 200 total medical students of which 95 were first year undergraduates and 90 were in second year. When asked about their intention to practice in rural Nepal after graduation, 72.4% expressed their intent to work in rural area. Low salary and security, inadequate facilities, being away from home and limited availability of medical equipment were listed as reasons why doctors are reluctant to work in rural areas. It was further noted that many medical graduates felt unprepared for the realities of working in rural areas due to limitations in current medical education.²⁷ In Nepal, students who receive government scholarships through the Ministry of Education are required to serve for two years in government run facilities, which include both hospitals and primary health care centers across the country.²⁸ To address the gap in rural health workforce and better prepare future doctors, PAHS has introduced a community-based learning and education (CBLE) model, an initiative where students are provided practical exposure to rural communities, aimed to build a sense of responsibility and interest in serving in these settings after graduation.²⁹ Despite such efforts, a study conducted around ten years ago found that 88.0% of 469 surveyed medical students preferred to work in urban areas.⁷ Interestingly, male students with a rural upbringing, government school background, and compulsory service bonds were more likely to consider working in rural locations.

Most medical doctors who worked abroad were located in the United States of America. This trend is consistent with findings from a study conducted a decade ago, as well as more recent research.^{7,23,24} A study done recently revealed that pull factors such as better employment opportunities, improved working condition, access to advanced education and higher salary facilitated migration of health care workers from Nepal. To address these issues, several interventions can serve as mitigating strategies, including the establishment of appropriate positions for health personnel, implementation of comprehensive retention policies with competitive pay and benefits, and the development of specialized training programs within academic institutions.³⁰

This survey highlights significant shifts in the demographics, education pathways, and practice locations of medical graduates in Nepal. Although the share of female doctors have increased from 8.1% before 2000 to 37.4% after 2020, males still make up the majority of medical doctors. A significant number of graduates came from TU Institute of Medicine. A majority of practitioners are based in Kathmandu Valley, workforce which is heavily centered in urban area, highlighting the current preference among doctors working in Nepal. While there have been recent improvements in retention of doctors in Nepal, especially among the graduates after 2020 with 98.5% practicing in Nepal, around one third of medical graduates continue to practice abroad, with most favored destination as the United States of America.

Policy makers committed to improving healthcare system in can help retain doctors in Nepal and in rural areas of Nepal by increasing incentives, establishing more graduate and postgraduate programs in rural and underrepresented provinces, create pathways for medical graduates to return by providing job security, increasing academic positions. Similarly with increasing female representation, targeted support like maternity benefits, safer working environment, family support would be beneficial. Improving infrastructure and health care facilities especially in Province 6 and 7 may result in more equitable distribution of doctors throughout Nepal.

Conflict of interest: None

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REFERENCES

1. McAuliffe M, Oucho LA. Report overview: Migration continues to be part of the solution in a rapidly changing world, but key challenges remain. World Migration Report. 2024 Jun 12. Available from: <https://doi.org/10.1002/wom3.33>
2. Upadhyay JP. Brain drain of Nepalese student. *Int J Manag* 2017; 8: 180–7.
3. Faini R. Is the brain drain an unmitigated blessing? Discussion paper 2003/064. Helsinki: United Nations University World Institute for Development Economics Research (UNU-WIDER); 2003.
4. National Statistics Office. National Population and Housing Census 2021: National report. Reprint ed. Kathmandu (Nepal): National Statistics Office; 2023. Available from: <https://censusnepal.cbs.gov.np/>
5. Department of Health Services (DOHS). Province wise hospitals. Available from: <http://nssd.dohs.gov.np/province.html> [Accessed on: June 2025]

6. Sapkota BP and Amatya A. What factors influence the choice of urban or rural location for future practice of Nepalese medical students? A cross-sectional descriptive study. *Hum Resour Health* 2015; 13: 84.
7. Zimmerman M, Shakya R, Pokhrel BM *et al*. Medical students' characteristics as predictors of career practice location: retrospective cohort study tracking graduates of Nepal's first medical college. *Brit Med J* 2012; 345: e4826.
8. Tolhurst HM, Adams J, Stewart SM. An exploration of when urban background medical students become interested in rural practice. *Rural Remote Health* 2006; 6: 1–11.
9. Nepal Medical Council (NMC). List of Medical and Dental Colleges. Available from: <https://www.nmc.org.np/list-of-medical-and-dental-college> (Accessed on: March 2025).
10. Institute of Medicine. About us. Available from: <https://iom.edu.np/about/> (Accessed on: March 2025).
11. Nepal Medical Council. प्रगति विवरण (Annual Report) २०७९/८० (सन् २०२३). Kathmandu: Nepal Medical Council; 2023. Available from: <https://nmc.org.np/files/4/2079-80%20Annual%20report.pdf> (Accessed on: February 2025).
12. Huntington I, Shrestha S, Reich NG *et al*. Career intentions of medical students in the setting of Nepal's rapidly expanding private medical education system. *Health Policy Plan* 2012; 27: 417–28. DOI: 10.1093/heapol/czr052
13. Rabinowitz HK, Diamond JJ, Markham FW, Santana AJ. The relationship between entering medical students' backgrounds and career plans and their rural practice outcomes three decades later. *Acad Med* 2012; 87: 493–7. DOI: 10.1097/ACM.0b013e3182488c06
14. Dossajee H, Obonyo N, Ahmed SM. Career preferences of final year medical students at a medical school in Kenya—A cross sectional study. *BMC Med Educ* 2016; 16: 5. DOI: <https://doi.org/10.1186/s12909-016-0528-1>
15. Mateen FJ. Future practice location and satisfaction with rural medical education: survey of medical students. *Can Fam Physician* 2006; 52: 1106–7.
16. Ahmed SM, Majumdar MA, Karim R *et al*. Career choices among medical students in Bangladesh. *Adv Med Educ Pract* 2011; 2: 51–8. DOI: 10.2147/AMEP.S13451.
17. Central Bureau of Statistics. National Population and Housing Census 2021: National Report; 2021. Available from: https://censusnepal.cbs.gov.np/results/files/result-folder/National%20Report_English.pdf.
18. AAMC. Majority of U.S. medical students are women, new data show [Internet]. AAMC; 2019 Dec 11. Available from: <https://www.aamc.org/news/press-releases/majority-us-medical-students-are-women-new-data-show>
19. Kraljević G, Čarapina-Zovko I, Jelavić B. Sex ratio of graduated medical students of the School of Medicine in Mostar (2003–2019). *Ann Biomed Clin Res* 2022; 1: 34–8.
20. Akhter N, Talukder MHK, Alam MKK *et al*. Extent of feminization of medical education in Bangladesh: a document. *Bangladesh J Med Educ* 2024; 15: 49–56. DOI: <https://doi.org/10.3329/bjme.v15i1.70949>
21. Pickel L and Sivachandran N. Gender trends in Canadian medicine and surgery: the past 30 years. *BMC Med Educ* 2024; 24: 100. DOI: <https://doi.org/10.1186/s12909-024-05071-4>
22. Nepal Education Commission (NEC). Notice regarding the distribution of seats for foreign as well as other categories for bachelor level programs in health professional education. 2023 Mar 14. Available from: <https://mec.gov.np/en/detail/notice-for-foreign-candidates-applying-for-common-entrance-examination-of-bachelor-level-in-health-professional-education-mecceb1-2023> (Accessed on: March 2025).
23. Karki L, Dhakal B, Bhandari KK *et al*. Migration of medical doctors from Nepal: analyzing trends and policy implications. *J Nepal Med Assoc* 2024; 62: 614–7.
24. Sheikh A, Naqvi SHA, Sheikh K *et al*. Physician migration at its roots: a study on the factors contributing towards a career choice abroad among students at a medical school in Pakistan. *Glob Health* 2012; 8: 43. DOI: <https://doi.org/10.1186/1744-8603-8-43>
25. Kansal R, Singla A, Bawa A *et al*. A nationwide survey on the preference of Indian undergraduate medical students to go abroad for higher studies and residency. *J Family Med Prim Care* 2023; 12: 1997–2002. DOI: 10.4103/jfmpc.318_23
26. Laven G, Wilkinson D. Rural doctors and rural backgrounds: how strong is the evidence? A systematic review. *Aust J Rural Health* 2003; 11: 277–84. DOI: 10.1111/j.1440-1584.2003.00534.x
27. Shankar PR and Thapa TP. Student perception about working in rural Nepal after graduation: a study among first- and second-year medical students. *Hum Resour Health* 2012; 10: 27. DOI: <https://doi.org/10.1186/1478-4491-10-27>
28. Sitaula S, Magar A. Medical practice in the peripheral health centers in Nepal. *J Nepal Health Res Counc* 2011; 9: 198–200
29. Baral K, Allison J, Upadhyay S, Bhandary S, Shrestha S, Renouf T. Rural community as context and teacher for health professions education. *Cureus* 2016; 8: e866. DOI: 10.7759/cureus.866
30. Jha N, Maharjan R, Bajracharya S *et al*. Contributing and mitigating factors of brain drain among healthcare workers from cardiac care facilities in Nepal - a qualitative case study. *PLOS Glob Public Health* 2025; 5: e0004260. DOI:10.1371/journal.pgph.0004260