Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

External Migration Intention Among Medical Officers in RDHS Colombo, Sri Lanka: Prevalence, Associated Factors and Relevance to Health Workforce Retention in Lower-Middle-Income Settings

A.K.D.N. Akmeemana[1]

duminda.ak@gmail.com

Ministry of Health and Mass Media

L.S.D.De Silva[1]

Ministry of Health and Mass Media

Research Article

Keywords: physician migration, migration intention, medical officers, health workforce, workforce retention, job dissatisfaction, political interference, Sri Lanka

Posted Date: November 20th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11354958/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

External Migration Intention Among Medical Officers in RDHS Colombo, Sri Lanka: Prevalence, Associated Factors and Relevance to Health Workforce Retention in Lower-Middle-Income Settings

A.K.D.N. Akmeemana[1]; L.S.D. De Silva[1]

[1] Ministry of Health and Mass Media,Colombo, Sri Lanka

Corresponding author: A.K.D.N. Akmeemana | Email: duminda.ak@gmail.com

A.K.D.N. Akmeemana -ORCID: 0000-0003-2234-3461

L.S.D. De Silva – ORCID: 0000-0003-4578-5019

Abstract

Background: Medical migration is an important health workforce concern in Sri Lanka, particularly during periods of economic and institutional instability. This study assessed the prevalence of external migration intention among medical officers working in hospitals under the Regional Director of Health Services (RDHS) Colombo, identified associated factors, and examined perceived push factors, pull factors, and potential retention measures.

Methods: A descriptive cross-sectional study with an analytical component was conducted among medical officers in RDHS Colombo hospitals. Proportionate stratified random sampling was used. Of 215 recruited medical officers, 197 completed the self-administered questionnaire (response rate 91.6%). Migration intention was measured using a study-specific composite index incorporating seven cognitive, intentional, and preparatory indicators. A score ≥3 was classified as migration intention. Crude associations were

assessed using univariable logistic regression, with Firth penalised regression used where sparse data or separation occurred. The final adjusted model used multivariable Firth penalised logistic regression. Sensitivity analyses used ordinal and unweighted-score outcome formulations.

Results: Overall, 30 participants (15.2%) met the operationally defined criterion for migration intention. Foreign university graduation (AOR 5.96, 95% CI 2.00–19.61), postgraduate qualification (AOR 9.73, 95% CI 2.15–49.85), perceived political or administrative interference (AOR 12.90, 95% CI 4.01–48.09), and increasing job dissatisfaction (AOR 3.18, 95% CI 1.91–5.66) were independently associated with migration intention. Inadequate salary, workload, and economic uncertainty were common push factors, while higher salary and better working conditions were leading pull factors. Political/economic stability was the most frequently endorsed retention measure.

Conclusions: Migration intention was associated with educational, workplace, and governance-related factors. Retention strategies should combine financial measures with improved working conditions, transparent career progression, supportive administration, and greater organisational stability.

Keywords: physician migration; migration intention; medical officers; health workforce; workforce retention; job dissatisfaction; political interference; Sri Lanka.

Background

Physician migration is an important health workforce issue because the loss of trained doctors can compound existing workforce shortages and place additional pressure on health systems in countries that already have constrained resources. Although migration may provide individual opportunities for professional development, improved working conditions and quality of life, sustained outmigration can reduce the availability of experienced personnel and affect service capacity, continuity of care and equitable access to health services [1–3].

The decision to migrate is multifactorial. Evidence from low- and middle-income countries identifies inadequate remuneration, heavy workload, poor working conditions, limited career development and postgraduate training opportunities, job dissatisfaction, political and economic instability, and broader quality-of-life considerations as important influences on migration intention. Destination-country factors such as higher salaries, better working environments, professional development and greater stability may act as pull factors [1,4,5]. These influences may operate at individual, workplace and system levels, and their relative importance can vary by setting.

Sri Lanka has experienced longstanding migration of health professionals, and concern has increased during the recent economic and sociopolitical crisis. Earlier Sri Lankan studies identified better quality of life, higher earnings and training opportunities as important reasons for migration intention among medical students and new graduates, while studies of specialists have documented the longer-term implications of overseas training and non-return [6,7]. More recent evidence indicates substantial migration of Sri Lankan doctors

during 2022–2024 and highlights the difficulty of accurately tracking the health-professional outflow [8,9]. The recent economic context therefore makes understanding migration intention among currently practising medical officers particularly relevant.

The reasons doctors consider leaving are not limited to financial considerations. Workplace experiences such as administrative support, recognition, fairness in career progression and perceptions of political or administrative interference may also influence whether medical officers consider remaining in or leaving the public health service. Such organisational factors are important because retention policies that address remuneration alone may not fully address the range of influences identified in the health-worker migration literature [1,4,5].

RDHS Colombo hospitals provide district-level secondary and primary care and form an important link between community-based services and higher-level referral care. Medical officers working in these institutions contribute to clinical services, hospital functioning, referral pathways and continuity of care. If migration intentions progress to actual migration, loss of these personnel may have implications for staffing, workload, continuity of services and workforce planning [2,7,9].

Despite increasing concern about medical migration in Sri Lanka, much of the available evidence has focused on medical students, newly qualified doctors, specialists or national migration trends. Recent, context-specific evidence concerning medical officers working in hospitals under an RDHS, particularly evidence incorporating workplace and governance-related factors alongside economic and professional factors, remains limited [6–9]. This gap

is important because migration intention may develop before actual migration and may therefore provide an opportunity for health-system responses.

Accordingly, this study aimed to assess the prevalence of external migration intention among medical officers working in hospitals under the RDHS Colombo, identify factors associated with migration intention, examine perceived push and pull factors, and explore measures considered relevant to improving retention. The findings may also contribute to understanding physician retention in other lower- and middle-income settings facing similar workforce shortages, economic pressures and organisational challenges.

Methods

Study design and setting

A descriptive cross-sectional study with an analytical component was conducted among medical officers working in hospitals under the Regional Director of Health Services (RDHS) Colombo, Western Province, Sri Lanka. Colombo District covers approximately 699 km^2 and had a population of approximately 2.37 million according to the 2024 census. During the study period, the RDHS Colombo curative-care network included two base hospitals, nine divisional hospitals, and primary medical care units. [14]

Study period and population

The overall study period was 1 August 2025 to 28 February 2026; data collection occurred from 1 August to 31 October 2025. Eligible participants were medical practitioners registered under section 29 of the Medical Ordinance of Sri Lanka and actively serving in selected hospitals. Board-certified consultants were excluded.

Sample size and sampling

The sample size was estimated for a single population proportion using the formula $n_0 = Z^2 \times p \times (1 - p) / d^2$. Assuming a 95% confidence level (Z=1.96), an expected prevalence of 50% (p=0.50) and an absolute precision of 5% (d=0.05), the initial calculated sample size was 384. As the total eligible population (N) consisted of approximately 389 medical officers, a finite population correction was applied using $n = n_0 / [1 + (n_0 - 1) / N]$, resulting in a required sample of approximately 194 participants. Allowing for an anticipated non-response rate of 10%, the final required sample size was approximately 215. [15]

Proportionate stratified random sampling was used to ensure representation from participating hospitals according to the number of eligible medical officers at each institution (Supplementary Table S1). Within hospitals, participants were selected randomly using the payroll lists.

Data collection and instrument

Data were collected using a pretested, self-administered questionnaire developed from relevant literature and expert opinion. The questionnaire included five main sections: sociodemographic and professional characteristics; migration-related intentions and behaviours; factors potentially associated with migration intention; perceived push and pull factors; and potential retention measures. The English questionnaire was translated into Sinhala and Tamil and back-translated to support consistency across language versions. Face and content validity were assessed by experts in medical administration and community medicine. The questionnaire was pretested among 10 intern medical officers at

District General Hospital Avissawella before the main study. The full study questionnaire is provided as Supplementary Material 2.

Primary outcome: migration intention

External migration intention was defined as consideration, intention, or active planning to migrate abroad within the following two years for employment, postgraduate education, career advancement, or other personal reasons. Migration intention was measured using a study-specific composite migration-intention index developed to capture cognitive, intentional, and preparatory aspects of migration behaviour. The measure was considered a composite index rather than a previously externally validated psychometric scale [1].

The index was based on seven indicators: frequent thoughts about migration; active preparation or planning; undertaking three or more migration preparations; strong commitment to migration; considering migration essential to achieving personal or career goals; considering migration the only way to improve quality of life; and having a permanent migration plan. The indicators were assigned one or two points according to the operationally defined scoring scheme, producing a theoretical score ranging from 0 to 10. Detailed operational definitions, original response categories, and scoring criteria are provided in Supplementary Table S2.

Total scores were classified as 0 = no intention, 1–2 = low contemplation, 3–4 = moderate intention, and ≥5 = high intention. For the primary regression analysis, the outcome was dichotomised as score <3, representing no or low migration intention, and score ≥3, representing moderate or high migration intention. The distribution of the seven component

indicators is presented in Supplementary Table S3, and the distribution of the final migration-intention categories is presented in Supplementary Table S4.

Assessment of the migration-intention index

Because the migration-intention index was developed for this study, additional exploratory analyses were undertaken to assess its internal structure and the robustness of its scoring approach. The seven indicators were represented as binary variables indicating whether the operationally defined criterion for each component was present.

Tetrachoric correlations were initially examined because the component indicators were dichotomous. Some pairwise tables contained zero cells, and the resulting tetrachoric correlation matrix was not positive definite. Therefore, tetrachoric results were interpreted cautiously and Pearson/phi correlations were also examined. The tetrachoric correlation matrix is presented in Supplementary Table S5.

Exploratory factor analysis was undertaken as a supportive analysis rather than as formal validation of a psychometric scale. Because of instability in the tetrachoric correlation matrix, the Pearson/phi correlation matrix was used for the main exploratory factor analysis. Minimum residual extraction with oblimin rotation was applied, and the number of factors was informed by parallel analysis. Results are reported in Supplementary Table S6.

Internal consistency was assessed using corrected item-total correlations, Cronbach's alpha, standardised Cronbach's alpha, and McDonald's omega total. The effect of removing

individual indicators was also examined. These analyses are reported in Supplementary Table S7.

As an additional assessment of the weighting scheme, an unweighted score was created by assigning one point to each endorsed indicator. Agreement between the weighted and unweighted scores was assessed using Spearman's rank correlation. The comparison is presented in Supplementary Table S8**.**

Explanatory variables

Potential explanatory variables included sociodemographic characteristics, professional characteristics, workplace experiences, and migration-related exposures. Variables examined included age, sex, marital status, having children, university attended, postgraduate qualification, current employment grade, private practice, duration of service, previous work abroad, perceived political or administrative interference, job satisfaction, feeling valued by superiors, migration of a friend or relative, attendance at migration-related seminars, and frequency of following migration-related forums.

Job satisfaction was recorded on an ordinal scale from 1 = very satisfied to 5 = very dissatisfied and was analysed as an ordinal predictor. Therefore, its regression coefficient represents the change associated with each one-category increase in dissatisfaction.

Push factors, pull factors and retention measures

Participants rated a range of possible push factors, pull factors, and retention measures using five-category response scales. For descriptive presentation, responses of 4 or 5 were

combined to indicate endorsement. For push and pull factors, these represented 'Very important' or 'Extremely important'; for retention measures, these represented 'Very effective' or 'Extremely effective'. The number and percentage endorsing each factor were calculated, together with 95% confidence intervals for the proportion using the Wilson method. Participants could endorse more than one item; therefore, percentages within each domain were not expected to sum to 100%. The five most frequently endorsed items within each domain were presented in the main manuscript.

Statistical analysis

Data were initially entered and managed using Microsoft Excel. The revised statistical analyses were performed using R version 4.6.1 (2026-06-24 ucrt). Statistical tests were two-sided, and a p value <0.05 was considered statistically significant.

Categorical variables were summarised using frequencies and percentages. Continuous variables were summarised using means and standard deviations or medians and interquartile ranges, as appropriate to their distributions.

For the primary outcome, crude associations with binary migration intention were estimated using univariable logistic regression, and crude odds ratios (ORs) with 95% confidence intervals were reported. Firth penalised logistic regression was used for univariable analyses where sparse cells or complete or quasi-complete separation resulted in unstable maximum-likelihood estimates. For predictors with more than two categories, category-specific estimates were presented together with an overall likelihood-ratio test where appropriate.

Variables for the multivariable model were selected based on their relevance to the study objectives, previous literature, and their plausible role as demographic, educational, or workplace factors associated with migration intention. Statistical significance in crude analyses was not used as the sole criterion for inclusion. The primary multivariable model included age, university attended, postgraduate qualification, perceived political or administrative interference, job satisfaction, and feeling valued by superiors. Variables that were considered likely to represent existing migration behaviour or engagement with migration activities, such as attendance at migration-related seminars and frequent use of migration-related forums, were not included in the primary explanatory model because these may occur after migration intention has already developed.

Because only 30 participants met the binary criterion for migration intention and some predictors showed sparse cells or separation**,** Firth penalised logistic regression was used for the final multivariable analysis. Adjusted odds ratios (AORs), 95% confidence intervals, and p values were reported. Multicollinearity among variables in the adjusted model was assessed using variance inflation factors; no evidence of problematic multicollinearity was identified.

Sensitivity analysis

Two additional multivariable analyses were undertaken to assess whether the main findings were sensitive to the way migration intention was represented.

First, the migration-intention outcome was analysed using its four ordered categories: no intention, low contemplation, moderate intention, and high intention. A proportional-odds

ordinal logistic regression model was initially fitted using the same covariates as the primary multivariable model. Assessment of the proportional-odds assumption indicated that the assumption was not met for postgraduate qualification. A partial proportional-odds model was therefore used, allowing the effect of postgraduate qualification to vary across outcome thresholds while retaining proportional effects for the remaining predictors.

Second, the unweighted migration-intention score was analyzed as a count outcome using negative binomial regression. Negative binomial regression was selected because the unweighted score was strongly right-skewed, contained a large proportion of zero values, and showed overdispersion. Incidence rate ratios (IRRs) with 95% confidence intervals were reported. The same covariates used in the primary multivariable analysis were included in both sensitivity models.

The purpose of these analyses was to assess the consistency of the direction and overall pattern of associations rather than to compare the numerical effect sizes directly, because the primary binary model, ordinal model, and negative binomial model estimate different measures of association. Results of the primary and sensitivity models are compared in Supplementary Table S9.

Missing data

The seven derived migration-intention indicators had no missing values, and all 197 participants could therefore be classified according to the study-specific migration-intention index. Analyses were based on available valid responses for the relevant variables.

Ethics and patient/public involvement

Ethical approval was obtained from the Ethics Review Committee of the Postgraduate Institute of Medicine (PGIM), University of Colombo (ERC/PGIM/2025/107; 16 July 2025). This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Administrative permission was obtained from the relevant authorities. Written informed consent was obtained, and anonymity and confidentiality were maintained. Patients and members of the public were not involved.

Results

Study population

Of the 215 medical officers recruited, 197 completed the questionnaire, giving a response rate of 91.6%. Participants were predominantly female (n = 136, 69.0%), married (n = 149, 75.6%), and graduates of local universities (n = 154, 78.2%). The mean age was 39.8 years (SD 8.34; range 27–62), and the mean duration of service was 12.94 years (SD 8.13; range 1–31). Sociodemographic and professional characteristics are presented in Table 1, and the flow of participant recruitment and inclusion is shown in Figure 1.

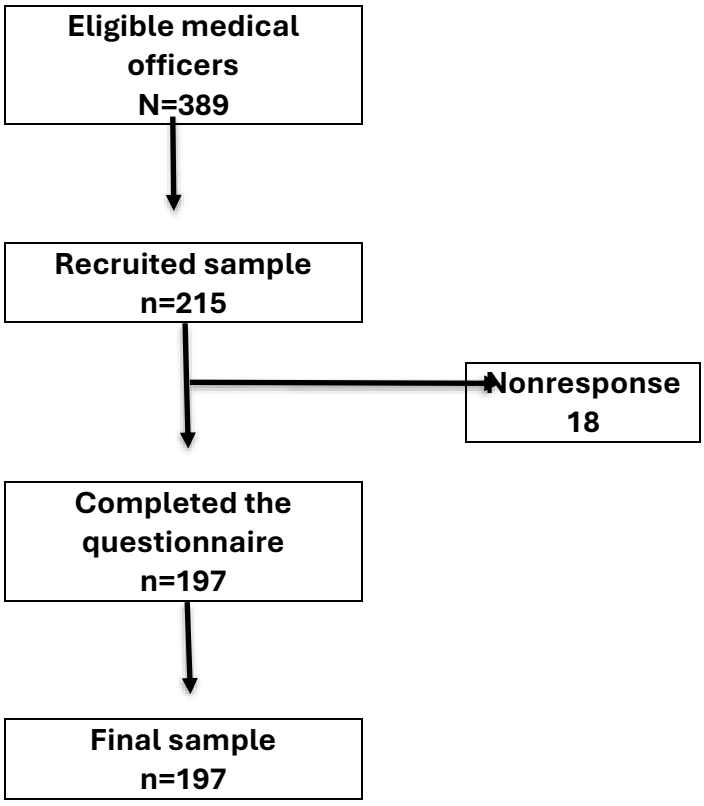

Figure 1. Flow of participant selection and inclusion in the analysis.

Migration-related characteristics and prevalence

Migration-related thoughts and behaviours varied across participants. Forty-one participants (20.8%) reported thinking about migration almost daily or several times per week, while 22 (11.2%) had progressed to active preparation or planning. Twenty-eight participants (14.2%) considered migration essential to achieving their goals, and 19 (9.6%) regarded migration as the only way to improve their circumstances.

Based on the study-specific composite migration-intention index, 123 participants (62.4%) were classified as having no intention, 44 (22.3%) as having low contemplation, 12 (6.1%) as having moderate intention, and 18 (9.1%) as having high intention. Overall, 30 participants

(15.2%) met the operationally defined criterion for migration intention, defined as a score of ≥3.

Factors associated with migration intention

In the crude analysis, several factors were associated with external migration intention. Medical officers who graduated from a foreign university had higher odds of migration intention than local university graduates (COR 4.16, 95% CI 1.83–9.47). Participants with a postgraduate qualification also had higher odds of migration intention (COR 2.71, 95% CI 1.11–6.37). Perceived political or administrative interference was strongly associated with migration intention (COR 6.82, 95% CI 2.88–16.30), while each one-category increase in job dissatisfaction was associated with higher odds of migration intention (COR 2.86, 95% CI 1.99–4.26).

Feeling valued by superiors showed an inverse association in the crude analysis. Compared with participants who did not feel valued, those who felt somewhat valued had lower odds of migration intention (COR 0.30, 95% CI 0.12–0.76), as did those who felt valued (COR 0.19, 95% CI 0.06–0.55). Previous work abroad, having a friend or relative who had migrated, attending migration-related seminars, and frequently following migration-related forums also showed strong crude associations. However, these estimates were affected by sparse data and should therefore be interpreted cautiously.

In the multivariable Firth penalised logistic regression model, foreign university graduation (AOR 5.96, 95% CI 2.00–19.61), postgraduate qualification (AOR 9.73, 95% CI 2.15–49.85), perceived political or administrative interference (AOR 12.90, 95% CI 4.01–48.09), and

increasing job dissatisfaction (AOR 3.18 per one-category increase, 95% CI 1.91–5.66) remained independently associated with migration intention. Age and feeling valued by superiors were not statistically significant after adjustment. Crude and adjusted associations are presented in Table 2.

Sensitivity analyses using an ordinal migration-intention outcome and an unweighted migration-intention score showed broadly similar patterns of association to the primary analysis, particularly for foreign university graduation, political or administrative interference, and job dissatisfaction (Supplementary Table S9).

Perceived push and pull factors and retention measures

The most frequently reported push factors were inadequate salary (83.8%), heavy workload or stressful working conditions (76.6%), economic uncertainty (75.1%), poor administrative support (66.5%), and lack of recognition (62.4%). The most frequently reported pull factors were higher salary or financial incentives (92.9%), better working conditions (88.3%), safer living conditions (77.2%), greater stability (71.6%), and better educational opportunities for children (70.1%).

Among the retention measures, political or economic stability was most frequently endorsed (91.4%), followed by improved benefits (89.3%), increased salaries or allowances (88.8%), improved working conditions (88.3%), and reduced workload (85.3%). The most frequently endorsed push factors, pull factors, and retention measures, together with their 95% confidence intervals, are presented in Table 3.

Tables

Table 1. Sociodemographic and professional characteristics of study participants (N = 197)

Characteristic	Number	Percentage
Gender		
Male	61	31.0
Female	136	69.0
Marital status		
Single	48	24.4
Married	149	75.6
Have children		
Yes	117	59.4
No	80	40.6
University attended		
Local university	154	78.2
Foreign university	43	21.8
Postgraduate qualification		
No postgraduate qualification	161	81.7
Any postgraduate qualification	36	18.3
Current employment grade		
Preliminary grade	35	17.8
Grade II	112	56.9
Grade I	50	25.4
Private practice		
Yes	39	19.8
No	158	80.2
Previously worked abroad		
Yes	10	5.1
No	187	94.9

328 Table 2. Crude and adjusted associations with external migration intention among medical

329 officers (N = 197)

Variable	Crude OR (95% CI)	p value	Adjusted OR* (95% CI)	p value
Age, per 1-year increase	0.97 (0.92–1.02)	0.256	0.93 (0.85–1.01)	0.096
Gender				
Male	Reference	—	—	—
Female	1.57 (0.63–3.89)	0.329	—	—
Marital status				
Single	Reference	—	—	—
Married	1.07 (0.43–2.67)	0.886	—	—
Have children				
No	Reference	—	—	—
Yes	0.64 (0.29–1.39)	0.258	—	—
University attended				
Local	Reference	—	Reference	—
Foreign	4.16 (1.83–9.47)	<0.001	5.96 (2.00–19.61)	0.001
Postgraduate qualification				
No	Reference	—	Reference	—
Yes	2.71 (1.11–6.37)	0.024	9.73 (2.15–49.85)	0.003
Current employment grade		0.270†		
Grade I	Reference	—	—	—
Grade II	2.08 (0.79–6.54)	0.168	—	—
Preliminary grade	1.16 (0.27–4.73)	0.833	—	—
Private practice				
Yes	Reference	—	—	—
No	0.63 (0.26–1.62)	0.308	—	—
Duration of service, per year	0.98 (0.93–1.03)	0.389	—	—
Previously worked abroad				
No	Reference	—	—	—
Yes	49.05 (10.53–473.57)‡	<0.001	—	—
Political/administrative interference				
No	Reference	—	Reference	—

Yes	6.82 (2.88–16.30)	<0.001	12.90 (4.01–48.09)	<0.001
Job satisfaction, per one-category increase in dissatisfaction§	2.86 (1.99–4.26)	<0.001	3.18 (1.91–5.66)	<0.001
Feeling valued by superiors		0.006†		
No	Reference	—	Reference	—
Somewhat	0.30 (0.12–0.76)	0.010	4.22 (0.99–21.76)	0.052
Yes	0.19 (0.06–0.55)	0.003	2.72 (0.55–14.55)	0.218
Friend or relative migrated				
No	Reference	—	—	—
Yes	9.43 (1.24–1210.09)‡	0.024	—	—
Attended migration-related seminar				
No	Reference	—	—	—
Yes	91.20 (28.25–415.40)	<0.001	—	—
Following migration-related forums				
No/occasionally	Reference	—	—	—
Frequently	244.91 (32.96–31,312)‡	<0.001	—	—

Notes: *OR, odds ratio; CI, confidence interval. Crude associations were estimated using univariable logistic regression. Firth penalised logistic regression was used for crude estimates where sparse cells or separation were present. *Adjusted ORs were estimated using multivariable Firth penalised logistic regression. The adjusted model included age, university attended, postgraduate qualification, perceived political or administrative interference, job satisfaction, and feeling valued by superiors. Job satisfaction was analysed as an ordinal variable from 1 = very satisfied to 5 = very dissatisfied; the OR represents the change in odds of migration intention for each one-category increase in dissatisfaction.*

†Overall likelihood-ratio p value. ‡Firth penalised estimate because of sparse cells or separation. Reference categories are indicated in the table.

Table 3. Most frequently endorsed perceived push factors, pull factors and retention measures among medical officers (N = 197)

Domain	Item	Endorsed, % (n)	95% CI
Push	Inadequate salary	83.8 (n=165)	78.0–88.3
	Heavy workload/stress	76.6 (n=151)	70.3–82.0
	Economic uncertainty	75.1 (n=148)	68.6–80.6
	Poor administrative support	66.5 (n=131)	59.6–72.7
	Lack of recognition	62.4 (n=123)	55.5–68.9
Pull	Higher salary/financial incentives	92.9 (n=183)	88.4–95.7
	Better working conditions	88.3 (n=174)	83.1–92.1
	Safe living environment	77.2 (n=152)	70.8–82.5
	Stability	71.6 (n=141)	64.9–77.4
	Child education opportunities	70.1 (n=138)	63.3–76.0
Retention	Political/economic stability	91.4 (n=180)	86.6–94.5
	Improved benefits	89.3 (n=176)	84.3–92.9
	Increased salaries/allowances	88.8 (n=175)	83.7–92.5
	Improved working conditions	88.3 (n=174)	83.1–92.1
	Reduced workload	85.3 (n=168)	79.7–89.6

Notes: *Values are presented as the percentage of participants who endorsed each item, with the corresponding number of participants shown in brackets. For push and pull factors, endorsement was defined as selecting 'Very important' or 'Extremely important'. For*

retention measures, endorsement was defined as selecting 'Very effective' or 'Extremely effective'. Ninety-five percent confidence intervals were calculated using the Wilson method. All 197 participants provided valid responses to the items presented. Participants could endorse more than one item; therefore, percentages within each domain do not sum to 100%. The table presents the five most frequently endorsed items within each domain.

Discussion

Principal findings

This study found that 30 of 197 medical officers (15.2%) met the operationally defined threshold for external migration intention. In the adjusted analysis, foreign university graduation, postgraduate qualification, perceived political or administrative interference, and increasing job dissatisfaction were associated with higher odds of migration intention. Age and feeling valued by superiors were not statistically significant after adjustment. In addition, inadequate salary, workload, economic uncertainty and poor administrative support were frequently reported as push factors, while higher salary, better working conditions and stability were prominent pull or retention considerations.

Comparison with previous evidence

The 15.2% prevalence observed in this study is lower than estimates reported in several studies from other settings, including 71.8% among doctors in Ghana, 74.2% among doctors undergoing training in Nigeria, and 67.5% among medical students and graduates in Pakistan [4–6]. A Sri Lankan study among medical students and newly qualified graduates

reported that 23.8% had already decided to migrate and a further 32.3% were unsure [10]. However, these comparisons should be interpreted cautiously because the populations, study periods, questions and definitions of migration intention differed substantially. The present study used a composite index incorporating cognitive, intentional and preparatory indicators and classified participants with a score of ≥3 as having migration intention. The 15.2% estimate therefore reflects the operational definition used in this study rather than a directly comparable measure across all studies.

Governance and workplace factors

Perceived political or administrative interference showed one of the strongest adjusted associations with migration intention (AOR 12.90, 95% CI 4.01–48.09). In a cross-sectional study, this association cannot be interpreted as causal. One possible interpretation is that perceptions of unfairness, limited transparency, non-merit-based decision-making or uncertainty about career progression may reduce confidence in the organisation and make alternative employment environments more attractive. Similar concerns about administrative policies, career progression and transparency have been described in studies of physician migration [1,4,6]. The wide confidence interval indicates uncertainty about the exact magnitude of the association, although the direction of association remained consistent after adjustment.

Job dissatisfaction and workplace experience

Increasing job dissatisfaction was independently associated with migration intention, with the odds increasing by 3.18 for each one-category increase in dissatisfaction (95% CI 1.91–

5.66). This finding is consistent with the broader literature linking migration intention with working conditions, workload, professional support, career development and organisational climate [1,4,7]. In the present study, heavy workload or stressful working conditions, poor administrative support and lack of recognition were among the most frequently endorsed push factors. These findings suggest that the experience of working within the health service may be relevant alongside financial considerations.

Educational and professional mobility

Foreign university graduation and postgraduate qualification also remained associated with migration intention after adjustment. These associations should not be interpreted as evidence that overseas education or postgraduate training causes migration. They may reflect greater professional mobility, exposure to international career pathways, transferable qualifications, professional networks or stronger awareness of opportunities abroad. Previous research has similarly linked professional development and training opportunities with migration intentions [1,7,11]. The interpretation should therefore remain cautious and contextual rather than assuming a single mechanism.

The relatively wide confidence intervals, particularly for postgraduate qualification (AOR 9.73, 95% CI 2.15–49.85) and political or administrative interference (AOR 12.90, 95% CI 4.01–48.09), indicate considerable uncertainty around the exact magnitude of these associations. The direction of association is therefore more informative than the size of the point estimates, which should be interpreted cautiously.

Sensitivity analyses

Sensitivity analyses supported the overall robustness of the main findings. When migration intention was analysed using the four ordered intention categories and, separately, the unweighted migration-intention score, the direction and general pattern of associations remained broadly similar, particularly for foreign university graduation, political or administrative interference, and job dissatisfaction. Because the three models used different outcome formulations and effect measures, the numerical magnitudes of the AORs, ORs and IRRs should not be compared directly; rather, the consistency in direction and overall pattern provides supportive evidence for the stability of the main findings.

Crude associations and migration-related exposure

Several variables showed strong crude associations but were not retained as independent predictors in the final adjusted model. Previous work abroad, having a friend or relative who had migrated, attendance at migration-related seminars, and frequent use of migration-related forums showed large crude associations, but these estimates were affected by sparse data and, in the case of seminars and migration-related forums, may represent engagement that occurs after migration intention has already developed. These variables should therefore not be described as independent predictors. This distinction is important when interpreting the findings and when considering interventions.

Push and pull factors

The push and pull findings support a multidimensional interpretation of migration intention. In the revised analysis, inadequate salary (83.8%), heavy workload or stressful working conditions (76.6%), economic uncertainty (75.1%), poor administrative support (66.5%) and

lack of recognition (62.4%) were the most frequently endorsed push factors. Higher salary or financial incentives (92.9%) and better working conditions (88.3%) were the leading pull factors, followed by safer living conditions and greater stability. At the same time, political or economic stability (91.4%), improved benefits (89.3%), increased salaries or allowances (88.8%), improved working conditions (88.3%) and reduced workload (85.3%) were frequently endorsed retention measures. Thus, the findings indicate that migration intention is not solely a financial issue; economic pressures interact with working conditions, administrative experience, professional development and perceived organisational stability [1,4,7,9].

Health-service and policy implications

For health-service planning, migration intention among district-level medical officers is relevant because progression from intention to actual migration could contribute to staffing gaps, increased workload for remaining staff, disruption of continuity of care and reduced access to services. The findings therefore support considering both financial and non-financial retention measures. Potential responses include competitive remuneration and benefits together with improved working conditions, workload management, fair and transparent career progression, supportive administration, professional recognition and greater organisational stability. Such measures are consistent with broader health-worker retention approaches that emphasise combined financial, educational, regulatory and supportive interventions [9,13]. Although the findings are context-specific, the combination of workforce shortages, economic pressures, challenging working conditions, and governance-related concerns identified in this study may also be relevant to other lower-

and middle-income countries facing similar health-workforce retention challenges. The findings should nevertheless be interpreted as evidence from RDHS Colombo rather than as representative of all Sri Lankan doctors.

Strengths and limitations

Strengths of this study include probability-based proportionate stratified sampling, a high response rate, use of Firth penalised logistic regression to address sparse data and separation, and sensitivity analyses using alternative representations of migration intention. Several limitations should be considered. The cross-sectional design prevents causal inference, and migration intention is not equivalent to actual migration. The study relied on self-reported information about a sensitive topic and therefore may be affected by response or reporting bias. Practical difficulties in reaching medical officers because of shift work and roster-based duties may also have introduced selection bias. The study was conducted within RDHS Colombo, limiting generalisability to other districts, tertiary hospitals or private-sector doctors. Finally, the study-specific composite migration-intention index was developed for this study; although it underwent expert review and pretesting and was examined through exploratory analyses, further psychometric validation is required.

Future research

Multicentre longitudinal studies should examine whether migration intention predicts subsequent migration and how intentions change with economic, professional and organisational conditions. Qualitative research could further explore perceptions of fairness, administrative decision-making and career progression, while future studies

should assess the reliability and construct validity of the composite migration-intention index and evaluate governance-focused retention interventions.

Conclusion

Among medical officers working in RDHS Colombo hospitals, 15.2% met the study-defined threshold for external migration intention. Foreign university graduation, postgraduate qualification, perceived political or administrative interference, and increasing job dissatisfaction were associated with higher migration intention after adjustment. Participants also commonly identified inadequate salary, workload, economic uncertainty and poor working conditions as important push factors, while higher salary, better working conditions and greater stability were frequently endorsed as pull or retention considerations. These findings suggest that physician retention may require a combination of financial and non-financial strategies, including fair and transparent career processes, supportive administration, improved working conditions, workload management and greater organisational stability. Further multicentre and longitudinal studies are needed to examine whether migration intention predicts actual migration.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Ethics Review Committee of the

Postgraduate Institute of Medicine, University of Colombo (ERC/PGIM/2025/107; 16 July 2025). Written informed consent was obtained from all participants.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Authors' contributions

A.K.D.N. Akmeemana contributed to the study conception, questionnaire development, data collection and coordination, initial data analysis, interpretation of findings, and drafting of the initial manuscript. L.S.D. De Silva contributed to the study design, advanced statistical analysis, interpretation of the findings, and critical review and revision of the manuscript. Both authors read and approved the final manuscript.

Availability of data and materials

The dataset is available from the corresponding author upon reasonable request and is subject to applicable ethical and confidentiality requirements.

Patient and public involvement

Patients and members of the general public were not involved in the design, conduct, reporting, or dissemination of this study. However, during questionnaire development, input was obtained from relevant experts and medical officers to improve the relevance, clarity, and content of the instrument. Face and content validity were assessed by experts, and the questionnaire was pretested among intern medical officers before the main data collection. Feedback from this process was used to refine the questionnaire.

Acknowledgements

The authors acknowledge the Postgraduate Institute of Medicine, University of Colombo; RDHS Colombo; the participating hospital authorities; and all the medical officers who participated.

Use of AI-assisted technologies

ChatGPT (OpenAI) was used to assist with language editing and to improve the clarity and readability of selected sections of the manuscript. All changes were reviewed and approved by the authors, who take full responsibility for the final content.

Additional files

Additional file 1: Supplementary Tables S1–S9 (DOCX). Includes the hospital-level sample allocation, operational definitions and scoring of the migration-intention index, descriptive distributions, exploratory assessment of the index, reliability analyses, and sensitivity analyses.

Additional file 2: English questionnaire (DOCX). The English-language data-collection questionnaire used in the study.

References

1. Toyin-Thomas P, Ikhurionan P, Omoyibo EE, Iwegim C, Ukueku AO, Okpere J, et al. Drivers of health workers' migration, intention to migrate and non-migration from low/middle-income countries, 1970–2022: a systematic review. BMJ Glob Health. 2023;8(5):e012338. doi:10.1136/bmjgh-2023-012338.

2. Jenkins R, Kydd R, Mullen P, Thomson K, Sculley J, Kuper S, et al. International migration of doctors, and its impact on availability of psychiatrists in low and middle income countries. PLoS One. 2010;5(2):e9049. doi:10.1371/journal.pone.0009049.

3. Aluwihare APR. Physician migration: donor country impact. J Contin Educ Health Prof. 2005;25(1):15–21. doi:10.1002/chp.4.

4. Wutor BM, Sarfo FN, Nkrumah LA, Bakuoru LD, Amanze CN, Osei I, et al. Factors influencing the intention of doctors to emigrate: a cross-sectional study of Ghanaian doctors. BMC Health Serv Res. 2024;24:1493. doi:10.1186/s12913-024-11977-y.

5. Akinwumi AF, Solomon OO, Ajayi PO, Ogunleye TS, Ilesanmi OA, Ajayi AO. Prevalence and pattern of migration intention of doctors undergoing training programmes in public tertiary hospitals in Ekiti State, Nigeria. Hum Resour Health. 2022;20(1):76. doi:10.1186/s12960-022-00772-7.

6. de Silva NL, Samarasekara K, Rodrigo C, Samarakoon L, Fernando SD, Rajapakse S. Why do doctors emigrate from Sri Lanka? A survey of medical undergraduates and new graduates. BMC Res Notes. 2014;7:918. doi:10.1186/1756-0500-7-918.

549 7. Niriella M, Prabagar K, Premaratna P, Premaratna R, Jayasinghe S, de Silva T, et al. The
550 Exodus and Its Toll: Sri Lanka's Economic Crisis and the Migration of Doctors. Int J Health
551 Plann Manage. 2025;40(6):1317–1325. doi:10.1002/hpm.70011.
552 8. Abeysooriya BMV, Karunathilake IM, Wanigasekara T, Palihakkara U, Amarasiri MMPL.
553 Brain drain: the exodus of Sri Lanka's healthcare workforce. South-East Asian J Med Educ.
554 2023;17(2):14–20. doi:10.4038/seajme.v17i2.577.
555 9. De Silva AP, Liyanage IK, De Silva STGR, Jayawardana MB, Liyanage CK, Karunathilake IM.
556 Migration of Sri Lankan medical specialists. Hum Resour Health. 2013;11:21.
557 doi:10.1186/1478-4491-11-21.
558 10. Tariq Z, Aimen A, Ijaz U, Khalil KUR. Career intentions and their influencing factors among
559 medical students and graduates in Peshawar, Pakistan: a cross-sectional study on brain
560 drain. Cureus. 2023;15(11):e48445. doi:10.7759/cureus.48445.
561 11. Suciu SM, Popescu CA, Ciumageanu MD, Buzoianu AD. Physician migration at its roots:
562 a study on the emigration preferences and plans among medical students in Romania. Hum
563 Resour Health. 2017;15:6. doi:10.1186/s12960-017-0181-8.
564 12. World Health Organization. Improving retention of health workers in rural and remote
565 areas: case studies from the WHO South-East Asia Region. New Delhi: WHO Regional Office
566 for South-East Asia; 2020.
567 13. Tangcharoensathien V, Travis P, Tancarino AS, Sawaengdee K, Chhoedon Y, Hassan S,
568 et al. Managing in- and out-migration of health workforce in selected countries in South East
569 Asia Region. Int J Health Policy Manag. 2018;7(2):137–143. doi:10.15171/ijhpm.2017.49.

14. Department of Census and Statistics, Sri Lanka. Census of Population and Housing 2024. Colombo: Department of Census and Statistics; 2026.

15. Lwanga SK, Lemeshow S, World Health Organization. Sample size determination in health studies: a practical manual. Geneva: World Health Organization; 1991.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- BMCHSRAdditionalfile1SupplementaryTablesS1S9.docx