

Consequences of health workers' migration on maternal and child health in the origin countries

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Abstract

International migration of health workers has been a subject of concern since the 1950s. Recently, however, issues of international migration of health workers have acquired enhanced attention due to a steep increase in the recruitment of developing country doctors, nurses, and other health professionals by the advanced nations. By employing fixed effect panel regression least square dummy variable approach and ANOVA, this paper investigates if there was any significant effect of emigration of doctors and nurses, density of doctors and density of nurses on emigration countries' capacity to address maternal and child health targets of the SDGs between 2012-2021. Further, if there was a variation of the impact of health workers migration, density of doctors and density of nurses between a select group of emigration countries vis-à-vis the WHO' Health Workforce Support and Safeguard (HWSS) countries capacity to address maternal and child health targets of the SDGs between 2012-2021. This paper finds that density of doctors has a significant effect on reduction of MMR, U5MR and NMR, while the emigration of health workers and density of nurses were not statistically significant implying limited marginal effects on MMR, U5MR and NMR after controlling for fixed effects. Several country dummies were found to be significant indicating country-specific heterogeneity.

Introduction

The endogenous growth models have emphasised the importance of investment in education and healthcare to raise levels of productivity and development (Schultz, 1961). Investment in healthcare directly impacts happiness and well-being of people and induces better educational outcomes and labour productivity. One of the state's essential investments to improve the population's health outcomes is enhancing human resources for health (HRH). International migration and mobility of healthcare workers has been a controversial subject of nation states since the 1950s. It begun when the British 'brain drain' of doctors to the US occurred in the late 1950s, and the UK, recruited Indian doctors to fill that void. Since then, the stock of international doctors and nurses, two prominent categories of HRH, especially from developing

countries, started accumulating initially in the US and the UK, and later, in the other OECD countries like Canada, Australia and New Zealand.

Traditionally, in the mid of 20th century, the brain drain analyses were based on the argument of loss of human capital – developed by investing in education and healthcare, and its productive potential to the country of destination. These analyses led to Bhagwati and Rodriguez (1975) suggest taxing the emigrant workers abroad to retrieve some of these losses to fund development of the population left behind. In the late 20th century, however, such arguments have lost steam, as the nature of migration changed from permanency to temporary and circulatory raising remittances and return flows to the countries of origin. Further, the characteristics of the dominant migrant groups changed from the traditional professionals like doctors and scientists, whose physical absence from the hospitals and laboratories of the origin countries negatively impacted the performance of the origin countries' institutions then to the new-age Information and Technology (IT) professional migrants (for example, the US's H-1B visa), whom the origin countries' institutions deputed them in the host countries to perform their own contractual obligations with the host country institutions. Consequently, the positive impact of 'brain drain' is argued through the analysis of the 'brain gain' and 'brain circulation' studies (Khadria, 1999; Beine, Docquier and Rapoport, 2001). However, the net-effects of emigration of health workers on the population left behind depends on how the positive effects of migration such as flows of remittances and return migration to the origin countries have weeded out the initial and continuing negative effects of their emigration. If this has had happened adequately with respect to the emigration of health workers, then the overall health of the population over time would have improved consequently.

Literature Review

Recently, the issues of international migration of healthcare workers have acquired enhanced attention due to a steep increase in the recruitment of developing country doctors, nurses and other health professionals by the advanced nations. NHS, UK reported that about 110,929 international doctors trained outside the European Economic Area (EEA) were working in the NHS in 2022. Further, Eaton et al. (2023) reported that about 78,823 doctors on the UK medical register were trained by the 57 poorest countries in the world. Similarly, nurse migration, though came into prominence later in the late 20th Century following the bandwagon of doctors' migration, has increased exponentially from a select country of Asia and Africa. The NHS (UK) reported that 33 percent of its doctors and 24 percent of its nurses in 2022 have a foreign

nationality. The leading source countries of these doctors and nurses are India, Pakistan, Philippines, Nepal, Bangladesh, Sri Lanka, Nigeria, Egypt, Ghana and South Africa.

The United Nations Sustainable Development Goals (SDG) set targets on maternal mortality (target 3.1) at 70 per 100,000 live births, neo-natal at 12 per 1,000 live births and under-five mortality (target 3.2) at 25 per 1,000 live births by 2030. Currently, India has a maternal mortality rate of 103 (2020) per 100,000 population, neo-natal mortality at 19.1 (2021) and under-5 mortality at 31 (2021) per 1,000 live births (Unicef, 2024), far short of the SDG targets. Similarly, Philippines also falls short of the SDG targets on maternal and child health. The adequate availability of doctors and nurses is an important requirement for basic healthcare of women and children during the pre- and post-natal care improving maternal and child health. India despite having one of the largest stocks of doctors and nurses in the world have a lower density of healthcare workers than the WHO prescribed minimum requirement of 4.5 doctors, nurses and midwives per 1000 population. This minimum benchmark is considered essential to have for progressing towards achieving the universal healthcare coverage (UHC) and Sustainable Development Goals (SDG) (WHO, 2016). In fact, Indian density of doctors and nurses is lower than that of Nepal, Algeria and Ghana, for example (Table 1).

A WHO (2016) study estimated that there was a shortage of 17.4 million health care workers in 2013. Among these shortages, 2.6 million are of doctors and 9 million of nurses and midwives. The largest shortages of 6.9 million health care workers were found in the South-East Asia, followed by 4.2 million in Africa. While the shortage in quantitative terms was the highest in South-East Asia, the crisis is acute in Africa in relative terms. A recent study of the WHO (2020) projected that there will be a shortage 18 million healthcare workers worldwide and 6.1 million in Africa by 2030. Several factors like inadequate training capacity, demographic conditions, low life-expectancy and disease burden, uneven distribution of healthcare workers, governance of healthcare institutions and international migration were considered to be the major contributors to the health workforce crisis in Africa (Oakorafor and Oaiya, 2021).

WHO, under its “Global Code of Practice”, recently released a list of 47 countries as the Health Workforce Support and Safeguards (HWSS) countries that face most pressing health workforce challenges related to Universal Health Coverage (UHC) (WHO, 2021). Owing to the negative impact of health workers’ migration, WHO advised restriction or ethical practice of

international recruitment of health workers from these countries. Among these 47 countries, 33 are from the African region, 1 from Americas, 6 from eastern mediterranean region, 2 from South East Asia and 5 from the Western Pacific region. Surprisingly, some of the most prominent source countries of international recruitment of healthcare workers, such as, India, Philippines and Sri Lanka from Asia and South Africa, Algeria and Tunisia from Africa have been excluded from this list. Many of these countries have inadequate densities of either doctors or nurses or both, though some of them may be fulfilling minimum norm under the key health workers category by pulling doctors, nurses and mid-wives (Table 1). Majority of the African countries facing health workforce crisis have a severe shortage of doctors than nurses. As a result, the nursing personnel are over-burdened in both public and private health facilities.

Objectives:

This paper aims to investigate if there was a significant effect of emigration of health workers (doctors, nurses and mid-wives), density of doctors and density of nurses and mid-wives on the origin country capacity to address maternal and child health targets of the SDGs. Further, if there was a variation of the impact of health workers migration on the SDG maternal and child health targets (2012-2021) between the select WHO's Health Workforce Support and Safeguard countries and other emigration countries of health workers.

Methodology:

Using the data collected from the WHO and OECD statistics, the paper employed fixed effect panel regression least square dummy variable approach and one-way ANOVA to address the above research objectives. For the fixed effect panel regression, we used data of a four-year period from 2018 to 2021 of a set of 3 independent variables such as, emigration of healthcare workers (doctors, nurses and mid-wives), density of doctors and density of nurses and mid-wives on three dependent variables separately, such as, maternal mortality rate (MMR), under-5 mortality rate (U5MR) and neonatal mortality rate (NMR). The panel regression includes data from 29 lead origin countries of health workers' emigration to the OECD countries and uses country specific dummy variables controlling for the unobserved heterogeneity regarding country-specific factors isolating the within-country variation attributable to health workforce dynamics.

General Model: $Y_{it} = \beta_0 + \beta_1 X1_{it} + \beta_2 X2_{it} + \beta_3 X3_{it} + \sum_{j=1}^{n-1} \delta_j \text{CountryDummy} + e_{it}$

Where, Y_{it} is the dependent variable (MMR per 100,000 population, NMR per 1,000 population and U5MR per 1000 population) for country i at time t .

$X1_{it}$ is emigration of health workers for country i at time t .

$X2_{it}$ is density of doctors per 10,000 population for country i at time t .

$X3_{it}$ is density of nurses per 10,000 population for country i at time t .

CountryDummy is the dummy variable for each country (excluding one as a base).

e_{it} is error term.

For one-way ANOVA, the 29 countries are grouped into 3 categories such as the WHO's health workforce support and safeguard (HWSS) countries and the non-HWSS emigration countries are divided in to 2 groups based on their geographic and population sizes.

Table 1:

Country	Emigration flow of healthcare workers	No of Doctors (Stock)	No of Nurses (Stock)	Density of doctors (per 10,000)	Density of nurses (per 10,000 popu)	WHO's HWS&S Country
	2021	2022	2022	2022	2022	
India	11873	1050538	2612621	7.5	18	No
Philippines	10650	91,533	479995	8	48	No
Nigeria	2478	86,181	220681	3.86	16.47	Yes
Pakistan	2409	280794	129123	12	5.5	Yes
China	639	4434728	5224244	31.12	36.66	No
Ghana	584	4726	124204	1.43	44.67	Yes
Nepal	574	28052	75316	10	38	Yes
Tunisia	458	16233	27037	13.3	22	No
Bangladesh	382	121387	77703	7.17	6.22	Yes
Sri Lanka	366	25597	42698	11.3	22.5	No
South Africa	283	49,533	397261	7.94	63.93	No
Kenya	271	12792	109659	2.36	20.24	No
Malawi	156	1115	9819	0.54	5.07	Yes
Thailand	91	39,120	252119	5.5	35	No
Morocco	75	27500	25700	7.5	8.5	No
Algeria	71	75512	104776	16.6	25.08	No
Ethiopia	43	12117	131262	1.05	12.22	Yes
Zambia	43	6531	49975	3.24	29.36	No
Uganda	40	9,052	74192	1.9	22.65	Yes

Indonesia	27	189979	688954	6.81	41.23	No
Gambia	19	274	1298	1.04	6.88	Yes
Botswana	13	992	8028	4.07	32.9	No
Rwanda	13	1223	13501	0.9	11.06	No
Congo	12	1042	5573	1.73	11.21	Yes
Malaysia	7	79443	139698	22.9	40.26	No
Lesotho	6	537	1235	2.35	17.56	Yes
Liberia	2	954	4424	1.78	10.07	Yes

Findings:

Table 2: Results of the fixed effect panel regression (LSDV) on MMR.

Dependent Variable	Constant	F	R square	Sig
MMR	236.923	91.230	.971	.000
Independent Variables			Coefficient (β) [Impact]	Sig.
Emigration of health workers			-0.003	.743
Density of doctors			-12.982	.048
Density of nurses			.883	.623
Bangladesh			-10.698	0.84
Botswana			-56.703	0.513
China			58.722	0.377
Congo			67.768	0.411
Ethiopia			48.186	0.564
Gambia			236.118	0.005
Ghana			11.466	0.914
India			-27.319	0.783
Indonesia			-28.462	0.74
Kenya			263.237	0.002

Lesotho	368.252	0
Liberia	445.508	0
Malawi	-150.213	0.07
Malaysia	298.131	0
Morocco	-67.858	0.154
Nepal	23.651	0.723
Nigeria	883.322	0
Pakistan	73.595	0.081
Philippines	-71.489	0.576
Rwanda	38.987	0.636
SouthAfrica	-20.263	0.668
Srilanka	-82.142	0.056
Thailand	-117.565	0.055
Tunisia	-49.806	0.179
Uganda	38.85	0.645
Zambia	-91.7	0.245

Table 2 (Model 2): Results of the fixed effect panel regression (LSDV) on NMR

Dependent Variable	Constant	F	R square	Sig
NMR	24.978	58.682	.956	.000
Independent Variables			Coefficient (β) [Impact]	Sig.
Emigration of health workers			.000	.352
Density of doctors			-.818	.014

Density of nurses	.137	.131
Bangladesh	-2.359	0.377
Botswana	-6.069	0.164
China	-6.667	0.048
Congo	-6.311	0.129
Ethiopia	2.959	0.48
Gambia	1.227	0.765
Ghana	-5.033	0.345
India	2.859	0.566
Indonesia	-13.574	0.002
Kenya	-5.127	0.214
Lesotho	8.928	0.041
Liberia	6.475	0.103
Malawi	-17.023	0
Malaysia	3.403	0.265
Morocco	-7.907	0.001
Nepal	-4.881	0.147
Nigeria	13.029	0.001
Pakistan	24.573	0
Philippines	-8.198	0.202
Rwanda	-7.083	0.09
SouthAfrica	-8.695	0
Srilanka	-14.615	0

Thailand	-16.678	0
Tunisia	-5.838	0.002
Uganda	-5.825	0.171
Zambia	-0.259	0.948

Table 3 (Model 3): Results of the fixed effect panel regression (LSDV) on U5MR

Dependent Variable	Constant	F	R square	Sig
U5MR	47.636	82.483	.968	.000
Independent Variables			Coefficient (β) [Impact]	Sig.
Emigration of health workers			-.001	.467
Density of doctors			-1.934	.007
Density of nurses			.080	.680
Bangladesh			-5.41	0.349
Botswana			-4.458	0.635
China			2.809	0.697
Congo			0.981	0.913
Ethiopia			3.659	0.686
Gambia			4.224	0.635
Ghana			-1.15	0.92
India			4.084	0.705
Indonesia			-16.407	0.081
Kenya			-5.546	0.533

Lesotho	32.418	0.001
Liberia	34.099	0
Malawi	-30.136	0.001
Malaysia	26.674	0
Morocco	-14.187	0.007
Nepal	-4.952	0.494
Nigeria	75.829	0
Pakistan	40.863	0
Philippines	-2.847	0.837
Rwanda	-4.809	0.591
SouthAfrica	1.423	0.782
Srilanka	-20.211	0
Thailand	-24.162	0
Tunisia	-8.618	0.034
Uganda	-0.719	0.937
Zambia	17.067	0.048

It is found that all the three models with dependent variables, MMR, NMR and U5MR are significant at 1 per cent level with R square values of 0.971, 0.956, and 0.968, respectively indicating strong association between the dependent and independent variables. Among the independent variables, density of doctors with a coefficient value of $\beta = -12.982$ and $p = 0.048$ is significantly and negatively associated with MMR suggesting that increased doctor density reduces maternal deaths. On the other hand, emigration of healthcare workers and density of nurses were not statistically significant implying limited marginal effects on MMR after controlling for fixed effects. Several country dummies were found to be significant indicating country-specific heterogeneity. For example, Nigeria has a large positive coefficient ($\beta = 883.32$, $p < 0.001$), indicating a much higher MMR relative to the base country. Among other

countries that have significant difference in MMR with the base country Algeria are Gambia, Kenya, Lesotho, Liberia and Malaysia.

With respect to dependent variable NMR too, density of doctors has a negative coefficient indicating higher density of doctors reduces NMR at statistical significance level of 5 per cent. Emigration of healthcare workers and density of nurses were not statistically significant implying limited marginal effects on NMR after controlling for fixed effects. The countries that are different from Algeria with statistical significance are China, Indonesia, Lesotho, Malawi, Morocco, Nigeria, Pakistan, South Africa, Sri Lanka, Thailand and Tunisia.

With respect to the U5MR, the density of doctors has a negative relationship indicating higher density of doctors reduces U5MR with a statistical significance level at 1 percent level. Emigration of health workers shows a negative relationship (-0.001) and density of nurses positive relationship (0.080) but are statistically not significant. The countries that are significantly different in U5MR than Algeria are Lesotho, Liberia, Malawi, Malaysia, Morocco, Nigeria, Pakistan, Sri Lanka, Thailand, Tunisia and Zambia.

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