



The Correlation of Physician to Population Ratio and Life Expectancy in Asian Countries

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Abstract

Life expectancy is influenced by a number of factors. There is a significant degree of variation in life expectancy among nations, particularly in the Asian region. The Physician to population ratio in the region is also not uniform. This study aims to assess the influence of physician population ratio on the life expectancy. Data on the number of doctors per 10,000 people and the life expectancy for Asian countries was obtained from the World Health Organization databases. The data obtained was evaluated under 4 sub- regional groupings and matched to assess the effect of doctors per capita on average life span. The population to physician ratio had a positive correlation with life expectancy.

Key Words: Life Expectancy, Physician Population Ratio, Mortality Rate.

INTRODUCTION

In the last fifty years, innovations, research and increased investments in health infrastructure has resulted in a significant increase in the average

life span. This was apparent in Europe and North America initially, but with the burgeoning and booming Asian economies spending a higher proportion of their wealth on health, similar longevity is also being seen in Asian nations. A

meta-analysis that included 10 studies published in the United States revealed that primary care physician supply was associated with improved health outcomes in factors such as low birth weight, infant mortality and life expectancy and an increase of one primary care physician per 10,000 population was associated with an average mortality reduction of 5.3%, or 4.9 per 10,000 per year.^[1] State Health ranking data from all 50 states in the United States revealed that physician to population ratio had a significant correlation with state health ranking.^[2] The spread of democracy in Asia has also been a harbinger of this change, democracies have greater degree of accountability and have invested more on primary health to benefit and address the concerns of their electorate. Norway has one of the highest densities of physicians in Europe and its life expectancy of 81.53 years is among the highest in the world.^[3] A low number of doctors per capita however had different outcomes. Low physician population ratio in Haiti contributes to the short life expectancy in Haiti.^[4] While physical infrastructure and health tools have an obvious benefit on health, but at the same time has the continent also invested in increasing the number of health personnel, Is manpower an important determinant of life expectancy, Do physicians per capita have an impact and influence on life span? These are pertinent questions for a country like India, where the debate is increasingly centered on significantly increasing the number of graduate and postgraduate medical seats. The purpose of this study therefore is to determine if the

physician to population ratio has a bearing on the life expectancy in Asian countries.

MATERIAL AND METHODS

The data on life expectancy of Asian countries was obtained from the World Health Organization's (WHO) global health observatory data repository.^[5] The data on doctors per ten thousand population was obtained from the WHO global health expenditure data base.^[6] To account for economic and regional disparity, the data for the countries was divided into four regional groups- South Asia, South East Asia, Middle East and Central Asia. Data on Japan was not included to prevent skewed results and bias as it is well-known that Japan enjoys the highest life expectancy in the world. The physician population ratio data was matched with the life expectancy data along regional lines to determine if the number of doctors was positively correlated with life expectancy.

RESULTS

In the present study Singapore (84) and South Korea (81) had the highest life expectancy, while Afghanistan (60) and Yemen (64) had the lowest life expectancy in Asia. Bhutan (0.23), Afghanistan (2.1), Nepal (2.1), Cambodia (2.27) and Yemen (3) had the least number of doctors per 10,000 people. Kazakhstan (40.99) and Lebanon (35.4) had the highest doctors to 10,000 people ratio. Singapore and South Korea which had the best life expectancy rates in our study had

a healthy physician/population ratio of 18.33 and

Figure 1 shows the physician population ratio and the life expectancy in South Asian countries. The life expectancy is highest in Maldives and the physicians per capita are also the highest in Maldives. Sri Lanka was not included because the physician population ratio data was unavailable. Ironically Bhutan which had the least physician to

20.24 respectively.

population ratio had the next highest life expectancy. Afghanistan which has a low physician to population ratio had the least life expectancy, but the long drawn strife and internal insurgency there might have contributed to the low life expectancy.

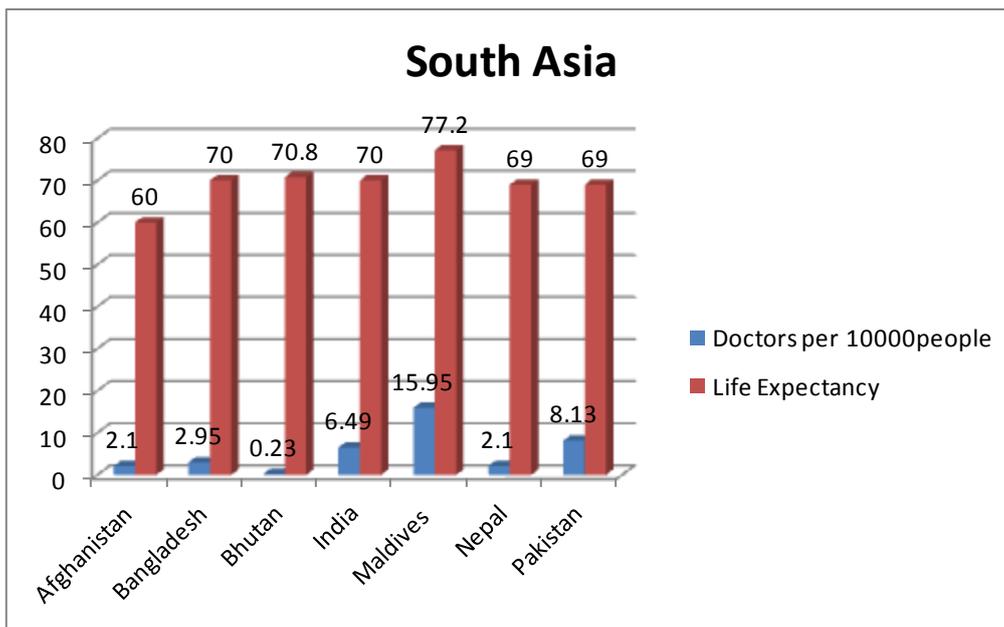


Figure 1: Doctors per 10000 population and Life Expectancy in South Asia

Figure 2 shows the physician population ratio and the life expectancy in South East Asian countries. Singapore has the highest life expectancy and the best physician population ratio in the region.

Cambodia had the lowest life expectancy and the lowest physician population ratio. Oil rich Brunei was placed second in both the parameters

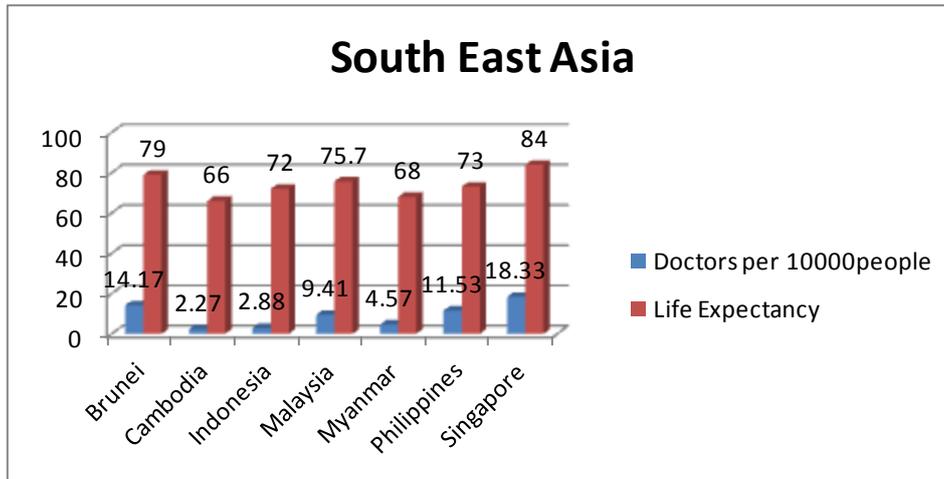


Figure 2: Doctors per 10000 population and Life Expectancy in South East Asia

Figure 3 shows the physician population ratio and the life expectancy in the Middle East, The life expectancy is highest in the United Arab Emirates, followed by Kuwait. Yemen has the

lowest life expectancy and also the least physician population ratio. The highest physician population ratio is seen in Lebanon and the next highest in Jordan

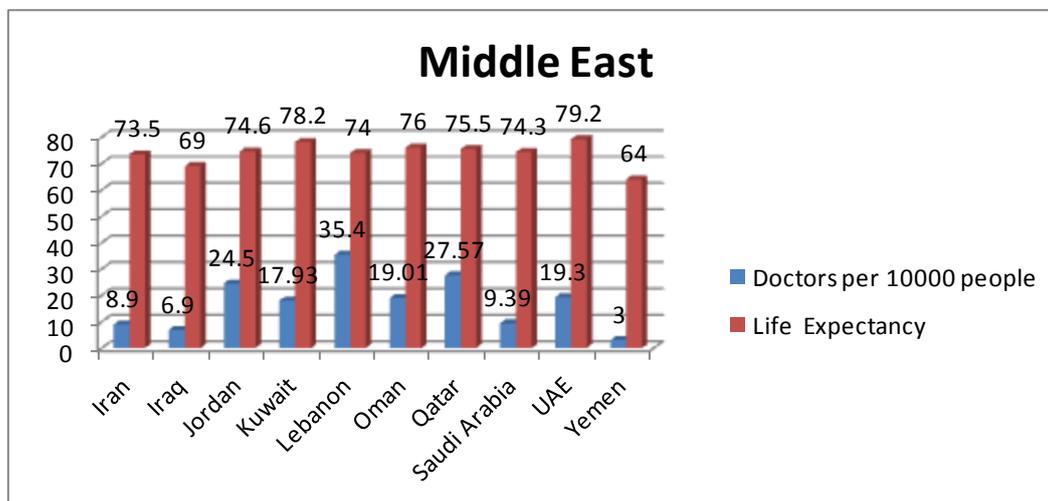


Figure 3: Doctors per 10000 population and Life Expectancy in the Middle East

Figure 4 shows the physician population ratio and the life expectancy in Central Asia. South Korea has the highest life expectancy and Kazakhstan

the lowest but surprisingly had the best physician population ratio. The lowest physician population ratio in the region was in Vietnam

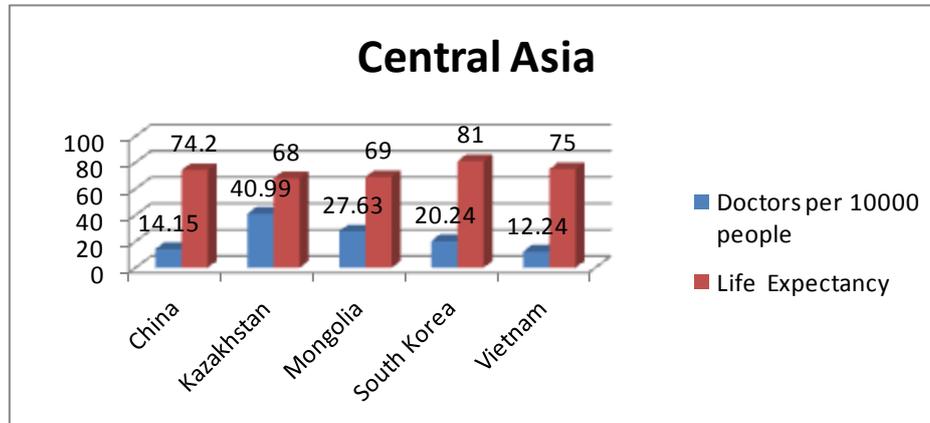


Figure 4: Doctors per 10000 population and Life Expectancy in Central Asia

DISCUSSION

In two of the four regions in our study, countries with the highest physician to population profile had the best life expectancies. Similarly, in three of the four regions, countries with the least life expectancy had the worst physician to population indices. The notable exceptions were Kazakhstan which had the highest physician population ratio in Asia but the least life expectancy in the Central Asian region this is probably related to the Soviet era health policies which resulted in a high number of health personnel but not the necessary accompanying health infrastructure. The other anomalous observation in our study was Maldives which showed the least physician population ratio in Asia but had the second lengthiest life expectancy in South Asia. This was probably due

to a healthier lifestyle and climate in the Himalayan state. Wealthier nations like Singapore, South Korea and resource rich Arab states had longer life expectancies. A study which analyzed WHO data concluded that there was greater correlation between GDP and average lifespan than between doctor's per capita and average life span.^[7] There were a few studies that did not show similar findings or correlation. A Swiss study concluded that the physician/population ratio in different cantons of Switzerland had no effect on avoidable mortality.^[8] However more skilled personnel generally resulted in better health outcomes. In sub Saharan Africa, births attended by skilled health personnel correlate strongly with health expectancy and maternal mortality rate.^[9] One reason why stronger economies have better

average lifespans are the ability to not only invest in primary health care but also in building modern health infrastructure. A study in North America and Western Europe demonstrated that the number of intensive care unit beds correlates strongly with mortality.^[10]

The number of doctors tends to be more in countries with higher per capita incomes, this is apparent in our study too. The highest proportion of doctors was seen in the wealthy oil producing nations and the tiger economies of South East Asia, on the other hand less dynamic and troubled economies such as Afghanistan, Cambodia and Yemen had a 'doctor deficit'. A stronger economy attracts more doctors. A study examined the influence of gross national product per capita on the global distribution of doctors and concluded that GNP explained 49% of the variation in doctors and the influence of GNP per capita on the distribution of doctors appeared to be substantial.^[11] This holds true even in developed economies. The geographic distribution of pediatricians in the United States was analyzed and the distribution did not parallel the distribution of child population but rather was concentrated in areas with higher per capita income and residency programs.^[12] One other factor that determines doctor distribution is the urban rural divide, that is why agrarian economies like Bhutan have a lower number of doctors, whereas city states like Singapore and Kuwait had a significantly higher proportion. Although the number of Pediatricians in the US doubled between 1981 and 1996, it resulted in only a small

increase in the pediatrician availability in rural areas and the increase in number was overwhelmingly in favor of urban localities.^[13] This phenomenon is seen at the other end of the age spectrum, which probably has a larger influence on life expectancy. In 2008 the total number of Geriatricians in the U.S. were 7412 and over 90% resided in urban areas and there was a decline in the ratio of Geriatricians to population in rural areas.^[14] Many medical graduates in Asia from countries like India, Jordan and Philippines emigrate to nations where incomes are more lucrative like in the Middle East and the West which tends to add to the imbalance. National Health systems are some of the biggest employers in countries, and employ around 35 million employees worldwide, a significant portion of them are expatriates.^[15] In the United States with the passage of the affordable care act or more popularly known as 'Obamacare' the number of physicians required will increase. A study estimated that by 2025 the United States will require nearly 52,000 additional primary care physicians, population growth will account for 33,000 of those required and 10,000 additional physicians will be needed to accommodate population ageing.^[16]

When our study is compared with similar studies in Europe and elsewhere they show similar results. The physician population ratios in those studies when matched with similar ratios in our study show very similar outcomes in terms of life expectancy too. Poland has 21.57 doctors per 10,000 population and the life expectancy in 2009

for women was 80.2 for females and 71.6 for males.^[17] Bulgaria, another eastern European nation has unique problems that are becoming more common in ageing European nations, a low crude birth rate, a low fertility rate, and a high mortality rate. Bulgaria has 37.3 doctors per 10,000 people and a life expectancy of 73.3 years.^[18] These figures are similar to the ones seen for middle income nations like Lebanon and Jordan in our study. Sweden like most Scandinavian countries is an efficient welfare state. Health care expenditure is mainly tax funded (80%) and is equivalent to 9.9% of gross domestic product. Only around 4% of the citizens avail of private insurance. Life expectancy in Sweden is a high 82.7 years and there are approximately 37.7 doctors for 10000 people.^[19] These figures are comparable to countries with high per capita income like South Korea and Singapore in our study. In the United States which practices a free market health care system, the life expectancy is 78.6 and there are 24.22 doctors per 10000 people.^[20] In our study, countries like Qatar and the United Arab Emirates show matching statistics and outcomes.

CONCLUSIONS

The present study shows that countries with higher physician population ratios generally have lengthier life expectancies and for countries with lower physician population ratios the inverse is true. Countries that have higher per capita incomes attract more health personnel and have better average life spans and perform better than

their poorer peers. Physician to population ratios have a significant bearing on life expectancy. This articulates and endorses the view that increasing the number of undergraduate and postgraduate seats available would be beneficial in the long run.

REFERENCES

1. Macinko J, Starfield B, Shi L. Quantifying the health benefits of primary care physician supply in the United States. *Int J Health Serv.*2007;37(1):111-26.
2. Bigbee JL. Relationships between nurse- and physician-to-population ratios and state health rankings. *Public Health Nurs.* 2008;25(3):244-52.
3. Ringard Å, Sagan A, Sperre Saunes I, Lindahl AK. Norway: health system review. *Health Syst Transit.* 2013;15(8):1-162.
4. Fournier AM, Dodard M. The health care delivery crisis in Haiti. *Fam Med.* 1997 Oct;29(9):666-9.
5. Life Expectancy data by country. Global Health Observatory data Repository. Available from <http://apps.who.int/gho/data/node.main.688?lang=en>
6. Doctors per 10000 population. World Health Organization global health expenditure database. Available from: <http://apps.who.int/nha/database/DataExplorerRegime.aspx>

7. Forgacs I. The required number of physicians: is it an optimal figure?. *Cah Sociol Demogr Med.* 2002;42(2-3):269-82.
8. Crivelli L, Domenighetti G. The physician/population ratio in Switzerland: the impact of its regional variation on mortality, health expenditures and user's satisfaction. *Cah Sociol Demogr Med.* 2003;43(3):397-425.
9. Buor D, Bream K. An analysis of the determinants of maternal mortality in sub-Saharan Africa. *J Womens Health .* 2004 Oct;13(8):926-38.
10. Wunsch H, Angus DC, Harrison DA, Collange O, Fowler R, Hoste EA, et al. Variation in critical care services across North America and Western Europe. *Crit Care Med.* 2008 ;36(10):2787-93.
11. Wharrad H, Robinson J. The global distribution of physicians and nurses. *J Adv Nurs.* 1999;30(1):109-20.
12. Chang RK, Halfon N. Geographic distribution of pediatricians in the United States: an analysis of the fifty states and Washington, DC. *Pediatrics.* 1997;100(2 Pt 1):172-9.
13. Randolph GD, Pathman DE. Trends in the rural-urban distribution of general pediatricians. *Pediatrics.* 2001;107(2):18.
14. Peterson LE, Bazemore A, Bragg EJ, Xierali I, Warshaw GA. Rural-urban distribution of the U.S. Geriatrics physician workforce. *J Am Geriatr Soc.* 2011;59(4):699-703.
15. Kingma M. Migration patterns of health professionals. *Cah Sociol Demogr Med.* 2005 ;45(2-3):287-306.
16. Petterson SM, Liaw WR, Phillips RL Jr, Rabin DL, Meyers DS, Bazemore AW. Projecting US primary care physician workforce needs: 2010-2025. *Ann Fam Med.* 2012 ;10(6):503-9.
17. Sagan A, Panteli D, Borkowski W, Dmowski M, Domanski F, Czyzewski M, et al. Poland health system review. *Health Syst Transit.* 2011;13(8):1-193.
18. Dimova A, Rohova M, Moutafova E, Atanasova E, Koeva S, Panteli D, et al. Bulgaria health system review. *Health Syst Transit.* 2012;14(3):1-186.
19. Anell A, Glenngård AH, Merkur S. Sweden health system review. *Health Syst Transit.* 2012;14(5):1-159.
20. Miniño AM, Murphy SL, Xu J, Kochanek KD. Deaths: final data for 2008. *Natl Vital Stat Rep.* 2011;59(10):1-126.