Title (character limit: 78/180): How many additional physicians are needed for hypertension treatment in India?

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ABSTRACT (word limit: 339/340)

Objective: To estimate the number of additional physicians needed to treat all individuals with hypertension in India.

Methods: We incorporated existing data and corresponding uncertainties from the Global Burden of Disease Study and two national-representative surveys (including >1.3 adults) to estimate the number of adults (18+ years) with hypertension in India. To estimate the number of additional physicians needed to treat all adults with hypertension, we used Monte Carlo simulations and derived central estimates and 95% uncertainty intervals from the 50th, 2.5^{th}, and 97.5^{th} percentiles of 1,000 simulations. We varied the proportion of visits for new physicians to spend on treating hypertensive patients from 10% to 100% of all visits (i.e., full dedication to hypertension treatment), and the number of visits per patient per year from 3 to 12, the latter being the current practice to allow monthly prescription renewals. The estimated capacity of currently available physicians (n=835,910) was 418 million visits per year, assuming 10% of visits devoted to treating hypertensive patients.

Results: In 2014, 195 million (95% uncertainty interval: 193-197) adults in India were estimated to have hypertension. This would require over 2.3 billion visits per year assuming monthly visits (i.e., current practice), and nearly 600 million visits per year assuming 3 visits per patient per year. With the current practice of monthly visits, 3.8 million new physicians would be required if they would have the same proportion of hypertensive patients as the available physicians (e.g., 10%), or 384,921 new physicians if they only were to see hypertensive patients (Table). These numbers were considerably reduced assuming 3 visits annually per patient, yet 33,529 new physicians would be required even if they only were to see hypertensive patients.

Conclusions: Adequate monitoring and treatment of individuals with hypertension in India will require a substantial number of new physicians. Even in the most optimistic scenario (3 visits per patient per year and full (100%) dedication of additional physician time to hypertension treatment), around 30,000 new physicians will be required. These findings indicate that another approach, e.g. task-sharing, will be required to achieve nationwide hypertension control.

Table. Estimated number of additional physicians required to ensure adequate hypertension treatment in India assuming 3-12 annual visits per hypertensive patient and 10-100% of patients treated by additional physicians to be hypertensive.[a]

Proportion of visits to additional physicians from hypertensive patients (% of visits)	Visits per patient per year		
	3 (Triannual) Estimate (95% uncertainty interval)	4 (Quarterly) Estimate (95% uncertainty interval)	12 (Monthly)[b] Estimate (95% uncertainty interval)
10[c]	335,290 (259,408-409,959)	725,498 (647,946-801,632)	3,849,210 (3,761,144-3,941,333)
25	134,116 (103,763-163,984)	290,199 (259,178-320,653)	1,539,684 (1,504,458-1,576,533)
50	67,058 (51,882-81,992)	145,100 (129,589-160,326)	769,842 (752,229-788,267)
75	44,705 (34,588-54,661)	96,733 (86,393-106,884)	513,228 (501,486-525,511)
100	33,529 (25,941-40,996)	72,550 (64,795-80,163)	384,921 (376,114-394,133)

[a]Existing data and corresponding uncertainties of hypertension prevalence (The District-Level Household Survey-4 and the second update of the Annual Health Survey; total n > 1.3 adults) and population size (The Global Burden of Disease Study) were used to estimate the number of adult ($\geq$18 y) men and women with hypertension in India 2014. The number of physicians available in 2014 (n= n=835,910) were assumed to complete around 418 million visit per year (assuming 25 visits per physician and day; 200 working days per year; and 10% of visits from individuals with hypertension). We used Monte Carlo simulations (n=1000), incorporating uncertainty of inputs, to estimate the number of total and additional physicians needed to treat all individuals with hypertension in Indian, altering the number of annual visits needed per patient and the proportion of patient visits to new physicians that included hypertensive individuals. The number of additional physician visits needed were calculated by subtracting the number of available physician visits from the total number of physician visits needed, and the number of additional physicians needed were calculated as the additional visits needed divided by visits per physician. We derived the central estimate and the 95% uncertainty interval (UI) from the 50th, 2.5th, and 97.5th percentiles of 1,000 simulations. [b]Twelve annual visits per patients are currently required to allow monthly prescription renewals. [c]10% of all patients seen by the available physicians are hypertensive.