

Title: Getting a C-section at a private facility, what are the odds?: Analysis of National Family Health Survey (NFHS) from India

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Background: Globally, the deliveries through cesarean sections (c-sections) have tripled in the past three decades. Private facilities in India are speculated to promote unnecessary c-sections raising ethical quandaries. We conducted an empirical analysis to test these speculations harnessing national-level data.

Methods: Data for National Health Family Survey (NHFS) for India was acquired from the DHS Program (dhsprogram.com) under agreement for research use. State-level and nationwide odds ratios (ORs) were calculated for women delivering through c-section at private facilities against the public facilities and for rural and urban aggregations. Pearson correlations were used to test the association between the OR values and indicators of literacy and earning in women. States were ranked from highest to lowest ORs and rank transitions were assessed between NFHS-3 (2005-2006) and NFHS-4 (2014-2015). The analysis was conducted in RStudio (1.1.383) and Microsoft Excel (16.29).

Results: For NFHS-4, nationally, the c-section delivery at a private facility had significantly greater odds than a public facility (OR = 5.12 [95% CI: 2.48, 10.58], $p < 0.0001$). The odds were higher in rural (OR = 5.93 [2.70, 13.01], $p < 0.0001$) than in urban (OR = 3.27 [1.74, 6.13], $p = 0.0002$) regions. Among states, Bihar ranked first (OR = 16.83 [4.57, 61.97]) while Kerala ranked last (OR = 1.37 [0.77, 2.46]). The OR was significantly correlated with literacy ($r = 0.61$, $p < 0.001$) but not with earning ($r = 0.11$, $p = 0.544$) in women. For NFHS-3, the national odds ratio was borderline significant (OR = 2.14 [1.06, 4.30], $p = 0.033$) with Tripura ranking first (OR = 7.34 [3.92, 13.74]) and Punjab ranking last (OR = 0.88 [0.49, 1.59]). Taken together, the NFHS-3 & 4 demonstrate an approximate growth of 13.9% in OR, with multiple states showing rank transitions.

Significance: These results validate the public speculation that c-section deliveries are more likely at private than at public facilities. Our estimates, being recent and nationally representative, posit regulatory attention for private medical facilities in India. Further research using these estimates can unravel the underlying determinants.

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