Title: Bayesian Qualitative Analysis reveals the role of Implementation Anxiety in shut down of Rural Medical Assistant Programme (RMAP), India

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Background: The relationship between political decision-making and health system reforms has a large scale impact on a population's health. Rigorously deconstructing the decision-making process is central to policy research. We applied qualitative Bayesian analysis (QBA) to investigate the case study of shut down of the Rural Medical Assistant Programme (RMAP), Chhattisgarh, India.

Methods: In qualitative Bayesian analysis, posterior probabilities of hypotheses are calculated following Bayes' theorem from likelihoods and prior beliefs, that are subject to the evidence and researcher's expertise. Four competing hypotheses (H_1, H_2, H_3, H_4) were generated. RMAP failure was attributed to - hasty and anxious implementation by the state government [H_1], opposition from the national medical fraternity [H_2], lack of political will of the new ruling government [H_3], and failure of policy to produce desired health outcomes [H_4]. Two sets of prior distributions were tested - equal and differential. We obtained twelve discrete evidence pieces (E_1 - E_{12}) from the relevant policy documents and academic articles (n = 9) that were used for likelihood computation.

Results: A total of forty-eight likelihood values were derived for twelve evidence pieces conditioned on the four hypotheses. Evidence piece which was most consistent under a given hypothesis (given as E_c) was arbitrarily assigned a high probability, always > 0.5. Likelihoods for that evidence under other competing hypotheses were less than the likelihood of E_c on a relative scale. We calculated joint likelihoods of evidence (E_1 to E_{12}) for H_1, H_2, H_3, and H_4. The posterior probabilities of hypotheses under equal priors were - 0.93 (H_1), 0.07 (H_2), 4.65E-07 (H_3) and 1.16E-15 (H_4) and those under differential priors were - 0.93 (H_1), 0.07 (H_2), 4.65E-07 (H_3) and 3.52E-18 (H_4). The largest posterior probabilities of H_1 under both prior distributions demonstrate H_1 as a probable causal mechanism for the RMAP shutdown.

Significance: To our best knowledge, this is the first instance of QBA application in health policy analysis. QBA has great utility compared to other methods of qualitative research, due to its capability of systematically generating and evaluating hypotheses in multicomponent scenarios, while leveraging the intuitive nature of bayesian inference.

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