Comment

A perspective on trends in air pollution attributed disease burden in India-Authors' reply

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We believe the success of publications is its visibility, comprehensibility, and application. We are glad and appreciate the efforts of Sarode and Sarode¹ in discussing our publication.² First, we would like to clarify that the study by Abdul Jabbar et al³ explained the air quality and pollution trends in South Asia and used a single value (levels of CO₂, NO₂, Methane and greenhouse gas) for each country for every year to report the trend of these values.3 However, our study2 used state-wise air pollution attributed disease burden (APADB) (disabilityadjusted life years lost due to air pollution) data published by the Global Burden of Disease (GBD) group for the previous decade to report their associations.4-7 The APADB indicates the measure of the "health effect" of air pollution emissions (indoor and outdoor air pollution) alone, which is just one of the indicators of "cause" (or air pollution). Further, the casual transitions could be transient and may not be immediate. For example, introducing the electric vehicle may reduce pollution (CO₂ emissions); however, the reduction in APADB may be transient. Thus, comparing the short-term changes in air pollution with changes in APADB in the current context may not be appropriate.

The authors Sarode and Sarode¹ identified the citation supporting the regularisation of motor act was related to United Kingdom, however India adopted the European emission and fuel regulations in 2000, when drafting the guidelines to regulate the vehicular emission.8 Simultaneously, the national Air (Prevention and Control of Pollution, 2021) Act also known as Air Act was amended in 1987 to prevent, control and abate air pollution. The Air Act currently includes The National Green Tribunal Act 2010, The Bio-Medical Waste Management Rules 2016, Hazardous and Other Wastes 2016, Solid Waste Management Rules 2016, E-Waste management 2016 etc. The Air Act involved actions toward safe and hygienic disposal of industrial releases for the safety of the residents and environment.9 Levels of CO₂, NO₂, methane and greenhouse gas

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certainly rise with progressive industrialisation; however, the Air Act implemented to protect the residents is being speculated in the manuscript as a cause of a negative association with APADB despite an increase in their levels.⁹

While considering the association between the number of motor vehicles and the annual number of factories with overall APADB, we observed a negative correlation. To explore the specific reasons for this trend, we further analysed the APADB separately into household air pollution attributed disease burden (HAPDB), and ambient particulate matter attributed disease burden (APMDB). The results show that APMDB (outdoor air pollution) is positively and HAPDB (indoor air pollution) is negatively associated with the number of motor vehicles and factories. Studies have already highlighted that HAPDB has been reduced over the years⁶; therefore, it is evident that indoor air pollution contributes more seriously to the overall APADB than outdoor pollution.¹⁰

In short, comparing the overall APADB with the number of motor vehicles and factories exhibited a trend of negative association. However, a separate analysis of APADB into HAPDB and APMDB shows that number of motor vehicles and factories were positively associated with APMDB and negatively with HAPDB. The statement from our study²: "considering the APADB separately into indoor (HAPDB) and outdoor (APMDB) air pollution exposed a negative association with economic growth for the former, and a positive association for the latter" clarifies the conflicting observations in our study.

Although it is reasonable to consider the impact of demonetisation and the introduction of goods and services tax (GST) on state gross domestic product (GDP), the literature has mixed opinions in terms of both positive and negative impacts on economic growth. Wu et al¹¹ report only short-term (30 and 90 days effects), stating, "the reported results show that the effects of demonetization are mixed, supporting neither broadly negative rhetoric nor the overly positive policy rhetoric". Further "the introduction of the GST implemented on 1 July 2017, despite claims of the decline attributed to demonetization, it is difficult to attribute either financial decline or gain to demonetization because of the additional policy treatments that were introduced after demonetization." Once again, we thank the authors for





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their comments, which allowed us to clarify the facts in further detail.

Contributors

All the authors (SKS, BSB and BR) conceptualized and wrote the article.

Declaration of interests

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