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Assessing India's strategy to combat antimicrobial resistance

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Abstract

It is projected that by the year 2050, AMR will cause more fatalities than cancer does globally. Antimicrobial resistance is a growing problem worldwide, and the Indian government has responded by creating a National Action Plan to tackle AMR (NAP-AMR), which is largely based on the World Health Organization's Global Action Plan on AMR. We find that although the NAP-AMR effectively matches the Global Action Plan and outlines ambitious objectives, a lack of budgetary allocation across states, inadequate enforcement, and insufficient multi-sectoral coordination have stymied progress. Reducing the overuse of antibiotics necessitates several measures, including expanding efforts to improve water and sanitation infrastructure, tying the problem of AMR into existing vertical health programs for HIV and TB, giving top priority to infection prevention and control, fortifying the frontline healthcare workforce in rural and peri-urban settings, and utilizing point-of-care testing and mobile app-based health interventions for diagnosis.

Keywords: Antimicrobial resistance; India; Policy; National action plan

1. Introduction

The World Health Organization (WHO) has identified antimicrobial resistance (AMR) as a serious worldwide health problem, but the difficulties are especially severe in India [1]. Studies demonstrate that over seventy percent of Acinetobacter baumannii, Escherichia coli, and Klebsiella pneumonia isolates and over fifty percent of Pseudomonas aeruginosa isolates are resistant to third-generation cephalosporins and fluoroquinolones, respectively [2]. New Delhi Metallo—lactamase (NDM-1) emerged in 2008 and has since rapidly spread to more than 70 countries worldwide, highlighting the need for immediate action in the face of AMR. The blaNDM-1 gene encodes a carbapenemase that can inhibit the effects of even the most potent and effective carbapenem antibiotics.

Monitoring the prevalence and distribution of AMR is difficult enough as it is, but the lack of consistent monitoring data just makes things worse.

Research on healthcare-associated infections in hospitalized patients is based on scoping reports, prospective studies, and point prevalence surveys at a subset of big hospitals [4]. On the other hand, antibiotics are often recommended for respiratory infections in both public and private primary care and outpatient settings [5-7]. For example, Kotwani and Hol- lowly discovered that 39% of all patients visiting private retail pharmacies and public facilities and 43% of all patients visiting private clinics were given at least one antibiotic [6].

To this end, in September 2016, the Indian Ministry of Health and Family Welfare established the Intersectoral Coordination Committee, the Technical Advisory Group, and the Core Working Group on AMR to create the country's first comprehensive strategy for combating antimicrobial resistance (NAP-AMR) [8]. The WHO's Global Action Plan on

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AMR, which was accepted by the World Health Assembly in 2015 [9], serves as a major inspiration for the NAP-AMR. In this article, we take a look at the NAP- AMR in India from a human resources perspective, discussing its history, current status, and plans.

2. The NAP-scope AMR's and coverage: what's included and what's missing

Political will in India to restrict AMR has been building since 2011 when health ministers of South-East Asia Region Member States stated their commitment to fight against AMR via the Jaipur Declaration and to prioritize it in national legislation. The NAP-AMR successfully incorporates input from numerous stakeholders, such as clinicians, microbiologists, international experts, and policy-makers from neighboring countries, as well as representatives from the Ministries of Health and Family Welfare, Agriculture and Farmers' Welfare, the Department of Animal Husbandry, Dairying, and Fisheries, and the Ministry of Environment [8]. This document employs a One Health approach to combating antimicrobial resistance across the four spheres of human, animal, agricultural, and environmental health, essentially replicating the World Health Organization's Global Action Plan. Following are the NAP-six AMR's overarching aims: 1. raising public understanding of AMR via improved channels of information and instruction; 2.

Improve India's capacity to take the lead in combating antimicrobial resistance on a global, national, and state level.

The multiple outputs and activities associated with each strategic goal are spread out throughout short, medium, and long periods [8]. Despite the plan's ambitious goals, it ignores important considerations, such as the latest findings on behavior change interventions and structural gaps in healthcare access, and the complexity of India's pluralistic, multisectoral approach to healthcare provision.

The first problem is that there is no centralized repository for collecting information on people's knowledge, attitudes, and practices (KAP) or their behavior. Simplifying, collecting, and analyzing this data to better monitor long-term trends would be greatly aided by a uniform system jointly administered by the federal and state governments. Systematic monitoring by government health authorities is more likely to result in changes in policy and practice in India than individual surveys, according to research by Swaminathan et al. [4].

Second, the plan's metrics depend heavily on training, guidelines, and behavior modification programs with prescribers (doctors, nurses, pharmacists, etc.) that have had little success in India and other low- and lower-middle-income country (LMIC) settings [10]. Even in states where attempts have been made, frequent changes in institutional governance, a lack of time and enthusiasm, and a perceived encroachment on professional autonomy have presented significant barriers to successful behavior change [7,11]. This has resulted in a wide range of compliance with standard treatment guidelines and inconsistent educational efforts.

Revision of professional training programs in human, animal, agricultural, and environmental health is given adequate attention in the NAP-AMR; however, the plan's overarching focus is on changing people's behavior through campaigns rather than ensuring social compliance through nudge interventions or modifying the socioecological environment's underlying structures. While social mobilization and educating people about the need of practising good hand hygiene get a lot of attention, making sure that primary care facilities have access to clean water and toilets is seldom mentioned [8]. Currently, active initiatives should be coordinated closely with existing sanitation programs like Swachh Bharat Abhiyan (Clean India Mission). A comparable effort should be taken to understand the structural and socioecological implications on behavioral changes and antibiotic prescriptions generally since the plan does mention explicitly pushing "steps for overall health improvement and service delivery" in maternal health and vaccination.

While the plan does recognize the importance of antimicrobial stewardship on multiple fronts, it falls short in two key areas: it does not account for the variety of outpatient care settings in India, and it does not establish transparent mechanisms for coordinating efforts between the public and private sectors. The private sector has been highlighted as a potential partner in microbiological monitoring and communication initiatives, but the system connections to promote antimicrobial stewardship or to track antibiotic use between the public and traditional, informal, or private sectors remain unclear. Outpatient settings provide unique diagnostic challenges, but increasing access to point-of-care diagnostics like C-reactive protein and procalcitonin might reduce unnecessary antibiotic prescriptions. Algorithms for electronic patient care using analogous treatments have shown clinically meaningful reductions in serious adverse events and improper antibiotic use in other LMICs [12].

The NAP-AMR relies on a statewide network of laboratory-based surveillance at a limited number of accredited reference labs in tertiary care medical institutions for data monitoring and evaluation and surveillance operations. Although an essential first step toward statewide monitoring, the Antimicrobial Resistance Surveillance & Research

Network (AMRSN) reflects tertiary care rather than community-based settings [13]. There is a large gap between our knowledge of the reasons for antibiotic use at the general level and the patterns of antibiotic use and resistance in primary and secondary care. This is why it is crucial to increase the reach of existing surveillance networks to include data collection in community settings [13]. An important development in this field might be the use of app-based systems for tracking and monitoring surveillance data. Smartphone applications for Bluetooth contact tracking, such as Aarogya Setu [14], were developed and used efficiently in India and China during the COVID-19 (coronavirus disease 2019) pandemic. Similar to how mobile, app-based platforms can be used to disseminate information to private and public providers about AMR patterns and antibiotic misuse, improving the diagnostic process and boosting surveillance and data collection in community settings, mobile, app-based platforms can also be used to disseminate information to private and public providers about AMR patterns and antibiotic misuse.

Finally, while the plan makes passing reference to the necessity of coordinating AMR containment efforts with existing vertical health programs (such as the National Vector Borne Disease Control Program or the National AIDS Control Organization), no supplementary, publicly available documents detail the mechanisms for enacting these connections. However, current programs for dengue and malaria prevention, leishmaniasis, tuberculosis (TB), and human immunodeficiency virus (HIV) care, among others, must be incorporated at all levels into the overall AMR containment strategy.

3. Inadequacies in the National Antimicrobial Resistance Action Plan's implementation (NAP-AMR)

The National Action Plan to Fight Antimicrobial Resistance (NAP-AMR) for 2017–2021 was developed to serve as a critical example for states to create their state action plans to combat AMR since health is a state concern in India. However, just three states/union territories have prepared state action plans (Kerala, Madhya Pradesh, and Delhi); financing constraints have delayed future implementation efforts [15].

Legislative attempts to reduce antibiotic overuse have been robust since 2017. These include the elimination of antibiotic residual criteria for pharmaceutical effluents, the prohibition of colistin as an animal growth stimulant, and the elimination of certain fixed-dose combinations. While these safeguards are necessary, they have proven challenging to adopt and enforce [15].

The updated and limited Schedule H1 policy that was put in place before the NAP-AMR [16,17] is only one example of the many measures to limit access to OTC antibiotics. Schedule H1: I require adequate labeling of Schedule H1 drugs, (ii) a separate register for Schedule H1 prescription sales, and (iii) restricts dispensing several third- and fourth-generation cephalosporins, carbapenems, newer fluoroquinolones, and first- and second-line anti-TB drugs to prescriptions only. Additional regulatory measures supporting Schedule H1 and a review of the scheduling of newer antimicrobials under Schedule H1 are called for in the NAP-AMR [8].

Farooqui et al. [18], using sales data from 30 different locations in India, reported that the use of antimicrobials dropped dramatically after the implementation of Schedule H1 limits in 2014. The Indian state of Kerala is unique in that it has successfully restricted the distribution and use of over-the-counter antibiotics [18]. Kerala was one of the few states to effectively implement measures to restrict access to and use of over-the-counter (OTC) antibiotics. Adoption and implementation of Schedule H1 have been severely slowed in certain locations due to weak regulatory enforcement by drug inspectors and limited capacity [17]. This has not led to reductions in non-prescription and OTC antibiotic consumption.

Problems have arisen due to a lack of funding and a failure to coordinate efforts across many sectors at the federal and state levels. The lack of separate monetary allocations for AMR initiatives across different states in India is a major hurdle to success on a national scale [9], especially given the conflicting agendas of state governments. Rarely, if ever, is AMR cited as a leading cause of death or illness [19]. Due to the COVID-19 epidemic, AMR is much less noticeable and development has been significantly slowed. Without established models and governance structures to coordinate efforts amongst states, India is unlikely to achieve substantial progress on AMR. Kerala's success in coordinating public-private partnerships, launching and scaling up strong antibiotic prescribing practices throughout primary, intermediate, and tertiary institutions, and coordinating efforts via a statewide task force and the core committee makes it a role model for other states. The federal government should actively promote and actively fund such programs, and state governments should encourage them.

4. Conclusion

The National Action Plan on Antimicrobial Resistance (NAP-AMR) successfully mimics the World Health Organization's Global Action Plan and outlines lofty targets; however, development has been stymied due to insufficient funding allocation across states, lax enforcement, and inadequate multisector coordination. The federal government could adopt antibiotic stewardship procedures similar to those implemented in Kerala State via the One Health concept and good coordination between public and private sector entities. Reducing reliance on antibiotics requires several measures, including strengthening the frontline healthcare workforce in rural and peri-urban settings; leveraging point-of-care testing and mobile app-based health interventions for diagnosis and surveillance; implementing a socioecological model; and investing in improved water and sanitation infrastructure.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

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