

## ANTI MICROBIAL RESISTANCE- ISSUES & A SOLUTION

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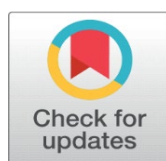
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## ABSTRACT

The current article looks into the aspects of Anti Microbial Resistance (AMR) keeping in context of unjustified use of antibiotics during COVID 19. Gradually, it delves into the subject of scientific aspects related to antibiotic resistance. After discussing the process, it focuses on challenges ahead & suggests a solution through integration of Homoeopathy at large scale. As development of novel antibiotics is a time taking process, the therapeutic system of Homoeopathy can chip in with its 'Isopathic' remedies. To add to it, the Essential Medicine properties of Homoeopathy can only catalyze the process of integration for masses at large scale. It is only befitting for a country like India which has a huge population.

**Keywords:** AMR, Isopathy, Homoeopathy, WHO, Antibiotics

## 1. INTRODUCTION

The World Health Organization (WHO) report on Anti Microbial Resistance (AMR) mentions that 75% received antibiotics during COVID 19 pandemic. Actually only 8% hospitalized cases needed antibiotics. It mentions that AMR is a significant public health concern as it caused 1.27 million deaths in 2029. Another 4.95 million

deaths are attributed to its contribution. During the pandemic, there were more than 83% of antibiotic uses in Eastern Mediterranean & African regions. Similarly the use was 33% in the Western Pacific region between 2020 & 2022. The highest rates of uses were among critical COVID19 cases with a global average of 81%. In mild cases, African region use was 79%. [WHO \(2025\)](#)

AMR is a silent pandemic that needs immediate & efficacious interventions. By 2025, AMR could supersede all other causes of mortality worldwide. The direct fatalities linked to AMR are 1.2 millions in 2019. The projection is 10 million per year by 20250. It is a reality to note that when unnecessary antibiotics offer no benefit while posing risks & use contributes to emergence & spread of AMR. [WHO \(2025\)](#)

WHO has a unit for surveillance, evidence & laboratory strengthening division for AMR that deals with the issue of AMR. WHO data underscores the urgent need for more prudent & targeted use of antibiotics to curb the spread of AMR & preserve the effectiveness of these antibiotics. [WHO \(2025\)](#)

Unjustified and irrational uses of antibiotics have resulted in pathogenic bacteria and other microorganisms that become resistant to antibiotics. In 2021, 1.2 million deaths worldwide were attributed to antimicrobial resistance to the prevalent antibiotics. Hospital surveys show that in India drug resistant infections have a 13% mortality rate. That's why the need for novel antibiotics is the focus of research currently. The word meaning of 'antibiotics' indicates against life. In reality, these are against the lives of bacteria only. Further, these antibiotics inhibit the growth of bacteria without harming the human cells. [WHO \(2025\)](#), [Gandra et al. \(2019\)](#)

Human cells do not have cell walls but bacteria have cell walls besides the cell membrane. The cell walls of bacteria are made up of peptidoglycan, a meshy structure comprising of two components. Glycans are long chains of alternating sugar molecules called N-Acetyl Glucosamine (NAG) and N-Acetyl Muramic acid (NAM). The NAM-NAG unit is linked to long chains is unique to bacteria. The uniqueness of these chains is the base for antibiotic development. Similarly, the human immune system also looks for this signature to attack the invading bacteria. [Gandra et al. \(2019\)](#), [Habboush and Guzman \(2025\)](#), [Dever and Dermody \(1991\)](#)

The 'peptido' portions of the peptidoglycans are peptides that are short amino acid chains. These chains link NAM sugars on adjacent glycan strands. The cross links form a strong, interconnected mesh. The first antibiotic 'Pencillin' works by interfering with this cross linking step. Thus, there is a weakened cell wall that no longer holds the cytoplasm securely & the bacterial cell bursts open & dies. On the other hand, the cleverness of bacteria helped the bacteria to evolve resistance to 'Pencillin'. The bacteria came up with new enzymes like 'Pencillinase' that chop up 'Pencillin' molecules. They also evade antibiotic action by modifying the targets of 'Pencillin'. [Habboush and Guzman \(2025\)](#), [Dever and Dermody \(1991\)](#), [Kaul et al, \(2024\)](#)

Bacterial infection requires rapid division of bacterial cells & for this process the cell wall synthesis is needed. Real bacterial cells must synthesise their own cell wall material. Bacteria selectively break & reform bonds within the existing wall to allow for growth & division. Before the process of addition of cell wall components molecular scissors are used. Enzymes called endo-peptidases uncouple the peptide crosslinks & Lytic Transglycosylases (LT) cleave the backbone sugar chains. Both these processes need to work in tandem & through a complex mechanism the bacterial machinery regulates this process. New components continue to be

discovered by bacteria. [Habboush and Guzman \(2025\)](#), [Dever and Dermody \(1991\)](#), [Kaul et al, \(2024\)](#)

The Centre for Cellular & Molecular Biology of Hyderabad works on mechanisms that enable bacteria to precisely control cell division. Studies have shown that bacteria are clever & can make up for the loss of the crosslink cutting scissors by making an excess of the chain cutting LT scissors. Further studies will only help in understanding of the survival process of the bacteria. The study mentions the previously unknown role of Glycan Hydrolases in cell wall expansion identifying these as potential targets for development of cell wall specific antimicrobial agents. [Dever and Dermody \(1991\)](#), [Kaul et al, \(2024\)](#)

## 2. SOLUTION

The current article discusses the 'Isopathic' medicines of Homoeopathic system of medicine as an alternative to AMR. It will bridge the gap between the advent of novel antibiotics as the antibiotics become ineffective as a result of AMR. These are the homoeopathic potencies prepared from the same antibiotics. To cite an example, the homoeopathic medicine 'Cipro' prepared from Ciprofloxacin is a deep acting & broad spectrum drug that has multifarious applications in a myriad of issues that are mental & physical. [Davidson \(1991\)](#), [Murphy \(2017\)](#), [Murphy \(2017\)](#)

Similarly, Isopathic medicines are prepared & can be prepared from the prevailing antibiotics. Once antibiotics become inefficient against bacteria, these become topical medicines or medicines for local applications e.g. Neomycin. [Davidson \(1991\)](#), [Murphy \(2017\)](#), [Murphy \(2017\)](#)

As homoeopathic medicines have application in the mental sphere through the 'Bach Flower' group of remedies & for gut health through the use of 'Bowel Nosodes', the isopathic remedies prepared from antibiotics will only add teeth to deal with the AMR issue. The popularity of homoeopathy in India is that 13 crore people use it currently & integration of the 'Isopathic' remedies will catalyze the process of Universal Health Coverage (UHC) in India. [Paterson \(1993\)](#), [Allen \(2001\)](#), [Boedler \(1996\)](#), [Chaturvedi et.al \(2022\)](#), [Popularity of Homoeopathy in India \(2023\)](#)

The updates of the AYUSH ministry on homoeopathy, the position of homoeopathy in National Health Mission (NHM) will only be in a better shape than the current shape as a result of the integration. [GoI \(2005\)](#), [GoI \(2025\)](#)

The principles & philosophies inherent to Homoeopathy and the application of Homoeopathy in large scale health surveys like National Family Health Surveys (NFHS) will be augmented in a better way as a result of the integration. [Hobhouse Rosa Waugh \(2001\)](#), [Sarkar \(1984\)](#)

In fact, the detailed case taking of a case & empathetic hearing are the elements of supportive therapy as AMR cases are chronic and resistant. The Homoeopathic approach of case-taking/anamnesis exactly fits into the criteria of supportive therapy. Hence, as a part of treatment, the supportive therapy is inherent in the Homoeopathic system of treatment to deal with AMR cases. [Phatak \(2002\)](#), [Boericke William \(2008\)](#), [Phatak and Phatak \(2006\)](#)

The Homoeopathic fraternity should be ready to cover the masses as there is no other therapeutic system that can cover the masses effectively while being economical, no side effects and to add to it, it is cost effective. Simultaneously, it has a wide range of medicines for AMR cases as seen in the contents of the sections mentioned above. [NLEM \(2022\)](#), [IIPS and ICF \(2021\)](#)

### 3. CONCLUSION

As all drugs in homoeopathy have a group of mental symptoms, Homoeopathy is and will be effective against AMR in general. The current article adds another feather in the Homoeopathic cap as it can deal with the probable upcoming of large number of cases of AMR in view of high stress levels due to the consequences of the ongoing COVID 19 crisis that is still prevalent in the form of long COVID. However, it should be also seen that along with constitutional/deep acting/polychrest Homoeopathic medicines, specific medicines through isopathy are also required to deal with the AMR cases. Simultaneously, nutrition, counselling and all psychic health modalities like life style modification, diet and stress reduction are adhered in all AMR cases.

### CONFLICT OF INTERESTS

None.

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### REFERENCES

- Allen, H C, (2001). Key Notes and Characteristics with Comparisons of Some of the Leading Remedies of the Homoeopathic Materia Medica with Bowel Nosodes, Reprint Edition, B. Jain Publishers Pvt. Ltd, 1993, ISBN-81-7021-187-5, book code, B.
- Boedler CR (1996). Applying Bach Flower Therapy to the Healing Profession of Homoeopathy, B. Jain Publishers(p) Ltd, Reprint Edition 1998, 1st edition. ISBN-81-7021-786-5.
- Boericke William (2008). New Manual of Homoeopathic Materia Medica with Repertory, Reprint Edition, B. Jain Publishers Private Limited, New Delhi, pages- 362-366, ISBN- 978-81-319-0184-7.
- Chaturvedi S et.al (2022). India & its Pluralistic Health System- a New Philosophy for Universal Health Coverage, The Lancet Regional Health, South East Asia 2023;10:100136, December.  
<https://doi.org/10.1016/j.lansea.2022.100136>
- Davidson (1991). Principles & Practice of Medicine, ELBS 16th Edition, Longman Group (FE) Limited, ISBN- 0-443-04482-1.
- Dever L A, Dermody T S, (1991). Mechanisms of Bacterial Resistance to Antibiotics, Arch Intern Med. May: 151(5):886-95. PMID:2025137.  
<https://doi.org/10.1001/archinte.1991.00400050040010>
- Gandra S, Tseng K K, Arora A, Bhowmick B, Robinson ML, Panigrahi B, Laxminarayan R, Klein E Y (2019). The Mortality Burden of Multidrug Resistant Pathogens

- in India- A Retrospective, Observational Study, Clinical Infectious Diseases, V69, I04, 15 August, Pg 563-570. <https://doi.org/10.1093/cid/ciy955>
- GoI (2005). MOHFW, NRHM Document, April, [www.nrhm.com](http://www.nrhm.com)
- GoI (2025). Ministry of AYUSH update, CCRH, 2014, 2017, 2019. 2020, 2021, 2022. <https://www.ccrh.india.nic.in>
- Habboush Y, Guzman N (2025). Antibiotic Resistance, Updated June 20, 2023. In: Statpearls (Internet). Treasure Island (FL): Statpearls Publishing, January.
- Hobhouse Rosa Waugh (2001). Life of Christian Samuel Hahnemann, B. Jain Publishers Private Ltd, Delhi, Reprint Edition, ISBN- 81-7021-685-0.
- IIPS and ICF (2021). NFHS 5, 2019-2021: India:volume 1, Mumbai:IIPS.
- Kaul M, Meher S K, Nallamotu K C, Reddy M, (2024). Glycan Strand Cleavage by a Lytic Transglycosylase, MltD Contributes to the expansion of Peptidoglycan in Escherichia Coli, PLOS Genetics, 20(2): e 1011161, February 29th. <https://doi.org/10.1371/journal.pgen.1011161>
- Murphy R (2017). Homoeopathic Medical Repertory, 3rd edition, B. Jain publishers (p) Ltd, ISBN-978-81-319-0858-7.
- Murphy R (2017). Lotus Materia Medica, 3rd Edition, B. Jain Publishers (P) Ltd, ISBN-978-81-319-0859-4.
- NLEM (2022). GOI, PIB, 13th September.
- Paterson J (1993). Introduction to Bowel Nosodes, Paper Presented at International Homoeopathic League Council, Lyons, France, 1949: as an addendum in H.C. Allen Key Notes, Reprint Edition.
- Phatak D S & Phatak S R (2006). Repertory of the Bio-chemic Medicines, B. Jain Publishers (p) Ltd, Edition, 1st Edition 1986. ISBN- 81-7021-723-7.
- Phatak SR (2002). A Concise Repertory of Homoeopathic Medicines, B. Jain Publishers (P) Ltd, Reprint Edition, ISBN-81-7021-757-1.
- Popularity of Homoeopathy in India (2023).
- Sarkar B K, (1984). Organon of Medicine by Hahnemann, M. Bhattacharya & Co. 1st edition 1955, 8th edition.
- WHO (2025). Report on Anti Microbial Resistance.