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Review Article

Antibiotics in national essential medicine list: alignment with WHO-AWaRe framework in Bangladesh and South Asian perspectives

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ABSTRACT

The list of essential medicines varies between countries due to several important reasons. Different countries have different health priorities. For example, malaria or tuberculosis is a major concern in many African and Asian countries, so antimalarial and antitubercular drugs are essential there, while they are less relevant in countries where malaria is rare. Health system capacity is an important factor to consider as some medicines require special storage (like refrigeration), trained professionals to administer, or advanced diagnostic tools. Countries with limited healthcare infrastructure may not include such medicines on their essential lists. Sometimes economic factors like budget constraints influence what medicines a country can afford to provide widely. Lower-income countries may prioritize low-cost, high-impact drugs over expensive treatments. Local regulations and national health policies, medicine approval processes, import laws vary from country to country. A drug considered essential and approved in one country may not be legally available in another. Moreover, cultural and social factors like public perception, traditional medicine practices, and cultural attitudes toward certain treatments can influence what's considered essential for that population. Countries with domestic pharmaceutical industries may prioritize medicines they can produce locally, ensuring consistent supply. While countries often refer to the World Health Organisation (WHO) model list of essential medicines, they adapt it to local needs, sometimes adding or omitting drugs based on national contexts.

Keywords: Essential medicine, WHO model list, South Asia, Antibiotics

INTRODUCTION

The essential medicines list (EML) is a list of medicines considered to be the most effective and safe to meet the most important needs in a health system.[1] The criteria for inclusion on this list, as outlined by the World Health Organization (WHO), generally include public health relevance, evidence on efficacy and safety, comparative cost-effectiveness, adequate quality assurance, feasibility of use, availability and accessibility.[2]

The WHO publishes a model list of essential medicines every two years.[1] This list includes antibiotics such as amoxicillin, ampicillin, and cephalexin. Countries can use this list to develop their own national essential medicine lists.

AWaRe classification is a WHO tool that categorizes the antibiotics into three groups based on sensitivity pattern of different organisms to promote rational use and minimize antimicrobial resistance. Antibiotics belong to the 'Access' group have narrow spectrum activity, minimal side effect and cost. 'Watch' group have higher risk of antimicrobial resistance and require careful monitoring against development of resistance. The last resort of antibiotics are the 'Reserve' group that should only be used in severe infection by multi-drug resistant organisms, and based on evidence.

ANTIBIOTICS ON THE WHO LIST (AWaRe)

The WHO selects essential medicines based on: disease prevalence, public health relevance, evidence of efficacy and safety, and comparative cost-effectiveness. Essential medicines can improve access to quality-assured medicines, which can lead to: streamlined procurement and distribution, more rational prescribing and use, and lower costs for healthcare systems and patients.[3] To compare the appropriateness of an EML involves evaluating how well the list meets the health needs of a country or population. This can be done by the following.

Assessing the disease burden alignment by comparing the EML with the national disease burden (e.g., data from WHO or national health statistics).

Check if the medicines listed address the most prevalent and deadly conditions in that country (e.g., HIV, TB, diabetes, and cardiovascular diseases).[4]

Check coverage of priority health conditions to ensure that medicines for primary healthcare, maternal and child health, infectious diseases, and chronic diseases are included or not by using the WHO's core list and complementary list as a benchmark.[2]

Evaluate rational selection criteria by checking if the medicines were selected based on evidence of efficacy and safety, cost-effectiveness, public health relevance of that population.[5]

Review availability and accessibility in the local market and affordable to the population or not.[5]

Check for duplication or gaps in the list as too many similar medicines can lead to waste or confusion. At the same time few options might limit treatment choices for healthcare providers.[6]

Alignment with WHO model list is Compare the national EML with the WHO model list of essential medicines. Differences can be appropriate (to fit local needs), but unexplained omissions or additions should be critically reviewed.[2]

Consultation with stakeholders by gathering input from doctors, pharmacists, public health officials, and patients as their practical experience can help determine if the list meets real-world needs.[6]

Evaluate regular updates of the EML (every 2–3 years) to address emerging health threats, new treatment guidelines, and changes in availability or pricing.[6]

PROS AND CONS OF NEML BANGLADESH

Reviews of the essential drugs list in Bangladesh have found that the list is outdated and doesn't include many drugs prescribed in public hospitals. This can lead to patients not getting the drugs they need.

Issues with the essential drugs list in Bangladesh includes- the national essential drugs list (EDL) hasn't been updated since 2017, many drugs prescribed in public hospitals aren't on the national EDL, some drugs supplied by the Directorate General of Health Services (DGHS) and the EDCL aren't on the EDL and millions of people in Bangladesh don't have access to essential drugs.

Bangladesh's EDL reveals that it is outdated, with the last major update occurring in 2008, leading to concerns about the lack of inclusion of newer, effective medications and potentially hindering optimal patient care; while the list does include a range of drugs for common illnesses, it may not fully reflect the current disease burden and treatment advancements, highlighting the need for a comprehensive review and revision based on current epidemiological data and clinical practice guidelines.[7]

LIMITATIONS ABOUT ESSENTIAL DRUGS IN BANGLADESH

Limited availability

Studies show a low availability of essential drugs in public health facilities, particularly in rural areas, with some medicines being almost completely unavailable in certain regions.[8]

Price variations

Prices for essential drugs can vary significantly depending on the brand, impacting affordability for many patients.[8]

Non-compliance with essential drug list

While Bangladesh has a national essential drug list, there is evidence of over-prescription of non-essential drugs, including antibiotics, even when not clinically indicated.[9]

Poor quality control

Concerns exist regarding the quality of some locally produced medicines and the ability of regulatory bodies to adequately monitor drug quality.

Inadequate awareness

Lack of awareness among healthcare providers regarding rational drug use and the appropriate selection of essential medicines can contribute to inappropriate prescribing practices.

Positive aspects

National drug policy

Bangladesh has a national drug policy that aims to promote the use of essential medicines.

Government initiatives

Efforts have been made to improve the availability and affordability of essential drugs through government programs.[10]

SOUTH ASIAN PERSPECTIVES

The list of essential medicines varies between countries due to several important reasons. Different countries have different health priorities (Figure 1). For example, malaria or tuberculosis is a major concern in many African and Asian countries, so antimalarial and antitubercular drugs are essential there, while they are less relevant in countries where malaria is rare. Health system capacity is an important factor to consider as some medicines require special storage (like refrigeration), trained professionals to administer, or advanced diagnostic tools. Countries with limited healthcare infrastructure may not include such medicines on their essential lists. Sometimes economic factors like budget constraints influence what medicines a country can afford to provide widely. Lower-income countries may prioritize low-cost, high-impact drugs over expensive treatments (Tables 1-3).

Local regulations and national health policies, medicine approval processes, import laws vary from country to country. A drug considered essential and approved in one country may not be legally available in another. Moreover, cultural and social factors like public perception, traditional medicine practices, and cultural attitudes toward certain treatments can influence what's considered essential for that population. Countries with domestic pharmaceutical industries may prioritize medicines they can produce locally, ensuring consistent supply. While countries often refer to the WHO model list of essential medicines, they adapt it to local needs, sometimes adding or omitting drugs based on national contexts.[12-17]

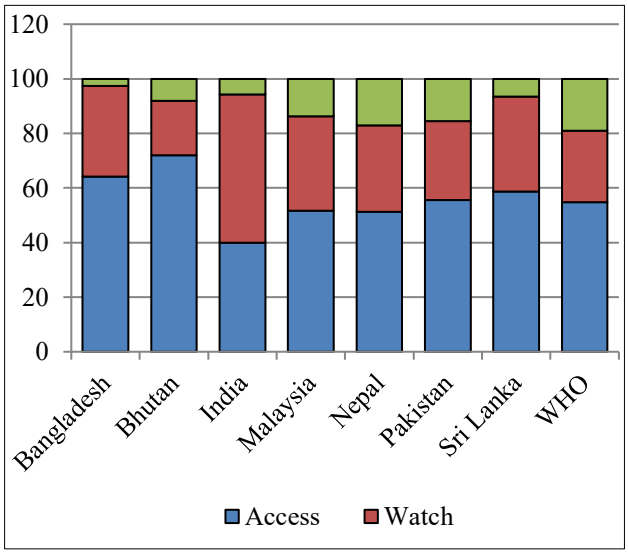

Figure 1: Variations of essential drugs in NEML in different countries.

Table 1: Medicines listed in access group.

Drug list	WHO	Nepal	Malaysia	Sri Lanka	India	Bhutan	Pakistan	Bangladesh
Amikacin	1	0	1	1	1	1	1	0
Amoxicillin	1	1	1	1	1	1	1	1
Amoxicillin + CA	1	0	1	1	1	0	1	1
Ampicillin	1	1	1	1	1	1	1	1
Benzathine penicillin	1	1	1	1	1	1	1	1
Benzyl penicillin	1	1	0	1	1	1	1	1
Cefalaxin	1	1	0	1	0	1	1	1
Cefazolin	1	1	0	0	0	1	1	0
Cefradine	0	0	0	0	0	0	0	1
Chloramphinicol	1	1	1	0	0	1	1	1
Clarithromycin	0	0	0	1	0	1	0	0
Clindamycin	1	0	0	1	0	0	1	0
Clofazimine	0	0	0	1	0	1	0	1
Cloxacillin	1	1	0	1	1	0	1	1
Co-trimoxazole	1	1	1	1	1	1	1	1
Dapsone	0	0	0	1	0	0	0	1
Doxycycline	1	1	1	1	1	1	1	1
Erythromycin	0	0	1	0	0	1	0	1
Ethambutol	0	1	0	1	0	0	1	1
Flucloxacillin	0	0	1	0	0	0	0	1
Furazolidone	0	0	0	1	0	0	0	0
Gentamicin	1	1	1	1	1	1	1	0
Isoniazide	1	1	0	1	0	0	1	1
Metronidazole	1	1	1	1	1	0	1	1

Continued.

Drug list	WHO	Nepal	Malaysia	Sri Lanka	India	Bhutan	Pakistan	Bangladesh
Nalidixic acid	0	1	0	1	0	0	0	1
Nitrofurantoin	1	1	1	1	1	1	1	0
Norfloxacin	0	0	0	1	0	1	0	0
Phenoxymethyl penicillin	1	1	1	0	1	1	1	1
Procaine benzyl penicillin	1	1	1	0	1	1	1	1
Pyrazenamide	1	1	0	1	0	0	1	1
Refampicine	1	1	0	1	0	0	1	1
Rifabutin	0	1	0	1	0	0	1	0
Spectinomycin	1	0	0	1	0	0	1	0
Tetracycline	0	0	0	0	0	0	0	1
Trimethoprim	1	0	0	1	0	0	1	1
Total	23	21	15	27	14	18	25	25

Table 2: Medicines listed in watch group.

Drug List	WHO	Nepal	Malaysia	Sri Lanka	India	Bhutan	Pakistan	Bangladesh
Amikacin	0	1	0	1	0	0	0	0
Amoxicillin + CA	0	1	0	0	0	0	0	1
Azithromycin	1	1	1	0	1	0	1	1
Cefadroxil	0	0	1	0	1	0	0	0
Cefazolin	0	0	1	0	1	0	0	0
Cefixime	1	1	1	0	1	1	1	1
Cefotaxime	1	1	1	1	1	1	1	1
Ceftazidime	1	0	1	1	1	0	1	1
Ceftriaxone	1	1	1	1	1	1	1	1
Cefuroxime	1	0	1	1	1	0	1	0
Ciprofloxacin	1	1	1	1	1	1	1	1
Clarithromycin	1	1	0	1	1	0	1	0
Clindamicin	0	1	0	1	1	0	0	0
Clofazimine	0	1	0	1	1	0	0	1
Erythromycin	0	1	0	1	0	0	0	1
Furazolidone	0	0	0	1	0	0	0	0
Levofloxacin	0	0	0	1	1	0	0	1
Meropenem	1	1	0	1	1	0	0	1
Moxifloxacin	0	0	0	0	1	0	1	0
Pipercillin + Tazobactam	1	0	1	0	1	0	1	0
Refampicin	0	1	0	1	1	1	1	1
Streptomicin	0	0	0	1	1	0	1	1
Vancomycin	1	0	0	1	1	0	1	0
Total	11	13	10	16	19	5	13	13

Table 3: Medicines listed in reserve group.

Drug list	WHO	Nepal	Malaysia	Sri Lanka	India	Bhutan	Pakistan	Bangladesh
Cefiderocol	1	0	0	0	0	0	1	0
Ceftazidime + avibactam	1	0	0	0	0	0	1	0
Colistin	1	1	1	0	0	0	1	0
Dapsone	0	1	0	1	0	1	1	1
Fosfomycin	1	0	0	0	0	0	1	0
Linezolid	1	1	1	0	1	0	1	0
Meropenem	0	1	1	1	1	0	0	0
Meropenem + Vabnobactum	1	0	0	0	0	0	0	0

Continued.

Drug list	WHO	Nepal	Malaysia	Sri Lanka	India	Bhutan	Pakistan	Bangladesh
Pip-Tz	0	1	0	0	0	0	0	0
Plazomicin	1	0	0	0	0	0	0	0
Polymyxin B	1	1	0	0	0	0	1	0
Vancomycin	0	1	1	1	0	1	0	0
Total	8	**7**	4	3	2	2	7	1

CONCLUSION

The review reflects the disparity and variations of antibiotics in national essential medicine list of different countries in South Asia. Almost all the developing countries in the region had adherence with the model list by WHO Bhutan had the highest inclusion of antibiotics from 'Access' group, India from 'Watch' group and Nepal from 'Reserve' group. This review has revealed the comparative inclusion with model 'AWaRe' and its demographic dissimilarity.

Recommendations

Strengthening drug regulatory system

Enhancing the capacity of the drug regulatory authority to monitor drug quality and enforce compliance.

Regular drug utilization reviews

Conducting periodic surveys to assess the availability, affordability, and rational use of essential medicines across different healthcare settings.

Public awareness campaigns

Educating healthcare providers and the general public about the importance of rational drug use and the benefits of utilizing essential medicines.

Updating essential drug list

Regularly reviewing and updating the national essential drug list to reflect current disease burden and treatment guidelines, particularly for NCDs.

Price control mechanisms

Implementing price control measures to ensure affordability of essential drugs.

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