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AWaRe Tool for Antimicrobial Resistance

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Editoral

Antimicrobial resistance (AMR) stands as most important global public health and development threats throughout the world. The World Health Organization (WHO) lists antimicrobial resistance as most serious public health and development challenges worldwide, which caused 1.27 million global deaths in year 2019 and contributed to a total of 4.95 million deaths [1]. Each year 700000 people are dying world- wide due to AMR, the toll may rise to 10 million in year 2050 [2].

In India, AMR was responsible for 297,000 deaths and associated with 1,042,500 deaths in 2019. India has the 145th highest age-standardized mortality rate per 100,000 population associated with AMR global. According to the Centers for Disease Control and Prevention (CDC), antibiotic-resistant bacteria cause at least 2.8 million infections and 35,000 deaths annually in the United States ,India faces challenges in combating AMR due to factors such as poor regulation control of antimicrobial drugs, insufficient monitoring of AMR emergence, and inappropriate antibiotic use in clinical settings. This emphasizes the need for effective strategies to address AMR.

The World Health Organization (WHO) has undertaken several strategies aimed at combating antimicrobial resistance (AMR). Two key initiatives in this regard are the updates to the Essential Medicines List (EML) and the development of the Access, Watch, Reserve (AWaRe) classification system for antibiotics.

Periodic updates to the EML ensure that it reflects the latest evidence on the efficacy, safety, and availability of medicines for priority health conditions. In 2017, WHO commissioned comprehensive reviews on antibiotic use for specific infections to update the EML. The updated EML added 30 medicines for adults and 25 for children, bringing the total to 433 drugs deemed essential for addressing the most important public health needs.

The AWaRe classification system introduced by WHO in the year 2019 and is a helpful tool for monitoring antibiotic usage, setting goals, and assessing the results of stewardship policies that seek to reduce antimicrobial resistance. The 2021 update of the AWaRe classification includes a total of 258 antibiotics, up from 78 in the previous update, and categorized drugs in to Access, Watch, Reserve group [3].

The WHO encourages countries to report antibiotic use data and increase use of Acess group antibiotics. WHO aim is to have all countries report antibiotic use by the year 2023 and at least 60% of prescribed antibiotics should be from Acess group. The WHO recommended ratio of A:W(Acess: Watch) should be 1.5. The WHO campaign supports efforts to establish antimicrobial stewardship programs that monitor antibiotic use, provide feedback to healthcare providers, and develop strategies to improve prescribing practice [3].

The WHO AWaRe antibiotic book was developed by the Essential Medicines List Secretariat and builds around the recommendations of using specific antibiotics for specific infections given in the 2017 model list. These recommendations for specific antibiotics for the treatment of common acute infections followed an evidence-based and open process that included assessments of more than 1000 clinical trials, systematic reviews and international clinical practice guidelines. The book also provides high quality information for the diagnosis, symptomatic care, dosing and treatment for specific infections in both pediatric and adult

patients (Figure 1) [4].

AWaRe classification of antibiotics

Access category Includes antibiotics that should be available at all times in a healthcare system to treat common infections and should be used as first- or second-choice treatments for these infections. eg. Amoxicillin, Ampicillin, Benzathine penicillin, Trimethoprimsulfamethoxazole, Amoxicillin-clavulanic acid, Cloxacillin.

Watch category contains antibiotics that have a higher potential for developing resistance and should be used prudently and only for specific infections. Their use should be monitored and regulated to preserve their effectiveness. eg. Third-generation cephalosporins (e.g., cefixime, cefotaxime, ceftazidime), Fluoroquinolones (e.g., ciprofloxacin, levofloxacin), Carbapenems (e.g., imipenem, meropenem).

Reserve category consists of antibiotics that should be considered last-resort options and used only in the most severe circumstances when all other alternatives have failed. These antibiotics are typically the last line of defense against multi-drug-resistant infections. eg. Linezolid, Aztreonam, Colistin, Ceftazidime-avibactam, Meropenem-vaborbactam.

Not Recommended group antibiotics refers to fixed-dose combinations with multiple broad spectrum antibiotics that lack evidence-based indications and are not recommended in international guidelines. These antibiotics are not part of the WHO's Access, Watch, or Reserve categories and are not considered for routine use in treating infections. The most commonly available antibiotics in this group are ampicillin/cloxacillin and ampicillin/sulbactam.

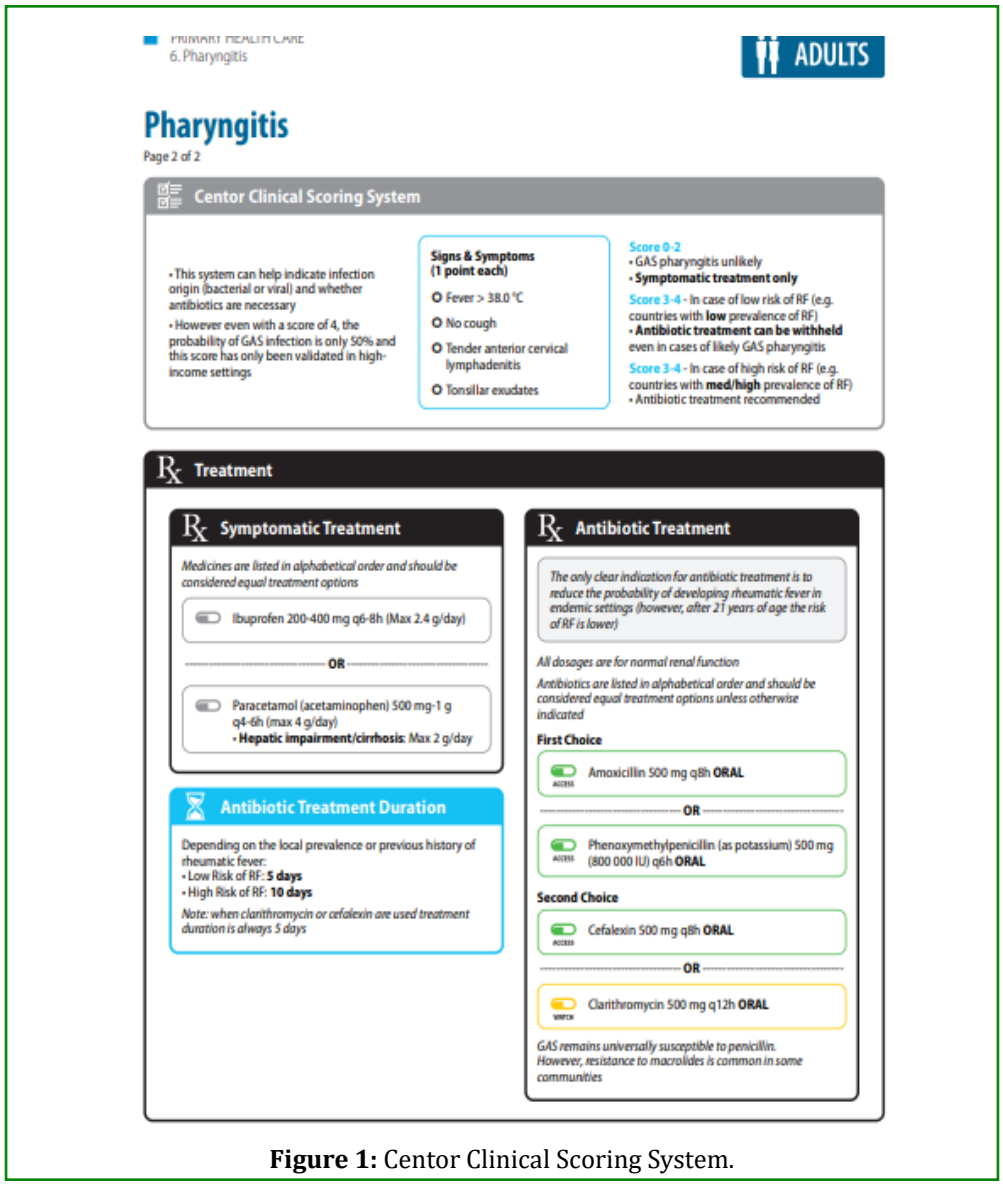

Figure 1: Centor Clinical Scoring System.

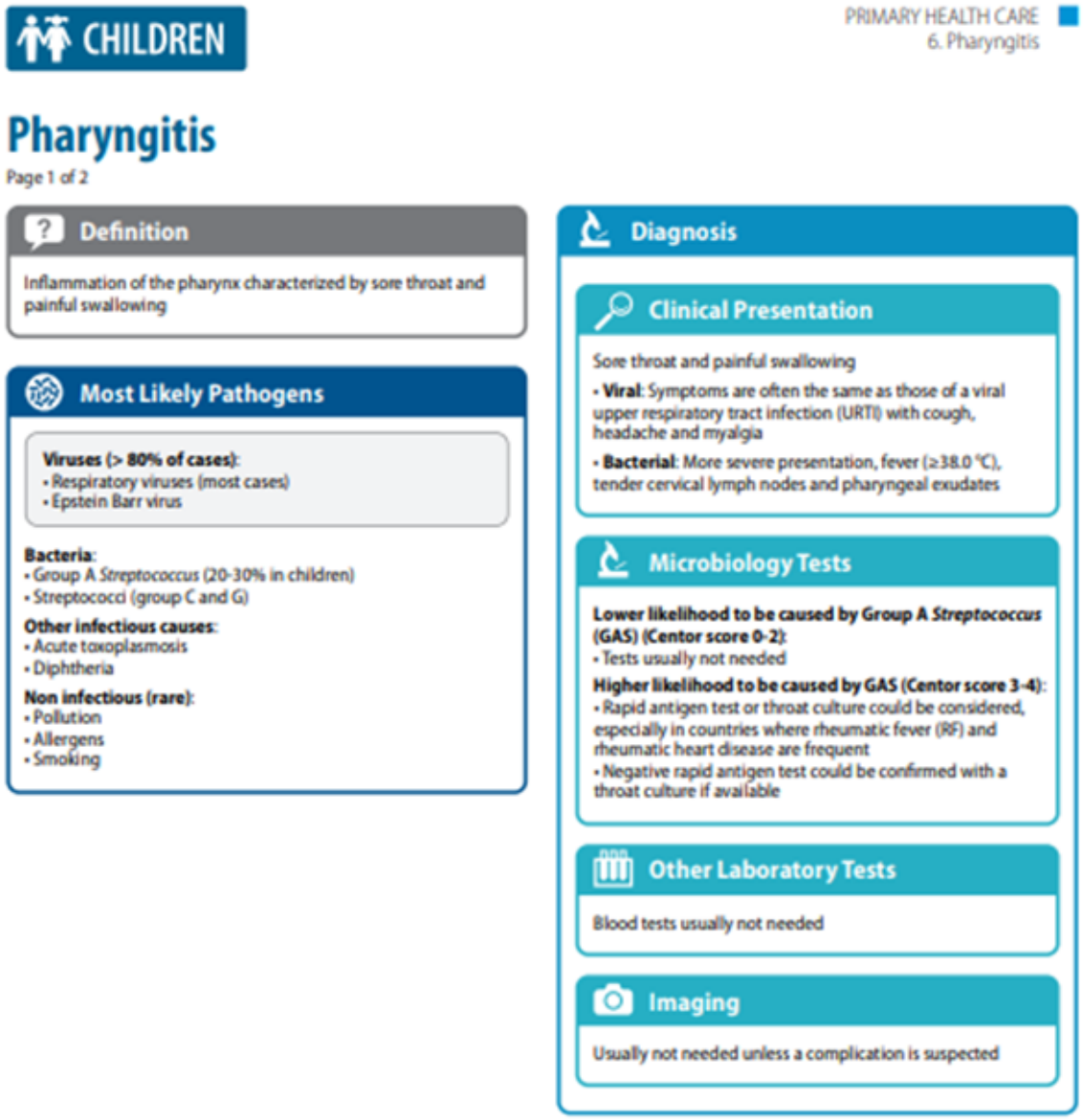

Figure 2: Children Pharyngitis.

In 2015, WHO Member States unanimously approved a Global Action Plan to tackle AMR (GAP-AMR). The goal of GAP-AMR is "to ensure, for as long as possible, continuity of successful treatment and prevention of infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and accessible to all who need them". GLASS provides a standardized approach to the collection, analysis, interpretation and sharing of data by countries and monitor the status of existing and new national surveillance systems. The GLASS IT Platform is a web-based platform and serves as a common environment for data submission for several technical modules (GLASS-AMR, GLASS-AMC, GLASS-FUNGI, EGASP) [5].

GLASS-AMR provides a standardized approach to the collection, analysis and sharing of national AMR data in samples collected routinely for clinical purposes for a set of pathogens that cause common bacterial infections in human. GLASS-AMC provides a common and standardized set of methods for measuring and reporting antimicrobial

consumption (AMC) at country, regional and global levels. GLASS-EAR, the emerging AMR reporting (EAR) module, supports the timely detection, reporting, risk assessment and monitoring of emerging resistance. GLASS-FUNGI focuses on the surveillance of invasive fungal bloodstream infections.

WHONET is a free desktop Windows application for the management and analysis of microbiology laboratory data, with a particular focus on AMR surveillance. It is developed and supported by the WHO Collaborating Centre for Surveillance of Antimicrobial Resistance at the Brigham and Women's Hospital in Boston, Massachusetts (USA). It is available in 28 languages and supports local, national, regional, and global surveillance efforts in more than 2300 hospital, public health, animal health and food laboratories in over 130 countries worldwide [5].

Selected Indicators to evaluate antimicrobial use in hospitals [6] Various indicators for antimicrobial use are as mentioned below:

Hospital Indicators

Indicator 1: Existence of Standard Treatment Guidelines (STGs) for Infectious Diseases The presence of an STG for infectious diseases within a hospital serves as a crucial measure of the institution's dedication to maintaining high standards of patient care and promoting rational medicine use. Evaluate whether it has been updated within the past three years and officially sanctioned by the hospital administration and/or the DTC.

Indicator 2: Existence of Approval of Hospital Formulary or Essential Medicines List (EML) The presence of an approved list of essential (antimicrobial) medicines within the hospital, is indicative of the institution's dedication to providing high-quality patient care and promoting rational medication usage. The existence of such a formulary or EML ensures that only authorized antimicrobial medications are acquired. It has been updated within the last two years and approved by either the hospital administration or the DTC.

Prescribing Indicators

Indicator 1: Average number of antimicrobials prescribed per hospitalization: During hospitalizations, patients may receive multiple antimicrobial medications. While this can be justified based on clinical needs, it can also indicate issues such as unnecessary combination therapy, medication duplication, or frequent, unjustified changes in treatment. Therefore, understanding the average number of antimicrobials per hospitalization helps to assess antimicrobial usage patterns and identify areas for improvement.

Indicator 2: Percentage of antimicrobials prescribed by generic name: If health care providers prescribe by generic names instead of brand names, confusion is avoided about multiple names for the same product. This practice simplifies procurement and dispensing, thus facilitating generic substitution and improving hospital efficiency.

There is a need for robust Antimicrobial Stewardship Programs (ASP) to promote Acess group antibiotics while restricting use of Watch and Reserve antibiotics. Still more measures need to be adopted to monitor and optimize all antibiotic consumption to prevent the development of drug resistance and hence preserve the effectiveness of last resort antibiotics.

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