

Original Research Article

PRESCRIBING TRENDS OF WHO RECOMMENDED AWaRe GROUP OF ANTIBIOTICS AT A TERTIARY CARE TEACHING CENTRE

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 Received
 : 10/04/2025

 Received in revised form : 30/05/2025
 Accepted

 Accepted
 : 18/06/2025

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DOI: 10.70034/ijmedph.2025.2.458

Source of Support: Nil, Conflict of Interest: None declared

Int J Med Pub Health 2025; 15 (2); 2531-2535

ABSTRACT

Background: WHO's AWaRe classification categorises 258 antibiotics into three stewardship groups – 'Access, Watch and Reserve' to tackle the challenges of Antimicrobial resistance. When compared to the Watch/Reserve group, the Access group of antibiotics show lesser resistance potential and hence must be widely accessible and encouraged for proper usage. The aim of the study was to assess the AWaRe group of antibiotics prescribed at a tertiary care teaching hospital. The objectives were to record the retrospective and prospective data of antibiotics prescribed, and calculate the total percentage of AWaRe group and the individual percentage of Access group of antibiotics prescribed.

Materials and Methods: In this observational study, Data on the total number of AWaRe group of antibiotics prescribed was collected from the hospital's pharmacy. Percentage of AWaRe group of antibiotics prescribed and the individual percentage of Access group prescribed was calculated half yearly. Hence the analysis was done twice.

Results: The percentage of prescribed Access, Watch, Reserve and Not recommended group antibiotics were 61.9%, 36.3%, 0.1%, and 1.7% respectively. Amoxicillin (25.59%) was the most commonly prescribed antibiotic and the least dispensed was Vancomycin (0.02%). Among the Access group antibiotics, Amoxicillin was most commonly prescribed during the former (46.4%) as well as the latter 6 months (36.3%). The least prescribed among Access group were Clindamycin (0.18%) during the former 6 months and Cephalexin (0.20%) during the latter 6 months.

Conclusion: This study highlights the reducing trend of prescribing Access group antibiotics though the WHO target is achieved (>60% antibiotics prescribed from the Access group). The data on percentage of AWaRe antibiotics prescribed will help to create awareness on Antimicrobial resistance. AWaRe assessment tool can be used to strengthen Antimicrobial Stewardship Programmes in Tertiary Care Hospitals and tackle AMR challenge in future.

Keywords: AWaRe antibiotics, Access, Watch, Reserve, Antimicrobial resistance, AMR.

INTRODUCTION

Antibiotics are an essential component of modern medicine.^[1] One of the most notable medical advances throughout the years has been the discovery, development, and application of

antibiotics, which are essential and life-saving medications.^[2] Unfortunately, the development and spread of resistance to many antimicrobials is caused by the overuse and misuse of these drugs.^[3]

The ability of microorganisms to resist the effects of an antimicrobial agent is known as antimicrobial resistance (AMR). Standard therapies are rendered ineffective by AMR, and serious infections may spread to other people.^[2] Consequently, individuals with serious infections have fewer alternatives for therapy. Therefore, it is believed that "one of the biggest threats to global health, food security, and development today" is antibiotic resistance.^[4] Out of the top ten worldwide public health problems identified by the World Health Organization (WHO), antimicrobial resistance (AMR) stands at the fifth place.^[5] An estimated 7 million deaths annually are attributed to antibiotic resistance, and by 2050, that number might rise to 10 million.^[6]

At the national and international levels, antimicrobial stewardship (AMS) has been promoted as a collection of coordinated actions needed to enhance appropriate antibiotic usage and lower resistance and related morbidity and mortality.^[5] As mentioned in the WHO Antibiotics Portal,^[8] the WHO established the "Access, Watch and Reserve" (AWaRe) classification of antibiotics in the Essential Medicines List, in order to assist AMS efforts at the local, national and global levels.^[5]

In order to guide prescriptions and therapy while monitoring consumption, AWaRe classification system for antibiotics was launched in 2017.^[4] The AWaRe Classification Database was developed in 2019.^[7,8] In 2021, 78 additional antibiotics were added to this classification, bringing the total to 258. This tool can serve as a benchmark for surveillance and monitoring of antibiotic use and assist policymakers in organizing the required interventions.^[1]

To highlight the significance of antibiotics' optimal usage and the possibility of antimicrobial resistance, AWaRe divides them into three stewardship groups: "Access, Watch, and Reserve." The AWaRe system is also represented by a traffic-light approach: Reserve = red, Watch = orange, and Access = green.^[9] All nations can utilize this classification as a local, national, and international tool for antimicrobial stewardship to assist antibiotic monitoring and optimal use in an effort to lower antimicrobial resistance.^[10] Additionally, the WHO database lists several antibiotics-specifically, fixeddose combinations of many broad-spectrum antibiotics, that are not recommended. Therefore, it is important to actively discourage the use of certain medications.^[11]

When compared to the Watch/Reserve group, the antibiotic classes in the ACCESS GROUP (88) exhibit lesser resistance potential and are active against a variety of frequently encountered susceptible infections. Antibiotics in the access group must be widely accessible and encouraged for proper usage. The critically important antibiotics, which are among the highest priority agents and have a reasonably high risk of developing resistance, are included in the WATCH GROUP ANTIBIOTICS (141), and have the potential to develop more resistance. National and local stewardship initiatives highlight watch group antibiotics as their primary focus. The antibiotic classes that are included in the RESERVE GROUP (29) should be used as a last option and only to treat infections that have been proven to be caused by microorganisms that are resistant to multiple drugs. To guarantee their continuous efficacy, they must be regularly observed and given top priority as important targets for stewardship initiatives both domestically and internationally.^[8,12]

WHO has set a target: By 2023, the Access group should account for at least 60% of the nation's antibiotic usage. By converting antimicrobial consumption data into AWaRe categories, it will be possible to investigate the potential of this recently created classification as a stewardship tool and gain valuable insights into global prescribing trends.^[13] As India has the highest rates of AMR among the common bacterial diseases in healthcare and community settings, the situation is very worrisome.^[9]

Therefore, the present study was conducted to assess the AWaRe group of antibiotics prescribed at a tertiary care teaching hospital. The objectives of the study were to record the retrospective and prospective data of antibiotics prescribed, from the hospital's Pharmacy and to calculate the total percentage of AWaRe group of Antibiotics and record the individual percentage of Access group of antibiotics prescribed.

MATERIALS AND METHODS

Study design: Retrospective and Prospective, observational study

Study population: Prescription of all patients (including OP & IP) collected from the Main pharmacy of the tertiary care hospital

Study area: Pharmacy - Annapoorana Medical College & Hospitals, Salem

Study period: One year (17.10.23 to 16.10.24)

Inclusion criteria:

All prescriptions with antibiotics of Patients attending OPD & IPD

Exclusion criteria:

Prescriptions without Antibiotics

IEC approval: AMCH/IEC/Proc.No.58/2024 dated 17.04.2024

Data collection: Data on the total number of AWaRe group of antibiotics prescribed and the number of antibiotics from the Access group was collected from the hospital's Main pharmacy software (wondersoft). Percentage of AWaRe group of antibiotics prescribed and the individual percentage of Access group prescribed was calculated. Data was analyzed half yearly and hence two analyses were done in the above mentioned study period.

RESULTS

While analyzing the prescribing trends of antibiotics, the total number of antibiotics which were dispensed for the period of one year were 112248 and the number of different antibiotics prescribed for a period of one year was 27. Among them, Amoxicillin (25.59% - Access) was the most prescribed drug followed by Ciprofloxacin (17.12%-Watch), Doxycycline (13.63%-Access), Sulphamethoxazole Trimethoprim (11.71%-Access), Ceftriaxone (8.15%-Watch), Cefotaxime (8.08%-Watch) and Metronidazole (7.57%-Access). The least prescribed was Vancomycin (0.02%) as mentioned in [Figure 1].



Figure 1: Percentage of antibiotics prescribed



Figure 2: Percentage of AWaRe group of antibiotics prescribed

The overall percentage of Access group prescribed was 61.9%, Watch group was 36.3%, Reserve group was 0.1% and Not recommended was 1.7% as mentioned in Fig.2

The percentage of AWaRe group assessed during the former 6 months were Access- 63.88%, Watch – 35.2%, Reserve – 0.1% and Not Recommended – 0.82% and the latter 6 months assessment showed, 60.05% belonging to Access group, 37.2% to the Watch group, 0.16% to the Reserve group and 2.59% to the Not recommended group.



Among the Access group assessed during the former half of the study period, Amoxicillin (46.47%) was most commonly prescribed, followed bv Sulphamethoxazole Trimethoprim (22.91%),Doxycycline (19.47%) and Metronidazole (6.9%). The most common drug prescribed during the latter half of the study was Amoxicillin (36.35%), followed by Doxycycline (24.52%), Metronidazole (17.45%) and Sulphamethoxazole Trimethoprim (15.04%) as mentioned in [Figure 3].

DISCUSSION

The findings of this study provide an insight on the antibiotic prescribing trends and awareness about the resistance in a tertiary care teaching hospital. The different number of antibiotics prescribed accounted to 27. A similar number of antibiotics' variety was found in the prescriptions of a teaching hospital in Rishikesh, India as reported by Negi G et al.^[9] Of the 27 antibiotics, Penicillin group - Amoxicillin was found in the highest number of prescriptions followed by Fluroquinolones - Ciprofloxacin. The least prescribed was Glycopeptides - Vancomycin. Similar to our research, a study at West Bengal by Mandal P et al., shows that Penicillin class antibiotics were found in most number of prescriptions,^[14] and a study done at the neighbouring country Pakistan by Sajjad U et al., gives a result of Amoxicillin as the most commonly prescribed drug which is also in line with this study.^[15] The WHO AWaRe classification was used as a tool to assess the prescriptions and the antibiotics were classified according to it. Access group contributed to a greater percentage of 61.9%, Watch group contributed to 36.2% and Reserve group -0.1% in our hospital. This shows the achievement of the WHO target of Access group usage of more than 60%.^[13] A Carribean study by Rocke T et al., shows the Access group antibiotic usage in 3 hospitals as 71%, 57.06% and 63.2% which is in consistent with this study although it was carried out earlier.^[16] An Indian study by Negi G et al., done in the recent years showed a percentage of 57.61% usage of the Access group and 38.27% of the Watch group,^[9] and the Reserve group usage from Bangladesh was reported as 0.1% by Rashid MM et al.^[17] All these percentages are in close proximity with our study. The not recommended group in our study was seen in 1.7% of prescriptions. A study in China by Song H et al., also states a closer percentage of 1.49% Not recommended group prescribed.^[18] Data analysis showed although more than 60% were prescribed from the access group, the prescribing trends has shown a decline towards the latter half of the study in the Access percentage and increase in the Watch percentage prescribed. But this is in par with a study in Rajasthan, India by Bansal A et al., which was conducted for a period of two years.^[19] It shows a decline in the Access group prescribed and an increase in the watch group in the second year of study when compared to the first year. Among the Access group, during the former half of the study period, Amoxicillin was the most commonly prescribed and Clindamycin was least commonly prescribed. This is akin to a study done in Tamilnadu by Sinha I et al., although it showed a reverse percentage of Access and watch group prescribed.^[1] A Jordanian study by Abu-Ajaleh S et al., also states that Amoxicillin is the most commonly prescribed drug.^[2] In another study from India by Negi G et al., Metronidazole is found to be the most commonly prescribed drug.^[9] A multi-centric study done comparing antibiotic usage in various countries by Pauwels I et al.^[13] says that Linezolid is the most commonly Reserve used antibiotic and Cefoperazone/Beta lactamase inhibitor is the most common drug from the Not recommended group, which is consistent with our study. The AWaRe tool serves as a symbol of humanity's optimism in the battle against antimicrobial resistance (AMR), and scientists are very interested in it, as seen by the increasing number of studies evaluating its use. Regretfully, each of these investigations demonstrated that much work remains before the AWaRe tool may be used in a meaningful way.^[3]

CONCLUSION

Though the Access group of antibiotics are prescribed more (61.9%) and the WHO target percentage is attained (>60% prescription of Access group antibiotics) in our study, the reduction in the trend of prescribing Access group of antibiotics is a matter of concern. This insists on implementing the AWaRe classification as an assessment tool in monitoring antibiotic prescription and usage. It is high time to strengthen Antimicrobial Stewardship Programmes in Tertiary Care Hospitals and to create awareness on Antimicrobial resistance, thereby preserving them for the future.

REFERENCES

 Sinha I, Kanth K, Krishnamoorthy Y, Gopichandran V. Access–Watch ratio based on Access, Watch, and Reserve Classification of Antibiotics in Public Health Facilities of Tamil Nadu. Indian Journal of Public Health. 2022 Jul 1;66(3):352-4.

- Abu-Ajaleh S, Darwish Elhajji F, Al-Bsoul S, Abu Farha R, Al-Hammouri F, Amer A, Al Rusasi A, Al-Azzam S, Araydah M, Aldeyab MA. An evaluation of the impact of increasing the awareness of the WHO access, watch, and reserve (AWaRe) antibiotics classification on knowledge, attitudes, and hospital antibiotic prescribing practices. Antibiotics. 2023 May 23;12(6):951.
- Kakumba JM, Kindenge JM, Kapepula PM, Iyamba JM, Mashi ML, Mulwahali JW, Kialengila DM. Evaluation of Antibiotic Prescribing Pattern Using WHO Access, Watch and Reserve Classification in Kinshasa, Democratic Republic of Congo. Antibiotics. 2023 Jul 27;12(8):1239.
- Anhøj J, Boel J, Olesen BR, Bak HB, Hellesøe AM, Thomsen K, Knudsen JD. Analysis of antibiotic use patterns in Danish hospitals 2015–2021 using an adapted version of the who aware classification. BMJ Open Quality. 2022 Nov 1;11(4):e002098.
- Akpan MR, Jackson IL, Eshiet UI, Mfon SA, Abasiattai EA. Knowledge of antimicrobial stewardship and the Access, Watch and Reserve (AWaRe) classification of antibiotics among frontline healthcare professionals in Akwa Ibom State, Nigeria: a cross-sectional study. BMC Health Services Research. 2024 Sep 2;24(1):1014.
- Palanisamy PR. Stop antibiotic resistance–A roller coaster ride through "antibiotic stewardship,""prescription auditing" and "AWaRe" assessment tool. Journal of Family Medicine and Primary Care. 2023 Sep 1;12(9):1796-801.
- The WHO AWaRe (Access, Watch, Reserve) antibiotic book

 Infographics [Internet]. www.who.int. Available from: https://www.who.int/publications/i/item/WHO-MHP-HPS-EML-2022.02.
- WHO Antibiotics Portal [Internet]. aware.essentialmeds.org. Available from: https://aware.essentialmeds.org/groups
- Negi G, Arjun KB, Panda PK. Ground level utility of access, watch, reserve classification: insights from a tertiary care center in north India. World Journal of Experimental Medicine. 2023 Dec 20;13(5):123.
- WHO. The selection and use of essential medicines2023Web Annex C WHO AWaRe (access, watch, reserve) classification of antibiotics for evaluation and monitoring of use, 2023.
- 11. WHO. WHO releases the 2019 AWaRe Classification Antibiotics [Internet]. www.who.int. 2019. Available from: https://www.who.int/news/item/01-10-2019-who-releasesthe-2019-aware-classification-antibiotics
- Ekuma A, Onukak A, Udoette S, Versporten A, Pauwels I, Oduyebo O, Goossens H. AWaRe classification of antibiotics prescribed within 2018-2021 for hospitalised medical and surgical patients in Uyo, Nigeria. Pan African Medical Journal. 2023;46(1).
- 13. Pauwels I, Versporten A, Drapier N, Vlieghe E, Goossens H. Hospital antibiotic prescribing patterns in adult patients according to the WHO Access, Watch and Reserve classification (AWaRe): Results from a worldwide point prevalence survey in 69 countries. Journal of Antimicrobial Chemotherapy. 2021 Jun 1;76(6):1614-24.
- 14. Mandal P, Asad M, Kayal A, Biswas M. Assessment of use of World Health Organization access, watch, reserve antibiotics and core prescribing indicators in pediatric outpatients in a tertiary care teaching hospital in Eastern India. Perspectives in Clinical Research. 2023 Apr 1;14(2):61-7.
- Sajjad U, Afzal N, Asif M, Rehman MB, Afridi AU, Kazmi T. Evaluation of antibiotic prescription patterns using WHO AWaRe classification. East Mediterr Health J. 2024 Feb 25;30(2):156-62.
- Rocke T, El Omeiri N, Quiros RE, Hsieh J, Ramon-Pardo P. Reporting on antibiotic use patterns using the WHO Access, Watch, Reserve classification in the Caribbean. Revista Panamericana de Salud Pública. 2023 May 19;46:e186.
- 17. Rashid MM, Akhtar Z, Chowdhury S, Islam MA, Parveen S, Ghosh PK, Rahman A, Khan ZH, Islam K, Debnath N, Rahman M. Pattern of antibiotic use among hospitalized patients according to WHO access, watch, reserve (AWaRe) classification: findings from a point prevalence survey in Bangladesh. Antibiotics. 2022 Jun 16;11(6):810.

- 18. Song H, Liu X, Zou K, Li H, Fei H, Huang L, Yu Q, Zhang L. Assessment of antibiotic consumption patterns in hospital and primary healthcare using WHO Access, Watch and Reserve classification (AWaRe) in Sichuan Western China: 2020. Archives of Public Health. 2024 Oct 14;82(1):182.
- Bansal A, Sharma R, Prakash R. Adoption of the World Health Organization access, watch reserve index to evaluate and monitor the use of antibiotics at a tertiary care hospital in India. Perspectives in Clinical Research. 2022 Apr 1;13(2):90-3.