

Trends in Antibiotic Use in a UK Secondary Care Prior to and During the COVID-19 Pandemic: A Cross-Sectional Retrospective Study

Rasha Abdelsalam Elshenawy, Nkiruka Umaru, and Zoe Aslanpour

Department of Pharmacy, School of Life and Medical Sciences, University of Hertfordshire, UK

R.elshenawy@herts.ac.uk Twitter: @Salam_Rasha ID: 108-2024-RA

Introduction

- Antimicrobial resistance (AMR) is a rapidly escalating global health challenge. To address this, the UK Government developed a 5-year action plan, 'Confronting Antimicrobial Resistance 2024 to 2029,' aimed at optimising antimicrobial use (1). The World Health Organisation (WHO) promotes antimicrobial stewardship (AMS) and developed the AWaRe classification system to guide global AMS implementation (2). The defined daily dose (DDD) standardise antibiotic use comparisons (3). The COVID-19 pandemic significantly impacted health services, particularly in secondary care, potentially exacerbating AMR due to increased antibiotic use (3).

Aim

- To evaluate changes in antibiotic use in a UK secondary care setting following the onset of the COVID-19 pandemic in 2020 compared to 2019.

Methods

- This cross-sectional retrospective study evaluated antibiotic use among adult patients admitted to an NHS Foundation Trust in England. The focus was on those prescribed antibiotics for respiratory tract infections (RTIs) and pneumonia in 2019 and 2020. Data from 640 patient records were extracted using a validated tool based on the WHO AWaRe classification, with antibiotic use measured using the Defined Daily Dose (DDD). The study included patients aged 25 and above, immunocompromised individuals, pregnant women, and those treated for RTIs.
- This research was registered under ISRCTN number 14825813 and received ethical approval from the University of Hertfordshire Ethics and Health Research Authority (HRA).
- The public and patient involvement included submitting the study protocol to the Citizens Senate, which provided valuable feedback and suggestions.

Results

- The results show a notable increase in the Defined Daily Dose (DDD) of several antibiotics during the COVID-19 pandemic (Figure 1).
- In the **"Access" category**, amoxicillin usage rose from 1.33 DDD pre-pandemic to 4.33 DDD in 2020. Co-amoxiclav remained nearly constant at around 15 DDD but showed a marked increase compared to other antibiotics.
- In the **"Watch" category**, azithromycin increased from 3 to 9 DDD, and clarithromycin from 32 to 35.5 DDD. Levofloxacin usage doubled from 13 to 26 DDD.
- The **"Reserve" category** showed no significant increase, indicating stable consumption.

Figure 1. Antibiotic Usage Trends by Name, Category, and Defined Daily Dose (DDD) for 2019 and 2020.



Antibiotic Name	Antibiotic Category	Antibiotics DDD in 2019	Antibiotics DDD in 2020	Trend
Amoxicillin	Access	1.33	4.33	↑
Co-amoxiclav	Access	15.9	15.2	↔
Benzyloxyphenylpenicillin	Access	0.45	0.15	↓
Doxycycline	Access	6	2	↓
Flucloxacillin	Access	1.13	1.13	↔
Gentamicin	Access	0	6.67	↑
Metronidazole	Access	1.8	0.4	↓
Sulfamethoxazole/trimethoprim	Access	0.25	1.5	↑
Cephalexin	Access	0	0.5	↑
Azithromycin	Watch	3	9	↑
Ceftazidime	Watch	1	0	↓
Ceftriaxone	Watch	0.5	1	↑
Ciprofloxacin	Watch	7	9	↑
Clarithromycin	Watch	32	35.5	↑
Levofloxacin	Watch	13	28	↑
Meropenem	Watch	0.67	2	↑
Piperacillin/tazobactam	Watch	0.32	0.32	↔
Teicoplanin	Watch	1	1	↔
Vancomycin	Watch	1.5	1	↓
Aztreonam	Reserve	0	0.5	↑
Cefazidime/Azobactam	Reserve	1.67	0	↓
Linezolid	Reserve	1.05	0.3	↓

Discussion and Conclusion

- Understanding trends in antibiotic prescribing during the COVID-19 pandemic is pivotal for effective management in secondary care settings. The significant increase in the "Watch" category of antibiotics, particularly macrolides like azithromycin and clarithromycin, highlights the need for stringent antimicrobial stewardship. This rise may reflect changes in prescribing behaviour due to the pandemic. Monitoring antibiotic use is vital to mitigate the AMR challenge.
- Additionally, the increased use of levofloxacin during the pandemic, despite MHRA safety alerts about its potentially severe side effects, highlights the importance of cautious antibiotic prescribing and prompt discontinuation at the first signs of adverse reactions.
- The COVID-19 pandemic has significantly influenced antibiotic prescribing trends, highlighting the urgent need for sustainable antimicrobial stewardship in secondary care. This study reveals a notable increase in "Watch" category antibiotics, particularly azithromycin and clarithromycin, advocating the need for sustainable stewardship.
- Optimised antibiotic use is crucial for patient safety, improving treatment quality, and saving lives. The increased reliance on levofloxacin, despite known risks, emphasises the importance of careful prescribing. Prioritising responsible antibiotic use is essential to combat antimicrobial resistance, necessitating enhanced monitoring and stewardship efforts.

References

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