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Review Article

Quality Indicators of Antimicrobials Prescribing in Iraq: A Scoping Review

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Abstract

Background: Antimicrobial overconsumption is a global public health concern, particularly in the Middle East, where illnesses and antibiotic use are on the increase. Antimicrobial resistance is associated with excessive usage. As a Middle Eastern country, Iraq provides a suitable baseline for situating it amid its neighbors. We use quality indicators to reliably identify bad practice and recommend updated antibiotic prescribing practice for hospitalized patients. ***Objectives***: To compare antimicrobial prescribing quality metrics in Iraqi hospitals to those in Middle Eastern nations. ***Methods***: We conducted a literature review using a point prevalence survey to assess the inappropriateness of antimicrobial usage in hospitals in the Middle East countries after evaluating literature from sources such as Scopus, Web of Science, PubMed, and EBSCO. To examine the Iraqi scenario, we used four primary quality indicators: guidelines compliance, stop/review note documentation, parenteral administration, and the selection of targeted antibios. ***Results***: According to the study, Iraq's guideline availability ranged from 0% to 7%, which was lower than Jordan's optimum of 95.8%. The rate of stop/review documentation was approximately 0.4%, which was lower than the maximum rate of 72% in the UAE; and only 1.2% of prescriptions were targeted antibiotics, which was higher than Iran's 0%. Regarding parenteral antibiotics, Iraq reported that 89.9% of the antibiotics used were injectable, which is consistent with most comparable nations (74%-100%). ***Conclusions***: In Iraqi hospitals, antimicrobials are used inappropriately. An immediate effort is necessary to update national records, with ongoing follow-up by regular prevalence surveys.

Keywords: Antimicrobial, Iraq, Quality indicators, Point prevalence survey.

مؤشرات جودة وصف مضادات الميكروبات في العراق: مراجعة استطلاعية

الخلاصة

الخلفية: يعتبر الاستهلاك المفرط للمضادات الحيوية مصدر قلق كبير للصحة العامة على مستوى العالم، لا سيما في منطقة الشرق الأوسط حيث تزداد الأمراض واستخدام المضادات الحيوية. وترتبط مقاومة الميكروبات بالاستخدام المفرط لها. كدولة من دول الشرق الأوسط، يوفر العراق قاعدة مناسبة لوضعه وسط جيرانه. نستخدم مؤشرات الجودة لتحديد الممارسات السيئة بشكل موثوق ونوصي بتحديث إرشادات وصف المضادات الحيوية للمرضى في المستشفيات. **الأهداف**: مقارنة مقاييس جودة وصف المضادات الحيوية في المستشفيات العراقية مع تلك الموجودة في دول الشرق الأوسط. **الطرق**: أجرينا مراجعة لادبيات حول الدراسات التي استخدمت مسحًا قائمًا على الانتشار لتقييم مدى عدم مناسبة استخدام المضادات الحيوية في الشرق الأوسط من مصادر مثل سكوبس، ويب أوف ساينس، بوبمد، و EBSCOلدراسة الوضع العراقي، استخدمنا أربعة مؤشرات جودة رئيسية: الالتزام بالإرشادات، توثيق ملاحظات الإيقاف/المراجعة، الإعطاء عن طريق الحقن، واختيار مضادات حيوية التخصصية. **النتائج**: تراوحت نسبة توفر الإرشادات في العراق بين 0% و7%، وهي أقل من النسبة المثلى في الأردن البالغة 95.8%. كانت نسبة توثيق ملاحظات الإيقاف/المراجعة حوالي 0.4%، وهي أقل من النسبة القصوى في الإمارات العربية المتحدة البالغة 72%؛ وبلغت نسبة الوصفات الطبية التي تحتوي على مضادات حيوية مستهدفة 1.2% فقط، وهي أعلى من نسبة إيران التي بلغت 0%. فيما يتعلق بالمضادات الحيوية التي تعطى عن طريق الحقن، أفاد العراق أن 89.9% من المضادات الحيوية المستخدمة كانت قابلة للحقن، وهو ما يتوافق مع معظم الدول المشابهة (74-100%). **الخلاصة**: يتم استخدام المضادات الحيوية بشكل غير مناسب في المستشفيات العراقية. هناك حاجة ماسة إلى بذل جهد فوري لتحديث السجلات الوطنية، مع متابعة مستمرة من خلال المسوحات المنتظمة للانتشار.

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INTRODUCTION

The function of antimicrobials in reducing rates of morbidity and mortality caused by microbial illnesses is very well realized. Antimicrobial resistance is closely associated with excessive consumption, which is recognized as a significant global public health issue, particularly in low and middle-income countries [2-4]. Research has shown a significant increase in bacterial resistance in the Middle East region, with concerning rates of resistance observed in both pathogens and medications [4–8]. Due to increasing concerns about resistance, the World Health Organization (WHO) initiated a Global Action Plan (GAP) during the 68th World Health Assembly in 2015. This plan received approval from numerous world leaders in 2016 [9-11].

Concurrently with this strategy, multiple groups are making attempts to address bacterial resistance through various techniques [12]. The primary goals of the entire endeavor are to delineate ways for ensuring the judicious utilization of antibiotics. These tactics involved monitoring the frequency of antibiotic usage in hospitals. The global point prevalence survey is a project conducted to assess the current state of antimicrobial prescribing and the quality of prescribing practices in hospitals globally [14]. The global measurement of antimicrobial use enables the creation of qualitative indicators that can consistently identify areas of substandard practice and suggest standards for enhancing antibiotic prescribing in hospitalized patients [15]. Due to its Middle Eastern location and socioeconomic alignment with neighboring nations, Iraq is regarded as a good comparative benchmark for determining its relative position among its neighbors. The aim of this study is to conduct a thorough comparison of the quality indicators currently implemented in hospitals in Iraq with those in other Middle Eastern nations.

METHODS

The primary approach entailed a deliberate (non-systematic) review of literature to ascertain the prevalence of utilizing quality indicators as a critical factor for achieving success in antimicrobial stewardship programs in hospitals throughout Middle Eastern nations. The search for published publications in the English language from January 2016 to March 2024 was conducted using electronic online databases, including Scopus, Web of Science, PubMed, and EBSCO. The decision of January 2016 was made since it marked the launch of the WHO Global Action Plan for addressing AMR [9]. Keywords such as antibiotic OR antimicrobial, "point prevalence survey," and "Middle East" OR list of Middle Eastern nations were employed to extract data from each source. This study conducted a point prevalence survey to assess the inappropriateness of antibiotic prescribing in the Middle East region. Country-level data will be compared, irrespective of the actual number of hospitals participating in the surveys.

Antimicrobial stewardship quality indicators

Several studies have highlighted the necessity for enhanced utilization of antimicrobial agents in hospital settings [16–18]. A comprehensive examination was carried out to determine the optimal quality indicators for measuring hospital performance in antimicrobial stewardship. This examination involved conducting many studies through a literature search and/or the RAND-modified Delphi approach, with the aim of reaching a consensus on the chosen indicators [19–21]. The indicators can be classified into three categories: structural, process, and outcome indicators. These indicators encompass a range of measurements, such as the rate of broad-spectrum antibiotic use, the fraction of combination therapy, adherence to guidelines, and others [22]. A point prevalence survey is a very efficient and time-saving method for monitoring performance. The Global-PPS project incorporated four primary quality indicators: the presence and adherence to guidelines, documentation of stop/review dates, measurement of the fraction of parenteral administration, and the rate of conducting culture sensitivity tests to determine the selection of targeted antibiotics [14].

RESULTS

Of the 109 publications identified in the first search across the four electronic website databases, only twenty-one were deemed relevant and included in the scoping review. The other articles were excluded due to duplication, irrelevance, or insufficient information. The percentage of implementation of the specified quality indicators in Middle Eastern nations was obtained from the available data. In the comprehensive prescribing reports from the participating regions, Iraq ranked highest with a range of 67.8% to 93.7% (Table 1). The study's findings indicate that Iraq ranked second to last in terms of guideline availability, with a range of 0% to 7%. Egypt followed with a rate of 22.4%, while Jordan had the highest availability at 95.8% (Figure 1).

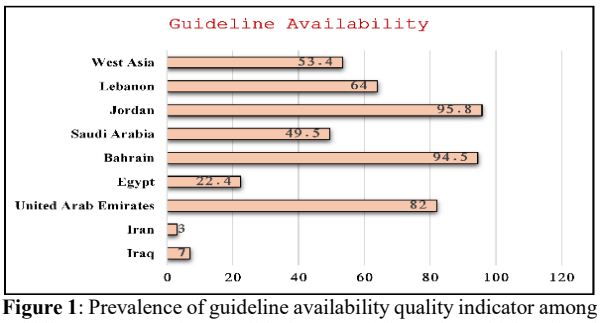

Figure 1: Prevalence of guideline availability quality indicator among Middle East countries. Antibiotic prescriptions for which a local guideline was available at all antibiotic prescriptions.

The documenting of stop/review notes was located at the bottom of the list, accounting for approximately 0.4% in comparison to the highest rate in the UAE, which was 72% (Figure 2).

Figure 2: Prevalence stop/review note documentation quality indicator among Middle East countries. Stop/review date documented: Count the number of prescriptions at the antibacterial level.

Only 1.2% of the prescribed antibiotics were targeted, with Iraq following closely behind. The highest utilization of targeted antibiotics was observed in the UAE, as shown in Figure 3.

Table 1: distribution of applying of the quality indicators and the total antibiotic use prevalence among Middle Eastern countries

Middle East Countries	Reference	Year	Hospitals number	Guideline availability (%)[a]	Stop/review Date (%)[b]	Targeted antibiotic (%)[c]	Parenteral prevalence (%)[d]	Total antibiotic prevalence (%)[e]
Iraq	Kurmanji *et al.* [23]	2021	5	0	0.4	1.2	80.1	67.8
Iraq	Kurdi *et al.* [24]	2021	3	0	0	0	89.9	93.7
Iraq	Talaat *et al.* [3]	2022	3	7	0	0	85	80
Iran	Soltani *et al.* [25]	2019	2	0-3	1.1-2.0	0-4	91.3	64
Iran	Soltani *et al.* [26]	2022	2	0 & 3	1 & 2	4 & 2	--	57.8 & 42.5
Iran	Soltani *et al.* [27]	2024	3	--	1.6	0	100	74.9
UAE	Talaat *et al.* [3]	2022	44	82	72	32	74	--
UAE	Alnajjar *et al.* [28]	2022	1	--	--	--	77.8	32.8
UAE	Abdulrazzaq and Chkhis [29]	2024	44	--	--	--	74.2	51.4
Egypt	Ashour *et al.* [30]	2022	1	22.4	19.6	9	98.6	79.1
Turkey	Kalem *et al.* [31]	2018	1	--	--	18.8	--	39.5
Turkey	Ergül *et al.* [32]	2018	1	--	--	14.3	--	70.8
Bahrain	Al Salman *et al.* [33]	2017	1	94.5	28.6	31.2	--	70.7
Qatar	Nasr *et al.* [34]	2019	1	--	--	30.4	58.4	--
Saudi Arabia	Al Matar *et al.* [35]	2019	26	--	56.3	--	80	46.9
Saudi Arabia	Al Matar *et al.* [36]	2019	21	--	49.9	--	--	41.6
Saudi Arabia	Haseeb *et al.* [37]	2022	6	--	33.6	14.6	90.3	61.9
Jordan	Abu Hammour *et al.* [38]	2020	1	95.8	8.4	21.5	97	45.3
Jordan	Talaat *et al.* [3]	2022	24	34	53	17	90	--
Lebanon	Talaat *et al.* [3]	2022	21	64	10	23	88	--
* West Asia	Versporten *et al.* [39]	2018	27	53.4	19.8	14.6	85.2	43.8

[a] Antibiotic prescriptions for which a local guideline was available at all antibiotic prescription; [b] Stop/review date documented: Count the number of prescriptions at the antibacterial level; [c] Count the number of prescriptions at the antibacterial level prescribed for targeted use instead of prescriptions for empirical use; [d] Patients who received at least one parenteral antibiotic for systemic use; [e] Number of patients received at least one antibiotic/total number of hospitals admitted patients. *the study includes results from different regions in the world that involved 9 countries for west and central Asia.

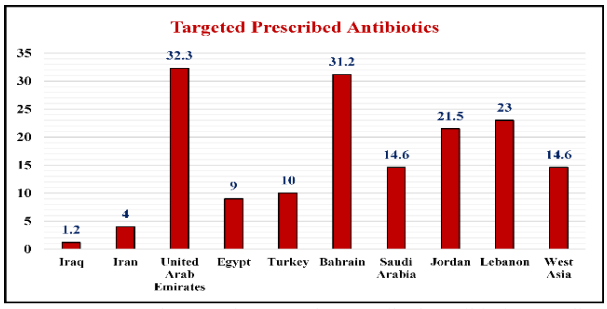

Figure 3: Prevalence of targeted prescribed antibiotics quality indicator among Middle East countries. Count the number of prescriptions at the antibacterial level prescribed for targeted based on culture result use instead of prescriptions for empirical use.

In terms of parenteral antibiotics, Iraq stated that 89.9% of the antibiotics used were administered by injection. The majority of comparable nations had a range of 74% to 100%, with the exception of Qatar, which had 58.4% (Figure 4).

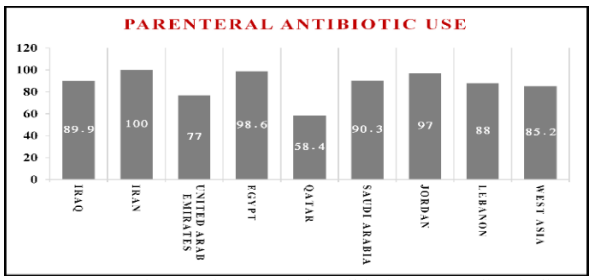

Figure 4: Prevalence of parenteral antibiotic use quality indicator among Middle East countries. Patients who received at least one parenteral antibiotic for systemic use.

DISCUSSION

Overuse and misuse of antibiotics accelerates the rise of antimicrobial resistance [40,41]. The study results emphasize the efficacy of antimicrobial stewardship programs in optimizing the utilization rate of antimicrobials [42]. This study is the inaugural assessment of the application of significant quality indicators for monitoring the appropriateness of antimicrobial prescribing in Iraq, in comparison to other Middle Eastern nations. The study sought to collect data using a paper-based point prevalence survey method, with a specific focus on antibiotic prescribing. The survey employed a uniform approach that was both uncomplicated and economical and was carried out globally [14]. These countries have comparable levels of income and sociodemographic characteristics, making them suited for assessing the effectiveness of antimicrobial stewardship [43]. The investigation unveiled substantial disparities in the overall incidence of antibiotic prescription among the countries. Iraq exhibited the highest prevalence rate, peaking at 93.7 percent, whereas Jordan demonstrated the lowest prevalence rate, fluctuating between 21.1% and 41.3%. The rate of record in this study is the highest among countries outside the region, except for a study conducted in pediatric wards in Pakistan, which showed a rate of 94.6% [44]. Nevertheless, the majority of the elevated rates are commonly seen in the pediatric and neonatal departments. In Iraq, these rates are obtained from public general hospitals that have a variety of

departments, which suggests the uncontrolled use of antibiotics [23,45]. The prevalence of excessive antibiotic consumption was not the only defining feature of unfettered prescribing of antimicrobials; the rates of adopting the selected quality measures also support this observation. Several studies have found that Iraqi hospitals lack infectious disease guidelines [3,23-45], as indicated by the availability quality indicator. However, both Iran and Iraq have the same ranking on this specific statistic [7]. In high-income states have significantly more prescribing guidelines than low- and middle-income countries [46]. According to other sources, the Public Procurement Systems (PPS) from Canada, Belgium, and the UAE have recorded guideline presence percentages of 79%, 88.4%, and 82%, respectively [3,47,48]. According to statistics from other studies, Nigeria has a 0% rate, while Egypt has a proportion of 22.4% [30,49]. The results revealed a lack in the execution of antimicrobial stewardship measures in these countries, which could be due to low resources or other factors [50]. The second signal indicates the existence of a proposed policy intervention that seeks to restrict the length of antibiotic treatments and assess the appropriateness of the selected antibiotic and its method of delivery, particularly after 48 hours from the initial dose. Enforcing this guideline should alleviate the difficulty of decision-making and mitigate potential harm, such as drug-related adverse events and disruption of the natural gut microbiota, which can result in a Clostridium difficile infection [17]. In Iraq, the documentation of stop/review date notes in an inpatient setting is highly limited, representing a mere 0.49% [23] of instances. It holds the lowest position compared to other Middle Eastern countries, exhibiting a notable discrepancy between them. The United Arab Emirates boasts the highest level of almost 72%, followed by Saudi Arabia with 56.2% and Lebanon with approximately 10% [3,37]. From a study included 53 countries, the point prevalence survey across different international regions, with the greatest rate of 51.6% recorded in northern Europe and the lowest rate of 19.8% in the west and central Asia region [39]. It is essential to combine culture sensitivity tests with clinical decision-making in order to enhance patient outcomes, minimize the emergence of resistance, and encourage the implementation of antimicrobial stewardship practices by utilizing targeted therapy [51]. However, Iraq's quality measure is relatively inferior to that of other Middle Eastern countries. The percentage is similar to the PPS outcome of Iran (0%–4%) in the selected region, Ghana (1.7%), and Georgia (2%) in different regions [25-27,52,53]. Turkey has a significantly greater percentage of 67.3% in this region, while Bahrain and the UAE have comparable percentages of 31.2% and 32.2% respectively [3,32,33]. Possible variables influencing this low rate may include compliance with local guidelines and the attitudes of healthcare professionals regarding requesting culture testing [54]. The fourth criterion for quality is the delivery of antibiotics through injection, which Iraq has achieved a consensus on with neighboring countries at a rate of 89.9%. This percentage is likewise similar to the majority of worldwide areas. Most broad-spectrum antibiotics, such third-generation cephalosporins, are administered via injection, but only a limited number of broad-spectrum antibiotics can be taken orally [55–57]. The shift from intravenous to oral antibiotics offers various benefits, including reducing catheter-associated infections, reducing healthcare costs, and shortening hospital stays. This transition is seen as a crucial step in the assessing stewardship process within a hospital setting [58,59]. However, the comparable percentages among the nations indicate that the changeover usually takes place after patients are discharged from the hospital, in order to save resources by using injectable antibiotics within the healthcare facilities [60]. This study has few limitations. Firstly, it was unable to conduct a comprehensive and systematic assessment of all point prevalence surveys conducted in the Middle East for entire nations. Additionally, it only incorporated data that was accessible from the specified sites. Furthermore, it failed to include all possible quality indicators used to monitor antibiotic prescribing, as it exclusively concentrated on the indicators authorized by the Global-PPS project as a standardized method.

Conclusion

This study underscores the urgent need for improved antimicrobial stewardship in Iraq to keep pace with the Middle East. High rates of antibiotic overuse and misuse, coupled with deficiencies in key quality indicators, underscore the pressing threat of antimicrobial resistance. Addressing these challenges requires comprehensive stewardship programs tailored to continuous communication with healthcare professionals to understand the reasons for these challenges and extract suitable suggestions that could facilitate implementing an effective stewardship program.

Conflict of interests

No conflict of interests was declared by the authors.

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Data sharing statement

Supplementary data can be shared with the corresponding author upon reasonable request.

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