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Research article

Evaluation of rational drug use based on world health organization core drug use indicators at a private hospital of western India: a cross sectional study

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ABSTRACT

Recent data from the National sample survey highlighted that many Indians prefer private hospitals over public hospitals for their healthcare needs. Hence, drug utilization research at private hospitals may help promote rational drug use, avoid risk to patient safety, and minimize pharmaceuticals wastage. The study aimed to evaluate the drugs prescription pattern using the World Health Organization (WHO)-recommended prescribing indicators at a private hospital in Pune, India. The study was an observational, prospective, and cross-sectional study conducted at the out-patient department of a private hospital in Pune, Maharashtra, India. Total 1023 prescriptions from October 2020 to May 2021 were studied using WHO drug prescribing indicators. Microsoft Excel and SPSS v26.0 was used to capture and analyse the data of the study. A total of 3954 drugs were prescribed in 1023 prescriptions. The average number of drugs prescribed per encounter was 3.9 (standard deviation: 1.3). Drugs prescribed by using the drug's generic name were 6.6%, the encounters with an antibiotic and an injection prescribed were 47.0% and 1.8%, respectively. The drugs prescribed from the Essential Drugs List (EDL) were 62.0%. Additionally, nonsteroidal anti-inflammatory drugs were prescribed the most (17.7%), followed by antacids (17.3%) and vitamins and supplements drugs (17.0%). The study highlighted deviations in prescribing practices compared to WHO standards. The study suggests a need to train the physicians and implement the WHO prescribing indicator on a trial basis in private hospitals to develop policies to achieve a long-lasting benefit.

Keywords: Antibiotic, Drug Utilization Research, WHO, Essential Drugs List.

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INTRODUCTION

Irrational prescribing practices may lead to a loss of effectiveness of treatment, leading to a delay in treatment and an increase in the severity of illness, which may cause harm to the patient and increase the overall treatment cost. Drug utilization research helps achieve rational and efficient healthcare services; by ensuring the availability and affordability of high-quality medications. [1]. Drug utilization research (DUR) is defined by The World Health Organization (WHO) as the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social, and economic consequences. [2]. DUR studies provide a context for studying the rationality of drug use; furthermore, these studies provide an evidence-based approach for making policy decisions at various levels in the healthcare system. [3]. DUR studies conducted in the out-patient settings are practical tools that help evaluate the prescribing habits and cost-effectiveness of treatment. The other aspect of DUR studies is diverseness in the data generated, and this variation can be observed among different countries, studies conducted within one country, and at times in the same hospital in different healthcare departments. [4]. Recent data on health provided by National Sample Survey (NSS) 2017-2018 demonstrated that the public health system in India accommodates less than half of the populations' needs while the remaining population depends on private hospitals for medical treatment. Furthermore, the data highlighted that around 66% of the population received medical treatment from a private hospital or clinic, whereas 33% and 26 % of the rural and urban populations still depend on public hospitals for treatment. Hereafter, underlining that most of India's population depends on private healthcare providers; hence, a drug utilization study at private hospitals would be more beneficial to ensure that the available resources are utilized in the best possible manner. [5].

WHO has provided standard drug use indicators to conduct a drug utilization study based on the actual practices occurring in clinical settings at out-patient departments of hospitals while treating

acute or chronic diseases of patients. [6]. We identified that most studies related to drug utilization in India are conducted in Government hospitals. [7-12]. However, very few studies evaluating prescribing patterns at private clinics and hospitals are available from India's Western region. Hence, the present study aimed to assess and evaluate the prescribing pattern of drugs using the WHO prescribing indicators at an out-patient department of a private hospital in Pune, India.

MATERIAL AND METHOD

A prospective, observational and cross-sectional study was conducted from October 2020 to May 2021 for 6 months at an out-patient department of a private hospital in Pune district, India. Independent Ethical Committee approval was obtained before initiating this study. The study's aim and objectives were explained to the participants, and written informed consent were obtained from patients before capturing their prescription data. The present study is prospectively registered with the Clinical Trials Registry of India (CTRI), and the registration number is CTRI/2020/10/028303.

A total of 1023 prescriptions were studied during 8 months of study. Prescriptions given to either gender, for any age, and any clinical diagnosis with at least 1 drug prescribed, were included in the study. Patients attending the out-patient facility for follow-up (who may or may not be enrolled previously), referral patients, intellectual disability and patients not willing to give informed consent were not included in the study.

Data were analysed as per five WHO prescribing indicators. [6].

1. The average number of drugs per encounter.
2. Percentage of drugs prescribed by generic name.
3. Percentage of encounters with an antibiotic prescribed.
4. Percentage of encounters with an injection prescribed.
5. Percentage of drugs prescribed from essential drugs list or formulary.

Additionally, all the prescriptions were analysed for demographic parameters like sex and other parameters like date of consultation, diagnosis and dosage.

Statistical analysis: Data were captured and analysed using Microsoft Excel and SPSS version 26 (SPSS for Windows, Version 26.0. Chicago, SPSS Inc.) and was presented as descriptive statistics.

RESULT AND DISCUSSION

Patients' demographic information and drug-related information, like drug name, strength, frequency, date of prescription, and prescriber's name, were stated in all prescriptions reviewed. A total of 1023 prescriptions were studied in the current study, from which 613 (59.9%) prescriptions were prescribed for female patients. In addition, the diagnosis was stated in 607 (59.3%) of the prescription.

A total of 3954 medicines were prescribed in 1023 prescriptions. Drugs were prescribed in a range of 1 to 8 in the 1023 prescriptions studied; out of these, 55 (5.4%) prescriptions had only 1 drug prescribed while 4 prescriptions (0.4%) contained 8 drugs prescribed (Table 1).

Table 1: Summary report of the number of drugs per encounter

Number of drugs per encounter	Frequency	Percentage
One drug	55	5.4
Two drugs	99	9.7
Three drugs	189	18.5
Four drugs	343	33.5
Five drugs	278	27.2
>Five drugs	59	5.7

The average number of drugs per prescription was 3.9 (SD 1.3). The percentage of drugs prescribed by generic name was 6.6%. Whereas the percentage of encounters with an antibiotic and injection was 47.0% and 1.8%, respectively. And 62.0% of drugs prescribed in the current study were from the National list of essential medicines (Table 2).

Table 2: Summary of WHO prescribing indicators results

WHO prescribing indicators	Total drugs/ encounters	Average/ percent	WHO recommended standard [17]
The average number of drugs per encounter	3954	3.9	(1.6-1.8)
Percentage of encounter with antibiotics	481	47.0%	(20.0-26.8%)
Percentage of encounters with injection	18	1.8%	(13.4%-24.1%)
Percentage of drugs prescribed by generic	258	6.6%	100%
Percentage of drugs from essential drug list	3687	62.0%	100%

Of a total of 3954 drugs prescribed, nonsteroidal anti-inflammatory drugs (NSAIDs) drugs were the highly prescribed drugs 697 (17.7%), followed by antacids drugs 684 (17.3%) and vitamins and supplements drugs 669 (17.0%). A total of 519 (13.2%) antibiotics drugs were prescribed in the current study, and the most commonly prescribed antibiotics were Azithromycin 167 (32.2%), Cefixime 108 (20.8%) and Ofloxacin 59 (11.4%) (Table 3).

Table3: Summary of frequently prescribed medicines (n = 3954) and antibiotics (n = 519) in the study

Frequently prescribed medicine	Frequency (Percentage)	S.N.	Frequently prescribed antibiotics	Frequency (Percentage)
Aceclofenac + Paracetamol	439 (11.1%)	1	Azithromycin	167 (32.2%)
Domperidone + Omeprazole	387 (9.8%)	2	Cefixime	108 (20.8%)
Levocetirizine	217 (5.5%)	3	Ofloxacin	59 (11.4%)
Azithromycin	167 (4.2%)	4	Doxycycline	47 (9.1%)
Pantoprazole + Domperidone	144 (3.6%)	5	Amoxycillin + Clavulanic Acid	31 (6.0%)

The percentage of fixed-dose drug combinations (FDCs) prescribed was 74.8% of the total drugs prescribed. Tablets were the most prescribed dosage form 2211 (55.9%) followed by capsules 1008 (25.5%), Syrup 448(11.3%) and Gel, ointment, lotion, creams 129 (3.3%).

Inappropriate prescribing practices are a worldwide issue that causes negative results in patients. [13, 14]. The WHO prescribing indicators utilized to assess existing prescribing practices in the

current research has created a clearer understanding of prescribing patterns and highlighted areas that need intervention. For example, the average number of drugs prescribed in the present study was 3.9 (WHO recommended value of 1.6-1.8). Similar findings were observed in studies conducted by Potharaju et al. and Mirza et al. in India. [15, 16]. Likewise, studies conducted in Gondar, South Ethiopia, and North Ethiopia reported the average number of drugs prescribed as 1.76, 1.83, and 1.9, respectively, which was lesser than the current study finding [17-19]. However, much higher-average drugs were prescribed in a study from Ghana (4.8) and India (5.05) [20, 21].

In the current study, 33.5% of prescriptions contained 4 drugs prescribed; this was less than the one reported by Shelat et al. (47.6%) [22]. The polypharmacy observed in the current study may be attributed to several factors, including a shortage of time for doctors to diagnose and treat common disease problems, patient demand for immediate symptom relief, the availability of irrational fixed medication combinations, deceptive pharmaceutical marketing practices. [21].

In developing countries like India, generic prescribing and marketing are preferred because it lowers medication costs and allows patients to obtain drugs more quickly because they are not obligated to search for a particular medicine with a brand name. However, in the current study, only 6.6% of drugs were prescribed with generic names (WHO recommendation 100%) [23]. Other studies conducted in India have also reported lower generic prescribing patterns, i.e., 1.41% and 2% reported by Ansari et al., [21] and Mohanty et al.,[24], respectively. Another study conducted by Kumari et al. reported 27.1% of drugs prescribed by generic name. [25]. Many international studies also have reported a lower value of generics prescribing. [26, 27]. Nevertheless, some international studies, like one conducted in Chinese county hospitals and another study conducted in Ethiopia and UAE, had 96.12% and 100% and 100% of drugs prescribed in generic names respectively, which is in line with WHO recommendation. [28-30].

In health facilities and the environment, antibiotic resistance is increasing at alarming rates. This accelerated resistance is due to overuse and misuse of antibiotics, where increased irrational use of antibiotics leads to more resistance. [31]. In the present study, the overall antibiotic prescribing per encounter was higher (47.0%) than the WHO standard. Many studies across the world showed that higher antibiotic prescribing practice is common. For example, studies from Kenya, Nigeria, Bahrain, and Pakistan showed that antibiotics were prescribed in 74%, 34.4%, 57%, and 60.9% [32-35]. One of the main reasons for antibiotic resistance is umbrella therapy. For out-patient settings, no culture sensitivity studies are performed to identify bacterial infection irrespective of which an antibiotic is prescribed; another reason is incomplete course completion of the antibiotic therapy, leading to antibiotic resistance. On the contrary, studies conducted in Ethiopia, India and Jordan showed antibiotics prescriptions 24.4%, 22.2%, and 17.7%, which were in line with WHO standards. [30, 36-37].

The percentage of injection prescribed (1.8%) was lower than the WHO standard value in this study, similar to the other studies conducted in India [38] and Nepal [39]. However, a study conducted in Pakistan demonstrated higher injection usage (27.1%) [35]. The current study's lower use of injections may be since non-parenteral treatment is easy, more economical, and appropriate for a busy out-patient department, whereas administering an injection requires qualified staff. In addition, minimum use of parenteral also reduces infection through the parenteral route. Furthermore, unsanitary injections may increase the risk of transmitting blood-borne infections such as syphilis, Hepatitis and Human Immunodeficiency Virus.

A prescription practice of prescribing drugs from the Essential Drug List encourages responsible drug use, aids in developing standard care protocols and rational prescribing practises, and provides economic benefits such as lower therapy costs [40]. 62.0% of drugs were prescribed from the NLEM in this study; although this is promising, it is less than the WHO recommended value. The findings from studies of other parts of India, such as Hazra et al. (45.71%), had a relatively more minor percentage of drugs prescribed from NLEM. [41]. However, findings higher to the current study were reported from Ethiopian (99%), Egyptian (95.4%) and Nigerian (94.0%) studies. [18, 42, 43]. The most commonly prescribed drugs in this study were analgesics, antacids and antibiotics. FDCs prescribed in our study was comparatively higher than other Indian studies. [9, 44].

A large number of irrational FDCs is available in the Indian pharmaceutical market. These irrational prescribing of FDCs increase the risk of adverse drug events and increase healthcare costs.

This study adds to the growing literature on medicine use in the healthcare systems of developing countries. However, the WHO prescribing indicators used in the study does not evaluate the prescribed drug's correctness based on the diagnosis. The core use of WHO indicators is to monitor various aspects of out-patient care. These indicators are laid down to be used in health centres, pharmacies, and hospital out-patient services. With this limitation, the drug use pattern was well identified in the current study.

CONCLUSION

The current study conducted at an out-patient department of the private hospital was in moderate compliance with the WHO recommended prescribing indicators. The study identified polypharmacy, the higher percentage of antibiotics prescribing, and

negligible generic prescribing; encouraging findings like the higher prescription of drugs from NLEM and fewer encounters with injections were observed. Further, the study advocates the need to train our prescribing doctors through seminars, workshops, and regular training programs to write rational prescriptions and adhere to the WHO standards for prescriptions for hospitals' quality improvement.

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Conflict of interest: All the authors hereby declare that there is no conflict of interest in this paper.

Ethical approval: Ethical approval for the study was received from Kabre Institutional Ethics Committee with approval number KIEC/20/2. Consent was also received from the participants.

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