

Prescription Audit in General Outpatient Department of a Tertiary Care Teaching Hospital: A Prospective Observational Study

Rajendra Sharma¹, Rakesh Soni², Nitin Sashidharan³, Khemlata Tilwani⁴

¹Assistant Professor, Department of Pharmacology, VCSG – GIMSR Srinagar Pauri Garhwal, Uttarakhand

²Assistant Professor, Department of General Medicine, GMC – Pali, Rajasthan

³Senior Medical Director, Allucent Greater Toronto Area, Canada

⁴Senior Professor, Department of Physiology, GMC – Pali, Rajasthan

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Corresponding Author: Dr. Rajendra Sharma

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Abstract:

Introduction: The prescribing habits are of critical importance since therapeutic efficacy and safety depends on rationality of the prescriptions. Prescription audit helps to detect any effective changes that would help HCPs to offer superior quality of care to the patients.

Aims & Objective: Identify the gaps in current prescribing practice and support HCPs to boost rational prescribing.

Methodology: A prospective observational study was conducted on 1188 prescriptions for a span of two month in the general outpatient department of a tertiary care teaching hospital in western Rajasthan, India. A total of 1188 prescriptions were sampled based on the MOHFW Govt. of India “Prescription Audit guideline” recommendation. All the prescriptions were analyzed based on WHO prescribing indicators and were evaluated for errors in prescription writing. Data were entered and analyzed using microsoft excel.

Results: 1188 prescription comprising of 4876 drugs were analyzed. The average number of drugs per prescription was four. The study encompassed 39.81% males and 60.19% females. Around 50% prescriptions were written in legible handwriting & recorded salient feature of clinical examinations. Presumptive diagnosis was mentioned in 95% however clear medicine doses & schedule were mentioned in just 75% prescriptions. None of the prescriptions mentioned next date of visit of the patients however just 0.5% prescription included allergy status of the patient. Approx. 85% of prescription didn't mention any medical history of the patient. Follow-up advice and precautions (do's and don'ts) as well as relevant clinical details and reason in case of referral were given in less than 1% of audited prescriptions. Polypharmacy (more than 5 medicines) was observed in 35% and about 1% prescriptions contain more than 10 medicines. Vitamins, Tonics or Enzymes and Antibiotics were prescribed in approx. 30% of audited prescriptions of which only 1/3rd of antibiotics were prescribed as per facility's Antibiotic Policy.

Conclusion: Prescription audit can be helpful to plan appropriate intervention to ensure the rational drug therapy and to evaluate the existing drug use pattern. It also reflects the perspectives of current prescribing pattern in hospitals.

Keywords: Prescription audit, WHO prescribing indicator, Essential drugs, Outpatient Pharmacy.

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Introduction

A prescription audit (PA) is a systematic and critical analysis of the quality of prescribed medical care, which includes procedures used for diagnostic and treatment purposes, the appropriate use of various resources, and the resulting outcome on the quality of life of patients. It is an active process that checks for improvement in quality of health care. [1] Being a continuous cycle in nature, PA involves observing various practices followed, setting standards for comparison, comparing followed practices with set standards, implementing changes

as required and observing for new practices. A PA is defined as “the review and evaluation of health-care procedures and their documentation to compare the quality of care which are being provided, with the accepted set standards”. [2-4] Prescription writing assessment is considered an important parameter to ensure rational drug use.

Rational use of drugs is essential to achieve good quality health care for patients as well as for community.[5] Rational use of drugs requires that patients receive medications appropriate to their

clinical needs, in doses that meet their own individual requirements for an adequate period of time, with the lowest cost to them and their community.[5] Irrational prescribing leads to ineffective and unsafe treatment, which may subject the patient to exacerbation or prolongation of illness, unnecessary distress, harm, and also higher expenses.[6] An ideal prescription should include the patient's full name, age, address, with or without the patient's hospital number, date of the prescription, and the clinical diagnosis and clearly specify the name of the drug using the generic name, the formulation used with the dose, frequency of administration, total quantity to be supplied or the duration of treatment, and signing the prescription, indicating one's name, and if possible, one's address.[7] The assessment of prescribing patterns by auditing prescriptions serves as a tool to monitor, evaluate, and suggest appropriate modifications in prescribing practices of medical practitioners to rationalize medical care and make it more cost-effective.[8] In addition, as a large amount of resources are spent on drugs, it becomes even more essential to regularly monitor drug prescriptions and drug administration and formulate appropriate measures to rectify the errors detected so as to ensure effective utilization of the resources spent.[8].

Our institution is a tertiary care hospital which meets the health needs of majority of the population in and around pali region. As a regular prescription auditing process at this institution, this study serves as a tool to evaluate the prescribing practices of the doctors in an attempt to optimize and rationalize the health care.

Materials & Method

A prospective observational non interventional study was conducted for a span of two month in the general outpatient department of a tertiary care teaching hospital in western Rajasthan, India. A total of 1188 prescriptions were sampled based on

the MOHFW Govt. of India "Prescription Audit guideline" recommendation.

The protocol of the study was approved by the institutional ethics committee of GMC Pali. Complete confidentiality of patients was maintained throughout the research process.

The WHO core indicators for drug use which include three groups were precisely monitored in the selected prescriptions viz. a) prescribing indicators: percentage of drugs prescribed by their generic name, average number of drugs per prescription, percentage of prescriptions containing antimicrobial agents, percentage of injections per prescription and percentage of drugs prescribed from the Essential Drug List (EDL), b) patient-care indicators: average time for consultation, dispensing actual percentage of drugs dispensed, percentage of adequate adequately labeled and knowledge of patients on correct dosage and c) indicators of health facility: availability of EDL copy in all OPDs and IPDs and availability of key drugs.[9]

All the prescriptions were analyzed based on WHO prescribing indicators and were evaluated for errors in prescription writing.

Source of Data: Data was obtained from the Out-patient department, the prescriptions file data collection, data scrutiny was carried out. No patient interaction was considered, the only patients file was referred after taking prior permission from hospital authority.

Statistical Analysis: All the data obtained during the study were entered in Microsoft Excel, expressed as a percentage and analyzed by descriptive statistics.

Results

A total of 1188 prescription comprising of 4876 drugs were analyzed.

Table 1- WHO indicators for Prescription audit

WHO indicators for Prescription audit (n=1188)			
Parameters	Yes	No	Compliance (%)
OPD Registration - Number mentioned	1185	3	99.75
Date of consultation - day / month / year	1187	1	99.92
Handwriting is Legible in Capital letter	668	520	56.23
Brief history Written	149	1039	12.54
Allergy status mentioned	6	1182	0.51
Salient features of Clinical Examination recorded	582	606	48.99
Presumptive / definitive diagnosis written	1136	52	95.62
Medicines are prescribed by generic names	1188	0	100.00
Medicines prescribed are in line with STG.	1187	1	99.92
Medicine Schedule / doses clearly written	894	294	75.25
Duration of treatment written	1074	114	90.40
Date of next visit (review) written	1	1187	0.08

In case of referral, the relevant clinical details and reason for referral given.	6	548	0.51
Follow-up advise and precautions (do's and don'ts) are recorded	3	1185	0.25
Prescription - duly - signed - (legibly)	996	192	83.84
Medicines Prescribed are as per EML/ Formulary	1188	0	100.00
Vitamins, Tonics or Enzymes prescribed?	364	824	30.64
Antibiotics prescribed?	369	819	31.06
Antibiotics are prescribed as per facility's Antibiotic Policy	382	806	32.15
Investigations advised?	440	748	37.04
Injections prescribed?	13	1175	1.09

Table -1 highlighted the important WHO indicators for Prescription audit. The study encompassed 39.81% males and 60.19% females (Fig. 1).

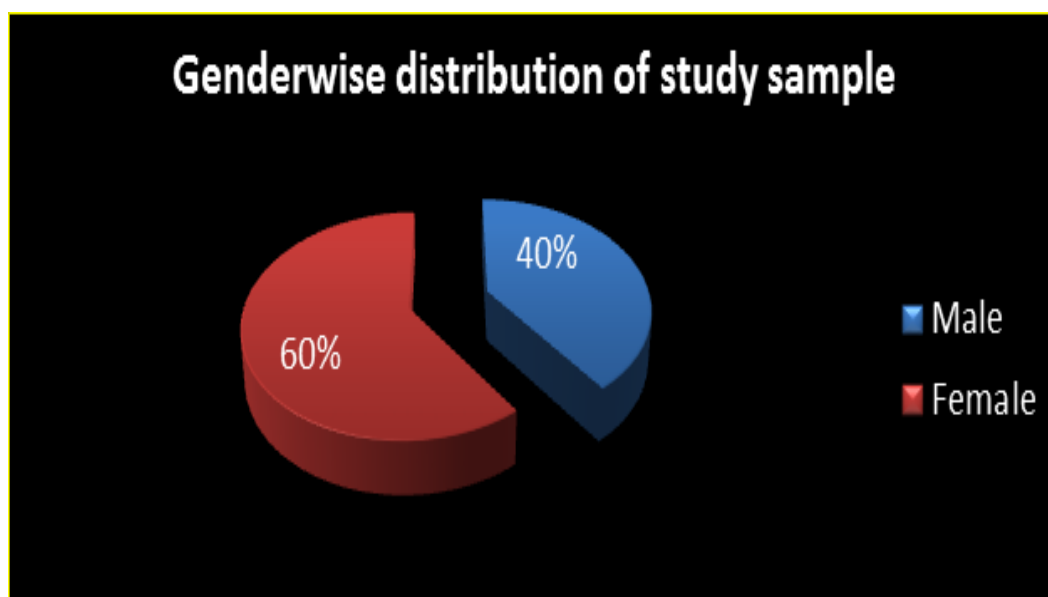


Figure 1: Gender wise distribution of study population

The average number of drugs per prescription was four. 56% prescriptions were written in legible handwriting & less than 50% prescriptions recorded salient feature of clinical examinations. Although presumptive diagnosis was mentioned in

95% of prescription however clear medicine doses & schedule were mentioned in just 75% prescriptions. It was observed that almost all the prescription (100%) included the medicines that are available in the hospital dispensary (Fig. 2).

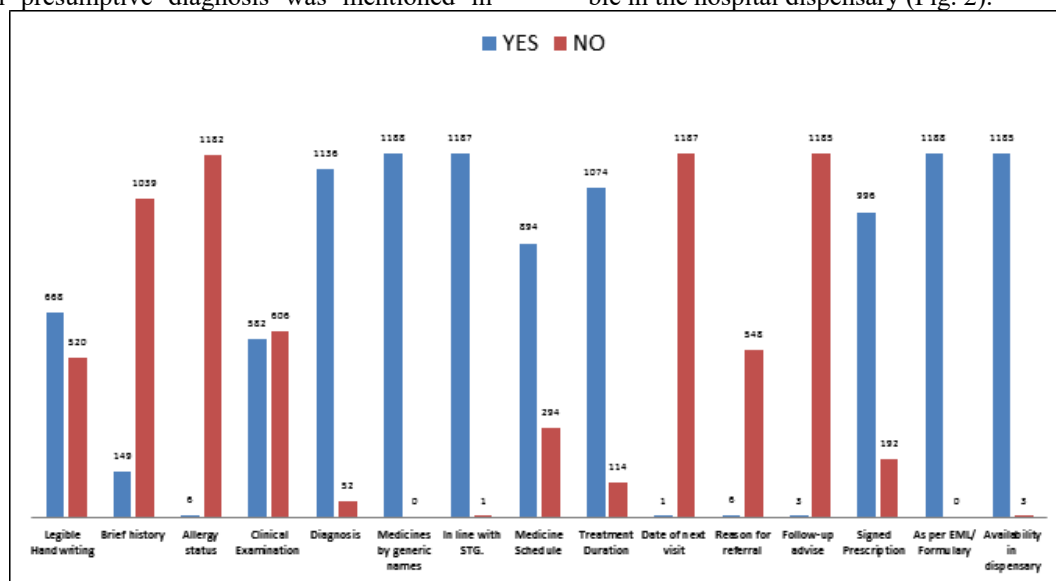


Figure 2: Important observations of audited prescriptions

None of the identified prescriptions were found to mention the next date of visit of the patients. Allergy status of the patient was mentioned in just 0.5% of identified prescriptions. Also more than 85% of prescription did not mention any medical history of the patient. More than 1/10th of the prescriptions were not duly signed by the prescribing physician and also did not mention the duration of treatment as well.

It was shocking to observe that follow-up advise and precautions (do's and don'ts) were mentioned in less than 1% of prescription audited, similarly in case of referral, the relevant clinical details and reason for referral were given in less than 1% of audited prescriptions.

Polypharmacy (more than 5 medicines) were prescribed in around 35% of audited prescriptions however majority of prescriptions (approx. 60%) contains 2-4 medicines and about 1% prescriptions contain more than 10 medicines (Fig. 3).

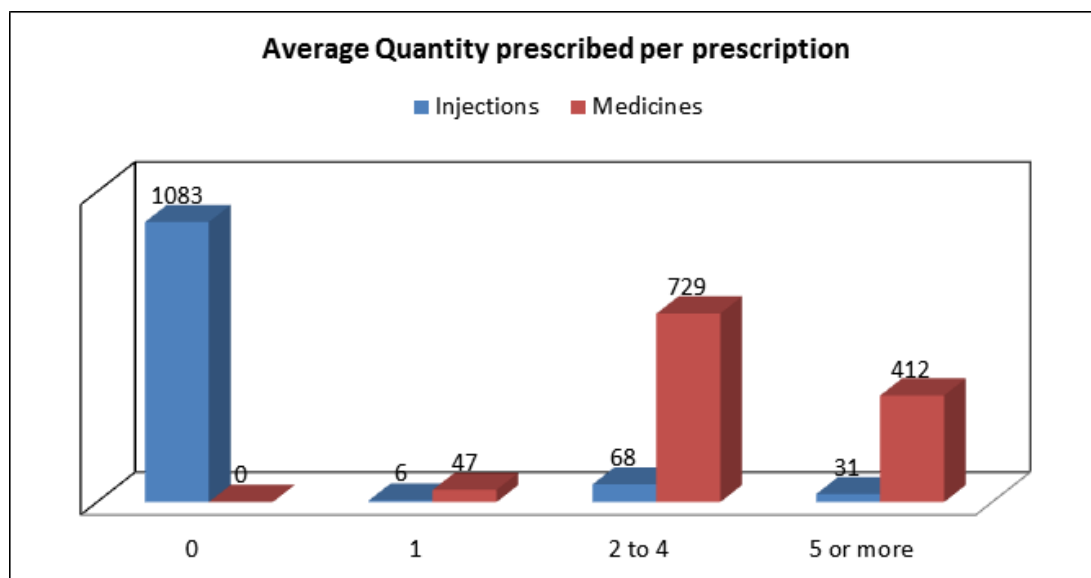


Figure 3: Average Quantity of Injection/Medicine per prescription

On further evaluation it was identified that Vitamins, Tonics or Enzymes and Antibiotics were prescribed in approx. 30% of audited prescriptions. Only in about 1/3rd of prescriptions the antibiotics are prescribed as per facility's Antibiotic Policy and Blood investigation were advised in about 37% of audited prescriptions (Fig. 4).

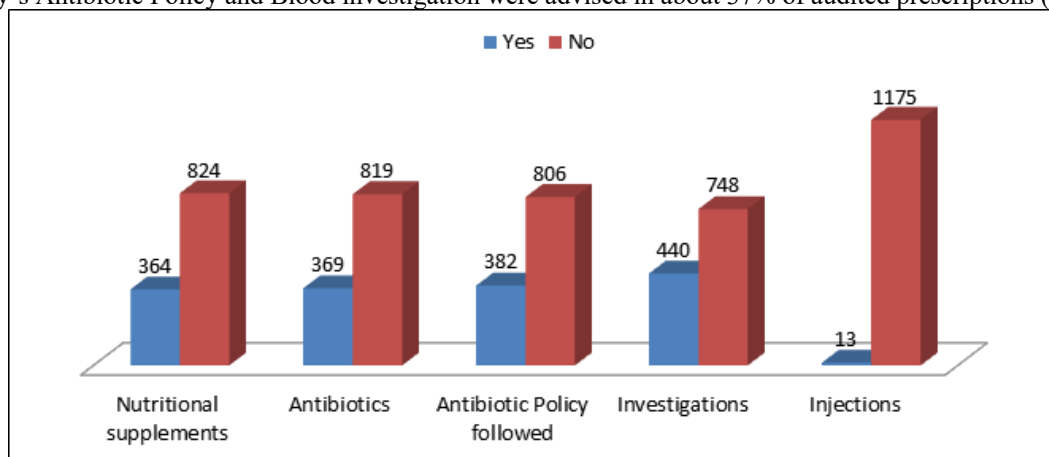


Figure 4: Category wise prescription details

Discussion

One of the most essential aspects of an optimally functioning healthcare system is judged by its ability to deliver the right medicine to the right patient. Prescriptions are an important intervention for the physician and it is an ethical and legal duty

on behalf of the practitioner to write complete prescriptions with generic drug names in legible hand writing [10]. Prescription auditing is used as one of the important tools to assess misuse of drugs as well to improve the rational usage of drugs [10]. Keeping this in mind, the present study was

undertaken to assess quality of prescribing at GMC & Bangur Hospital, Pali, Rajasthan, India. The locale comprises rural communities and more than 80% of the population has very limited literacy or knowledge regarding drugs. Since only a small proportion of the population know about drugs, their role, use as well as misuse, it is entirely the clinician's role and responsibility to educate and explain to the patients regarding proper use, dosage and follow up. The process of conducting an audit of patient prescriptions from various departments in tertiary care teaching hospital was an eye-opening experience for the staff that was a part of it. According to the calculated results of our study, we found that the patient's details such as name, age and gender were 100% complete on the prescriptions. This could be due to the details being printed at the time of registration itself. Though addresses are also printed during registration, the noted absence of few patient addresses in the obtained prescriptions might be due to factors such as; technical glitches during registration, absence of specific address in the hospital database or uninformed patient. The date of the appointment is also printed at the time of registration, but was still missing from 0.08% of the prescriptions. This might also have been due to one of the aforementioned issues. Certain studies on auditing of hand-written prescriptions have reported that patient details were usually found to be incomplete in most prescriptions [2]. Patient details are important as they ensure that correct patient receives the appropriate medicine and also important for record-keeping and medico-legal purposes. Whilst prescribing drugs with known contraindications or drugs for special populations, it is important to mention the age, gender and weight of the patient on the prescriptions. Upon analysis of the results, we observed that the prescriptions written were incomplete with regards to the patient's personal medical and surgical history, the patient's family history and their clinical examination. The reasons could be a heavy OPD load, emergency cases in the ER, nonspecific complaints and tendency among clinicians for verbal communication rather than writing down in details. All prescriptions were missing with the details of contraindications regarding the medications and allergy status. A fraction of the prescriptions, about 16% had no clear initials of the prescribing clinician. The failure of stating the prescribers name is an example of ill practice and predisposes to future complications concerning patient's having to revisit, drugs being prescribed irrespective of the underlying disease and difficulty with tracing back for clarifications. Furthermore, initial details are important to identify the prescribing clinician, validate the authenticity of their prescriptions and hold them accountable for the medications they have prescribed. In a study

similar to ours, the names of all the physicians and hospital addresses were printed on the prescriptions with doctor's registration number and 17% of prescriptions did not have the physician's initials [11]. In the present study, out of the 200 prescriptions, 29.5% had diagnosis written in the prescriptions. A study from Merseyside, UK reported that 51% of their prescriptions (total, n= 81) didn't have a diagnosis [12]. Globally, untraceable to time or place, doctors have managed to gain a reputation for their illegible handwriting. In our study we found that 43.8% of prescribing clinicians had either illegible handwriting or had handwriting that was legible with difficulty. A similar type of study carried out in Delhi, India also reported that 15% of the prescribing doctors had illegible handwriting [13]. Another study from Kerala, India reported that due to illegible handwriting of prescribing doctors, 3.4% (122/3557) medicines were unable to decode [14]. These legibility issues can cause dispensing errors or administration errors which could lead to adverse drug reactions or adverse medical outcomes [15]. To avoid such errors, the use of capital letters whilst prescribing drugs should be encouraged and where possible, switching to an electronic prescribing system is recommended [13]. Prescription writing is regarded as one of the most important and basic skills which a doctor should be able to perform. Specific training and supervision for prescription writing must be emphasized during undergraduate and postgraduate training to minimize errors [16]. A lack of accuracy and completeness in prescriptions with regards to all of the above-mentioned criteria could be due to lack of training but may also be influenced by the attitude of some doctors, who due to inadequate time, are unwilling to invest in writing clear and legible prescriptions. The extra time spent on the prescriptions, however, can avoid unnecessary enquiries from the pharmacist and also decrease discrepancies/delays in patient care with the intended drug therapy. In the guidelines laid down by the NMC erstwhile Medical Council of India, states that all drugs should be prescribed preferably in capital letters in legible handwriting and should also mention the generic name. In the present study, the average number of drugs prescribed (approx. 4) was higher when compared with the WHO laid benchmark i.e., two drugs per prescription. 15 Similar studies from India reported higher average number of drug prescription (3.02±0.81 to 4.02±2.23 drugs) [14,15]. This indicator helps in measuring the practice of polypharmacy. The more the number of drugs prescribed, the more the chance of errors in healthcare cost and also there will be increase in the drug-drug interaction resulting in adverse drug reaction [13]. The practice of drug prescription by generic names was found to be satisfactory (100%) in the present study. This is

similar to studies by Anteneh and Ola et al., which reported the percentage of generic name drugs prescribed to be as high as 98.7% and 95.4%, respectively [17,18]. Another study by Sudarshan et al. also revealed the percentage of generic name drugs prescribed to be 69.26% [19]. Low prescription rates for generic name (45-55.4%) was reported in one another studies from India [15,19]. This may reflect the influential nature of pharmaceutical company representatives for inordinate favors. Prescribing generic drugs reduces the chances of errors while dispensing drugs which may be due to misinterpretation of sound-alike trade names of drugs and this will decrease the economic burden on the patients [20]. The WHO considers generic drug prescriptions a safety precaution for the patients as it provides clear identification and enables for easy information exchange as well as for allowing better communication between health-care providers [17]. We also observed that none of the prescriptions mentioned the allergy status of the patient. A study from North India also reported similar limitations on their study [15]. Drug dose start date was mentioned in 75.25% of the prescriptions whereas the duration of drug intake was mentioned amongst 90.4% of the prescriptions. The absence of mentioning duration of drug intake may result in re-presentation to the physician due to treatment failure if the patient does not take the medication for the required course (i.e. in the case of antibiotics \pm development of resistance) [16] or adverse effects if the patient surpasses the recommended course duration. Most drugs which are available in variable strengths and dosage forms pose problems while dispensing, especially if trade/brand names are used. Wrong dose, omission of dosage and wrong duration are the most common types of prescribing errors reported from most studies worldwide [21-23]. We observed that the percentage of injections per prescription (1.09%) was lower when compared with studies from India (7.54%) though both the findings are within the WHO laid limits ($\leq 10\%$) [15]. The drug route instruction is very important as medication administration route has its own contraindications, which needs to be recognized by the treating doctor and the nurses involved. For example, in a patient with diarrhea or active rectal bleeding rectal route is contraindicated [24]. In our study, 31.06% of the prescriptions had antimicrobials prescribed wherein only 25.75% antibiotics are prescribed as per facility's antibiotic policy. This finding of antimicrobials prescription is higher when compared with the limits set by the WHO i.e., 20-25% [15]. Studies from India reported higher antimicrobial prescription rates (39.01% > 50%) which are also beyond the limits of the WHO. 14,16 studies by Anteneh and Ola et al., combination antimicrobial regimens (>2 antibiotics) were

observed in 58.1% and $39.2 \pm 8.8\%$ respectively [17,18]. A study by Sudarshan et al. it was found to be at a percentage of 39.4% [19]. Polypharmacy was also quite prevalent in the above stated studies which increase the chances of adverse drug reactions, drug interactions as well as high expenses for the patient. It also leads to increased incidence of prescribing errors (those related to drug interactions) [25]. Use of antimicrobials should be rational as irrational use may lead to emergence of antimicrobial drug resistance, as well as increased adverse reactions and unnecessary hospital admissions. Super infection is also a potential possibility with overprescribing of antimicrobials.

Conclusion

Based on the results of audit it can be concluded that prescription writing is approached mindfully and there is no irrational use of drugs. Prescription audit can be helpful to plan appropriate intervention to ensure the rational drug therapy and to evaluate the existing drug use pattern. It also reflects the perspectives of current prescribing pattern in hospitals. With the help of such audit medical professionals especially the prescribers become more aware of the current practices and would drive themselves to safe, economic and effective therapeutic practice.

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References

1. Bandyopadhyay D. A study of prescription auditing in a Tertiary Care Teaching Hospital of Eastern India. *J Drug Delivery Ther.* 2014;4(1):140-149.
2. Solanki ND, Shah C. Prescription audit in outpatient department of multispecialty hospital in Western India: An observational study. *Int J Clin Trials.* 2015;2(1):14- 19.
3. Patterson HR. The problems of audit and research. *J R Coll Gen Pract.* 1986;36(286):196.
4. Srishyla MV, Mahesh K, Nagarani MA, Sr. Mary C, Andrade C, Venkataraman BV. Prescription audit in an Indian hospital setting us-

- ing the DDD (defined daily dose) concept. *Indian J Pharmacol.* 1994;26(1):23-28
5. Ola AA, Azza AE, Ahmed AE, Abdallah MS. WHO/INRUD drug use indicators at primary healthcare centers in Alexandria, Egypt. *J Taibah Univ Med Sci* 2014; 9:54-64.
 6. Anteneh AD. Assessment of drug use pattern using WHO prescribing indicators at Hawassa University teaching and referral hospital, South Ethiopia: A cross-sectional study. *Desalegn BMC Health Serv Res* 2013; 13:170.
 7. Mohammad A, Muhammad MA, Nushrat N, Abul KM, Ekramul MM. Audit of typical prescription format among the prescribers of a garment medical centre in Bangladesh. *Update Dent Coll J* 2011; 1:7-12.
 8. Anuja AP, Subhash BT, Prakash RB. Prescription analysis of pediatric outpatient practice in Nagpur city. *Indian J Community Med* 2010; 35:70-3.
 9. World Health Organization: How to Investigate Drug Use in Health Facilities: Selected Drug Use Indicators - EDM Research Series. <http://apps.who.int/medicinedocs/en/d/Js2289e/>
 10. Rai S, Bhuvana K, Sowmya C, Sahana HV, Yaseen M. Prescription audit at a tertiary care teaching hospital. *Natl J Physiol Pharm Pharmacol.* 2018;8(9):1271-1274.
 11. Janmano P, Chaichanawirote U, Kongkaew C. Analysis of medication consultation networks and reporting medication errors: A mixed methods study. *BMC Health Serv Res.* 2018;18(1):221.
 12. Smith R, Loh M, Mills D. Prescription audit. *British Dental J.* 2021;230 (4):189.
 13. Singh T, Banerjee B, Garg S, Sharma S. A prescription audit using the World Health Organization recommended core drug use indicators in a rural hospital of Delhi. *J Educ Health Promot.* 2019; 8:37.
 14. Dhanya TH, Sanalkumar KB, Andrews MA. Prescription auditing based on the World Health Organization (WHO) prescribing indicators in outpatient department of a teaching hospital in Kerala. *Asian J Pharm Clin Res.* 2021;14 (5):147-151.
 15. Ahsan M, Shaifali I, Mallick AK, Singh HK, Verma S, Shekhar A. Prescription auditing based on World Health Organization (WHO) prescribing indicators in a teaching hospital in North India. *Int J Med Res Rev.* 2016;4(10):1847-1852.
 16. Chaturvedi SK, Preeti S, Prabha SC, Geetha D. Improving quality of prescriptions with clinical audit. *Indian J Med Sci.* 2008;62(11):461-464.
 17. Akl OA, El Mahalli AA, Elkahky AAA, Salem AMAA. WHO/INRUD drug use indicators at primary healthcare centers in Alexandria, Egypt. *J Taibah Univ Med Sci.* 2014; 9:54-64.
 18. Desalegn AA. Assessment of drug use pattern using WHO prescribing indicators at Hawassa University teaching and referral hospital, South Ethiopia: A cross-sectional study. *BMC Health Serv Res.* 2013;13(1):170.
 19. Meenakshi R, Selvaraj N, Anandabaskar N, Dhamodharan A, Badrinath AK, Rajamohammad MA. Prescription audit of a teaching hospital in South India using World Health Organization core prescribing indicators - A cross-sectional study. *PrespectClin Res.* 2021.
 20. Balbir K, Rani W. Prescription audit for evaluation of prescribing pattern of the doctors for rational drug therapy in a tertiary care hospital. *J Drug Delivery Ther.* 2013; 3:77-80.
 21. Abidi A, Gupta S, Kansal S, Ramgopal. Prescription auditing and drug utilization pattern in a tertiary care teaching hospital of western UP. *Int J Basic ClinPharmacol.* 2012;1(3):184-190.
 22. Seden K, Kirkham JJ, Kennedy T, et al. Cross-sectional study of prescribing errors in patients admitted to nine hospitals across Northwest England. *BMJ Open.* 2013;3:e002036.
 23. Kiekkas P, Karga M, Lemonidou C, Aretha D, Karanikolas M. Medication errors in critically ill adults: A review of direct observation evidence. *Am J Crit Care.* 2011;20(1):36-44.
 24. Kim J, De Jesus O. Medication Routes of Administration. *StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021.*
 25. Ndungu TK, Maru SM, Kuria KA, Karimi PN, Burburia JM. Prescription audit carried out at the pharmacy practice centre of the university of Nairobi between June and November 2004. *East Cent Afr J Pharm Sci.* 2007;10(2):51-55.