Original Article

Analysis of the pattern of drug use using WHO core drug indicators among general OPD patients in rural Puducherry

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ABSTRACT

Background: Prescription auditing is a crucial tool for evaluating a range of concerns, including injectable usage, polypharmacy, the use of generic names, and the quality of treatment given to patients in primary care facilities. The objective of the study was to assess, using WHO core drug use indicators, the drug use patterns of general outpatients (OPD) at a rural healthcare facility. **Materials and Methods:** A cross-sectional study was conducted in a rural peripheral health centre in Puducherry for a period of one year from September 2019 to August 2020. A total of 1200 prescriptions were analysed using the World Health Organization/ International Network of Rational Use of Drugs (WHO/INRUD) monitoring tool to evaluate the prescription practices. Prescriptions of consenting patients attending OPD for general ailments were included in the study. Three to four prescriptions were chosen randomly on a daily basis. Patients who attended special clinics were excluded. The data was entered and analysed in MS Excel. **Results:** The average number of drugs per encounter was 3.10. The number of drugs prescribed by generic name was 65.7% and 39.8% of the encounters had antibiotics prescribed. Around 23.0% of the prescriptions contained injections. Of the prescribed drugs, 97.4% were available in the essential drug list. The average dispensing time observed was 20.80 sec. Out of the 3723 drugs prescribed 92.2% were actually dispensed and 77.5% were adequately labelled. Out of the 1200 patients interviewed regarding the dosage 72.0% had knowledge regarding the correct dosage. The health centre had a copy of the essential drug list and 83.0% of the drugs were available from the key drug list. **Conclusion:** Many indicators had shown sub-optimal values when compared to the recommended ones by WHO/INRUD. Timely interventions like continuing medical education for budding physicians, improving the doctor-population ratio, adequate number of pharmacists in public health facilities will improve prescription practices which in turn may contribute to mitigating antimicrobial resistance.

Keywords: Polypharmacy, prescription auditing, primary health care, Puducherry, World Health Organisation core drug use indicators

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Introduction

A prescription is a written directive that the patient receives from the treating physician.[1] It provides details about the patient's name, age, gender, diagnosis and course of therapy (accessible with a prescription). The medication's formulation, name (which

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may be a trade name or a generic name), dosage, frequency of administration, and length of therapy are all included in the prescription. The examination and assessment of medical records and practices with the aim of assessing the calibre of treatment rendered are known as a prescription audit.[1]

Florence Nightingale instituted the first audit in 1854 to lower post-operative mortality.[1] Prescription auditing is required to enhance the doctor's prescribing practices, which enhances the standard of care the medical facility provides to the patient. Since drug utilisation research explains the amount, kind and factors that influence drug exposure, it is a crucial component of pharmacoepidemiology.[2]

To define the drug use situation in a nation, region or specific health facility, the World Health Organisation (WHO) has created a set of key drug use indicators.[3] The prescription indicators, which measure the extent of polypharmacy, the average usage of antibiotics, the average number of medications prescribed under generic names, and injection procedures are among the fundamental indicators. The patient care indicators, which evaluate average consultation and dispensing times as well as patient comprehension of appropriate dosage, comprise the second set of core indicators. The third is the facility indicator, which evaluates the facility's supply of necessary medications.

There are previous studies conducted on prescription auditing in various healthcare centres worldwide including India.[4-8] But, most of them have assessed only the prescription indicators, and not many have probed into the other set of indicators, namely, patient care and facility indicators. The current research has included all three core indicators as per the WHO INRUD guidelines.[3] Also, the majority of the authors have conducted their research at tertiary care centres or specialty clinics. Whereas the WHO advises that their guideline on investigation of drug use to be done preferably in general clinical settings at a primary health care level.[3] Most studies encompass prescription monitoring of a particular group of drugs such as anti-epileptics, anti-microbials, anti-asthmatics, anti-diabetic or anti-hypertensive drugs, rather than evaluating the prescribing indicators irrespective of the diagnosis.[4-8] This study is novel, since it was performed with the objective of analysing the pattern of drug use among general OPD patients of a rural healthcare facility using WHO core drug use indicators.

Materials and Methods

This facility-based cross-sectional study was conducted in a peripheral health centre attached to a tertiary care institute in Puducherry, India. OPD of the centre is available on all days of the year and caters to a population of around 33850. The duration of study was spread over for one year from September 2019 to August 2020 to ensure that the bias that can potentially arise due to seasonal variation or peculiarities in staffing or interruptions with the drug supply could be minimised. All patients attending the OPD for general ailments were included in the study. Those

who were not comprehensive for data collection and patients who attended special clinics were excluded from the study. As per the WHO guidelines, a minimum of 600 encounters are to be audited for investigating drug use in health facilities.[3] Since a larger sample size reduces the margin of error and standard deviation, thereby enhancing the study's reliability, the sample size was doubled that is 1200. The standardized questionnaire to assess drug use in health facilities developed by WHO and INRUD was used to collect data about the three groups of core drug use indicators.[3] The prescription indicators studied were the average number of drugs per encounter, percentage of drugs prescribed by generic name, percentage of encounters with an antibiotic prescribed, percentage of encounters with an injection prescribed and percentage of drugs from essential drug list or formulary. The patient care indicators were average consultation time, average dispensing time, percentage of drugs actually dispensed, percentage of drugs adequately labelled and patients' knowledge of correct dosage. The facility indicators studied were the availability of a copy of the essential drug list and the availability of key drugs. Permission was obtained from the medical officer in charge of the peripheral health centre before commencing the study. Data about the prescription indicators were collected from the patients' prescriptions using the prescribing indicator form. Three to four prescriptions were chosen randomly on a daily basis and the details were recorded as per the WHO/INRUD guidelines.[3] The data was collected when the patients were leaving the health facility.

Data about patient care indicators were collected by patient observations. After obtaining written informed consent patients were interviewed using the patient care form. Observations were timed in the middle of the day to ensure that the results were not overly influenced by the rush to see patients at the beginning or end of a clinic session or by the freshness or fatigue of the health workers. Care was taken that the routine patient flow was not disrupted to intercept the patients for data collection. About ten patients were chosen randomly on a daily basis and they were interviewed. This was to ensure that the interviewer did not get tired by interviewing many patients. Patient were interviewed to know their knowledge regarding the correct dosage of the drug like the number of tablets to be taken per dose, when to be taken and the periodicity with food.

Data about facility indicators were collected using the facility indicator reporting form by observing for the presence of an Essential Drug List (EDL) and checking the stock of key drug lists. The EDL was taken from the national list of essential medicines. Institute ethics committee approval was obtained before beginning the study (No. 5/sl.no.246/27thIEC). Informed consent was obtained from the study participants before data collection.

Results

A total of 1200 prescriptions were analysed over one year from September 2019 to August 2020. Among them 55.0% were males,

45.0% were females, 49.6% were in the age group of 30–60 years and 31.1% were between 0–30 years. All the prescriptions had the name, age, gender of the patients and the date of the visit to the hospital. None of the prescriptions mentioned the addresses of the patients. Weight was mentioned in all the paediatric prescriptions but not in adult prescriptions. About 87.4% of the prescriptions had a present history and 93.4% had examination findings.

The average number of drugs per encounter was 3.10. The number of drugs prescribed by generic name was 65.7%. About 39.8% of the encounters had antibiotics prescribed and among them, 19.9% of them had more than one antibiotic. The most common antibiotic prescribed was amoxicillin which accounted for 63.4%. Around 23.0% of the prescriptions contained injection and among them, 10.1% had more than one injection. Almost 97.4% of the prescribed drugs were available in the essential drug list. Among the 3723 drugs, the commonly prescribed drugs were supplements like B-complex and calcium tablets which constituted 23.2% [Tables 1 and 2].

The average dispensing time observed for 1200 patients was 20.80 s. Out of the 3723 drugs prescribed to 1200 patients, 92.2% were actually dispensed and 77.5% were adequately labelled. Out of the 1200 patients interviewed regarding the dosage 72.0% had knowledge regarding the correct dosage. The health centre had a copy of the essential drug list and 83% of the drugs were available from the key drug list [Table 3].

Discussion

The study was conducted for 12 months in a primary healthcare facility and 1200 prescriptions were analysed. The present study had shown that the average number of drugs per encounter was 3.10 which is higher than the standard range (1.6–1.8) recommended by WHO. A study conducted by Aravumuthan *et al.*[6] in Tamil Nadu, Upadhyay *et al.*[9] in Nepal and Raj *et al.*[10] in North India had shown the average number of drugs was 3.76, 4.98 and 3.70, respectively. A study conducted by Chandelkar in Goa in south India had shown the average number of drugs was 1.8 which is less than the present study (3.10).[11] Studies in other countries had shown that the average number of drugs per encounter was higher than the recommended range and was 2.9 in Kenya, 3.0 in Srilanka and 3.4 in Pakistan.[12-14] The higher average number of drugs per encounter indicates the practice of polypharmacy.[3] Lack of CME (Continuing Medical Education) programmes, inept prescribers and a shortage of therapeutically powerful medications in healthcare facilities are potential causes of polypharmacy.[14] Because patients with polypharmacy are more likely to be noncompliant or have negative drug reactions, it determines how well they respond to treatment.[15] WHO/INRUD recommends rationale prescribing to prevent needless medication waste and unfavourable drug reactions.[14]

The present study showed that the percentage of drugs prescribed by generic name was 65.7% which is much less than

Table 1: WHO/INRUD prescription indicators

Prescription indicator	Observed (*n*=1200)	Recommended
Average number of drugs per encounter	3.10	1.6–1.8
Percentage of drugs prescribed by generic name	65.7%	100%
Percentage of encounters with an antibiotic prescribed	39.8%	20.0–26.8%
Percentage of encounters with an injection prescribed	23.0%	13.4–24.1%
Percentage of drugs prescribed from essential drugs list or formulary	97.4%	100%

Table 2: Frequency distributions of commonly prescribed drugs

Category of drug	Frequency (%) (*n*=3723)
Supplements (Calcium and B-complex)	23.2%
Anti-ulcer drugs	18.0%
Analgesics	16.8%
Antibiotics	15.4%
Antipyretics (Paracetamol)	13.7%
Cough syrup	9.1%
Others (ORS, tranexamic acid, progesterone, adrenochrome)	3.6%

Table 3: WHO/INRUD Patient care indicators

Variables	Observed	Recommended
Average consultation time	2.60 min	>10 min
Average dispensing time	20.8 sec	>90 sec
Percentage of drugs actually dispensed	92.2%	100%
Percentage of drugs adequately labelled	77.5%	100%
Patients knowledge of correct dosage	72.0%	100%

the recommended (100%). Study by Shanmugapriya *et al.*[4] in Coimbatore had shown similar results (64.2%). Studies in other countries had shown that in some countries like Egypt, and Malawi it was 95.4% and 99.4%, respectively whereas in Uzbekistan it was 38.3%. The reason for this low percentage could be attributed to the repeated promotion of their products by the pharmaceutical companies.[16] Another explanation might be that some doctors think that brand-name and generic medications differ in their bioavailability, which has an impact on therapeutic results.[17] Given that generic medications are less expensive than branded ones, their use ought to be encouraged. This can be accomplished by using an integrated approach, such as educating prospective prescribers in medical school and providing clinicians with ongoing medical education aimed at easing their concerns about bioequivalency when using generic medications.[4] Experts have suggested several approaches to promote the use of generic names, including enforcing legal responsibilities, establishing precise criteria for generic prescribing and legally discouraging the use of proprietary names when prescribing medication.

The present study showed that 39.8% of the analysed prescriptions contain antibiotics which is higher than the

recommended (20.0–26.8). Study conducted by Karki *et al.*[5] in Nepal had shown that 11% of the prescriptions contain antibiotics. Studies in various countries like Kenya, Brazil and Burundi had shown 84.8%, 24.8% and 50%, respectively contain antibiotics.[12,18] The overuse of antibiotics contributes to antimicrobial resistance, a serious global health hazard. Antimicrobial stewardship strategies must be tailored to certain stakeholders and constituencies to avoid antibiotic misuse and increase public understanding of the drugs.

Interestingly, the present study showed the number of prescriptions with injections prescribed as 23.0% which was within the recommended range by WHO/INRUD. A previous study in Coimbatore had shown the percentage of prescriptions with injections to be 8.14%.[4] Studies in Cambodia and Ghana have reported 57.6% and 80.0%.[18,19] This study shows a positive trend in prescribing injections. The percentage of drugs prescribed from the essential drug list was 97.4% compared to the recommended value of 100%. This high coverage can be attributed to the fact that a copy of the essential drug list was available to the prescribers.

The present study showed the average consultation time was 2.1 min which was way behind the WHO recommendation of more than 10 min. A study conducted in Kenya had shown the average consultation time as 4.1 min.[12] Studies around the world had shown that the consultation time varies from 2 min to 7.5 min.[14,15,20] The amount of time spent in consultation is indicative of the doctor's level of patient care. The extremely low time in our study may have resulted from the huge number of patients seen by each doctor, which puts a strain on them. Inadequate consultation duration may result in a partial patient assessment and inappropriate patient care. Prescribers must spend enough time with patients to complete a thorough history taking, patient assessment, appropriate health education and maintenance of a positive clinician-patient relationship.[12]

The present study showed the average dispensing time was 20.8 sec which was much less when compared to the recommended value of above 90 sec. Studies in other countries had shown the average dispensing time to vary from 30 sec to 80 sec.[14,19,21] Dispensing time needs to be adequate to explain the correct dosage of the drug, the time and the number of days the drug has to be taken. All the above when appropriately explained will improve the compliance of the patient and also avoid the unnecessary adverse effects of the drugs.

The present study showed that 92.2% of the prescribed drugs were actually dispensed. Previous studies in Kenya and Tanzania had shown it to be 76% and 89%.[12,22] The recommendation by WHO is 100%. This indication will improve with regular reviews of the medication's availability and prompt purchases from the central government pharmacy.

The present study showed the percentage of drugs adequately labelled was 77% which was less than the recommended value of 100% by WHO/INRUD. A study conducted in a tertiary care hospital in India showed that 100% of the drugs were adequately labelled.[23] Studies in Kenya, Tanzania and Saudi Arabia had shown this value to be 22%, 20.1% and 10%, respectively.[12,22,24] Adequate labelling is necessary for the patients to identify the drug and know its correct dosage. Inappropriate labelling can lead to serious consequences such as drug misuse by patients.

The present study showed that 72% of the patients had knowledge regarding the correct dosage of the drug. This lesser value could be a reflection of the less average consultation time and the average dispensing time. Correct knowledge is essential for the patients to take the right drug at the right time in adequate dosage for improving the health condition of the individual and also to avoid adverse effects of the drug.

This health facility had a copy of the EDL which is essential to provide health services efficiently. This is aimed at ensuring adherence of prescribers to the medicines listed in the EDL when prescribing to promote the efficient provision of healthcare to patients. This study showed that only 83% of the key drugs were available in the healthcare facility where the study was conducted. WHO/INRUD recommends 100%. The shortage of key drugs is detrimental to patients about their health status and out-of-pocket expenses.[3]

The strengths of this study were the large sample size and the long duration of the study. Previous studies conducted in India have assessed only the prescription indicators. The present study assessed all three WHO core drug indicators. Most of the previous studies in India were performed in tertiary care settings. WHO recommended these indicators to be used in primary healthcare facilities.

Limitation

The study is being conducted in a single healthcare facility generalisability to other centres might be a limitation nevertheless we have tried to overcome this by following a stringent methodology.

Conclusion

Many indicators analysed in the study had shown sub-optimal values when compared to the recommended ones by WHO/INRUD. Educating the community about polypharmacy is essential to raise awareness and empower individuals to make informed decisions about their medications and contributes to public health goals by promoting medication safety and reducing the overall burden of medication-related issues on healthcare systems. Timely interventions like continuing medical education for the budding physicians, improving the doctor-population ratio, adequate number of pharmacists in the public health facilities will improve the healthcare provided in the primary health care facility which is the first point of care to the patients.

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Conflicts of interest

There are no conflicts of interest.

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