

Prescription patterns of doctors in rural settings of district Peshawar, Pakistan: A descriptive cross-sectional study

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Abstract

Objective: To analyse prescriptions with respect to the essential components of a standard prescription format, and to compare them with global standards.

Method: The descriptive cross-sectional study was conducted from December 2022 to April 2023 after approval from the ethics review board of Khyber Medical College, Peshawar, Pakistan, at eight private clinics in rural areas of the district. Data was collected by taking pictures of prescriptions. They were analysed for the five essential components of prescriptions; patient identifiers, superscriptions, inscriptions, transcriptions and prescriber identifiers. Additionally, the prescriptions were compared against the prescribing indicators outlined by the World Health Organisation/International Network for Rational Use of Drugs. Data was analysed using SPSS 24.

Results: Of the 377 prescriptions analysed, 231(61.3%) contained all the five essential components, while 70(18.6%), 203(53.8%) and 146(38.7%) prescriptions recorded vital signs, diagnoses and investigations, respectively. There were 253(53.1%) prescriptions with antibiotics, 252(66.8%) with painkillers, 36(9.5%) with steroids, 128(34.0%) with injections, 19/1195(1.6%) drugs prescribed by generic names, and 1063/1195(89.0%) from the essential medicine list. None of the prescriptions met the indicators recommended by the World Health Organisation/International Network for Rational Use of Drugs.

Conclusions: Practitioners showed poor compliance with the standard prescription format, and overlooked the importance of recording vital signs and diagnoses. Moreover, World Health Organisation/International Network for Rational Use of Drugs recommendations were poorly followed, suggesting suboptimal prescriptions.

Keywords: Drug prescribing, Prescription components, Prescription indicators, Drug usage, Drug adherence.

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Introduction

Prescription is a critical component of patient management. It is a means of communicating instructions from a doctor to a patient regarding medications.¹ It also carries the credentials of the prescriber, and is used as a legal document when needed. Many errors can arise in prescriptions with grave consequences. They can manifest as the wrong drug, dose, route, frequency, duration, alteration when required, under-prescribing, over-prescribing, etc.² The World Health Organisation (WHO) has developed 12 standardised core indicators for rational drug use, of which five alone are prescribing indicators to monitor and curb these issues.³

According to a worldwide survey, the WHO concluded that almost half of all medications are prescribed

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inappropriately.⁴ A study in India reported that among medication errors, prescription errors were the most common (65%) in addition to dispensing errors and administration errors.⁵

Suboptimal drug prescribing is a common practice among physicians without taking into account the medications' undesired side-effects. Data from national and international studies vary in this regard, with some identifying antibiotics⁶ and others claiming analgesics⁷ as the most prescribed medications. However, prescription patterns and prescribing behaviour are influenced by multiple factors.⁸ Important to mention is the pattern of the dispensing doctor (DD), who is allowed to sell drugs to patients, either as an exemption to the laws governing pharmaceutical services, or as a part of medical care provision. A study in Zimbabwe reported that DDs prescribed more drugs per encounter than non-DDs.⁹ Their number is increasing with time, particularly in rural areas.

While national studies primarily focus on tertiary care hospitals, understanding practices in rural areas remain important which fall under the domain of primary healthcare that is mostly provided by the public sector, with some contributions from the private sector. Hence, it is essential to assess prescription patterns in rural areas. The

current study was planned to address that need by analysing prescriptions with respect to the essential components of a standard prescription format, and to compare them with global standards.

Materials and Methods

The descriptive cross-sectional study was conducted from December 2022 to April 2023 after approval from the ethics review board of Khyber Medical College, Peshawar, Pakistan, at eight private clinics in rural areas of the district. Verbal consent was obtained from both the physicians and the patients before data-collection. The study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.¹⁰

The sample size was determined using the online Raosoft calculator¹¹ with margin of error of 5%, confidence interval (CI) 95%, and assuming a response distribution of 50%. Eight private clinics, each composed of 1-3 doctors, were selected through convenience sampling based on their accessibility and willingness to participate. Data from approximately 50 patients was collected from each clinic until the required sample size was achieved. Only those doctors who were practising in private clinics and had at least a Bachelor of Medicine and Bachelor of Surgery (MBBS) degree or equivalent and one year of training as House Officers were included. Others, such as unlicensed paramedics, pharmacy dispensers, traditional healers, homoeopathic practitioners and hakims were excluded. No patient-level inclusion or exclusion criterion was applied. Data was collected from all prescriptions irrespective of patients' age, gender or diagnosis. A non-probability convenience sampling technique was used to select both the doctors and patients. Data was collected by taking pictures of the prescriptions regardless of the patients' illnesses. They were analysed for the five essential components of standard prescription format; patient identifiers, superscriptions, inscriptions, transcriptions, and prescriber identifiers.

Additionally, the WHO/International Network for Rational Use of Drugs (WHO/INRUD) prescribing indicators were used as a benchmark to evaluate the prescribing patterns of the doctors.³ For each indicator, the observed value was compared against the WHO-recommended range or value. These included: average number of medicines per prescription (WHO recommended range: 1.6-1.8), percentage of prescription with an antibiotic (WHO recommended range: 20.0-26.8%); percentage of prescriptions with an injection (WHO recommended range: 13.4-24.1%); percentage of medicines prescribed by generic name (WHO recommended value: 100%); and percentage of medicines prescribed from the essential

medicine list (EML)¹² (WHO recommended value: 100%).³ For the first three indicators, values outside the recommended range were interpreted as suboptimal, while for the remaining two indicators, values <100% were interpreted as suboptimal.

Data was analysed using SPSS 24. Continuous data was presented as averages (observed values divided by total), while categorical data was presented as frequencies and percentages.

Results

Of the 377 prescriptions analysed, 231(61.3%) contained all the five essential components, while 70(18.6%), 203(53.8%)

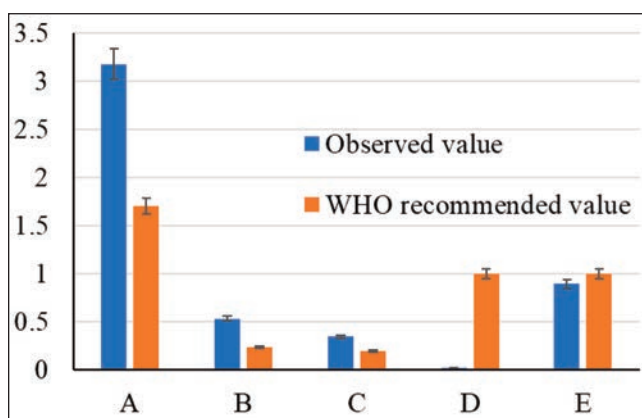
Table-1: Characteristics of the prescriptions (n=377).

	n (%)
Essential components	
Yes	231 (61.3)
No	146 (38.7)
Vital signs recorded	
Yes	70 (18.6)
No	307 (81.4)
Diagnosis	
Written	203 (53.8)
Not written	174 (46.2)
Investigations ordered	
0	231 (61.3)
1-2	123 (32.6)
2-4	23 (6.1)
No. of drugs prescribed	
1-3	216 (57.3)
4-6	153 (40.6)
7-9	8 (2.1)
Drug pharmaceutical company	
Multinational	227 (60.2)
Local	150 (39.8)
Drug name	
Trade	360 (95.5)
Generic	2 (0.5)
Both trade and generic	15 (4.0)
Antibiotics prescription	
No antibiotics	176 (46.7)
*Broad spectrum	129 (34.2)
**Narrow spectrum	49 (13.0)
Both broad and narrow spectrum	23 (6.1)
Painkillers	
No	125 (33.2)
NSAIDS	176 (46.7)
Opioids	2 (0.5)
Others	74 (19.6)
Steroids	
Yes	36 (9.6)
No	341 (90.4)

Footnote: *Broad-spectrum: Antibiotics that work against both gram-positive and gram-negative organisms. **Narrow-spectrum: Antibiotics that work only against gram-positive or gram-negative, or a specific organism. NSAIDS: Non-steroidal anti-inflammatory drugs.

Table-2: Studied parameters of the prescriptions.

Parameters	Value
Total number of prescriptions analysed	377
Total number of medicines prescribed	1195
Average number of medicines per prescription	3.17
Medicines prescribed by generic names	19/1195
Total number of antibiotics included	248/1195
Average number of antibiotics per prescription	20.7%

**Figure:** Comparison between the observed values and WHO-recommended prescribing indicators.

A: Average medicines per encounter, B: Percentage of prescription with an antibiotic, C: Percentage of prescription with an injection, D: Percentage of medicines prescribed by generic name, E: Percentage of medicines prescribed from EML.
WHO: World Health Organisation, EML: Essential medicine list.

and 146(38.7%) prescriptions recorded vital signs, diagnoses and investigations, respectively. There were 253(53.1%) prescriptions with antibiotics, 252(66.8%) with painkillers, 36(9.5%) with steroids, and 2(0.5%) with generic drugs (Table 1).

Among the parameters of prescribed medicines, the average number of medicines per prescription was 3.2. Although the majority of prescriptions contained up to three medicines 216(57.3%), the remaining included polypharmacy practices among practitioners (Table 2).

The number of prescriptions with antibiotics was 253(53.1%), the average number of medications per prescription was 3.2, the number of prescriptions with injection was 128(34.0%), the number of medicines prescribed by generic name was 19/1195(1.6%), and those prescribing drugs from EML were 1063/1195(89.0%). All the observed indicators of prescription were outside the WHO recommended range (Figure).

Discussion

The current study focussed on the essential components of the standard prescription format and WHO indicators in rural settings. To our knowledge, clinical practices in rural areas are seldom studied. Health facilities, including private clinics, serve as the first point of encounter for the majority

of the population, especially the poor. They do not, however, represent the specialist approach. The current study provides baseline data regarding prescribing practices in a rural setting.

Evidence suggests that varying degrees of compliance with the standard protocols for prescription format exist across the globe. However, poor adherence to these protocols is common. The current study revealed that only 61.3% of the prescriptions contained all the essential components of the standard format, whereas vitals were recorded in 18.6%, diagnoses in 53.8%, and investigations in 38.7% of the prescriptions. A study in Saudi Arabia revealed that only 44.5% of prescriptions included a diagnosis, which is more troubling than the current results. Other essential components were also missing with varying frequencies.¹³ A study in India reported that a diagnosis was written in 76.3% of prescriptions, which is comparatively better than the current findings. Additionally, the doctor's name and signature were present in approximately 81% of the prescriptions.¹⁴ This may be attributed to variations in individuals' and institutional prescription practices.

In the current study, polypharmacy practice was evident as the prescriptions contained an average of 3.2 medicines, whereas the WHO recommendation is for 1.6-1.8. In other countries, the same trend has been observed, like 2.8 in Saudi Arabia,¹³ 2.0 in China¹⁵ and 2.5 in Nepal.¹⁶ Among local studies, 3.1 and 7.1 have been recorded previously in Lahore¹⁷ and Peshawar,¹⁸ respectively. Only a few studies have reported values in the recommended range, such as in India (2.1±0.8).¹⁴ Factors, like inadequate training, pharmaceutical manufacturers' influence (both ethical and non-ethical) on doctors' prescription practices in Pakistan,¹⁹ and on-demand medication from patients,²⁰ may contribute to polypharmacy.

Studies have reported findings similar to the current results regarding the remaining WHO indicators. The reason for the limited prescription of antibiotics (recommended 20.0-26.8%¹²) is to control their injudicious use and to prevent the emergence of resistant strains. Additionally, generic (recommended 100%¹²) rather than brand names are encouraged to give patients choices for less costly drugs and to create healthy competition between pharmaceuticals, leading to a reduction in prices and quality improvement.²¹ In the current study, 53.1% prescriptions had antibiotics. Findings of prior studies depict inconsistency in this regard, as 25.8%, 21.5%, 18.0%, 39.6% and 30.3% have been reported in India,¹⁴ Saudi Arabia,²² Peshawar,²³ Bahawalpur²⁴ and Peshawar,²⁵ respectively. Among these studies, the generic names per prescription were 25.1%,¹⁴ 75.6%,²² 0.7%,²³ 23.3%²⁴ and 2.7%²⁵ compared to the current finding of 2%. Pertaining

to medicines from EML, 57.7%,¹⁴ 27.0%²³ and 5.2%²⁵ have been reported earlier compared to 89% in the current study. Variations across regions regarding adherence to guidelines may exist owing to inadequate practitioners' knowledge, limited drug access, resource limitations, and local policy heterogeneity across regions.

Policies implemented in the form of interventions and periodic monitoring can effectively optimise drug use in rural settings, given the grave consequences of suboptimal prescribing.²⁶ Straand J. et al. have reported the critical role of interventions in improving prescription behaviours among physicians.²⁷

The current study has limitations. A smaller sample size and fewer healthcare facilities limit the generalisability of the findings. Patients' actual use of the prescription medication was not explored. Furthermore, the findings are cross-sectional and do not reflect long-term prescribing practices and patterns.

Conclusions

WHO recommendations for prescriptions were found to be poorly followed, suggesting suboptimal prescription practices. The importance of recording vital signs and diagnosis did not seem to hold much importance among the practitioners, as they showed poor compliance with the standard prescription format. Moreover, more than half of the prescriptions contained antibiotics, whereas only 38.7% had ordered investigations, indicating inappropriate use of antibiotics without prior culture reports. Interventions in the form of refresher courses or continuous medical education, and periodic monitoring are needed to stop suboptimal prescriptions.

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Author Contribution:

MK & MIM: Concept, design, data analysis, drafting and final approval.

MO: Data collection, organized the patient data, critically revision and final approval.

SE: Data collection, organized the patient data and final approval.