

A Comparative Assessment of Rational Medicine Use in Primary Health Centres in Namrole and Leksula Districts Using WHO Indicators

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Abstract:

Rational medicine use is essential to effective primary healthcare. This study compared medicine use in primary health centres in Namrole and Leksula using World Health Organization indicators. A comparative cross-sectional study was conducted at four centres between March and October 2024. Data collection comprised retrospective review of outpatient prescriptions issued between January and October 2024, interviews, direct observation and facility assessment. Prescriptions and 30 adult patients per centre were selected through systematic random sampling. Prescribing comparisons were assessed using the Mann-Whitney U test. Mean medicine counts ranged from 3.85 to 4.09 per prescription. Generic prescribing ranged from 96.64% to 99.15%, antibiotic prescribing from 32.67% to 56.00%, and prescribing from the national essential medicines list from 85.67% to 90.47%. No injections were prescribed. Reported prescribing comparisons between centres with inpatient facilities were not statistically significant ($p > 0.05$). Although 97.56–100% of prescribed medicines were dispensed, adequate labelling ranged from 36.67% to 60.00%, and patient understanding from 43.33% to 66.67%. Leksula recorded higher labelling and understanding percentages within both facility categories. High dispensing percentages contrasted with gaps in labelling and patient understanding. Improvement priorities include clearer medicine information, patient counselling and clinical review of prescribing; neither district demonstrated consistently better performance.

Keywords: rational medicine use; WHO indicators; prescribing practices; patient care; primary health centres.

INTRODUCTION

Rational medicine use is fundamental to the provision of safe, effective and affordable healthcare. The World Health Organization (WHO) defines this principle in terms of treatment that addresses patients' clinical needs, with individually appropriate doses, a suitable treatment duration and minimal cost to patients and their communities. Accordingly, the quality of pharmaceutical care depends not merely on the availability of medicines, but also on how they are prescribed, dispensed and used. Promoting rational medicine use is therefore essential to improving therapeutic outcomes whilst ensuring the responsible allocation of healthcare resources. WHO, 2002

Inappropriate medicine use can undermine these objectives. Unnecessary prescribing, excessive use of antibiotics and injections, and treatment that departs

from clinical guidelines may expose patients to avoidable harm and increase expenditure without providing corresponding clinical benefits. Such practices can also compromise the efficient use of limited pharmaceutical supplies. Improving medicine use consequently requires coordinated measures that address prescribing behaviour, professional education, access to reliable information and routine monitoring of clinical practice. WHO, Promoting Rational Use of Medicines

Within Indonesian primary healthcare, community health centres, known as puskesmas, provide an important setting for evaluating medicine use. Pharmaceutical services at this level bring together several interdependent activities, including medicine selection, procurement, storage, prescribing, dispensing and patient counselling. Weaknesses at any stage may affect the treatment ultimately received by patients. An evaluation of rational medicine use should therefore consider both prescribing practices and the service conditions that support the appropriate provision and use of medicines.

The WHO core drug use indicators offer a standardised framework for examining three complementary domains: prescribing, patient care and health-facility readiness. Prescribing indicators comprise the average number of medicines per encounter, the percentage of medicines prescribed by generic name, the percentages of encounters involving an antibiotic or an injection, and the percentage of medicines prescribed from an essential medicines list or formulary. Patient-care indicators assess consultation and dispensing times, the proportion of prescribed medicines actually dispensed, adequate labelling and patients' knowledge of the correct dosage. Facility indicators examine the availability of an essential medicines list or formulary and selected key medicines. Together, these measures facilitate comparisons between facilities and the monitoring of changes over time. WHO, 1993

For the present comparison, this multidimensional approach is particularly useful because prescribing data alone cannot describe the entire process of medicine provision. A prescription may be appropriate, yet its intended benefit may not be realised if the medicine is unavailable, dispensing information is inadequate or the patient does not understand the dosage instructions. Examining the three indicator domains together can therefore help distinguish concerns relating to prescribing from those associated with dispensing, patient communication and the availability of essential pharmaceutical resources.

Primary health centres in Namrole and Leksula provide the setting for this comparative assessment. Potential differences in pharmaceutical staffing, medicine-management arrangements, supply continuity and service organisation warrant examination rather than assumption. The relevant question is whether the centres demonstrate comparable performance across the WHO indicator domains and, where differences are observed, which aspects of service delivery require closer attention. A structured comparison can provide a local evidence base for identifying improvement priorities without presuming that

either setting performs better.

This study therefore aims to compare rational medicine use in primary health centres in Namrole and Leksula using WHO prescribing, patient-care and health-facility indicators. The findings are intended to identify areas requiring improvement and inform locally appropriate measures to strengthen pharmaceutical services. In doing so, the study seeks to support safer medicine use, more effective patient communication and the efficient utilisation of pharmaceutical resources in primary healthcare

RESEARCH METHODS

Study Design and Setting

This comparative cross-sectional study assessed rational medicine use in primary health centres in Namrole and Leksula districts. Participating centres included facilities with and without inpatient services. The study was conducted between March and October 2024. Data collection followed World Health Organization (WHO) procedures for assessing prescribing, patient-care and health-facility indicators.

Prescribing Indicators

Prescribing indicators were evaluated through a retrospective review of outpatient prescriptions issued between January and October 2024. A total of 150 prescriptions were selected across the participating centres using systematic random sampling. The sampling approach was intended to include prescriptions from all prescribers at each centre. Eligible prescriptions contained complete information on the prescription date, the patient's name, age and sex, and the names, doses and quantities of the prescribed medicines. Prescriptions with incomplete information were excluded.

Patient-Care Indicators

The patient-care sample comprised 30 patients from each participating centre, selected using systematic random sampling. Eligible participants were adults aged 18 years and over who attended a general outpatient clinic and received a prescription. All personnel responsible for dispensing medicines at the participating centres between March and June 2024 were also included. Data were collected through interviews and direct observation. Patient-care assessments covered consultation and dispensing times, the proportion of prescribed medicines actually dispensed, the adequacy of medicine labelling and patients' knowledge of the prescribed dosage regimen.

Health-Facility Indicators

Health-facility indicators comprised the availability of a formulary or the Indonesian National Essential Medicines List (*Daftar Obat Esensial Nasional*, DOEN), together with the availability of key medicines at each participating centre. Key medicine availability was assessed against the indicator medicine list used in the study.

Statistical Analysis

The Mann-Whitney U test was used to compare the assessed indicators between primary health centres in Namrole and Leksula

RESULTS AND DISCUSSION

Prescribing Indicators

Table 1 summarises prescribing indicators across the four participating primary health centres, comprising centres with and without inpatient facilities in Namrole and Leksula districts. All indicators relate to the outpatient prescriptions reviewed.

Table 1.
 Prescribing indicators in primary health centres in Namrole and Leksula districts, 2024

Prescribing indicator	Namrole: with inpatient facilities	Namrole: without inpatient facilities	Leksula: with inpatient facilities	Leksula: without inpatient facilities
Mean number of medicines per prescription	3.94	3.85	3.97	4.09
Medicines prescribed by generic name (%)	99.15	98.44	96.64	97.07
Prescriptions containing an antibiotic (%)	51.33	51.33	56.00	32.67
Prescriptions containing an injection (%)	0.00	0.00	0.00	0.00
Medicines prescribed from DOEN (%)	89.51	90.47	88.24	85.67

The mean number of medicines per prescription ranged from 3.85 to 4.09. The highest value was recorded at the centre without inpatient facilities in Leksula, whereas the lowest was observed at the corresponding centre in Namrole. Within each facility category, centres in Namrole recorded a lower mean number of medicines per prescription than those in Leksula. Generic prescribing was consistently high, ranging from 96.64% to 99.15%. The highest proportion was observed at the centre with inpatient facilities in Namrole, whilst the lowest occurred at the corresponding centre in Leksula. Prescribing from DOEN ranged from 85.67% to 90.47%, with the highest proportion recorded at the centre without inpatient facilities in Namrole and the lowest at its counterpart in Leksula. Both generic prescribing and DOEN-listed prescribing were higher in Namrole within each facility category.

Antibiotic prescribing showed a different pattern. In Namrole, antibiotics appeared in 51.33% of prescriptions at both centres. In Leksula, the corresponding proportions were 56.00% at the centre with inpatient facilities and 32.67% at the centre without inpatient facilities. Thus, antibiotic prescribing was lower in Namrole for centres with inpatient facilities but higher for centres without inpatient facilities. These results do not support a uniform conclusion that antibiotic prescribing was lower in Namrole.

No injections were prescribed in the outpatient prescriptions reviewed at

any of the four centres. This finding describes prescribing within the sampled outpatient encounters and should not be interpreted as evidence that injections were absent from all services delivered by these facilities.

Mean Number of Medicines per Prescription

Across the four centres, patients received approximately four medicines per prescription on average. This finding warrants closer examination of the clinical justification for individual medicines. However, the mean number of medicines alone cannot establish inappropriate polypharmacy. Multiple medicines may be justified by coexisting conditions or treatment requirements, and their appropriateness must be assessed in relation to individual clinical needs. WHO guidance accordingly emphasises a person-centred assessment of medication regimens rather than medicine counts alone. WHO, 2019 The lower means observed in Namrole represent descriptive differences rather than conclusive evidence of more appropriate prescribing. Interpretation requires information on diagnoses, comorbidities and the indications for each medicine. Moreover, without the relevant statistical results, these differences cannot be described as statistically significant.

Symptom-oriented prescribing and patient expectations are possible explanations for the prescribing patterns described in the original narrative. Nevertheless, neither explanation can be established from the aggregate indicators presented here. Further assessment of prescription records and prescriber-patient interactions would be required before attributing the observed medicine counts to these factors.

Generic and Essential Medicine Prescribing

The high proportions of generic prescribing indicate that generic names predominated across all four centres. Nevertheless, generic prescribing and prescribing from DOEN represent distinct aspects of medicine use. A medicine prescribed by its generic name is not necessarily included in the essential medicines list. The lower DOEN percentages therefore identify an area for further examination rather than contradicting the high generic prescribing figures.

Assessment of prescriptions outside DOEN should consider the list applicable during the study period, the clinical indications and the availability of therapeutic alternatives. The aggregate percentages do not establish whether individual non-listed medicines were clinically unjustified.

Antibiotic and Injection Prescribing

The variation in antibiotic prescribing, particularly between the two Leksula centres, merits diagnosis-specific review. A higher prescribing proportion does not independently establish antibiotic overuse, just as a lower proportion does not necessarily demonstrate appropriate treatment. Clinical need remains central to rational medicine use. Similarly, the absence of injection prescribing cannot, by itself, demonstrate rational prescribing without considering whether injectable treatment was indicated. WHO, Promoting Rational Use of Medicines

Overall, the findings reveal differences across facilities rather than a consistent district-wide ranking. Namrole recorded lower mean medicine counts and higher generic and DOEN-listed prescribing within both facility categories,

whereas antibiotic prescribing followed a mixed pattern. These descriptive findings identify priorities for further clinical review but do not establish the causes of the differences or the appropriateness of individual prescriptions.

Percentage of Medicines Prescribed by Generic Name

Generic prescribing was consistently high across the four primary health centres, ranging from 96.64% to 99.15%. The highest proportion was recorded at the centre with inpatient facilities in Namrole (99.15%), whereas the lowest was observed at the corresponding centre in Leksula (96.64%), representing a difference of 2.51 percentage points. Among centres without inpatient facilities, the proportions were 98.44% in Namrole and 97.07% in Leksula. These findings demonstrate that generic names predominated in prescribing across all participating centres, with descriptively higher proportions in Namrole within both facility categories.

The observed percentages were numerically close to the 98.82% reported in an earlier study [insert the original reference]. Nevertheless, this comparison should be interpreted cautiously, as differences in study periods, sampling procedures and healthcare settings may affect comparability. Numerical proximity alone does not establish equivalent prescribing performance, and no claim of statistical similarity can be made without an appropriate analysis.

An important distinction concerns the interpretation of this indicator. The WHO prescribing indicator measures the proportion of prescribed medicine items recorded by generic name; it does not directly measure the proportion of generic products purchased or dispensed. Consequently, prescribing records and procurement data describe related but distinct aspects of pharmaceutical practice. A high percentage of prescribing by generic name should not automatically be interpreted as evidence that an equivalent proportion of the procurement budget or medicine stock comprises generic products. WHO, 1993

Procurement arrangements may provide a contextual explanation for the observed prescribing patterns. Where generic medicines are consistently available, prescribers may have greater opportunity to maintain generic prescribing. However, the present findings do not establish that procurement policies caused the differences between Namrole and Leksula. Such an interpretation would require supporting evidence from procurement documents, stock records and interviews with the personnel responsible for pharmaceutical management. These sources would also help distinguish the influence of medicine availability from that of prescribing habits and local administrative arrangements.

Although generic prescribing approached completeness, none of the participating centres recorded 100%. Reviewing the small proportion of medicine items prescribed by brand name could help clarify whether these instances reflected product availability, prescribing conventions or other documented circumstances. Importantly, high generic prescribing alone does not establish that treatment was clinically appropriate. Medicine selection, dosage, treatment duration and suitability for the patient's condition remain separate

considerations.

Overall, the findings indicate widespread prescribing by generic name across the four centres. The remaining differences identify opportunities for targeted review, rather than providing sufficient evidence to rank the overall quality of pharmaceutical care between the two districts.

Comparison of Prescribing Indicators between Primary Health Centres with Inpatient Facilities

Table 2.

Mann–Whitney U test results for prescribing indicators at primary health centres with inpatient facilities in Namrole and Leksula, 2024

Prescribing indicator	Namrole: mean rank	Leksula: mean rank	<i>p</i> -value
Number of medicines per patient	145.04	155.96	0.239
Medicines prescribed by generic name (%)	149.06	151.94	0.754
Prescriptions containing an antibiotic (%)	146.50	154.50	0.354
Prescriptions containing an injection (%)	150.50	150.50	1.000
Medicines prescribed from DOEN (%)	147.94	153.06	0.590

Table 2 presents the reported Mann–Whitney U test results for prescribing indicators at primary health centres with inpatient facilities in Namrole and Leksula. Using a significance threshold of 0.05, none of the reported comparisons reached statistical significance. The findings therefore provide insufficient evidence of differences between the two centres in the distributions of the prescribing variables analysed. This interpretation concerns outpatient prescribing at centres that provide inpatient services; it does not describe prescribing among admitted patients. For the number of medicines prescribed, the mean ranks were 145.04 in Namrole and 155.96 in Leksula, with a reported *p*-value of 0.239. Although Leksula had a higher mean rank, the observed difference was not statistically significant. This finding complements the descriptive results, which showed mean medicine counts of 3.94 and 3.97 per prescription, respectively. Nevertheless, the absence of a significant difference does not establish that the number of medicines prescribed was clinically appropriate in either centre. Such an assessment would require consideration of diagnoses, comorbidities and the indications for individual medicines.

The comparison of generic prescribing likewise did not reach statistical significance (*p* = 0.754). The descriptive proportions were high in both centres, at 99.15% in Namrole and 96.64% in Leksula. However, these percentages and the reported mean ranks represent different statistical summaries and should not be treated as interchangeable. The definition and coding of the variable entered into the Mann–Whitney analysis should be clarified before interpreting the direction of the rank difference. Antibiotic prescribing also showed no statistically significant difference between the centres (*p* = 0.354). Although antibiotics appeared in 51.33% of prescriptions in Namrole and 56.00% in Leksula, the

reported analysis did not establish a difference between the groups. This result does not determine whether antibiotic treatment was justified. Assessment of prescribing appropriateness would require diagnosis-specific information, together with the prescribed agent, dosage and treatment duration.

For injection prescribing, both centres had identical mean ranks of 150.50, and the table reported a p-value of 1.000. The preceding descriptive results indicated that no injections were prescribed in either sample. Consequently, this indicator showed no observed variation between or within the groups. The principal finding is therefore the absence of injection prescribing in the sampled outpatient prescriptions. The reported test result should be checked against the original statistical output, particularly the handling of completely tied observations, rather than interpreted as evidence of equivalent prescribing quality.

Prescribing from the Indonesian National Essential Medicines List also showed no statistically significant difference ($p = 0.590$). The corresponding descriptive proportions were 89.51% in Namrole and 88.24% in Leksula. These findings indicate that most prescribed medicine items were included in DOEN, whilst a proportion in each centre fell outside the list. Reviewing those items against the applicable list and their clinical indications would provide a more informative assessment than the between-centre comparison alone.

Overall, the reported analyses did not identify statistically significant differences in the prescribing indicators examined. However, non-significant findings should not be interpreted as proof of equivalence or as confirmation of rational prescribing. The results should be considered alongside the descriptive data, sample sizes and clinical context. Moreover, the comparison is limited to the participating centres and does not, by itself, establish district-wide prescribing performance.

Table 3

Rational medicine use based on patient-care indicators at primary health centres in Namrole and Leksula, 2024

Patient-care indicator	Namrole: with inpatient facilities	Namrole: without inpatient facilities	Leksula: with inpatient facilities	Leksula: without inpatient facilities
Mean consultation time (seconds)	185.93	239.63	202.17	244.7
Mean medicine preparation time (minutes)	9.06	8.433	12.06	7.9
Prescribed medicines actually dispensed (%)	97.56	100	99.11	100

Medicines adequately labelled (%)	43.33	36.67	60	53.33
Patients who understood their medication regimen (%)	63.33	43.33	66.67	60

Patient-Care Indicators

Table 3 presents patient-care indicators across the four primary health centres in Namrole and Leksula. The findings show that most prescribed medicines were actually dispensed, whilst adequate labelling and patients' understanding of their medication regimens were less consistently achieved. Consultation and medicine preparation times also varied between facilities. Mean consultation time ranged from 185.93 to 244.7 seconds, equivalent to approximately 3.10–4.08 minutes. The shortest consultations were recorded at the centre with inpatient facilities in Namrole, whereas the longest occurred at the centre without inpatient facilities in Leksula. Within both districts, consultation times were longer at centres without inpatient facilities. However, consultation duration alone does not establish the quality or completeness of clinical assessment. The table does not indicate how consultation time was distributed between history-taking, examination and treatment discussions.

Mean medicine preparation time ranged from 7.9 to 12.06 minutes. The centre with inpatient facilities in Leksula recorded the longest preparation time, followed by its counterpart in Namrole at 9.06 minutes. The corresponding times at centres without inpatient facilities were 8.433 minutes in Namrole and 7.9 minutes in Leksula. These differences should not automatically be interpreted as evidence of greater efficiency or better pharmaceutical care. Their interpretation requires clarification of the activities included in the measurement, particularly whether the recorded duration covered preparation alone or also included waiting time and patient counselling.

The proportion of prescribed medicines actually dispensed was high across all four centres, ranging from 97.56% to 100%. Both centres without inpatient facilities dispensed all prescribed medicine items recorded in the assessment. At centres with inpatient facilities, the proportions were 97.56% in Namrole and 99.11% in Leksula. These findings indicate that most prescribed items were supplied during the observed encounters. Nevertheless, they do not establish uninterrupted medicine availability throughout the study period, and the reasons why some items were not dispensed cannot be determined from the table. Adequate medicine labelling was less consistently achieved, with proportions ranging from 36.67% to 60.00%. Leksula recorded higher percentages than Namrole within both facility categories. Among centres with inpatient facilities, adequate labelling was reported for 60.00% of medicines in Leksula and 43.33% in Namrole. The corresponding figures for centres without inpatient facilities were 53.33% and 36.67%, respectively. Thus, a substantial proportion of assessed medicine items did not meet the study's labelling criteria, identifying an area requiring further review.

Patients' understanding of their medication regimens ranged from 43.33% to 66.67%. The highest proportion was observed at the centre with inpatient facilities in Leksula, followed by the corresponding centre in Namrole at 63.33%. Among centres without inpatient facilities, the proportions were 60.00% in Leksula and 43.33% in Namrole. Although centres with inpatient facilities recorded higher percentages within each district, a considerable proportion of patients at every centre did not demonstrate the level of understanding required by the assessment. Taken together, the findings reveal a contrast between the provision of prescribed medicines and the information accompanying their use. High dispensing percentages coexisted with lower levels of adequate labelling and patient understanding. Although Leksula recorded higher percentages for both labelling and understanding, these aggregate observations do not demonstrate that better labelling caused better understanding. Similarly, longer consultation or preparation times did not consistently correspond to better performance across the remaining indicators.

Overall, adequate labelling and patients' understanding of their medication regimens emerge as priorities for service review. Further assessment could examine which labelling elements were missing and which instructions patients found difficult to understand. The differences presented here remain descriptive, as Table 3 provides neither measures of variability nor statistical test results. Consequently, the findings do not establish statistically significant differences or justify an overall ranking of the participating centres.

CONCLUSION

The assessment identified differences in prescribing and patient-care indicators across the participating primary health centres in Namrole and Leksula, but did not demonstrate consistently better performance in either district. Centres in Namrole recorded lower mean numbers of medicines per prescription and higher proportions of prescribing by generic name and from the Indonesian National Essential Medicines List (DOEN). Antibiotic prescribing, however, showed a mixed pattern across facility categories. The reported comparisons between centres with inpatient facilities revealed no statistically significant differences in prescribing indicators ($p > 0.05$). These findings should not be interpreted as evidence of equivalence or confirmation that all prescribing was clinically appropriate.

For patient-care indicators, centres in Leksula recorded higher proportions of adequately labelled medicines and patients who understood their medication regimens within both facility categories. Most prescribed medicines were actually dispensed at all four centres. Nevertheless, the contrast between high dispensing percentages and lower levels of adequate labelling and patient understanding indicates that medicine provision was not consistently accompanied by sufficient information. Medicine preparation times varied by facility category and did not show a uniform advantage for either district. The availability of DOEN or a formulary was reported to be comparable between the

two districts. However, the availability of such documents should be distinguished from the availability of individual essential medicines, which requires separate assessment.

These findings support a targeted review of pharmaceutical services, particularly medicine labelling, patient counselling and the clinical appropriateness of prescribing. Primary health centres should assess pharmaceutical staffing against actual workload and use the findings to guide staffing allocation and service organisation. Regular review of essential medicine stocks and prescribing practices would further support service improvement. These recommendations address the gaps identified without assuming that staffing shortages or procurement arrangements caused the observed differences

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