

# Pattern of medication use in geriatric patients at primary health care facilities in Karawang, Indonesia

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**Background:** Rational drug use is a critical component in patient care, particularly among the elderly who often have multiple medical problems. The aim of this study was to assess the pattern of medication use among the elderly visiting primary health care facilities.

**Methods:** A retrospective cross-sectional study was conducted at 25 primary health care facilities in Karawang District, Indonesia, and patients aged  $\geq 60$  years visiting the facilities from January to December 2014 were included. A systematic random sampling technique was used to select the study samples. Each prescription was assessed using the WHO prescribing indicators.

**Results:** A total of 10,118 prescriptions with 31,927 drugs were assessed. The average number of drugs prescribed was 3.15 (range: 1–7). Drugs prescribed by generic name comprised 98.09% (n=31,318) of the total number of drugs. Medical appointments wherein an antibiotic was prescribed constituted 23.45% (n=2373) of the total number of prescriptions. No injections were prescribed in this study setting. Drugs prescribed from the essential drug list comprised 83.07% (n=26,522). Paracetamol (13.44%), vitamin B complex (8.05%), and aluminum–magnesium hydroxide (7%) were the most frequently prescribed drugs, whereas amoxicillin (44.03%), chloramphenicol (13.10%), and ciprofloxacin (12.00%) were the most frequently prescribed antibiotics.

**Conclusion:** Our findings highlight that polypharmacy and prescription of essential drugs remain subjects of concern in geriatric health care. Regular medication review and promoting the use of the essential drug list among health care professionals are encouraged in primary care settings.

**Keywords:** WHO prescribing indicators, inappropriate prescribing, rationale prescribing

## Introduction

Inappropriate prescribing is one of the major challenges in the public health sector. It is associated with adverse consequences, including prolongation of illness, emergence of antimicrobial drug resistance, undesirable side effects, and increased cost of treatment.<sup>1,2</sup> As defined by the WHO, rational drug use implies that patients receive medicines appropriate to their clinical needs, with adequate dose and sufficient duration, and at the lowest cost that can be afforded by patients and the community.<sup>3</sup> The ultimate goal of rational prescribing is to optimize therapeutic outcomes and ensure patient safety.<sup>4</sup>

The most common influential factors of inappropriate prescribing include lack of adequate information regarding the correct treatment, poor patient–physician relationship, unavailability of appropriate alternative medicines, and improper prescribing

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supervision.<sup>5,6</sup> It is estimated that 60% of medicines in public health care facilities are prescribed inappropriately in developing countries.<sup>7</sup>

Rational prescribing has significant importance for the elderly. However, the prescribing practice for this population is challenging for several reasons. Multiple comorbidities and complex treatment regimens render the elderly particularly vulnerable to drug-related adverse effects. In addition, prescribing in the elderly is often more problematic due to alterations in physiological functions, which can lead to compromised pharmacokinetics.<sup>8,9</sup>

The vital step to address the issue of inappropriate prescribing is to quantify the extent to which this phenomenon occurs.<sup>10</sup> This finding can be used as the foundation for designing an intervention to promote rational drug use. Several instruments have been developed to assess the quality of prescribing.<sup>11–13</sup> WHO developed a set of prescribing indicators to evaluate the appropriateness of medication, including the number of drugs prescribed per medical appointment; the percentage of drugs prescribed by generic name; and the percentage of medical appointment with antibiotics, injections, and drugs prescribed from the essential drug list.<sup>14</sup> This is a widely accepted quantitative instrument and has been applied in various settings in >30 developing countries.<sup>15</sup>

Indonesia is one of the countries that adopt universal health care coverage for the entire population. In the current system, primary health care is the prominent frontline of health care service; thus, the quality of health care delivery must be adequate to effectively screen and manage diseases, particularly for the elderly who comprise the largest consumers of medication. Nevertheless, there is limited information on the quality of prescribing for Indonesian elderly patients in the primary health care setting. Therefore, the aim of this study was to assess the pattern of medication use among elderly patients receiving primary health care using the WHO prescribing indicators.

## Methods

### Study design

An observational retrospective cross-sectional study was conducted at 25 primary health care facilities in Karawang District, Indonesia. The data source was the prescriptions of geriatric patients aged  $\geq 60$  years visiting the facilities from January to December 2014. A systematic random sampling technique was used to select the study samples. The target sample size was calculated based on the estimated proportion of geriatric patients receiving inappropriate prescribing

as 58.1% according to a previous study.<sup>16</sup> A minimum sample size of 2,926 prescriptions was required to obtain a 95% confidence level. The term prescriptions refer to all treatments per medical appointment. Ethical approval was obtained from the Health Research Ethics Committee of Faculty of Medicine, Universitas Padjadjaran, Indonesia. Informed consent was not required since no intervention or changes from common practice was performed. To ensure all data remained confidential, data collection did not include any personal information that could identify the participants. The study was in accordance with declaration of Helsinki.

### Data collection

From each prescription, data on demographic characteristics (age and sex) and patient's medication (name and number of drugs prescribed) were collected. The data were assessed using the WHO prescribing indicators according to the following formulas:

1. The average number of drugs prescribed per medical appointment = Total number of different drug products/total number of medical appointments. This was calculated to examine the degree of polypharmacy.
2. Percentage of drugs prescribed by generic name = (Total number of drugs prescribed by generic name/total number of drugs prescribed)  $\times 100$ .
3. Percentage of medical appointment in which an antibiotic was prescribed = (Number of medical appointment in which an antibiotic was prescribed/total number of appointments)  $\times 100$ .
4. Percentage of medical appointment with an injection prescribed was not calculated because no injection was prescribed in this study setting.
5. Percentage of drugs prescribed from the Indonesian national essential drug list = (Number of drugs that are in the essential drug list/total number of drugs prescribed)  $\times 100$ .<sup>14</sup>

### Data analysis

Statistical analysis was performed using descriptive statistics, expressed as proportion and mean values, depending on each indicator. Normality of the data was examined using the Kolmogorov–Smirnov test. Spearman's correlation test was used to assess the association between the age of the patients and the number of drugs prescribed.  $P < 0.05$  was considered statistically significant. Statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) version 17.0 (IBM Corporation, Armonk, NY, USA).

## Results

A total of 10,118 prescriptions from 25 primary health care facilities were included in this study. More than half of the patients were female (54.3%,  $n=5,493$ ). The majority of patients were in the age group of 60–74 years (90.2%,  $n=9,125$ ). The demographic characteristics of the study patients are presented in Table 1.

Among the 10,118 prescriptions, the total number of drugs prescribed was 31,927, with an average of 3.15 drugs (range: 1–7). Almost half (48.1%,  $n=4,871$ ) of the patients received three drugs, whereas approximately one-third of them received four or more drugs (Table 2). Statistical analysis revealed a moderate but statistically significant correlation between increasing age and higher number of prescribed drugs per prescription ( $r=0.55$ ,  $P=0.001$ ).

The percentage of drugs prescribed by generic name was close to optimal, ie, 98.09% ( $n=31,318$ ). Medical appointment wherein an antibiotic prescribed was 23.45% ( $n=2,373$ ). No injection was prescribed in this study setting. Drugs prescribed from the essential drug list constituted

83.07% ( $n=26,522$ ) of the total number of drugs. Table 3 summarizes the results of the assessment of the prescribing quality.

The most frequently prescribed drugs were paracetamol (13.44%), vitamin B complex (8.05%), and aluminum–magnesium hydroxide (7%). Amoxicillin (44.03%), chloramphenicol (13.10%), and ciprofloxacin (12.00%) were among the most frequently prescribed antibiotics (Tables 4 and 5).

## Discussion

Inappropriate prescribing is a major concern in the health care service, particularly in developing countries where the health system and health monitoring are often not well established.<sup>15</sup> This study evaluated the prescribing quality using the WHO prescribing indicators among Indonesian elderly patients. Owing to the scarcity of studies from Indonesia, the results of this study can serve as baseline information for health care professionals and policymakers to further improve drug therapy.

We found that the number of drugs prescribed was the most notable indicator that deviated from the standard recommended by WHO. The average number of drugs prescribed was 3.15, which exceeded the WHO standard (1.6–1.8). Unnecessary combination of drugs could increase the risk of nonadherence and adverse drug effects, particularly in the elderly.<sup>14</sup> Our finding was higher than those reported in Pakistan (2.3),<sup>10</sup> Ethiopia (1.9),<sup>16</sup> Zimbabwe (1.3),<sup>17</sup> and Sudan (1.4)<sup>18</sup> but relatively lower than those reported in China (3.5),<sup>19</sup> Iran (3.68),<sup>20</sup> and India (3.7).<sup>21,22</sup>

In this study, we found that the majority of drugs were prescribed by generic name (98.09%,  $n=31,318$ ), which was already in accordance with the WHO standard.<sup>14</sup> The use of the generic name is important as a safety measure for patients because it depicts a clear identification that can enable better communication between health care professionals.<sup>23</sup> Prescribing generic drugs can also help sustain affordable access to medication, particularly in lower middle-income countries such as Indonesia.<sup>24</sup> Nevertheless, the study setting might influence this finding. Prescribing generic drugs is a common practice in public medical centers, whereas the trend

**Table 1** Demographic characteristics of the patients

Characteristics	n (total =10,118)	Percentage
Sex		
Male	4,625	45.7
Female	5,493	54.3
Age (years)		
60–74	9,125	90.2
75–90	964	9.5
>90	29	0.3

**Table 2** Number of drugs prescribed per medical appointment

Number of drugs	n (total =10,118)	Percentage
One	261	2.58
Two	1,446	14.29
Three	4,881	48.24
Four	3,192	31.55
Five	324	3.20
Six	11	0.11
Seven	3	0.03

**Table 3** Results of the assessment of the prescribing quality ( $n=10,118$  prescriptions)

Prescribing indicators	Total drugs/encounters	Average/percentage	Standard recommended by WHO <sup>14</sup>
Average number of drugs per encounter	31,927 drugs	3.15	1.6–1.8
Percentage of encounter with antibiotics	2,373 encounter	23.45%	20.0%–26.8%
Percentage of drugs prescribed by generic name	31,318 drugs	98.09%	100%
Percentage of drugs from essential drug list	26,522 drugs	83.97%	100%

**Table 4** Most frequently prescribed drugs

Name of drugs	n (total =31,927)	Percentage
Paracetamol	4,291	13.44
Vitamin B complex	2,571	8.05
Aluminum–magnesium hydroxide	2,235	7.00
Captopril	2,133	6.68
Chlorpheniramine maleate	1,978	6.19
Others	18,719	58.64

**Table 5** Most frequently prescribed antibiotics

Name of antibiotic	n (all drugs in antibiotic class =2,389)	Percentage
Amoxicillin	1,052	44.03
Cloramphenicol	372	13.10
Ciprofloxacin	287	12.00
Cotrimoxazol	243	10.17
Others	435	20.70

in private facilities is relatively different.<sup>25,26</sup> A much lower rate of prescribing generic drugs has been reported in private medical centers (1.6%–24.5%).<sup>25,27–29</sup> Prescribers in private health care facilities may perceive that prescribing generic products is not financially rewarding.<sup>17,30</sup> In addition, a negative perception on the quality and efficacy of generic products has been demonstrated to be another major barrier of generic prescribing.<sup>29</sup> One of the key strategies for enhancing public confidence in generic medicine is providing information and education, particularly regarding the strict regulation of the bioequivalence standard in drug authorization approval and evidence on comparable clinical outcomes between the originator and its generic products across a wide range of diseases.<sup>31–33</sup>

Medical appointment wherein an antibiotic prescribed was 23.45% (n=2,373) of the total appointments, which was in accordance with the WHO recommendation (20%–26.8%). Primary care accounted for 74%–80% of all antibiotic prescriptions,<sup>34,35</sup> which indicates that the antibiotic-prescribing quality in these facilities can play a major role in preventing the misuse and overuse of antibiotics. Appropriate prescribing of antibiotics can prevent the risk of antimicrobial resistance and increase the chances of successful treatment completion.<sup>36</sup> Selecting an appropriate antibiotic based on the results of microbiological testing of the pathogen is associated with substantial advantages in improving patient outcomes.<sup>37,38</sup> However, it cannot always be performed in limited-resource facilities like primary care setting, which can lead to the tendency of regularly prescribing broad-spectrum antibiotics to address suspected infections.<sup>10</sup>

Drugs prescribed from the essential drug list were 83.07% (n=26,522) of the total number of drugs prescribed, which were lower than the WHO standard (100%). This value was slightly higher than that reported by a survey conducted in a region from Southeast Asia (81%) during 2006. The essential drug list is a vital instrument to improve access to medicines that satisfy the priority of the population's health care needs.<sup>39</sup> Adherence to the essential drug list can lead to better medication management and more rational prescribing because these drugs have been judiciously selected based on scientific evidence regarding their quality, safety, efficacy, and cost-effectiveness.<sup>40</sup> Improvement in adherence can be achieved by adequate sensitization of the essential drug list among health care professionals and the availability of an enforcement mechanism.<sup>17</sup>

Our finding suggests that regular medication monitoring by pharmacist is needed in primary care setting to improve current prescribing practice.<sup>23</sup> Previous studies emphasized the importance of the following three aspects of drug monitoring, ie, regular medication review, identification of adverse reactions, and monitoring the effect of newly prescribed medication.<sup>41–43</sup>

This study has some limitations. First, the justification of the selection of medicine could not be evaluated using the WHO prescribing indicators, and this may affect our judgment on the rationality of medication. Second, in contrast to a longitudinal study, since our study was cross-sectional, it did not allow the assessment of possible trends associated with changes in the national policy on health care provision.

## Conclusion

Our findings highlight that polypharmacy and prescription of essential drugs remain subjects of concern in geriatric health care. Regular medication review and promoting the use of the essential drug list among health care professionals are encouraged in primary care settings.

## Disclosure

The authors report no conflicts of interest in this work.

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