

## **Prescribing patterns of non-steroidal anti-inflammatory drugs (NSAIDs) at outpatient departments of four hospitals.**

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### **Abstract**

**Objective:** The purpose of the current study was to assess non-steroidal anti-inflammatory drug (NSAIDs) prescription patterns at outpatient departments (OPDs) of four hospitals in Aden-Yemen.

**Method:** This hospitals-based, cross-sectional descriptive study was conducted from May 2018 through August 2018. WHO drug use indicators were selected to evaluate prescription patterns. Data was collected from patient case files at OPDs.

**Results:** Prescriptions of 600 patients containing at least one NSAID were nominated for analysis. More than half (52%) of prescriptions were prescribed for females and 48% for males. NSAIDs were prescribed less commonly for patients over 60 y of age (6%). The most common indications for NSAIDs were infective conditions (29.3%), fever (9.3%) and orthopedic pain (8.1%). The average number of drugs per prescription was 3.5 drugs. Additionally, 18.5% of the prescriptions contained medicines prescribed by generic name while 73.3% were from Essential Medicine List (EML). Diclofenac sodium was the most commonly prescribed NSAID (26.6). The average cost of NSAIDs per prescription was 970 Yemeni Riyals (YR).

**Conclusion:** The prescribing pattern of NSAIDs in Aden city hospitals showed deviation from the standard values of WHO requirements. The result suggests irrational/inappropriate prescribing of NSAIDs, low practice of international nonproprietary names (generic names) in prescriptions and high rate of NSAIDs prescription. In addition, some informational shortage was notable among prescribers concerning prescribing rules.

**Keywords:** NSAIDs, Prescription, Standard therapeutic guidelines, Outpatient departments of hospital, Essential medical list, Aden, Yemen.

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### **Introduction**

The World Health Organization (WHO) defined rational drug prescribing as patients receiving “medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, and the lowest cost to them and their community.” [1]. Globally, irrational drug prescribing is a great challenge for health care systems [2] and a widespread phenomenon in developing countries [3]. Some irresponsible practices such as: poly-pharmacy, irrational prescribing of medicines, abuse of injectable medicine and non-compliance to prescribing strategies are the most common [4].

Non-steroidal anti-inflammatory drugs (NSAIDs) are considered among the most every day used medicine all over the world [5,6]. NSAIDs are prescribed irrationally in the outpatient department (OPDs). NSAIDs are associated with

side effects that range from mild to severe and sometimes fatal [7,8]. Nevertheless, there is a need for recurrent assessment of medicinal prescribing manner in order to provide appropriate adjustment in prescription of medicine to enhance curative benefits and reduce the side-effects [9].

Unfortunately, data on prescribing pattern outpatient and inpatients settings in Yemen is limited for all medicine in general and for NSAIDs in particular. Therefore, the main objective of this study was to evaluate prescribing patterns according to the stipulated World Health Organization (WHO) indicators in four hospitals in Aden. The study also aims to provide recommendations for intervention that may be designed to improve prescribing practice. This study will help to recognize the trends in prescribing NSAIDs, and offer strategies for designing proper future intervention policies in

order to encourage rational prescribing and improve the quality of health care.

## Methods

### *Study setting and period*

The study was carried out at an Out Patient Department (OPDs) of four selected hospitals in Aden city namely, Al-Gamhouria Teaching based Hospital, Alsadaqa hospital, Alwali hospital and Yemen-Germany private hospital. These hospitals considered as main referral medical center in Aden city.

### *Study design*

A cross-sectional descriptive study was conducted in four hospitals in different areas of Aden city, the commercial capital of Yemen. The three purposes behind exploring the use of medicine are; to define the existing manner of medicine use, to amend particular medicine utilization issues, and to observe the quality of medicine use over a period of time. Examination of utilization of medicines in a particular situation can be performed through various actions. This includes surveying current manner of drug utilization; characterizing guidelines of suitable practice and distinguishing the particular problem.

Seven prescription utilization indicators, three centers, one patient, and three complimentary indicators from the WHO drug use indicators (Outpatient facilities) list were evaluated.

#### **Core indicators:**

- Average number of medicines per encounter
- Percentage of medicines prescribed by generic name
- Percentage of medicines prescribed from the EML or formulary

#### **Patient indicator:**

- Percentage of medicines actually dispensed

#### **Complimentary indicators:**

- Average medicine cost per encounter
- Average medicine cost spent on NSAIDs per encounter
- Percentage of prescriptions in accordance with treatment guidelines.

### *Sampling*

Sample selection was suitable by focusing on four main hospitals. The four hospitals represent government and private hospital practice in Aden city.

### *Data collection*

Patients' information was collected from their medical files when they presented to the pharmacy department to collect their medications. Information about their present medical conditions and prescribed NSAIDs were recorded in data collection sheets. The prescribed NSAIDs was evaluated for suitability and whether they had been prescribed according to

the Standard Treatment Guidelines (STGs). The accessibility of STGs in the OPDs and the rate of referring and adherence to these guidelines by the prescribing doctors were also evaluated.

### *Data analysis*

The collected data from the respondents were analysed using SPSS<sup>®</sup> version 21.0. The data from the data collection sheet were evaluated for various parameters. Descriptive statistics such as frequencies, percentages and means were used in the analysis of the data.

### *Ethical consideration*

The study protocol was approved by the Ethics Research Committee of the Faculty of Medicine and Health Sciences, Aden University. A verbal agreement was attained from all participants who agreed to participate in the study after explaining the objectives, importance and benefits of the research and that the participation is voluntary. Participants were informed that all collected data will be handled with full confidentiality and will be used only for the research purposes.

## Results

Six hundred patients were involved in this study. Prescriptions containing at least one NSAID were included in the analysis. The majority of NSAIDs users were in the age group 12 to 30 y old (48.3%) and 52% of them were females (Table 1). Patients over 60 y old were prescribed NSAIDs less frequently (6%).

Infective conditions were the most common clinical conditions in hospitals for which NSAIDs were prescribed in high percentage (29.3%) followed by fever (9.3%) orthopedic pain (8.1%) and musculo-skeletal pain (7.8%) (Table 2).

The most commonly used non-selective COX inhibitor was diclofenac sodium (26.6%) followed by meloxicam (12.8%) and ibuprofen (12%). In addition, combination of two non-selective anti-inflammatory drugs was also presented in this study. The selective COX inhibitor was also used but the frequency was very low. Only 18.5% of prescribed medicines were mentioned using generic name and 73.3% of them were form the National Drug List (NDL). The average cost of NSAIDs per prescription was 970 YR. The average number of drugs per prescription was 3.5.

**Table 1.** Demographic characteristics of patients taking NSAIDs.

Demographic factors	Categories	N	%
Age in years	Below 12 y of age	53	8.9
	12-30 y	290	48.3
	30-60 y	221	36.8
	More than 60 y	36	6
Gender	Male	288	48

Female	312	52
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**Table 2.** Clinical indications.

Clinical indications	Frequency	Percent
Infective condition	177	29.3
Fever	56	9.3
Orthopedic pain	49	8.1
Musculo-skeletal pain	47	7.8
Rheumatoid arthritis	30	5
Osteoarthritis	24	4
Backache	23	3.8
Headache	17	2.8
Traumatic injury	13	2.2
Others	167	27.7

\*Total number of NSAIDs=603

## Discussion

The evaluation of drugs prescribing patterns is considered essential to improve clinical and economical outcomes [10]. The main objective of this type of studies is providing findings to the prescribers and to create consciousness about the proper use of drugs [11].

The current study was completed with a specific aim to review a sum of 600 prescriptions containing NSAIDs gathered from the OPDs of four hospitals in Aden. The main aim was to assess the prescribing pattern of NSAIDs, in addition, other WHO specific indicators were studied such as; the pharmacological sub-classes of NSAIDs prescribed, the clinical indications for prescribing NSAIDs and costs of total drugs and of NSAIDs per prescription and an assessment of prescriptions containing NSAIDs with respect to use of generic or trade name. To the best of the authors knowledge the present study is the first of its kind in Yemen to investigate the prescribing pattern of NSAIDs in four hospitals in Aden.

The most encountered clinical indication of using NSAIDs was for infective conditions and fever. In addition, other medical symptoms such as; Orthopedic pain, musculo-skeletal pain, rheumatoid arthritis, osteoarthritis, backache, headache, traumatic injury. Similarly, lower back pain was the most common clinical indication of using NSAIDs in the Orthopedics OPDs in Ajman and Nepal [12,13]. Pain was a common symptom of all patients complains.

Diclofenac sodium was the most commonly prescribed NSAIDs for about 21.5% of the patients. Comparable rate was reported by a study from Ajman, United Arab Emirates (UAE) [12], while a study from Nepal reported predominantly reported prescription of Meloxicam [13], whereas ibuprofen and piroxicam were found common by another study from Nepal [14]. These results are comparable to Fosbol et al. study,

which concluded that ibuprofen and diclofenac were the most frequently used conventional NSAIDs [15]. While IMS Health reported that diclofenac was more common prescribed in the UK. However, in the USA, ibuprofen and naxprofen are the most commonly prescribed NSAIDs [16]. In addition, the study revealed that diclofenac sodium injection was used irrationally which could lead to harmful adverse drug reactions such as renal and cardiovascular reactions. Selective COX-2 inhibitors were reported to have lower renal and gastrointestinal complications compared to classical NSAIDs, however, the use of this new class is associated with myocardial infarction and cardio vascular system toxicity [17-21]. In the current study, the percentage of using selective COX-2 inhibitors is considered low in comparison to the classical NSAIDs (3.5%), this may be due to high price of selective COX-2 inhibitors in contrast to the conventional NSAIDs and financial difficulties faced by some patients [22,23]. The result was closely comparable to a study conducted in Jordan with only 3.5% and another study of about 4% for using selective COX-2 inhibitors with a different survey period [24,25]. In contrast, other studies showed higher levels of prescribing selective COX-2 inhibitors [26,27]. The conventional and the selective NSAIDs are broadly prescribed for indications including osteoarthritis, rheumatoid arthritis, and acute pain. However, both classes of drugs have identical clinical efficacy [28-30].

The number of drugs prescribed by generic name in the present study was 18.5%. This finding is considered too low according to the WHO standard for the developing countries which is 100% [31] and relatively similar to the other studies that ranged from 3% to 20%. [32-35]. Nevertheless, it is low in comparison to other studies in other developing country like Nigeria (49.5-58%) [36-38]. Relatively close to the ideal percentages of WHO standard were reported by studies from other developing countries like; Tanzania (94%) [39], Eastern and Southern Ethiopia (97-98.7%) [40,41] and Bengal (98.5%) [42]. Although, a study in Ajman, UAE revealed that none of the medicines were prescribed by generic name [12] which is also similar to that reported by a study in eastern Nepal [14]. The practice of prescribing drugs by generic name is essential in order to increase the rational use of drugs, reduce dispensing errors and cost per prescription. Around 73.3 % of prescribed drugs was from the EML, which is lower than the value recommended by WHO 100% [43].

The higher cost of drugs per prescription is related to the use of trade name instead of generic names and poly-pharmacy. The result of drug cost was 4700YR per prescription and about 970 YR for NSAIDs, which is considered expensive for the majority of patients due to the low level of individual income in Yemen in comparison to other developing countries. Isenalumhe specified that the cost of drugs per prescription can be an indication of patient non-adherence to medication [44]. Commitment of using generic names may result in reducing the cost of prescriptions.

The mean number of drugs per prescription is an important guide for the evaluation of the prescribing patterns of the physician and recognizing the weakness points in order to

provide appropriate intervention. The mean number of medicines per prescription in the present study was 3.5 which is considered high according to the recommended WHO standard (1.6-1.8) [43]. The reported result in the current study regarding number of drugs per prescription is higher than a study carried out in eastern and southern Ethiopia (2.2-1.9) [40,41]. Also, other studies indicated a lower number of drugs per prescription (2.5, 1.9, 1.3) [13,14,45]. Results that are similar to our study were reported in Ajman, United Arab Emirates [12]. The finding from this study indicates that poly-pharmacy prescribing is common among physicians in Yemen.

The main limitation of the study is that the results were obtained from health care professionals working only in one city in Yemen. However, it is estimated that prescribing practice is similar all over Yemen. Therefore the results may be representative.

## Conclusion

It can be concluded from this study that prescribing patterns in Aden, Yemen has several limitations in relation to the WHO indicators. There is a need to review drug utilization practice and physicians compliance with EML. Policy makers such as the Ministry of Health should enforce sanction on physicians who do not comply with standards and procedures. Generic drug prescribing should be encouraged by the policy makers.

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