Research Article

Prescribing patterns of NSAIDs in the outpatient department at Al-Nouman Teaching Hospital, in Iraq

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ABSTRACT

INTRODUCTION: Appropriate use of drugs is an essential element in achieving quality of health and medical care for patients and the community as a whole.

OBJECTIVE: To describes demographic characteristics of patients using NSAIDs. Investigate the prescription pattern of NSAID in the Out-patient Department of Al-Nouman Teaching Hospital, Baghdad, by using WHO prescribing indicators. To assess the co-prescription of NSAID with gastro-protective agents (GPA).

METHODS: A cross sectional study was conducted at the outpatient department over one year (2/01/2019-31/12/2019). 1100 encounters were selected randomly, according to methodology of World Health Organization (WHO), from eleven health-care specialty units.

RESULTS: From the total of 1100 prescriptions were analyzed, 369(33.55%) encounters had NSAIDs prescribed. the average number of drug items were 2.93±2.230, generic NSAID names were used in (14)3.17% of the encounters, (133)36.04% of patients received antibiotics, (56)5.1% of patients received injectable form of NSAIDs, and (368)99.77% received NSAID Essential drugs. The percentage of NSAID encounters co-prescribed as gastroprotective agents (GPA) was (25)6.78% and proton pump inhibitor (PPI) was the most frequently co-prescribed (20)75%, There were statistically significant ($p \leq 0.05$) associations between NSAID prescribing and patient's age .There were a significant association between specialty of the prescribers and prescribing NSAID.

CONCLUSION: The study showed some irrational practice with most prescribing indicators. Policy makers should develop strategies and implement an educational and training program for physicians and health workers on rational use of NSAID to improve prescription quality.

Key words: NSAIDs, prescribing pattern.

INTRODUCTION

Prescription patterns explain the extent and profile of drug use, trends, quality of drugs and compliance with regional, state or national guidelines like standard treatment guidelines, usage of drugs from essential medicine list and use of generic drugs.[1] Studies on prescription pattern monitoring are type of drug utilization research, with their main focus on rational prescribing of drugs. It compares the observed patterns of drug use with current recommendations and guidelines.[2] 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."[3]

Globally, irrational drug prescribing is a great challenge for health care systems and a widespread phenomenon in developing countries. 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] The overuse, under use or misuse of medicines results in wastage of scarce resources and widespread health hazards. WHO estimates that more than half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take them correctly.[1] Several studies in the United States have consistently reported ad-

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verse drug events ranging from 3% to 12%.[5]

Non-steroidal anti-inflammatory drugs (NSAIDs) are among the most widely used and misused of all drugs.[6] They are used because of their demonstrated efficacy in reducing pain and inflammation.[7] They constitute more than 20% of all drug prescription.[8] Approximately 30 million people worldwide take NSAIDS on a daily basis, of which 40% are older than 60 years.[9] The use of NSAIDs is associated with various adverse effects such as an increased risk of upper gastrointestinal bleeding, colopathy, renal impairment, acute hepatitis, and cardiovascular toxicity,[10] which has a relevant impact on morbidity and mortality and account for a substantial increment of healthcare costs.[11] It has been previously found that NSAIDs cause adverse effects in 25% of patients,[12] with serious life-threatening complications, about 5% with serious consequences of GIT bleeding and kidney failure.[13]

Endoscopic studies have demonstrated that gastric or duodenal ulcers develop in 15% to 30% of patients who regularly take tradional NSAIDs.[14] Clinical practice guidelines in the UK, Europe and North America recommend co-prescription of a gastroprotective agent (GPA) in high gastrointestinal (GI) risk patients on chronic non-selective NSAID therapy.[15]

Irrational prescribing has further complicated the adverse effects from the use of NSAIDs.[6] NSAIDs are prescribed irrationally in the outpatient department (OPDs).[16]

The World Health Organization (WHO) compiled a set of core drug use indicators that are useful for studying patterns of drug prescribing in health care facilities.[5] The WHO core indicators for drug utilization include: Average number of drugs per encounter, percentage of drugs prescribed by generic name, percentage of encounters with an antibiotic, percentage of encounters with an injection, percentage of drugs prescribed from the essential drug list.[16]

Several studies have been conducted to study the prescription pattern of NSAIDs. These studies stated that the prescribing pattern of NSAIDs was not in accordance with current guidelines mentioned by regulatory agencies; NSAIDs were overused and sometimes irrationally prescribed,[1,10] Therefore, periodic evaluations of drug utilization patterns enables suitable modifications in NSAID prescribing to increase the therapeutic benefit and to minimize the adverse effects.[17]

In Iraq, data on prescribing pattern at the outpatient settings is limited for NSAIDs; so we made this study to give information that are useful for healthcare workers and policy makers for rational use of NSAIDs.

The objectives of the current study were to describes the demographic characteristics of patients using NSAIDs, investigate the prescription pattern of NSAID in the Out-patient Department of Al-Nouman Teaching Hospital in Baghdad by using WHO prescribing indicators, and to assess the co-prescription of NSAID with gastro-protective agents.

METHODS

Study design& Setting: A cross sectional study was conducted at the outpatient department of Al Noaman Teaching Hospital in Baghdad over one-year from 2nd January 2019 to 31st December 2019. The outpatient departments of Al Noaman teaching hospital consist of 25 health-care facility units. The study has made on records of prescriptions.

Ethical consideration: All necessary permissions and commencement of the project were obtained from Al-Russafa health directorate and Al Noaman hospital before conducting the study.

Inclusion and exclusion criteria: We included eleven health-care facility units; rheumatology, orthopaedic surgery, obstetrics and gynaecology, general surgery, internal medicine, ophthalmology, otolaryngology, paediatrics, dermatology, urology and dental health-care facility units. Health care facilities that have small number of encounters or do nor using writing prescription were excluded from this study. We used the WHO essential drug list as a basis to classify drug names as generic names.[18,16] We considered the local name as a generic name

for the fixed dose combination.[16]

Sampling and procedure: *Step 1*: we confirmed the availability and accessibility of the prescribing records (patient encounters) for the intended study period (2019). We depended only on the data recorded on the encounters.

Step 2: Identified the encounters included in our sampling frame.

Step 3: we selected our sample of encounters from the target. The total number of encounters to be sampled in each facility has been determined by 100 encounters to compare facilities and to decrease the margin of error. A sampling interval was calculated by dividing the number of days represented in the sampling frame in one year (365 days) by the number of encounters to be selected (100 encounters) = 3.65; the first sampling day was 2/1/2019, the second sampling day would be 6/1/2019 (3.65 + 2 =5.65 rounded to 6), the third sampling day would be 9 (5.65+ 3.65=9.3 rounded to 9) and so forth. We continued that process until all sampling days had been selected and assigned on the 2019 calendar.

Step 4: For each selected sampling day for a speciality unit, we selected a single encounter and kept a copy of it to be reviewed later.

Step 5: if the selected day has shown no encounters due to any reason, we automatically changed to the day next to or previous to it.

Step 6: Data from each encounter (prescriber) were extracted into a prescribing indicator form prepared for each specialty.

Step 7: We coded the data from the encounter as the number of drug items, number of NSAID prescribed by generic names, presence of NSAID prescribed with antibiotic, presence of NSAID injection and prescribing NSAID from essential drug list (EDL),[18] presence of NSAID combination, presence of NSAID prescribed with GPA .

Data collection: All Encounters of the out-patients department of the previous year were collected from patients upon dispensation at the out-patient pharmacy and were kept at hospital drug store. 1100 encounters were selected randomly, according to methodology of WHO[16] at regular intervals over one-year period (2/01/2019 -31/12/2019). Data collection was carried out from January–March 2020 by the researcher.

Outcomes: We estimated the percentage of NSAID encounters, then the NSAID encounters were analyzed according to the following variables: patients demographics (age & gender), the NSAID prescribed [types of NSAID prescribed ,single or incombination, concomitant gastroprotective agents], number of drugs prescribed, number of NSAID generic name, presence of antibiotics(Ab), presence of NSAID injection(inj), percentage of NSAID from essential drug list (EDL).

Statistical analysis: Categorical variables were expressed as frequencies (percentage). Continuous variables were presented as the mean and standard deviation. The data generated were entered into the SPSS® statistical package (version 24) and simple descriptive statistics were used to analyse results. The Chi-square test was used to study differences between variables. Statistical significance was set at $p < 0.05$.

RESULTS

A total of 1100 encounters were analysed. NSAIDs were prescribed in 369 (33.55%) encounters, see figure 1.

Male patients received almost equal numbers of NSAID encounters 185 (16.82 %) as to female patients 184 (16.73 %) (table 1). Age group of 21-40 years was the commonest age receiving NSAID, 149 (13.55%). While only 28 (2.55 %) encounters referred to patient's age group 61-80 years. In this study there were statistically significant ($p \leq 0.05$) associations between prescribing NSAID and patient's age (Table 1).

The most commonly prescribed NSAIDs in out-patient department was Ibuprofen 131 (35.5 %), followed by diclofenac sodium 90 (24.39 %). Combination of NSAIDs were reported in 72 (19.51 %) and three NSAIDs was

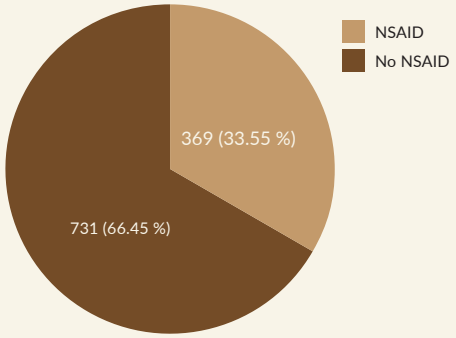

Figure 1| Percentage of prescribing NSAIDs.

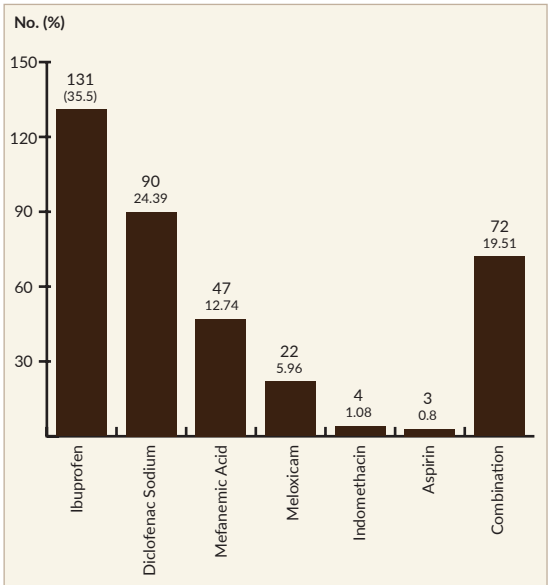

Figure 2 | Frequency and percentages of different types of NSAIDs in patient encounters.

seen in only one encounter (0.27 %). For other NSAIDs see figure 2.

Orthopaedic surgery and rheumatology were the specialities most commonly prescribing NSAID. Also they were most commonly prescribing injectable NSAIDs. For details see table 2. In 25 encounters (6.78 %) GPAs were co-prescribed; 11 (44%) of them were prescribed by orthopaedic unit. Proton pump inhibitors (PPI) was co prescribed in 20 (75%) encounters while histamine 2 blockers were co-prescribed in only 5 (25%) encounters.

Table 3 shows some WHO indicators for prescribing NSAIDs.

DISCUSSION

In this study, NSAIDs were prescribed in 369 out of 1100 (33.55%) encounters (figure 1) emphasizing a high tendency towards utilizing these drugs, as previously reported.[19] Injudicious use of NSAIDs can add to the cost of therapy and unnecessary exposure to adverse effects.[20] Our result is lower than that of an Indian study conducted by Anandan in 2019[2] and Omani study conducted by Al Balushi in 2014[21] who they reported that NSAIDs is used in 42.2 and 38 % respectively. However, it is higher than that reported by Majid[12] in his study from northeast of Iran in 2017 which was 19.3 %.

In the present study, male patients received almost equal numbers of NSAID encounters as female patients, knowing that female patients visiting the OPD more than male patients

Table 1| Relationship between Patients demographic characteristics (age, gender) and prescribing NSAID.

	NSAID (%)	No NSAID (%)	Total (%)	χ2 (P value)
Age Group in years				
<1-20	(75) 6.82%	(209) 19%	(284) 25.82%	
21-40	(149) 13.55%	(260) 23.64%	(409) 37.18%	
41-60	(115) 10.46%	(192) 17.46%	(307) 27.91%	
61-80	(28) 2.55%	(70) 6.36%	(98) 8.91%	
>80	(2) 0.18%	0	(2) 0.18%	
Total	(369) 33.55%	(731) 66.45%	(1100) 100%	15.175/ 0.004
Gender	(N)% NSAID	(N)no NSAID%	(N)% total	
Male	(185) 16.82%	(311) 28.27%	(496) 45.1%	
Female	(184) 16.73%	(420) 38.18%	(604) 54.9%	
Total	(369) 33.55%	(731) 66.46%	(1100) 100%	5.824/ 0.443

Table 2 | Prescribing NSAIDs, NSAID Injections, and co-prescribed GPA) among different specialty unites.

Specialty units	NSAID (%)	NSAID Inj (%)	Coprescribing GPA
Internal Medicine	20 (1.82)	1 (0.09)	0 (0)
Rhuematology	97 (8.82)	24 (2.18)	7 (28)
Dental	27 (2.55)	6 (0.55)	0 (0)
Paediatric	12 (1.09)	0 (0)	0 (0)
Surgical	48 (4.36)	5 (0.45)	5 (20)
Otolaryngology	28 (2.55)	2 (0.18)	0 (0)
Gynaecologic	21 (1.91)	2 (0.18)	1 (4)
Orthopaedics	93 (8.46)	16 (1.46)	11 (44)
Dermal	5 (0.46)	0 (0)	0 (0)
Ophthalmology	12 (1.09)	0 (0)	0 (0)
Urology	6 (0.55)	0 (0)	1 (4)
Mean	369 (33.5)	56 (5.1)	25 (6.78)
$\chi 2$	224.507	127.679	6.006
P value	0.000	0.000	0.199

NSAID: non-steroidal anti-inflammatory drugs. ***Inj***: Injection, ***GPA***: Gastro protective Agents

Table 3 | World Health Organization core prescribing indicators for NSAIDs

WHO indicators (n=369) Percentage	Results
Average number of drugs per encounter (n=369)	2.93±2.230
Percentage of encounters with NSAIDs prescribed	(369)33.55%
Percentage of NSAIDs prescribed by Generic names	(14)3.79%
Percentage of NSAID encounters with an antibiotics	(133)36.04%
Percentage of encounters with an injection of NSAID prescribed	(56)5.1%
Percentage of encounter with NSAIDs prescribed from EDL	(368)99.77%
Percentage of encounter prescribed combinations of NSAIDs	(72)19.51%
Percentage of encounters with NSAIDs and GPA (s) prescribed	(25)6.78%

Continuous variables were expressed as mean ± standard deviation; categorical variables were expressed as frequency and percentages. NSAIDs: Nonsteroidal Anti-inflammatory drugs, n=Number of prescriptions, EDL: essential drug list, GPA: gastroprotective agent.

which means that there were no differences in the pattern of NSAID prescription according to gender; other studies reported various results.[4,5,22,23] This variations may be to the sampling method used in selecting participants. Females may need NSAIDs for gynaecological reasons, such as dysmenorrhea and menorrhagia, in addition to other common conditions. Added to that, the prevalence of osteoarthritis is thought to be higher in females.[17] While the probability that males are more prone to injuries occurred during specific work activities and exercise may balance the female figures.

In the present study, majority of the NSAID encounters (149) 13.55% belonged to the patient's age group of 21-40 years (**Table 1**). Only 28 (2.55%) of the NSAID encounters collected referred to patient's age group 61-80 years old. This result indicated that NSAID pattern consumption decreases with age because elderly people have higher risks of NSAID-related adverse episodes; both gastrointestinal haemorrhage and cardiovascular events,[24] similar result have been reported in study done by S Kumar in 2016.[25]

In this study, Ibuprofen was the most commonly prescribed NSAIDs 131 (35.4%), diclofenac sodium 90 (26.6%), mefanemic acid 47 (12.4%), meloxicam 22 (5.96%) and aspirin (4)1.1%, indomethacin 3 (0.8%). A possible reason for more prescriptions of ibuprofen compared to other types of NSAIDs is its analgesic activity, safety profiles and having very low risks for GI adverse events, CV side effects, renal, and hepatotoxic effects compared with other NSAIDs.[26, 27] Other studies showed the same results.[28, 29,30,31]

In this study, most NSAID encounters 297 (80.49%) prescribed only one NSAID per encounter, 71 (19.24%) of the encounters prescribed combination of two NSAID and only one encounter 1 (0.27%) prescribed three NSAIDs. Most of the NSAID combination prescribed by orthopaedic surgeons 32 (44.4%) and rheumatologists 28 (38.9%). Taking two or more different NSAIDs may not be therapeutically beneficial. Such practice multiplies the toxicities of NSAIDs with no evidence of improvement in efficacy.[6] Majid in 2017 reported combinations of two, three, or four NSAIDs in 7%, 0.6%, and 0.01% of prescriptions, respectively.[12]

In our study, the percentage of NSAID co-prescribed with gastroprotective agents was low 25(6.78%) in comparison with that from similar studies (14%), (24.32%).[20,28] According to the American College of Gastroenterology guidelines, prescribing of gastroprotective agents along with NSAIDs is required only in risky patients such as previous history of/suffering from gastrointestinal ulcer, aged more than 65 years and concomitant usage of other drugs such as corticosteroid, antiplatelet anticoagulant and aspirin including low dose.[2]

In our study, NSAIDs co-administration of gastro protective agent was observed in 25(6.78%) encounters and proton pump inhibitors (PPIs), Omprazol, 20(80%) were the most widely prescribed with NSAID, while histamine 2 blockers (H2Bs) were observed only in 5(20%) of NSAID encounters; other study reported similar result.[20] PPIs are more effective than H2Bs for treatment and prevention of GI toxicity associated with NSAIDs.[12, 31]

In the present study, the average number of drugs per encounter was (2.93±2.230)with a maximum of 4 drug items; this finding is high compared to the standard of the WHO value (1.6–1.8).[33] Ideally the number of drugs per prescription should be low so that incidence of drug interactions and adverse effects would also be low.[17] Our result was lower than that reported by studies conducted in India 2018 (5.2) and higher than that of Sudan (2.3) and Nepal (2.43±0.039).[34,35,36] The prescribing of several drugs per prescription (polypharmacy) is a serious problem as it might increase the adverse effects among the combination of drugs prescribed and it increase prescription cost;it has been attributed to patients' demand; desire to treat several ailments at the same time, inadequate diagnostic facilities to determine definitive cause of ill health,[37] incompetency on the part of physicians, unavailability of clinical practice guidelines, financial incentives to the prescribers, lack of continuous medical education of the prescribers and the shortage of therapeutically correct drugs.[38]

Generic prescribing is desirable to promote rational use of drugs, and to minimize cost of therapy and dispensing errors. In the present study, Ibuprofen was the only NSAID prescribed in generic name 14 (3.79%),which was much low compared to the standard WHO value (100%) for the developing countries.[33] Our result might be due to the absence to a regulation from the Iraqi ministry of health makes the doctors prescribing in generic names beside in our study we depend only on NEDL on classification of drug generic name. This finding was similar to the results reported by other studies which was ranged from 0%-8.4%.[39, 40] while another study conducted in India in 2017 reported higher result (91.15%).[20]

In the present study, Percentage of NSAID encounters prescribed with an antibiotic (133) 36.04%. This finding is high comparing to the WHO standard for the developing countries which is (20-26.8%)[33] and to that of a study conducted at clinical setting in India in 2016 reported (64.25%),[25] another study conducted in orthopaedic outpatient clinic reported (20.4%).[40] Irrational prescription of antibiotics is a universal problem that ultimately leads to adverse drug reactions, frequent hospital admissions[38] and may potentially lead to antimicrobial resistance and increase the necessity to use more expensive antibiotics to treat common and life-threatening infections.[41] The evidence-based appropriate antibiotic policy is a current need for health care facilities to reduce inappropriate antibiotic use and consequent effects.[42]

In the present study, Percentage of encounters prescribed NSAID injection was (56)5.1% which is lower than the standard value (13.4–24.1%).[33] In the current study prescribing of NSAID injections (diclofenac ampule) in the OPD were mainly by rheumatologists 25 (2.27%), orthopaedic surgeon 16 (1.46%), dentists 6 (0.55%) and general surgeons 5 (0.45%). The use of NSAIDs by parenteral route in OPD setting shall be reserved for severe painful conditions.[20] Other studies conducted at the outpatient departments by Awodele in 2015, Vaishnavi in 2017 and by Anandan in 2019 reported similar results 0.1%, 4.32%, and 9.5% respectively; however, Jayakumari in 2016[43] has reported a higher result (11.11%).

In the present study, the percentage of NSAID prescribed from Essential Drug List was 99.77%; this finding is almost identical to the WHO standard of 100%.[33] Prescribing drugs from the EDL issued by WHO provides a framework for rational prescribing; drugs on the list are well-established drugs, already tested in practice, with established clinical use and lower cost than newer drugs.[44] This indicator reflects that prescribers are compliant with EDL. Vaishnavi et al in India reported lower result (49.72%).[20]

Electronic data base were not available, data collection consumed effort and time .The sampling population restricted to a small geographic area, the data were collected from one hospital and thus the generalizability of the results is limited. The study also does not include a review of the medical chart of patients to further evaluate if the prescriptions were rational and appropriate to the current diagnosis. The data were also collected only by reviewing the prescription papers, which does not include interviews with prescribers and/or patients and thus does not assess factors contributing to the current practice.

CONCLUSION

The study showed that the frequency of NSAID encounters was high, and the NSAIDs were highly prescribed to the age group of 21-40 year. The mean number of drugs prescribed in NSAID encounters was high. Physicians are prescribing less injectable NSAIDs, less generic names, and mor compliant with the EDL in a good attitude to the WHO standards. But they are prescribing more than a single NSAIDs, more antibiotics and less GPA. Ibuprofen was the commonest NSAIDs prescribed in the outpatient department.

Policy makers should develop strategies and implement an educational and training program for physicians and health workers on rational use of drugs to improve NSAID prescription quality.

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Abbreviations list: Cardiovascular (**CV**), Essential drug list (**EDL**), Gastrointestinal (**GI**), Gastroprotective agent (**GPA**), Histamine 2 blockers (**H2Bs**), Non-steroidal anti-inflammatory drugs (**NSAIDs**), Outpatient department (**OPDs**), Proton pump inhibitors (**PPIs**), Statistical Package for the Social Sciences (**SPSS**), World Health Organization (**WHO**).

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