Prescription Pattern of Nonsteroidal Antiinflammatory Drugs in a Family Practice Clinic at Jordan University Hospital

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Abstract

Objective: To study the pattern of prescribing of Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) in a family practice clinic at Jordan University Hospital, Amman, Jordan.

Materials and Methods: Review of files for prescribed drugs in the "Family Practice Clinic at Jordan University Hospital" during the period 28/03/2008- 18/07/2008. Files at the end of the clinic session were collected and reviewed for prescriptions.

Results: A total of 2027 patient files were reviewed, 343 (16.9%) of which contained NSAIDs. The number of drugs per prescription ranged from 1-12 (mean ± SD, 3.1 ± 1.9), with 67% of prescriptions containing 3 or less drugs. Proprietary drug names were used in 89.5% of prescriptions. Diclofenac was the most frequently prescribed NSAID (44.9%), followed by aspirin (30.3%) and proprionic acid derivatives (15.2%). One fourth (90) of the files containing NSAIDs prescriptions belonged to females in chilf-bearing age. In most cases, diclofenac and proprionic acid derivatives were prescribed for musculoskeletal disorders followed by infections, while aspirin was prescribed mostly for cardiovascular disorders.

Conclusions: With some exceptions, the pattern of prescriptions of NSAIDs is fairly appropriate. Diclofenac was irrationally and overused as it was prescribed for infections, and inappropriately used in patients with bronchial asthma. These drugs were prescribed for women in child-bearing age. Proprietary drug names were used in the majority of prescriptions. The strength of medications, frequency of administration and duration of therapy were missing in some of the prescriptions. Continued medical education on rational prescribing seems necessary.

Keywords: Family Practice, Prescriptions, Nonsteroidal Anti-inflammatory Drugs.

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Introduction

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) are among the most commonly prescribed drugs in clinical practice. [1-3] The use of NSAIDs is associated with various adverse effects such as an increased risk of upper gastrointestinal bleeding, [4-7] colopathy, [8, 9] renal impairment, [10-12] acute hepatitis, [13] and cardiovascular toxicity. [14, 15] These drugs are used to relieve pain and inflammation, and are commonly used for disorders of the musculoskeletal system. [4, 5, 16] In addition, aspirin is used as an effective antiplatelet drug in patients with ischemic heart disease. [17]

Several studies have shown that NSAIDs are overused and sometimes irrationally prescribed. [18-21] Others have reported on the use of aspirin in patients with bronchial asthma, where it may be contraindicated. [22]

This work was designed to study the pattern of prescriptions of NSAIDs in a family practice clinic at Jordan University Hospital in Amman, Jordan, and to identify possible deficiencies to be able to provide suggestions for a more rational prescription behavior for such drugs.

Materials and Methods

Patient files from within the Family Practice Clinic at Jordan University Hospital during the period 28/03/2008 -18/07/2008 were examined for the use of NSAIDs. Twice a week, and at the end of each working day, all files were reviewed for the evaluation of prescribed drugs. Those containing NSAIDs were isolated for further analysis. To avoid bias, the investigator's patient files were not included in the study, and the other practitioners were not aware of the study. Over the study period, 2027 files were reviewed, out of which 343 contained NSAIDs. Two medical students were trained to analyze the files according to the following variables: number of drugs prescribed, patient's age, gender, type and number of the NSAID prescribed, concomitant drugs and diagnoses. The NSAIDs were analyzed for: name (generic vs. proprietary), formulation, strength, daily dose, frequency of administration and duration of treatment. The data were collected according to a coding key. The data generated were entered into the SPSS® statistical package (version 9) and simple descriptive statistics were used to analyze results. The word "prescription" throughout the text refers to the drugs prescribed which were obtained from the medical files of patients.

Results

A total of 2027 files were reviewed according to the methods, 343 (16.9%) of which contained NSAIDs. The number of drugs per prescription ranged from 1-12, with a mean ± SD of 3.1 ± 1.9, with 67% of the prescriptions containing 3 or less drugs and 88.3% containing 5 or less drugs. Female patients received 57.1% of prescriptions. The age distribution was such that 3.5 % of prescriptions were for patients aged 13-17 years, 47.2 % were for patients' age group of 18-49 years and 49.3 % for patients 50 years and above. In 89.5% of prescription proprietary drug names were used. The frequency of NSAIDs used is shown in table (1). Diclofenac was the most frequently prescribed drug (44.9%) followed by aspirin (30.3%) and proprionic acid derivatives (ibuprofen and naproxen) (15.2%). The formulation of the drugs used was oral in 65%, topical in 14.9% and combination of oral and topical in 13.1% of prescriptions. Injections and rectal preparations constituted 5.2% and 1.7% of prescriptions, respectively. Aspirin, Ibuprofen, naproxen, meloxicam and indomethacin were all used orally. Diclofenac routes of administration were topical (31.8%), oral (31.2%), parenteral (11.7%) and rectal (3.9%) of prescriptions, whereas a combination of routes was used in 21.4% of them. Where the combination of NSAIDs was found within the same prescriptions, combinations of routes of administration were used in 70.6% of prescriptions, the oral in 23.5% and topical in 5.9% of them.

The diagnoses for which the most frequently prescribed NSAIDs were prescribed are presented in table (2). Diseases were grouped to reduce rare ones. Musculoskeletal disorders were the most frequent causes for prescribing diclofenac (63%)

followed by infections (17%). In 1.7% of cases, diclofenac was prescribed for musculoskeletal disorders in patients having bronchial asthma. Aspirin was prescribed mostly for patients with cardiovascular disorders (64.4%), and in all cases the dose used was 100 mg. Proprionic acid derivatives (ibuprofen and naproxen) were prescribed for patients with musculoskeletal disorders (43.1%) and infections (39.7%).

Concerning concomitant drugs, diclofenac was mostly prescribed as monotherapy (39.1%) followed by prescription with antibiotics (15.2%) and cold medicines (10.3%). Aspirin was mostly prescribed with drugs for cardiovascular diseases or other conditions associated with high cardiovascular risk (70%). Proprionic acid derivatives were most frequently prescribed with antibiotics (36.8%) followed by monotherapy in 25% of prescriptions (table 3).

The age and gender distribution of the pattern of NSAIDs prescribing is presented in table (4). Diclofenac was prescribed for the adult age group mostly (97.4%), aspirin was prescribed only to the adult age group, while proprionic acid derivatives were mainly prescribed for adults (78.8%) and to a much lesser extent to children less than 18 years of age (15.4%). There are statistically significant differences in the frequency of NSAID prescribing according to age group utilizing the Chi-Square test, the Pearson Chi-Square statistic was 124.7 and the p value 0.0001. The youngest age for which diclofenac was prescribed was 16 years, aspirin (22 years) and proprionic acid derivatives (14 years). There were no differences in the pattern of prescription according to gender. The Pearson Chi-Square statistic was 9.9 and the p value 0.196. These drugs were prescribed to 90 women (26.2 %) in child-bearing age.

The strength of the medication was missing in 17.2% of prescriptions while the frequency of administration was missing in 1.5% of them. This made the calculation of the daily dose not possible in these cases. Of the 154 prescriptions containing diclofenac, 56 (38.4%) lacked the strength of medication. Of these, 49 (31.8%) were topical formulations (usually the strength isnot written in prescriptions) while 7 (4.5%) were systemic and lacked the strength of medication. Concerning aspirin and proprionic acid derivatives, the strength of medication was included in all prescriptions. The frequency of administration was mentioned for aspirin and proprionic acid derivatives in all prescriptions, while 4 (2.6%) of those of diclofenac lacked frequency of administration. The duration of treatment was not mentioned in 20.1% of all prescriptions. Concerning individual drugs, the percentages were 20.2% for aspirin, 17.5% for diclofenac and 26.9% for proprionic acid derivatives. In none of the prescriptions in which the daily dose could be calculated was the maximal allowed daily dose exceeded. Likewise, in none of the prescriptions containing the frequency of administration was the frequency exceeding what is recommended.

Table (1): The frequency distribution of individual nonsteroidal anti-inflammatory drugs prescribed.

Nonsteroidal Antiinflammatory Drug	*Frequency*	*Percent*
Diclofenac	*154*	*44.9*
Aspirin	*104*	*30.3*
Ibuprofen	*26*	*7.6*
Naproxen	*26*	*7.6*
Meloxicam	*8*	*2.3*
Mefenamic acid	*7*	*2.0*
Indomethacin	*1*	*0.3*
Combination	*17*	*5.0*
Total	*343*	*100*

Table (2): Prescribing frequencies of nonsteroidal antiinflammatory drugs according to the diagnoses.

	Frequency of NSAIDs prescribing (%)			
Diagnoses	**Diclofenac**	**Aspirin**	**Propionic acid derivatives***	**Total**
Infections	30 (17)	4 (2.7)	23 (39.7)	57 (14.9)
Musculoskeletal disorders	111 (63.1)	0 (0)	25 (43.1)	136 (35.5)
Cardiovascular disease	13 (7.4)	96 (64.4)	1 (1.7)	110 (28.7)
Others***	22(12.5)	49 (32.9)	9 (15.5)	80 (20.9)
Total	**176 (100)**	**149 (100)**	**58 (100)**	**383 (100)****

NSAID = Nonsteroidal Anti-Inflammatory Drug.
**** Propionic acid derivatives = Ibuprofen and Naproxen.***
***** Total is higher than the number of prescriptions because some prescriptions contained more than one diagnosis.***
****** Others mean many conditions that cannot be grouped into a valid diagnosis.***

Table (3): Concomitant drugs prescribed with the most frequently prescribed NSAIDs.

	Frequency of NSAIDs prescribing (%)			
Concomitant drugs	**Diclofenac**	**Aspirin**	**Propionic acid derivatives***	**Total**
None	72 (39.1)	1 (0.6)	17 (25)	90 (20.8)
Antibiotics	28 (15.2)	5 (2.8)	25 (36.8)	58 (13.4)
Antihistamines, decongestants, expectorants and cough suppressants	19 (10.3)	2 (1.1)	6 (8.8)	27 (6.3)
Acid-controlling agents	9 (4.9)	15 (8.3)	8 (1.2)	32 (7.4)
Diuretics, lipid-lowering agents, antidiabetics and β-blockers	17 (9.2)	126 (70)	6 (8.8)	149 (34.5)
Others	39 (21.2)	31 (17.2)	6 (8.8)	76 (17.6)
Total	**184 (100)**	**180 (100)**	**68 (100)**	**432 (100)****

NSAID = Nonsteroidal Anti-Inflammatory Drug.
**** Propionic acid derivatives = Ibuprofen and Naproxen.***
***** Total is higher than the number of prescriptions because some prescriptions contained more than one concomitant drug.***

Table (4): Prescribing frequencies of nonsteroidal antiinflammatory drugs according to the age group and sex of patients.

NSAID	Gender	Age group			Total
		< 18 years	18 – 49 years	50 or more years	
Aspirin	Male	0	6	40	46
	Female	0	11	47	58
	Total	0	17	87	104
Diclofenac	Male	3	46	19	68
	Female	0	52	34	86
	Total	3	98	53	154
PADs	Male	2	16	6	24
	Female	5	19	4	28
	Total	7	35	10	52
Mefenamic	Male	0	0	0	0
acid	Female	2	4	1	7
	Total	2	4	1	7
Meloxicam	Male	0	0	1	1
	Female	0	0	7	7
	Total	0	0	8	8
Indomethacin	Male	0	0	0	0
	Female	0	0	1	1
	Total	0	0	1	1
Combination	Male	0	4	4	8
	Female	0	4	5	9
	Total	0	8	9	17
Total	Male	5	72	70	147
	Female	7	90	99	196
	Total	12	162	169	343

NSAID = Nonsteroidal Anti-Inflammatory Drug.
PADs = Propionic acid derivatives = Ibuprofen and Naproxen
Pearson Chi-Square statistic = 124.7, P value = 0.0001, for NSAID prescription in relation to age.
Pearson Chi-Square statistic = 9.9, P value = 0.196, for NSAID prescription in relation to gender.

Discussion

This study describes the pattern of prescription of NSAIDs in family practice clinic at Jordan University Hospital. The number of drugs per prescription was 1-12 with a mean of 3.1 ± 1.9, with 67% of the prescriptions containing 3 or less drugs. This is different from what is reported by Irshaid et al., [23] who reported a range from 1-7 with 90.8% of prescriptions containing 3 or less drugs, from Aseer Central Hospital outpatients in Southwestern Saudi Arabia, and Mahfouz et al.,[18] who reported an average number of drugs per prescription of 1.44 from primary health care centers in the same area of Saudi Arabia. Sharif et al. [24] reported an average number of drugs of 2.2 in a private hospital in Dubai, the United Arab Emirates. In our case, many of our patients are in the older age group with multiple medical problems and concomitant drug use. None of our patients are younger than 13 years of age because these patients usually go to pediatrics clinics. However, careful attention should be paid to potential drug-drug interaction when such a large number of drugs is prescribed.

Of the 2027 files reviewed, 343 (16.9%) contained NSAIDs. This finding is similar to the 19.8% prevalence reported by Al Homrany and Irshaid [21] from Aseer central hospital outpatient and emergency departments in Southwestern Saudi Arabia, and is much less than what is reported from primary health care in the same region by Mahfouz et al. [18] They found that the prevalence of prescribing for analgesics-antipyretics (without specifying individual drugs) was 61.9%. Ravi Shankar et al. [25] from a medical department in a tertiary care hospital in Pokhara, Nepal reported that the frequency of prescribing analgesics was 15.09%, which is similar to our figure. Clinard et al. [26] from France, using a questionnaire mailed to general practitioners, reported that the rate of prescription of NSAIDs was 25%, but when pharmacies in the same administrative area were surveyed, a 40% rate of NSAID prescription was found. Sharif et al. [24] reported that NSAIDs were the most commonly (23.4%) prescribed drugs in a hospital in Dubai, the United Arab Emirates, almost half of them were for diclofenac. Diclofenac was the most frequently prescribed NSAID according to Sharif et al. [24] and Valhovic-Palcevski et al. (2002) [19] from Croatia and Sweden, while Ibuprofen was the most frequently prescribed according to Al Homrany and Irshaid. [21] Others [27, 28] also have reported that ibuprofen was the most frequently prescribed NSAID.

In most of the prescriptions (89.5%), proprietary names of drugs were used. Irshaid et al. [23] reported that the proprietary name was used in 50.1% of prescriptions, while both generic and proprietary were used on the same prescription in 28.3% of cases. Blatt et al. [29] reported that 16% of outpatient clinic prescriptions and 73% of emergency room prescriptions contained proprietary names. It is recommended to use generic names in prescriptions, which gives flexibility to the dispensing pharmacist and may be of economic benefit to the patient. However, the use of proprietary names may be acceptable when problems of drug bioavailability amongst various proprietary products are expected. [30, 31]

The use of diclofenac for infections (17%) and in conjunction with anti-infective agents (15.2%) and/or antihistamines and decongestants (10.3%) (Tables 2 & 3) is considered inappropriate and an overuse of the drug. Its use in cardiovascular disease (7.4%) and in conjunction with cardiovascular medications is explained by the presence of musculoskeletal disorders in such a group of patients and might be accepted, while its use in patients with bronchial asthma (1.7%) for whatever indication cannot be appropriately rationalized. Aspirin and other NSAIDs may exacerbate or even induce bronchial asthma attacks. In most of the cases, aspirin was appropriately prescribed and at a low dose as an antiplatelet agent and in combination with drugs used to treat cardiovascular disorders. Proprionic acid derivatives were used in infections (39.7%) and in conjunction with antibiotics (36.8%) which is considered as an appropriate analgesic-antipyretic and in musculoskeletal disorders (43.1%) which is also considered appropriate.

The age distribution of prescriptions for NSAIDs is considered fairly appropriate. The use of these drugs in women of child-bearing age requires

careful attention and reconsideration. These drugs may affect the fertility of women. Meloxicam was found to delay ovulation in healthy volunteers. [32] Lack of strength of medication (17.2%), frequency of administration (1.5%), and duration of therapy (20.1%) constitute a deficiency in the prescription and is not acceptable according to De Vries et al. [30] and Lofholm and Katzung. [31] Such a defect in prescriptions was also observed by others. [23]

Conclusions and Recommendations

The patterns of prescription of aspirin and proprionic acid derivatives were fairly appropriate. Prescribing of diclofenac for infections and in combination with cold preparations is considered an overuse of the drug and is irrational, while its prescribing for patients with bronchial asthma is considered inappropriate. Proprietary drug names were used in the majority of prescriptions. The strength of medication, the frequency of administration and duration of therapy were missing in some of the prescriptions. The use of NSAIDs in women with child-bearing age should be discouraged. Continued medical education on rational prescribing seems necessary.

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نمط صرف أدوية الالتهابات غير الاستريدوية في عيادة طب الأسرة في مستشفى الجامعة الأردنية

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الملخص

الهدف: تهدف هذه الدراسة إلى دراسة وتحليل النمط المتبع في الصرف العلاجي لأدوية مضادات الالتهاب غير الاستريدوية (NSAIDS) لمراجعي عيادة طب الأسرة في مستشفى الجامعة الأردنية.

المرضى وطرق البحث: تمت مراجعة 2077 ملفاً من ملفات المرضى في عيادة طب الأسرة من الفترة الواقعة بين 28-3-2008 وحتى 17-8-2008. حيث كان يتم جمع الملفات جميعا ومراجعتها من قبل الباحثين في نهاية كل جلسة أو مراجعة علاجية.

وقد تم جمع (بالإضافة إلى المعلومات الشخصية: الجنس والعمر) معلومات متعلقة بالوصفة العلاجية من ناحية شكوى المريض –التشخيص– العلاجات التي تم وصفها وعددها وأنواعها وأي مضاعفات من الأدوية التي تم وصفها.

النتائج: أظهرت النتائج أن 343 ملف أي 16.9% من العينة صرف فيها (NSAID) وبلغ معدل عدد الأدوية في الوصفة الواحدة 3.1 (مدى 1-12 وانحراف معياري 1.9). 67% من الوصفات احتوت 3 أدوية أو اقل استعملت الأدوية الأصيلة وفي حوالي 90 % من الوصفات تبين كذلك أن ديكلوفيناك كان أكثر الأدوية غير الاستيرودية تكرارا للصرف بنسبة 45 % يتبعه الأسبرين بنسبة 30% ومن ثم مشتقات حمض البروبونيك بنسبة 15%. 25% من الملفات التي تحتوي على وصفات (NSAID) تخص النساء في عمر الأنجاب في معظم الحالات صرف كل من ديكلوفيناك وحمض البروبونيك في المرتبة الأولى كمسكن لأمراض العضلات أو المفاصل ثم كخافض للحرارة أو مسكن للأمراض الانتانية الفيروسية أو البكتيرية في المرتبة الثانية أما الأسبرين فصرف في معظم الحالات لغرض الوقاية من أمراض القلب أو تجلطات الدم.

الخاتمة: إن نمط صرف (NSAID) في عيادة طب الأسرة، مستشفى الجامعة الأردنية، جيد ومقبول بشكل عام. ورغم ذلك فان عملية صرف الديكلوفيناك كانت زائدة عن اللزوم، حيث انه صرف لأغراض الإنتان البكتيري أو لغرض غير مناسب كما في حالات الأزمة الصدرية القصبية. ولوحظ أن الأدوية الأصيلة تصرف في معظم الوصفات. أما جرعة الأدوية وتكرار تناولها ومدة العلاج لم يتم ذكرها أو تفصيلها في بعض الوصفات الطبية. وعليه فان التعليم المستمر وتدريب مقيمي طب الأسرة على الصرف العلاجي العقلاني لأدوية المضادة للالتهابات غيرالاستيرويدية ضروري وهام.

الكلمات الدالة: طب الأسرة، الوصفات، أدوية الالتهابات غير الاستريدويه NSAID.