Pharmacoepidemiological study of prescription pattern of analgesics, antipyretics, and nonsteroidal anti-inflammatory drugs at Tikrit teaching hospital, Iraq, Tikrit.

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Abstract

A cross sectional study of outpatient prescriptions kept by the pharmacy department at Tikrit teaching Hospital during the period 7th December 2009 until 7th December 2010 ,To examine the outpatients' prescribing pattern of doctors to analgesics, antipyretics, and nonsteroidal anti-inflammatory drugs (NSAIDs) . The type and number of drugs prescribed, patient's diagnoses and age, and the prescribing physician were analyzed. The study sample included 1898 prescriptions, (1040%) of them containing to analgesics, antipyretics, and non steroidal anti-inflammatory drugs (NSAIDs) .There was no significant seasonal variation in the pattern of prescription. The most commonly prescribed agent was paracetamol (63.9%), followed in decreasing frequency by ibuprofen, diclofenac, and aspirin. In few of the prescriptions combination of analgesics, antipyretics, and NSAIDs were used. infection in 40%, and musculoskeletal disorders in 17.7% of all treated cases. The rest were a variety of problems for some of which, the drugs were used inappropriately. Aspirin was used exclusively in adults for cardio-protection, while paracetamol was used mainly as analgesic-antipyretic over all age groups.

دراسة في ألوبائيات الدوائية لطرق وصف المسكنات، خافض الحرارة، ومضادات الالتهابات اللا ستيرويدية الرثوية في مستشفى تكريت التعليمي، العراق، تكريت.

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المستخلص

الدراسة مقطعية للأدوية الموصوفة في الصيدلية الخارجية لمستشفى تكريت التعليمي للمدة من 7 كانون الأول للعام 2009 لل7 كانون الثاني 2010 لفحص وصفات أدويةالأطباء للمرضى الخارجين لأدوية المسكنات، خافض الحرارة، ومضادات الألتهابات اللاستيرويدية الرثوية في مستشفى تكريت التعليمي.نوع وعدد الأدوية الموصوفة ،تشخيص المريض، عمر المريض،والوصفة الطبية تمت دراستها.عدد عينات الدراسة تضمنت(1898) وصفة .لا توجد هناك أختلاف بين فصول السنة بالنسبة لطرق وصف العلاج.الدواء الأكثر وصفا من قبل الأطباء كان البراسيتول يتبعه البروفين،الفولتارين، والأسبرين. في عدد قليل من الوصفات هناك جمع بين المسكنات وخافض الحرارة ،ومضادات الألتهابات اللاستيرويدية الرثوية. الألتهابات كانت 40%والأعتلال الهيكلي العضلي كان 17.7% من مجموع الحالات المعالجة. وباقي الوصفات كانت لأمراض عدة،وصف لها الدواء الغير مناسب.الأسبرين وصف بالأخص لبالغين الذين يعانون من لمرض القلب، بينما البراسيتول وصف كمسكن و خافض للحرارة لجميع الفئات العمرية.

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Introduction

Analgesics, antipyretics, and non steroidal anti-inflammatory drugs (NSAIDs) are among the most commonly prescribed drugs in clinical practice.[1-3] They are commonly used for inflammatory disorders of the musculoskeletal system. They constitute a heterogeneous group of compounds with the common ability to inhibit cyclooxygenase, and thus, prostaglandin synthesis.[4,5] These drugs have a wide range of adverse effects, including but not limited to, gastric ulceration, gastrointestinal bleeding, inhibition of platelet function, inhibition of induction of labor, renal dysfunction, sodium and water retention, and hypersensitivity reactions.[4,5]

Paracetamol is a non-opioid analgesic that have antipyretic activity, however, it is not useful as anti-inflammatory agent and lacks many of the adverse effects of NSAIDs.It is thought to inhibit cyclooxygenase in the central nervous system (CNS). It is much better tolerated than the NSAIDs as analgesic-antipyretic. Only in overdose, it can produce hepatic damage. In few cases it has produced renal injury.[4,5] However, these drugs are perceived by patients as effective for the conditions for which they are prescribed.[6-8] Paracetamol is generally considered to be safe analgesic-antipyretic when used at therapeutic doses. Recent evidence has suggested that it can exacerbate bronchial asthma and chronic obstructive pulmonary disease (COPD) and reduce lung function.[9-12] In many cases, the diagnosis was not found. the use of analgesics, antipyretics, and NSAIDs might be a contributing factor, especially when used for a long time and at a higher cumulative dose, since analgesics, antipyretics, and NSAIDs are available over-the-counter in Tikrit city .[13]

Many studies have shown that the diagnosis was not found, and NSAIDs are overused and some times irrationally prescribed, and that physicians should be educated to practice evidence-based medicine in their use.[13] Vlahovic-Palcevski et al[14] reported that evidence-based medicine was not the leading factor in prescribing NSAIDs during 2000 in Rijeka, Croatia, and Stockholm, Sweden. Bernal-Delgado et al[15] have reported that evidence based outreach visits have improved the physician's behavior on NSAID prescription. Paul and Chauhan[16] reported on the significant use of aspirin in patients with bronchial asthma, where this drug is contraindicated and concluded that awareness programs on rational prescribing of NSAIDs in India are needed.

Although the prescription format may vary slightly from one country to another, most agree on the core elements that should be included in the prescription order.[17-20] These essential elements are: name, address, and telephone number of the prescriber, name and address of the patient, patient's age and weight particularly for the extremes of age, date of prescription, name of drug (preferably the generic name), strength and dosage form, dose and frequency of administration, quantity prescribed, the reason for prescribing the drug, instructions for use, and the signature of the prescriber. In Tikrit city, all of these requirements are recommended and are available in local regulations. In addition, the physician is required to stamp the prescription. The stamp usually contains name, title, and address of physician.

This work was designed to examine the pattern of prescriptions of analgesics, antipyretics, and NSAIDs in a Tikrit teaching hospital located in Tikrit city, and to identify possible deficiencies in indications for use, patients' age and inappropriate medical indications, and provide suggestions for a more rational prescription behavior for such drugs.

Methods

Tikrit teaching Hospital is the biggest hospital that located in Tikrit City . It is utilized by the College of Medicine, Tikrit University for training of Medical Students.

All outpatient prescriptions from within the hospital, irrespective of the clinic of origin, received by and kept in the pharmacy were the target of the study. The study sample included 1898 prescriptions One-year prescriptions during the period 7th December 2009 until 7th December 2010 were analyzed. This period was divided into 4 seasons: spring, summer, fall, and winter. One week (5 working days) of each season was sampled randomly and systemically as every other prescription.

Of these, all prescriptions containing paracetamol and NSAIDs were analyzed for the type and number of drugs prescribed, the diagnosis for which they were given, the age of the patient and the prescribing physician. The physicians involved were not aware of the conduction of the study.

The data generated were fed to the Statistical Package for Social Sciences (SSPS) program and simple descriptive statistics were used to analyze results, microsoft Access screens were used for data entry. If the p value of the test is <0.05, the association was considered significant at the 0.05 level.

Results

Out of 1898 prescriptions reviewed, 1040 (54.8%) of which contained paracetamol or NSAIDs. Paracetamol was the most commonly prescribed among the analgesics, antipyretics, and NSAIDs (63.9%). The next most often prescribed analgesics, antipyretics, and NSAID was ibuprofen, which was present in 14.9% of such prescriptions followed by diclofenac (9%) and aspirin (6.7%) (Table 1). Indomethacin was less frequently prescribed (1.6%).

Combinations of paracetamol with NSAIDs were present in 3% of prescriptions and NSAID combinations (2 or 3) in 0.9% of prescriptions.

There was no significant seasonal variation in the prescribing frequency of the most often prescribed analgesics, antipyretics, and NSAIDs. Using the analysis of variance to compare the frequency of NSAID use with the season, the F statistic was 0.658 and the p-value was 0.578, However, paracetamol was slightly less prescribed in spring (19.5%), while ibuprofen was slightly more prescribed in fall (33.1%). Diclofenac was more prescribed in winter (36.9%) and less so in spring and fall (17.1%). Aspirin was uniformly prescribed over the seasons.

The distribution of drugs prescribed according to the diagnosis was presented in Table 2 Paracetamol was most often prescribed for infections (59%), followed by musculoskeletal pain or trauma, in addition to headache and fever (9.8%), apparently as an analgesic-antipyretic.

In 19.8% of the prescriptions for paracetamol, the indication was either not mentioned or not clearly written and in 1.9% of prescriptions the diagnosis written in the prescriptions was either bronchial asthma or COPD.

Aspirin was found in 6.7% of prescriptions containing analgesics, antipyretics, and NSAIDs. In 36.4% of prescriptions containing aspirin, the indication was cardiovascular disorders. Only in 4 prescriptions aspirin was prescribed for transient ischemic attacks, while in 46.3% the indication was not mentioned or not clearly written. However, the dose in all of the cases was 325 mg apparently; it was prescribed as an anti platelet agent. Ibuprofen was found in 14.9% of prescriptions containing analgesics, antipyretics, and NSAIDs (Table 1). In 44.9% of the prescriptions the indication was musculoskeletal pain or trauma, in 37.6% of the prescriptions the indication was either not mentioned or not clearly written, in 5.7% it was infections and in 2.2% of prescriptions containing ibuprofen, the diagnosis mentioned in the prescription was gastritis and gastroenteritis.

Diclofenac was found in 9% of prescriptions containing analgesics, antipyretics, and NSAIDs (Table1). In 50.5% of prescriptions containing diclofenac, the indication was musculoskeletal pain or trauma, while in 21.9% of prescriptions the diagnosis was not mentioned or not clearly written. In 6.8% of prescriptions the indication was renal colic and 9.4% it was infections.

Indomethacin was found in 1.6% of prescriptions containing analgesics, antipyretics and NSAIDs (Table1). In 34.3% of prescriptions containing indomethacin, the indication was musculoskeletal pain or trauma, while in 31.4% the indication was not mentioned or not written clearly. In 14.3% In 14.3% of such prescriptions the indication was renal colic and in 8.6% it was nonspecific abdominal pain.

A combination of paracetamol with one or 2 NSAIDs was found in 3% of prescriptions containing analgesics, antipyretics, and NSAIDs (Table 1), 50.8% of these the indication was musculoskeletal disorders, while in 20% the indication was not mentioned or not clearly written , In 15.4% the indication was infections.

Combination of 2 or 3 NSAIDs was present in 0.9% of prescriptions containing analgesics, antipyretics, and NSAIDs (Table 1). In 72.2% of these the indication was musculoskeletal disorders and trauma, while in the rest (27.8%) the indication was not mentioned or not written clearly. Arthritis, osteoarthritis, and gout constituted 12% of the musculoskeletal disorders and the rest constituted musculoskeletal pain or trauma.

Concomitant drugs (Table 3) prescribed along with aspirin were mainly (66.8%) those concerning the cardiovascular system.

Paracetamol was prescribed along with anti-infective agents (39.7%), anti histamines, decongestants, expectorants or anti tussives (32.5%), drugs for gastrointestinal disorders (8.8%), and drugs for bronchial asthma (3.3%). Ibuprofen was mainly prescribed alone (52.7%) and in conjunction with anti histamines, decongestants, expectorants or anti tussives (6.5%).
Diclofenac was mainly prescribed alone (50.2%) and in conjunction with anti-infective agent (15.5) and drugs for gastrointestinal disorders (17.8).

Indomethacin was prescribed alone in 24.5% of prescriptions containing aspirin, paracetamol, ibuprofen, diclofenac, and indomethacin.

In all prescriptions containing age, aspirin was prescribed exclusively for

adults and the elderly, while paracetamol was prescribed for all age groups. The other NSAIDs were mostly prescribed for adults and none for children below one year of age (Table 4).

Table 1 :- Distribution of paracetamol and non steroidal anti-inflammatory drugs among the prescriptions.

Drug	Number of prescription	Frequency (%)
Paracetamol	665	(63.9)
Ibuprofen	155	(14.9)
Diclofenac	94	(9)
Aspirin	70	(6.7)
Indomethacin	16	(1.6)
Paracetamol + NSAIDs	31	(3)
NSAID combinations	9	(0.9)
Total	**1040**	**(100)**

NSAID – non steroidal anti-inflammatory drug

Table 2: - Prescribing frequencies of analgesic, antipyretic and non steroidal anti-inflammatory drugs according to the diagnosis.

Diagnosis	Paracetamol	Ibuprofen	Diclofenac	Aspirin	Indomethacin	Paracetamol + NSAIDs	NSAID combinations	Total
Not mentioned	102 (7.2)	54 (17.2)	20 (10.4)	60 (37)	2 (5.7)	6 (9.2)	2 (11.1)	**246**
Not clear	179 (12.6)	64 (20.4)	22 (11.5)	15 (9.3)	9 (25.7)	7(10.8)	3 (16.7)	**299**
Infections	836 (59)	18 (5.7)	18 (9.4)	1 (0.6)	1 (2.9)	10 (15.4)	0 (0)	**884**
Musculoskeletal disorders and trauma	91 (6.4)	141 (44.9)	97 (50.5)	4 (2.5)	12 (34.3)	33 (50.8)	13 (72.2)	**391**
Renal colic	6 (0.4)	2 (0.6)	13 (6.8)	0 (0)	5 (14.3)	2 (3.1)	0 (0)	**28**
Abdominal colic & GIT disorders	47 (3.3)	7 (2.2)	6 (3.1)	1 (0.6)	3 (8.6)	1 (1.5)	0 (0)	**65**
Cardiovascular	11 (0.8)	2 (0.6)	1 (0.5)	59 (36.4)	0 (0)	0 (0)	0 (0)	**73**
Headache and other pains	48 (3.4)	8 (2.5)	5 (2.6)	3 (1.9)	0 (0)	3 (4.6)	0 (0)	**67**
Bronchial asthma and COPD	27 (1.9)	0 (0)	0 (0)	1 (0.6)	0 (0)	0 (0)	0 (0)	**28**
Fever	5 (0.4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	**5**
Others	66 (4.7)	18 (5.7)	10 (5.2)	18 (11.1)	3 (8.6)	3 (4.6)	0 (0)	**118**
Total	**1418 (100)**	**314 (100)**	**192 (100)**	**162 (100)**	**35 (100)**	**65 (100)**	**18 (100)**	**2204***

*The total is more than 1040 as some prescriptions contained two diagnoses, NSAID – Non steroidal anti-inflammatory drug, COPD -Chronic obstructive pulmonary disease, GIT -Gastrointestinal tract, GIT disorders - gastritis and gastroenteritis

Table 3 :- Concomitant drugs* prescribed with analgesic, antipyretic and non steroidal anti-inflammatory drugs.

Concomitant drugs' type	Analgesic, antipyretic or anti-inflammatory drug						
	Aspirin	Paracetamol	Ibuprofen	Diclofenac	Indomethacin	Combination	Total
No other drugs	19 (8.2)	148 (6.6)	186 (52.7)	107 (50.2)	12 (24.5)	48 (55.2)	**520**
Antiinfective agents	2 (0.9)	893 (39.7)	71 (20.1)	33 (15.5)	9 (18.4)	14 (16.1)	**1022**
Antihistamines, Decongestants, Expectorants or Antitussives	2 (0.9)	731 (32.5)	23 (6.5)	3 (1.4)	1 (2)	3 (3.5)	**763**
Drugs for GIT disorders	7 (3)	199 (8.8)	36 (10.2)	38 (17.8)	19 (38.8)	11 (12.6)	**310**
Drugs for Bronchial Asthma	0 (0)	72 (3.3)	0 (0)	0 (0)	0 (0)	0 (0)	**72**
Cardiovascular Drugs	155 (66.8)	10 (0.4)	3 (0.9)	4 (1.9)	0 (00)	2 (2.3)	**174**
Other Drugs	47 (20.2)	196 (8.7)	34 (9.6)	28 (13.2)	8 (16.3)	9 (10.3)	**322**
Total	**232 (100)**	**2249 (100)**	**353 (100)**	**213 (100)**	**49 (100)**	**87 (100)**	**3183**

GIT -Gastrointestinal tract, *Prescriptions contained 1-8 drugs,
**Percentages are not included because this column contain total analgesics, antipyretics or anti-inflammatory drugs

Table 4 :- Age-wise prescribing frequencies for analgesics, antipyretics and non steroidal anti-inflammatory drugs.

Drug	Number of prescriptions (%)							Total
	Newborn (<2 months)	Infants and (2 to <12) months	Children toddler (2 months <2 years)	Adolescents (12 to <18 years)	Adults (18 to 65 years)	Elderly (>65 years)	Not mentioned	
Aspirin	0 (0)	0 (0)	0 (0)	0 (0)	14 (20.9)	3 (5)	52 (74.1)	**69 (100)**
Paracetamol	3 (0.5)	54(8.1)	128 (19.2)	19 (2.9)	128 (19.2)	5 (0.8)	328 (49.3)	**665 (100)**
Ibuprofen	0 (0)	1 (0.3)	3 (1.9)	5 (3.5)	75 (47.9)	2(1.6)	69(44.7)	**155 (100)**
Diclofenac	0 (0)	1 (0.5)	2 (1.6)	3 (3.2)	36 (39)	2 (2.1)	50 (53.5)	**94 (100)**
Indomethacin	0 (0)	0 (0)	1 (2.9)	0 (0)	5 (32.4)	0 (0)	11(64.7)	**17 (100)**
Paracetamol + NSAID	0 (0)	0 (0)	2 (6.5)	1 (1.6)	8 (29.0)	0 (0)	20 (62.9)	**31 (100)**
NSAID Combinations	0 (0)	0 (0)	1 (11.1)	1 (11.1)	5 (50.0)	0 (0)	2 (27.8)	**9 (100)**
Total	**3**	**56**	**272**	**29**	**271**	**12**	**532**	**1040**

NSAIDs – non steroidal anti-inflammatory drugs

Discussion

This study describes the pattern of prescription of paracetamol and NSAIDs in outpatient clinics of Tikrit teaching hospital in Tikrit city, Iraq.

Out of the 1898 prescriptions reviewed, 1040 (54.8%) of prescriptions contained analgesics, antipyretics, and NSAIDs. Moreover, Ravi Shankar et al[22] from a medical department in a tertiary care hospital in Pokhara, Nebal reported that the frequency of prescribing analgesics was 15.09%, which is much lower than our figure. However, our study was performed on outpatient prescriptions irrespective of the department of origin.

Paracetamol was the most often prescribed drug, apparently as an analgesic-antipyretic, which is considered to be an appropriate indication. It could not be concluded that this drug was over prescribed, while in 7.2 % of prescriptions containing it, no diagnosis was mentioned. Concomitant drugs (ant infective agents and antihistamines, decongestants, expectorants and anti tussives) indicate its use as analgesic-antipyretic.

Concerning the NSAIDs, others also have reported that ibuprofen was the most often prescribed NSAID.[16,23] It is perceived to be the safest NSAID concerning gastrointestinal complications.[24,25] The use of ibuprofen for gastritis and gastroenteritis could not be justified as the drug is a gastrointestinal irritant and if such patients need an antipyretic, paracetamol should be the first choice.

Diclofenac was the second most often prescribed NSAID. Others have reported that diclofenac was the most often prescribe NSAID.[14] The use of diclofenac for infections in conjunction with antiinfective agents and antihistamines, decongestants, expectorants, or antitussives is also inappropriate and considered an overuse of the drug. The rational for giving indomethacin for nonspecific abdominal pain also could not be understood.

The combination of more than one systemic NSAID is also an inappropriate practice, while it may be reasonable to combine a topical agent with a systemic one. It is well-known that the use of NSAIDs is associated with a substantial increase in the risk of gastrointestinal bleeding.[6,7]

In most of the cases, aspirin was appropriately prescribed at low dose as an anti platelet agent and in combination with drugs used to treat cardiovascular disorders.

The use of paracetamol in bronchial asthma and COPD or its co-prescription with drugs for bronchial asthma could not be justified in light of recent evidence that it can reduce lung function and exacerbate bronchial asthma and COPD.

Concomitant drugs gave an insight on the indication for the use of NSAIDs. Such agents included mainly anti infective agents; and antihistamines, decongestants, expectorants or anti tussives; and antacids and anti ulcer drugs. The last group was given apparently to protect from the gastrointestinal complications of NSAIDs.

In some of the prescriptions, NSAIDs were inappropriately prescribed, such as for gastritis and nonspecific abdominal pain, whereas in one fourth of prescriptions, the diagnosis was not mentioned or was not clearly written. One can argue that the prescribing physician was not clear on the indication and tried to avoid writing down the diagnosis, especially when he wrote it unclearly. In such cases, no single letter of the word was clear. Such a practice was performed

in a teaching hospital. One should wonder if the same attitude is practiced at a larger scale in primary health care or other health sectors. In such cases, NSAIDs are assumed to have been misused. Knowing that the prevalence of ESRD is high in Iraq, and in many cases the cause could not be identified and the fact that analgesics, antipyretics, and NSAIDs are available over-the-counter in this country, one can assume an association between these drugs and ESRD. However, such an association remains to be investigated. The age distribution of prescriptions for analgesics, antipyretics, and NSAIDs is noteworthy. Aspirin was prescribed for adults and elderly exclusively, which agrees with the indications for these age groups as a cardio protective agent.[26,27] Other NSAIDs were avoided in children below one year of age but mostly prescribed for adults, while paracetamol was prescribed for all age groups.

Conclusion

some of prescriptions for NSAIDs suffered from clear deficiencies in both content and indications. The need for continuing medical education regarding the potential dangers of analgesics, antipyretics, and NSAIDs, the importance of their appropriate and rational utilization and the necessity of appropriate prescription writing regarding both content and indication is obvious.

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