The Impact of Lack of Pharmacist Contribution on the Prescription Patterns and the Appropriateness of Indications of NSAIDs, A Cross-Sectional Study

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ABSTRACT

Purpose: Non-steroidal anti-inflammatory drugs (NSAIDs) are among the most commonly used medications worldwide. However, recent literature strongly points to gastrointestinal (GI) and cardiovascular (CV) risks associated with NSAIDs use. The current study was carried out in Jordan University Hospital. The main objective was to evaluate the role of pharmacists in directing the current prescription patterns and appropriateness of NSAID therapiesto establish strategies for medication reconciliation in the healthcare systems in the region.

Methods: This is a prospective cross-sectional qualitative study that enrolled a total of 400 patients over a period of 10 months. The NSAID use was evaluated in patients with and without established CVD and various GI risk stratifications. In addition, 30 physicians were recruited into the study to determine the current prescription patterns. A structured questionnaire was validated and handed to physicians to determine strengths and weaknesses in the current system. NSAID-related drug interactions were evaluated in 200 of the patients.

Results: Sixty five percent of the patients without CVD were at moderate GI risk and 12% were at high risk. Sixty nine percentof patients with CVD were at high GI risk and 28% were at moderate risk. Pharmacists were not involved in decision therapies pertaining to NSAIDs, which led to serious drug-related problems in the therapeutic regimens for patients using the NSAIDs.In 64% of the patients without CVD, NSAID therapy did not meetthe recommendations of current guidelines. There was no drug therapy monitoring or patient counseling by a proficient clinical pharmacist, whichled to virtually no identification of potential drug interactions or optimization of medication therapy.

Conclusions: The study unraveleda great opportunity to improve the clinical outcomes in patients on NSAID therapy. The lack of pharmacist involvement puts patients at major health risks. Updating physicians on practice guidelines, including a clinical pharmacist in therapy decisions, and modifying hospital formularies are the most urgent recommendations.

Keywords: NSAIDS, gastrointestinal risk, cardiovascular risk, risk stratification, appropriateness, prescription patterns, University of Jordan Hospital, cross-sectional, medicine reconciliation.

INTRODUCTION

Non-steroidal anti-inflammatory drugs (NSAIDs) are among the most commonly used medications in the world.[1] They play a central role in the management of mild to moderate pain, fever, and a vast array of inflammatory conditions. Indeed, current agents within this class of drugs gained official approvals for the management of headaches, neuromuscular disorders, acute gout, osteoarthritis (OA), rheumatoid arthritis (RA), and musculoskeletal pain just to mention a few. Despite the well-known clinical effectiveness of NSAIDs, their use has been linked to a broad spectrum of adverse events affecting different body systems. A striking example of the risks associated with NSAIDs use is the increase in gastrointestinal and cardiovascular events in patients on NSAIDs.[2,3]The gastrointestinal risk in particular has been largely blamed forthe lack of selectivity of NSAIDs as cyclooxygenase inhibitors since cyclooxygenase one is pivotal to the protection of

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the gastrointestinal mucosa.Hence, a subclass of NSAIDs with more cyclooxygenase-2 (COX-2) selectivity was introduced in the early 1990s.[4]Unfortunately, patients on the more selective agents suffered from increased cardiovascular(CV) risks and required thorough patientassessment prior to their use and closer monitoring during the therapy.[5-8]In fact, the Food and Drug Administration (FDA), the European Medicines Agency (EMA), and the American College of Gastroenterology (ACG)agree that the eligibility for NSAID therapy must be decided only after a thorough assessment of GI and CV risk factors in the individual patient.[9-11]

It is currently recommended thatnon-selective NSAIDs should be co-prescribed with a gastro-protective agent in patients with a moderate GI risk.[11-13]A COX-2-selective agent plus a proton pump inhibitor (PPI) is recommended in those with the highest GI risk, and all NSAIDs should be avoided in patients who have high GI and CV risks.[10-13]Interestingly, the FDA clearly states that the CV risk is associated with all NSAIDs, excluding aspirin.[9]

The main objective of this study was to evaluate the current prescription patterns and appropriateness of NSAID therapies in Jordan in compliance with current recommendations issued by the ACG.[11]In addition, the prevalence of NSAID-related GI risk factors in patients, with and without established cardiovascular disease, CVD was determined.The current study provides a grim glimpse of the consequences of neutralizing the role of the clinical pharmacist in patient therapy. On the other hand, we hope that the results of the study willbe a first step in establishing a better health care system in Jordan that incorporates pharmacist-run medication therapy management (MTM) services. Further, to our knowledge, this is the first study in Jordan to be conducted in accordance with the principles of medicine reconciliation. Unlike previous studies that merely reported prescription patterns and the prevalence of drug therapy in Jordan and the Middle East, the current study points to weaknesses and strengths of NSAID therapy in one of the busiest hospitals in Jordan. Our ultimate goal is to provide insights and rationalized suggestions that willhelp improve the health care system in Jordan and similar systems in the region.

METHODOLOGY

Study Design

The current study is a prospective cross-sectional qualitative study that was carried out on patients treated in Jordan University Hospital (JUH).The patients included in the study were those who received prescriptions for NSAIDs as a part of the pharmacologic management of their underlying diseases. The study design encompassed three parallel arms.The first arm assessed the prescription patterns and appropriateness of NSAID therapy in patients without established cardiovascular disease who had various GI risks. The second arm assessed the prescription patterns and appropriateness of NSAID therapy in patients with established CVD. The third arm determined the currentprotocols and practices used to identify and manage NSAID-related drug interactions in patients receiving low daily doses of aspirin (100-325 mg). The aspirin intake was for primary or secondary prevention of myocardial infarction or other major cardiac events in patients with diagnosed ischemic heart diseases. A total of 400 patients and 30 physicians were recruited into the study over a period of ten months. One hundred patients were recruited for each of the first two arms of the study and two hundred patients were recruited for the third arm. Patients were interviewed,their medical records reviewed, and patient data forms were filled according to the study protocol. The protocol was approved by the institutional review board (IRB) of the Jordan University and Jordan University Hospital. The stratification of GI risk in patients on NSAIDs was according to the American College of Gastroenterology (ACG)2009 guidelines.[11]After assessing the GI risk in NSAID users, we assessed the appropriateness of the selected NSAIDs and the rationale for any gastro-protective agentsthat were administered to the patient or newly prescribed by the treating physicians.The study was carried out in JUH in Ammanbetween July 2011 and April 2012.

Data Collection

The inclusion and exclusion criteria were detailed in the study protocol and approved by the IRB as mentioned above. During the time of study, all patients eligible for inclusion were required to provide a verbal informed consent in accordance with the declaration of Helsinki.[14]Patient demographic data, clinical characteristics, medical history, and current medications, including prescribed NSAIDs and gastro-protective agents, were all gathered and documented.

For the first part of the study (patients without established CVD), patients were included if they met the following criteria: 1)Intake of a prescribed daily NSAID for less than three months at the time of recruitment, 2) Low, moderate or high GI risk according to ACG 2009 guidelines, 3) Patients with or without acid-suppressive therapies, and 4) Patients treated as either in patients or out patients at JUH.

Patients were excluded if they have established CVD or diabetes, Framingham score > 20%, and if they were using NSAIDs on a daily basis for more than three months or if NSAIDs were used on anas needed basis.

For the second arm, patients were included if they met the following criteria: 1) Intake of a prescribed daily NSAID for less than three months at the time of recruitment, 2) Established diagnosis of cardiovascular disease (Angina, MI, CAD, CHF, stroke, arrhythmia, or PAD), 3) Daily, intermittent or no use of low dose aspirin (100-325 mg), 4) Low, moderate or high GI risk according to ACG 2009 guidelines, and 5) Patients with or without acid-suppressive therapies.Patients with diabetes, active bleeding, or critically ill (ICU patients) were excluded.

For the third arm, patients receiving daily aspirin for the primary and secondary prevention of CV disease (100-325 mg) and taking two or more medications during a hospital stay were included. Diabetic patients were excluded.

For all arms of the study, the inclusion criteria allowed only males and females over 18 years to participate**.**

Gastrointestinal Risk Stratification

The stratification of the patient's gastrointestinal risk was according to ACG guidelines.[11]Information regarding CV history including any previous history of thrombotic events, i.e. myocardial infarction, angina, stroke, heart failure and peripheral arteriopathy, was collected. These diagnoses were confirmed by reviewing the patient's medical record.

Patients were classified into three GI risk categories (low, moderate and high). In summary, patients were considered to be at low GI risk if they did not have any of the risk factors. Patients at moderate GI risk had one or two risk factors: Age >65 years, concomitant use of low dose aspirin, anticoagulant, or corticosteroid, history of uncomplicated ulcer, and use of two NSAIDS or high dose NSAID. Patients at high GI risk had a history of GI ulcer complication (GI bleeding history or perforation), or the presence of three of the risk factors above.

After assessing the GI risk for NSAID users, we assessed the appropriateness of the selected NSAID and the use of gastro-protective agents as recommended by the 2009 ACG practice guidelines for the prevention of NSAID-induced ulcers.[11]

Identification of Potential Drug – Drug Interaction(pDDIs)

Two hundred patients were included in this arm of the study. Patients were interviewed and their medical records were reviewed to collect information regarding medical therapies that the patients were receiving.Patient length of hospital stay and the number of admissions were also reviewed.

Identification of pDDIs was done using an online interactive analysis program:Lexi-interact online.[15]This program gives monographic information about interactions and severity of the outcome; it also gives information about the onset of interactions and reliability rating. Potential drug interactions were classified according to the severity of interactions into minor, moderate, and major.

Statistical Analysis

The data were analyzed using the Statistical Package for Social Science (SPSS), version 17. Descriptive

statistics were used for the purpose of obtaining frequencies and percentages of demographics,clinical characteristics, GI risk factors, CV history, andpharmacological treatments.The means and standard deviations were calculated forcontinuous variables and percentages for qualitativevariables. Statistical analyses using Pearson and Spearman correlations were performed to find out the statistical significance between the number of pDDIs and different factors.

For calculating the minimum sample size and assuming a Confidence Interval(CI) of 95% and a Power(P) of 90%, the following equation was used.

$N = pqz^2/\delta^2$

Where N is the minimum sample size, Z^2 is the abscissa of the normal curve that cuts off an area at the tails (1 - equals the desired confidence level, e.g., 95%), e is the desired level of precision, p is the estimated proportion of an attribute that is present in the population, and q is 1-p. The value for Z is found in statistical tables which contain the area under the normal curve:

N = (0.5) (0.5) (10.5)/ (0.027) = 98 individuals in each group.

RESULTS

Demographic Characteristics

The demographic details of the patients included in the study are shown in **table 1.**In the first arm of the study (patients with no CVD), women accounted for 67% of the patients and the average age for the group was 43.9 years. Twenty percent of the patients were aged over 65 years in this group. The second arm of the study (patients with established CVD) included also one hundred patients. Most patients were older than 65 years (73%) and females accounted for 64 % of the patients.

Table 1. Demographic characteristics of patients included in the study

Demographic characteristic	Patients with no established CVD (n=100)	Patients with established CVD (n=100)
Age (years) mean ±SD	43.94 ± 17.7	66.79±10.36
Less than 65 years. N(%)	80 (80%)	27 (27%)
Above65 years. N(%)	20 (20%)	73 (73%)
Female. N(%)	67 (67%)	64 (64%)
BMI, kg/m^2		
Underweight	9 (9%)	0 (0%)
Normal	20 (20%)	27 (27%)
Overweight	30 (30%)	43 (43%)
Obese	41 (41%)	30 (30%)
Smokers. N(%)	23 (23%)	2 (2%)
Alcohol drinking. N(%)	8 (8%)	0 (0%)

Clinical Characteristics

For patients with no established CVD, rheumatoid arthritis was the most common indication for prescribing an NSAID (33%) followed by osteoarthritis (26%). On the other hand, in patients with established CVD,the most common indication for prescribing an NSAIDwas osteoarthritis (44%), followed by rheumatoid arthritis (18%).

The most common cardiovascular diseases among patients in the second arm of the study were angina (33%) followed by a history of myocardial infarction (27%) and heart failure (15%).

Percentages of NSAIDs and COX-2 inhibitors prescribed for patients are summarized in **table 2**. For patients with no established CVD, non-selective NSAIDs accounted for around 98% of prescriptions. Of these, diclofenac sodium was the most commonly prescribed NSAID (89%) followed by ibuprofen (5%). Prescription of COX-2 selective agents was very low (2%). A similar prescription pattern was seen in patients

with established CVD.The number of prescriptions for non-selective NSAIDs far exceeded the prescriptions for selective COX-2 inhibitors (94% vs. 6%).In this group, diclofenac sodium was the most commonly prescribed non-selective NSAID (82%), followed by nimesulide (even though it is considered a selective COX-2 inhibitor in many countries, it is listed in JUH formulary as a non-selective agent) and ibuprofen (9%and 3%, respectively). Celecoxib was the only selective COX-2 inhibitor prescribed (6%) in this group of patients.

Gastrointestinal Risk

The two most prevalent risk factors in patients with no established CVD were concomitant use of anticoagulants (51%)followed by concomitant use of corticosteroids (28%), while the least common risk factor was the use of a high doseNSAID. In patients with established CVD, the most common GI risk factorswere concomitant use of an anticoagulant (75%) followed by age above 65 years (73%), and concomitant use of prednisolone (61%).

Taking into account the previous risk factors, patients were classified into three levels of GI risk: low, moderate and high**.**For patients with no established CVD, the highest percentage was for those with moderate GI risk (65%), followed by low GI risk group (23%) and high GI risk group (12 %). On the other hand, most patients with established CVD were identified as having high GI risk (69%). Moderate and low GI risk groups accounted for 28 and 3 %, respectively.

The two gastro-protective agents that were prescribed to patients in JUHwere famotidine 40 mg/day and omeprazole 20 mg/day. Table 3 sumarizes the types of gastro-protective agents used according to different GI risk levels.

Table 2. Types of prescriptions according to GI risk group in patients with or without established CVD

Patients without CVD			
Type of treatment	**Low GI risk N (%)* (n=23)**	**Moderate GI risk N (%)* (n=65)**	**High GI risk N (%)* (n=12)**
NSAID alone	23 (100%)	48 (73.8%)	3 (25%)
COX-2 inhibitor alone	0 (0%)	1 (1.5%)	0 (0%)
NSAID + PPI	0 (0%)	11 (16.9%)	8 (66.7%)
NSAID +H2RA	0 (0%)	5 (7.7%)	0 (0%)
COX-2 inhibitor + PPI	0 (0%)	0 (0%)	1 (8.3%)
Patients with established CVD			
Type of treatment	**Low GI risk N (%)* (n=3)**	**Moderate GI risk N (%)* (n=28)**	**High GI risk N (%)* (n=69)**
NSAID alone	0 (0%)	10 (35.7%)	14 (20.3%)
COX-2 inhibitor alone	0 (0%)	0 (0%)	2 (2.9%)
NSAID + PPI	3 (100%)	18 (64.3%)	43 (62.3%)
NSAID +H2RA	0 (0%)	0 (0%)	6 (8.7%)
COX-2 inhibitor + PPI	0 (0%)	0 (0%)	4 (5.8%)
Naproxen +PPI	0 (0%)	0 (0%)	0 (0%)

PPI: proton pump inhibitor, H2RA: H2 receptor antagonist

*Percentage among each risk group.

Table 3. Types of gastro-protective agents used acoording to different GI risk levels.

Patients Without CVD				
Drug therapy	**Number of prescriptions**	**Low GI risk (n=23)**	**Moderate GI risk (n= 65)**	**High GI risk(n=12)**
Famotidine	5	0	5	0
Omeprazole	20	0	11	9
Patient with CVD				
Drug therapy	**Number of prescription**	**Low GI risk (n=3)**	**Moderate GI risk (n= 28)**	**High GI risk(n=69)**
Famotidine	6	0	0	6
Omeprazole	68	3	18	47

Finally, after classifying patients to different GI risk levels, we assessed the appropriateness of NSAID selection and the appropriateness of using gastro-protective agents according to different GI risk levels**.**

In patients without established CVD, all patients at low GI risk were appropriately treated with nonselective NSAIDs alone. Unfortunately, only 18.4 % of the patients with moderate GI risk were appropriately treated with a COX-2 inhibitor alone or an NSAID plus a gastro-protective agent (PPI) as recommended by the ACG. The remainder of the patients within this GI risk received NSAID alone or NSAID plus H2RA which is considered ineffective in preventing NSAID induced ulcers according to ACG 2009 guidelines. For patients with high GI risk, only8.3 % of the patients received the correct treatment of COX-2 plus PPI.The majority of high risk patients were treated with a nonselective NSAID and a PPI. In summary, only 36 patients (36%)were receiving the appropriate treatment of NSAIDs according to ACG 2009 guidelines, while 64% of the patients were inappropriately treated.

On the other hand, none of the patients with CVD (at low, moderate or high GI risk) received the appropriate treatment according to ACG recommendations.

Evaluation of NSAID-related Drug Interactions

The total number of potential drug-drug interactions (pDDIs) for the 200 patients was 704 interactions. The mean number of pDDIs for each patient was 3.81 interactions. The pDDIs were classified based on the severity of the interaction into major, moderate, and minor interactions. The majority of interactions were of moderate severity(84.5%). Major and minor drug interactions accounted for 12.1% and 3.4 %, respectively.Among the 704 pDDIs, 374 interactions involved aspirin therapy. The most common drug pairs were aspirin-enoxaparin (103 interactions accounting for 14.6% of all interactions).

Statistical analysis by the Pearson correlation indicated a strong relationship between the number of drugs prescribed for each patient and number of pDDIs (r=0.505). There was a weak relationship between the number of pDDIs and the number of admissions in the following three months(Spearman correlation =0.144). When applying the Spearman correlation, there was no significant relationship between the number of pDDIs and the length of hospital stay (r= 0.095). Also there was no correlation between the number of pDDIs and the number of hospital admissions for a period of six months. (Spearman correlation r= 0.045).

Table 4: Frequency and severity of the most common potential drug-drug interactions involving aspirin in the studied population.

Pair of drugs	Frequency (percentage %)*	Interaction Severity
aspirin/enoxaparin	103(14.6)	Moderate
aspirin/furosemide	72(10.2)	Moderate
aspirin/clopidogrel	61 (8.7)	Moderate
aspirin/warfarin	24 (3.4)	Major
aspirin/calcium carbonate	22 (3.1)	Minor
aspirin/levofloxacin	22 (3.1)	Moderate
aspirin/hydrocortisone	18 (2.6)	Moderate
aspirin/enalapril	16 (2.3)	Moderate
aspirin/prednisolone	15 (2.1)	Moderate
aspirin/heparin	11 (1.6)	Major
aspirin/glimepiride	10 (1.4)	Moderate

*Percentage from the total number of drug- drug interactions (704)

DISCUSSION

NSAIDs (non-steroidal anti-inflammatory drugs) comprise a cornerstone in the management of a vast plethora of inflammatory and painful conditions. Unfortunately, NSAIDs' use is not void of serious adverse events. These include gastrointestinal ulceration and bleeding, hepatic and renal toxicities, and an increase in thromboembolic events.[16-20]Using NSAIDs safely requires striking a balance between cardiovascular safety and gastrointestinal safety. NSAIDs that are the safest from a cardiovascular standpoint tend to have higher gastrointestinal toxicity and vice versa, but the risk rankings are not absolute and are based on epidemiologic data.

The ACG recommends naproxen as the NSAID of choice for patients with low or moderate gastrointestinal risk but high cardiovascular risk. These patients, however, will also require a proton pump inhibitor or misoprostol. Finally, patients with high risk of both gastrointestinal and cardiovascular risk should not receive an NSAID,whether COX-2 selective or nonselective.[11]

The study was conductedat Jordan University Hospital (JUH) over a period of 10 months. JUH is one of the busiest hospitals in Amman and the oldest educational hospital in Jordan. In the first part of the study, we looked at the prevalence of GI and CV risk factors in the study population. We excluded all diabetic patients from the study since diabetes is considered a coronary heart disease (CHD) equivalent that may influence the cardiovascular risk stratification.

In patients with established CVD, the most common GI risk factors were concomitant use of an anticoagulant (75%) followed by age above 65 years (73%) and then concomitant use of prednisolone (61%). These results are comparable to those reported by a previous studies in which 76.1% of the patients had an age as the most common GI risk factor for NSAID induced ulcer.[21]Unfortunately, none of the patients werecategorized into different GI risks prior to NSAID therapies by the treating medical team. The assessment of the GI risk was quite subjective.When looking at the individualized treatments for the patients, it was found that that 81.5% of the patients at moderate GI risk and no established CVD were inappropriately treated with nonselective NSAIDs alone or NSIAD plus H2RA (73.8 + 7.7% for NSAID alone or NSAID with H2RA, respectively). Likewise, 91.7% of the patients with high GI risk were inappropriately treated with either nonselective NSAID alone or a non-selective NSAID and a PPI.

As recommended by ACG 2009 guidelines, patients

with established CVD and low or moderate GI risk should be treated with naproxen and a gastro-protective agent like PPI or misoprostol. None of the patients with established CVD who were at low or moderate GI risk werepresprescribed naproxen. For patients with CVD and high GI risk, NSAIDs including COX-2 inhibitors should be avoided and an alternative therapy including tramadol, narcotics, non-pharmacologic therapies, topical therapies, and surgeries, if necessary, should be recommended. None of the patients who were at high GI risk wereprescribed an alternative therapy. In other words, all patients with established CVD were inappropriately treated. The choice of an NSAID was wrong for CVD patients with low and moderate GI risk as none of the patients wereprescribed naproxen. The use of gastro-protective agents was prescribed only for 64.3% of patients with moderate GI risk. When numbers werecombined, only 21% of the total population of patients with established CVD at low and moderate GI risk was prescribed a gastro-protective agent for prevention of NSAID induced GI toxicity. Hence, the need for the active involvement of a clinical pharmacist in selecting the appropriate NSAID and modification of the risks is undeniable.

Interestingly, in a Spanish population of osteoarthritis patients, more than 90% of patients were at increased GI risk and 60.3% of them were at high risk for cardiovascular events. When both the GI and CV risks were combined, 51% of the study population was prescribed drugs that were either not recommended or contraindicated.[23]The latter finding shows that NSAIDs therapies, in particular, mandate the involvement of a clinical pharmacist regardless of the geographic or ethnic differences between patients.

Several studies have shown that the use of non-selective NSAIDs is associated with an increased risk of cardiovascular events.[5,8,24-28] Despite the fact that absolute risk is low, evidence showed that higher doses or frequency of use increases the risk more.[5,8]Naproxen is considered the safest among NSAIDs with respect to cardiovascular risk.[24]A recent meta-analysis (including 31 trials of116,429 patients with average follow up of one year) evaluated the cardiovascular effects of three non-selective NSAIDs (naproxen, ibuprofen, and diclofenac) and four COX-2 selective NSAIDs (celecoxib, etoricoxib, rofecoxib, and lumiracoxib). It has shown that ibuprofen was associated with the highest risk of stroke (3.36, 1.00to 11.6), followed by diclofenac (2.86, 1.09 to 8.36).The highest risk of myocardial infarction was associated with rofecoxib (rate ratio 2.12, 95% credibility interval 1.26 to 3.56), followed by lumiracoxib (2.00, 0.71 to 6.21). Etoricoxib (4.07, 1.23 to 15.7) and diclofenac (3.98, 1.48 to 12.7) were associated with the highest risk of cardiovascular death.[24]

Non-selective NSAIDs were the most commonly prescribed NSAIDs among JUH patients with CVD (94%). The CV risk of the individual agent did not have any impact on the drug selection. In fact, 89% of the patients with established CVD were prescribed diclofenac sodium. This NSAID has been shown in a recent study to increase the risk for cardiovascular mortality after a single day of treatment.[30]These results may reflect the inappropriate knowledge of physicians of the risks associated with NSAIDs and the lack of proper assessment of both GI and CV risk in patients prescribed NSAIDs.

On the other hand, only 6% of the patients were receiving celecoxib, which was the only COX-2 selective NSAID available in JUH formulary. Patients with established CVD who were prescribed celecoxib in this study had high GI risks as well. Hence, it seems that prescribing physicians took into consideration the GI risk but not the CV risk in selecting an NSAID to treat their patients. Celecoxib would be inappropriate for patients with high GI and high CV risks.[11]

The cardiovascular effects of celecoxib are seen in the recent meta-analysis mentioned above.[24]The risk of myocardial infarction (MI) with celecoxib compared with a placebo (RR, 1.35, 95% CI, 0.71-2.72) was lower than that for rofecoxib (RR 2.12, 95% CI 1.26-3.56) or ibuprofen (RR 1.61, 95% CI 0.50-5.77), but greater than naproxen (RR 0.82, 95% CI 0.37-1.67), which had the most favorable cardiovascular risk profile.[26]

Identification and management of NSAID-related drug interactions were selected in this study to determine points of strengths and weaknesses in the current healthcare system in Jordan.

Finally, the current study is the first study in Jordan to evaluate the prescription patterns and appropriateness of NSAID therapy for the purpose of establishing strategies for medication reconciliation. The latter is a relatively new concept in Jordan and the region since the focus of patient treatment has been primarily rotating around physician competency and skills. In fact, there is currently no defined responsibility or active involvement of clinical pharmacists in patient treatments in Jordan. This could be largely attributed to poor communication and trust issues between physicians and their pharmacist colleagues. Unfortunately, the same grim relation between pharmacists and physicians is observed in most of the Middle East and North African countries. To complicate things further, all NSAIDs can be purchased without a prescription in Jordan and neighboring countries. Hence, an established role for community and clinical pharmacists in medication selection and monitoring is pivotal to improve the clinical outcomes for patients. Medication reconciliation strategies are essential to establish a better role for the pharmacist and optimize patient therapies.

CONCLUSIONS

This study provides valuable information on the high prevalence of GI risk factors in patients who receive NSAID therapy in Jordan. It shows that adherence to guidelines for safe prescription of NSAIDs was poor**.**The study unravels a great opportunity to improve the clinical outcomes in patients on NSAID therapy. Updating physicians on practice guidelines, including a clinical pharmacist in therapy decisions, and modifying hospital formularies are the most urgent recommendations to improve the healthcare systems in the region.

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نظرة فاحصة على استخدام المضادة للالتهابات غير الستيرويدية في سكان الأردن من حيث أنماط الوصفات الطبية، وملاءمة المؤشرات وفرص المصالحة في استخدام الدواء

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ملخـص

الهدف من الدراسة: الأدوية المضادة للالتهابات غير الستيرويدية (المسكنات) هي من بين الأدوية الأكثر استخداما في جميع أنحاء العالم. ومع ذلك فان الدراسات الحديثة تشير بقوة إلى المخاطر المرتبطة باستخدام المسكنات على الجهاز الهضمي والقلب والأوعية الدموية. وقد أجريت الدراسة الحالية في مستشفى الجامعة الأردنية. وكان الهدف الرئيس لها تقييم أنماط الوصفات الطبية الحالية ومدى ملاءمة العلاجات بالأدوية المضادة للالتهابات غير الستيرويدية بهدف وضع استراتيجيات للملاءمة والمصالحة في استخدام الدواء بين الواقع والمطلوب في نظام الرعاية الصحية الأردنية ونظم مماثلة في المنطقة.

الأساليب: يعتبر هذا البحث دراسة نوعية مستعرضة شملت مجموعتين مستهدفتين؛ المرضى والأطباء. تم تقييم استخدام الأدوية المضادة للالتهاب في المرضى الذين يعانون من الأمراض القلبية الوعائية والمرضى الذين لا يعانون من الأمراض القلبية الوعائية ومختلف عوامل الخطورة للأضرار التي تلحق بالجهاز الهضمي نتيجة استخدام المسكنات. تم توظيف ما مجموعه 400 مريض و 30 طبيبا في الدراسة. وقد تم اختيار المرضى ومتابعتهم على مدى فترة 10 أشهر. تم التحقق من صحة استبانه منظمة أعطيت للأطباء لتحديد نقاط القوة والضعف في النظام الطبي الحالي. وجرى تقييم التداخلات الدوائية المتعلقة بالأدوية المضادة للالتهابات غير الستيرويدية.

النتائج: أشارت الدراسة إلى ان 65٪ من المرضى الذين لا يعانون من الأمراض القلبية الوعائية كانوا على درجة خطورة متوسطة للإصابة بالأضرار المتعلقة بالجهاز الهضمي بينما كان 12٪ منهم على درجة خطورة عالية. وكان 69٪ من المرضى الذين يعانون من الأمراض القلبية الوعائية بدرجة خطورة عالية للإصابة بالأضرار المتعلقة بالجهاز الهضمي و 28٪ منهم كانوا على درجة خطورة معتدلة. كما أشارت الدراسة إلى ان 64٪ من المرضى الذين لا يعانون من الأمراض القلبية الوعائية، لم يتوافق العلاج بالمسكنات مع توصيات الجهات العالمية التوجيهية الحالية و لم تكن هناك مراقبة للعلاج بالادوية المسكنة ولم تقدم المشورة للمريض من قبل الصيدلي السريري. كل هذا أدى الى عدم تعرف التداخلات الدوائية أو الاستفادة المثلى من العلاج بالدواء.

الاستنتاجات و التوصيات. كشفت الدراسة عن فرصة كبيرة لتحسين النتائج السريرية في المرضى الذين يتلقون العلاج بمضادات الالتهاب غير الستيرويدية. إن تحديث معلومات الأطباء بشأن المبادئ التوجيهية للممارسة و إدراج الصيدلي السريري في اتخاذ قرارات العلاج وتعديل قوائم الادوية في المستشفى هي التوصيات الأكثر إلحاحا لتحسين نظم الرعاية الصحية في المنطقة.

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