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The effect of celecoxib on kidney function in elderly people in the Saudi health sector

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Abstract: The aim of this research is to evaluate the impact of celecoxib on kidney function among elderly individuals within the Saudi healthcare system. The study's target population comprises kidney patients residing in Riyadh. Given the challenges associated with conducting a comprehensive inventory of all individuals within this population, the research employed a sampling approach. Specifically, a simple random sample of patients was selected from both the King Salman Center for Kidney Disease and the Dialysis Center at Diriyah Hospital, resulting in a total of 150 participants in the study sample. To collect data, an electronic questionnaire will be utilized, and the respondents will consist of kidney patients in Riyadh. Data analysis will be conducted using SPSS23. Findings from the study indicate potential adverse effects of NSAIDs on renal health. In conclusion, the use of NSAIDs, by inhibiting the inflammatory response mediated by COX enzymes, which forms the fundamental approach to managing pain and fever, may expose patients to harmful and hazardous kidney-related side effects. Therefore, it is imperative for healthcare practitioners to exercise caution when prescribing short-term celecoxib medication, as it has been associated with significant or life-threatening renal failure in patients with both normal and impaired renal function. Patients with severe renal conditions should avoid the use of celecoxib altogether.

Keywords: NSAIDs, celecoxib, kidney, renal, elderly people, old people.

تأثير السيليكوكسيب على وظيفة الكلى لدى كبار السن في قطاع الصحة في المملكة العربية السعودية

الدكتورة / هيله صالح الخليفي*[1]، الممرضة / تالا سعيد المطيري[1]، الممرضة / نوره ابراهيم البتال[1]
[1] مدينة الملك فهد الطبية | تجمع الرياض الصحي الثاني | وزارة الصحة | المملكة العربية السعودية

المستخلص: يهدف البحث إلى تقييم تأثير سيليكوكسيب على وظيفة الكلى لدى كبار السن ضمن نظام الرعاية الصحية في المملكة العربية السعودية. يتألف مجتمع الدراسة من مرضى الكلى المقيمين في الرياض. نظرًا للصعوبات المرتبطة بإجراء جرد شامل لجميع الأفراد في هذا السكان، اعتمد البحث منهج العينة. تم تحديد عينة عشوائية بسيطة من المرضى من مركز الملك سلمان لأمراض الكلى ومركز الغسيل في مستشفى الدرعية بشكل خاص، مما أسفر عن مشاركة إجمالية قدرها 150 مشاركًا في عينة الدراسة. لجمع البيانات، سيتم استخدام استبيان إلكتروني، وسيكون المجيبون من مرضى الكلى في الرياض. سيتم إجراء تحليل البيانات باستخدام SPSS23. تشير النتائج التي توصلت إليها الدراسة إلى وجود تأثيرات سلبية محتملة للمضادات الالتهابية غير الستيرويدية على الصحة الكلوية. في الختام، يمكن لاستخدام المضادات الالتهابية غير الستيرويدية، من خلال قمع الاستجابة الالتهابية المتوسطة بواسطة إنزيمات COX، والتي تشكل الأساس الأساسي لإدارة الألم والحمى، أن يعرض المرضى لتأثيرات جانبية ضارة وخطيرة على الكلى. لذلك، من الضروري بالنسبة لممارسي الرعاية الصحية أن يمارسوا الحذر عند وصف دواء سيليكوكسيب على المدى القصير، نظرًا لارتباطه بحالات فشل الكلى الكبيرة أو التي تهدد الحياة لدى المرضى ذوي وظائف كلوية طبيعية ومتضررة على حد سواء. يجب على المرضى الذين يعانون من حالات كلوية شديدة تجنب استخدام سيليكوكسيب بشكل عام.

الكلمات المفتاحية: المضادات الالتهابية غير الستيرويدية، سيليكوكسيب، الكلى، الكلوية، كبار السن، كبار السن.

Introduction

NSAIDs, or nonsteroidal anti-inflammatory medications, are usually used to treat pain and inflammation. Traditional NSAID use has been linked to significant gastrointestinal side effects include ulceration, bleeding, and perforation. The US Food and Drug Administration (FDA) approved the first two selective cyclo-oxygenase-2 (COX-2) inhibitors, celecoxib and rofecoxib, for commercialization in December 1998 and May 1999, respectively. The selective COX-2 inhibitors, often known as coxibs, were created in part with the hope that they would be safer than traditional NSAIDs. The kidneys are the second most frequently impacted organ by side effects from NSAID use, right behind the gastrointestinal tract. Reduced renal perfusion, decreased glomerular filtration rate, decreased sodium/potassium excretion, oedema, elevated blood pressure, and interstitial nephritis are some of the deleterious effects of NSAIDs on the kidneys (Ahmad et al., 2002).

Through the liver's CYP2C9 enzyme, celecoxib is converted to an inactive alcohol metabolite and a carboxylic acid metabolite. However, more studies are required to examine the potential pharmacological interaction between celecoxib and other medications that are used concurrently, which could increase its nephrotoxicity (Alkhuja et al., 2002).

Nonsteroidal anti-inflammatory medications (NSAIDs) are frequently used to treat inflammatory disorders, as well as acute and chronic pain. These medications could have a number of negative effects, including ones that affect renal function. Nonselective NSAIDs work by inhibiting COX-1 and COX-2, which, in addition to having positive benefits, may potentially increase the likelihood of unpleasant reactions by reducing prostaglandins' anti-inflammatory properties (Brater, 2002).

Fluid and electrolyte imbalances, acute renal failure, and other renal consequences can all be brought on by NSAID use. Patients are more likely to experience these harmful kidney effects if they have a risky underlying condition, which is typically a concurrent disease. This is especially true in the case of acute renal failure. Patients who have either actual or effective circulation volume depletion are at risk for this condition. Preexisting hypertension, diabetes, and co-existing illness, particularly in senior patients, are additional risk factors for harmful renal consequences. Age is not a risk factor for NSAID-associated renal impairment because NSAIDs do not negatively influence glomerular filtration rate (GFR) in elderly patients with normal renal function and no risk factors (HARRIS, 2000).

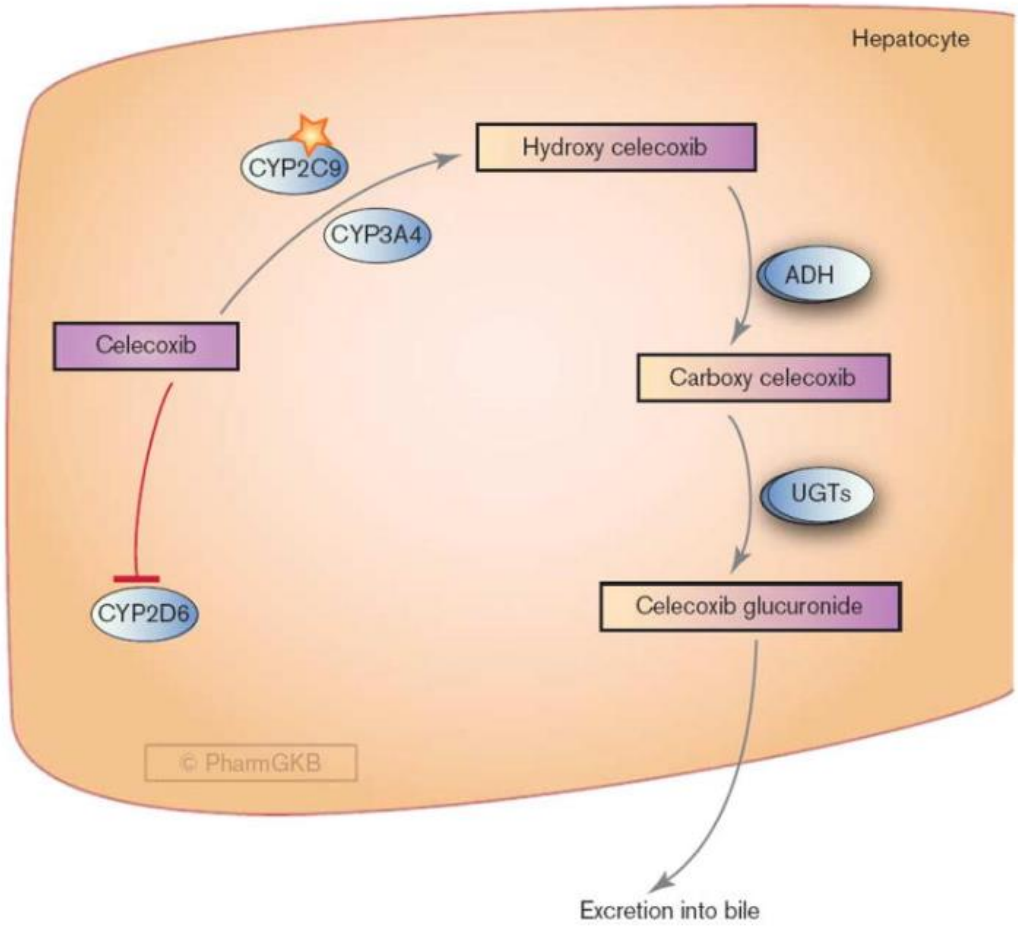
Literature review

Celecoxib pathways: pharmacokinetics and pharmacodynamics

The properties of NSAIDs (nonsteroidal anti-inflammatory drugs, celecoxib) include anti-inflammatory, analgesic, and antipyretic properties. Approved to treat acute pain, ankylosing spondylitis, rheumatoid arthritis, and osteoarthritis. In addition to its use as an adjuvant to surgery to treat patients with familial adenomatous polyposis (FAP), a genetic disease that increases the risk of developing colon cancer, celecoxib also has promise in cancer prevention. is shown. The anti-inflammatory and analgesic effects of celecoxib are due to the specific inhibition of PG G/H synthase 2 (encoded by the gene PTGS2), which prevents prostaglandin (PG) synthesis. The two PTGS isoforms, PTGS1 and PTGS2, are commonly referred to as COX, although they have both cyclooxygenase (COX) and hydroperoxidase activities. See the Pharmacodynamics section for more information (Grosser, 2006).

The common name for this subclass of NSAIDs, known as coxibs, is COX-2 selective inhibitors (pdCOX-2 inhibitors), which includes celecoxib. Most conventional NSAIDs (tNSAIDs) inhibit both COX isoforms. However, some have COX-2 selectivity comparable to celecoxib, even though they were manufactured before the discovery of COX-2. Compared to tNSAIDs, which inhibit both COX isoforms, pdCOX-2 inhibitors have anti-inflammatory effects with a lower risk of significant gastrointestinal injury (Lanas & Sopeña, 2009).

PdCOX-2 inhibitors have significant therapeutic benefit in many patients with severe arthritis or susceptibility to nonselective NSAIDs due to gastrointestinal side effects. Measuring people who benefit from celecoxib but do not experience side effects would be very helpful in treatment management for patients who require anti-inflammatory pain therapy or who are at high risk for colorectal adenomas. Understanding the pharmacogenomics of these pathways could potentially make celecoxib therapy more individualized and effective (Grosser et al., 2006).



ADH, alcohol dehydrogenases; UGTs, UDP glucuronosyltransferases: hepatic metabolism of celecoxib (Grosser et al., 2006).

Pharmacokinetics

Celecoxib is rapidly absorbed after oral treatment, reaching maximum serum concentrations after approximately 3 hours. Because a significant portion of the drug is metabolized in the liver, the amount of drug excreted unchanged (3%) is very small. Celecoxib is primarily excreted in the urine and feces. The main metabolic process that converts celecoxib to hydroxycelecoxib is methyl hydroxylation. CYP2C9 is primarily responsible for catalyzing this process, with CYP3A4 contributing only a small amount (25%). Cytosolic alcohol dehydrogenases ADH1 and ADH2 further oxidize hydroxycelecoxib to carboxycelecoxib, which is then combined with glucuronic acid by UDP-glucuronosyltransferase to generate 1-O-glucuronide. All metabolites are pharmacologically inactive (Sandberg et al., 2002). Because CYP2C9 is primarily involved in mediating celecoxib metabolism, celecoxib pharmacokinetics and drug response variability are expected to be directly influenced by CYP2C9 polymorphisms. Exposure to celecoxib is higher in subjects with poor CYP2C9 substrate metabolism (e.g., CYP2C9*3 allele carriers) than in subjects with normal CYP2C9 activity. Therefore, celecoxib users should be careful when taking drugs that inhibit CYP2C9 (Metabolism, 2001).

Pharmacodynamics

Celecoxib provides analgesic and anti-inflammatory effects by preventing the formation of certain inflammatory prostanoids (PGs). The end products of fatty acid metabolism resulting from tissue-specific COX enzyme activity are prostanoids such as PG and thromboxane. These substances play important roles as physiological and pathological mediators in various biological processes such as inflammation, pain, cancer, glaucoma, osteoporosis, cardiovascular diseases, and asthma. The synthesis of prostanoids (PGs) requires the utilization of arachidonic acid (AA). The first step in PG synthesis occurs after an inflammatory or mitogenic signal

stimulates the cell membrane, producing cellular phospholipids by secreted (sPLA2, encoded by the gene PLA2G2A) or cytoplasmic (cPLA2, expressed by the gene PLA2G4A) PLA2. This occurs when AA is released from Phospholipase (FitzGerald, 2004).

Two isoenzymes, COX-1 (encoded by PTGS1) and COX-2 (encoded by PTGS2), catalyze the synthesis of prostanoids as soon as AA is released. As already mentioned, this requires two consecutive reactions. The first COX reaction first converts AA to PGG2. In the second reaction, PGG2 is converted to PGH2. Subsequently, tissue-specific PG synthases convert PGH2 into the active metabolites PGE2, prostacyclin (PGI2), thromboxane (TA2), PGD2, and PGF2. These active metabolites modulate various physiological responses such as inflammation, fever, blood pressure regulation, coagulation, and gastrointestinal protection by interacting with specific prostanoid G protein-coupled receptors (Funk, 2001) .

Antineoplastic actions of celecoxib

In clinical trials for various malignancies, selective COX-2 inhibitors, particularly celecoxib, are being investigated as potential chemopreventive and therapeutic agents for cancer. Since the 1980s, patients with FAP, an inherited disease that often causes colon cancer, have been treated with nonselective NSAIDs such as sulindac as an adjunct to surgery to prevent colon tumors. Both FAP patients and sporadic colorectal adenoma patients have demonstrated that celecoxib dramatically reduces the number of colorectal polyps. Both in vitro and in vivo studies with celecoxib have shown anticancer effects against established invasive cancers such as prostate, lung, and colon cancers. Its anticancer effects may involve both COX-dependent and COX-independent pathways, but their exact nature is unclear (Schönthal, 2006).

Celecoxib modulates a wide variety of tumor-associated molecular events in in vitro tests, but these have not yet been put into a clear context that explains clinical responses, and the majority of COX-independent actions were only shown in vitro at supratherapeutic dosages. Cell culture experiments have shown that the cell cycle inhibitors p21 (encoded by the gene CDKN1A) and p27 (encoded by the gene CDKN1B) are expressed more and cyclins (encoded by the genes CCNA1, CCNB1, and CCND1) are expressed less when celecoxib-mediated inhibition of cell cycle progression is present. Human colon cancer cells treated with celecoxib also show increased degradation of the oncoprotein -catenin (encoded by gene CTNNB1), which is linked to pronounced decreases in tumor cell growth (Maier et al., 2005).

Another important limitation is that these investigations were carried out at 10-100 times higher in vitro doses than the plasma level of individuals. Celecoxib induces apoptosis by activating proapoptotic molecules including caspases and CHOP (encoded by the gene DDIT3) and inhibiting antiapoptotic ones like PDK1 (encoded by the gene PDPK1) and its downstream target AKT1. The anticancer effects of celecoxib may also be influenced by inhibition of angiogenesis and tumor cell invasion. In cancer tissues and cell lines, celecoxib therapy reduced vascular endothelial growth factor production and inhibited matrix metalloproteinase 9 (Peluffo et al., 2004).

The toxic effects of celecoxib and ibuprofen on liver and kidney

Effect of the NSAIDs on the serum level of ALT, AST, ALP, and TSB in rats:

Aziz et al., 2018 found that when compared to the ibuprofen and control groups, the results for the celecoxib group showed a significant increase (p0.05) in the serum levels of AST, ALT, ALP, and TSB, while those for the ibuprofen group showed a non-significant difference (p>0.05) in the levels of ALT and ALP.

Effect of the NSAIDs on the serum level of urea and creatinine in rats:

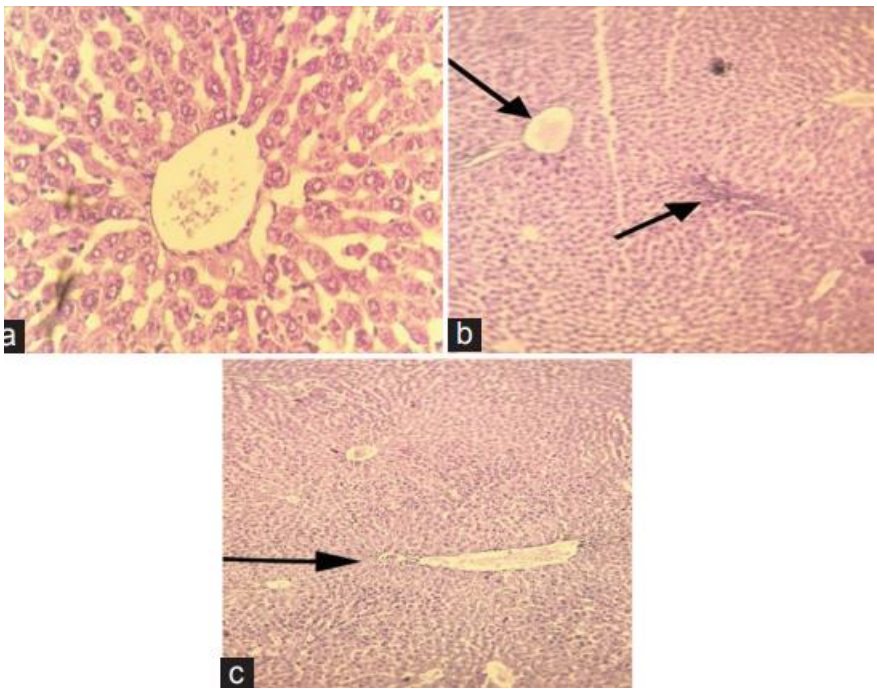
Aziz et al., 2018 showed a significant difference (p>0.05) between the three groups in the serum level of creatinine (0.69, 0.77, and 0.72) but not in the serum level of urea (29.66, 41.50, and 35.83), with the highest level in the ibuprofen group when compared to both celecoxib and control groups.

Hepatic alterations

Histologically, liver changes in the celecoxib group manifested as mild chronic portal inflammation and vascular congestion. Serum levels reflecting significant changes in biochemical indicators in rats also indicate that administration of celecoxib at the

indicated doses can cause hepatotoxicity. These results are consistent with those of Nachimuthu et al. observed in a clinical trial of celecoxib in 2001 (Nachimuthu et al., 2001).

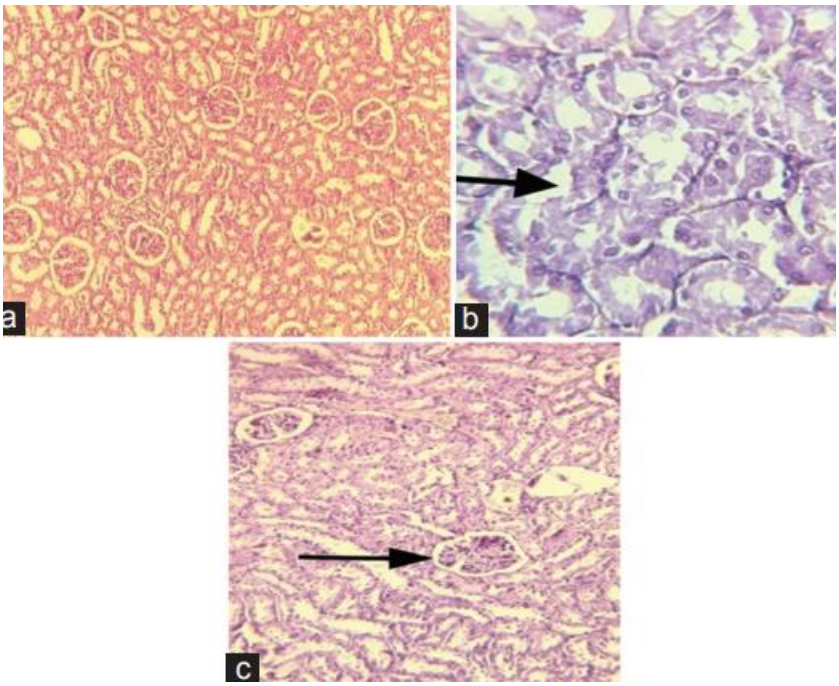
AST, ALT, and ALP activities are widely used as biochemical markers of liver function. Increased levels of these enzymes in the blood are caused by structural and functional changes in the liver. All liver diseases are characterized by high serum levels of these aminotransferases (AST and ALT). In fact, exceptionally high levels of >1000 units can occur in acute hepatitis (Vasudevan and Sreekumari, 2007)



liver tissue slices from the treated and untreated groups. (A) Histology of a normal control rat liver (400); (B) histological abnormalities in the portal tract and vascular congestion in ibuprofen-treated rats; and (C) chronic vascular inflammation in the liver of rats pretreated with celecoxib (Aziz et al., 2018).

Kidney alterations

In the ibuprofen group, the kidneys were characterized by marked vascular congestion and partial tubular necrosis in the cortex and medulla. In contrast, the celecoxib group showed severe diffuse vascular congestion that was not primarily confined to the cortex. This result is consistent with the study of Rania et al. (2013) have shown that high doses of chronic NSAIDs contribute to the development of glomerular changes in the filtration barrier. There is focal enlargement of the mesangium of some glomeruli (intraglomerular fibrosis) and partial tubular necrosis. Celecoxib thinned the glomerular basement membrane, decreased density, increased mesangial area, and enlarged slit pores and foot processes. However, at the same dose, ibuprofen is more harmful than celecoxib, causing severe necrotizing pyelonephritis (Nasrallahetal., 2013).



Part of the histological structure of the kidneys in the treated and untreated groups. (A) Histology of normal control rat kidney (400). (B) Partial tubular necrosis, a histological change observed in rats treated with ibuprofen. (C) Increased glomerular mesangium. Changes previously observed in rats administered renally with celecoxib (Aziz et al., 2018).

In patients with cirrhosis and ascites, nonsteroidal anti-inflammatory drugs (NSAIDs), potent inhibitors of prostaglandin synthesis, significantly reduce renal blood flow, glomerular filtration rate (GFR), sodium, and free water. decreases to excretion, and natriuretic response to diuretics. NSAIDs have therapeutic benefits because they can prevent the production of prostaglandins catalyzed by the enzyme cyclooxygenase (COX). Celecoxib, a selective COX-2 inhibitor, has been reported to be a more effective NSAID than traditional NSAIDs in the treatment of inflammation. It was recently demonstrated that celecoxib does not adversely affect renal function in rats with cirrhosis and ascites (Guevara et al., 2004).

Acute renal failure (ARF) has many important causes, including acute interstitial nephritis (AIN). Antibiotics, nonsteroidal anti-inflammatory drugs (NSAIDs), anticonvulsants, diuretics, and other substances can cause this condition. To alleviate the known gastrointestinal and renal toxicity of nonselective NSAIDs, selective inhibitors of cyclooxygenase 2 (COX-2) have been used in clinical therapy. Although data on the nephrotoxicity of COX-2 inhibitors are still in the early stages of development, it is generally accepted that NSAID-associated nephrotoxic renal syndromes include edema, electrolyte imbalance, and acute and chronic renal failure. Masu. Initially, the widespread organ toxicity of NSAIDs was thought to be due to nonselective inhibition of cyclooxygenases. Cyclooxygenase 1 (COX-1) is a constituent enzyme important for maintaining the functions of the kidneys, intestines, and other organs, and COX-2 has been thought to be mainly induced in response to inflammation. , two isoforms of this enzyme (Henao et al., 2002). Both hypertonic and water-deficient conditions cause COX-2 expression in interstitial cells of the renal medulla, and selective COX-2 inhibitors may sensitize the medullary region of the kidney to cell death under these conditions. suggests that there is. All non-selective NSAIDs inhibit his COX-2 and therefore have sodium retention as a side effect. Therefore, COX-2-specific inhibitors may be equally effective. The anti-inflammatory drugs rofecoxib, celecoxib, diclofenac and flurbiprofen significantly reduced urinary sodium and potassium excretion compared to placebo when administered orally once daily for 4 days to rats, whereas meloxicam It wasn't. Independent of COX-2-COX-1 selectivity, NSAIDs administered orally to rats for 4 days showed short-term and time-dependent effects on urinary electrolyte excretion (Harirforoosh & Jamali, 2005).

Aim of the study:

This study aims to assess the effect of celecoxib on kidney function in elderly people in the Saudi health sector.

Objectives:

- Assess knowledge of elderly towards celecoxib.
- Assess attitude of elderly towards celecoxib.
- Assess the effect of celecoxib on kidney function in elderly people

ANALYSIS AND RESULTS

Research Approach

The current study used the analytical method, through which statistical methods used in analyzing the research data of questionnaire study achieve the objectives of the research.

Data Analysis

The research will use the SPSS2 3to analyze the data of questionnaire using Alpha coefficient, Frequencies, percentages, mean, standard deviation and Pearson correlation coefficient

Study population and sample

The study population consists of kidney patients in the city of Riyadh. As a result of the difficulty of conducting a comprehensive inventory of all members of the study population; The study used the sample method by selecting a simple random sample of patients from the King Salman Center for Kidney Disease and the Dialysis Center at Diriyah Hospital. The number of members of the study sample reached 150 individuals.

Study tool

The research will use the electronic questionnaire form as a tool for the field study by preparing the questionnaire and its axes and phrases by using the theoretical framework of the study, previous studies related to the subject of the study. The Likert scale was used in answering the questions of the study tool

Validate the study tool

The validity of the questionnaire statements was calculated by calculating the value of the Pearson correlation coefficient between the degree of each statement and the total degree to determine the level of internal consistency of the study tool. This means that the tool has a high validity level and is valid for study purposes.

Reliability of the study tool

The Reliability coefficient of the scale was also extracted using Cronbach's alpha method, and the Reliability value was (0.994), which is an excellent value and higher than 0. 7and the study tool is high Reliability.

Demographic

- Age:

Divided is Less than 40 years old 10%, From 40 to less than 50 years old 26%, from 50 to less than 60 years old 37.3% and 60 years old and over 26.7 %

Table (1) sample according to age

Categories	N	%
Less than 40 years old	15	10
From 40 to less than 50 years old	39	26
From 50 to less than 60 years old	56	37.3
60 years old and over	40	26.7
Total	150	100

Statistical analysis showed that highest age group that full questionnaire is From 50 to less than 60 years old.

- Gender

Divided male 74.7 % and female 25.3% of the study sample

Table (2) sample according to gender

Categories	N	%
Male	**112**	**74.7**
female	**38**	**25.3**
Total	**150**	**100**

Statistical analysis showed that male participants were the largest participants in our sample than female.

- Marital status

Divided Married 78 % and Single 22% of the study sample

Table (3) sample according to Marital status

Categories	N	%
Married	**117**	**78.0**
Single	**33**	**22.0**
Total	**150**	**100**

Statistical analysis showed that the highest group that filled questionnaire was married group.

- Are you smoker?

Divided Yes 64.7 % and No 35.3% of the study sample

Table (4) sample according to smoke

Categories	N	%
Yes	**97**	**64.7**
No	**53**	**35.3**
Total	**150**	**100**

Statistical analysis showed increasing incidence of smoking among participants.

- Are you hypertensive?

Divided Yes 64.7 % and No 35.3% of the study sample

Table (5) sample according to hypertensive

Categories	N	%
Yes	**81**	**54**
No	**69**	**46**
Total	**150**	**100**

Statistical analysis showed increasing incidence of hypertension among participants.

- Are you diabetic?

Divided Yes 59.3 % and No 40.7% of the study sample

Table (6) sample according to diabetic

Categories	N	%
Yes	**89**	**59.3**
No	**61**	**40.7**
Total	**150**	**100**

Statistical analysis showed increasing incidence of diabetes among participants.

knowledge and attitude

- Do you know that celecoxib nephrotoxic?

Divided Yes 71.3 % and No 28.7% of the study sample and mean is 1.713 and S.D 0.454 and it is evident that the study sample has a high level of knowledge that celecoxib nephrotoxic

Table (7) sample according to know that celecoxib nephrotoxic

Categories	N	%
Yes	107	71.3
No	43	28.7
Total	150	100

Statistical analysis showed increasing incidence of awareness among our sample about celecoxib nephrotoxicity and bad effect on kidney.

- Do you know the exact dose of celecoxib?

Divided Yes 66 % and No 34% of the study sample and mean is 1. 660and S.D 0. 475and It is evident that there is an average level among the study sample members of knowing the exact dose of celecoxib

Table (8) sample according to know that exact dose of celecoxib

Categories	N	%
Yes	99	66.0
No	51	34.0
Total	150	100

Statistical analysis showed increasing incidence of awareness among our sample about dose of celecoxib.

- Is your doctor prescribed celecoxib for you?

Divided Yes 61.3 % and No 38.7% of the study sample and it turns out that most of the study sample members were prescribed celecoxib by their doctor

Table (9) sample according to doctor prescribed celecoxib

Categories	N	%
Yes	92	61.3
No	58	38.7
Total	150	100

Statistical analysis showed that most our sample obey doctors' orders.

- How many times do you take celecoxib per day?

Divided One time 39.3% Two times 48.7% and Three times 12% of the study sample and It turns out that about half of the study sample takes celecoxib twice a day

Table (10) sample according to times take celecoxib per day

Categories	N	%
One time	59	39.3
Two times	73	48.7
Three times	18	12.0
Total	150	100

- Do you complain of loin pain?

Divided Yes 63.3% and No 36.7% of the study sample and mean is 1. 633and S.D 0.484 and it is evident that the study sample has a medium level of complaint about flank pain

Table (11) sample according to complain of loin pain

Categories	N	%
Yes	95	63.3
No	55	36.7
Total	150	100

- What is last time you doing kidney function test?

Divided yesterday 32.7% last week 49.3% and Last month 18% of the study sample and It turns out that about half of the study sample had their kidney function checked last week.

Table (12) sample according to complain of loin pain

Categories	N	%
yesterday	49	32.7
last week	74	49.3
Last month	27	18.0
Total	150	100

- Was your kidney function test high or normal?

Divided High 57.3% and Normal 42.7% of the study sample and it turns out that more than half of the study sample had a high test

Table (13) sample according to kidney function test

Categories	N	%
High	86	57.3
Normal	66	42.7
Total	150	100

- Do you complain of renal symptoms?

Divided Yes 60.7 % and No 39.3% of the study sample and mean is 1.607 and S.D 0.490 and it turns out that there is a moderate level of complaint among members of the study sample from renal symptoms, and that most members of the study sample complain of renal symptoms.

Table (14) sample according to complain of renal symptoms

Categories	N	%
Yes	91	60.7
No	59	39.3
Total	150	100

- Are there problems in micturition?

Divided Yes 52.7 % and No 47.3% of the study sample and and mean is 1.527 and S.D 0.501 it turns out that there is an average level of problems in micturition among the study sample members, and that more than half of the study sample members have problems in micturition.

Table (15) sample according to problems in micturition

Categories	N	%
Yes	79	52.7
No	71	47.3
Total	150	100

Main points in results

- ✓ The study sample has a high level of knowledge that celecoxib nephrotoxic
- ✓ The average level among the study sample members of knowing the exact dose of celecoxib
- ✓ The most of the study sample members were prescribed celecoxib by their doctor
- ✓ About half of the study sample takes celecoxib twice a day
- ✓ The study sample has a medium level of complaint about flank pain
- ✓ About half of the study sample had their kidney function checked last week
- ✓ The more than half of the study sample had a high test

- ✓ There is a moderate level of complaint among members of the study sample from renal symptoms, and that most members of the study sample complain of renal symptoms.
- ✓ There is an average level of problems in micturition among the study sample members, and that more than half of the study sample members have problems in micturition.

Discussion

The most frequently prescribed medications for treating pain, fever, redness, and edema brought on by the production of inflammatory mediators are nonsteroidal anti-inflammatory medicines (NSAIDs). By inhibiting the enzyme cyclooxygenase (COX), which is responsible for converting arachidonic acid into PGs, thromboxanes, and prostacyclins, NSAIDs produce their anti-inflammatory, analgesic, and antipyretic effects. Cox-1 and Cox-2 are the two known isoforms of COX. The "COX-1" isoenzyme is typically present in all tissues, and its stimulation causes the production of "PGs," which are vital for maintaining organ systems like kidney function and stomach wall protection. In contrast, "COX-2" is never expressed in the majority of tissues under normal physiological circumstances, but it is expressed when there is damage in the body, which induces the synthesis of PGs (Miladiyah et al., 2017).

It is well known and acknowledged that using traditional NSAIDs might have negative effects on the kidneys. However, there is a small chance of significant renal toxicity. However, up to 5% of people exposed to NSAIDs may experience some sort of negative renal result (Ahmad et al., 2002).

BRATER, 2002 found that After the initial 400-mg dose of celecoxib, GFR and renal plasma flow considerably dropped, showing that treatment with this drug can still have an impact on renal function in this non-rigorous situation. After 2 hours, the celecoxib's temporary impact on GFR had mostly disappeared (BRATER, 2002).

Lafrance & Miller, 2009 found AKI risk was elevated across all exposure categories, however it was mostly exhibited by people who used multiple agents or switched from one agent to another. Most NSAIDs sold in the USA, including the more COX-2 selective ones, had their risk estimated. The risk of AKI was linked to the three most selective drugs (celecoxib, rofecoxib, and meloxicam) (Lafrance & Miller, 2009).

Alkhuja et al., 2002 found that NSAIDs can have a variety of effects on renal function. Reduced sodium excretion and loss in renal perfusion are the two most significant clinical consequences. Acute renal failure can result from a sufficient reduction in renal function. According to Perazella and Eras, two patients with stable chronic renal insufficiency had volume overload and reversible acute renal failure 13 and 16 days after beginning celecoxib medication. After celecoxib use was stopped, urinary chemical analysis was not recorded, and renal function restored to normal. The usage of celecoxib for 13–16 days has been noted by those authors as a potential explanation and risk factor for the development of acute renal failure (Alkhuja et al., 2002).

Conclusion

By suppressing the inflammatory response caused by COX enzymes, which is the basic therapy for treating pain and fever, NSAIDs expose patients to harmful and hazardous side effects on kidney.

Recommendations

1- Doctors need to be aware that short-term celecoxib medication has been associated with significant or life-threatening renal failure in patients with normal or impaired renal function.
2- Patients with extensive renal illness should not take celecoxib.
3- Particularly in high-risk individuals, kidney function should be regularly evaluated for any indications of possible renal damage as soon as treatment is started.
4- Medical professionals need to fully inform patients of the symptoms and signs of severe renal toxicity.

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