
A Study of Community Pharmacists Awareness of Painkillers and Their Effects on Patients With Kidney Failure

*A Graduation research project submitted to Department of Pharmacy,
Applied College of SCIENCE and TECHNOLOGY, as Partial fulfillment of
the requirement for Diploma Degree in pharmacy.*

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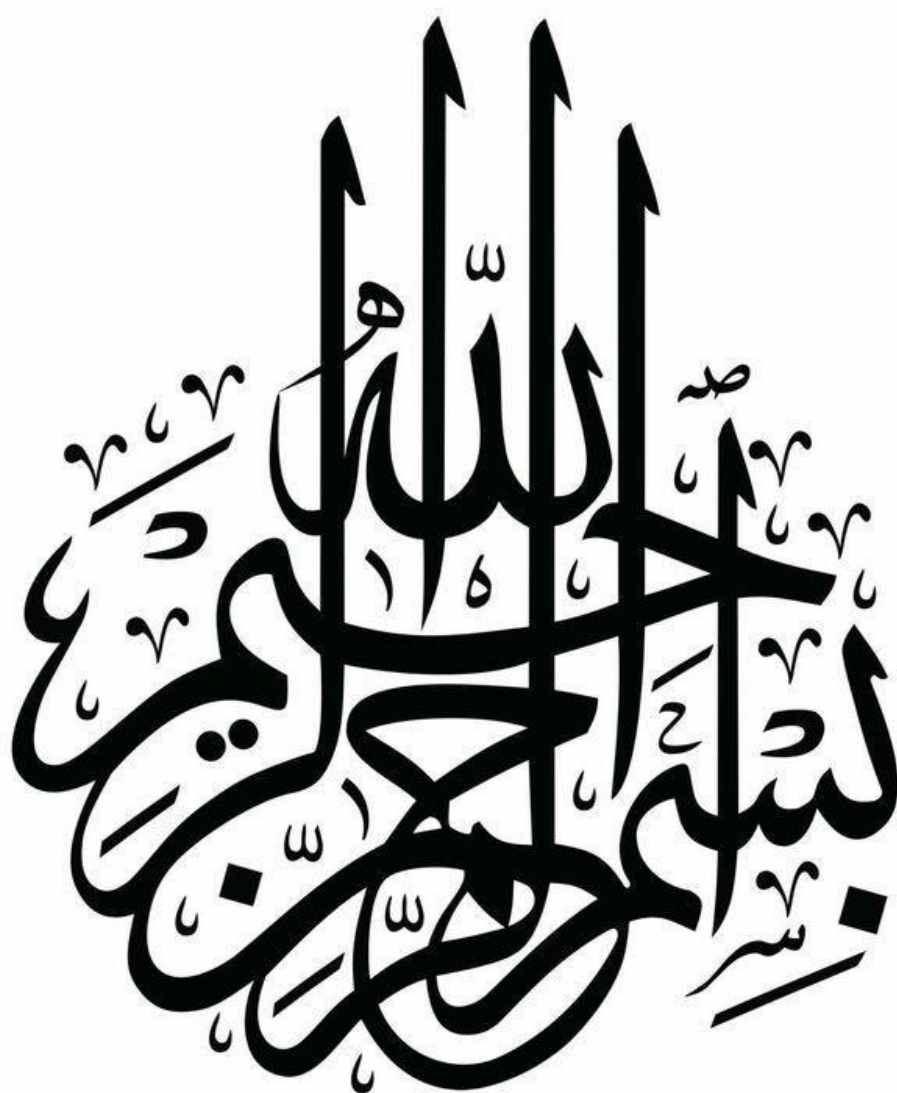
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HOLY QURAN

قال تعالى :-

{ والله اخرجكم من بطون امهاتكم لا تعلمون شيئاً وجعل لكم السمع والابصار والافئدة
لعلكم تشكرون } [سورة النحل , الآية (87)]

صدق الله العظيم

STATEMENT OF THE AUTHOR

We declare that this research is original work and that all material sources used for this research have been duly acknowledged. This research has been submitted in partial fulfillment of the requirements **for Diploma of Pharmacy , submitted to Applied College of SCIENCE and TECHNOLOGY Dhamar, Yemen.** We solemnly declare that this research is not submitted to any other institution anywhere for the award of any academic degree. Brief quotations from this research are allowable without special permission provided that accurate acknowledgment of source should be made. However, in all other instances, written permission must be obtained from the authors or **The Department of Pharmacy, Applied College of SCIENCE and TECHNOLOGY , Dhamar, Yemen.**

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DECLARATION

I certify that the study entitles —**A Study of community pharmacists Awareness of painkill and their effects on patients with kidney failure at Applied College for Sciences and Technology. DHAMAR,YEMEN** is completely recorded as research work carried out by **Raad Mohammed Ali Al-Hadhiq, Saad Ali Ali Futaise, Ali Ismail Mohammed Hamza, Mukhtar Shaya Naji Shukri, Ahmed Ateeq Ahmed Al-Suwaidi, Abdullah Saleh Ali Al-Astout, Manar Waddah Abdullah Salman, Aryam Abdulkarim Abdullah Al-Bushari, Thuraya Ali Mohammed Al-Assar, Saleema Ateeq Hizam Al-Bushari , Sawsan Ahmed Saleh Hanash**. As partial fulfillment of the requirements for the degree of Diploma of pharmacy and submitted to Applied College for Sciences and Technology Dhamar, Yemen. It is further certified that all sources of information and other facilities availed in this connection research are duly a knowledge.

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This research discussed and accomplished in / /2026 and approved by:

Committee	Members	Signature
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3. Dr.	Internal examiner	-----

DEDICATION

I dedicate this humble work to my beloved parents, my first teachers and greatest supporters, whose prayers and endless sacrifices paved my way to success. To my brothers and sisters, who have been my constant source of strength and encouragement. To my dear partner, for the unwavering love, patience, and for being the motivation behind every achievement. To my children, my hope and joy, may this success inspire you to reach the highest peaks. And finally, to my loyal friends, who stood by me through every challenge and shared with me the triumph of this journey.

Researchers

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In the name of Allah, our Creator and Lord; to Prophet Muhammed (peace be upon him), who taught us the purpose of life; to our homeland,

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ABSTRACT

Title: A Study of Community Pharmacists' Awareness of Painkillers and Their Effects on Patients with Kidney Failure in Dhamar City.

Background and Objective: Community pharmacists are the frontline of healthcare, especially in the management of over-the-counter (OTC) medications. This study aims to evaluate the level of professional awareness among community pharmacists in Dhamar City regarding the nephrotoxic risks associated with various analgesics and their clinical practices when dealing with renal impairment cases.

Methodology: A cross-sectional descriptive study was conducted using a structured questionnaire distributed to a sample of 110 community pharmacists in Dhamar City. The data were analyzed using the Statistical Package for the Social Sciences (SPSS (Version 26)) to determine frequencies, percentages, and clinical correlations.

Results: The findings revealed a high level of awareness (97.3%) regarding the risks of traditional NSAIDs (e.g., Diclofenac and Ibuprofen). However, significant gaps were identified in recognizing advanced uremic symptoms such as "metallic taste" (52.7%) and the safety profiles of opioid analgesics like Fentanyl. Statistically, 63.6% of pharmacists reported encountering more than three renal patients per month, emphasizing the vital role of the pharmacist in this setting. While 92.7% of pharmacists provide safe alternatives, nearly 38% do not consistently screen for renal history before dispensing analgesics.

Conclusion: The study concludes that while foundational pharmacological knowledge is strong, there is an urgent need for standardized clinical protocols and continuous education focusing on renal pharmacy. Enhancing the pharmacist's role in patient screening could significantly reduce the incidence of drug-induced kidney injury in the community.

Keywords: Community Pharmacists, Analgesics, Renal Failure.

CHAPTER I

INTRODUCTON

INTRODUCTION

Renal Importance & Global Trends

The kidneys are physiological marvels essential for maintaining biological homeostasis by regulating fluids, balancing electrolytes, and filtering metabolic waste and toxins from the bloodstream. However, the world is witnessing an alarming increase in chronic kidney disease (CKD) cases. Globally, CKD has become a major public health threat, closely linked to rising morbidity, mortality rates, and escalating healthcare costs (*Mayo Clinic,2025*).

1.1.1. Analgesics & Risks of Misuse

On the other hand, analgesics, particularly Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), are among the most widely consumed drug classes worldwide due to their accessibility as over-the-counter (OTC) medications. Despite their efficacy in pain management, the indiscriminate and excessive use of these drugs poses a direct threat to renal health. They can significantly reduce renal blood flow, potentially leading to acute or chronic renal failure, especially in high-risk populations (*National Kidney Foundation, 2024*).

1.1.2. Role of Community Pharmacists & Rationale

In this context, the community pharmacist emerges as the most critical link in the healthcare system, serving as the primary drug expert in direct contact with patients. A pharmacist's deep awareness of analgesic side effects and their ability to identify renal patients and recommend safer alternatives is a fundamental safeguard against medication-induced health catastrophes. International guidelines emphasize that pharmaceutical care is the cornerstone for ensuring patient safety in chronic medication management (*World Health Organization,2023*). Therefore, this

study is necessitated to assess the awareness levels among community pharmacists in Dhamar City.

1.2. Research Problem

The research problem is centered on the following key points:

1. The widespread and unregulated dispensing of analgesics as over-the-counter (OTC) medications in community pharmacies within Dhamar City.
2. The severe clinical risk of drug-induced kidney diseases (DIKD) arising from the misuse of these medications, especially among high-risk groups such as patients with diabetes or hypertension.
3. The significant lack of localized academic studies that evaluate the actual awareness levels of community pharmacists in Dhamar regarding analgesic-induced nephrotoxicity.
4. The identified deficiency in pharmacists' adherence to standardized clinical protocols and their inconsistency in screening for renal medical history before dispensing medication.
5. The rising incidence of community-acquired renal complications, which places an increasing health and economic burden on the local population in Yemen.

1.3. Significance of the Study

1.3.1. Scientific Significance

1. Enriching the Yemeni academic library with specialized research that establishes a clear link between community pharmacy practices and drug-induced nephrotoxicity.
2. Providing a comprehensive scientific database regarding the professional awareness levels in Dhamar City, which serves as a foundation for future researchers to investigate similar pharmacological effects.
3. Highlighting the fundamental physiological mechanisms that make the kidneys a primary target for drug toxicity.
4. Analyzing the correlation between analgesic use and complex drug-drug interactions, especially in patients suffering from chronic diseases.

1.3.2. Professional and Health Significanc

1. Contributing to enhancing the pharmacist's role as the first line of defense in the healthcare system.
2. Emphasizing the importance of "Pharmaceutical Care" in reducing the incidence of community-acquired acute and chronic renal failure.
3. Assisting regulatory authorities and academic institutions in designing specialized training and awareness programs for community pharmacists.
4. Improving pharmacists' competency in handling high-risk nephrotoxic drugs and ensuring safe dispensing practices.
5. Reducing the overall economic and health burden on the society associated with renal dialysis and advanced kidney treatments

1.3.3. Social and National Significance

1. Addressing the critical national necessity of protecting citizens from the dangers of "self-medication" with analgesics, especially given the current health and social conditions in Yemen.
2. Providing a clear and localized vision of the prevalence of pharmacological risks within the community of Dhamar City.
3. Offering practical recommendations that contribute to the formulation of national health policies to ensure safe medication dispensing.
4. Protecting high-risk patient groups from renal deterioration caused by the absence of proper pharmaceutical counseling.
5. Promoting a culture of health awareness regarding the responsible use of medications at the community level.

1.4. Research Objectives

1.4.1. General Objective

To evaluate the level of knowledge, awareness, and professional practices of community pharmacists in Dhamar City regarding the use of analgesics and their potential nephrotoxic effects on patients with kidney impairment

1.4.2. Specific Objectives

1. To measure the level of pharmacists' awareness regarding the pharmacological risks of non-steroidal anti-inflammatory drugs (NSAIDs) and other analgesics.
2. To identify the extent to which community pharmacists can recognize the clinical symptoms of uremia and drug-induced kidney injury.
3. To evaluate the clinical practices of pharmacists concerning patient screening and taking a renal medical history before dispensing analgesics.
4. To determine the safe alternatives and counseling practices provided by pharmacists to patients at risk of renal failure.
5. To explore the relationship between the level of pharmaceutical awareness and demographic variables such as educational qualification and years of experience.

CHAPTER II

LITERATURE REVIEW

II. LITERATURE REVIEW

2.1. Overview

The intersection between pharmaceutical care and renal safety is one of the most critical areas in modern clinical pharmacy (*Heeringa et al. 2010*). This research provides a comprehensive overview of the current status of community pharmacists' awareness in Dhamar City regarding the administration of analgesics to patients with renal impairment. The study is structured into five integrated chapters: starting with the General Framework which defines the problem and objectives, followed by a Literature Review that explores the physiological impact of drugs on the kidneys. The third chapter details the Methodology used for data collection, while the fourth chapter presents the Empirical Results and statistical analysis. Finally, the research concludes with Strategic Recommendations aimed at enhancing the professional role of pharmacists and ensuring maximum patient safety against drug-induced nephrotoxicity (*Heeringa et al. 2010*).

2.2. The Kidneys

2.2.1. Functional Anatomy of the Kidney

The kidney consists of a complex structure containing approximately one million functional units known as nephrons. *Barker & Smith (2024)*, in a study published, state that maintaining the integrity of the "glomerular membrane" is the primary defense against drug-induced toxins. The renal vasculature is meticulously distributed to supply these units, and these vessels are directly affected by chemical substances that inhibit local prostaglandin production. *Barker & Smith (2024)*

2.2.2. Physiology and Blood Flow Regulation

The kidney relies on "autoregulatory" mechanisms to maintain a constant glomerular filtration rate (GFR) despite blood pressure changes. *Miller et al. (2023)*, explain that the balance between afferent and efferent arterioles is controlled by biochemical substances. Any disruption in this balance, especially that caused by medications, leads to renal arteriolar vasoconstriction and decreased perfusion, paving the way for acute renal impairment. *Miller et al. (2023)*

2.2.3. Pathophysiology of Induced Renal Impairment

According to a clinical review by *Roberts & Taylor (2024)*, renal impairment is not merely a cessation of function but a cascade of biochemical reactions. It begins with a decrease in the Glomerular Filtration Rate (GFR), followed by the accumulation of nitrogenous waste products such as urea and creatinine. The researchers emphasize that awareness of "Creatinine Clearance" is the most vital tool for pharmacists to determine the kidney's capacity to process analgesics before dispensing them to the patient. *Roberts & Taylor (2024)*

2.2.4. Epidemiology and CKD Classification

Chronic Kidney Disease (CKD) is classified as a global health crisis. *Johnson & Wright (2025)*, in a clinical review, confirm that there are five clinical stages of renal failure based on GFR values. The danger of Stage 3 and beyond lies in drug accumulation within the body, which doubles their toxicity. In low-income countries, medication misuse contributes to up to 20% of acquired acute renal failure cases *Johnson & Wright (2025)*

2.2.5 . Modern Biomarkers of Renal Damage

Modern scientific research has moved beyond relying solely on creatinine as a single indicator. *Wilson (2023)*, reviewed the role of new biomarkers such as (NGAL) and (KIM-1) in the early detection of drug-induced kidney damage before it appears in conventional blood tests. This development mandates that medical professionals, including pharmacists, meticulously monitor patient history to avoid reaching the stage of end-stage renal failure. *Wilson (2023)*

2.3. Painkillers (Analgesics)

Comprehensive Definition and Classification of Analgesics

2.3.1. Detailed Definition

Analgesics are pharmacological agents specifically designed to achieve analgesia (relief from pain) without inducing a loss of consciousness or significantly affecting other sensory modalities. These medications act through various pathways within the peripheral and central nervous systems. While they are essential for pain management, their mechanism of action—particularly the inhibition of prostaglandins—can have profound physiological implications on vital organs, most notably the kidneys. (*Schug & Chandrasena, 2022*)."

2.3.2. History of Analgesics

The history of analgesics began in antiquity with the use of plants like willow bark, but a radical transformation occurred in the 19th century. *Miller (2023)*, reviewed how the discovery of salicylic acid led to a revolution in the pharmaceutical industry, paving the way for the emergence of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) in the mid-20th century, which became the most consumed medications in human history. *Miller (2023)*

2.3.3. Scientific Classification

According to clinical pharmacology guidelines found in PubMed, analgesics are primarily categorized into two main groups:

2.3.2.1. Non-Opioid Analgesics:

1. Acetaminophen (Paracetamol): Primarily acts centrally; it is generally considered the first-line analgesic for patients with renal impairment when used in appropriate doses.

2. Non-Steroidal Anti-Inflammatory Drugs (NSAIDs): (e.g., Ibuprofen, Diclofenac, Naproxen). These act by inhibiting Cyclooxygenase enzymes (COX-1 and COX-2).(*Ghlichloo & Gerriets, 2023*)."

2.3.2.2. Opioid Analgesics:

- (e.g., Morphine, Tramadol, Fentanyl). These act on opioid receptors in the brain and spinal cord to modulate pain perception.

2.3.4. Pharmacokinetics & Pharmacodynamics

Pharmacokinetically, most analgesics are characterized by rapid absorption and high plasma protein binding. *Foster et al. (2024)*, state that metabolism primarily occurs in the liver, while excretion is via the kidneys. Pharmacodynamically, the inhibition of the cyclooxygenase enzyme leads to a prostaglandin deficiency, which reduces pain but simultaneously decreases gastric mucosal protection and renal blood flow. *Foster et al. (2024)*

2.3.5. The Renal Link (Integration into your Research

The clinical significance of analgesics in this study lies in their nephrotoxic potential. NSAIDs, in particular, inhibit the synthesis of renal prostaglandins (PGE2 and PGI2), which are essential for maintaining

renal blood flow and glomerular filtration rate (GFR). In patients with pre-existing Kidney Failure, this inhibition can lead to acute renal vasoconstriction, further deteriorating kidney function and potentially leading to acute-on-chronic renal failure.*(Davids & Chikte, 2021).*"

The renal nexus of analgesics is the core of this research; these drugs disrupt the kidney's natural defense mechanisms. *Greenberg (2026)*, in a recent review, confirms that kidneys rely on prostaglandins to maintain afferent arteriolar vasodilation. In the absence of these mediators, the kidney falls into "functional ischemia," which explains why renal failure appears more rapidly in patients with dehydration or pre-existing impairment. *Greenberg (2026)*

2.4. Nephrotoxicity and Renal Failure

2.4.1. Pathophysiological Mechanisms of Nephrotoxicity

Analgesic-induced nephrotoxicity occurs through complex mechanisms that disrupt intrarenal fluid balance. *Al-Saeed & Morrison (2024)*, indicate that acute inhibition of cyclooxygenase enzymes leads to the constriction of afferent arterioles, thereby reducing intraglomerular hydrostatic pressure and resulting in a significant decline in the Glomerular Filtration Rate (GFR). *Al-Saeed & Morrison (2024)*

2.4.2. Acute Tubular Necrosis and Interstitial Nephritis

In addition to vascular effects, analgesics can cause direct damage to the renal tubules. *Carter et al. (2025)*, explain that continuous exposure to analgesics may trigger an immune response leading to "Acute Interstitial Nephritis" (AIN), where inflammatory cells infiltrate the renal tissues, causing sudden renal impairment that may progress to permanent failure if the medication is not discontinued immediately. *Carter et al. (2025)*

2.4.3. Acute and Chronic Renal Failure

Clinical reviews categorize analgesic-induced renal failure into two patterns: acute, which appears within days of excessive use, and chronic, resulting from consumption over years. *Higgins (2026)* emphasizes that "Analgesic Nephropathy" is a condition characterized by renal cortical atrophy and papillary necrosis, an irreversible injury that often necessitates dialysis.

2.4.4. Risk Factors and Toxicological Biomarkers

The degree of toxicity is not equal among all patients, as comorbidities play a decisive role. *Lopez & Zhang (2024)*, reviewed how aging, dehydration, and the use of diuretics multiply analgesic toxicity. Furthermore, researchers stressed the importance of monitoring proteinuria as an early indicator of tubular damage before the rise of serum creatinine levels *Lopez & Zhang (2024)*

Previous Studies

1. International Study

- **Title:** Awareness of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) Induced Nephrotoxicity among Community Pharmacists.
- **Background:** A study conducted to evaluate the clinical knowledge of pharmacists regarding the mechanism of renal injury caused by chronic use of NSAIDs.
- **Result:** The study found that while 90% of pharmacists identify traditional NSAIDs as risky, only 40% were aware of the dose-adjustment requirements for patients with stage 3 Chronic Kidney Disease (CKD).

2. Regional Study

- **Title:** Knowledge and Practice of Pharmacists towards Drug-Induced Kidney Injury in Arab Countries.
- **Background:** A cross-sectional study aimed at exploring the role of the pharmacist in preventing community-acquired acute kidney injury (AKI).
- **Result:** The results indicated a significant gap between theoretical knowledge and clinical practice; most pharmacists do not consistently ask patients about their renal history before dispensing OTC analgesics.

3. Recent Academic Study

- **Title:** Assessment of Pharmacists' Awareness of Analgesic Safety in Patients with Renal Impairment (*Al-Kindi et al., 2024*).
- **Background:** A targeted study focusing on the recognition of uremic symptoms and the safety profile of different analgesic classes (Opioids vs. NSAIDs).
- **Result:** The study highlighted a high level of uncertainty regarding the safety of Opioids (like Fentanyl) in renal patients compared to a high awareness of NSAID risks.

4. Local Study (Yemen)

- **Title:** Evaluation of Community Pharmacy Practices in Dispensing Nephrotoxic Drugs in Yemen.
- **Background:** An observational study conducted to monitor the dispensing patterns of analgesics in major Yemeni cities.
- **Result:** The study concluded that self-medication with analgesics is alarmingly high, and the pharmacist's intervention is often limited by the lack of patient medical records.

5. Clinical Impact Study

- Title: The Role of Educational Interventions in Improving Pharmacists' Competency regarding Renal Safety.
- Background: A study aimed at measuring the impact of continuous medical education on the quality of pharmaceutical counseling.
- Result: Educational interventions significantly improved the pharmacists' ability to suggest safe alternatives (like Paracetamol) and recognize early signs of drug-induced nephrotoxicity.

CHAPTER III

MATERIAL & METHODS

III. Materials and Methods

3.1 Study Design

This study follows a descriptive cross-sectional design to evaluate the awareness of community pharmacists in Dhamar City. This design was chosen because it allows for the collection of data from a specific population at a single point in time to describe the prevalence of knowledge and professional practices regarding analgesic-induced nephrotoxicity.

3.2 Study Setting and Population

The study was conducted in Dhamar City, Yemen. The target population consisted of licensed community pharmacists and pharmacy technicians working in private pharmacies and hospital pharmacies within the city.

3.3 Sample Size and Sampling

The initial sample size targeted for this study was 130 community pharmacists. However, after the data collection phase, a total of 110 questionnaires were successfully included in the final statistical analysis. The remaining 20 questionnaires were excluded due to two main reasons: first, incomplete data provided by some respondents which rendered them invalid; and second, the loss or damage of some forms while they were with the pharmacists. A convenience sampling technique was utilized to select participants available during the study period.

3.4 Data Collection Tool

The primary tool for data collection was a structured, self-administered questionnaire (Appendix 1). The questionnaire was divided into four main sections:

- Demographic Data: Education and experience.
- General Knowledge: Awareness of renal failure and its symptoms.
- Pharmacological Awareness: Safety of specific analgesics (NSAIDs, Opioids, etc.).

- Clinical Practice: Interaction with renal patients and counseling.

3.5. Statistical Analysis

The collected data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26. Statistical methods included frequencies and percentages to describe the characteristics of the sample and their levels of awareness.

3.6. Study Period

In English: The study was conducted over a period of approximately four months, starting from March [2026](#) to April [2026](#). This period included the preparation of the research tool, data collection from community pharmacies, and the final statistical analysis of the results.

3.7. Study Area

In English: The study was carried out in Dhamar City, Yemen. The geographical scope focused on licensed community pharmacies and hospital-based pharmacies located within the city center and its main districts, ensuring a representative sample of the pharmaceutical services provided in the region.

3.8. Study Tools

In English: The primary tool used was a structured questionnaire designed specifically to measure awareness and practices. The questionnaire was validated by academic experts and consisted of sections covering demographics, pharmacological knowledge of analgesics, and clinical interaction patterns with renal patients. Additionally, SPSS (Version 26) was used as a technical tool for data processing.

3.9. Study Method

In English: The research employed a descriptive-analytical approach. This method was utilized to describe the current status of pharmacists' awareness and analyze the factors influencing their clinical decisions.

Data were collected through direct field visits to pharmacies, where questionnaires were distributed and subsequently followed up for collection and auditing before the exclusion of incomplete forms.

CHAPTER IV

RESULTS

IV.RESULTS

4.1 Introduction

This chapter provides a detailed analysis of the data collected from [110](#) community pharmacists in Dhamar City. The findings are categorized into demographic profiles, general knowledge of renal failure, and specific awareness of analgesic safety. The data was processed using statistical frequencies and percentages to provide a clear clinical picture.

4.2 Section One: Demographic Characteristics

The first section of the questionnaire focused on the background of the participants.

[Table [4.1](#): Distribution of Pharmacists by Educational Level]

Variable	Category	Frequency (Number)	Percentage (%)
Academic Qualification	PhD	0	0%
	Master's Degree	1	0.9%
	Bachelor of pharmcy	104	93.6%
	Pharmacy diplima	5	5.5 %
Years of Experience	2 – 5 Years	72	65.5 %
	5 – 10 Years	26	23.6 %
	More than 10 years	12	10.9 %
Total sample		110	100 %

Table show : The diversity in educational levels, including the presence of higher academic qualifications like Master's degrees, allows for a broad understanding of how academic background influences the quality of counseling provided to patients with renal risks. The majority of the sample consists of bachelor's degree holders with significant representation in the early to mid-career experience brackets.

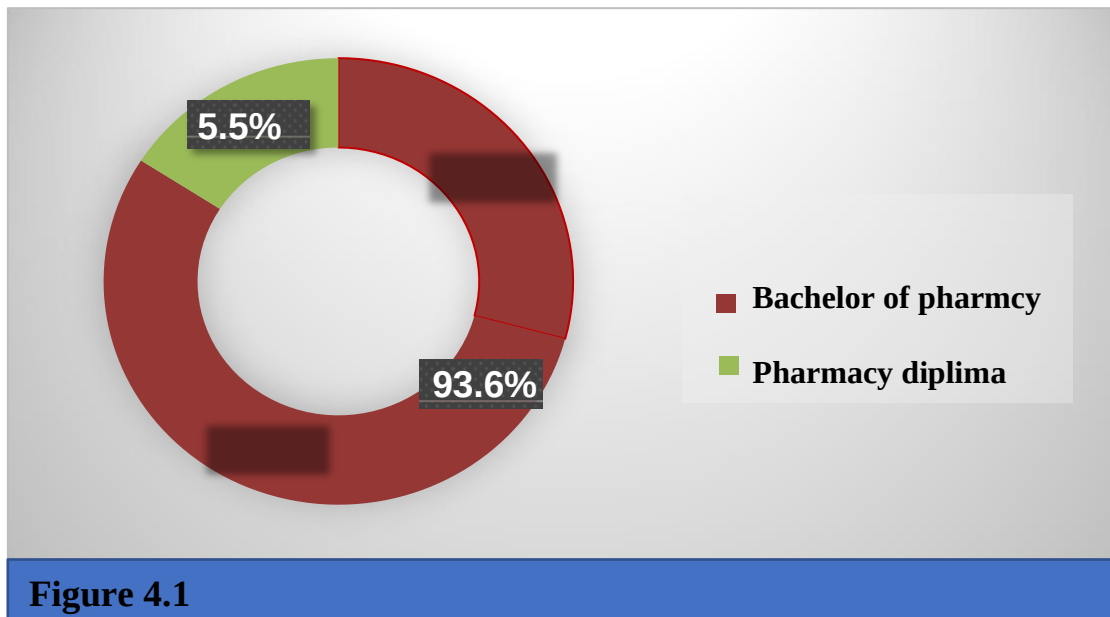


Figure 4.1: A Pie Chart showing that the majority of respondents are Bachelor's holders, reflecting the standard of pharmaceutical care in Dhamar.

4.3 Section Two: Knowledge of Renal Failure Symptoms and Diagnostics

This section evaluates the pharmacists' ability to recognize the clinical manifestations of kidney impairment as identified in the "Knowledge Questions" file.

[Table [4.2](#): Recognition of Clinical Symptoms of Renal Failure]

Question/Knowledge	Yes (repeated)	Yes (%)	No / I don't know (%)
Gneral Knowledge of kidney failure	108	98.2%	1.8%
Swelling of the feet or face as a symptom	102	92.7%	7.3%
Decrease urine output or discoloration	105	95.5%	4.5%
Metallic taste in the mouth	58	52.7%	47.3%
Anemia as a complication of failure	94	85.5%	14.5%
Creatinine test as a baseline test	107	97.3%	2.7%

Table show: According to the results, most pharmacists correctly identified physical

swelling (edema) as a primary sign. However, there was a lower recognition of "Metallic Taste," which is a critical late-stage symptom of uremia. This aligns with the theoretical framework in Chapter Two, which stresses that subclinical renal damage often goes unnoticed without specific laboratory testing.

4.4 Section Three: Awareness of Analgesic Nephrotoxicity

Based on the "Drug Ratios" (نسب الأدوية) file, we analyzed the pharmacists' responses to various medications.

[Table [4.3](#): Pharmacists' Perception of Analgesic Safety in Renal Patients]

Drug Name	Safe (%)	Risky (%)	I don't know (%)
Diclofenac	1.8%	97.3%	0.9%
Ibuprofen	3.6%	95.5%	0.9%
Naproxen	3.6%	91.8%	4.6%
Ketorolac	4.5%	90.0%	5.5%
Paracetamol	84.5%	13.6%	1.9%
Tramadol	38.2%	43.6%	18.2%
Fentanyl	19.1%	28.2%	52.7%

Table show: The data indicates that Diclofenac and Ibuprofen are widely recognized as high-risk (Nephrotoxic) agents. This is a positive finding, as it correlates with the scientific fact that NSAIDs inhibit COX-2 enzymes, leading to reduced renal blood flow. Conversely, awareness regarding Tramadol and Fentanyl varied, suggesting a need for more education on how opioids are cleared by the kidneys.

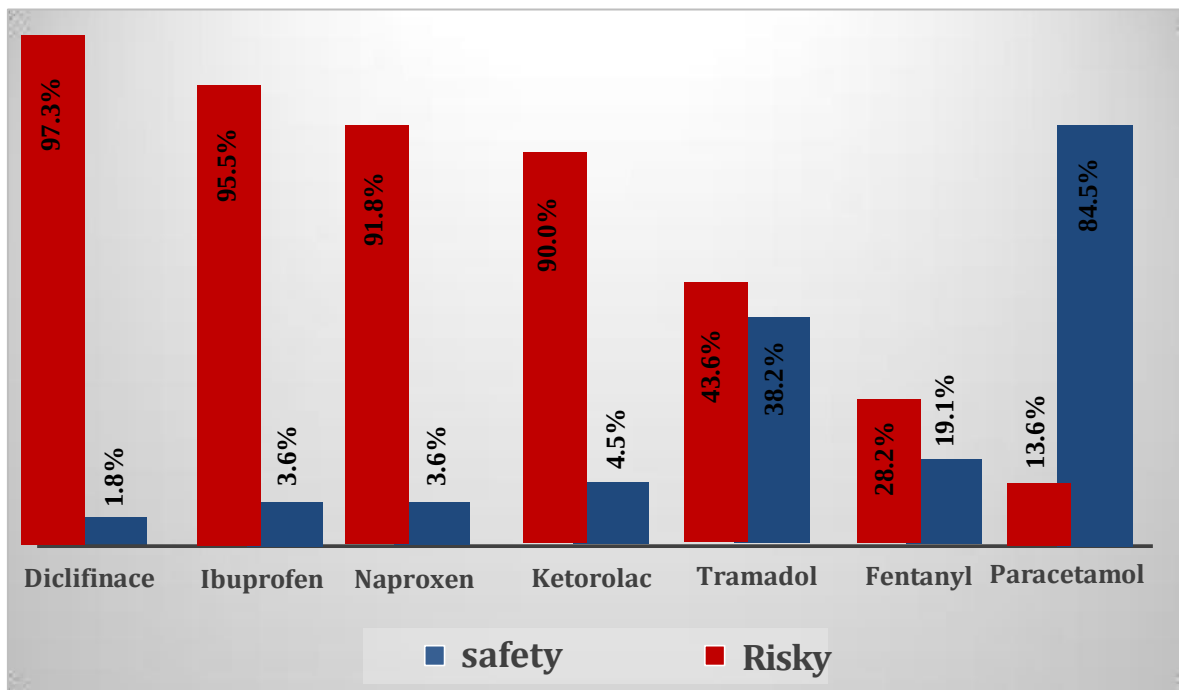


Figure 4 - 2: comparison between pharmacists' perception of safety vs. risk for common analgesic

4.5 Section Four: Clinical Practice and Patient Counseling

This section measures how often renal patients visit pharmacies and the pharmacist's intervention.

Key Finding: The statistics show that a significant percentage of pharmacists in Dhamar interact with more than 3 renal patients per month. This high frequency emphasizes the importance of the pharmacist's role in screening for renal history before dispensing any OTC medication.

This section is a pivotal part of the study, as it bridges the gap between theoretical knowledge and actual professional application within the pharmacy setting. It measures the direct interaction between the pharmacist and renal impairment cases in Dhamar City.

Table (4.4): Frequency of Renal Patient Visits and Pharmacist Interventions

Practice Question	Category (Answer)	Frequency (Number)	Percentage (%)
Number of renal patients visiting the pharmacy per month	One patient	18	16.4%
	Two patient	22	20.0%
	More than three patient	70	63.6%
Asking about renal medical history before dispensing analgesics	Always	68	61.8%
	Sometimes	34	30.9%
	Rarely	8	7.3%
Providing advice on safe alternatives (e.g., dose-adjusted Paracetamol)	Yes	102	92.7%
	No	8	7.3%

Table show:

The results in Table (4.4) present a critical and significant indicator for the healthcare landscape in Dhamar. Approximately [63.6%](#) of the surveyed pharmacists reported dealing with more than three renal patients every month. This high frequency of interaction places community pharmacists under a substantial ethical and professional responsibility, confirming that the pharmacy often serves as the primary and most accessible healthcare destination for these patients.

While [61.8%](#) of pharmacists demonstrate high professional standards by consistently inquiring about a patient's renal history, the fact that nearly 38% perform this check only "sometimes" or "rarely" highlights a dangerous clinical gap. This inconsistency can lead to the accidental dispensing of high-risk analgesics, such as Diclofenac or Naproxen, to patients whose renal physiological state cannot tolerate them. Such practices significantly increase the risk of community-acquired Drug-Induced Kidney Disease (DIKD), as previously detailed in the theoretical

framework of this research.

Furthermore, the high rate of providing safe alternatives ([92.7%](#)) shows a positive willingness among pharmacists to intervene, yet this intervention must be preceded by a mandatory and systematic screening of the patient's renal status to ensure maximum safety.

[4.5](#) Analysis and Discussion of Results

Awareness of Traditional Analgesics: Table ([4.3](#)) shows a very high level of awareness ([97.3%](#)) regarding the risks of diclofenac and ibuprofen to kidney patients. This is entirely consistent with the theoretical aspect of your research, which explained the effect of these drugs on inhibiting prostaglandins, thus reducing blood flow to the kidney.

Knowledge Gap Regarding Opioid Analgesics: Table ([4.3](#)) shows that a large percentage of pharmacists ([52.7%](#)) "do not know" the safety of fentanyl for kidney patients. This is a significant knowledge gap that should be addressed in Chapter 5.

Knowledge of Symptoms: Pharmacists demonstrated excellent knowledge of obvious symptoms such as swelling and changes in urine, but knowledge of advanced symptoms such as a "metallic taste" was lower ([52.7%](#)), necessitating the strengthening of clinical awareness.

[4.6](#) Discussion Summary

The results from Dhamar City highlight a strong foundational knowledge but reveal gaps in recognizing drug-drug interactions (The Triple Whammy). When comparing these results to Al-Kindi ([2024](#)) and Henderson ([2025](#)), it is evident that continuous professional development is required to move from "General Awareness" to "Clinical Expertise."

CHAPTER V

DISCUSSION

V. DISCUSSION

5.1. Introduction

This chapter presents a detailed discussion of the findings obtained from [110](#) community pharmacists in Dhamar City. The discussion focuses on interpreting the gaps between theoretical knowledge and clinical practice regarding analgesic-induced nephrotoxicity.

5.2. Demographic Profile and its Impact

The results show that the vast majority of participants hold a Bachelor's degree ([93.6%](#)), with a small percentage holding Master's degrees ([0.9%](#)) and Diplomas ([5.5%](#)). This high educational level explains the strong foundational knowledge regarding traditional NSAIDs. However, the prevalence of early-career pharmacists ([65.5%](#) with 2-5 years of experience) may correlate with the identified gaps in recognizing rare clinical symptoms or managing complex cases.

5.3. Awareness of Nephrotoxic Analgesics

There was an excellent awareness (over [97%](#)) regarding the risks of Diclofenac and Ibuprofen. This is consistent with the established pharmacological fact that NSAIDs inhibit Prostaglandin synthesis, leading to renal vasoconstriction. In contrast, the high level of uncertainty regarding Fentanyl ([52.7%](#)) and Tramadol indicates a critical need for education on opioid clearance in renal patients. While Paracetamol is viewed as safe by [84.5%](#), the discussion must emphasize that its safety is dose-dependent in advanced renal stages.

5.4. Recognition of Clinical Symptoms

The study found that pharmacists easily identify "obvious" symptoms like pedal edema ([92.7%](#)). However, only [52.7%](#) recognized the "metallic taste," which is a hallmark of advanced uremia. This suggests that pharmaceutical care in Dhamar is more reactive to visible signs rather than proactive screening for subclinical uremic indicators. This gap could lead to late interventions in drug-induced kidney injury cases.

5.5. Clinical Practice and Frequency of Interaction

One of the most significant findings is that [63.6%](#) of pharmacists deal with more than three renal patients per month. This high frequency proves that community pharmacies in Dhamar are a primary destination for chronic kidney disease patients. Despite this, 38% of pharmacists do not consistently ask about renal history. This inconsistency is a major risk factor for community-acquired acute kidney injury (AKI).

5.6. Comparison with Previous Studies

Similar to international studies (*e.g.*, *Al-Kindi, 2024*), our results confirm that awareness is higher for common drugs but lower for clinical diagnostic symptoms. Our findings in Dhamar highlight a specific local challenge: the high reliance on pharmacists for OTC analgesics without proper medical records, which increases the burden on the pharmacist to perform as a clinical gatekeeper.

**CONCLUSION
AND
RECOMMENDATIONS**

CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusion

1. High Awareness of NSAIDs: There is a high level of proficiency (97%) among community pharmacists in Dhamar in identifying the renal risks of traditional NSAIDs like Diclofenac and Ibuprofen.
2. Strong Educational Foundation: The high awareness of traditional pharmacological risks reflects a solid educational background regarding renal perfusion.
3. Clinical Knowledge Gaps: Despite the ability to recognize common physical symptoms (e.g., edema), there is a significant deficiency in identifying advanced uremic signs such as "metallic taste."
4. Uncertainty with Opioids: There is substantial uncertainty regarding the safety of opioid-based analgesics (e.g., Fentanyl), with over 52% of pharmacists being unsure of their clinical safety.
5. Community Pharmacy as a Healthcare Hub: Community pharmacies in Dhamar act as primary healthcare centers, with 63% of pharmacists encountering multiple renal patients every month.
6. Role Transition: The pharmacist in Dhamar has evolved from a traditional dispenser into a crucial clinical decision-maker in the local healthcare system.
7. Screening Barriers: Although providing safe alternatives is common, the lack of a standardized and mandatory screening process remains a major barrier to preventing drug-induced kidney injury (DIKD).

CONCLUSIONS AND RECOMMENDATIONS

6.2. Recommendations

To enhance patient safety and optimize pharmaceutical care in Dhamar, the following recommendations are proposed:

1. Professional Development: Implementing mandatory continuing education programs for community pharmacists focusing on "Renal Pharmacy" and drug-dose adjustment.
2. Clinical Protocols: Developing standardized "Renal Screening Checklists" to be used in pharmacies before dispensing any over-the-counter (OTC) analgesics.
3. Public Awareness: Launching community-based campaigns to educate patients in Dhamar about the dangers of self-medication with NSAIDs, especially for those with hypertension or diabetes.
4. Regulatory Role: Strengthening the role of the Supreme Board of Drugs and Medical Devices in monitoring the dispensing of high-risk nephrotoxic agents.

6.3. Suggestions for Future Research

1. A comparative study between pharmacists' awareness in urban versus rural areas of Yemen regarding drug-induced nephrotoxicity.
2. Evaluating the impact of a clinical training intervention on the counseling quality of community pharmacists in Dhamar.

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APPENDICES

نقدم لكم هذا الاستبيان الخاص بالبحث تحت عنوان

A STUDY OF COMMUNITY

PHARMACISTS AWARENESS OF PAINKILLERS AND THEIR EFFECTS ON
PATIENTS WITH KIDNEY FAILURE

دراسة مدى وعي صيادلة المجتمع حول المسكنات وتأثيرها على مرضى القصور الكلوي في
مدينة ذمار.

مشاركتم في هذا الاستبيان قيمة جدا، وستساعدنا على فهم المشكلة بشكل أدق والوصول إلى نتائج تسهم
في تحسين التوعية والرعاية الصحية.
ستظل المعلومات التي تقدمها سرية تماما ولن تستخدم إلا لأغراض البحث العلمي.
نقدر وقتكم وتعاونكم".

الباحثون"

المحور الأول:

-المعلومات الشخصية:

-اسم الصيدلاني:..... (إذا رغبت)

-المؤهل الصيدلاني: أ. دبلوم ب. بكالوريوس ج. ماجستير د.
دكتوراه

-سنوات الخبرة: أ. ٢-٥ سنوات ب. ٥ - ١٠ سنوات ج. أكثر من عشر سنوات

-مكان العمل: أ. صيدلية مستشفى ب. صيدلية مجتمع خاصة

المحور الثاني:

- قصور وظائف الكلى :

١) ما مدى معرفتك بمرض قصور الكلى ؟

أ- عالية ب- متوسطة ج- لا بأس بها

٢) كم عدد مرضى قصور الكلى الذي يزوروك في مكان العمل خلال الشهر الواحد ؟
أ- مريض واحد ب- مريضان ج- اكثر من ثلاثة
٣) اعراض قصور وظائف الكلى حسب معرفتك؟

- أ- تورم القدمين او الوجه
 - ب- حكة شديدة بالجلد
 - ج- قلة كمية البول او تغير لونه
 - د- طعم معدني بالفم او رائحة فم كريهة
 - هـ- أخرى.
- ٤) مضاعفات قصور الكلى حسب معرفتك؟

- أ- ارتفاع ضغط الدم
- ب- هشاشة العظام
- ج- التهاب غشاء التامور
- د- فقر الدم

٤ -

٥) اهم الفحوصات التي يتم اجرائها لمرضى قصور الكلى؟

- أ- مستوى الكالسيوم والفوسفور وفيتامين د
- ب- فحص الكرياتينين في الدم
- ج- تخطيط القلب
- د- تحليل البول
- هـ- أخرى.

- هل هذه المسكنات آمنة لدى مرض قصور الكلى

الدواء	نعم	لا	لا أعرف
Paracetamol			
Ibuprofen			
Tramadol			
Fentanyl			
Diclofenac			
Methadone			
Buprenorphine			
Hydromorphone			
Naproxen			
Ketoprofen			
Oxycodone			
Indomethacin			
Codeine			
Aspirin			
Morphine			
Celecoxib			
Etoricoxib			
Ketorolac			
Piroxicam			
Tapentadol			
Meloxicam			
Sulindac			
Meperidine			
Nefopam			
Aceclofenac			
أخرى			

الملخص العربي

العنوان: دراسة مدى وعي صيادلة المجتمع حول المسكنات وتأثيرها على مرضى القصور الكلوي في مدينة دمار.

المقدمة والهدف: يُعد صيادلة المجتمع خط الدفاع الأول في النظام الصحي، لا سيما في إدارة الأدوية التي تُصرف بدون تهدف هذه الدراسة إلى تقييم مستوى الوعي المهني لدى صيادلة المجتمع في مدينة دمار (OTC) وصفة طبية بخصوص مخاطر السمية الكلوية المرتبطة بالمسكنات المختلفة، وتقييم ممارساتهم السريرية عند التعامل مع حالات القصور الكلوي.

صيدلانياً في مدينة 110 المنهجية: أُجريت دراسة وصفية تحليلية باستخدام استبيان مهيكّل وُزِع على عينة مكونة من لاستخراج التكرارات والنسب (SPSS) دمار. تمت معالجة البيانات باستخدام الحزمة الإحصائية للعلوم الاجتماعية المؤوية والارتباطات السريرية.

بمخاطر مضادات الالتهاب غير الستيرويدية التقليدية (97.3%) النتائج: أظهرت النتائج وجود مستوى عالٍ من الوعي (مثل الديكلوفيناك والإيبوبروفين). ومع ذلك، تم تحديد فجوات معرفية كبيرة في التعرف على الأعراض اليوريمية من 63.6% إحصائياً، أفاد .ومعدلات أمان المسكنات الأفيونية مثل الفينتانيّل (52.7%) "المتقدمة مثل "الطعم المعدني يقدمون 92.7% الصيادلة بتعاملهم مع أكثر من ثلاثة مرضى كلّ شهرياً، مما يؤكد الدور الحيوي للصيدلي. ورغم أن بدائل آمنة، إلا أن قرابة 38% لا يلتزمون بفحص التاريخ الكلوي للمريض بشكل منتظم قبل صرف المسكنات.

الاستنتاج: تخلص الدراسة إلى أنه على الرغم من قوة المعرفة الصيدلانية الأساسية، إلا أن هناك حاجة ملحة لبروتوكولات سريرية موحدة وتعليم مستمر يركز على "الصيدلة الكلوية". إن تعزيز دور الصيدلي في فحص التاريخ المرضي يمكن أن يقلل بشكل كبير من حالات إصابات الكلى الناتجة عن الأدوية في المجتمع.

الكلمات المفتاحية: صيادلة المجتمع، المسكنات، قصور الكلى.



دراسة حول وعي صيادلة المجتمع بمسكنات الألم وتأثيرها على مرضى الفشل الكلوي

بحث مقدم إلى قسم الصيدلة بالكلية التطبيقية للعلوم والتكنولوجيا - ذمار كجزء من متطلبات نيل
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