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Research Article

Efficacy and Safety of Pharmacist-Managed NSAIDs Deprescribing: A Jordanian Outpatient Study

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Background. Nonsteroidal anti-inflammatory drugs (NSAIDs) are commonly used to manage pain, including chronic pain conditions. However, their prolonged use is associated with significant risks, particularly gastrointestinal (GI) adverse events. This study aimed to evaluate the effectiveness and safety of a pharmacist-managed deprescribing program for NSAIDs in a Jordanian outpatient population. *Methods*. A convenience sample of 100 participants who had been using NSAIDs for pain management was recruited. Participants underwent a structured deprescribing intervention in collaboration with physicians. Various effectiveness and safety outcomes were assessed before and after deprescribing. Descriptive statistics and chi-square test were used for data analysis. *Results*. The majority of participants reported chronic pain conditions, with rheumatoid arthritis (24%) and osteoarthritis (22%) being the most prevalent. Ibuprofen (28%) and diclofenac (22%) were the most commonly used NSAIDs. The deprescribing program was associated with a significant reduction in heartburn, stomach ulcer, kidney problems and fluctuation in blood pressure readings ($p < 0.05$), and pain exacerbation. Notably, the reduction in pain exacerbation was evident ($p = 0.003$) in the 4-month follow-up. *Conclusion*. A pharmacist-managed NSAIDs deprescribing program demonstrated effectiveness in reducing the risk of GI adverse events and fluctuation in blood pressure readings without causing harm during a short-term follow-up. These findings support the feasibility of implementing such programs in outpatient settings. Further long-term investigations are necessary to confirm these results.

1. Introduction

Nonsteroidal anti-inflammatory drugs (NSAIDs) are often prescribed as first-line treatment for a number of illnesses, including the management of various acute and chronic pain conditions, including osteoarthritis, rheumatoid arthritis, and other musculoskeletal disorders [1]. They are among the most widely used drugs in the world. These medications are sold over-the-counter (i.e., without a prescription) and prescribed in clinics and hospitals across the globe because it is thought that their use is safe even when taken for extended periods of time [2]. Furthermore, compared to going to the ER or scheduling an appointment to see a general practitioner, many members of the public believe that getting an analgesic over-the-counter will save time and money and provide speedier pain relief [3]. Their widespread use can be attributed to their efficacy in alleviating pain and reducing inflammation [4]. However, the therapeutic benefits of NSAIDs often come with a price, as their prolonged use has been associated with a spectrum of adverse effects, raising concerns regarding their long-term safety, especially in outpatient settings [5, 6].

One of the most prominent risks of NSAIDs usage is gastrointestinal (GI) bleeding, which can encompass conditions such as stomach ulcers, heartburn, and even life-threatening GI hemorrhage [7]. The mechanism underlying this risk involves the inhibition of cyclooxygenase enzymes by NSAIDs, leading to the suppression of prostaglandin synthesis [8]. Prostaglandins are essential for the maintenance of the gastric mucosal barrier and blood flow regulation within the GI tract [9]. NSAIDs-induced reduction in prostaglandins can compromise the mucosal integrity,

making the stomach and intestines more susceptible to damage, irritation, and ulceration [5, 9]. The severity of GI bleeding events is often dose-dependent and duration-related, with continuous NSAIDs use being a critical risk factor [10].

Additionally, NSAIDs have been associated with adverse renal effects, including acute kidney injury and increased blood pressure [11]. NSAIDs exert their impact on renal function by constriction of the afferent arterioles, leading to reduced renal perfusion and potential nephron injury [12]. The reduction in renal blood flow can cause electrolyte imbalances, fluid retention, and increased blood pressure, particularly in patients with preexisting hypertension [13].

Consumers may be more likely to accidentally exceed the recommended NSAIDs dosage, which could result in potentially dangerous adverse effects, due to the availability of several products containing NSAIDs as well as a lack of awareness and understanding of NSAIDs [14].

To address the potential risks of prolonged NSAIDs use, deprescribing programs have emerged as a viable strategy to minimize harm in patients requiring pain management [15–17]. Pharmacist-led deprescribing programs have gained recognition for their role in optimizing medication use and reducing the risks associated with long-term drug therapy [18–20]. Such programs aim to assess the necessity and appropriateness of ongoing drug therapy, gradually taper drug doses, explore alternative treatment options, and ultimately discontinue medications when the potential harms outweigh the benefits [21, 22].

According to the Department of General Statistics in Jordan (2018), the elderly make up around 5% of the country's total population [23]. Older patients are particularly affected, with a higher frequency of chronic diseases than people in other age groups [24–26]. Prior reports have documented the high frequency of polypharmacy among elderly patients in Jordan and the irrational and unethical prescribing practices [27]. At Jordan, NSAIDs are among the most widely available over-the-counter medications found at community pharmacies [28]. Approximately one-third of older Jordanian patients experienced polypharmacy, with NSAIDs prescriptions being written for individuals at least once every three prescriptions [23].

Deprescribing is the process of stopping an ineffective medicine under the supervision of a medical professional in order to manage polypharmacy and enhance efficacy, safety, and financial outcomes [29, 30]. An interdisciplinary approach is used in the deprescribing of NSAIDs to support the appropriate and efficient use of pharmacological and non-pharmacological pain management therapies. Patients using NSAIDs for various forms of pain are given evidence-based therapies by the clinical pharmacists. The process of deprescribing and optimizing medicine for pain management has a favorable impact on every aspect of patients' lives, including social interactions, physical activity, mood, and sleep quality [17]. Effective NSAIDs deprescribing in different settings and for various high-risk patients would improve NSAIDs safety. The current study ensured the direct engagement with patients to enhance safety outcomes of NSAIDs deprescribing and especially appropriate deprescribing of OTC NSAIDs use since these drugs are sold without prescription.

In Jordan, where the utilization of NSAIDs is common for pain management, and the population demographics include a significant portion of elderly individuals, there is an imperative need to explore the efficacy and safety of pharmacist-managed deprescribing programs in outpatient settings [23]. This study was designed to address this need and to evaluate the impact of a pharmacist-led deprescribing program on NSAIDs-related adverse events, with a particular focus on GI events such as bleeding, heartburn, ulcer, and fluctuation in blood pressure readings. By investigating the effectiveness of this intervention, our aim is to contribute to the advancement of safer pain management practices for patients in Jordan and, potentially, in other similar healthcare settings.

2. Methods

2.1. Study Design and Participants. This study employed a prospective interventional design to evaluate the effectiveness and safety of a pharmacist-managed deprescribing program for NSAIDs among the Jordanian outpatient population. Participants were recruited from July to November 2022. In order to be eligible for the current study on the deprescribing of NSAIDs, the sample was made up of any patient over 18 who have been taken NSAIDs both by prescription or OTC and with an adequate intelligence level to respond to the questionnaire as a structured interview and after comprehensive assessment of their medical condition and suitability for deprescribing interventions. The used NSAIDs could control acute pain (lasting less than four weeks), subacute pain (lasting four to twelve weeks), or chronic pain (lasting more than twelve weeks). Among the NSAIDs were cyclooxygenase-2 inhibitors, oxicam derivatives, acetic acid derivatives, and propionic acid derivatives. Patients who qualified for the deprescribing program between July and November of 2022 were included in the trial cohort. After that, the recruited participants were chosen during the initial doctor appointment.

The following variables were gathered as follows: (1) sociodemographic data including gender, age, job title, educational level, marital status, health insurance, and smoking status, (2) medical condition variables including chronic illnesses, chronic illnesses associated with chronic pain, acute illnesses with acute pain, regular medication usage, and the length of chronic medication usage, (3) questions are related to the used NSAIDs including duration of NSAIDs usage, sources of information for NSAIDs usage, side effects due to NSAIDs usage, sensitivity to NSAIDs medication usage, and (4) type of deprescribing intervention by pharmacist after consulting a doctor including stop using it for the patient and give suitable alternatives, reducing the dose by 25%–50%, reducing the duration of medication use, giving an alternative from within the NSAID group, frequency reduction, and using when needed. Finally, there was assessment of different variables before and after the

deprescribing intervention in regards to safety outcomes evaluation and whether pharmacist intervention was accepted by the responsible physician.

2.2. Deprescribing Procedure. Although pharmacists are not authorized by Jordanian law to start, stop, or modify medications directly with patients, they still maintain essential pharmacy services. The current investigation was therefore carried out under the guidance of physicians specializing in orthopedics, internal medicine, and general practice. After obtaining approval and consulting with the responsible physician and initiating face-to-face discussions with the patients in the clinic and based on the inclusion criteria, medical files were screened to find patients who met the requirements. Following the identification of eligible patients, the clinical pharmacist assessed each patient's condition to ascertain whether the patient would benefit from deprescribing interventions. The clinical pharmacist and the responsible physician discussed the best deprescribing intervention based on the patient's demographic information, presence of comorbidities, pain type, medication schedule, preferred and updated evidence-based interventions, and patient's lifestyle.

Medication reviews for gaps and duplication of therapy, patient education regarding medication self-administration and monitoring, and therapy optimization recommendations in accordance with the updated guidelines and drug-drug interactions were all included in the scheduled deprescribing. The deprescribing approach included various options, such as discontinuation of NSAIDs use, dose reduction, and offering alternative medications or treatment strategies. During the deprescribing process, self-reported questionnaires were administered to participants to assess multiple aspects. The patient's file contains records of the conversations and decisions made by the patient, physician, and pharmacist. Lastly, a follow-up appointment is usually set up four months after the original visit, and in the interim, the clinical pharmacist can be reached by phone for weekly check-ins. This allowed for ongoing progress monitoring of the patient, as well as planned follow-up monitoring for pain management and evaluation of the deprescribing plan's efficacy.

2.3. Effectiveness Outcomes. The clinical pharmacist assessed all existing NSAIDs, selected medications to be targeted for discontinuation, created a deprescribing schedule, and planned depending on patient's needs and responsible physician consultation.

This study investigated the rate of (1) new onset GI events, such as GI bleeding (stool color change and/or blood through vomiting like coffee color), heartburn, or stomach ulcers and (2) variations in blood pressure for hypertensive patients in order to assess the efficacy of the pharmacist-managed NSAIDs deprescribing program.

2.4. Safety Outcome. In the current study, the rate of ER visits or hospitalization due to pain exacerbation or use of preexisting pain as a proxy for the safety result was defined as the safety outcome. By following up patients through clinic visits, preventing pain from getting worse by giving alternatives to other medications from natural sources to remove inflammation and/or giving alternative analgesics that are less harmful like paracetamol for mild pain. The recruited participants in the current study monitored to report any change in pain intensity and any increase or decrease in pain exacerbation after the deprescribing intervention.

2.5. Sample Size. The sample size calculation was determined based on the number of patients visiting the pharmacy daily. The Raosoft® software [31] was employed to estimate the minimal sample size required, which was 100 participants. A convenience sampling approach was utilized to select the 100 participants who met the inclusion criteria for the study.

2.6. Ethical Considerations. This study meticulously followed ethical principles to safeguard the rights and well-being of participants. Approval was obtained from the Institutional Review Board at Zarqa University (no. 2023/2022/71) ensuring that the research design aligns with ethical principles and regulations. Informed consents were secured from participants, emphasizing the voluntary nature of participation and confidentiality. Privacy and data security measures were strictly upheld, with personal information anonymized.

2.7. Data Analysis. Data analysis was conducted using the Statistical Package for the Social Sciences, version 26 (SPSS®, IBM Corp, USA). Descriptive statistics were generated to summarize key study variables. Differences among groups were assessed using the *chi*-square test for categorical variables, aiming to identify significant differences in the levels of NSAIDs usage and awareness among participants. A p value of less than 0.05 was considered statistically significant. The study data were collected, analyzed, and presented in a comprehensive manner to provide meaningful insights into the effectiveness and safety of the pharmacist-led deprescribing program for NSAIDs among the Jordanian outpatient population.

3. Results

One hundred participants were recruited for the study, and their sociodemographic characteristics are summarized in Table 1. The majority of participants were females (77%), and most were aged over 60 years old (62%). Approximately two-thirds of the participants had public insurance (61%), while one-third had noninsured coverage (37%). The highest level of education among the participants predominantly consisted of those with a high school or lower (96%). In terms of occupation, a large majority were not engaged in any occupation (87%).

Chronic diseases among the participants were prevalent, with hypertension (21%) being the most frequently reported, while psychiatry disorders (1%) were the least common

Table 1: Participants' sociodemographic characteristics ($N = 100$).

Characteristics	N (%)
Marital status	
Married	91 (91)
Widowed	9 (9)
Age	
40–59	38 (38)
60–75	49 (49)
>75	13 (13)
Gender	
Male	23 (23)
Female	77 (77)
Smoking status	
Nonsmoker	79 (79)
Smoker	21 (21)
Health insurance	
None	37 (37)
Public*	61 (61)
Private	2 (2)
Educational level	
High school or less	96 (96)
Diploma	4 (4)
Occupation	
None	87 (87)
Nonmedical field	13 (13)

*Public (Ministry of Health, military, universities, and other ministries).

Table 2: Chronic disease among participants, number of medications used, and groups of medications used ($N = 100$).

Variables	N (%)
None	45 (45)
Hypertension	21 (21)
Cardiovascular/dyslipidemia	2 (2)
GI diseases	20 (20)
Psychiatry disorders*	1 (1)
Respiratory disorders**	11 (11)
Number of medications	
None	7 (7)
1–3 medications	91 (91)
More than 4	2 (2)
Group of medications	
Analgesic	84 (84)
Antihypertensives	21 (21)
Bronchodilator	8 (8)

*Psychiatry disorders were depression and anxiety. **Respiratory disorders were asthma and COPD.

Table 3: Chronic diseases that cause chronic pain among participants ($N = 100$).

Chronic diseases that cause pain	N (%)
None	28 (28)
Osteoarthritis pain	22 (22)
Rheumatoid arthritis pain	24 (24)
Neuropathic pain	17 (17)
Chronic low back pain	9 (9)

(Table 2). Most participants used 1–3 medications (91%), and analgesics (84%) were the most commonly used group of medications.

Chronic diseases that cause pain were also reported among participants, with rheumatoid arthritis pain (24%) and osteoarthritis pain (22%) being the most frequent (Table 3). Chronic low back pain (9%) was the least reported among the participants.

Participants in the study reported various NSAIDs usage patterns, with ibuprofen (28%) and diclofenac (22%) being the most widely used nonselective NSAIDs (Table 4). Notably, 72% of the participants reported using NSAIDs for chronic pain management, with only 3% referring to NSAIDs usage for subacute pain (4–12 weeks). Surprisingly, a substantial portion of participants reported having no specific information sources for NSAIDs usage (66%) or relied on family and relatives (21%), while a smaller number sought advice from healthcare professionals (13%).

The implementation of the pharmacist-managed deprescribing program was associated with several positive outcomes. Table 5 illustrates the types of NSAIDs deprescribing initiated by the clinical pharmacist researcher in consultation with the responsible doctors. The most common deprescribing approach was "stop using it for the patient and give suitable alternatives" (52%). Among the effectiveness outcomes, the data revealed that heartburn (81%), stomach ulcer (24%), and renal problems (28%) were the most frequently reported side effects before deprescribing. After deprescribing, almost complete disappearance of these side effects was observed ($p < 0.001$). A significant reduction in heartburn and stomach ulcer was observed. Table 6 shows detailed effectiveness outcomes before and after deprescribing. However, there was no significant change in the occurrence of GI bleeding events ($p = 0.20$), heart palpitations ($p = 0.33$), sore throat ($p = 0.08$), dry cough ($p = 0.22$), and pallor ($p = 0.35$). Fluctuations in blood pressure had a significant decrease after deprescribing ($p = 0.038$). Moreover and as safety outcome measurement, participants reported a decrease in pain exacerbation from 40% to 20% after the deprescribing intervention ($p = 0.003$).

4. Discussion

To our knowledge, this is the first study to examine the efficacy and safety results of a deprescribing program for NSAIDs in patients with various pain types in the Middle East area and in Jordan specifically. NSAIDs are essential for treating a wide range of painful and inflammatory disorders. Unfortunately, there are significant side effects associated with using NSAIDs. These include bleeding and ulceration of the gastrointestinal tract, toxicities to the liver and kidneys, and a rise in thromboembolic events [2]. Finding a balance between gastrointestinal and cardiovascular safety is necessary for the safe use of NSAIDs. The risk rankings are based on epidemiologic data and are not absolute; conversely, NSAIDs that are the safest for the heart often have higher gastrointestinal toxicity. The findings of the current study underscore the effectiveness and safety of a pharmacist-managed deprescribing program for NSAIDs in an outpatient population. This primary goal was to address the potential health risks associated with prolonged NSAIDs

Table 4: Types of NSAIDs used by participants ($N = 100$).

Types of NSAIDs used by the patient	N (%)
Monotherapy	
Nonselective NSAIDs	
Ibuprofen	28 (28)
Ketoprofen	3 (3)
Lornoxicam	3 (3)
Indomethacin	1 (1)
Diclofenac	22 (22)
Piroxicam	1 (1)
Selective CoX2	
Celecoxib	1 (1)
Etoricoxib	2 (2)
Combination of different NSAIDs	
Ibuprofen + diclofenac	1 (1)
Ibuprofen + ketoprofen	1 (1)
Ibuprofen + meloxicam	38 (38)
Duration of NSAIDs usage	
Use only when necessary	1 (1)
Management of acute pain (less than 4 weeks)	24 (24)
Management of subacute pain (4–12 weeks)	3 (3)
Management of chronic pain (more than 12 weeks)	72 (72)
Types of pain that need NSAIDs Tx	
Acute	26 (26)
Chronic	74 (74)
Degree of pain	
Severe	100 (100)
Side effects due to NSAIDs usage	
GI bleeding	3 (3)
GI symptoms	37 (37)
Dry cough	5 (5)
Sore throat	3 (3)
Edema	2 (2)
Renal problem	22 (22)
Elevated blood pressure	8 (8)
None of the above	12 (12)
More than one of the above	10 (10)
Allergy/sensitivity to NSAIDs	
None	100 (100)
Sources of information for NSAIDs usage	
Family and relatives	21 (21)
Doctor	10 (10)
Pharmacist	3 (3)
No sources	66 (66)

Table 5: Types of NSAIDs deprescribing by the pharmacist after consulting the responsible doctor ($N = 100$).

Types of deprescribing approach	N (%)
Stop using it for the patient and give suitable alternatives	52 (52)
Reducing the dose by 25%–50%	12 (12)
Reducing the duration of medication use	1 (1)
Giving an alternative from within the NSAID group	15 (15)
Frequency reduction	14 (14)
Using when needed	6 (6)

use, particularly the risks of GI bleeding events and kidney problems. Although the absolute reduction in the occurrence of these adverse events was relatively modest, the results have important implications for the feasibility of implementing pharmacist-led deprescribing initiatives to enhance the safety of chronic pain management in outpatient settings.

This study showed that the majority of NSAIDs users were nonsmoker females and more than 60 years old. Also, a number of earlier research studies have noted that women use NSAIDs more frequently than males [32, 33]. This is noteworthy due to the potential influence of age on pain experience, comorbidities, and consequently NSAIDs usage [34, 35]. Smoking status is another crucial variable, revealing that nonsmokers constituted a substantial portion of the sample compared to smokers. The recent study found that 79% of NSAIDs users were not smokers. Smoking is thought to raise pain thresholds and tolerance levels [36, 37], which would reduce the need for analgesics. We also discovered that NSAIDs users accounted for about 37% of those in our community without health insurance. When people lack health insurance, they may find it difficult to see doctors or receive follow-up care, which could increase their use of self-medication [38]. This disparity could potentially influence pain perception and NSAIDs-related health risks [39]. The distribution of health insurance coverage indicated that around two-thirds of the participants had public insurance, which may impact healthcare accessibility and the ability to seek medical advice on medication usage. Occupation status offers insights into daily activities that might contribute to pain and NSAIDs usage, highlighting the need for a multidisciplinary approach to pain management.

The prevalence of chronic pain conditions in the study population was substantial, with rheumatoid arthritis and osteoarthritis being the most common causes of pain. This aligns with previous research emphasizing the burden of chronic pain on individuals' daily lives and the significance of effective pain management strategies [40]. NSAIDs are frequently used for pain management, but their long-term use raises concerns about adverse effects, especially GI bleeding and kidney problems [41]. Understanding the range of chronic pain conditions allows healthcare providers to provide more personalized and comprehensive pain management solutions.

Remarkably, the study found that none of the participants reported allergies or sensitivity to NSAIDs. This observation is consistent with a high tolerance for NSAIDs within the study population [42]. According to our statistics, 13% of users received NSAIDs prescriptions from doctors or pharmacists. Nonetheless, 21% of respondents self-prescribed NSAIDs based on recommendations from friends and family, or even 66% relied on no information at all, indicating an overuse of these drugs in the public health system [43]. The prominence of no source of information for NSAIDs usage raises concerns about the potential lack of awareness and education among the users. These findings underscore the importance of tailored deprescribing programs that consider the specific needs of patients, their overall health, and the educational requirements, particularly for individuals

Table 6: Effectiveness outcomes (before and after deprescribing) ($N = 100$).

Variables	N (%)		p-value[a]
	Before deprescribed	After deprescribed	
GI bleed events*	5 (5)	0 (0)	$p = 0.20$
Stomach ulcer	24 (24)	1 (1)	**p = 0.00018**
Heart palpitations	6 (6)	0 (0)	$p = 0.33$
Sore throat	10 (10)	0 (0)	$p = 0.08$
Heartburn	81 (81)	0 (0)	**p = 0.00072**
Dry cough	8 (8)	0 (0)	$p = 0.22$
Pallor	4 (4)	0 (0)	$p = 0.35$
Fluctuation in blood pressure	21 (21)	9 (9)	**p = 0.038**

*Stool color change and/or blood through vomiting with coffee-like color. [a]A p value of less than 0.05 indicates statistical significance.

with chronic pain conditions. They also highlight the crucial role of pharmacists collaborating with physicians to ensure safe and effective deprescribing.

The most prevalent forms of interventions utilized by the clinical pharmacist when deprescribing NSAIDs were to substitute the used medicine with a safer alternative (52%), reduce the dosage by 25–50% (12%), cut down on the length and frequency of needless pharmaceutical usage (15%), and only use the NSAIDs when necessary to treat acute pain (6%). This indicates the necessity for clinical pharmacists in a particular portion of the prison population as well as the wide range of services provided by pharmacy practice, including advising on healthy living choices and prescription knowledge. Consequently, the pharmacist's role in the deprescribing process is crucial, and it has been researched in the context of NSAIDs and other drugs, including the deprescribing of oral antidiabetics, proton pump inhibitors, antihistamines, hypnotics, and others [44–46]. Physicians' positive assessment of the role of clinical pharmacists within the health care team is demonstrated by the 100% physician acceptance rate for pharmacist interventions. Selecting the best medication to treat pain, lower cardiovascular risks, and safeguard the gastrointestinal mucosa is a challenging process that requires skilled pharmacists and the application of appropriate techniques. Community-based pharmacists are becoming more and more involved in the ongoing management of patients with multiple chronic conditions [47, 48]. Based on the type of intervention, the roles of clinical pharmacists were divided into two categories: interventions involving drug review, consultation, or therapy management, and educational interventions. Pharmacist interventions have been shown to lower healthcare costs, support the safe and efficient use of pharmaceuticals, improve adherence, and have a favorable impact on disease control [47, 48].

The effectiveness of the pharmacist-managed deprescribing program was evident in the reduction of GI bleeding events. Although the absolute reduction was 5%, it is important to note that the occurrence of GI bleeding events is often dose-dependent and linearly related to continuous NSAIDs use over time [10]. Thus, even a modest decrease in these events indicates a promising reduction in risk. Moreover, as most NSAIDs users often require long-term pain management, this reduction becomes even more significant in the context of extended NSAIDs use [5]. The most significant outcome was observed in the case of stomach ulcers, with a notable decline from 24% before deprescribing to only 1% after deprescribing, with highly statistical significance. This finding underscores the program's effectiveness in preventing one of the most severe adverse events associated with NSAIDs use.

Heartburn problems saw substantial improvement as well. Heartburn dropped significantly from 81% before deprescribing to 0% after deprescribing, with significant p value <0.001. These results strongly indicate that the deprescribing program effectively mitigated severe and potentially life-threatening complications tied to NSAIDs use [49].

This study also addressed pain exacerbation, with participants reporting a decrease in pain exacerbation following the deprescribing intervention. The alternative therapies utilized, such as collagen therapy and selective serotonin reuptake inhibitors (SSRIs), suggest effective pain management strategies in the absence of chronic NSAIDs use. While collagen therapy has shown limited impact on pain and joint inflammation in some studies [50], SSRIs have long been considered for chronic pain treatment due to their role in managing pain states associated with depression [51]. This suggests that alternative therapies may provide effective pain management strategies in the absence of chronic NSAIDs use. The recruited participants in the current study reported a decrease in pain exacerbation from 40% to 20% after the deprescribing intervention ($p = 0.003$). One study reported lower pain levels among older adults who reduced NSAIDs as part of a pharmacist review program [16].

While this study demonstrates the feasibility and effectiveness of a pharmacist-managed deprescribing program, it is important to acknowledge its limitations. The study design, limited sample size, and short follow-up time are among the constraints that may restrict the generalizability of the findings to a broader population. Unobserved factors, including lifestyle, dietary habits, and the use of over-the-counter NSAIDs or aspirin, may have influenced the results but were not accounted for in this study. Moreover, the study did not collect data on other relevant outcomes, such as the frequency of physician visits or the use of other opioid drugs that might impact the results. Information on other relevant outcomes, such as the economic result or the frequency of doctor visits, was not gathered for the current study. Nonetheless, this study has shed

important light on how deprescribing NSAIDs affects individuals who use them for a variety of pain conditions. The researchers intend to keep informing diverse stakeholders about the findings and recommended courses of action. Subsequently, larger sample sizes and longer follow-up times are required for further investigations, as some NSAIDs side effects can become more apparent over time.

Additionally, it is impossible to predict the recurrence of a condition by short-term symptom monitoring after stopping the usage of prescription drugs intended as preventive measures. Removing the long-term advantages of preventative medicine prescriptions means deprescribing them will likely increase death. The hazards of continuing outweigh the long-term benefits, therefore quitting the medicine should, and in theory, they have a net positive effect if it is determined to be inappropriate and designated for deprescribing. Making educated decisions about appropriateness (and hence the possibility of deprescribing) in older persons is, at best, challenging because the advantages and drawbacks of many preventive drugs are not well understood. Furthermore, the regional focus in Jordan may not fully represent the diversity of patient populations found in other countries, highlighting the need for more extensive, multinational research to better understand the applicability of deprescribing programs.

Finally, since the main focus of patient treatment has been shifting around physician competency and skills, the current study is the first in Jordan to assess the role of pharmacist in deprescribing NSAIDs, which is a relatively new concept in Jordan and the MENA region. In actuality, clinical pharmacists do not yet have a well-defined role or actively participate in patient treatments in Jordan. This may be mostly related to a lack of trust and inadequate communication between doctors and their pharmacist colleagues. Unfortunately, the majority of the Middle East and North African nations witness the same depressing relationship between pharmacists and doctors. To make matters more complicated, in Jordan and the surrounding nations, nonprescription purchases are permitted for all NSAIDs. Therefore, it is essential to have community and clinical pharmacists play a recognized role in the selection and monitoring of medications in order to enhance patient clinical outcomes. In order to maximize patient therapy and establish a more positive role for the pharmacist, deprescribing procedures are crucial.

5. Conclusion

In conclusion, the results of this study suggest that a pharmacist-managed deprescribing program for NSAIDs in outpatient settings can effectively reduce the risks associated with prolonged NSAIDs use. The observed improvements in GI safety profile, as well as the reduction in pain exacerbation, are particularly promising. Despite the study's limitations, these findings provide valuable insights into the potential benefits of deprescribing initiatives for enhancing pain management safety in outpatient populations. Long-term investigations are essential to confirm the sustainability of these improvements over extended durations and to further evaluate the clinical benefits of such programs. The study highlights the importance of collaborative efforts among healthcare professionals to optimize pain management while minimizing the risks associated with NSAIDs use in patients with chronic pain. The pharmacist-managed deprescribing program for NSAIDs demonstrated its potential to significantly reduce the risk of gastrointestinal adverse events among patients with chronic pain without causing harm in the short-term follow-up. These findings suggest a viable strategy for enhancing the safety of pain management in outpatient settings. Long-term investigations are essential to validate the sustainability of these improvements and explore their impact on the overall health and well-being of patients. This study contributes to the growing body of evidence supporting the value of collaborative healthcare efforts, involving pharmacists and physicians, in optimizing pain management while minimizing the risks associated with prolonged NSAIDs use.

Data Availability

The dataset used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

All authors have contributed equally, read, and agreed to the published version of the manuscript.

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