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Impact of Non-Steroidal Anti-Inflammatory Drug Usage and Awareness of Side Effects among the Population

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Abstract:

Background: Non-steroidal anti-inflammatory drugs (NSAIDs) are commonly used for pain relief, inflammation, and fever reduction. This study examines the patterns of NSAID use and awareness of their side-effects in the adult population, along with sociodemographic associations.

Methods: A cross-sectional study was conducted among 604 adults aged >18 years using a validated questionnaire to collect data on NSAID use and sociodemographic factors.

Results: Most respondents were NSAID users (65.7%), predominantly female (53.4%), and aged under 50 years (74.5%). Around 42.6% had received NSAIDs through physician prescriptions. Male gender and smoking were negatively correlated with NSAID use (OR: 0.5, 95% CI: 0.4–0.8, p=0.001; OR: 0.6, 95% CI: 0.4–0.8, p=0.003). Ministry of Health Insurance was associated with NSAID use (OR: 1.6, 95% CI: 1.1–2.6, p=0.03). Awareness of kidney-related side-effects was at 65.1%, while awareness of asthma and allergy risks was at 22.4%.

Conclusion: Despite widespread NSAID usage in Jordan, there is limited awareness of their side-effects and interactions, highlighting the need for enhanced patient safety education during physician-prescribed NSAID use.

Introduction:

Non-steroidal anti-inflammatory drugs (NSAIDs) constitute a group of medications widely used as pain relievers, fever reducers, and anti-inflammatory agents, albeit accompanied by notable side-effects. These drugs are employed in treating various conditions such as headaches, fever, acute and chronic pain, biliary and ureteric colic, rheumatologic diseases, and dysmenorrhea. Their accessibility both by prescription and over the counter reflects a common belief in their safety even during prolonged use. (Koffeman et al., 2014) Despite their perceived safety and ease of access, long-term users of NSAIDs must be cognizant of the maximum daily dosage and potential harmful side-effects. Adverse reactions can manifest in multiple bodily systems including the gastrointestinal (GI) tract, kidneys, liver, skin, central nervous system, and blood. Studies have indicated varying levels of awareness among users regarding these side-effects, with a significant proportion aware of GI issues but fewer recognizing specific kidney problems and other adverse effects. (Banerjee and Bhadury, 2012)

This study seeks to evaluate the utilization patterns of NSAIDs and the level of awareness regarding NSAID-related side-effects among a representative sample of the public. Additionally, it aims to identify factors influencing NSAID use and awareness, encompassing sociodemographic factors, personal health,

and family medical history. Understanding the public's knowledge regarding NSAIDs and their side-effects is crucial, as misuse can have detrimental health implications. Previous research, such as a study among medical students in India, has highlighted gaps in knowledge regarding over-the-counter medications and self-medication practices, emphasizing the importance of assessing and improving public awareness in this domain. (Davis and Robson, 2016)

Methodology:

Study Design and Participant Selection:

This cross-sectional study was conducted . The study targeted the public aged 18 years and above, excluding healthcare providers. A

distributed a questionnaire to participants after providing an introduction about the study's purpose and obtaining written consent. Trained medical students offered non-influential assistance if requested during the self-administration of the questionnaire. A sample size of 604 participants was determined based on achieving a 95% confidence interval with a 5% margin of error and assuming a 60% response rate.

Study Questionnaire:

A validated, self-administered questionnaire was used to collect sociodemographic data, NSAID usage patterns, and knowledge of potential side-effects. The questionnaire consisted of three sections:

1. Sociodemographic information including gender, age, marital status, education level, employment type, insurance, smoking status, and body mass index.
2. Medical history, current medication use, and frequency of NSAID administration.
3. Details regarding NSAID use, including purpose, source of procurement (prescription or over-the-counter), and awareness of potential side-effects.

Validation and Data Analysis:

The questionnaire was validated through a pilot study and review by two physicians for clarity and coherence. Data analysis was performed using SPSS software (version 25), employing descriptive statistics, Chi-squared tests, and multivariable logistic regression models. Significant variables ($p < 0.05$) associated with NSAID use were included in the final regression model. Differences in NSAID side-effects awareness between users and non-users were assessed using Chi-squared tests, with $p < 0.05$ indicating statistical significance. The analysis categorized respondents based on their awareness of side-effects and NSAID use status to explore the relationship between awareness and usage patterns.

Results:

A total of 604 participants from the general public were included in the study. Among them, 450 (74.5%) were younger than 50 years, and 260 (43%) were smokers. Regarding comorbidities, 15.7% had hypertension, and 10.9% had diabetes. Medical insurance coverage showed that 22.8% had no insurance, while 35.3% had Ministry of Health Insurance. The prevalence of NSAID use among participants was 65.7%, with a higher proportion of female users (56.7%) compared to males (p value = 0.03). Smokers constituted 46.9% of NSAID users versus 35.7% of non-users (p value = 0.03). Among NSAID users, 13.4% had hypertension compared to 20.3% among non-users (p = 0.03), and 8.8% had diabetes compared to 14.9% among non-users (p value = 0.02).

Multivariable analysis revealed that male gender and smoking were negatively associated with NSAID use (multivariable odds ratio [OR]: 0.5, 95% confidence interval [CI]: 0.4–0.8, p = 0.001; OR: 0.6, 95% CI 0.4–0.8, p = 0.003). However, having Ministry of Health Insurance was associated with NSAID use (OR: 1.6, 95% CI: 1.1–2.6, p = 0.03).

In terms of awareness of NSAID-related side-effects, 37.9% of respondents knew about potential drug interactions, while awareness of organ-specific side-effects was as follows: kidney problems (65.1%), GI problems (52.6%), increased risk of asthma and allergy (22.4%). Only 29.6% of NSAID users received patient education about potential side-effects. Non-NSAID users showed higher awareness of kidney and GI side-effects compared to users (p value = 0.001 and 0.004, respectively). Awareness regarding hypertension and heart disease side effects did not differ significantly between users and non-users.

The majority of NSAID users were prescribed these medications by physicians (42.6%) or pharmacists (17%), while 28.6% obtained them without prescriptions. The most common indications for NSAID use

were headache, toothache, and menstrual pain, with varying frequencies between genders. Most users (81%) used NSAIDs once per month or less frequently.

Factors associated with NSAID use included gender (p = 0.029) and type of health insurance (p = 0.032), with female respondents and those with government insurance more likely to use NSAIDs. Conversely, smokers and individuals with a history of diabetes or hypertension were less likely to use NSAIDs.

Regarding specific adverse effects awareness, a significant proportion of respondents used NSAIDs without being aware of their effects on asthma/allergies (51.2%), GI side-effects (28.3% to 37.4%), and potential kidney disease (20% to 45.7%).

Table 1. Factors associated with NSAIDs use (univariate associations).

Baseline characteristics	**Total no. 604 (%)**	**NSAIDs users (%)**	**Non-NSAIDs user (%)**	**p Value**
Gender				
Female	323 (53.4)	225 (56.7)	98 (47.3)	0.029*
Male	281 (46.5)	172 (43.3)	109 (52.7)	
Age				
<50	450 (74.5)	303 (76.3)	147 (71.0)	0.155
>=50	154 (25.5)	94 (23.7)	60 (29.0)	
Social status				
Married	343 (56.8)	223 (56.2)	120 (57.9)	0.914
Single	246 (40.7)	164 (41.3)	82 (39.6)	
Other	15 (2.5)	10 (2.5)	5 (2.4)	
Education level				
Middle school	47 (7.8)	26 (6.5)	21 (10.1)	0.100
High school	162 (26.8)	98 (24.7)	64 (30.9)	
Bachelor's degree	354 (58.6)	245 (61.7)	109 (52.6)	
Masters/PhD	41 (6.8)	28 (7.1)	13 (6.2)	
Working status				
Student	131 (21.7)	81 (20.4)	50 (24.1)	0.066
Working	292 (48.3)	204 (51.4)	88 (42.5)	
Housewife	116 (19.2)	77 (19.4)	39 (18.8)	
Retired	65 (10.7)	35 (8.8)	30 (14.4)	
Smoking status				
Non-smoker	315 (52.1)	192 (49.4)	123 (59.4)	0.029*
Smoker	260 (43)	186 (46.9)	74 (35.7)	
Ex-smoker	29 (4.8)	19 (4.8)	10 (4.8)	
Insurance				
Private	160 (26.5)	112 (28.2)	48 (23.2)	0.032*
Ministry of Health	213 (35.3)	125 (31.5)	88 (52.5)	
University	93 (15.4)	60 (15.1)	33 (15.9)	
None	138 (22.8)	100 (25.2)	38 (18.3)	
Body-mass-index				
Normal	208 (34.4)	142 (35.8)	66 (31.9)	0.809
Underweight	52 (8.6)	33 (8.3)	19 (9.1)	
Overweight	212 (35.0)	136 (34.3)	76 (36.7)	
Obese	132 (21.8)	86 (21.7)	46 (22.2)	
Comorbidities				
Hypertension	95 (15.7)	53 (13.4)	42 (20.3)	0.026*
Diabetes mellitus	66 (10.9)	35 (8.8)	31 (14.9)	0.021*

Gastrointestinal disease	31 (5.1)	23 (5.8)	8 (3.8)	0.308
Heart disease	17 (2.8)	10 (2.5)	7 (3.3)	0.543
Asthma	10 (1.7)	8 (2.0)	2 (1)	0.338
Musculoskeletal disease	31 (5.1)	23 (5.8)	8 (3.8)	0.308
Thyroid disease	28 (4.6)	16 (4.0)	12 (5.8)	0.327

Table 2. Multivariable logistic regression analyses of NSAIDs use.

Variable	Subgroups	Odd ratio	95% CI	p Value
Sex	Female (Ref)			
	Male	0.5	0.4–0.8	0.001*
Medical history	Diabetes	0.7	0.4–1.4	0.3
	Hypertension	0.9	0.5–1.5	0.6
Smoking	Non-smoker (Ref)			
	Smoker	0.6	0.4–0.8	0.003*
	Ex-Smoker	0.5	0.2–1.2	0.12
Medical Insurance	Private (Ref)			
	Ministry of Health	1.6	1.1–2.6	0.03*
	University insurance	1.4	0.8–2.5	0.2
	Non	0.9	0.6–1.6	0.8

Table 3. NSAIDs awareness questions (univariate associations).

Awareness questions	Total no. (%)	NSAIDs users (%)	Non-NSAIDs user (%)	p Value
Do you know whether NSAIDs are safe in pregnancy? (Yes)	284 (47)	192 (48.4)	92 (51.6%)	0.4
Did anyone explain to you side effects of NSAIDs? (Yes)	179 (29.6)	129 (72.0)	50 (27.9)	0.03*
Are you aware NSAIDs may cause hypertension and heart disease? (Yes)	199 (32.9)	136 (68.3)	63 (31.7)	0.3
Are you aware NSAIDs may increase the risk of asthma or cause allergy? (Yes)	135 (22.4)	88 (65.2)	47 (34.8)	0.9
Are you aware NSAIDs may cause gastrointestinal problems? (Yes)	318 (52.6)	226 (71.1)	92 (28.9)	0.004*
Are you aware NSAIDs may cause kidney problems? (Yes)	393 (65.1)	279 (70.2)	117 (29.8)	0.001*
Are you aware NSAIDs can interact with each other and other drugs? (Yes)	229 (37.9)	142 (62)	87 (38)	0.1

Discussion

Non-steroidal anti-inflammatory drugs (NSAIDs) are widely used globally, with approximately 30 million people taking them daily. However, despite their common usage, NSAIDs carry significant risks of adverse drug reactions, including serious complications like myocardial infarction, stroke, bleeding, and kidney damage. This study delved into the patterns of NSAID usage and awareness of their potential side-effects among a representative sample of the public, shedding light on crucial aspects of medication use and patient education. (Kifle et al., 2021)

One notable finding is the higher prevalence of NSAID usage among females, consistent with previous studies that have also reported a greater frequency of NSAID use among women. This trend could be attributed to conditions more prevalent in women, such as migraines and menstrual pain, which often prompt NSAID use. Additionally, younger age groups were more frequent users of NSAIDs in our study, aligning with research indicating that younger patients are more likely to use these medications. (Varpaei et al., 2020)

Surprisingly, smokers were found to be less likely to use NSAIDs. This observation may be linked to smoking's potential impact on pain tolerance levels, potentially reducing the perceived need for analgesics. Moreover, individuals without health insurance were more likely to use NSAIDs, reflecting potential barriers to accessing healthcare and leading to increased self-medication practices. On the other hand, respondents with comorbidities reported decreased NSAID consumption, likely due to heightened awareness of the risks associated with NSAID use in such populations. (Amirimoghadam et al., 2017)

The study also highlighted patterns in NSAID usage, with headache being the most common indication for NSAID use. However, a concerning finding was the significant proportion of respondents who self-prescribed NSAIDs, indicating potential overuse and lack of oversight in medication management. Moreover, a substantial portion of NSAID users were not adequately warned about potential side-effects, pointing to gaps in patient education and healthcare provider practices. (Sarganas et al., 2015)

Awareness of NSAID-related side-effects among respondents varied, with higher awareness of kidney and gastrointestinal side-effects compared to other complications like asthma and allergies. This underscores the need for improved patient education regarding the full spectrum of NSAID-related risks. Healthcare professionals play a crucial role in providing comprehensive information to patients about NSAIDs, including potential interactions and complications, to ensure informed decision-making and safe medication use. (Lei et al., 2018)

The broader implications of these findings extend to the healthcare system, emphasizing the importance of strategies to enhance patient education, monitor NSAID usage, and mitigate the risk of adverse effects. Given the substantial burden of NSAID-related complications globally, further research is warranted to quantify this burden in developing countries and implement measures to promote safer medication practices and patient outcomes. (Abd ElHafeez et al., 2019)

Conclusion

In conclusion, the study revealed a high prevalence of NSAID usage among the study participants, particularly among those under 50 years of age without comorbidities. However, there was a concerning lack of awareness among users regarding NSAID-related side-effects beyond gastrointestinal and renal problems. This highlights the need for improved patient education, especially regarding acute and long-term complications that can arise from NSAID use.

Healthcare workers play a crucial role in educating patients about the risks associated with NSAIDs, including allergic reactions that can progress to severe conditions like anaphylaxis, as well as chronic complications such as kidney failure, peptic ulcer disease, and increased cardiovascular risk. These findings can inform healthcare priorities , contribute to the development of national health policies, and guide patient counseling to ensure the appropriate use of NSAIDs and mitigate potential adverse effects.

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