

A Questionnaire to Evaluate Undergraduate Students' Consumption and Awareness of Non-Steroidal Anti-Inflammatory Drugs in Syria



Reem Salloum, Fatima Baddour, Ayat Abbood

Abstract: This study aims to evaluate the level of awareness and consumption of NSAIDs among college undergraduate students in Syria. 60.1% of 309 participants were between 20 and 25 years old. 64.1% were females. 27.6% were medical college students. NSAID consumption was very high among participating students. 94.9% have used these drugs. 65.9% admit taking these medications between 2 to 10 times per month. Most participants prefer to take tablets and capsules (93.8%), especially for relieving pain (84.6%). The first choice of NSAIDs among students was ibuprofen 36.6%, then diclofenac 25.3%. 69.1% have not experienced any side effects as a result of taking NSAIDs. The study findings showed that the level of awareness among participants about NSAIDs was good since about 76% of participants have taken NSAIDs after food. However, most participants used NSAIDs without consulting a doctor or a pharmacist every 8 hours. In addition, some of them mentioned antibiotics as an example of NSAIDs. The college students who participated in this survey have a general knowledge of NSAIDs. Medical college students are more aware of the side effects, safety, and dosage of NSAIDs.

Keywords: NSAIDs, Syria, Knowledge, Practice, Survey.

I. INTRODUCTION

The inflammatory process is a normal physiological reaction to various harmful factors, such as pathogens that cause infections, and chemical or physical harmful factors. The symptoms at the site of inflammation include high temperature, pain, redness, and swelling. The inflammatory response may be severe, requiring the use of both steroidal and nonsteroidal anti-inflammatory drugs [1]-[2].

Nonsteroidal anti-inflammatory drugs (NSAIDs) are the most widely medications used for pain and inflammation treatment [3]-[6]. NSAIDs inhibit the action of cyclooxygenase (COX) enzymes and thus inhibiting the

production of prostaglandins and thromboxane. They have antipyretic, anti-inflammatory, and pain-relieving properties, which has led to their use in cases of arthritis pain, dental pain, headache and migraine pain and treatment of inflammatory diseases such as rheumatoid arthritis, in addition to their use in combination with opioid analgesics to treat metastatic pain, especially bone cancer, which is associated with the release of prostaglandins [3]-[5].

Most compounds of NSAIDs share a set of side effects, including gastrointestinal disorders (particularly peptic ulcers), kidney disorders, prolonged bleeding time, cardiovascular disorders, allergic reactions, and bronchospasm [5]-[7]. These side effects necessitate limiting their use in patients with peptic ulcers, bleeding disorders, and asthma patients, and in cases of severe liver and kidney failure [7]-[9].

NSAIDs have been classified according to their chemical structure into several groups, differing among themselves in indications, efficacy, and side effects, leading to diverse use in different pathological conditions.

NSAIDs are also classified according to their selectivity for COX-1 and COX-2 [5]-[8]. Some NSAIDs inhibit both COX-1 and COX-2, such as aspirin, acetic acid derivatives (diclofenac, indomethacin, nabumetone, ketorolac), propionic acid derivatives (ibuprofen, ketoprofen), oxicam derivatives (piroxicam, tenoxicam), as well as fenamic acid derivatives (mefenamate, mefenamic acid). NSAIDs also include drugs selective COX-2 inhibitors, such as etoricoxib and celecoxib. The latter group has fewer gastrointestinal side effects, as it does not inhibit COX-1. Unfortunately, it inhibits prostacyclin production in the blood vessels, leading to the possibility of blood clot formation and increasing the risk of cardiovascular diseases and strokes, limiting their use [7]-[8].

To achieve specific therapeutic purposes, NSAIDs require taking into account adherence to the specific dose, which is recommended to be the minimum that induces response and treatment, and the therapeutic interval between doses [5]-[20]. In addition, there is also a need to pay attention to the interactions of NSAIDs with some foods, drugs, or other medicines, which may cause a decrease in the effectiveness of the drug, causing toxicity, or increasing side effects.

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NSAIDs are among the most widely used medications in society, due to their great importance in relieving inflammation, reducing fever, and relieving pain, in addition to their ease of obtaining, as most of them are available without a prescription (over-the-counter OTC) [21]-[39][42][43][44]. However, each of the NSAIDs has indications, doses, and side effects that may be neglected due to a lack of awareness. Several surveys were conducted to ascertain people's knowledge about NSAIDs. Gawda *et al.* assessed the consumption and awareness of students about NSAIDs. The findings of this study show that while young adults frequently use NSAIDs, their knowledge about the dangers associated with the use of NSAIDs is low [40]. Another study by Aboalrob *et al.* monitored that The college students surveyed had a general awareness of NSAIDs [41]. This research aims to conduct a survey to evaluate the level of consumption and awareness of NSAIDs among undergraduate students in Syria.

II. METHODS

The questionnaire was designed with the help of previous studies, especially by Wawryk-Gawda *et al.* 2014 [40]. It consisted of two parts. The first part included 5 questions to collect the demographic characteristics of the participants. The second part included 13 questions to assess students' consumption and awareness of NSAIDs. The questionnaire was distributed at Tishreen University and published on social networking sites during November, December, and January for the years 2023-2024. Statistical programs were used to analyze the data and reach results.

III. RESULTS

A. Demographic data of Participants

Table- I: Demographic Characteristics of Participating Students.

Percentage	Total Number of Participants (309)	Demographic Characteristics	
35.90%	111	Male	1. Sex
64.10%	198	Female	
2.90%	9	< 18 years	2. Age
27.30%	85	18-20 years	
60.10%	187	21-25 years	
9.60%	30	>25 years old	3. Study
27.60%	84	Medical colleges	
25.40%	79	Engineering colleges	
13.80%	43	Science colleges	
6.80%	21	Education college	
6.80%	21	Literature colleges	
5.10%	16	Law college	
3.90%	12	Economy college	
5.50%	17	Nursing college	
4.10%	16	Institutes	
5.50%	18	Yes	4. Do you suffer from chronic diseases?
94.50%	291	No	
65%	201	Yes	5. Do you have an interest in medical scientific articles?
35%	109	No	

309 students participated in this study. The demographic characteristics of the participants are summarized in Table I. Most of the participants were females 64.1% (189) females. The percentage of male participants was 35.9% (111). The ages of most participants ranged between 20-25 years, representing 60.1% (187 out of 309 students). The number of participants from medical colleges was 84 (27.6%), while the total number of students from other colleges and institutes was 225 (72.3%). Most participants do not suffer from chronic diseases 94.5% (291%). 65.1% (201) are interested in medical scientific articles.

B. Practices Data of Participants

Table-II presents the level of NSAID consumption and awareness among participants surveyed in this study. The questionnaire results indicate that most participants used NSAIDs 94.9% (295), but 5.1% (16) did not use them. 93.8% (288) prefer to take tablets and capsules, 16.6% (51) creams and ointments, 9.1% (28), 2.9% (9) suppositories, and 2.3% (7) syrups. 84.6% (263) of participants used NSAIDs to relieve pain, 60.1% (187) to treat inflammation, 24.4% (76) to reduce fever, 10.9% (34) to treat back and neck pain, and 1.9% (4) for dental pain. The participant monthly consumption of these medications was: 25.7% (80) less than 2 times. 65.9% (205) from 2 to 10 times, 8.4% (26) from 10 to 20 times. 69.1% (215) of the participants have not experienced any side effects as a result of taking NSAIDs. 28.6% (89) suffered from nausea, vomiting, and stomach pain, 5.5% (17) from dizziness, insomnia, and headache, and 1.6% (5) from skin rash, and redness.

Regarding the behavior of taking these medications (before food, after food, or the timing is not important), 76.2% (237) have taken NSAIDs after food. 76.8% (239) reported they should take NSAIDs every 8 hours. More than half of participants believe that NSAIDs are not safe (57.6% -178). 22.7% (70) knew their side effects. 62.6% (194) used NSAIDs without consulting a doctor or pharmacist.

Concerning taking NSAIDs: 74.4% (229) have taken these drugs without any drinks or medications, 9.7% (30) with tea, 8.4% (26) with coffee, and 7.5% (23) with other medications. participants believed that anti-inflammatories are: paracetamol 18.5% (56), and antibiotics 15.1% (46). 2.3% (7) of participants stated that the doctor prescribed anti-inflammatories for them. 64.1% (197) of participants knew that NSAIDs are anti-inflammatory. The first choice of NSAID among students was ibuprofen 36.6% (71), then diclofenac 25.3% (49). The percentages of the rest of the medications were as follows: 12.2% (24) ketoprofen, 6.2% (15) etoricoxib, 12% (23) mefenamic acid, 6.1% (12) Plant extracts, 1.6% (3) other medications.

Table-II: Assessing the level of NSAID Consumption and Awareness Among Participants (Participants Can Select More Than Responses for Some Questions).

Percentage	Number of Answers	Options	Question
94.90%	294	Yes	6. Did you use NSAIDs?
5.10%	15	No	



93.80%	288	Tablets & Capsules	7. What dosage form of NSAIDs did you use?
2.30%	7	Syrups	
16.60%	51	Creams & Ointments	
9.10%	28	Ampules	
2.90%	9	Suppositories	
84.60%	263	Analgesic	8. Why did you use NSAIDs?
24.40%	76	Antipyretic	
10.90%	34	Back and neck pain	
60.10%	187	Inflammation treatment	
1.90%	6	Dental pain	9. On average, how many times do you need to take NSAIDs per month?
25.70%	80	< 2 times	
65.90%	204	2-10 times	
8.40%	25	10-20 times	
0%	0	More than 20 times	10. Did you suffer from any of the following side effects while using NSAIDs?
28.60%	89	Nausea, vomiting, stomach pain	
5.50%	17	Dizziness, insomnia, headache	
1.60%	5	Rash, redness	
69.10%	215	Non	
5.50%	7	Before meals	11. When do you take NSAIDs?
76.20%	237	After meals	
18.30%	57	Timing doesn't matter	
12.50%	38	<8 hours	12. Interval between doses:
76.80%	238	8 hours	
10.60%	33	>8 hours	
42.40%	131	Yes	13. Do you think that NSAIDs are safe?
57.60%	178	No	
22.70%	70	Yes	14. Do you know the side effects of NSAIDs?
77.30%	239	No	
62.60%	194	Yes	15. Do you use these medicines without consulting a doctor or a pharmacist?
37.40%	115	No	
0	0	Alcohol	16. Are you using these medicines in combination with?
8.40%	26	Coffee	
9.70%	30	Tea	
7.50%	23	Other drugs	
74.40%	229	Never	17. Tell us which medication(s) are anti-inflammatory?.
2.30%	7	As prescribed by the doctor	
18.50%	56	Paracetamol	
15.10%	46	Antibiotics	
64.10%	197	NSAIDs	18. What is the NSAID considered as the first choice for you?
36.60%	71	Ibuprofen	
12.20%	24	Ketoprofen	
25.30%	49	Diclofenac	
6.20%	15	Etoricoxib	
12%	23	Mefenamic acid	
6.10%	12	Plant extracts	
1.60%	3	Other drugs	

IV. DISCUSSION

NSAIDs inhibit the inflammatory process, relieve pain, and reduce fever, by inhibiting COX enzymes in a reversible or irreversible mechanism [3]-[5]. They may be selective, inhibiting COX-2, or non-selective, inhibiting both COX-1 and COX-2. NSAIDs are considered one of the most widespread drugs used among students, which prompted us

to shed light on adherence to their specific doses, knowledge of their side effects, and the necessity of distinguishing them from others, by presenting a questionnaire to assess the extent of consumption and awareness of NSAIDs among undergraduates students in Syria.

These medications are commonly used, due to their antipyretic, anti-inflammatory, and pain-relieving effectiveness [6]-[9]. In addition to these important and diverse uses, one of the factors that contributed to making it popular is that NSAIDs are available over the counter in various pharmaceutical forms. It was noted a high level of consumption of NSAIDs among undergraduate students. Ibuprofen is one of the most commonly used medications as a first choice among students, followed by diclofenac, then ketofen and mefenamic acid, and to a lesser extent etoricoxib and other medications. Tablets and capsules were the most dosage forms of NSAIDs used among participants. Awareness about these medications plays an important role in achieving the desired benefit and reducing side effects as much as possible. The dosage varies from one person to another for various reasons, such as the severity of inflammation and pain. In addition to the importance of knowing the correct timing for taking it, it is often taken with an interval between doses of about 8 hours, after food, to mitigate its gastrointestinal side effects. Most participants stated that they took these medications after food and every 8 hours. Although different types of these medications are available without a prescription, they must be used under the supervision of a doctor or pharmacist, as they are not considered safe enough. In addition, most of them exhibit a group of side effects that may be neglected due to their low probability of occurrence, such as gastrointestinal disorders (nausea, vomiting, peptic ulcers,...), renal disorders, and cardiovascular disorders. More than half of the participants reported that these medications were not safe. However, most have not experienced any side effects from taking these medications. Some of the participants considered antibiotics as an example of NSAIDs. This constitutes a danger and is directed to increasing attention to the issue of awareness about NSAIDs and clarifying the importance of the role of the doctor and pharmacist.

NSAID consumption and awareness were compared between medical and nonmedical undergraduate students who participated in the survey (Table-III). The knowledge about these medications differs between medical and non-medical college students. The medical students were aware of the non-safety of NSAIDs, their side effects, and taking them after meals and under prescription. In addition, the non-medical surveyed in this study thought that paracetamol and antibiotics are anti-inflammatory drugs.

Table-III: Comparison of NSAID Consumption and Awareness Among Participants

p-value	Comparison		Practice and Awareness about NSAIDs
	Non-Medical College Student	Medical College Student	
1.03	95 % (214)	95% (80)	Usage of NSAIDs



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Dosage form of NSAIDs			
0.37	94% (211)	93% (78)	Tablets & Capsules of
0.86	16% (36)	17% (15)	Creams & Ointments
The usage of NSAIDs as			
0.86	85.3% (192)	84.5% (71)	Analgesic
0.001	30% (161)	12% (10)	Antipyretic
0.71	60.8% (161)	59.5% (10)	For inflammation treatment
Number of times of usage of NSAIDs per month			
0.89	29.3% (66)	28.5% (24)	Less than 2 times
0.49	64.8% (146)	69% (58)	Between 2 and 10 times
0.075	9.7% (22)	3.5% (3)	Between 10 and 20 times per month
Suffering side effects of NSAIDs			
0.53	26.2% (59)	29.7% (25)	Nausea, vomiting, stomach pain
Taking NSAIDs with meals			
0.102	3.1% (7)	0% (0)	Before meals
<0.00001	68% (84)	100% (153)	After meals
<0.00001	25.3% (22)	0% (0)	Timing doesn't matter
The interval between doses			
<0.00001	17% (38)	0% (0)	<8 hours
<0.00001	70.2% (158)	95.2% (80)	8 hours
0.0035	7.5% (17)	19% (16)	>8 hours
NSAIDs are safe			
<0.00001	58.2% (131)	0% (0)	Yes
<0.00001	41.8% (94)	100% (84)	NO
Knowledge about the side effects of NSAIDs			
<0.00001	0.8% (3)	79% (67)	Yes
<0.00001	99.2% (222)	21% (17)	NO
Usage of NSAIDs without consulting a doctor or a pharmacist			
0.548	59.5% (134)	71.40% (60)	Yes
0.053	40.5% (91)	28.60% (24)	NO
Combination of taking NSAIDs with other drinks			
<0.00001	66.22% (149)	95.2% (80)	Never
The following medication(s) are anti-inflammatory			
<0.00001	24.8% (56)	0% (0)	Paracetamol
<0.00001	20.4% (46)	0% (0)	Antibiotics
<0.00001	50% (113)	100% (84)	NSAIDs
The first choice of NSAIDs			
0.84	22.7% (51)	23.8% (20)	Ibuprofen
0.56	15.11% (34)	17.8% (15)	Diclofenac

V. CONCLUSION

Syrian undergraduate students present a high consumption of NSAIDs, especially for the treatment of pain. They have a good understanding of these medications. However, they need to obtain more information about these OTC drugs concerning their dose, side effects, and efficacy.

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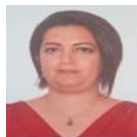
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A Questionnaire to Evaluate Undergraduate Students' Consumption and Awareness of Non-Steroidal Anti-Inflammatory Drugs in Syria



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