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Knowledge and Awareness of Maximum Doses, Side Effects and Complications of Common Analgesics Among the General Public in Saudi Arabia: A Cross-Sectional Study

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Abstract **Background:** Non-steroidal anti-inflammatory drugs (NSAIDs) are widely used for their analgesic, antipyretic and anti-inflammatory effects. However, their use is often limited by drug interactions and adverse effects, including gastrointestinal, hepatic, renal and cardiovascular complications. Analgesics remain the most frequently self-medicated drugs globally. Epidemiological studies indicate a high prevalence of analgesic use, with reports of up to 59% in Nepal and other developing countries. The misuse and overuse of prescription and over-the-counter pain relievers represent a significant public health concern. Accurate, accessible information is essential to ensure safe and effective use, particularly with regard to recommended dosages and potential side effects. Despite the widespread use of analgesics, gaps in public knowledge persist, especially concerning maximum dosage limits and associated risks. This underscores the need to assess current public awareness to guide health education strategies effectively. **Objectives:** This study aims to assess the level of knowledge and awareness among the general public in Saudi Arabia regarding the maximum recommended doses, potential side effects and complications of commonly used analgesics. **Methodology:** A cross-sectional survey was conducted from September 2024 to March 2025 using a structured and validated questionnaire, modified to suit the study context. The target population included Saudi residents aged 18 years and above who reported using analgesic medications. Participants were recruited through online platforms using convenience sampling. Individuals under 18 years of age or those who did not use analgesics were excluded. Informed consent was obtained from all participants. **Results:** A total of 791 participants completed the questionnaire. While 82% reported awareness of different types of analgesics, only 47.5% correctly identified the maximum daily dose of paracetamol. Awareness of adverse effects varied: 60.2% were aware of paracetamol-induced liver toxicity, 53.5% recognized NSAID-related gastrointestinal risks and 67.1% acknowledged renal complications. Notably, 89.9% agreed that increased analgesic doses lead to adverse effects; however, only 32.2% could accurately identify specific side effects. Overall, 52.5% of respondents demonstrated a high level of knowledge and 58.7% exhibited a positive attitude toward responsible analgesic use. Knowledge and attitude scores were significantly associated with demographic factors such as age, gender, education level and occupation ($p<0.05$). **Conclusion:** Although a moderate level of public awareness regarding analgesics exists, significant gaps remain particularly in understanding correct dosages and recognizing symptoms of overdose or toxicity. These findings highlight the urgent need for targeted public health campaigns and educational interventions to enhance safe medication practices and reduce the risk of analgesic-related complications in Saudi Arabia.

Key Words Knowledge, Awareness, Analgesics, Saudi Arabia, Maximum Dose

INTRODUCTION

Non-steroidal anti-inflammatory medications (NSAIDS) are commonly used to reduce inflammation, fever and pain. But their use is sometimes limited due to interactions between drugs and adverse responses, including gastrointestinal, liver, kidney and heart damage [1]. According to reports,

analgesics are the most popular self-medication drug [2]. The epidemiological data have revealed a significant prevalence worldwide, reaching up to 59% in Nepal and other underdeveloped nations [3]. Studies have also found that Turkey, along with other developing nations, has high rates of irrational use of both prescribed and non-prescribed analgesics [4].

The study by Algamdi *et al.* [5] aimed to measure the knowledge and attitudes of the Saudi population regarding non-steroidal anti-inflammatory drugs (NSAIDs). This observational cross-sectional study was conducted in the northern region of Saudi Arabia between June 2020 and July 2021. An electronic questionnaire was used to collect data from a sample of 1018 participants aged between 15-60 years. The questionnaire assessed participants' knowledge, attitudes and practices related to NSAIDs. The study found that there is a significant level of knowledge among the population regarding NSAIDs but misconceptions and inappropriate usage still exist. The findings indicated a need for better educational initiatives to improve the correct use of NSAIDs and to reduce self-medication practices. Improving public awareness about the risks associated with NSAIDs and promoting proper usage through targeted educational campaigns can potentially reduce the misuse of these medications. Future studies should focus on broader populations and longer-term assessments to evaluate the impact of these educational interventions [5]. Alqahtani *et al.* [6] investigated the practices and perceptions of caregivers regarding paracetamol usage for children post-COVID-19. The study focused on understanding how the pandemic influenced medication practices among caregivers. The study utilized a structured questionnaire distributed to caregivers. The questionnaire included questions about the frequency of paracetamol use, combinations with other medications and general perceptions about the safety and efficacy of paracetamol. The research revealed that nearly half of the caregivers reported an increase in paracetamol use post-pandemic, with some caregivers administering it without checking the label contents. This highlighted a significant gap in knowledge regarding the safe administration of paracetamol and the potential risks of concurrent use with other medications. The study emphasized the need for educational programs aimed at caregivers to ensure the safe use of paracetamol, especially in the context of increased use post-COVID-19. Proper guidance and information dissemination could mitigate the risks associated with improper medication practices [6]. Alharthi *et al.* [7] examined the prevalence of self-medication with analgesics among medical students at Taif University. This study sought to understand the frequency, reasons and side effects associated with the self-medication practices of medical students. The study used a self-administered structured questionnaire distributed via online platforms. It included questions about the frequency of analgesic use, common indications, side effects and attitudes toward self-medication, alongside socio-demographic data. The study found that 92.7% of the students reported using analgesics, with 50.7% using them rarely. Females were more likely to use analgesics and experience side effects compared to males. The most common indication for analgesic use was headaches and abdominal pain was a frequent side effect. The high prevalence of self-medication among medical students indicates a need for better education on the risks and proper use of analgesics. Universities should implement awareness campaigns to inform students about the potential dangers of self-medication and the importance of seeking medical advice when necessary [7].

The appropriate and inappropriate use of analgesics-prescription medications used to relieve pain represents a significant public health concern. It is essential that information about these medications, including their maximum recommended dosages and potential side effects, be communicated clearly and comprehensibly. Patients must be equipped to use analgesics both effectively and safely. However, notable gaps persist in public knowledge regarding dosage limits and associated risks. While a few studies in Saudi Arabia have explored public knowledge or documented adverse effects of analgesics, they often lacked specificity regarding the drugs involved. To date, no study has directly focused on public awareness of maximum dosage thresholds. Therefore, the purpose of this study was to assess the knowledge and understanding among a sample of Saudi citizens regarding the safe maximum dosages of commonly used analgesics and the potential consequences of exceeding these limits.

Objectives

This study aims to assess the level of knowledge and awareness among the general public in Saudi Arabia regarding the maximum recommended dosages, potential side effects and complications associated with commonly used analgesics.

METHODS

Study Design and Setting

This study was a cross-sectional study conducted between July 2024 to May 2025, based on using a structured and validated questionnaire, modified to suit the study context.

Sample Size

The sample size was computed using Raosoft with a 95% confidence interval and 5% confidence level, yielding 384 participants. The study aimed to evaluate differences in respondents' use of analgesic medication to relieve pain. Knowledge, attitudes and practices (KAPs). The data collection page will feature consent for participation, followed by other parts.

Inclusion and Exclusion Criteria

The inclusion criteria for this study were as follows: all Saudi adult males and females aged 18 years and above who use analgesic medications and can provide informed consent were eligible to participate, regardless of their social or

educational background. Individuals under the age of 18 and those who do not use analgesic medications were excluded from the study.

Method for Data Collection, Instrument and Score System

A structured, self-administered questionnaire was used as the primary data collection tool. The questionnaire was developed based on previous literature and validated tools, with appropriate modifications to fit the cultural and healthcare context of Saudi Arabia. It was designed to be clear, concise and accessible to participants from various educational backgrounds. The questionnaire was composed of multiple sections, including sociodemographic data, knowledge-related questions and attitude-related statements.

The survey was distributed electronically via online platforms, including social media channels such as WhatsApp, Twitter (X), Instagram and Telegram. This method ensured broad geographic coverage and helped reach a diverse range of respondents across different regions of Saudi Arabia. Participation in the study was entirely voluntary and an informed consent statement was included at the beginning of the questionnaire. Only those who agreed to the terms were able to proceed to complete the survey.

To maintain confidentiality and privacy, no personally identifiable information was collected. The study adhered to ethical guidelines and approval was obtained from the appropriate institutional review board before data collection.

Scoring System

A total of 18 statements were used to assess participants' knowledge and attitudes. The questionnaire included six demographic items, eight knowledge-based questions and four items evaluating attitudes. Each correct answer was awarded one point, while incorrect or "I don't know" responses received zero points. The maximum obtainable score was 13. Knowledge scores ranged from 0 to 9 and were categorized into two levels: a score of 6 or higher indicated a high level of knowledge, whereas a score of 5 or below reflected a low level of knowledge. Similarly, attitude scores ranged from 0 to 9 and were also divided into two levels: participants scoring 6 or above were considered to have a positive attitude, while those scoring 5 or below were categorized as having a negative attitude. Bloom's original cut-off points (80.0-100.0%, 60.0-70.0% and below 59.0%) were used as a general reference for interpreting the results.

Pilot test

The questionnaire was distributed to 20 individuals who were asked to complete it. This pilot test aimed to evaluate the simplicity of the questionnaire and the feasibility of the study. Data collected during the pilot study were excluded from the final analysis of the study.

Analysis and Entry Method

The data was entered on the computer using the "Microsoft Office Excel Software" program (2016) for Windows. Data transferred to the Statistical Package of Social Science Software (SPSS) program, version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) to be statistically analyzed. Descriptive statistics, comprising frequencies, percentages, means and standard deviations, were utilized to summarize the data. To examine the relationships between knowledge, awareness and demographic factors, inferential statistical methods including Chi-square tests and independent t-tests were applied. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1 presents the demographic characteristics of the 791 participants. The average age of respondents was 34.1 years, with 22.8% being over 45 years old. The majority were female (57.3%) and Saudi nationals (90.9%), reflecting the regional population. Slightly more than half of the participants (51.1%) were married. Regarding education, most held a bachelor's degree or higher, including PhDs. Students constituted the largest occupational group at 32.1%, while 15.2% reported being unemployed. Importantly, the majority of participants (84%) reported no chronic illnesses, indicating that the sample largely represents a healthy population.

As shown in Figure 1, Analysis of the data concerning a total sample of 791 respondents shows an insight into public knowledge as regards the recommended doses of paracetamol from the data involved. Of note, 47.5% (376 participants) confirmed their knowledge of the correct dosage of paracetamol and 26.7% (206 individuals) reported they knew the dosage for adults but not for children. On the other hand, mere 1.6% (13 respondents) knew pediatric dosing but not adult dosing. Also alarming, over a quarter (196 participants) admitted to never having heard any recommended dosage.

Table 2 summarizes the awareness and knowledge of analgesics among a sample of 791 participants. A large majority (82%) were familiar with different types of analgesics, indicating broad awareness of available pain relief options. However, only 47.5% correctly identified the recommended dosages for both adults and children, highlighting a critical gap in knowledge, especially important given the risks associated with improper dosing in pediatric cases. Participants showed varied understanding regarding the side effects of analgesic overuse, with just 32.2% providing accurate responses. Additionally, 47.9% demonstrated partial knowledge, though many were unable to identify all side effects comprehensively. Furthermore, only 42.7% of respondents were able to distinguish between over-the-counter (OTC) and prescription analgesics, suggesting the need for clearer public education in this area.

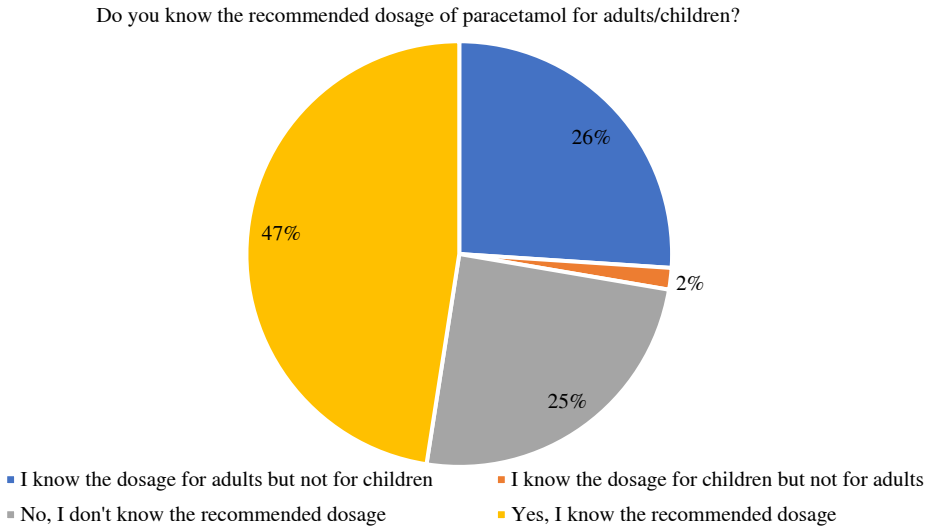

Figure 1: Recommended dosage of paracetamol among participants

Table 1: Sociodemographic characteristics of participants (n = 791)

Parameters		No.	Percentage
Age (Mean:34.1, STD:13.1)	Less than 23	193	24.4
	23 to 25	128	16.2
	26 to 35	151	19.1
	36 to 45	139	17.6
	More than 45	180	22.8
Gender	Female	453	57.3
	Male	338	42.7
Nationality	Saudi	719	90.9
	Non-Saudi	72	9.1
Marital status	Single	365	46.1
	Married	404	51.1
	Divorced or widowed	22	2.8
Residential region	Alahsa	3	0.4
	Al-Baha	7	0.9
	Dammam	8	1.0
	Riyadh	72	9.1
	Al-Ola	1	0.1
	Al-Madinah Almonawra	69	8.7
	Buraidah	5	0.6
	Tabuk	56	7.1
	Jazan	1	0.1
	Jeddah	8	1.0
	Ha'il	5	0.6
	Arar	1	0.1
	Asir	40	5.1
	Makkah	514	65.0
	Najran	1	0.1
Educational qualification	Primary Stage	3	0.4
	Intermediate Stage	8	1.0
	High school Diploma	228	28.8
	Bachelor's Degree	455	57.5
	Master's Degree	61	7.7
	PhD Degree or above	28	3.5
	I don't have an educational qualification	8	1.0
Occupation	Student	254	32.1
	Health Sector Employee	70	8.8
	Non-health Sector Employee	186	23.5
	Government Employee	14	1.8
	Private Sector Employees or self-employed	86	10.9
	Unemployed	120	15.2
	Retired	61	7.7
Do you suffer from any chronic diseases?	No	665	84.1
	Yes	126	15.9

Table 2: Parameters related to knowledge regarding maximum dose, side effects and complications of highly frequented of analgesics (n = 791)

Parameter		No.	Percentage
Are you aware of the different types of analgesics available (e.g., paracetamol, ibuprofen, aspirin)?	No	142	18.0
	Yes	649	82.0
Do you know the recommended dosage of paracetamol for adults/children?	I know the dosage for adults but not for children	206	26.0
	I know the dosage for children but not for adults	13	1.6
	No, I don't know the recommended dosage	196	24.8
	Yes, I know the recommended dosage	376	47.5
Can you identify potential side effects of overusing analgesics?	No, I cannot identify the side effects	157	19.8
	Yes, I can identify the side effects	255	32.2
	I can identify some but not all side effects	379	47.9
Do you know the difference between over the counter (OTC) and prescription analgesics?	No, I don't know the difference	134	16.9
	I have a general idea, but am not sure	319	40.3
	Yes, I know the difference	338	42.7
Are you aware of the risks associated with combining different analgesics?	I know some risks, but not all	290	36.7
	No, I am not aware of the risks	215	27.2
	Yes, I am aware of the risks	286	36.2
What is the most commonly used of analgesic?	Aspirin	53	6.7
	Paracetamol or acetaminophen	623	78.8
	Ibuprofen	32	4.0
	Other analgesic	33	4.2
	I don't know	50	6.3
When do you use the analgesics?	Regularly	11	1.4
	When needed	728	92.0
	Never used	52	6.6
If the pain didn't subside, what would you do?	I increase the dose	106	13.4
	Ask a physician, pharmacist	539	68.1
	Use another analgesic	146	18.5
When you buy pain relief medication without a prescription, what is your source of information about it? *	Family or friends	302	38.2
	Pharmacist, physician	605	76.5
	I have heard about it on television and social media	124	15.7

*Results may overlap

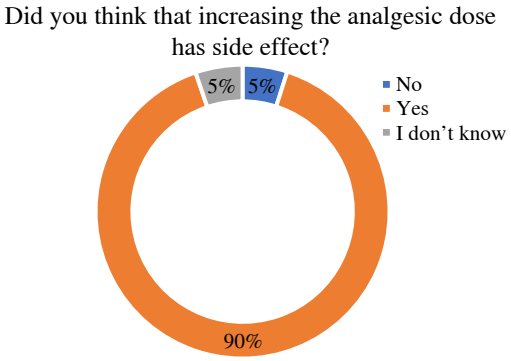

Figure 2: Illustrates whether increasing the analgesic dose has side effects among participants

As shown in Figure 2, from a total sample size of 791, the data presented indicates a significant perception by the respondents of the effect arising from the 'increase' of analgesic doses. In particular, 711 participants (89.9% of the sample) agreed that an increase in dosage of analgesics accompanies side effects. However, only 39 respondents (4.9%) stated that higher doses do not result in adverse effects, while 41 respondents (5.2%) said that they had doubts about that matter.

Table 3 shows how well participants in 791 respondents knew about how much dose to take, side effects and complications of currently used analgesics among a sample group. Of note, most participants agreed that higher dosages of an analgesic might cause side effects (89.9%), reflecting knowledge of the risks of analgesic misuse. Along with that, however, the findings also show some serious omissions in knowledge, specifically in first drug agents' knowledge of the potential serious side effects of over-the-counter (OTC) medications; a lack of knowledge in 16.4 percent of respondents. Furthermore, they found that while 60.2% were aware of the hepatotoxicity risk associated with overuse of paracetamol, 39.8% of people were unaware of it. Also, there was variability in awareness of non-steroidal anti-inflammatory drugs (NSAIDs) risk, including gastrointestinal and renal risks, at 46.5% unaware of the potential of stomach ulcers.

From Table 4 it can be seen that knowledge distribution about maximum doses, side effects and complications of analgesics is considerably wide. encouraging, 52.5 percent of respondents showed a high level of knowledge on these critical factors which can greatly affect the patient's safety and treatment efficacy. On the other hand, 47.5% of the respondents with a low knowledge pose some potential risks and adverse outcomes in a clinical setting.

Table 5 provides the data about prevailing attitudes towards the maximum dose, side effects and complications of commonly used analgesics. One of the novel features of this report is that a substantial majority of the respondents, namely 58.7 per cent, manifest a positive attitude towards these analgesics, which might hint at a broad trust in their efficacy and a perception of manageable risk profile. Of the

Table 3: Participants' awareness regarding maximum dose, side effects, and complications of highly frequent analgesics (n = 791)

Parameter		No.	Percentage
Did you think that increasing the analgesic dose has side effects?	No	39	4.9
	Yes	711	89.9
	I don't know	41	5.2
Did you read the medication leaflet before using any medication?	No, I didn't do	139	17.6
	Yes, I do	373	47.2
	Yes, sometimes	279	35.3
Did you know that the long-term use of OTC medications will cause serious side effects?	No, I don't know	130	16.4
	Yes, I know	661	83.6
Did you know that overusing Panadol (paracetamol) will cause liver toxicity?	No, I don't know	315	39.8
	Yes, I know	476	60.2
Did you know that using of NSAIDs (ibuprofen) cause stomach ulcers?	No, I don't know	368	46.5
	Yes, I know	423	53.5
Did you know that the use of NSAIDs (ibuprofen) may cause harm to your kidneys if they are misused?	No, I don't know	260	32.9
	Yes, I know	531	67.1
Did you know that one tablet of paracetamol contains a dosage of 500 mg?	No, I don't know	271	34.3
	Yes, I know	520	65.7
Did you think that paracetamol can be taken 2-3 times a day if experiencing body pain or discomfort? The maximum dosage of paracetamol is 8 tablets per day?	No, I don't know	307	38.8
	Yes, I know	484	61.2
Do you know that paracetamol does not irritate the digestive tract, so it can be taken before meals?	No, I don't know	364	46.0
	Yes, I know	427	54.0

Table 4: Shows knowledge regarding maximum dose, side effects and complications of highly frequent of analgesics score results

	Frequency	Percent
High level of knowledge	415	52.5
Low level of knowledge	376	47.5
Total	791	100.0

Table 5: Shows attitude regarding maximum dose, side effects, and complications of highly frequent analgesics, score results

	Frequency	Percent
Positive attitude	464	58.7
Negative attitude	327	41.3
Total	791	100.0

participants, 41.3% had a subjective negative attitude, which indicates that it can be true that things which suggest their aware of possible hydroxychloroquine adverse effects or complications.

Table 6 shows that knowledge regarding maximum dose, side effects and complications of highly frequent analgesics has a statistically significant relation to gender (p-value = 0.0001), age (p-value = 0.0001), educational qualification (p-value = 0.019) and occupation (p-value = 0.0001). It also shows a statistically insignificant relation to nationality, marital status and suffering from chronic diseases.

Table 7 shows attitude level regarding maximum dose, side effects and complications of highly frequent of analgesics has a statistically significant relation to gender (p-value = 0.008), educational qualification (p-value = 0.007) and occupation (p-value = 0.0001). It also shows a statistically insignificant relation to age, nationality, marital status and if participants suffer from chronic diseases.

DISCUSSION

The present study aimed to investigate the level of knowledge and awareness regarding the maximum dosage, side effects and complications of commonly used analgesics among the general population in Saudi Arabia. Our findings reveal significant insights into the understanding and misconceptions prevailing in the community surrounding analgesic medications. While a majority of participants demonstrated familiarity with certain types of analgesics, including paracetamol, ibuprofen and aspirin, this familiarity does not uniformly translate into comprehensive knowledge regarding their safe use, which is particularly pressing given the extent of analgesic self-medication observed in various global contexts.

Most of our respondents knew what analgesics are but only half of them could give the right dose for paracetamol. Earlier studies, including one by Salih *et al.* [9], have shown a clear link between knowing about analgesics and their use among female students at Jazan University. Even though people were aware of the right doses, some still followed inappropriate practices, which showed a gap between what they knew and how they acted [10]. It is concerning to see these patterns, as they show that some groups, especially the young and less educated, are more likely to have unsafe dosing behaviors (significant association with demographic variables).

Also, the participants did not understand the specific issues that arise when someone overdoses on analgesics. For example, most people understood that taking higher doses of analgesics can result in side effects but fewer knew about possible serious risks like liver toxicity with paracetamol and side effects in the stomach with NSAIDs-these numbers

Table 6: Relation between knowledge regarding maximum dose, side effects, and complications of highly frequent use of analgesics and sociodemographic characteristics

Parameters		Knowledge level		Total (N = 791)	p-value*
		High level of knowledge	Low level of knowledge		
Gender	Female	263	190	453	0.0001
		63.4%	50.5%	57.3%	
	Male	152	186	338	
		36.6%	49.5%	42.7%	
Age	Less than 23	88	105	193	0.0001
		21.2%	27.9%	24.4%	
	23 to 25	71	57	128	
		17.1%	15.2%	16.2%	
	26 to 35	98	53	151	
		23.6%	14.1%	19.1%	
	36 to 45	83	56	139	
		20.0%	14.9%	17.6%	
	More than 45	75	105	180	
		18.1%	27.9%	22.8%	
Nationality	Saudi	378	341	719	0.848
		91.1%	90.7%	90.9%	
	Non-Saudi	37	35	72	
		8.9%	9.3%	9.1%	
Marital status	Single	183	182	365	0.479
		44.1%	48.4%	46.1%	
	Married	220	184	404	
		53.0%	48.9%	51.1%	
	Divorced or widowed	12	10	22	
		2.9%	2.7%	2.8%	
Educational qualification	Primary Stage	1	2	3	0.019
		0.2%	0.5%	0.4%	
	Intermediate Stage	3	5	8	
		0.7%	1.3%	1.0%	
	High school Diploma	106	122	228	
		25.5%	32.4%	28.8%	
	Bachelor's Degree	247	208	455	
		59.5%	55.3%	57.5%	
	Master's Degree	40	21	61	
		9.6%	5.6%	7.7%	
	PhD Degree or above	17	11	28	
		4.1%	2.9%	3.5%	
	I don't have an educational qualification	1	7	8	
		0.2%	1.9%	1.0%	
Occupation	Student	125	129	254	0.0001
		30.1%	34.3%	32.1%	
	Health Sector Employee	58	12	70	
		14.0%	3.2%	8.8%	
	Non-health Sector Employee	86	100	186	
		20.7%	26.6%	23.5%	
	Government Employee	8	6	14	
		1.9%	1.6%	1.8%	
	Private Sector Employees or self-employed	41	45	86	
		9.9%	12.0%	10.9%	
	Unemployed	76	44	120	
		18.3%	11.7%	15.2%	
	Retired	21	40	61	
		5.1%	10.6%	7.7%	
Do you suffer from any chronic diseases?	No	354	311	665	0.320
		85.3%	82.7%	84.1%	
	Yes	61	65	126	
		14.7%	17.3%	15.9%	

*p-value was considered significant if ≤0.05

were 60.2% and 53.5%, respectively. As Khaled explains, not recognizing the dangers of taking OTC medications in high doses can put users at risk of drug interactions and organ damage [11].

It is concerning that around a quarter of the participants did not know the standard guidelines for giving drugs to children. Because of this gap, some people may suffer from serious health problems, especially if many caregivers treat

Table 7: Attitude level regarding maximum dose, side effects and complications of highly frequented use of analgesicsin association with sociodemographic characteristics

Parameters		Attitude level		Total (N = 791)	p-value*
		Negative attitude	Positive attitude		
Gender	Female	169	284	453	0.008
		51.7%	61.2%	57.3%	
	Male	158	180	338	
		48.3%	38.8%	42.7%	
Age	Less than 23	91	102	193	0.071
		27.8%	22.0%	24.4%	
	23 to 25	44	84	128	
		13.5%	18.1%	16.2%	
	26 to 35	53	98	151	
		16.2%	21.1%	19.1%	
	36 to 45	63	76	139	
		19.3%	16.4%	17.6%	
	More than 45	76	104	180	
		23.2%	22.4%	22.8%	
Nationality	Saudi	293	426	719	0.288
		89.6%	91.8%	90.9%	
	Non-Saudi	34	38	72	
		10.4%	8.2%	9.1%	
Marital status	Single	152	213	365	0.901
		46.5%	45.9%	46.1%	
	Married	165	239	404	
		50.5%	51.5%	51.1%	
	Divorced or widowed	10	12	22	
		3.1%	2.6%	2.8%	
Educational qualification	Primary Stage	1	2	3	0.007
		0.3%	0.4%	0.4%	
	Intermediate Stage	5	3	8	
		1.5%	0.6%	1.0%	
	High school Diploma	108	120	228	
		33.0%	25.9%	28.8%	
	Bachelor's Degree	179	276	455	
		54.7%	59.5%	57.5%	
	Master's Degree	20	41	61	
		6.1%	8.8%	7.7%	
	PhD Degree or above	7	21	28	
		2.1%	4.5%	3.5%	
	I don't have an educational qualification	7	1	8	
		2.1%	0.2%	1.0%	
Occupation	Student	106	148	254	0.0001
		32.4%	31.9%	32.1%	
	Health Sector Employee	10	60	70	
		3.1%	12.9%	8.8%	
	Non-health Sector Employee	90	96	186	
		27.5%	20.7%	23.5%	
	Government Employee	4	10	14	
		1.2%	2.2%	1.8%	
	Private Sector Employees or self-employed	46	40	86	
		14.1%	8.6%	10.9%	
	Unemployed	40	80	120	
		12.2%	17.2%	15.2%	
	Retired	31	30	61	
		9.5%	6.5%	7.7%	
Do you suffer from any chronic diseases?	No	275	390	665	0.986
		84.1%	84.1%	84.1%	
	Yes	52	74	126	
		15.9%	15.9%	15.9%	

*p-value was considered significant if ≤0.05

themselves with medication. An analysis by Raja *et al.* [12] points out that many people are not familiar with proper usage of analgesics, which is similar to what we found. Since these findings are similar, it is important to create interventions that address the known weaknesses in education.

Respondents did not all have the same level of understanding about analgesic side effects. Only around 32.2% of respondents were able to identify all the possible negative effects, which is concerning for the whole population. This lack of understanding is common across the world, for example, in Turkey, where Okyay and Erdoğan

found that many students do not understand the risks of self-medication and need more information [13]. Because our data shows significant differences, we must focus on special campaigns to help prevent vulnerable people from using unsafe analgesics.

Also, regarding treatment choices, we observed that the majority (68.1%) turned to a medical professional when pain remained, yet almost one in ten (13.4%) decided to take more medicine on their own. According to Fendrick *et al.* [14] and other researchers, OTC medications can be dangerous if not used properly and our results suggest there is still a tendency among people to take them without proper advice or guidance. In other words, even though people say they are responsible with their medicine, their actions show that they are not aware of the risks linked to OTC analgesics [15].

Since this is a cross-sectional study, it is not possible to conclude whether one thing causes another. It is possible that the highly educated people we surveyed do not accurately show how much people in different sectors of the community know, mainly because of shortages in education and healthcare. Including a wider and longer study with people from various backgrounds could give us a better picture of the knowledge about analgesics in Saudi Arabia. Also, people may not remember their knowledge or habits about analgesic use correctly, which could make the survey results less reliable.

CONCLUSIONS

Although there is some awareness among Saudi people about analgesics, important gaps in their knowledge are found concerning the proper dosage and symptoms of overdose. Because of these insights, health authorities feel the need to launch public health campaigns that teach people how to use analgesics properly. If people improve their knowledge about analgesics, this may decrease the rate of associated adverse effects and encourage a healthier approach to self-medication.

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Ethical Approval

Informed consent was obtained from each participant after explaining the study in full and clarifying that participation was voluntary. Data collected was securely saved and used for research purposes only.

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