

**Saudi Toxicology Journal (STJ)**Journal home page: <https://uqu.edu.sa/s.toxicology.s/S.T.J>*Article***Public Awareness of Controlled Drug Abuse and Dependence in Saudi Arabia: A Cross-Sectional Study**Khalid Mohammed Alharbi^{1*}, Amal Faraj Alotaibi²¹Department of Pharmaceutical Services, King Fahad Hospital, Madinah Health Cluster, Madinah, Saudi Arabia; khalharbi84@gmail.com²Department of Pharmacy Practice, College of Pharmacy, Umm Al-Qura University, Makkah, Saudi Arabia; afotaibi@uqu.edu.sa

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Abstract

Background: This study examines public awareness in Saudi Arabia regarding controlled drug abuse and dependence. It aims to evaluate public knowledge of controlled drugs, their complications, legal considerations, and exposure to related campaign. The study also explored predictors of public awareness of controlled drug abuse and dependence.

Methods: A cross-sectional survey utilized a random sampling technique to recruit 529 participants aged 18 or older across Saudi Arabia. Participants were recruited via an online questionnaire distributed from January to February 2024, targeting diverse demographics (e.g., age, gender, region). The survey assessed knowledge of controlled drugs, their effects, and explored perceptions about campaigns. Informed consent was obtained online, ensuring anonymity and voluntary participation, with ethical approval from Umm Al-Qura University.

Results: Only 52.4% of participants knew the term "controlled drugs", 33.3% understood legal implications, and 29.1% knew where to seek help. Half (50.7%) viewed campaigns as inadequate. Females (30.2%) vs. males (13.8%) saw drug abuse as a community issue ($\chi^2 = 13.361$, $p = 0.001$). Familiarity correlated with side-effect knowledge (Cramer's $V=0.293$, $p < 0.001$).

Conclusion: Significant knowledge gaps and limited campaign exposure highlight the need for targeted education and ongoing evaluation to increase awareness in Saudi Arabia.

Keywords: Saudi Arabia, Controlled drugs, Awareness, General population

1. Introduction

Controlled drugs are prescription drugs that are dispensed with a restricted prescription approved by a licensed physician to treat certain diseases and conditions such as epilepsy and acute pain. They may cause addiction when abused, such as tramadol, pregabalin, and diazepam. Drug abuse and addiction are growing public health crises worldwide, burdening societies with higher healthcare costs, increased crime, and family breakdowns [4]. In Saudi Arabia, substance abuse is rising among youth and adults, demanding urgent action [1, 2, 3].

Research highlights the scope of substance abuse in Saudi Arabia. [1] noted frequent misuse of alcohol, opioids, and amphetamines, especially among youth. [2] linked rising drug use to factors like age and income. In Al Qassim, [3] identified signs like poor performance and behavioral changes but did not explore public awareness of these. [5] found pharmacists have some knowledge of drug misuse but need better training. [7] showed even healthcare students lack deep understanding of drug abuse symptoms.

[6] reported abuse of amphetamines, cannabis, and alcohol in Riyadh, with polydrug use common. [8] flagged over-the-counter drug misuse in Jeddah, stressing the need for education.

However, research gaps remain. Most studies focus on general substance abuse, not controlled drugs, which are heavily regulated due to their high abuse potential. Public awareness of controlled drug risks, signs, symptoms, and legal consequences is underexplored, as are related public health campaigns across diverse groups. This study explores public awareness in Saudi Arabia of controlled drug abuse, aiming to inform targeted interventions to reduce controlled drug abuse.

2. Methods

2.1. Study Design and Population

A cross-sectional survey was conducted to assess public awareness of controlled drug abuse and dependence in Saudi Arabia. Eligible participants were residents aged ≥ 18 years, excluding those under 18 to comply with ethical standards and ensure relevance. A random sampling technique was employed to achieve diverse demographic representation.

2.2. Sample Size

The sample size of 529 participants was calculated based on an estimated Saudi population of 32 million [9], using a 95% confidence level and 5% margin of error [10], ensuring adequate statistical power.

2.3. Questionnaire Development

The questionnaire was developed by adapting themes from prior substance abuse studies [1, 2] to ensure content validity and appropriateness. The questionnaire was translated into Arabic to ensure accuracy, with pilot testing conducted to confirm clarity and content validity. The survey explored awareness of the term "controlled drugs", legal implications, health risks, and resource accessibility. Most items used a 3-point Likert scale (Yes/No/Unsure) for simplicity across diverse literacy levels, while a 4-point scale (Frequently/Sometimes/Rarely/Never) was used for nuanced questions (e.g., media exposure, perceived danger).

2.4. Pilot Testing

The questionnaire was pilot tested on 30 individuals (5.7% of the sample) to evaluate clarity and relevance, with minor revisions made based on feedback (e.g., simplifying ambiguous terms). Construct validity was supported by significant correlations in the main study data (Cramer's $V = 0.293$, $p < 0.001$, for familiarity with "controlled drugs" and side effect knowledge). The internal consistency of the questionnaire was evaluated using Cronbach's alpha. The overall scale demonstrated good reliability ($\alpha = 0.84$), supporting the internal coherence of the survey items. Restricting responses to one per unique email address via Google Forms was a data integrity measure to prevent duplicate submissions if distributed via any platforms (e.g., WhatsApp, and Telegram).

2.5. Data Collection

Data were collected from January to February 2024 using an online questionnaire administered in Arabic. The survey was distributed via social media platforms (e.g., Twitter/X, WhatsApp, and Telegram). The questionnaire was drafted in English, then translated into Arabic.

2.6. Demographic Data

Demographic variables included region, gender, age, education level, and employment status.

2.7. Ethical Considerations

The study was approved by the Ethics Committee at Umm Al-Qura University (approval no. HAPO-02-K-012-2023-11-18660). Informed consent was obtained online prior to survey completion. Responses were anonymous, and participation was voluntary.

2.8. Data Analysis

Descriptive statistics (frequencies, percentages) summarized demographic characteristics and responses. Chi-square tests and correlation analyses (e.g., Cramer's V, Phi) examined associations between demographic factors and awareness variables. This study analyzed 529 responses from participants across Saudi Arabia.

3. Results

3.1. Respondents' Demographic Characteristics

The majority of respondents were from Al-Qassim (29.0%), Riyadh (25.0%), and Makkah (17.7%). More than half were female (64.2%). The 18–24-year age group constituted the largest segment (77.7%). Over two-thirds had a bachelor's degree (67.2%), and most were students (78.3%) (Table 1).

3.2. Survey Findings on Controlled Drug Abuse (table 2)

3.2.1. General Awareness

52.4% of respondents were familiar with the term "controlled drugs", but 38.1% were unsure whether signs of abuse are easily recognizable, suggesting variable awareness. 41.9% frequently or sometimes encountered drug-related information, supporting the link between media exposure and knowledge ($\Phi = 0.239$, $p < .001$).

3.2.2. Accessibility and Community Education

56.8% believed obtaining controlled drugs for non-medical use is difficult, yet 49.7% were unaware of help resources, indicating a gap in service awareness. 50.7% viewed community education as insufficient, with 43.4% seeing abuse

as a significant issue, aligning with the need for public education ($\Phi = 0.207$, $p < .001$).

3.2.3. Legal Implications

33.3% were aware of legal consequences, with 83% supporting stricter regulations and 81.7% backing pharmacists' refusal rights, consistent with legal awareness driving regulatory support ($\Phi = 0.233$, $p < .001$).

3.2.4. Complications

68% recognized long-term health risks, and 68.6% acknowledged addiction risks, supporting the link between long-term risk awareness and perceived danger ($\Phi = 0.302$, $p < .001$).

3.3. Predictors of Public Awareness

Factors associated with public awareness of controlled drugs are displayed in Table 3. The predictors of public awareness of controlled drugs include demographic factors (age, gender, region, education), media exposure, legal awareness, community concern, and awareness of long-term health risks. Statistical tests (χ^2 , Cramer's V, Φ) consistently show significant associations ($p < .05$) between these predictors and various awareness-related outcomes. Younger individuals, females, and those with higher education or frequent media exposure tend to exhibit greater awareness. Regional differences also play a significant role, as do legal knowledge and concern for community-level issues.

3.4. Regression Analysis

Table 4 presents the logistic regression analysis examining factors influencing public awareness of controlled drug abuse. Age (18–24 years vs. ≥ 25 years) was a significant predictor ($P = 0.021$; OR = 0.619; 95% CI: 0.440–0.871), indicating that younger adults were more likely to be aware compared to older individuals. Gender demonstrated significance in two domains: females were more likely to perceive drug abuse as a community issue ($P = 0.001$; OR = 2.541; 95% CI: 1.789–3.610) and reported greater difficulty recognizing signs and symptoms of drug abuse ($P = 0.015$; OR = 3.960; 95% CI: 2.718–5.769). Educational attainment was highly significant, with higher education levels associated with increased awareness ($P < 0.001$; OR = 3.046; 95% CI: 2.091–4.440). Employment status did not significantly predict awareness ($P > 0.05$; OR = 0.980; 95% CI: 0.672–1.428). Region of residence was significant,

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage
Region of Residence			
Central Region (Al-Qassim, Riyadh)		283	54.0%
Western Region (Makkah, Madina)		134	25.6%
Eastern Region (Eastern)		61	11.6%
Southern Region (Najran, Baha, Jazan, Asir)		33	6.3%
Northern Region (Tabuk, Northern, Jouf, Hail)		9	1.7%
Gender			
Male		181	34.5%
Female		337	64.2%
Age in Years			
18–24		408	77.7%
25–35		70	13.3%
35–44		30	5.7%
45–54		12	2.3%
55+		5	1.0%
Level of Education			
High school or below		139	26.5%
Bachelor's degree		353	67.2%
Master's degree		25	4.8%
Doctoral degree		5	1.0%
Employment Status			
Employed		71	13.5%
Unemployed		38	7.2%
Student		411	78.3%
Retired		5	1.0%

Table 2: Survey Findings on Controlled Drug Abuse

Question	Yes	No	Unsure
General awareness of controlled drug			
Are you familiar with the term "controlled drugs"?	275 (52.4%)	112 (21.3%)	137 (26.1%)
Do you think that signs and symptoms of controlled drug abuse can be easily recognized by friends and family?	171 (32.6%)	152 (29%)	200 (38.1%)
How often do you come across information about controlled drugs in media?	Frequently 60 (11.6%)	sometimes 160 30.5%	rarely 191 36.4
			never 114 21.7
Accessibility to the controlled drug and related services			
Do you think it is easy for people to obtain controlled drugs for non-medical use?	Yes 82(15.6%)	No 298(56.8%)	Unsure 141(26.9%)
Do you know where to seek help or advice if someone is abusing a controlled drug?	153 (29.1%)	261 (49.7%)	111 (21.1%)
Do you think enough is being done in your community to educate people about the risks of abusing controlled drugs?	126 (24%)	266 (50.7%)	128 (24.4%)
Legal implications			
Are you aware of the legal implications of abusing controlled drugs?	Yes 175 (33.3%)	No 239 (45.5%)	Unsure 109 (20.8%)
Would you support stricter regulations on controlled drugs to prevent abuse?	436 (83%)	19 (3.6%)	69 (13.1%)

Should pharmacists have the right to refuse to sell controlled drugs if they suspect abuse?	429 (81.7%)	31 (5.9%)	64 (12.2%)
Complications related to the use of controlled drugs	Yes	No	Unsure
Do you think controlled drug abuse is a significant issue in your community?	228 (43.4%)	112 (21.3%)	183 (34.9%)
Do you believe that abusing controlled drugs is less harmful than abusing illegal drugs?	142 (27%)	216 (41.1%)	166 (31.6%)
Are you aware that the abuse of controlled drugs can lead to long-term health issues?	357 (68%)	68 (13%)	99 (18.9%)
Are you aware that long-term abuse of controlled drugs can lead to addiction?	360 (68.6%)	77 (14.7%)	87 (16.6%)

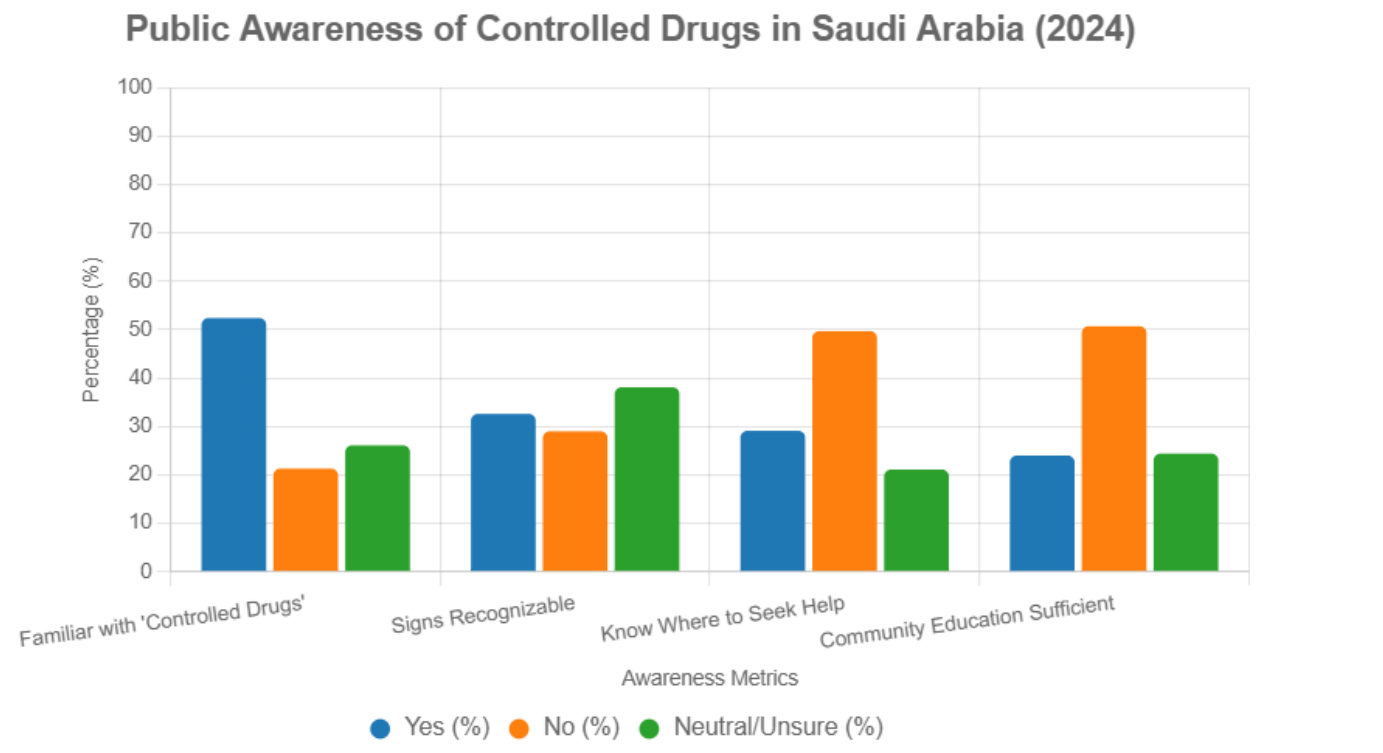


Figure 1: General Awareness of Controlled Drugs

Table 3 Predictors of Public Awareness

Predictor	Outcome Variable	Statistical Test	Significance	Interpretation
Age groups (18–24 / 25–35 / 35–44 / 45–54 / 55+ years)	Frequency of encountering drug-related info in media	$\chi^2(12) = 23.933$	$p = .021$	Younger individuals more frequently/sometimes encounter info—linked to awareness
Gender (Female)	Belief that drug abuse is a community issue	$\chi^2(2) = 13.361$	$p = .001$	Females more likely to perceive drug abuse as a public issue
Gender (Female)	Belief that signs/symptoms are not easily recognized	$\chi^2(2) = 8.355$	$p = .015$	Females more likely to report difficulty recognizing symptoms
Region of Residence	Media exposure, perception of danger, community concern	$\chi^2 = 56.49, 60.40, 37.38$	$p = .016, .0066, .040$	Region significantly predicts awareness levels across multiple domains
Education Level	Perceived danger of controlled drug abuse	Cramer's V = 0.169	$p < .001$	Higher education associated with perceiving abuse as more dangerous

Region	Perceived danger of controlled drug abuse	Cramer's V = 0.197	p = .007	Region influences perception of danger, linked to awareness
Media Exposure	Self-rated knowledge of side effects and symptoms	Phi = 0.239	p < .001	Frequent media exposure increases knowledge and awareness
Legal Awareness	Support for stricter regulations or pharmacists' refusal rights	Phi = 0.233	p < .001	Legal awareness predicts regulatory support, reflecting greater overall awareness
Community Concern	Belief that abuse is a community issue ↔ education efforts	Phi = 0.207	p < .001	Concern about community issue aligns with perceived need for public education
Long-term Health Risk Awareness	Belief that drug abuse is harmful compared to illegal drugs	Phi = 0.302	p < .001	Awareness of long-term effects predicts greater perceived danger

Table 4 shows the regression analysis of factors predicting public awareness.

Factor	P-value	Odds Ratio	Confidence Interval
Age (18–24 vs. 25+)	0.021	0.619	[0.440, 0.871]
Gender (Female vs. Male) - Community Issue	0.001	2.541	[1.789, 3.610]
Gender (Female vs. Male) - Signs/Symptoms	0.015	3.960	[2.718, 5.769]
Level of Education (Higher vs. High School or below)	<0.001	3.046	[2.091, 4.440]
Employment Status (Employed vs. Not Employed)	>0.05	0.980	[0.672, 1.428]
Region of Residence (Western Region vs. Others)	0.015	1.667	[1.104, 2.517]

with those in the Western Region being more likely to be aware compared to other regions ($P = 0.015$; OR = 1.667; 95% CI: 1.104–2.517). These findings underscore the importance of targeted educational interventions focusing on regions less aware, older age groups (25 years and older) and less educated populations to enhance public awareness of controlled drug issues.

The confidence intervals presented alongside odds ratios further support the reliability of these predictors, as narrower intervals (e.g., education level, OR = 3.046; 95% CI: 2.091–4.440) indicate stronger precision compared to wider intervals (e.g., region of residence, OR = 1.667; 95% CI: 1.104–2.517).

3.5. Correlation Analysis

A significant positive association was found between awareness of the term "controlled drugs"

and knowledge of side effects (Cramer's $V = 0.293$, $p < .001$). Region of residence (Cramer's $V = 0.197$, $p = .007$) and education level (Cramer's $V = 0.169$, $p < .001$) showed significant positive associations with perceived danger of controlled drug abuse. A significant moderate positive association was found between media exposure and self-rated knowledge of side effects and symptoms (Phi = 0.239, $p < .001$). Awareness of legal implications was associated with support for stricter regulations (Phi = 0.233, $p < .001$). A significant moderate positive association was observed between community concern and perceived need for education (Phi = 0.207, $p < .001$), and between long-term health risk awareness and attitudes toward the severity of drug abuse (Phi = 0.302, $p < .001$).

4. Discussion

When compared to other studies, these findings highlight important differences. [11] reported that 76% of survey respondents from Banat's University Romania, knew the harmful effects of illicit drugs, suggesting higher risk awareness than general population in Saudi Arabia. [12] focused on risk factors and prevention strategies, noting barriers to screening and counseling among healthcare providers. [13] reported 88.4% of 201 students abstaining from drugs in Dubai, attributing success to awareness programs involving schools. Only one-third of participants reported awareness of the legal implications of controlled drug abuse. This may be attributed to several factors: current campaigns may emphasize health risks rather than legal penalties; legal information is often has limited accessibility; and demographic patterns suggest that older and less educated groups are less likely to be exposed to legal education.

The study found that half of participants perceived campaigns as inadequate, the survey did not specify individual campaigns by name. This was intentional, as the aim was to capture participants' general perception of national awareness efforts rather than to evaluate specific initiatives. Given the diversity of campaigns across different regions, schools, and healthcare settings, isolating one program might have limited the representativeness of findings.

In Saudi Arabia, controlled drug awareness efforts are primarily led by the Saudi Food and Drug Authority (SFDA) and Ministry of Health, with support from the General Directorate of Narcotics Control (GDNC). These initiatives usually take the form of health-education brochures, media messaging, and community-based outreach in schools or public spaces. Our findings showed that 50.7% of participants perceived such campaigns as inadequate, 49.7% were unaware of available help resources, and only 33.3% understood legal implications, highlighting important knowledge gaps. By contrast, international evidence demonstrates that well-designed awareness interventions can achieve measurable impact. For example, Scotland's "How to Save a Life" campaign significantly improved public overdose knowledge and was associated with a 126% increase in the weekly supply of take-home naloxone kits during the campaign period [15]. Complementary experimental data also showed that exposure to audiovisual components of the campaign boosted knowledge of

overdose signs, even if readiness to intervene was more modest [14].

While regional differences emerged as significant, the distribution of participants across regions was unequal, with central regions (Al-Qassim and Riyadh) more heavily represented. This imbalance may partly explain why these regions showed stronger associations with awareness outcomes. However, the analysis still demonstrated statistically significant regional effects even after accounting for sample variation, suggesting that regional context is an independent predictor.

The finding that females expressed greater concern about drug abuse as a community issue but also reported more difficulty in recognizing symptoms may reflect differences between perceived risk and practical knowledge. While women may show higher sensitivity to the social consequences of drug abuse, they may feel less confident in identifying clinical or behavioral signs due to limited exposure and reliance on formal knowledge sources.

The findings point to substantial knowledge gaps in legal and resource awareness in Saudi Arabia, particularly among regions less aware, older age groups (25 years and older) and less educated populations to enhance public awareness of controlled drug issues.

A strategy incorporate media, education, and community resources is crucial to reduce controlled drug abuse.

4.1. Limitations

The demographic composition, with the majority being students aged 18–24, may restrict generalizability. The high proportion of students (78.3%) in our sample reflects the reliance on online distribution channels that are more accessible to younger populations. The reliance on an online survey potentially excluded individual with limited internet access. Employment status did not emerge as a significant predictor of awareness, which may be due to the dominance of students in the sample. This study did not assess participants' personal or family exposure to drug abuse, which may have influenced awareness levels. Although the survey encompassed various regions, some areas were more heavily represented, which could introduce regional bias.

4.2. Implications and Strengths

Despite these limitations, this study provides valuable insights into public awareness of

controlled drug abuse in Saudi Arabia. By highlighting knowledge gaps and the need for improved public health campaigns, it offers essential groundwork for future interventions. Comprehensive analysis enhances its credibility for policymakers and healthcare professionals.

Our findings can inform national awareness programs by emphasizing legal consequences and available support services, areas where knowledge was notably limited. Campaigns should focus on youth through schools, adopt gender-sensitive approaches, and tailor messages regionally. Greater use of social media and audiovisual content, as shown in Scotland's How to Save a Life campaign, could help increase public awareness and preparedness [14, 15]. Targeted strategies should focus where awareness programs can be tailored to reach diverse groups more effectively. In addition, pharmacists' refusal rights, supported by 81.7% of participants, could be practically implemented through SFDA/MOH guidelines and public framing as a patient-safety measure, ensuring cultural acceptance.

For future experimental validation, SH-SY5Y human neuroblastoma cells provide a useful in-vitro neuronal model. They are widely applied in addiction research; for example, [16] showed that oxycodone and naloxone induced DNA damage and oxidative stress in SH-SY5Y cells, supporting their value for investigating cytotoxicity and neuroadaptive changes linked to drugs such as tramadol and pregabalin.

5. Conclusion

This study emphasizes the importance of enhancing public awareness through focused public health initiatives. The success of interventional education in raising awareness about health threats [17] suggests that similar approaches could be beneficial for controlled drug abuse awareness campaigns. Continuous evaluation and improvement of these campaigns are crucial to effectively combat controlled drug abuse in Saudi Arabia.

Author Contributions:

Khalid M. Al-Harbi contributed as the main author. He was responsible for the study conception and design, performed the material preparation, data collection, data analysis, and wrote the first draft of the manuscript.

Dr. Amal F. Al-Otaibi contributed as the

supervising co-author. She provided guidance and oversight throughout the study, reviewed and commented on all versions of the manuscript, and approved the final version.

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Khalid M. Al-Harbi and Supervised by Dr. Amal F. Al-Otaibi. The first draft of the manuscript was written by Khalid M. Al-Harbi, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest:

The author declared no conflicts of interest related to this study.

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Institutional Review Board

Statement:

The study was approved by the Ethics Committee at Umm Al-Qura University (approval no. HAPO-02-K-012-2023-11-18660).

Informed Consent Statement:

Informed consent was obtained online prior to survey completion. Responses were anonymous, and participation was voluntary.

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