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Pharmaceutical Education and Rational Drug Use Patterns in Urban Kirkuk: Pendidikan Farmasi dan Pola Penggunaan Obat yang Rasional di Kota Kirkuk

Pendidikan Farmasi dan Pola Penggunaan Obat yang Rasional di Kota Kirkuk

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Abstract

Background: Irrational drug use remains a major public health concern in low- and middle-income countries. **Specific Background:** In conflict-affected regions such as Kirkuk, limited regulation and widespread self-medication exacerbate unsafe practices. **Knowledge Gap:** Empirical evidence linking pharmaceutical education to rational drug use in such contexts remains scarce. **Aim:** This study examined the relationship between pharmaceutical education and knowledge, attitudes, and practices regarding medication use among Kirkuk residents. **Results:** A cross-sectional survey of 200 participants revealed that higher educational attainment was significantly associated with safer medication behaviors ($p < 0.05$), including instruction reading and pharmacist consultation, although irrational practices persisted. **Novelty:** This study provides rare data from a conflict-affected Middle Eastern urban setting. **Implications:** Findings highlight the need for integrated, culturally responsive educational and regulatory strategies to promote rational drug use beyond knowledge acquisition alone.

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Highlights:
- Pharmaceutical education improves awareness but does not eliminate irrational drug use
- Younger adults show higher self-medication tendencies
- Gender and education significantly shape medication practices

Keywords: Pharmaceutical Education, Rational Drug Use, Self-Medication, Community Health, Iraq

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Introduction

Inappropriate and irrational medicine utilization constitutes a substantial global public health issue, especially in low- and middle-income countries (LMICs) where access to healthcare professionals is limited [1]. Self-medication and pharmaceutical misuse are extensively documented, with prevalence rates ranging from 7% in certain high-income countries to over 70% in various low- and middle-income nations [2], [3]. These activities result in adverse pharmaceutical reactions, increased antibiotic resistance, and superfluous healthcare costs. Organized pharmaceutical education aimed at enhancing drug-related information and promoting safe practices is a crucial approach for mitigating irrational drug use [4], [5]. Research conducted in various contexts, such as Nigeria and Indonesia, has demonstrated that pharmacist-led training programs markedly enhance patient understanding, adherence to prescriptions, and mitigate drug abuse [4], [5].

In Iraq, the accessibility of over-the-counter medications, inadequate regulatory enforcement, and prevalent public misunderstandings perpetuate irrational drug consumption. Structured pharmaceutical education aimed at improving drug-related knowledge and safe practices has emerged as a crucial tool to address these difficulties [6].

Educational interventions delivered by pharmacists in Nigeria and Indonesia have dramatically impacted drug usage, improving patient awareness and adherence to treatment, according to [5] and [4]. These treatments aimed not just to provide knowledge but also to achieve significant behavioral change.

Methodology

Study Design and Setting

This cross-sectional survey took place in Kirkuk, Iraq, from April to September 2025. Kirkuk is a city with a lot of different residents and issues with financial matters and health care, which makes it a good place to investigate drug usage.

Participants and Sampling

Individuals that had lived in Kirkuk for at least a year and were at least 18 years old were eligible to participate. Two hundred people were selected at random from four areas of the city that represent the socio-demographic diversity of its residents. In order to provide sufficient statistical strength, the sample size was determined using prior prevalence estimates of drug using patterns.

Results

Variable	Category	Frequency	Percentage (%)
Age Group	18–25 years	56	28%
	26–33 years	76	38%
	34–41 years	42	21%
	42 years and above	26	13%
Education Level	Primary or less	30	15%
	Secondary	66	33%
	University	104	52%
Occupation	Housewives	80	40%
	Students	24	12%
	Skilled workers	62	31%
	Professionals	34	17%

Table 1. **Table 1: Sociodemographic Characteristics of Study Participants (n = 200)**
Table 1 presents the socio-demographic attributes of the research participants. The predominant age group was 26–33 years (38%), succeeded by 18–25 years (28%), 34–41 years (21%), and those aged 42 years and above (13%). Regarding educational attainment, over half possessed a university degree (52%), while others indicated secondary education (33%) or elementary education or less (15%). In terms of occupation, housewives were the biggest grouping at 40%, followed by skilled workers at 31%, professionals at 17%, and students at 12%.

Question	Yes	No	Don't Know
Aware of the risks of self-medication	74.5%	18%	7.5%
Know safe drugs for minor illnesses	69%	24%	7%
Can identify treatable conditions	68%	21%	11%
Familiar with the side effects of common OTCs	53%	29%	18%
Know allergy history	88%	6%	6%

Table 2. **Table 2: Participants' Knowledge Regarding Safe Drug Use (n = 200)**
Table 2 encapsulates participants' understanding of the hazards and safe utilization of medications. A majority (74.5%) acknowledged the hazards associated with self-medication, whereas 69% were aware of which medications are safe for treating mild ailments. Approximately two-thirds (68%) were able to recognize medical situations suitable for self-treatment.

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Only 53% recognized the adverse effects linked to common over-the-counter (OTC) medications, while 88% were informed about their allergy history.

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Pharmacists are key educators	69%	19%	7%	3%	2%
Prefer natural remedies	31%	26%	20%	13%	10%
Trust the family's drug advice	42%	28%	14%	10%	6%
Comfortable seeking medical help	52%	24%	15%	6%	3%
Recommend education for others	76%	17%	5%	2%	0%

Table 3. **Table 3: Participants' Attitudes Toward Pharmaceutical Education and Drug Use (n = 200)**

Table 3 outlines viewpoints regarding pharmaceutical education and substance use. A significant proportion of respondents, specifically 69%, strongly agreed, while 19% agreed, that pharmacists play a crucial role as health educators. Seventy-six percent recommended pharmacological education for others, while over fifty-two percent expressed confidence in acquiring expert medical advice. Dependence on familial counsel was noted by 42% of respondents who strongly agree, while 31% strongly agree and 26% agree with an inclination towards natural therapies, indicating their significance.

Behavior	Always	Often	Rarely	Never
Self-medicate	19%	22%	36%	23%
Read instructions	48%	26%	19%	7%
Discard expired meds	22%	30%	29%	19%
Consult pharmacist	54%	23%	17%	6%
Use natural remedies	25%	30%	30%	15%
Combine OTC and herbs	26.5%	25%	28%	20.5%
Report adverse events	41%	32%	17%	10%

Table 4. **Table 4: Participants' Self-Reported Drug Usage Practices (n = 200)**

Table 4 encapsulates self-reported drug utilization habits. Nineteen percent indicated they consistently self-medicated, while a further 22% did so frequently. Fewer than half (48%) consistently read the box directions, and only 22% consistently dispose of expired medications properly. More over half (54%) consistently visit a pharmacist prior to using a medicine, and 41% consistently report adverse effects. The simultaneous utilization of herbal and conventional medications was prevalent, with 26.5% consistently and 25% often integrating them.

Education Level	Regularly Read Instructions		Chi-square Test p-value < 0.001
	Yes	No	
University (n=104)	78	26	
Secondary or less (n=96)	46	50	

Figure 1. **Table 5: Statistical Comparison Between Education Level and Instruction-Reading Practice**

Table 5 examines the relationship between educational attainment and participation in reading instructions. Among individuals with a university education, 78 out of 104 (75%) constantly read drug instructions, while 46 out of 96 (48%) of those with secondary education or lower engage in this practice. The association was statistically significant (chi-square, $p < 0.001$), suggesting that higher education correlates with safer prescription practices.

Age Group	Often/Always Self-Medicate	Rarely/Never	Chi-square Test p-value = 0.009
18–33 (n=132)	64	68	
34+ (n=68)	18	50	

Figure 2. **Table 6: Statistical Comparison Between Age Groups and Frequency of Self-Medication**

Table 6 presents the variations in self-medication frequency across different age groups. Participants aged 18–33 years had a higher propensity for frequent self-medication (64 of 132; 48.5%) in contrast to those aged 34 years and beyond (18 of 68; 26.5%). The disparity was statistically significant (chi-square, $p = 0.009$).

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Gender	Always Consult a Pharmacist	Others	Chi-square Test
Male (n=92)	38	54	p-value = 0.0012
Female (n=108)	70	38	

Figure 3. **Table 7: Statistical Comparison Between Gender and Pharmacist Consultation Behavior.**

Table 7 illustrates the relationship between gender and pharmacist consultation. Female participants demonstrated a greater tendency to regularly consult a pharmacist (70 of 108; 64.8%) in comparison to male participants (38 of 92; 41.3%), with this difference being statistically significant (chi-square, p = 0.0012).

Discussion

This study shows that even if people in urban Kirkuk have a lot of education, they still take drugs in ways that don't make sense. This shows that there is a big gap between what people know about drugs and how they use them every day. Even while most people said they understood the hazards of using prescription drugs and the necessity of learning about drugs, there were still many cases of self-medication and not following good drug use practices. The current research indicates a significant correlation between age and educational attainment and safer medication practices. Individuals aged 18 to 33 exhibited higher rates of self-medication, consistent with findings from cross-national surveys indicating that adolescents show greater autonomy and a tendency towards self-treatment [7], [8]. Similarly, individuals with university degrees demonstrated a significantly greater tendency to read medicine instructions on packaging and engage in safe medication practices, supporting findings from studies conducted in Indonesia, Eritrea, and other low- and middle-income nations [5], [9]. Nonetheless, the persistence of risky behaviors among well-educated populations suggests that superficial awareness is insufficient for achieving permanent behavioral change [10], [11]. These findings support the concept of a "knowledge practice gap" commonly noted in global public health literature.

This study identified variations in gender, showing that females were more likely to visit pharmacists, a finding supported by data from Saudi Arabia, Brazil, and other diverse populations [12], [13]. The limited use of pharmacist consultations by males may reflect persistent psychological or cultural barriers, as suggested by prior research.

This research offers novel insights and significance to the global literature by providing data from Kirkuk, Iraq, a conflict-affected urban setting that is infrequently included in pharmacological education studies. The reliance on both pharmaceutical and herbal therapies underscores the influence of local customs, suggesting that efforts to promote rational medication use must be culturally tailored, merging modern medical education with respect for traditional practices [14]. The investigation correlates its findings with global research, highlighting specific contextual challenges: unrestricted access to OTC drugs, insufficient regulatory enforcement, and persistent misconceptions contribute to irrational drug use in Iraq. Thus, recommendations should encompass educational initiatives, regulatory policies, increased pharmacist engagement, and outreach efforts specifically targeting high-risk populations, such as young adults and men identified in this context.

This study presents new data from a previously neglected Middle Eastern context and systematically compares the findings with an international evidence base, contributing to broader discussions on the role of pharmaceutical education in promoting rational drug use, especially in regions prone to general instability [15].

Conclusion

This study highlights that, despite significant educational attainment among urban residents of Kirkuk, irrational drug use and inconsistencies between knowledge and behavior continue to exist. The level of education, age, and gender significantly influenced rational medicine practices. Individuals with higher education and females demonstrated safer drug usage, while younger participants and males were more likely to engage in self-medication and underutilize pharmacist counsel. The findings indicate global patterns; however, the ongoing prevalence of hazardous practices, particularly among educated groups, highlights that knowledge alone does not ensure responsible application. Responding to these issues involves comprehensive programs that expand beyond pharmaceutical education, integrating change in behavior strategies, culturally responsive campaigns, greater pharmacist participation, and more strict regulation of over-the-counter medications.

The results obtained from Kirkuk provide substantial evidence from a conflict-affected Middle Eastern city to the global literature, underscoring the need for tailored, context-specific public health initiatives. Future research should employ long-term and interventional designs to examine the lasting effectiveness of integrated approaches and clarify the best strategies to bridge the persistent gap between knowledge and practice in rational medication use.

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