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Knowledge, Attitudes and Practices of Physicians Toward Drugs Induced QT Prolongation

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ABSTRACT

Prolonged QTc intervals are a common and clinically significant issue, associated with an increased risk of cardiovascular events and overall mortality. Medication-induced QT prolongation is a frequent cause, involving widely used drugs such as antiarrhythmics, antidepressants, antibiotics, and antipsychotics. Addressing this risk requires improved physician awareness and proactive monitoring. This cross sectional study aimed to enhance the practice of physicians toward drug-induced QT prolongation and related cardiac events. Conducted over three months from January 15 to April 15, 2025, the study took place at Imam Al-Sadiq Teaching Hospital in Al-Hilla. 53 physicians were interviewed regarding their knowledge, attitude, and practice toward QT prolongation. The majority of participating physicians were under 40 years old, predominantly male (67.9%), and most commonly specialized in internal medicine (45.3%). Regarding their years of practice, 37.7% had been practicing medicine for(less) than 5 years, (28.3%) had between 5 and 10 years of (experience, and 34.0% had over (10 years) of experience. In the term of knowledge, 5.7% of physicians have a good knowledge and 94.3% have a bad knowledge. Favourable attitude was present in 24.5%. Adequate practice was found in 67.9% while 32.1% of physicians had inadequate practice. This study shows a bad knowledge, unfavourable attitudes and adequate practices among physicians about drugs induced QT prolongation.

Keywords: QT prolongation, antiarrhythmics, cardiovascular event, physician Practice, medication safety.

I. INTRODUCTION

The QT interval, measured on an electrocardiogram (ECG)[1], represents the time from the beginning of ventricular depolarization to the end of repolarization[2]. Prolongation of the corrected QT interval (QTc)[3] is associated with life-threatening arrhythmias such as Torsades de Pointes (TdP) and sudden cardiac death[4,5]. Various factors contribute to QTc prolongation, including medications (e.g., antibiotics, antiarrhythmics, antiemetics, antipsychotics)[6,7,8], electrolyte imbalances (e.g., hypokalemia, hypomagnesemia, hypocalcemia)[9], genetic predispositions[10], and systemic inflammation. Women are generally more susceptible than men, and the condition is prevalent among patients in intensive care units and emergency departments [11,12]. Accurate measurement and correction of the QT interval, often using formulas like Bazett's, are critical for clinical assessment, though no single standard method exists[13,14]. Symptoms of QT prolongation range from dizziness and syncope to seizures and, in severe cases, cardiac arrest [13]. By assessing the knowledge, attitudes and practices of physicians towards drug induced QT prolongation, we expect that the prevalence and risks of QT prolongation will be declined and enhance practices and attitudes of physicians after our assessment.

II. METHODS AND MATERIAL

This cross-sectional study was conducted at Imam Al-Sadiq Teaching Hospital over a period of 3 months from 15 January to 15 April[15]. This study included a convenient

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sample of 53 physicians who worked at coronary care units in hospital mentioned above who agreed to participate in this study. A pilot study carried out before starting the collection of data for a period of two weeks. After obtaining verbal permission, data was collected by interviewing physicians. The questionnaire's content validity was assessed by professionals. The questionnaire included four parts in Table I : the first one was demographic characteristics[16,17]. The second part includes 6 questions about physicians' Knowledge (the total score was 11). The total knowledge score, was categorized into two distinct levels to facilitate analysis. A cutoff score of 7 out of a maximum of 11 was selected as the threshold for adequate knowledge. The third part of questionnaire consisted of 5 questions about attitudes of physicians which are evaluated. The total attitude score was categorized into two levels. Given the maximum possible attitude score of 9, a cutoff score of 5 was utilized to distinguish between favorable and unfavorable attitudes. The total practice score was categorized into two levels. The maximum attainable practice score was 13.5, A cutoff score of 7 was established to distinguish between inadequate and adequate practice. Participants who achieved a score of less than 7 were classified as having inadequate practice.

R software packages were utilized for statistical analysis, data processing, and visualization. ("R version 4.5.0, R Foundation for Statistical Computing, Vienna, Austria"). Categorical variables were summarized using frequencies and percentages. Continuous variables representing total knowledge, attitude, and practice scores were presented as means and standard deviations.

TABLE I: Questions to assess knowledge, attitude and practice of physicians toward QT prolongation induced by drugs.

Questionnaire	
knowledge	1) How do you expect the risk factor for QT prolongation? 2) Which of the following are the most common risk factor for QT prolongation? 3) Do you routinely check for potential drug-drug interactions that can prolong QT interval? 4) What are the most common consequence of prolonged QT interval in hospital patient? 5) What are the most common drug categories that can cause prolonged QT interval in hospital patient? 6) Are you ready to cooperate with clinical pharmacists to manage drug-induced QT prolongation?
Attitudes	1) How comfortable are you collaborating with clinical pharmacist to manage QT prolongation risks? 2) What is your perception of clinical pharmacists' knowledge and skills in managing QT prolongation? 3) What do you perceive as the primary benefits of involving clinical pharmacists in QT prolongation interval management? 4) Would you be willing to involve clinical pharmacists more actively in the management of QT prolongation? 5) In your opinion, what are the main barriers to implementing pharmacist-led interventions for QT prolongation?
Practices	1. How often do you prescribe drugs known to cause QT prolongation? 2. Do you consult clinical pharmacist when prescribing QT-prolonging medications? 3. Based on a clinical pharmacist recommendation, do you have a previous modification on your prescribing decision? 4. How often do you perform ECG monitoring before prescribing QT-prolonging medications? 5. Do you request electrolyte monitoring for patients on QT-prolonging medications? 6. According to your experience, what is the most important electrolyte test for QT prolonged patients? 7. Have you experienced before a QT prolonged case? 8. If yes, what step do you take if a patient develops a prolonged QT interval?

III. RESULTS AND DISCUSSION

The demographic and educational characteristics of the doctors involved in the study are presented in Table II . The sample consisted of 53 doctors, with the majority being under the age of 40. Specifically, 35.8% were aged less than 30 years, while 32.1% were between 31 and 40 years old. A smaller proportion, 24.5%, were aged between 41 and 50 years, and 7.5% were over the age of 50. In terms of gender, the majority of the doctors were male (67.9%), with females comprising 32.1% of the sample. The doctors' medical specialties varied, with internist being the most common (45.3%), followed by senior cardiologist (28.3%) and cardiology residents (26.4%). Regarding their years of practice, 37.7% had

been practicing medicine for (less) than 5 years, (28.3%) had between 5 and 10 years of (experience, and 34.0% had over (10 years) of experience.

TABLE II: DESCRIPTION OF DOCTOR'S DEMOGRAPHICS

Characteristic	N =53(%)	
Age (years)	<30	19 (35.8%)
	31-40	17 (32.1%)
	41-50	13 (24.5%)
	>50	4 (7.5%)
Gender	male	36(67.9%)
	female	17(32.1%)
Medical Specialty	Internist	24(45.3%)
	Senior cardiologist	15(28.3%)
	Cardiology resident	14(26.4%)
Years of practicing medicine	<5 years	20(37.7%)
	5-10 years	15(28.3%)
	>10 years	18(34.0%)

Table III presents a summary of the variations in (knowledge, attitudes, and practices (KAP) among physicians using established cutoffs for interpretation. The mean knowledge score was 4.3 ± 1.4, with the proportion of physicians categorized as having "good knowledge are 5.7%, while those with "bad knowledge" are 94.3%. Similarly, the mean attitude score was 3.4 ± 1.6 with favorable attitudes are 24.5% and unfavorable attitudes are 75.5%. The mean practice score was 7.2 ± 1.8, the proportion of physicians demonstrating "adequate practice" are 67.9%, while those with "inadequate practice" are 32.1%.

TABLE IIIIVV description of the level of knowledge, attitude and practice in physicians

Characteristic	score
Knowledge score(cutoff is 7)	4.3 ± 1.4
Good knowledge	3 (5.7%)
Bad knowledge	50 (94.3%)
Attitude score (cutoff is 5)	3.4 ± 1.6
Favorable attitudes	13 (24.5%)
Unfavorable attitudes	40 (75.5%)
Practice score (cutoff is 7)	7.2 ± 1.8
Adequate practices	36 (67.9%)
Inadequate practices	17 (32.1%)

Our study that involving 53 physicians, mainly composed of younger practitioners, with over two-thirds (67.9%) being under the age of 40. Additionally, the gender distribution was skewed toward males (67.9%), as cozmuta R et al found in a study done at 2014 [18] , consistent with regional patterns in medical workforce demographics, although the presence of female practitioners (32.1%) still ensured a level of representativeness in the study population. In terms of medical specialization, nearly half of the participants were internists (45.3%), followed by senior cardiologists (28.3%) and cardiology residents (26.4%). This diverse mix reflects varying degrees of experience and specialization in cardiovascular care, a critical factor given the focus on drug-induced QT prolongation—a condition closely linked to cardiology and internal medicine.

The participants also varied in clinical experience, with a relatively even distribution among those with less than five years (37.7%), five to ten years (28.3%), and over ten years (34.0%) of practice. Notably, less experienced physicians may have demonstrated greater shifts in knowledge and practice due to a lower baseline of exposure to QT risk mitigation strategies.

IV. CONCLUSION

According to the data, the solvent antisolvent approach was a successful and efficient way for manufacturing ketoprofen nanoparticles. Among three polymers, PVP-K15 give best formulas (F3) with polymer: drug ratio 3:1, increase ratio of polymer: drug give best result on size of ketoprofen nanoparticles. While when use HPMC (E15 and E50) for prepare ketoprofen nanoparticles,was found increasing the polymer :drug ratio above 1:1 increases particle size. The nanoparticle-hydrogel F3 formulation demonstrated good spreadability, viscosity, and drug release profiles than plain ketoprofen hydrogel.

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