Assessment of physicians and type 2 diabetic patient's awareness regarding oral hypoglycemic medications and potential drug interactions. Tripoli/Libya

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ABSTRACT

Background: When patients are diagnosed with diabetes, a large number of medications become appropriate therapy. These include medications for dyslipidemia, hypertension, antiplatelet therapy, and glycemic control. So many medications can be overwhelming, and it is imperative that patients are thoroughly educated about their drug regimen. Patients have many concerns when multiple medications are started, including prescribing errors and possible adverse effects. **Objective:** This study aimed to provide a comprehensive and more accurate assessment of the nature of drug interactions and their impact on patients treatment plans. **Methods**: The study designed two separate questionnaires to assess drug interactions associated with diabetes medications from two different perspectives: the first from the perspective of physicians, and the second from the perspective of patients with diabetes. Patients and physicians were randomly selected from a diabetes hospital in Tripoli, Libya, between April 2025 and July 2025. **Results**: The study included 150 patients and 9 physicians. The patient survey revealed that a large percentage of patients used medications other than their diabetes medications, and these patients were mostly middle-aged or elderly. As for the physician survey, most participants were general practitioners, and more than half of the physicians noted interactions with Diabetes Medications. **Conclusion:** The findings have increased patient awareness of the risks of drug interactions and require periodic reviews of patients' medications, especially for those using more than one type of medication. Physicians must also establish clear protocols for assessing and avoiding drug interactions when prescribing treatment, and enhance collaboration between physicians and pharmacists to monitor medications that may cause interactions with diabetes.

KEYWORDS: Diabetes mellitus, hyperglycemia, insulin resistance, Diabetes hospital in Tripoli, Libya.

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INTRODUCTION

Diabetes mellitus, particularly type 2 diabetes mellitus (T2DM), is a chronic metabolic disorder characterized by hyperglycemia resulting from insulin resistance and relative insulin deficiency. [1] and [2]. Globally, the prevalence of T2DM has been rising exponentially, with the International Diabetes Federation (IDF) estimating approximately 537 million adults affected worldwide in 2021, a figure projected to reach 643 million by 2030 [3]. The burden is especially profound in developing countries, where healthcare systems often face challenges in managing the increasing diabetic population [4]. T2DM is associated with various microvascular and macrovascular complications, including retinopathy, nephropathy, neuropathy, cardiovascular disease, and stroke [5]. Effective management is critical to prevent or delay these complications, improve quality of life, and reduce healthcare costs [6]. The cornerstone of T2DM management involves lifestyle modifications— diet, exercise, weight control—and pharmacotherapy aimed at controlling hyperglycemia. Among pharmacological options, oral hypoglycemic agents are widely prescribed due to their efficacy, convenience, and cost-effectiveness [7] and [8]. These medications facilitate blood glucose regulation but may also pose risks of drug interactions that could compromise safety and efficacy [9]. Patient awareness and knowledge regarding their medications significantly influence treatment adherence, glycemic control, and overall health outcomes [10]. Inadequate understanding may lead to medication errors, poor compliance, and adverse drug reactions, including dangerous drug interactions. Given the expanding variety of oral hypoglycemic medications and their potential interactions with other drugs or herbal supplements, assessing patient awareness is vital for optimizing diabetes management and minimizing preventable complications. T2DM develops through a complex interplay of insulin resistance in peripheral tissues and dysfunction of pancreatic beta cells, leading to inadequate insulin secretion in response to blood glucose levels [11] and [12]. Initially, insulin resistance in skeletal muscle, adipose tissue, and the liver results in impaired glucose uptake and increased hepatic glucose production, respectively. Over time, pancreatic beta cells fail to compensate for insulin resistance, resulting in hyperglycemia [13]. This chronic hyperglycemic state triggers various deleterious processes, including oxidative stress, inflammation, and vascular damage, contributing to the development of diabetic complications. Early recognition and proper management are essential to halt or slow disease progression [14]. Drug interactions are often categorized as pharmacodynamic or pharmacokinetic in nature. A pharmacodynamic drug interaction is related to the drug's effect on the body. An example is the combination of alcohol with medications that cause sedation. A pharmacokinetic drug interaction is related to the body's effect on the drug. An example is an increase in the systemic concentration of a renally eliminated drug because of renal insufficiency [15] and [16]. A pharmacokinetic drug interaction can be caused by an alteration in absorption, distribution, metabolism, or elimination of a drug. This study aims to evaluate the level of awareness of oral hypoglycemic agents (OHAs) among physicians and Type 2 diabetic patients in Tripoli, focusing on dosing, contraindications, monitoring, and potential drug–drug interactions. evaluate patients' knowledge of the names and purposes of their medications, and to identify awareness of potential side effects and adverse reactions. determine patients' understanding of possible drug interactions, and to explore factors influencing awareness levels. Assess sources of information (guidelines, pharmaceutical reps, continuing medical education, patient education materials). Explore barriers to safe prescribing and patient self-management, and propose targeted interventions (education, materials, and system-level changes) to improve safety and outcomes.

MATERIALAND METHOD

The Period of Study The data collection for this study was carried out from April 6, 2025, to July 24, 2025.

Study Population and Setting

This study was conducted by a group of pharmacy students from the Higher Institute of Sciences and Medical Technologies – Abu Salim. As part of a field research component, the students visited the Diabetes Hospital in Tripoli, where they engaged directly with healthcare professionals and patients

with diabetes.

Data Collection Period and Distribution Sites

A descriptive cross-sectional design was adopted to assess patient awareness regarding oral hypoglycemic medications and potential drug interactions. The target population included both type 1 and type 2 diabetic patients attending the hospital during the study period. Patients were selected using a non-probability convenience sampling technique, based on their availability and willingness to participate. Data collection was performed using a structured questionnaire, which was administered to both patients and consulted physicians. The questionnaire covered various aspects of medication awareness, including drug names, mechanisms, side effects, and possible drug interactions.

Data management and statistical analysis

The collected data were then organized and statistically analyzed using the Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics such as frequencies and percentages were used to summarize the responses. The majority of patients and medical staff showed cooperation and willingness to participate, which significantly contributed to the data quality and completion of the study. Ethical considerations were respected throughout the research process. All participants were informed about the purpose of the study, and verbal consent was obtained before data collection. Confidentiality and anonymity were maintained for all responses.

RESULTS

Analysis of the demographic data of diabetic patients

The following charts illustrate the frequencies and percentages of patients' responses concerning their age, gender, duration of diabetes, type of diabetes, and whether they suffer from other diabetes-related conditions.

Age distribution of diabetic patients

The majority of diabetic patients (53.33%) are aged between 40–60 years, indicating that middle-aged individuals are most affected in this sample. As shown in figure 1.
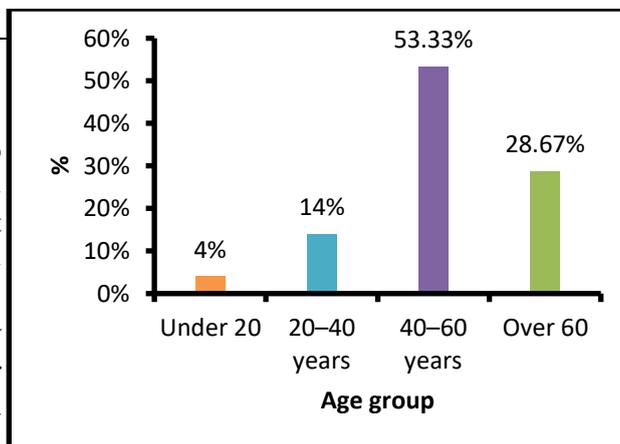

Figure 1. The age distribution of diabetic patients.

Gender of diabetic patients

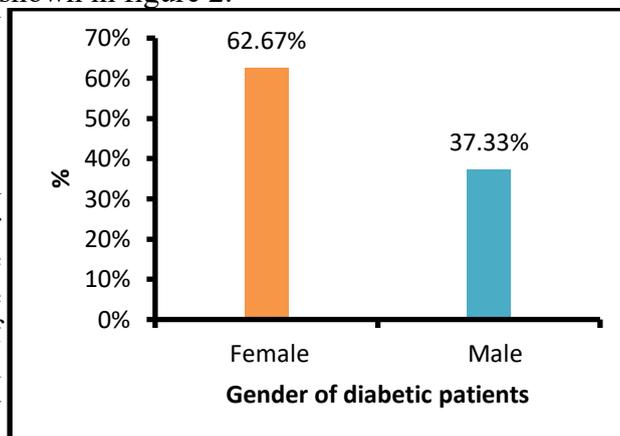Most participants were female (62.67%). As shown in figure 2.

Figure 2. The gender of diabetic patients

Duration of diabetes among patients

A large portion of patients (65.33%) have had diabetes for more than 5 years, reflecting a long-term experience with the condition. As shown in figure 3.
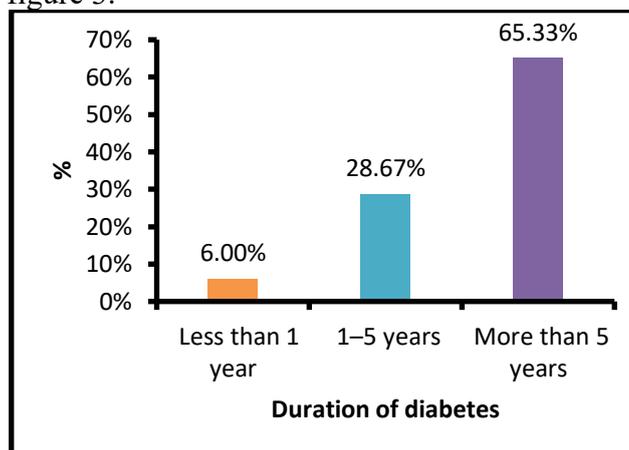

Figure 3. The duration of diabetes among patients

Type of diabetes among the patients

Type 2 diabetes is the most prevalent (74.67%) among patients, followed by Type 1 and
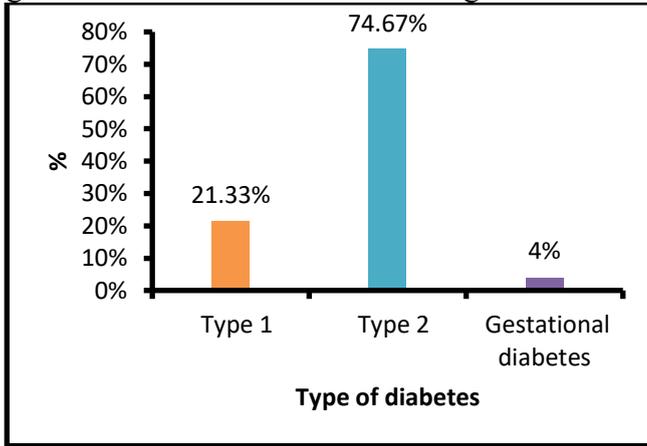
gestational diabetes. As shown in figure 4.

Figure 4. The type of diabetes among the patients

Analysis of diabetes medication use

The most common treatment among patients is a combination of insulin and tablets (41.30%), followed by oral tablets only and insulin only. As shown in figure 5.
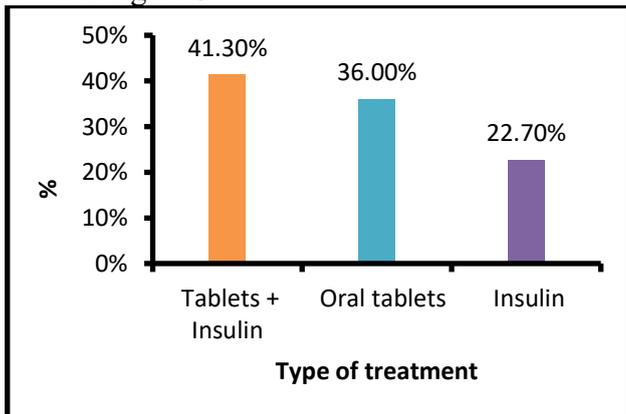

Figure 5. The type of treatment used by diabetic patients

Analysis of awareness of drug interactions

Most patients (53.34%) are interested in learning about drug interactions, with 25.33% being very interested. As shown in figure 6.
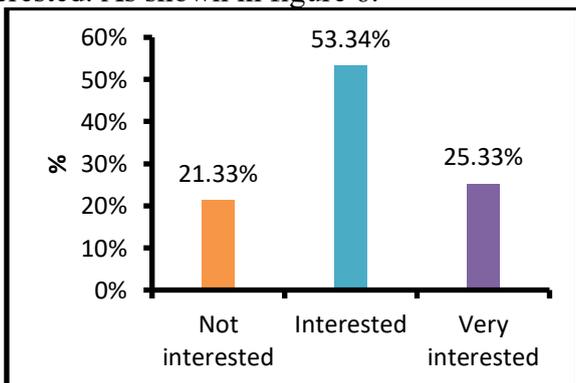

Figure 6. Interest among diabetic patients in knowing about drug interactions

DISCUSSION

This cross-sectional assessment evaluated awareness of oral hypoglycemic medications and potential drug interactions among type 2 diabetic patients in Tripoli, Libya. Key findings show substantial use of multiple Antidiabetic regimens, a notable proportion of patients on non-diabetes medications, limited prior counseling about drug interactions, and strong interest in receiving awareness sessions. The data point to gaps in patient-pharmacist communication and opportunities for structured education to mitigate clinically meaningful drug interactions [16] and [17]. Age distribution: The majority of participants were 40–60 years (53.3%), with 28.7% over 60, 14% aged 20–40, and 4% under 20. Gender: Female participants constituted 62.7% of the sample. Duration of diabetes: A striking 65.3% had diabetes for more than 5 years, while 28.7% had 1–5 years, and 6% less than 1 year. Type of diabetes: Type 2 accounted for 74.7% of patients, Type 1 for 21.3%, and gestational diabetes for 4%. The age and duration profiles suggest a mature, long-standing type 2 diabetic population, consistent with the epidemiology of type 2 diabetes in the region and globally [15]. The higher proportion of females may reflect healthcare-seeking behavior, sampling design, or local epidemiology. It warrants consideration in tailoring education approaches to gender-specific needs and barriers. Treatment modalities: 41.3% on tablets plus insulin, 36% on oral tablets alone, and 22.7% on insulin alone. Polypharmacy: 45.3% used more than one medication, while 54.7% used a single medication. A notable minority requires combination therapy (oral agents with insulin), indicating advanced disease or inadequate glycemic control in a substantial subgroup. Polypharmacy is common, which increases the risk of drug–drug interactions and adverse events, underscoring the need for risk-focused education on drug interactions even when patients are not on multiple medications [12]. Regular use of other (non-diabetes) medications: 46.7% reported using other medications. Counseling on interactions: 76.7% reported not being informed by a doctor or pharmacist about potential drug interactions; only 23.3% reported receiving information. Blood glucose changes with other medications: 40% noticed changes in blood sugar when taking other meds; 28% reported an increase, 12.7% a decrease, and 59% no change. Dose adjustments based on other medications: 63.3% reported no adjustment by their doctor; 36.7% reported adjustments.

CONCLUSION

There is a strong opportunity to close the awareness gap around oral hypoglycemic drug interactions in Tripoli. By implementing structured medication reconciliation, delivering culturally tailored education, and engaging both patients and clinicians through pharmacist-led interventions, we can reduce clinically meaningful interactions and improve glycemic safety and outcomes for people with type 2 diabetes in this setting.

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