Beliefs about Medications and Their Correlates Among Type 2 Diabetic Patients in Upper Egypt

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Abstract:

Background: A better understanding of patients' beliefs about medicines in specific and general contexts is of great value in addressing medication adherence with subsequent glycemic control and prevention of complications among diabetic patients. Therefore, the present study aimed to explore beliefs about medications and their correlates among Type 2 diabetic patients in Upper Egypt.

Methods: A cross-sectional study was conducted from August 2022 to January 2023 at Assiut University Hospitals in Assiut district, Egypt. Data was collected through semi-structured questionnaires, which were filled in by direct interviews with the participants of the study. The questionnaire used was composed of three sections. The first section inquired about socioeconomic characteristics. The second section of the questionnaire was about clinical data. The Beliefs about Medicine Questionnaire was the third section of the questionnaire. Data analysis was done using SPSS version 26. A p-value less than 0.05 was considered statistically significant.

Results: The present study included 417 participants (42.4% male, 57.6% female). A high necessity belief was noted among 93% of the participants, indicating strong perceptions of medication benefits, while 67.4% expressed concerns about the long-term effects of medications. Nearly three-quarters of the participants believed in the overuse of medications by doctors, and 51.8% disagreed with the idea that medications cause general harm.

Sociodemographic factors such as residence influenced necessity beliefs. Furthermore, necessity beliefs were significantly associated with the type of medications, medication side effects, blood glucose monitoring, receiving health education, and the presence of comorbid conditions or diabetes complications. Concern beliefs were significantly associated with the types and side effects of medications. Sociodemographic factors (education, marital status, occupation) and clinical factors (BMI, blood glucose monitoring, presence of diabetes complications) significantly influence general overuse scores. Lastly, the general harm score is significantly affected by sociodemographic characteristics such as age, education, and residence, as well as clinical characteristics such as BMI, price of medications, and the presence of comorbid conditions.

Conclusions: Most participants believed in the necessity of medications but expressed moderate concerns about their effects. Different sociodemographic and clinical characteristics influenced beliefs about medications, highlighting the need for targeted health education to enhance patients' knowledge about diabetes medications to shape positive beliefs towards it.

Keywords: Beliefs about medications, Type 2 diabetic patients, correlates, Egypt.

Introduction

Diabetes mellitus (DM) is recognized as one of the most persistent and rapidly growing challenges in public health. It's a chronic metabolic disorder characterized mainly by high levels of glucose, associated globally with increased morbidity and mortality, particularly in developing countries [1].

The World Health Organization (WHO) had predicted that by 2030, diabetes mellitus would rank as the seventh leading cause of mortality globally [2]. Patients with type 2 DM are likely to experience higher morbidity and mortality rates due to the condition's prevalence, insidious onset, and delayed diagnosis, particularly in resource-constrained developing regions like Africa [3].

Currently, 537 million people suffer from diabetes worldwide. The Middle East and North Africa (MENA) Region has 73 million people who have diabetes, and it is estimated that by 2045, this will rise to 135.7 million according to the International Diabetes Federation (IDF) in 2021[4]. In 2017, Egypt was ranked eighth among the ten nations/territories with the highest number of individuals affected by diabetes, ranging from 4.4 million to 9.4 million in 2017, and is projected to rank sixth by 2045 [4].

More than 77 percent of morbidities and 88 percent of fatalities in developing nations are attributable to DM [5]. Hence comes the importance of self-management in patients with type 2 DM in reducing complications from the disease and improving overall health outcomes [6].

Understanding how patients perceive their beliefs about medication plays a crucial role in medication adherence, particularly in diabetes. Additionally, beliefs about the necessity and concerns regarding medication side effects significantly impact adherence levels. This connection is vital for achieving optimum glycemic control in diabetes management [3]. In Upper Egypt, no study has been conducted on beliefs about medications among diabetic patients. Therefore, the current study identifies beliefs about medication and their correlates among patients attending diabetic clinics at Assiut University Hospitals in Assiut district, Egypt.

Patients and Methods

Study Design and Population

A cross-sectional study was carried out at Assiut University Hospitals in Assiut district, Upper Egypt. The target population for this study consisted of diabetic patients with type 2 who sought care at diabetes clinics at Assiut University Hospitals.

Sample Size Estimation

The Epi Info version 7 StatCalc was utilized for sample size estimation, based on the following assumption: 55% of the Egyptian population believed that medications could potentially cause them harm [7], with a precision of 5%, a 95% confidence level, and a design effect of 1. The sample size was raised to 417 after adding 10% as a non-response rate.

Inclusion Criteria

Patients who have been diagnosed with type 2 diabetes for at least one year and patients aged eighteen years or more were included.

Exclusion Criteria

Psychiatric patients, newly diagnosed diabetic patients, patients who are sick on the day of selection or not taking any drug for diabetes, and type 1 diabetic patients were excluded.

Sampling Technique

A systematic random sampling technique was adopted. The average attendance at diabetic clinics is 40 patients per day, and the authors aimed to take 10 patients per day. The first case was selected by the simple random sampling technique, and then every case was selected for every 4 patients.

Data Collection Tool

Data was collected through semi-structured questionnaires, which were filled out by direct interview. The questionnaire was composed of three sections: The first section inquired about socioeconomic characteristics. The second section of the questionnaire was about clinical data. The Beliefs about Medicine Questionnaire

(BMQ-General and BMQ Specific) was the third section of the questionnaire. BMQ-General assesses whether a person believes that taking medication in general is harmful (general harm) or that doctors overuse medication (general overuse). The BMQ specifically assesses whether patients believe medications are necessary to maintain their current and future health (necessity) or whether they are concerned about the existing and potentially adverse consequences of medication use (concerns) [8].

Statistical Analysis

SPSS version 26 was used for statistical analysis. T-tests and ANOVA were used to identify the determinants of beliefs about medication. A p-value less than 0.05 was considered statistically significant.

Results

Table (1) describes the sociodemographic features of the participants. Males represent 42.4% of the participants, while females represent 57.6%. The participants' mean age was 48.82 ± 13.46 years. Most of the participants were urban residents (56.4%), married (89%), and had four or more children (57.5%). In terms of education level, 40% of the participants reported being unable to read or write.

Table 1: Sociodemographic features of the studied diabetic patients

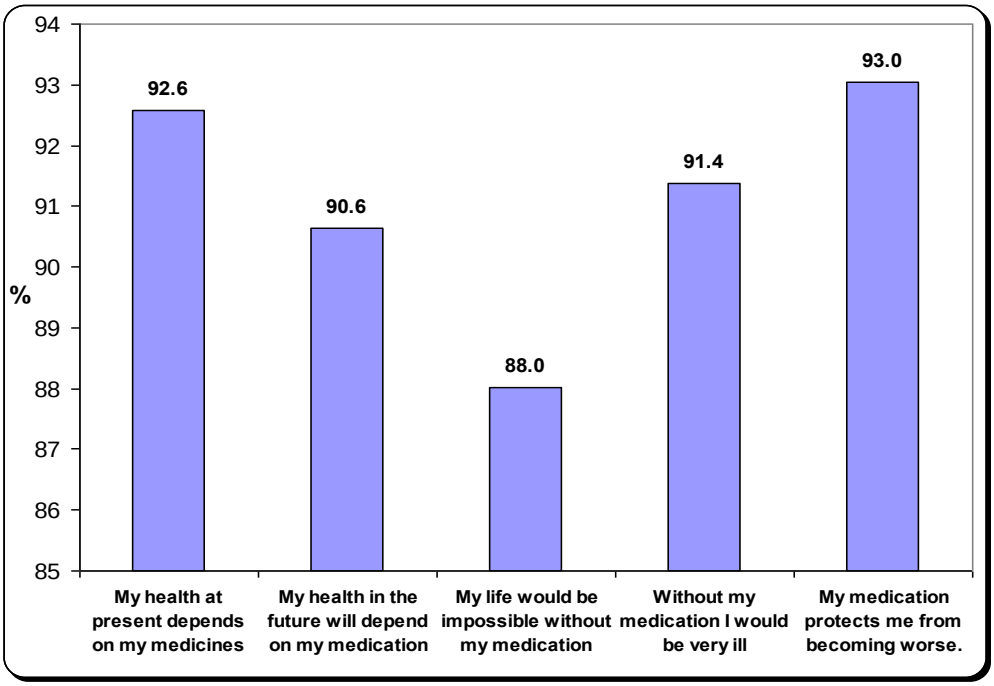
Personal data	No. (417) (%)
Gender	
Male	177 (42.4%)
Female	240 (57.6%)
Age (years)	
< 40	92 (22.1%)
40 - < 50	119 (28.5%)
50 - < 60	125 (30.0%)
> 60	81 (19.4%)
Mean ± SD (Range)	48.82 ± 13.46 (19.0-84.0)
Education	
Don't read or write	167 (40.0%)
Primary school	48 (11.5%)
Preparatory school	54 (12.9%)
Secondary school	117 (28.1%)
Higher education/ Postgraduate	31 (7.4%)
Residence	
Urban	235 (56.4%)
Rural	182 (43.6%)
Marital status	
Married	371 (89.0%)
Not married	46 (11.0%)
Do you have any children? (n=381)	
Yes	362 (95.0%)
No	19 (5.0%)
No. of children (n=362)	
1 - 3	154 (42.5%)
4 or more	208 (57.5%)
Occupation	
Not working/ Unskilled	326 (78.2%)
Skilled/ Free trades	47 (11.3%)
Clerk/ Professional	44 (10.6%)

Table (2) demonstrates the clinical data of the participants. Most of the participants were taking oral hypoglycemic drugs (58.5%). Nearly two-thirds of the participants experienced side effects from medication (65.2%) and faced financial challenges in affording it (59.0%). In addition, two-thirds had other medical conditions, primarily hypertension (77.6%). Most of the participants suffered from complications related to diabetes mellitus (75.8%).

Table 2: Clinical data of the studied diabetic patients

	No. (417) (%)
BMI	
Normal	107 (25.7%)
Overweight	172 (41.2%)
Obese	138 (33.1%)
Duration of diabetes (in years)	
< 5	112 (26.9%)
5 - < 10	169 (40.5%)
≥ 10	136 (32.6%)
Medications	
Insulin	117 (28.1%)
Oral hypoglycemic drugs	244 (58.5%)
Both	56 (13.4%)
Medication side effects	
Yes	272 (65.2%)
No	145 (34.8%)
Price of medications	
Affordable	89 (21.3%)
Unaffordable	246 (59.0%)
Free	82 (19.7%)
Any other comorbid conditions?	
Yes	254 (60.9%)
No	163 (39.1%)
Other comorbid conditions* (n=254)	
Hypertension	197 (77.6%)
Coronary heart disease	43 (16.9%)
Renal disease	10 (3.9%)
Liver disease	8 (3.1%)
Neurological disease	18 (7.1%)
Others	13 (5.1%)
Complications of diabetes	
Yes	316 (75.8%)
No	101 (24.2%)
Measuring blood glucose regularly at home	
Yes	284 (68.1%)
No	133 (31.9%)
Last medical check-up	
Less than 3 months	266 (63.8%)
More than 3 months	151 (36.2%)
HbA1c:	
Less than or equal to 7%	89 (21.3%)
More than 7%	328 (78.7%)
Receiving health education in the last 6 months:	
Once or twice	219 (52.5%)
None	198 (47.5%)

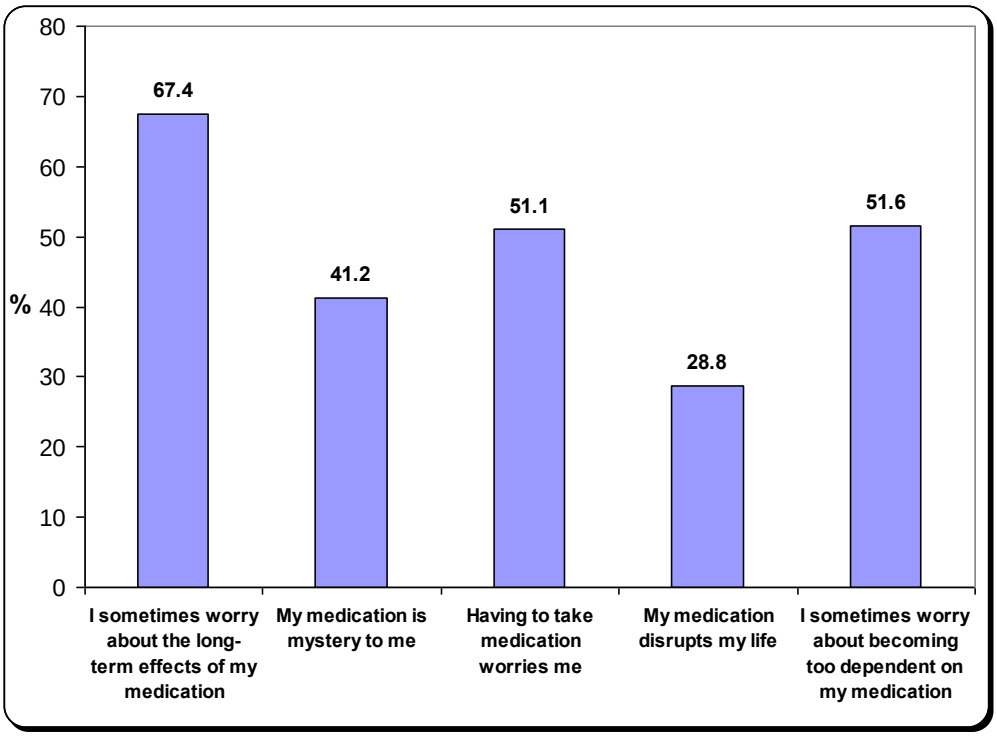
*More than one answer had been reported



*More than one answer had been reported

Figure (1): Beliefs about medications (necessity specific) among diabetic patients

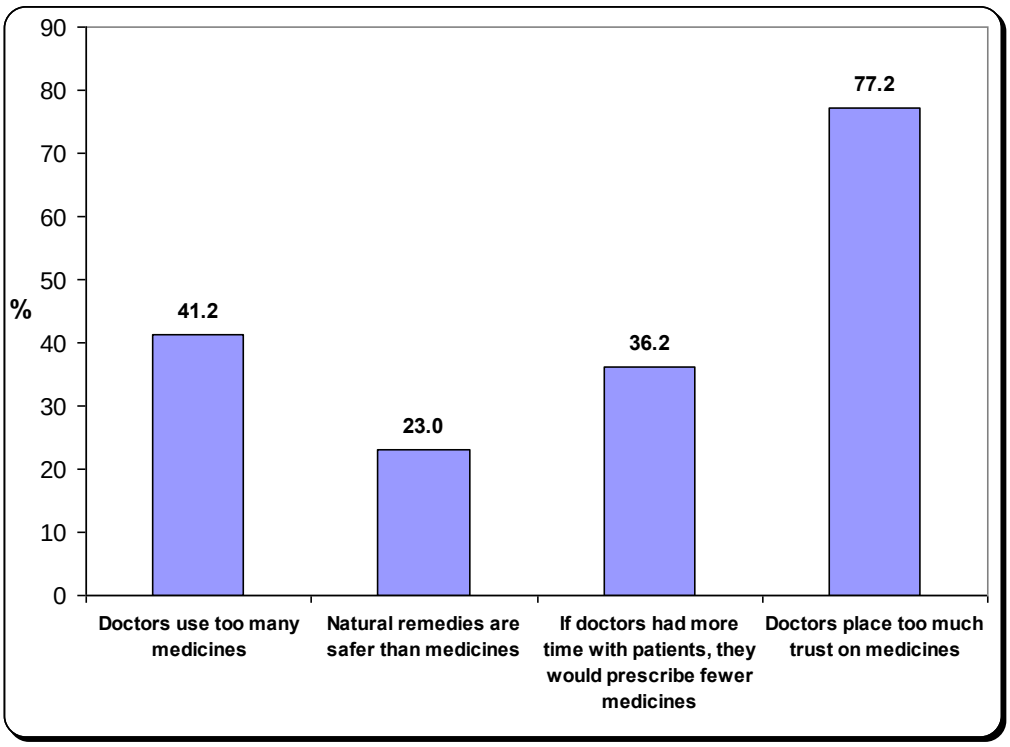
Figure (1) shows that most of the participants (93%) believed that their medications protect them from becoming worse. Furthermore, 92.6% believed that their health at present depends on medications.



*More than one answer had been reported

Figure (2): Beliefs about medications (concern specific) among diabetic patients

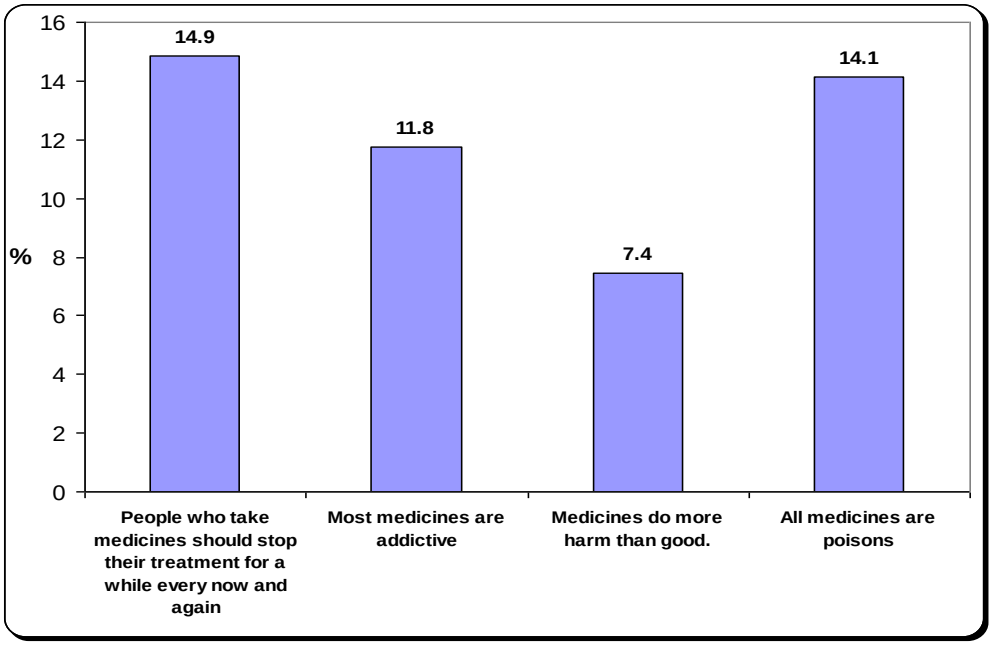
Figure (2) shows that about two-thirds of the participants (67.4%) worried sometimes about the long-term effects of medication. Furthermore, 51.6% worried about becoming too dependent on medication.



*More than one answer had been reported

Figure (3): Beliefs about medications (general overuse) among diabetic patients

Figure (3) shows that about three-quarters of the participants (77.2%) believed that doctors place too much trust in medicines. In addition, 41.2% thought that doctors use too many medicines.



* 51.8 % of the patients believed that medications do not cause general harm.

Figure (4): Beliefs about medications (general harm) among diabetic patients

Figure (4) shows that 14.9% of the participants believed that they should stop their treatment for a while every now and again. Furthermore, 14.1% of the patients believed that all medicines are poisons.

Table (3): Association between beliefs about medications and sociodemographic characteristics of the studied diabetic patients

	Specific necessity	Specific concerns	General overuse	General harm
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Gender:				
Male	20.69 ± 2.03	15.05 ± 3.32	11.68 ± 2.14	8.77 ± 1.84
Female	20.76 ± 2.46	15.22 ± 3.10	11.64 ± 2.07	9.15 ± 2.45
P-value	0.760	0.601	0.840	0.084
Age: (years)				
< 50	20.79 ± 2.22	15.37 ± 2.86	11.57 ± 2.04	8.61 ± 1.92
≥ 50	20.67 ± 2.35	14.91 ± 3.50	11.75 ± 2.15	9.39 ± 2.43
P-value	0.602	0.140	0.397	0.000*
Education:				
Illiterate	20.59 ± 2.52	14.67 ± 3.36	11.58 ± 2.17	9.51 ± 2.24
Basic education	20.95 ± 2.18	15.65 ± 3.31	11.40 ± 1.88	8.72 ± 2.52
Secondary school	20.66 ± 2.00	15.47 ± 2.46	11.75 ± 2.24	8.69 ± 1.90
High education/ postgraduate	21.03 ± 2.32	14.84 ± 4.01	12.58 ± 1.59	8.26 ± 1.57
P-value	0.519	0.052	0.046*	0.001*
Residence:				
Urban	20.93 ± 2.51	15.00 ± 3.35	11.70 ± 2.24	8.70 ± 2.30
Rural	20.47 ± 1.93	15.33 ± 2.98	11.60 ± 1.91	9.37 ± 2.06
P-value	0.043*	0.303	0.637	0.002*
Marital status:				
Married	20.79 ± 2.33	15.05 ± 3.27	11.57 ± 2.13	9.01 ± 2.29
Not married	20.26 ± 1.82	15.89 ± 2.43	12.37 ± 1.62	8.89 ± 1.51
P-value	0.140	0.093	0.015*	0.743
Do you have any children?				
Yes	20.80 ± 2.34	15.13 ± 3.24	11.60 ± 2.13	9.01 ± 2.32
No	20.11 ± 1.91	14.68 ± 3.65	11.26 ± 1.85	9.16 ± 0.83
P-value	0.205	0.562	0.497	0.788
No. of children:				
1 - 3	20.78 ± 2.30	15.06 ± 3.30	11.84 ± 1.98	8.99 ± 2.13
4 or more	20.81 ± 2.37	15.18 ± 3.20	11.43 ± 2.23	9.03 ± 2.45
P-value	0.894	0.744	0.070	0.850
Occupation:				
Not working/ Unskilled	20.69 ± 2.30	15.15 ± 3.18	11.47 ± 2.14	9.02 ± 2.34
Skilled/ Free trades	20.68 ± 2.49	15.43 ± 3.06	12.00 ± 1.49	8.83 ± 1.69
Clerk/ professional	21.07 ± 1.93	14.84 ± 3.49	12.68 ± 1.97	8.95 ± 1.74
P-value	0.582	0.684	0.001*	0.852

*P-value was calculated using the t-test and ANOVA test

Table (3) presents the association between beliefs about medications and sociodemographic data of diabetic patients. Regarding age, patients aged 50 years or older believed that medications cause harm with a higher mean score (P-value = 0.000). Concerning education, patients with higher education or postgraduates believed that doctors overuse medications with a higher mean score (P-value 0.046). Illiterate patients believed that medications cause more harm, with a higher mean score (P-value = 0.001). Urban residents perceived medication as more necessary with a higher specific necessity mean score (P-value = 0.043). Furthermore, patients who were not married believed that medications are overused by doctors with a higher mean score (P-value = 0.015).

Table (4): Association between beliefs about medications and clinical characteristics of the studied diabetic patients

Clinical data	Specific Necessity	Specific concerns	General overuse	General harm
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
BMI:				
Normal	20.67 ± 2.31	15.44 ± 3.22	11.50 ± 2.26	8.41 ± 1.79
Overweight	20.52 ± 2.15	14.99 ± 3.18	11.43 ± 2.11	9.33 ± 2.29
Obese	21.03 ± 2.40	15.11 ± 3.20	12.07 ± 1.89	9.02 ± 2.35
P-value	0.146	0.521	0.020*	0.003*
Duration of disease: (years)				
< 5	20.41 ± 2.79	15.24 ± 2.95	11.70 ± 2.04	8.75 ± 2.50
5 - < 10	20.73 ± 2.19	15.38 ± 2.96	11.70 ± 2.12	8.97 ± 1.97
≥ 10	20.99 ± 1.88	14.77 ± 3.62	11.57 ± 2.13	9.22 ± 2.27
P-value	0.136	0.234	0.844	0.248
Medications:				
Insulin	20.36 ± 2.41	15.47 ± 2.63	11.97 ± 1.86	8.96 ± 2.32
Oral hypoglycemic drugs	20.75 ± 2.29	15.23 ± 3.29	11.51 ± 2.12	8.89 ± 2.19
Mixed	21.43 ± 1.78	14.12 ± 3.67	11.66 ± 2.39	9.50 ± 2.10
P-value	0.015*	0.029*	0.157	0.179
Medication side effects:				
Yes	20.91 ± 2.01	15.40 ± 3.14	11.85 ± 2.20	9.04 ± 2.08
No	20.39 ± 2.70	14.66 ± 3.24	11.30 ± 1.85	8.91 ± 2.47
P-value	0.025*	0.024*	0.010*	0.580
Price of medications:				
Affordable	20.70 ± 2.18	15.19 ± 3.29	11.94 ± 2.04	8.27 ± 1.68
Unbearable	20.89 ± 2.47	15.20 ± 3.20	11.48 ± 2.13	8.99 ± 2.23
Free	20.27 ± 1.69	14.93 ± 3.11	11.88 ± 2.03	9.79 ± 2.43
P-value	0.098	0.786	0.119	0.000*
Other medical conditions:				
Yes	20.91 ± 2.31	15.29 ± 3.31	11.55 ± 2.13	9.19 ± 2.38
No	20.45 ± 2.21	14.92 ± 3.00	11.83 ± 2.03	8.69 ± 1.90
P-value	0.049*	0.247	0.173	0.024*
Complications of DM:				
Yes	20.87 ± 2.31	15.15 ± 3.27	11.46 ± 2.18	9.05 ± 2.28
No	20.30 ± 2.15	15.13 ± 2.96	12.29 ± 1.68	8.80 ± 2.02
P-value	0.029*	0.949	0.001*	0.321
Blood glucose measure:				
Yes	20.86 ± 2.29	15.24 ± 3.20	11.92 ± 1.99	8.87 ± 2.14
No	20.44 ± 2.24	14.95 ± 3.19	11.11 ± 2.22	9.25 ± 2.37
P-value	0.000*	0.385	0.000*	0.108
Last medical check-up:				
Less than 3 months	20.93 ± 2.33	15.06 ± 3.21	11.68 ± 2.16	8.95 ± 2.27
More than 3 months	20.38 ± 2.15	15.30 ± 3.16	11.62 ± 1.98	9.06 ± 2.12
P-value	0.018*	0.446	0.787	0.644
HbA1c:				
Less than or equal to 7%	20.56 ± 2.75	15.12 ± 2.86	11.82 ± 1.66	8.72 ± 2.17
More than 7%	20.77 ± 2.14	15.15 ± 3.28	11.62 ± 2.20	9.07 ± 2.23
P-value	0.436	0.940	0.415	0.190
Health education last 6 months:				
Once or twice	20.95 ± 2.07	15.20 ± 3.01	11.75 ± 2.05	8.82 ± 2.36
None	20.48 ± 2.48	15.09 ± 3.39	11.56 ± 2.14	9.19 ± 2.04
P-value	0.038*	0.714	0.336	0.089

*P-value was calculated using the t-test and ANOVA test

Table (4) presents the association between beliefs about medications and clinical data of diabetic patients. Obese patients believed that medications are overused by the doctors with a higher mean score (P-value = 0.020), whereas overweight patients believed that medications cause harm with a higher general harm mean score (P-value = 0.003). Patients who used insulin and hypoglycemic drugs believed that medications are more necessary with a higher specific necessity mean score (P-value = 0.015), whereas patients who took insulin held more concerns about medications with a higher mean score (P-value = 0.029). Patients who experienced side effects with medications believed that medications are more necessary with a higher specific necessity mean score (P-value = 0.025) and held more concerns

about side effects of medications with a higher mean score (P-value = 0.024). Furthermore, patients who took medications for free believed that medications could cause harm with a higher mean score (P-value = 0.000). Patients with other medical conditions believed that medications are necessary, with a higher mean score (P-value = 0.049). In addition, these patients believed that the medications could be harmful to them, with a higher mean score (P-value = 0.024). Patients with diabetic complications believed that medications are more necessary with a higher specific necessity score (P-value = 0.029) compared to patients without diabetes complications, who believed that medications are overused by doctors for treatment with a higher mean score (P-value = 0.001). Patients who measure glucose level regularly believe that medications are necessary and that medications are overused for treatment with a higher specific necessity mean score (P-value = 0.000) and a higher general overuse mean score (P-value = 0.000).

Discussion

Beliefs about medications play a key role in shaping how patients approach their treatment. The World Health Organization highlights that beliefs about the benefits and risks of medicines greatly influence medication use [9]. Therefore, the present study aimed to investigate the beliefs about medications and their correlates among diabetic patients in Upper Egypt.

Concerning the necessity of treatment (specific necessity), 93% of the participants in this study believed that their medications are necessary and protect them from becoming worse. These findings indicate a high perceived need for diabetes medications to maintain current and future health. Similar results were reported in a Malaysian study, which found that among patients with type 2 diabetes, 91% believed they would become very ill without medication, and 88% felt their life would be impossible without it [10]. However, the results of the current study were much higher than those of a study conducted in Palestine, where 70% of the participants believed their health depended on medications [11]. The higher percentage observed in the present study may reflect improved health education and counseling efforts that emphasize the importance of medications.

Patients on both insulin and hypoglycemic drugs in this study had significantly higher specific necessity score. This is consistent with Stewart et al. (2022), who suggested that the complexity of multiple therapies reinforces patients' perceived dependency on medications [12]. In contrast, a study in Gaza found no significant difference, possibly due to uniform treatment options in resource-limited settings, where fewer therapeutic alternatives may limit perceptions of necessity [13].

Patients who regularly measured their blood glucose had significantly higher specific necessity scores, consistent with Jamous et al. (2014) [11]. This highlights the reinforcing effect of self-monitoring, which provides tangible evidence of the benefits of medications. The specific necessity score in this study was higher than the findings of a study conducted in Jordan [14]. In this study, participants may have received more tailored counseling or support from healthcare providers, emphasizing the importance of medication in managing diabetes.

Regarding concerns about the side effects of medications (specific concern), 67.4% of the participants in this study expressed occasional worry about the long-term effects of medication. These findings are higher than a study conducted in Palestine, where 55.3% of participants worried about the long-term effects of medication [15]. The higher percentages in this study regarding the side effects of medications may reflect differences in healthcare delivery or cultural attitudes, where participants might be more vocal about their concerns due to heightened awareness or personal experiences. In this study, the mean score for specific concerns is slightly higher than the study conducted in Egypt and Palestine [7, 15], which reported

a moderate mean concern score. The higher scores in the present study could be attributed to increased exposure to health information, leading to greater awareness of potential medication side effects. The mean specific necessity score in this study was higher than the mean specific concern score, indicating a stronger belief in the importance of medications despite moderate concerns. This finding aligns with a study conducted at the National Diabetes Center in Iraq, which reported a mean specific necessity score of 19.29 ± 4.51 compared to a mean specific concern score of 14.27 ± 5.58 [16].

The mean score of medication overuse in this study was slightly lower than the findings of Salama & Saudi (2020) [7], possibly reflecting regional differences in healthcare practices or communication between providers and patients. Participants with higher education levels in this study believed more strongly that doctors tend to overprescribe medications. Similar findings were reported by Basheti et al. (2016), Hong (2019), and Roque et al. (2014), where educated participants demonstrated a more critical view of prescribing practices [14, 17, 18]. This may be attributed to their higher health literacy and greater exposure to global health information, enabling them to evaluate and question medical practices more critically.

Participants aged 50 years or older in this study demonstrated significantly higher mean general harm scores (9.39 ± 2.43) compared to younger patients (P = 0.000). This finding aligns with the results of Hussein et al. (2017), Rafhi (2024), and Xu et al. (2018) [16, 19, 20], who observed that older patients tend to express greater concerns about medication harm. This may be attributed to their longer exposure to various medications or their experience managing multiple prescriptions over time.

Illiterate participants in the present study demonstrated significantly higher general harm scores compared to their educated counterparts. This finding is consistent with the observations of Al-Tannir et al. (2015) and Rumun (2014) [21, 22], who reported that low literacy levels are associated with increased misconceptions about medications.

Rural participants in the current study reported greater general harm compared to urban participants. Similar results were reported by Jamous et al. (2014), who attributed higher harm perceptions in rural populations to limited healthcare access [11].

Conclusions

Most individuals with type 2 diabetes in Upper Egypt believe that medication is necessary to protect them from the deterioration of their condition. However, they also express concerns about the long-term effects of these medications and believe that physicians tend to overprescribe drugs. These findings highlight how demographic, educational, and geographic factors influence patients' beliefs about medication-related harm. Addressing these disparities through targeted education and improved healthcare access is essential to reducing misconceptions and improving medication adherence.

Ethical Considerations

An Ethical Committee of the Faculty of Medicine at Assiut University examined and accepted the research proposal (**IRB No.:** 17300662). Administrative permission was obtained from the University authority. The patients provided written informed consent. Confidentiality of the data was assured.

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