




False Beliefs About Diabetes Mellitus in the Kurdistan Region of Iraq: A Population-Based Study

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Abstract

Background. Diabetes mellitus (DM) is a chronic, non-transmissible health condition distinguished by high blood glucose levels caused by faulty insulin secretion and impaired insulin activity. People play an essential role in preventing and managing their illnesses. Thus, the misconceptions may negatively influence the prevention and management of DM.

The aim of this study was to gauge the extent of knowledge among the general population concerning DM, to determine the prevalence of misconceptions about DM in the community, and to find the factors influencing them.

Methods. A population-based study was conducted in Duhok Province, the Kurdistan Region of Iraq. A total of 2,305 adults were enrolled in the study. The study data were collected by face-to-face interview. The survey questionnaire comprised two sections: the first section included basic demographic characteristics of participants, while the second section consisted of ten questions to identify common misconceptions about DM among participants.

Results. Among the participants, there were 1,406 (61.0%) females. Participants' age ranged from 18 to 90 years (the mean age: 54 ± 13.69 years). The most common misconceptions positively responded to were "Will I become addicted to insulin if I start taking it?", followed by "Does DM occur because of increased sugar intake?". Male gender was associated with higher level of misconceptions. In addition, the misconceptions were more prevalent among diabetics as they might seek treatment from non-professionals. There was a significant association between education status and the prevalence of misconceptions. Healthcare workers were found to have a better knowledge about DM compared to the general population. Surprisingly, certain myths were prevalent even among healthcare workers.

Conclusions. Certain myths and misconceptions have been pervasive in our society. Actions must be taken to dispel these misconceptions as they lead to an avoidable burden of disease. Therefore, people's knowledge of DM needs to be enhanced through educational programs, social media, television, newspapers and campaigns.

Keywords

Diabetes Mellitus; Misconceptions; Knowledge; Management; Kurdistan Region of Iraq

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Introduction

Diabetes mellitus (DM) is a chronic, non-communicable disorder characterised by hyperglycaemia caused by defective insulin secretion, impaired insulin action, or both [1]. Chronic exposure to high plasma glucose levels is associated with multiple organ damage such as the heart, eyes,

kidneys, and neurons [1]. According to the International Diabetes Federation (IDF), more than 500 million individuals worldwide are currently living with DM, indicating that over 10.5% of the adult population globally are affected by this disease, and its prevalence is steadily increasing, as it is expected to reach 783.2 million by 2045 [2].

Gaining a better understanding of medications and

lifestyle modifications can potentially enable individuals to manage their glucose levels more effectively and postpone the development of complications associated with DM [3]. People play an essential role in preventing and managing their own health, therefore, adequate knowledge about DM, lifestyle management, diet, and disease complications should be shared with the general population and diabetic patients to prevent or delay DM and its serious complications [4, 5]. Medical mistrust may result from myths, leading to decreased trust in healthcare providers or the healthcare system as a whole, which can contribute significantly to inadequate adherence to medical management [6].

The prevalence of myths regarding the disease can significantly affect individuals' lives by shaping their perception of the condition, their willingness to seek treatment, their acceptance of therapeutic options, and their readiness to adopt essential changes in their diet and lifestyle [7]. Disease myths are part of the identity of any culture; these misconceptions mainly affect our lives and behaviours and are the main obstacles in seeking health professional advice [8]. A healthy understanding of false beliefs is vital to provide better healthcare and health education to the general population and diabetic patients, which will reduce an avoidable burden of the disease [9, 10].

A few excellent studies have been carried out in India, Saudi Arabia, and Taiwan to validate the prevailing misconceptions about DM [8, 11, 12]. To date, no such investigations have been carried out in the Kurdistan region of Iraq to explore the misconceptions about DM in the community. Thus, it is important to ensure that the community has sufficient knowledge and awareness of this disease to enable further promotion of public health interventions to control its prevalence.

Therefore, this **study aimed** to assess the population's knowledge about DM, to determine the prevalence of misconceptions about DM in the community, and to understand their influence on DM management. This study will provide efficient evidence to bridge the scientific gap and potential factors to deal with the disease from a purely scientific perspective, thereby reducing its possible effects.

Materials and Methods

Study Design and Data Collection

Between February 1 and April 10, 2022, a population-based study was carried out in Duhok Province, the Kurdistan Region, Iraq, and the study data were collected through face-to-face questionnaires. The study utilized a random sampling method to select participants from public spaces. Participants were approached randomly and invited to participate in the study. A total of 2,305 participants were recruited, and they were selected at random from the broader population. In addition, an alternate questionnaire in the Kurdish language was offered to participants who were not proficient in English to ensure inclusivity and minimize potential language obstacles.

Study Tool

This study questionnaire was designed based on a literature review that sought to assess the prevalence of false beliefs, including myths, misconceptions, and misperceptions regarding DM in the population [9, 13, 14]. The survey questionnaire was categorised into two sections. The first section consisted of the basic demographic characteristics of the participants, including age, gender, marital status, smoking status (smoker, non-smoker, passive smoker, or ex-smoker), residency, education level, history of chronic disease, DM status, and type of treatments if the participant had DM. In "education status", medical staff, including physicians, nurses, and medical school students, were regarded as a specific category called "healthcare workers" because this group was expected to have better information and fewer false beliefs about DM.

The second section comprised ten questions: six questions for myths about DM (*Does DM occur because of increased sugar intake? Is DM a contagious disease? Do all people with DM go blind and lose their legs? Shouldn't people with DM play sport? Will I become addicted to insulin if I start taking it? Is honey good for diabetic patients?*), two questions for misconceptions about DM (*Do you always develop DM if you are overweight? Can DM be cured by herbal treatment?*), and two questions about knowledge of DM (*Can people with DM eat sweets or chocolate? Is DM a serious disease?*) where participants were required to answer "yes" or "no" to identify common false beliefs among the general population; response "I don't know" was regarded as a false belief as well.

Inclusion/Exclusion Criteria

The inclusion criteria for the study included participants over 18 years of age, living in the Kurdistan Region, Iraq, and consenting to be recruited in the study, whereas participants under the age of 18 and questionnaires with incomplete information or missing data were excluded.

Statistical Analysis

GraphPad Prism version 9.3.1 and Microsoft Office Excel were used for statistical analysis. Frequencies and percentages were used to describe categorical variables. Fisher's exact test or Chi-Square was used to study the association between variables based on gender, diabetes status, education level, and district categories. A p-value < 0.05 was considered statistically significant.

Results

Basic Demographic Characteristics

In the present study, a total of 2,305 complete questionnaires were recruited. Among the participants, there were 1,406 (61.0%) females. Participants' age ranged from 18 to 90 years (the mean age: 54 ± 13.69 years). A total of 17.4% of the participants were smokers, and 25.4% had a history of chronic diseases (Table 1). One-third of the participants were from the Duhok Province, and more than two-thirds (72.6%) had at least a secondary education.

Table 1. Basic demographic characteristics of the study population.

Variables	Total No. (%) n=2,305	Variables	Total No. (%) n=2,305
Gender		Level of education	
Male	899 (39)	Uneducated	249 (10.8)
Female	1,406 (61)	Primary	382 (16.6)
Marital status		Secondary	1,151 (49.9)
Single	1,251 (54.3)	Graduated	404 (17.5)
Married	1,054 (45.7)	Healthcare workers	119 (5.2)
Smoking status		Diabetes status	
Smoker	401 (17.4)	Non-diabetic	1,241 (53.9)
Non-smoker	1,024 (44.4)	Family history	798 (34.6)
Passive smoker	782 (33.9)	Diabetic	266 (11.5)
Ex-smoker	98 (4.3)	Diabetes management	
History of chronic illness (multiple-choice question)		Lifestyle	45 (16.9)
Hypertension	280 (12.1)	Oral drugs	171 (64.3)
Hyperlipidaemia	216 (9.4)	Insulin	50 (18.8)
Ischemic heart disease	89 (3.9)		
Residency			
Duhok	762 (33.0)		
Zakho	468 (20.3)		
Semel	423 (18.4)		
Other areas	652 (28.3)		

Prevalence of DM

A total of 798 (34.6%) participants had a family history of DM and 266 (11.5%) were diagnosed with DM. Out of the total individuals diagnosed with DM, 152 (57.1%) of them were females (Fig. 1). About two-thirds of people with diabetes were managing their DM with oral hypoglycaemic agents, and 18.8% of diabetic people received insulin.

Prevalence of Misconceptions About DM

As shown in Table 2, the most common misconception among the participants was “*Will I become addicted to insulin if I start taking it?*”, which was positively responded to by more than half of the participants (53.4%), followed by the “*Does DM occur because of increased sugar intake?*” (50.7%) and “*Is honey good for diabetic patients?*” (47.9%).

When comparing false beliefs about DM between males and females, males reported a higher prevalence of misconceptions than females (Table 2). Several variables showed a significant difference, like “*Do you always develop DM if you are overweight?*”, “*Do all people with DM go blind*

and lose their legs?”, and “*Is honey good for diabetic patients?*”, while the other variables missed the significance.

Most surprisingly, to a greater extent, the misconceptions were more prevalent in diabetics when compared to non-diabetics. The most prevalent misconception among diabetic patients was “*Will I become addicted to insulin if I start taking it?*”, which was positively responded to by 57.1% of diabetics and 51.0% of non-diabetics. Table 3 concludes the comparison between diabetics and non-diabetics.

Table 4 shows the comparison by education level, where there are statistically significant differences between the prevalence of misconceptions and academic level. The misconceptions were more prevalent among less educated people. The lower the level of education, the more misconceptions spread. The misconceptions were more prevalent among the general population as compared to healthcare workers. In addition, they were high among healthcare workers as well; for instance, around half of them positively responded to “*Is honey good for diabetics?*”. The comparison of misconceptions between general population and healthcare workers is presented in Table 5.

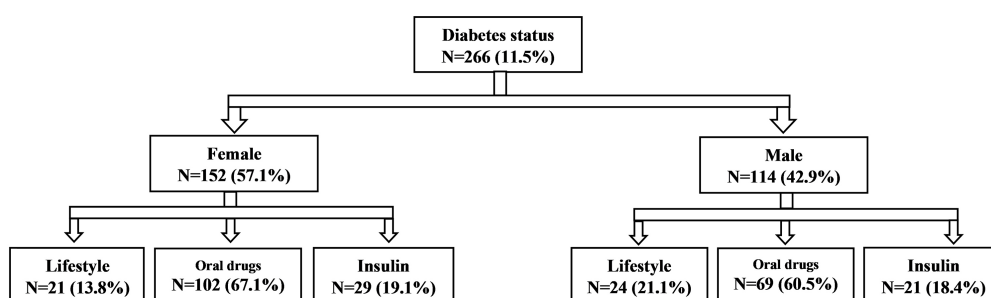
**Figure 1.** Diabetic patients recruited in the study and categorized based on their DM management.

Table 2. Comparison of false beliefs between males and females.

Variables	Total n=2,305 No. (%)	Males n=899 No. (%)	Females n=1,406 No. (%)	p-value
Do you always develop DM if you are overweight?	794 (34.4)	342(38.0)	452 (32.1)	0.004
Does DM occur because of increased sugar intake?	1,169 (50.7)	461 (51.3)	708 (50.4)	0.67
Is DM a serious disease?	206 (8.9)	78 (8.7)	128 (9.1)	0.76
Can DM be cured by herbal treatment?	629 (27.3)	252 (28.0)	377 (26.8)	0.53
Can people with DM eat sweets or chocolate?	705 (30.6)	280 (31.1)	425 (30.2)	0.64
Is DM a contagious disease?	209 (9.1)	82 (9.1)	127 (9.0)	0.94
Do all people with DM go blind and lose their legs?	376 (16.3)	166 (18.5)	210 (15.0)	0.03
Shouldn't people with DM play sport?	298 (13.0)	109 (12.1)	189 (13.4)	0.37
Will I become addicted to insulin if I start taking it?	1,230 (53.4)	496 (55.2)	734 (52.2)	0.17
Is honey good for diabetic patients?	1,105 (47.9)	466 (51.8)	639 (45.4)	0.003

Table 3. Comparison of false beliefs between diabetics and non-diabetics.

Variables	Diabetics n=266	Non-diabetics n=1,241	p-value
Do you always develop DM if you are overweight?	108 (40.6%)	427 (34.4%)	0.06
Does DM occur because of increased sugar intake?	148 (55.6%)	655 (52.8%)	0.42
Is DM a serious disease?	39 (14.6)	69 (5.6%)	<0.001
Can DM be cured by herbal treatment?	72 (27.1%)	356 (28.7%)	0.65
Can people with DM eat sweets or chocolate?	73 (27.4%)	386 (31.1%)	0.27
Is DM a contagious disease?	25 (9.4%)	114 (9.2%)	0.91
Do all people with DM go blind and lose their legs?	74 (27.8%)	190 (15.3%)	<0.001
Shouldn't people with DM play sport?	20 (7.5%)	200 (16.1%)	<0.001
Will I become addicted to insulin if I start taking it?	152 (57.1%)	633 (51.0%)	0.079
Is honey good for diabetic patients?	139 (52.3%)	573 (46.2%)	0.079

Table 4. Comparison of misconceptions based on education level.

Variables	Uneducated n=249	Primary n=382	Secondary n=1151	Graduated n=404	Healthcare workers n= 119	p-value
Do you always develop DM if you are overweight?	131 (52.6%)	178 (46.6%)	368 (32.0%)	94 (23.3%)	23 (19.3%)	<0.001
Does DM occur because of increased sugar intake?	172 (69.1%)	225 (58.9%)	586 (51.0%)	155 (38.4%)	31 (26.1%)	<0.001
Is DM a serious disease?	27 (10.8%)	32 (8.4%)	95 (8.3%)	42 (10.4%)	10 (8.4%)	0.55
Can DM be cured by herbal treatment?	80 (32.1%)	115 (30.1%)	323 (28.1%)	95 (23.5%)	16 (13.4%)	<0.001
Can people with DM eat sweets or chocolate?	47 (18.9%)	72 (18.8%)	442 (38.4%)	108 (26.7%)	36 (30.3%)	<0.001
Is DM a contagious disease?	38 (15.3%)	42 (11.0%)	103 (9.0%)	22 (5.4%)	4 (3.4%)	<0.001
Do all people with DM go blind and lose their legs?	88 (35.3%)	89 (23.3%)	146 (12.7%)	48 (11.9%)	5 (4.2%)	<0.001
Shouldn't people with DM play sport?	32 (12.9%)	56 (14.7%)	162 (14.1%)	40 (9.9%)	8 (6.7%)	0.045
Will I become addicted to insulin if I start taking it?	169 (67.9%)	231 (60.5%)	602 (52.3%)	189 (46.8%)	39 (32.8%)	<0.001
Is honey good for diabetic patients?	144 (57.8%)	232 (60.7%)	478 (41.5%)	197 (48.8%)	54 (45.4%)	<0.001

Most of the variables were approximate when comparing the misconceptions between urban and rural areas (Table 6). Still, some variables were spared from the approximate such as “*Is honey good for diabetic patients?*”, which was significantly higher in rural areas (55.0%) compared to urban areas (45.2%) as well as “*Can people with DM eat sweets or chocolate?*” was significantly more preva-

lent in urban areas (33.0%) than in rural areas (24.7%).

Discussion

False beliefs have been observed to significantly exacerbate the impact of diseases on human health. Additionally, myths may engender medical mistrust, which, in turn, can erode confidence in healthcare providers or the healthcare

Table 5. Comparison of misconceptions between the general population and healthcare workers.

Variables	General population n=2186	Healthcare workers n=119	p-value
Do you always develop DM if you are overweight?	771 (35.3%)	23 (19.3%)	<0.001
Does DM occur because of increased sugar intake?	1,138 (52.1%)	31 (26.1%)	<0.001
Is DM a serious disease?	196 (9.0%)	10 (8.4%)	>0.99
Can DM be cured by herbal treatment?	613 (28.0%)	16 (13.4%)	<0.001
Can people with DM eat sweets or chocolate?	669 (30.6%)	36 (30.3%)	>0.99
Is DM a contagious disease?	205 (9.4%)	4 (3.4%)	0.02
Do all people with DM go blind and lose their legs?	371 (17.0%)	5 (4.2%)	<0.001
Shouldn't people with DM play sport?	290 (13.3%)	8 (6.7%)	0.035
Will I become addicted to insulin if I start taking it?	1,191 (54.5%)	39 (32.8%)	<0.001
Is honey good for diabetic patients?	1,051 (48.1%)	54 (45.4%)	0.57

Table 6. Comparison of misconceptions between the general population and healthcare workers.

Variables	Urban areas n=1,653	Rural areas n=652	p-value
Do you always develop DM if you are overweight?	547 (33.1%)	247 (37.9%)	0.032
Does DM occur because of increased sugar intake?	827 (50.0%)	342 (52.5%)	0.31
Is DM a serious disease?	153 (9.3%)	53 (8.1%)	0.42
Can DM be cured by herbal treatment?	438 (26.5%)	191 (29.3%)	0.18
Can people with DM eat sweets or chocolate?	544 (33.0%)	161 (24.7%)	<0.001
Is DM a contagious disease?	168 (10.2%)	41 (6.3%)	0.004
Do all people with DM go blind and lose their legs?	265 (16.0%)	111 (17.0%)	0.57
Shouldn't people with DM play sport?	220 (13.3%)	78 (12.0%)	0.41
Will I become addicted to insulin if I start taking it?	875 (53.0%)	355 (54.5%)	0.52
Is honey good for diabetic patients?	747 (45.2%)	358 (55.0%)	<0.001

Notes: Urban areas: Duhok, Zakho, and Semel; Rural area: other areas.

system, ultimately resulting in suboptimal adherence to medical treatment [6, 15, 16]. False beliefs are more prevalent in chronic disease, and DM is not an exception in this regard [3]. These false beliefs are influenced by age, gender, and level of education. Providing an excellent health care and health education to both healthy people and patients requires a deep understanding of misconceptions surrounding a disease [16, 17]. Based on folklore and hearsay, health beliefs are formed in people's minds [18]. In the present study, various misconceptions have spread among the population due to a lack of knowledge and awareness.

The study results showed a prevalence of DM (11.5%) among enrolled participants from the general population. The prevalence of DM in our study is lower than that reported by the International Diabetes Federation for the Middle East and North Africa region (IDF-MENA), which estimated the prevalence of 16.2% [19]. The prevalence of DM in our study is lower compared to studies in Northern India and Malaysia, which reported a high prevalence of 29.8% and 22.9%, respectively [9, 20]. A study in Saudi Arabia comprising adult males reported a similar prevalence of DM (11.7%) among their participants [21]. DM was more common in females, and the results of our study were consistent with the previously conducted research [20].

The most typical false beliefs positively responded to in our study were “*Will I become addicted to insulin if I start taking it?*” and “*Does DM occur because of increased sugar intake?*”. Insulin therapy, which is sometimes used

in managing DM, is not adequately understood by some individuals. The misconceptions about insulin will result in delayed insulin therapy or non-adherence, which will worsen the condition. Previously conducted studies in Taiwan, West Nigeria, and Saudi Arabia reported the misconceptions about insulin therapy as well [12, 13, 21]. “*Does DM occur because of increased sugar intake?*” was positively responded to by 50.7% of the participants; however, a survey conducted in North India and West Nigeria found the prevalence of this false belief in 22.1% and 50.5% of the respondents, respectively [9, 13].

In this study, we found that male gender was associated with higher level of misconceptions. Our results support a previously conducted research in the Kurdistan region that found male patients to have a higher level of poor glycaemic control [22]. Individuals may not make the right decision when it comes to DM management if they have a high level of myths about the disease [23, 24]. Therefore, based on these two studies, we suggest an association between the misconceptions about DM and uncontrolled DM. Similar findings were found in two studies conducted in Malaysia which showed that females had a better understanding of DM [20, 25, 26]. Nevertheless, this contradicts the results of studies conducted in Iran and Pakistan, as both studies reported male participants as more aware of DM than females [27, 28].

Moreover, a higher prevalence of misunderstandings was observed in diabetics compared to non-diabetics. This is inconsistent with the findings in North India [9]. In

our study, about two-thirds of diabetics were uneducated or primarily educated, with most non-diabetics having at least secondary education. According to a study in Uganda, healthcare providers believed that illiterate people were at increased risk of developing DM-related complications as they might seek care from non-professionals [29].

Education levels affect health literacy; thus, we found a significant association between educational status and the prevalence of misunderstandings. A high level of education is associated with better knowledge of DM and less reliance on misunderstandings. Similar findings were found in studies conducted in Jordan, Taiwan, and Gujarat (India) [12, 30, 31]. The misconceptions were significantly lower among healthcare workers compared to the general population. Surprisingly, the misconceptions regarding some variables among healthcare workers were neither absent nor low. Similar to our findings, a study in Nigeria found insufficient knowledge amongst healthcare workers regarding the diagnosis and management of DM [32]. An integrative review comprising studies from developing and developed countries has concluded that there is a significant and widespread diabetic knowledge deficit among nurses [33].

Implications for Practice

The misconceptions and poor health literacy are primary barriers to effective glycaemic control and treatment adherence. Based on our study, we believe that the higher the level of knowledge about DM, the better glycaemic control and treatment compliance; therefore, we need to provide the general population with education related to DM prevention and management. Physicians should address all patients' concerns and provide them with appropriate information about the treatment and management of DM to ensure adherence to treatment, reduce the level of misunderstanding, and reduce the risk of seeking treatment from non-professionals. Finally, as lack of knowledge is a major barrier to safe DM care, we recommend training programs for healthcare workers to increase their understanding of DM and ensure better DM care.

Conclusions

Certain myths and misconceptions have been pervasive in our society. In this study, male gender, low education level, and diabetic patients were associated with more beliefs in the misconceptions and less knowledge about DM. To prevent an unnecessary disease burden, it is crucial to address the misconceptions about DM. This can be achieved by enhancing people's knowledge of DM through educational programs, social media, television, newspapers, and campaigns.

Ethical Statement

The Ethics and Scientific Committee approved the final version of the survey at the University of Zakho, College of Medicine, Kurdistan Region of Iraq. Informed consent was obtained from all participants.

Informed Consent

Informed consent was obtained from all participants.

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Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the content of this study.

Financial Disclosure

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