

# Knowledge and Risk Factors Regarding Type 2 Diabetes among Saudi Population in Jeddah

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## ABSTRACT

**Aim:** Public awareness of type 2 diabetes is a requirement for individuals and communities to help prevent the disease. Therefore, this study aimed to assess the level of knowledge and awareness of type 2 diabetes among diabetic and non-diabetic persons in Jeddah region, Kingdom of Saudi Arabia (KSA). **Materials and Methods:** A structured questionnaire was established and a total of 325 respondents (male = 180 and female = 145) have joined this study and descriptive analysis was used to evaluate the knowledge and attitude of the respondents. **Results:** There was 44.0% of respondents who did not know the difference between diabetes type 1 and 2. The level of awareness about type 2 diabetes in Saudi Arabia ranged between good and very good with 37.8% and 28.9% respectively. More than 50% of respondents did know the important combination of drugs, diet, and physical activity in type 2 diabetes treatment. The respondents have below-average knowledge regarding risk factors, symptoms, and prevention of type 2 diabetes. Furthermore, the respondents (39.4%) have the misconception that diabetes can be cured. However, they were awarded that modification of lifestyles could control type 2 diabetes. **Conclusion:** Diabetes education should be taken into consideration to increase awareness regarding the risk factors of type 2 diabetes in Saudi Arabia.

**Keywords:** Type 2 diabetes, Saudi Arabia, Knowledge, Risk factors, Control, Awareness.

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## INTRODUCTION

Diabetes Mellitus (DM) is a growing global health crisis which increased about 5 times since 10 years ago to reach 135 million today, with an estimated 300 million by 2025.<sup>1</sup> People with DM are at higher risk for cardiovascular disease, vascular disease, hypertension, vision loss, nephrotic syndrome, neurological disorders, amputated limbs, oral health problems, and pregnancy complications.<sup>2,3</sup> Unfortunately, many DM patients realize that they have the disease when they develop one of its life-threatening complications. The lifestyle in Saudi Arabia has affected dramatically on DM during the last two decades,<sup>4</sup> with a 23.7% rise in diabetes prevalence, Saudi Arabia is among the countries with the highest prevalence.<sup>5</sup>

Type 2 Diabetes Mellitus (T2DM) is a chronic metabolic disease of epidemic proportions caused by defects in insulin production and/or insulin action.<sup>6</sup> This causes a medical problem caused by excessive glucose (or sugar) in the blood. Worldwide campaigns for changing lifestyle and eating habits have led to

increasing awareness that DMT2 complications and morbidity can be prevented by glycemic control.<sup>7,8</sup> However, the prevalence of T2DM in Saudi Arabia has increased because of rapid industrialization.<sup>9</sup>

Public health has an important impact on awareness people of diabetes, its causes, complications, and management to control the disease and improve life quality.<sup>10,11</sup> In addition, various forms of media have been used to educate the public about diabetes.<sup>12</sup> As prevention is better than cure, awareness is always helpful to reduce the occurrence of earlier onset diabetes and its associated complications. Therefore, this study aimed to assess the level of knowledge and awareness of type 2 diabetes among diabetic and non-diabetic persons in Jeddah region, Kingdom of Saudi Arabia (KSA).

## MATERIALS AND METHODS

An independent cross-sectional study was conducted between June 2019 and January 2021. This study involved diabetic and non-diabetic respondents of either gender. A convenience sampling method was used to select the respondents. Participants were interviewed and a structured questionnaire was completed by surveyors who received training and practice. A total of 325 of respondents (male = 180 and female = 145) have joined this study from Saudi Arabia, Jeddah. A response rate of 96% was achieved, and a sample size of 325 was sufficient to estimate the study's objective. A validated structured questionnaire



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was written in local languages (Arabic) to avoid confusion and misunderstanding. In order to avoid bias, all questions in the questionnaire were open-ended without suggestions. There were 20 questions in our study, divided into three sections. Section A contained socio-demographic questions about the respondents included information such as age, gender, education level, family history of diabetes. Section B included questions to assess the level of knowledge, attitude and practice regarding type 2 diabetes. Section C assesses the knowledge regarding risk factors of diabetes

### Statistics analysis

Descriptive statistics were used to determine the knowledge, attitude, and practice levels regarding type 2 diabetes. A Chi-Square Test was performed to evaluate differences in knowledge regarding risk factors of diabetes among the respondents. The analysis was done using SPSSV20 statistical software and the level of statistical significance was set at  $p < 0.05$ .

### RESULTS

Males constituted more than half of the respondents (55.4%; Table 1). Respondents' mean ages ranged from 19 to 29 years (44.6%) whereas ~22% of respondents age was ranged from 30 years and above. Approximately 10% of respondents was under 18 years old. In addition, more than 60% (216) of respondents was completed university or higher education while 23% had completed secondary school (Table 1). More than half of the respondents (55.1%) with frequency 179 had family history of

type 2 diabetes and 86.8% (282) of the respondents identified no suffering from diabetes type 2.

Table 2 shows the level of knowledge, attitude and practice regarding type 2 diabetes among Saudi Population in Jeddah. There was 44.0% of respondents not knowing the difference between diabetes type 1 and 2 (Table 2). Nearly half of the respondents (53.5%; 174) had poor information about type 2 diabetes. However, about 24.3% had enough knowledge about this disease. It was found that type 2 diabetes awareness in Saudi Arabia ranged between good and very good with 66% (Figure 1). There was a close match between respondents with knowledge of type 2 diabetes symptoms 34.2% (111) and respondents without any knowledge 36.3% (118). Moreover, 29.5% (99) of the respondents showed not sure answer for knowing the symptoms associated with type 2 diabetes. Most of the respondents (72.0%)

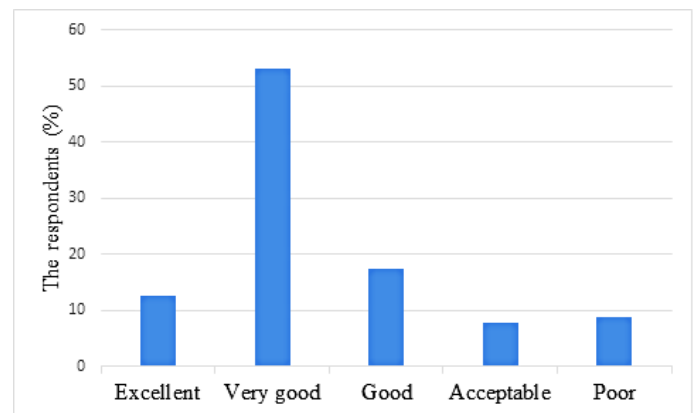


Figure 1: Level of awareness about type 2 diabetes in Saudi Arabia.

Table 1: Demographic characteristics of the study respondents (n = 325).

	Frequency	Percent	Valid Percent
Age	11- younger years	1	0.3
	12 - 18 years	32	9.8
	19 - 29 years	145	44.6
	30 - 39 years	72	22.2
	40 years or more	75	23.1
Gender	Male	180	55.4
	Female	145	44.6
Education	Illiterate	3	0.9
	Primary school	5	1.5
	Intermediate school	24	7.4
	Secondary school	77	23.7
	University or higher	216	66.5
Suffering from type 2 diabetes.	Yes	43	13.2
	No	282	86.8
Family suffering from type 2 diabetes.	Yes	179	55.1
	No	146	44.9

**Table 2: Level of knowledge, attitude, and practice regarding type 2 diabetes among Saudi population in Jeddah (n = 325).**

		Frequency	Percent	Valid Percent
The difference between type 1 and 2 diabetes.	Yes	116	35.7	35.7
	No	143	44.0	44.0
	Not sure	66	20.3	20.3
Information about type 2 diabetes.	Yes	79	24.3	24.3
	No	174	53.5	53.5
	Not sure	72	22.2	22.2
The symptoms associated with type 2 diabetes.	Yes	111	34.2	34.2
	No	118	36.3	36.3
	Not sure	96	29.5	29.5
The age group of type 2 diabetes.	Children	5	1.5	1.5
	Young	9	2.8	2.8
	Elderly	38	11.7	11.7
	It is not limited to certain age.	234	72.0	72.0
	I do not know	39	12.0	12.0
Prevalence of type 2 diabetes in Saudi Arabia.	Between 10 - 20%	28	8.6	8.6
	Between 30 - 40%	110	33.8	33.8
	Between 50 - 60%	129	39.7	39.7
	Between 70 - 80%	58	17.8	17.8
Saudi Association of diabetes and their concern with type 2 diabetes.	No, I do not think so.	79	24.3	24.3
	Yes, but I do not know about it.	208	64.0	64.0
	Yes, but I have enough information about it.	38	11.7	11.7
The level of awareness about type 2 diabetes in Saudi Arabia.	Poor	32	9.8	9.8
	Acceptable	59	18.2	18.2
	Good	123	37.8	37.8
	Very good	94	28.9	28.9
	Excellent	17	5.2	5.2
Role of the media to provide information about type 2 diabetes.	Yes	81	24.9	24.9
	No	117	36.0	36.0
	I do not know	127	39.1	39.1

		Frequency	Percent	Valid Percent
Cure for type 2 diabetes	Yes	129	39.7	39.7
	No	87	26.8	26.8
	I do not know	109	33.5	33.5
The most common treatment for type 2 diabetes.	Prescription of drugs	59	18.2	18.2
	Herbal remedies	4	1.2	1.2
	Dietary management	61	18.8	18.8
	Regular exercise	21	6.5	6.5
	All the above	180	55.4	55.4
There is no need to take medicine.	Yes	35	10.8	10.8
	No	208	64.0	64.0
	I do not know	82	25.2	25.2
Medications and drugs prevent type 2 diabetes.	Yes	53	16.3	16.3
	No	123	37.8	37.8
	I do not know	149	45.8	45.8
Drugs and medications can treat type 2 diabetes.	Yes	108	33.2	33.2
	No	85	26.2	26.2
	I do not know	132	40.6	40.6
Lifestyle changes can help control type 2 diabetes.	Yes	267	82.2	82.2
	No	21	6.5	6.5
	I do not know	37	11.4	11.4
Type 2 diabetes is less important than type 1.	Yes	57	17.5	17.5
	No	156	48.0	48.0
	I do not know	112	34.5	34.5

with frequency 234 were aware that type 2 diabetes not limited to certain age (Table 2). The respondents (40%) suggested that the spread of type 2 diabetes in Saudi Arabia is between 50 - 60% and 33.8% suggested between 30-40%. A high percentage (64.0%; 208) of respondents knowing that there are diabetes associations and social support centers in Saudi Arabia concerned with type 2 diabetes but they have not enough information about their activities. Only 11.7% of respondents knew the activities of these diabetes associations and social support centers however, 24.3% they thought there was no such thing in Saudi Arabia. In addition, this study indicated that 25% of respondents confirmed the role of the media to provide information about type 2 diabetes whereas 36% and 39% they said no or did not know respectively (Table 2).

There were 39.7% of respondents who thought that type 2 diabetes can be cured completely, while 26.8% thought that type 2 diabetes cannot be cured and 33.5% they did not know. In terms of knowing about appropriate methods in type 2 diabetes treatment, appropriate nutrition and prescription of drugs had about 18%, physical activity and herbal remedies had 6.5% and 1.2% respectively (Table 2). There were 55% of participants who understood the essential combination of all these methods in type 2 diabetes treatment. Rate of knowledge about changing life style to control type 2 diabetes was the highest (82.2%; 267).

Table 3 illustrates the responses of the respondents to the major risk factors of type 2 diabetes. Prevalence of obesity (over weight) had the highest percentage (30.8%) followed by family history (22.5%), sedentary lifestyle (12.6%), lack of regular exercise

**Table 3: Knowledge regarding risk factors of diabetes among the respondents.**

		Frequency	Percent	Valid Percent	p value
The most important reasons for the prevalence of type 2 diabetes in Saudi Arabia.	Prevalence of obesity (over weight)	100	30.8	30.8	<0.05
	Increasing age	8	2.5	2.5	
	Smoking	5	1.5	1.5	
	Mental stress	13	4.0	4.0	
	Family history	73	22.5	22.5	
	Sedentary lifestyle	41	12.6	12.6	
	Lack of regular exercise	35	10.8	10.8	
	Soft drinks	5	1.5	1.5	
	Fast foods	23	7.1	7.1	
	High-fat foods	22	6.8	6.8	

(10.8%), fast food (7.1%), and high-fat foods (6.8%). Less than 5% was shown for other factors including mental stress, increasing age, smoking, and soft drinks (Table 3).

## DISCUSSION

Diabetes mellitus in Saudi Arabia is causing a real threat to existing health services. Increasing awareness of the risk factors of diabetes can help to prevent and reduce the increasing prevalence of diabetes. Knowledge, attitude and practice regarding diabetes depending on socioeconomic gradient, culture and habits<sup>13</sup> and understanding of these variables is very essential to prevent and reduce the diabetes.<sup>14,15</sup> Previous studies reported that people living with diabetes have better knowledge, attitude and practice compared to non-diabetic people.<sup>12,16-18</sup> In the present study, the knowledge of participants' regarding their understanding of type 2 diabetes included the causes, risk factors, symptoms, prevention and treatment options of the disease was assessed.

Obesity has been known to be a main risk factor for type 2 diabetes.<sup>19</sup> In Saudi Arabia, around 70% of both genders were overweight and 35% were obese.<sup>20</sup> In this study, 30% of the respondents agreed that being overweight has the highest risk factors for diabetes followed by a family history (22.5%). The findings are consistent to the studies conducted in eastern Saudi Arabia,<sup>20</sup> Malaysia,<sup>21</sup> Iraq,<sup>22</sup> Bangladesh,<sup>23</sup> and Ethiopia<sup>24</sup> where obesity was the most frequently selected by the respondents as the risk factors of diabetes. However, Mohan *et al.*<sup>25</sup> found that only 12% of respondents from Chennai urban-rural, India agreed that obese persons are more likely to develop diabetes. In addition, the respondents showed less than 10% for other risk factors i.e. risk factors, high-fat foods, mental stress, increasing age, smoking, and soft drinks. This indicated that respondents were not familiar with these risk factors. Mumu *et al.*<sup>23</sup> reported a higher percentage (28% for smoking and > 50% for others), suggesting more awareness of these risk factors among the general population of rural Bangladesh.

Regarding treatment options for type 2 diabetes, 18% of the respondents approved of the possibility of preventing diabetes through food control and medications. However, over half of the respondents agreed that all treatment options which included appropriate nutrition, prescription of drugs, physical activity, and herbal remedies are important in the management of type 2 diabetes. Moreover, the majority of respondents (82%) agreed that modification of lifestyle is effective in controlling type 2 diabetes. On the other hand, Binh *et al.*<sup>26</sup> reported that 60% of respondents from the Red River Delta region, Vietnam disagreed with the statement "modification of lifestyle is not effective in controlling type 2 diabetes".

Over half of the respondents agreed on that have not enough information about type 2 diabetes and 44% they did not know the difference between type 1 and 2 diabetes. In addition, 39% of them thought that type 2 diabetes is curable. Similar results was obtained by Kenya,<sup>27</sup> Mongolia,<sup>28</sup> India,<sup>25,29</sup> Vietnam.<sup>26</sup> The level of knowledge regarding diabetes tends to be lower in developing countries than in developed countries.<sup>25-32</sup> In addition, urban and rural people have significantly different knowledge and attitudes about type 2 diabetes.<sup>28,33,34</sup> Even though this study was conducted in Jeddah city with more than 60% of respondents holding a high level of education, the poor information about type 2 diabetes among the respondents could be related to the weak role of the media, diabetes associations, and social support centers in Saudi Arabia to educate people about type 2 diabetes.

## CONCLUSION

According to this study, the respondents have below the average knowledge regarding risk factors, symptoms, and prevention of type 2 diabetes. The respondents did know the important role of diet, exercise, and medications in the treatment of type 2 diabetes. In addition, they were aware that modification of lifestyles could control type 2 diabetes. Furthermore, over a quarter of respondents have the misconception that diabetes is curable.



However, the lack of knowledge about type 2 diabetes among the respondents could be related to the weak role of the media, diabetes associations, and social support centers in Saudi Arabia to educate people about type 2 diabetes. Therefore, Saudi Arabia should consider diabetes education to raise awareness about the risk factors of type 2 diabetes. Further research involving a larger cohort is required to confirm these findings.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## ABBREVIATIONS

**DM:** Diabetes Mellitus; **T2DM:** Type 2 diabetes mellitus; **KSA:** Kingdom of Saudi Arabia.

## SUMMARY

The present article summarizes the knowledge and awareness of type 2 diabetes among diabetic and non-diabetic persons in the Jeddah region, Kingdom of Saudi Arabia (KSA). In order to achieve this, a survey was conducted among a sample of 325 people in Jeddah. The survey results revealed that overall, the respondents have below the average knowledge regarding risk factors, symptoms, and prevention of type 2 diabetes. The respondents did know the important role of diet, exercise, and medications in the treatment of type 2 diabetes. In addition, they were aware that modification of lifestyles could control type 2 diabetes. Furthermore, over a quarter of respondents have the misconception that diabetes is curable. However, the lack of knowledge about type 2 diabetes among the respondents could be related to the weak role of the media, diabetes associations, and social support centers in Saudi Arabia in educating people about type 2 diabetes. This is an important finding, as greater knowledge and awareness of the disease can lead to improved management of the condition, and ultimately better health outcomes. As such, it is recommended that further research is conducted in order to identify potential interventions that could be implemented to improve the knowledge and awareness of type 2 diabetes among diabetic and non-diabetic persons in Jeddah.

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