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# Knowledge assessment about diabetes mellitus among adults: A cross-sectional study in Basra, Iraq

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**Abstract**

**Background:** Diabetes mellitus is a serious chronic disease all over the world including Iraq. If uncontrolled or not treated, major complications can affect the whole body systems. Therefore it is important that everyone should be aware about the disease, its risk factors, signs and symptoms, the complications in addition to its management and self-care.

**Objectives:** To assess the knowledge of adults in Basra about the signs, symptoms, risk factors and complications of Diabetes Mellitus

**Methodology:** A descriptive cross sectional that included 388 in-patients attending Basra teaching hospitals during October 2024.

**Results:** 72.16% of the study population gave a history of having previous education about Diabetes Mellitus. While 27.84% of them had no any kind of education or awareness about the disease. Among those with previous history of health education about the disease, media was the main source of education (36.07%) followed by Health care workers (30%).

On asking the study respondents about the information they have about the signs and symptoms of Diabetes mellitus, "Thirst" and "Change in weight" were the highest. While in regards to the risk factors, "Genetics and Family History" was the most common factor they know about (18.44%). And in relation to the respondents' knowledge about complications of Diabetes, the highest they knew about was "Diabetic nephropathy" and Stroke.

**Conclusions and Recommendations:** In spite of having good percentage of people whom already had a previous history of receiving health education on Diabetes Mellitus, still there's a proportion of the population that did not receive any education or awareness about the disease. In general there's deficiency in the knowledge about the disease signs and symptoms, risk factors and its complications. Accordingly, and based on the study results, strengthening of the health educational and awareness programs with a special focus on those with a positive family history of the disease or those having its risk factors.

**Keywords:** Thirst, change in weight, genetics and family history, diabetic nephropathy, Stroke

## Introduction

Diabetes mellitus is a metabolic disorder characterized by high blood glucose levels and metabolic disturbance in carbohydrate, protein and fat due to insulin deficiency or insulin resistance, that can subsequently lead to chronic complication and even death [1].

The incidence of DM has been raised worldwide. International Diabetes Federation IDF estimated that 425 million people worldwide have diabetes in 2017. The number of people with diabetes is expected to increase to 629 million by 2045 [2].

According to the World Health Organization (WHO) in 2016, an estimated 422 million adults are living with DM, and the number is expected to almost double by 2030 [3].

In Iraq, and according to the World Health Organization, it's estimated that Diabetes Mellitus affects 1.4 million of the population with more than 13.9% of adults in the country having the disease, and many do not know that they have the disease [4].

In Basra, a population-based study that included screening of around 5445 individuals between 19 to 94 years of age during 2011 revealed a very high prevalence rate of the disease affecting one in five adults (28.3% for the age group 31-45 years, 42.8% for the age group 46-60 years, and 21% for the age group 61-75 years) with an age adjusted prevalence rate of 19.7%. The study also reported that 55.7% of those with diabetes being previously undiagnosed [5].

Uncontrolled diabetes or poor glycemic control is associated with serious long term macro and micro complications even death if left untreated [6].

These complications can be reduced or delayed by early diagnosis and proper management. Management of diabetes is an integrated process between medications and patient lifestyle (pharmacological drugs and non-pharmacological) to achieve good glycemic control and then reduce the rate of complications, morbidity and mortality. Therefore, knowledge of patients about the disease and its complications plays an important role in management. And there is strong evidence that diabetic patients with good knowledge about the disease achieve better disease control and management [7] and consequently reduces morbidity and mortality due to Diabetes [8].

A prospective study in United Kingdom, revealed that a good and thorough management of risk factors associated with high blood pressure can also reduce the complications and life threatening complications of Diabetes Mellitus especially those related to macro and micro vascular complications. In addition, good knowledge and awareness of the disease leads to better quality of the patient's life [9].

A meta-analysis that included 463 clinical trials to evaluate the effectiveness of the educational programs among diabetic patients revealed its helpful effect on countless diabetes management concerns [10].

Another systematic review which included 273 studies, confirmed by 34 of them that awareness programs and mental behavioral counselling decreases levels of fear associated with the disease and its complications and subsequently improve disease management [11].

As what Dr. Adham Ismail -the WHO representative in Iraq-said: "Everyone should also be aware of early symptoms of diabetes" [12]. Therefore, systematic and periodic monitoring of public awareness of disease is essential to provide effective educational and preventive plans and strategies [13].

**Study Objectives**

- To determine the general information and socio-demographic characteristics of the patients admitted in Basra teaching hospitals.
- To assess the knowledge of inpatients in Basra teaching hospitals about the signs and symptoms, risk factors and complications of Diabetes Mellitus
- To assess the respondents' Health education and the source of information about Diabetes Mellitus.

**The study design and duration:** This study is a descriptive cross sectional that included in-patients attending Basra teaching hospitals. A total of 388 patients were included in the study through face-to-face interviews. The sample was collected during October 2024 by random selection sampling technique. Total duration of the study was from July to December 2024.

**The study population:** The patients included were aged 20 years and above that were selected randomly from different hospital words (Internal Medicine, surgical words & Gynecology/Obstetric words) of Basra hospitals. Hospitals included are:

- Al Sadr Teaching Hospital
- Basra General Hospital
- Al Fayhaa Teaching Hospital

**Pilot study of the sample:** The study included a pilot trial to decide the practicability of the questionnaire. 10% of the study population sample was the sample of the pilot. The pilot also evaluated the readiness of the surveyors in approaching the patients and completing the questionnaire. Accordingly, modifications of the questionnaire were made before the final data gathering of the study population.

**The study Tools:** The study questionnaire was created to meet the study objectives, which included the following four parts:

- General information and sociodemographic characteristics such as (age, gender, marital status, education level and occupation). In addition, questions related to previous history of having health education and awareness about Diabetes with the source of information and their family history of having the disease.
- Information on the respondents' knowledge about the signs and symptoms of diabetes mellitus.
- Information on the respondents' knowledge about the risk factors and complications of the disease.

**Inclusion criteria**

- Patients admitted to the internal medicine, surgical words & gynecology/obstetric words) of Basra teaching hospitals during October 2024.
- Age >20 years old.
- Both gender (male and female).

**Exclusion criteria.**

- Age < 20 years old.
- Relatives of the admitted patients
- Unconscious patients.

**Study Sample size:** The total sample was conducted according to the equation of the minimum required sample size by Krejcie and Morgan [14]. The required sample was 331 for a population of 2400 (total inpatients during October 2024). However, for more representation of the sample, 388 inpatients were included in the study and collected randomly to cover the selected wards of Basra hospitals.

**Statistical Analysis of the study:** Statistical analysis of the data was done by using Microsoft Excel sheets (2010).

**Ethical Considerations of the study**: Patients' informed consents were collected from each patient before having the face-to-face interview. In addition, the study was approved by the Clinical & Ethical Committee of Basra Directorate of Health and the College Scientific committee.

**Study limitations:** Shortage of the time allocated for the study at the same time with performing our clinical studying was the main limitation of the study.

**Results and Discussion**

**1. General Information: Socio-demographic characteristics of the respondents**

Figure 1 shows the distribution of the study sample according to gender. (276: 71.13%) of the study sample were female. 35.31% of the study population were at the age of 20-24 years while 7.73% were above 55 years of age (Figure 2).

Similar findings were reported in a previous study done in Basra during 2020 with a similar findings regarding the socio-demographic characteristics of the study population. [15].

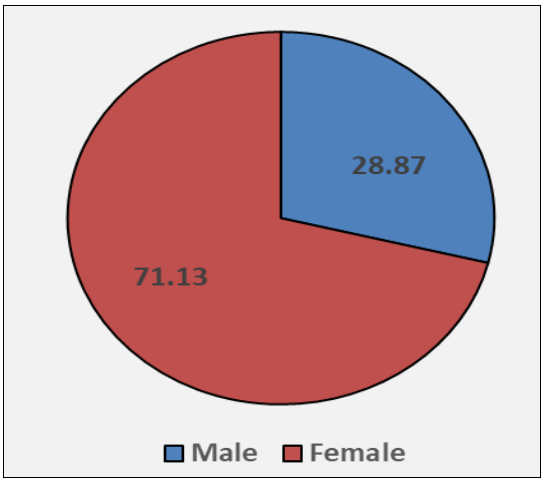


**Fig 1:** Distribution of the study population according to gender (%)

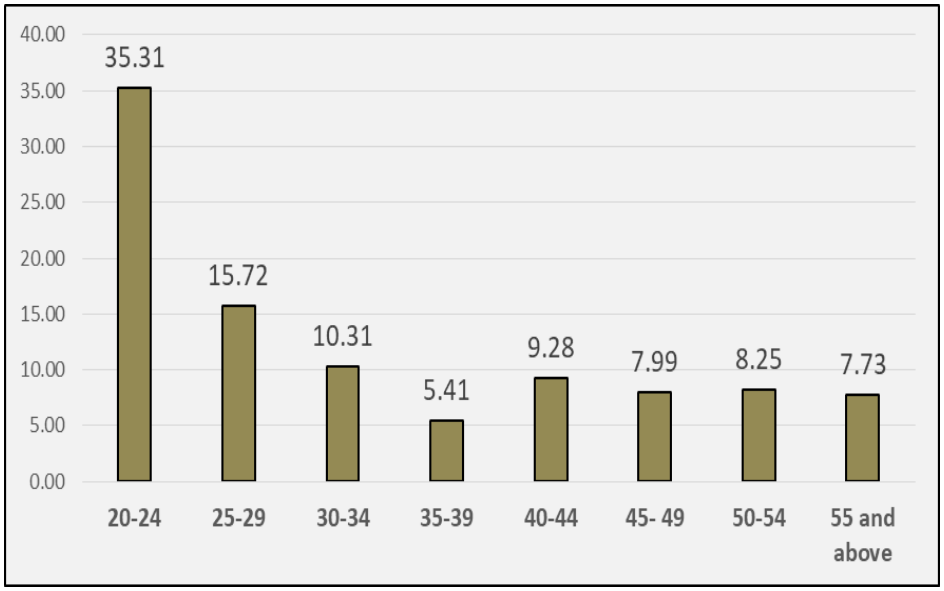


**Fig 2:** Distribution of the study population according to Age (%)

Figure 3 shows that 59.28% of the study population were married with 39.95% were found to be single. In addition, 54.38% of the study sample were having a Bachelor degree and above in education with only 4.12% of them were found to be "read and write only" (Figure 4).

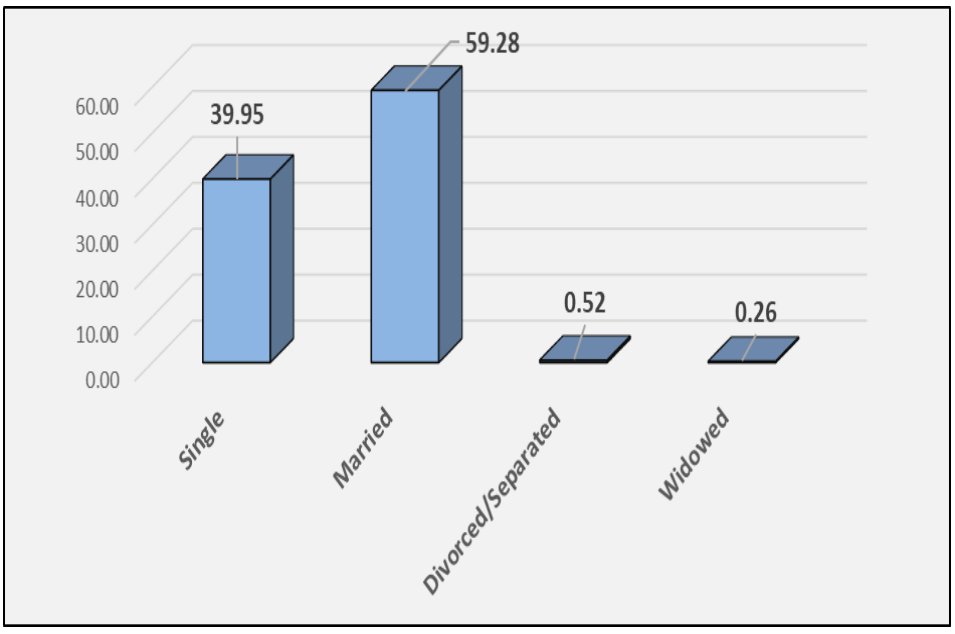


**Fig 3:** Distribution of the study population according to Marital Status (%)

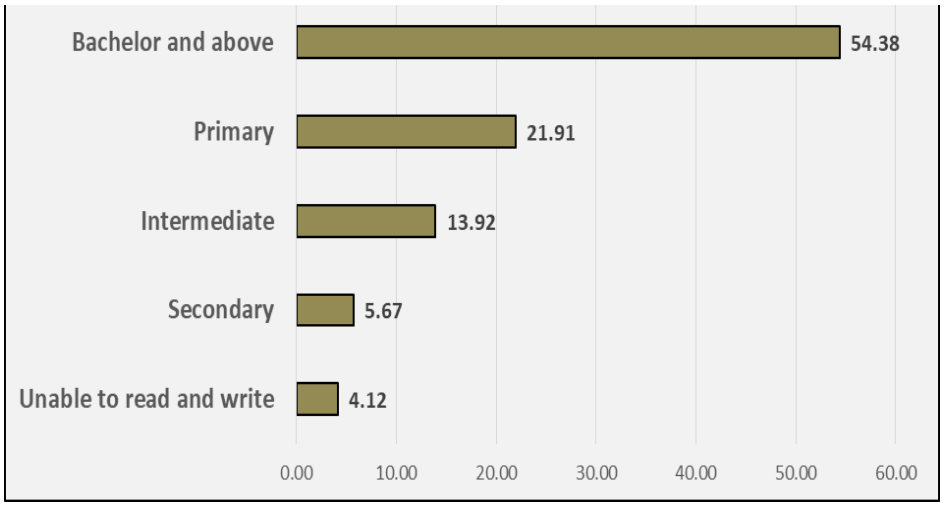


**Fig 4:** Distribution of the study population according to Education (%)

Figure 5 represents the distribution of the study population according to their occupation. 35.57% of them were found to be students followed by 31.96% as housewives. 18.56% of them were found to be governmental employees and 12.89% were private employees.

72.16% of the study population gave a history of having previous education about Diabetes Mellitus. While 27.84% of them had no any kind of education or awareness about the disease (Figure 6). Among those with previous history of health education about the disease, media was the main source of education (36.07%) followed by Health care workers (30%), Friends/relatives (14.64%), Books (11.79%) and teachers (7.5%) as shown in (Figure 7).

In a cross-sectional study that was conducted on 252 type 2 diabetic patients in Karbala during 2023, physicians were found to be the main source of information about Diabetes (91.7%) with (75.4%) having "other family members" as their source of information [16].

In another observational cross sectional study done in Baghdad in 2016 to investigate diabetic knowledge among 300 pharmacists, the researchers found that the main source of information obtained about diabetes was during their undergraduate study materials, followed by information obtained by reading books and articles about the disease [17].


**Fig 5:** Distribution of the study population according to Occupation (%)

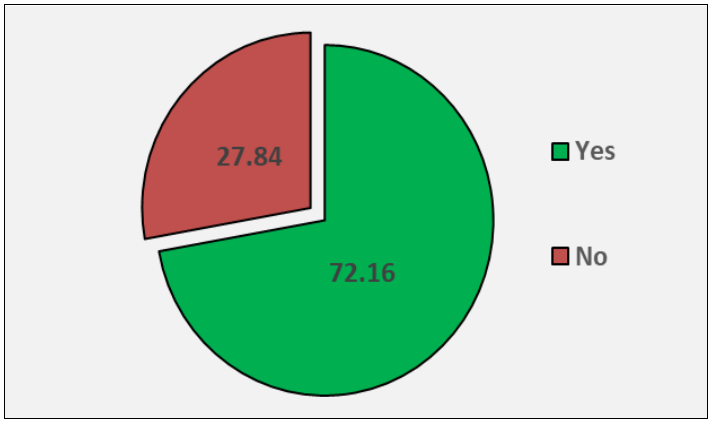


**Fig 6:** Distribution of the study population according to Exposure to health education about DM (%)

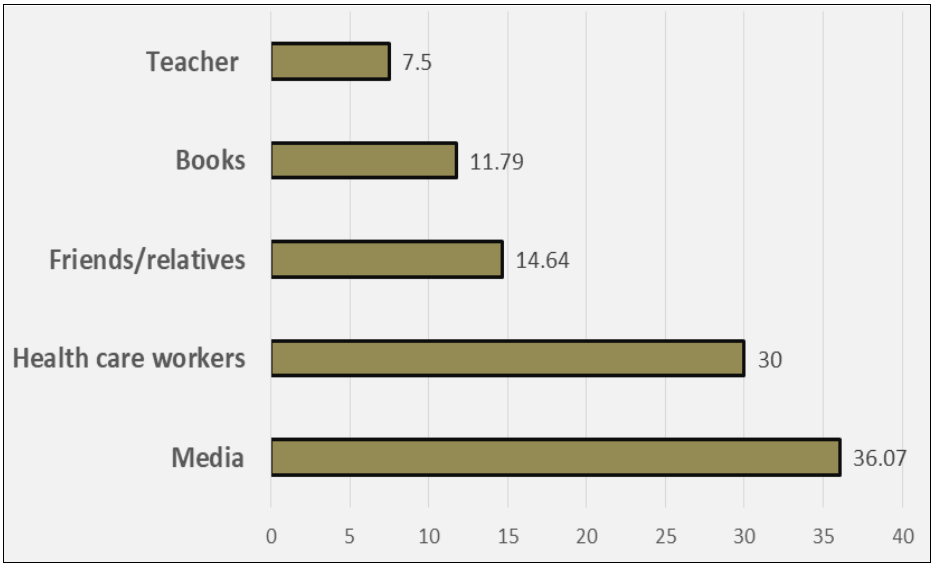


**Fig 7:** Distribution of the study population according to the sources of educational information (%)

In regards to the family history of the disease, Figure 8 shows that 69.07% of the respondents shared a positive family history. A higher percentage was found in a similar previous study done in Basra during 2018, in which the researchers found that 81.66% of the study population gave a positive family history of Diabetes [18]. But, a similar result to the present study was found in a prospective case-control study done at Al-Faiha Specialized Diabetes, Endocrine, and Metabolism Center in Basra during 2021 in which it revealed a positive family history of Diabetes in 66.7% of the study population [19].

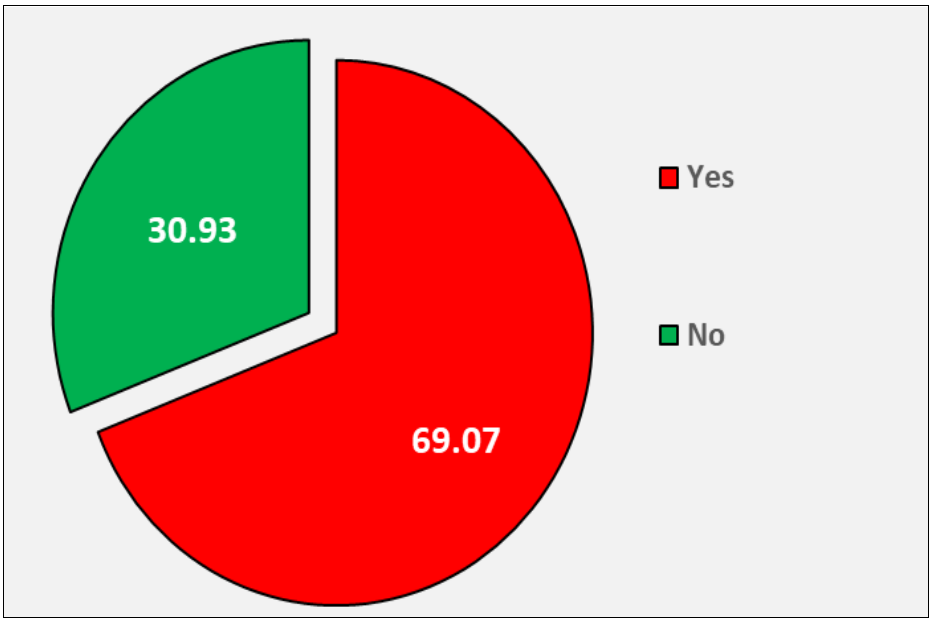


**Fig 8:** Distribution of the study population according to Family history of DM (%)

**2. Study respondents' knowledge about the Signs & Symptoms of Diabetes**

On asking the study respondents about the information they have about the signs and symptoms of Diabetes mellitus, "Thirst" was the highest (21.43%), followed by "Change in weight" 12.46%, "Excessive urination" (11.7%), "Slow Healing Wounds" (10.18%), "Wound infection" 7.8%, and "Tingling or Numbness" 7.5% as represented in Table 1.

In a cross - sectional study done in Baghdad during 2011, the highest responses of the study population was frequent urination (78.62%) followed by feeling thirsty that was reported by (71.72%) of the respondents. While "feeling hungry" and generalized weakness were the least reported by the study respondents [20].

"Numbness and tingling" in another study done at Al-Zahraa Teaching Hospital in Wasit governorate in Iraq during 2019, was reported by 77.9% of the study group which is more higher finding than the finding of the present study [21].

**3. Study respondents' knowledge about the risk factors of diabetes**

In regards to the respondents knowledge about the risk factors of Diabetes mellitus, table 2 shows that "Genetics and Family History" was the most common factor they know about it (18.44%), followed by "Unhealthy Diet" (18.05%), "Stress" (13.79%), "Overweight" (13.17%) and "Physical inactivity" (11.15%) as represented in Table 2.

The results of the present study are much lower than those found by a previous cross-sectional study done during 2018 among 350 college students from the Southern Technical University to assess their knowledge about the risk

factorsand preventive measures of chronic diseases among students of Southern Technical University in Basrah. The researchers revealed that "Genetics" as a risk factor for chronic diseases was mentioned by 58% of the study population. "Unhealthy diet" was mentioned by 59% of them, followed by "Overweight" & "Physical inactivity" that were mentioned by 67.1% & 29.7% respectively [22].

**Table 1:** Respondent's knowledge about the signs & symptoms of diabetes

| # | Sing/Symptom | Yes | |
|---|---|---|---|
| | | Frequency | % |
| 1. | Thirst, dry mouth | 182 | 21.43 |
| 2. | Change in weight | 164 | 12.46 |
| 3. | Polyuria | 154 | 11.70 |
| 4. | Slow Healing Wounds | 134 | 10.18 |
| 5. | Wounds or Infections | 103 | 7.83 |
| 6. | Headache | 100 | 7.60 |
| 7. | Hyperphagia; predilection for sweet foods | 102 | 7.75 |
| 8. | Tingling or Numbness | 99 | 7.52 |
| 9. | Blurring of vision | 93 | 7.07 |
| 10. | Tiredness, fatigue, lethargy | 57 | 4.33 |
| 11. | Nausea & vomiting | 54 | 4.10 |
| 12. | Nocturia | 46 | 3.50 |
| 13. | Pruritus vulvae, balanitis (genital candidiasis) | 28 | 2.13 |
| 14. | Others: | 38 | 2.89 |
| | Burning sensation | 13 | 34.21 |
| | Erectile dysfunction | 12 | 31.58 |
| | Sweating | 8 | 21.05 |
| | Syncope | 5 | 13.16 |

**Table 2:** Respondent's knowledge about the risk factors of diabetes

| | Risk Factors | Yes Frequency | % |
|---|---|---|---|
| 1 | Genetics and Family History | 238 | 18.44 |
| 2 | Unhealthy Diet | 233 | 18.05 |
| 3 | Mental Health and Stress | 178 | 13.79 |
| 4 | Obesity and Overweight | 170 | 13.17 |
| 5 | Physical Inactivity | 144 | 11.15 |
| 6 | Age | 100 | 7.75 |
| 7 | Dyslipidemia | 51 | 3.95 |
| 8 | Hypertension | 43 | 3.33 |
| 9 | Smoking | 43 | 3.33 |
| 10 | Gestational Diabetes | 38 | 2.94 |
| 11 | Ethnicity | 35 | 2.71 |
| 12 | Polycystic Ovary Syndrome (PCOS) | 18 | 1.39 |

It was surprising to find out that only 3.3% of the respondents knew that smoking is a risk factor of the disease with similar percentage of them knowing about dyslipidemia and hypertension (3.95%, 3.33% respectively). Much higher result was found by a study done during 2019 in Al Riyadh city-Saudi Arabia, smoking was found to be known as a risk factor for Diabetes Mellitus among (27.3%) of the study population. (23) In another study done by in Tanzania, 23.3% of the respondents acknowledged smoking as a risk factor of the disease. (24)

**4. Study respondents' knowledge about the complications of diabetes**

**A. Micro-vascular complication**

Table 3 represents the respondents' knowledge regarding the micro vascular complications of Diabetes Mellitus. For Diabetic Ketoacidosis, 28.75% of the respondents mentioned the complications of "Polydipsia, polyuria, polyphagia". 21.09% of them mentioned "Altered consciousness, drowsiness, & coma" while 15.34% of them mentioned "Fruity" (acetone) breathe odor.

In regards to "Diabetic Foot", 28.38% of the respondents mentioned "Gangrene" followed by 26.28% of them mentioned "Amputation" and 24.17% of them mentioned "Ulcer" as a complication of the disease.

For "Diabetic neuropathy", "Paresthesia" was the highest complication that was mentioned by the study respondents (29.62%), followed by "Numbness", Pain, GIT complications (including constipation, dysphagia, abdominal fullness) and "Abnormal gait" (27.39%, 18.79%, 13.38%, 10.83% respectively).

As for "Diabetic retinopathy", Impair vision was the highest complication mentioned by the respondents (38.89%) followed by Loss of vision, Cataract and Glucoma (34.36%, 15.43%, and 11.32% respectively). Furthermore and in relation to "Diabetic nephropathy", almost 50% of the respondents mentioned "Renal failure" as a complication of Diabetes. "Recurrent infection" was mentioned by 19.94% of the respondents followed by Hypertension & Edema (19.03% and 16.01% respectively).

In comparing these results with other similar studies, we can see the similarities among some of the complications that were mentioned by the respondents. A study done in Karbala during 2019 revealed that blindness (Retinopathy complications) was mentioned by 76.5% of the study population. Renal Failure (Nephropathy complications) by 60% of the respondents. In addition, nerve diseases (Neuropathy) was mentioned by (41.5%) of the study group [25].

**Table 3:** Respondent's knowledge about the complications of Diabetes (Microvascular)

| # | Complications | Yes | |
|---|---|---|---|
| | | Frequency | % |
| **1. Diabetic ketoacidosis** | | | |
| | Polydipsia, polyuria, polyphagia | 90 | 28.75 |
| | Altered consciousness, drowsiness, & coma | 66 | 21.09 |
| | Nausea and vomiting, abdominal pain | 60 | 19.17 |
| | Kussmaul respiration—rapid, deep breathing | 49 | 15.65 |
| | "Fruity" (acetone) breath odor | 48 | 15.34 |
| **2. Diabetic foot** | | | |
| | Gangrene | 189 | 28.38 |
| | Amputation | 175 | 26.28 |
| | Ulcer | 161 | 24.17 |
| | Abscess | 106 | 15.92 |
| | Osteomylitis | 35 | 5.26 |
| **3. Diabetic neuropathy** | | | |
| | Paresthesia | 93 | 29.62 |
| | Numbness | 86 | 27.39 |
| | Pain | 59 | 18.79 |
| | GIT (constipation, dysphagia, abdominal fullness) | 42 | 13.38 |
| | Abnormal gait | 34 | 10.83 |
| **4. Diabetic retinopathy** | | | |
| | Impaired vision | 189 | 38.89 |
| | Vision loss | 167 | 34.36 |
| | Cataracts | 75 | 15.43 |
| | Glucoma | 55 | 11.32 |
| **5. Diabetic nephropathy** | | | |
| | Renal failure | 149 | 45.02 |
| | Recurrent infection | 66 | 19.94 |
| | Hypertension | 63 | 19.03 |
| | Edema | 53 | 16.01 |

**B. Macro-vascular complications**

In relation to the respondents' knowledge about the macro-vascular complications of Diabetes Mellitus, the present study found that 51.03% of them familiar of Stroke as a complication of the disease. Myocardial Infarction was mentioned by 26.55% of them followed by Transient Ischemic Attack and Ischemic limb (11.34% and 11.08% respectively) as shown in Table 4.

**Table 4:** Respondent's knowledge about the complications of diabetes (Macro-vascular)

| Complications | Yes | |
|---|---|---|
| | Frequency | % |
| Stroke | 198 | 51.03 |
| Myocardial infarction | 103 | 26.55 |
| Transient ischemic attack | 44 | 11.34 |
| Ischemic limb | 43 | 11.08 |

The results of the present study are on a higher level than those found by Fahad Almatrafi *et al* on their study in Makkah during 2021 in which they reported that the least heard of Diabetic complications were the macro-vascular complications including heart disease and stroke [26].

## Conclusions

In spite of having a good percentage of people whom already had a previous history of receiving health education on Diabetes Mellitus, still there's a proportion of the population that did not receive any education or awareness about the disease. And for those who had a previous education, the media and health care workers were found to be the main source of information.

The study found that less than quarter of the respondents had previous information about the signs, symptoms, and risk factors of the disease. Very small percentage of the respondents knew that smoking and hypertension are among the risk factors of the disease.

The same level of responses was found by the study in regards to the respondents' knowledge about the macro and micro vascular complications of the disease except for "Diabetic nephropathy" and "Stroke" that were mentioned by half of the study group.

## Recommendations

Based on the study results and conclusions, the present study strongly recommend strengthening the health educational and awareness programs about Diabetes Mellitus. A special focus should be made for those with a positive family history of the disease in addition to those having the risk factors. The educational awareness program should focus on clear simple massages regarding risk factors, signs and symptoms, and complications of the disease.

In addition, future researches are recommended to periodically assess the impact of these health educational programs at the community and individual level.

**Conflict of Interest:** Not available

**Financial Support:** Not available

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