# Social Awareness and Attitude about the Diabetes Mellitus, in Al-Qatif, Eastern province, Saudi Arabia

*Nada Hussain Alsairafi*[1]

*E-Mail: nada.alsairafi@hotmail.com*

## Abstract

Diabetes mellitus is a chronic disease that occurs either because of pancreatic cell destruction that lead to not produce enough insulin or due to body cell insensitivity to the insulin. *Aim*: The primary objective is to evaluate the knowledge level of symptoms, risk factors, causes and complications of DM in AlQatif population. Secondary objectives are to determine the relationship between the knowledge of DM risk factors and the lifestyle practices, measuring the correlation between the socio-demographic factors and the level of DM knowledge, also, to compare the level of knowledge between the diabetic and non-diabetic. *Method*: sample size was calculated through online questionnaire. The study was observational cross-sectional study. Critically sick patients, population under 18 years old or not resident in Al-Qatif were excluded. *Results*. A total sample of 454 patients join the inclusion criteria for the analysis male 388 and female 66. The study population has a good knowledge regarding DM and moderate knowledge regarding complications of retinopathy and lifestyle prevention. No significant association between age and educational level.

---

[1] College of Medicine, King Faisal University, KSA.

However, better knowledge of DM lifestyle prevention observed in female and awareness of retina examination in DM type 2. One of the most important findings among comparing diabetic and non-diabetic respondents, that DM knowledge awareness level is similar. *Conclusion:* The study showed there is no significant difference regarding DM knowledge irrespective of demographic variable. Population education about DM knowledge can decrease the DM prevalence and make diabetic patient's life better.

**Keywords:** Diabetes mellitus, diabetes knowledge, Diabetes awareness

**1.0 Introduction**

Diabetes mellitus (DM) is a metabolic disorder characterized by a deficit in insulin secretion or action resulting in hyperglycemia (Alanazi, F.,et al 2018). Complications of DM involve many body systems. Diabetic neuropathy, nephropathy, retinopathy and coronary artery disease are long-term severe complications of DM that require management and medical treatment (Abdulmageed, SS., et al 2014). The global diabetes prevalence in 2019 is estimated to be 9.3% (463 million people), rising to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045 (Abu El-Asrar, AM.,et al 2015).

As of June 2020, the population of Saudi Arabia is slightly more than 34.8 million. According to the IDF, adult diabetes prevalence in the Kingdom is currently 18.3%. The IDF also ranked Saudi Arabia as the seventh-highest country for new cases of type 1 diabetes per year. Although there are a variety of factors affecting the development of type 2 diabetes, lifestyle habits typically associated with urbanization are likely the most important ones (IDF Diabetes Atlas, 8th ed.). The risk factors of DM can be classified into two categories: modifiable and non-modifiable. Modifiable risk factors include diets rich in fat, low physical activity, high BMI, high blood pressure metabolic syndrome and high plasma levels of triglycerides. Non-modifiable risk factors include age above 40 years and family history of DM (Al-Mohaimeed, AA.,et al 2010).

Due to the poor literatures that published in eastern province among DM this study was done in 2004 include 197,681 participants .Out of them, 35,929 (18.2 percent) had a positive history of DM or a positive screening test for hyperglycemia. After confirmation by venous blood testing, the prevalence of DM dropped to 17.2 percent while the prevalence of newly diagnosed DM was 1.8 percent, so the total become 19 percentage. The prevalence increased with age and was higher in women,

widows, divorcees, those who had a low education level and the unemployed. Specifically, the prevalence in Al-Qatif was 31,083 after conformation as the population in Al-Qatif that time was 98,259 (Al-Baghli, N A.,et al 2010).

Generally, low knowledge about DM, its risk factors and its complications among the Saudi population. Most DM patients had low to moderate knowledge scores in Riyadh, Jeddah, Al Hasa, Al-Khobar, and Mecca (Abdulmageed, SS., et al 2014).

Consequently, Most studies found a poor level of knowledge of the disease among DM patients in Saudi Arabia. As the literature is insufficient regarding such information in Al-qatif , the aim of this study is to assess the social knowledge and practice regarding DM symptoms, risk factors, causes and complications in Al-qatif.

**2.0 Subjects**

The study conducted by using an online questionnaire for population who assigned to be part of this study, without collecting any identifiable data.

The primary outcome expected is that the level of social knowledge of symptoms, risk factors, causes and complications of diabetes mellitus is low. The secondary outcome expected is that there is an association between knowledge of DM risk factors and lifestyle practices. In addition, there will be a relationship between the level of knowledge and the socio-demographic factors.

The data of this study collected by using a standard online self-reported questionnaire, which reviewing by the specialists, and written in Arabic.

The questionnaire included three sections; the first section is socio-demographic data: which includes questions about age, gender, smoker, marital status, occupation, residency, level of education, diagnosed with diabetes. The second section is knowledge about symptoms, risk factors, causes and complications of DM. The third section is about lifestyle practices regarding preventing or controlling DM.

This study conducted from December 2020 to April 2021.

## 3.0 Material and Methods

### * Study Design and Sampling

An observational cross-sectional descriptive study extended for 5 months from December 2020 to April 2021.Validated questionnaire used to assess the knowledge, risk factor, complications, and lifestyle prevention for diabetes mellitus in Arabic language. This questionnaire of the final form was examined and approved by the specialist to assess content and construct validity. The questionnaire did not contain any questions which can reveal the identity of the participants. The questionnaire divided to 3 segments. The first segment of the questionnaire included the socio-demographics of the participants. Data included gender, age, marital status, residence, diabetic, educational level, occupation. Knowledge regarding DM was measured by using seven main questions related to the cause and symptoms. The possible categorical answers for majority of the questions were "Yes", "No" and "Do not know". The other possible categorical answers about the cause that lead to appear the symptoms were "increase the blood glucose" or "increase the insulin in the blood ". Other questions answers were "pancreatic cell damage" or "insulin resistance". Four questions related to the risk factor that increase DM risk. The possible categorical answers of the questions were "Yes" or "No". One of those questions were asking about the type that increased by overweight, the answers option were "DM type1" or "DM type2". Two questions related to the complications of uncontrolled blood sugar. The answers option were "immediately after diagnosis", after 2 years of the diagnosis", "after 5 years of the diagnosis", or "no need to do the retina examination". Three questions related to lifestyle prevention. One of the questions was asking about the healthy diet options were "high in carbohydrates and fats, low in fibers and protein", "high in sodium and fats, low in fibers and carbohydrates" or "high in fibers, moderate in protein, low in carbohydrates and fats'. The other questions possible categorical answers for majority of the questions were "Yes", "No" and "Do not know".

Sample size is determined by Raosoft software, with margin of error 5.6%, confidence level 95%, Al-Qatif population size about 166,303, and response distribution 50% for calculation of sample size. The expected sample value about 384 participants. The actual sample size of this study was 454 participants , 93 person of them were diabetic patietn. Participants were well informed about the study

objectives, by describing them before each segment of the questionnaire. All 454 participants were fulfilled the inclusion criteria, age were from 18 to 72 years old classified to 5 groups ( 18-28 years old, 29-39 years old, 40-50 years old, 51-61 years old, 62-72 years old).

**\* Data Collection and Analysis**

Participants were well informed about the study objectives, by describing them before each segment of the questionnaire, emphasizing that participation was voluntary and their answers would be kept confidential. A structured and pretested data collection form to inquire about such as age, gender, marital status, residence, educational level, occupation, past-medical history. A questionnaire used to collect the information from the respondents is consisting three segments including the socio-demographic data, the knowledge of diabetes, risk factors, complications, and lifestyle prevention. Data were analyzed using SPSS version 20. Chi-squared/crosstab test exact were used for comparison between categorical groups. Respondent's socio-demographic characteristics were stated using descriptive statistics. Means, standard deviations, and proportions were generated to describe the overall sample characteristics (age, gender, occupational status, disease duration, and education). Student's t-test and one way ANOVA test were used to test the equality of means between demographic variables.

**4.0 Result**

**\* Patient Demographics**

During this study, out of 454, 388 males make up 85.5% of the respondents, while the females 66 constitute 14.5%. The percent of diabetic (93 patients) from the total analyzed patients was about 20.5%.

The demographic statistics presented in Table 1 based on frequencies and percentages. Age category of the respondent showed that the minimum age was 18 years old; by contrast, the maximum age was 71 years old. Mean age was about 48 years old. According to the gender, males mean age was 49 Instead, females was 38.

From 454, 403 who cover 88.8% of respondent were married, 42 were single they make up 9.3%, widowed were 6 and the least percentage were for the divorces about 0.7%.

Education level of the respondents revel that most of the respondent attended to university degree, females were 49 and males were 273 were they cover 70.9% from total percentage.

The rest percentages divided to 23.3% who attended to high school , 5.1% attended to intermediated school and the lowest percentage 0.7% were for 8 males who attended to primary school.

Out of 454 respondents, there were 58.6% employee, 24.9% retired and the rest were un-employee.

**Table (1): Demographics of the study population**

| Parameter | Number of population | | % of population | |
|---|---|---|---|---|
| Gender | | | | |
| Female | 66 | | 14.5 | |
| Male | 388 | | 85.5 | |
| Age | Female | Male | Female | Male |
| (18 to 28) | 18 | 21 | 27.3 | 5.4 |
| (29 to 39) | 18 | 34 | 27.3 | 8.8 |
| (40 to 50) | 18 | 149 | 27.3 | 38.4 |
| (51 to 61) | 6 | 148 | 9.1 | 38.1 |
| (62 to 72) | 6 | 36 | 9.1 | 9.3 |
| Marital status | | | | |
| Single | 42 | | 9.3 | |
| Married | 403 | | 88.8 | |
| Widowed | 6 | | 1.3 | |
| Divorced | 3 | | 0.7 | |
| Education | | | | |
| Primary school | 3 | | 0.7 | |
| Intermediate  school | 23 | | 5.1 | |
| High school | 106 | | 23.3 | |
| University degree | 322 | | 70.9 | |
| Social history | | | | |
| Smokers | 104 | | 22.9 | |
| Nonsmokers | 307 | | 67.6 | |
| Ex-smoker | 43 | | 9.5 | |
| Occupation | | | | |
| Worker | 266 | | 58.6 | |
| Non-worker | 75 | | 16.5 | |
| Retire | 113 | | 24.9 | |

| Medical history | | |
|---|---|---|
| Diabetics | 93 | 20.5 |
| Non – diabetics | 361 | 79.5 |

## Difference between the Demographic Variable

Student's t-test (Tables2) shows no significant difference between the gender and diabetic cause awareness.

However, female found to have better knowledge significantly than the male regarding DM lifestyle prevention (p.value 0.015), and awareness of retina examination in DM type 2 (P.value 0.007).

One of the most important findings that student t-test showed among comparing diabetic and non-diabetic respondents, that DM knowledge awareness level is similar. Except in explaining of DM type2 cause that showed diabetics had significantly more awareness (P.Value 0.013). On other hands, non-diabetic have higher awareness to prevent DM (P. value 0.021).

**Table (2) Association of attitude of respondents towards the knowledge, risk factors, complications and prevention of diabetes with diabetic and gender**

| Questions | diabetic (mean ± SD) | | | | Gender (mean ± SD) | | | |
|---|---|---|---|---|---|---|---|---|
| | yes n=93 | No n=361 | t | Sig. | Female n=66 | Male n=388 | t | Sig. |
| **Knowledge of diabetes** | | | | | | | | |
| what's the cause of DM Symptoms ? | 1.22 ± 0.41 | 1.19 ± 0.40 | 0.46 | 0.649 | 1.23 ±0.42 | 1.19 ± 0.40 | 0.64 | 0.523 |
| What's the DM type 1 cause? | 1.13 ± 0.34 | 1.14 ± 0.35 | -0.24 | 0.813 | 1.18 ±0.39 | 1.13 ± 0.34 | 1.16 | 0.248 |
| What's the DM type 2 cause? | 1.47 ± 0.50 | 1.61 ± 0.49 | -2.49 | 0.018 | 1.64 ±0.48 | 1.58 ± 0.49 | 0.90 | 0.369 |
| Is DM type 1 considering as an autoimmune condition? | 1.58±0.50 | 1.59±0.49 | -0.21 | 0.832 | 1.59±0.05 | 1.59±0.49 | 0.01 | 0.991 |
| **Knowledge of Risk factor** | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Dose lifestyle dependent on Fast food increase the DM risk?** | 1.04 ± 0.20 | 1.05 ± 0.22 | -0.38 | 0.707 | 1.05±0.21 | 1.05±0.22 | -0.21 | 0.676 |
| **Which type of DM that effected by overweight?** | 1.47 ± 0.50 | 1.45 ± 0.50 | 0.42 | 0.675 | 1.59 ±0.50 | 1.43±0.50 | 2.43 | 0.015 |
| **Dose sedentary lifestyle increase DM risk?** | 1.02 ± 0.15 | 1.04 ± 0.20 | -0.91 | 0.365 | 1.06±0.24 | 1.03±0.18 | 1.07 | 0.285 |
| **Dose viral mediated autoimmunity trigger DM type 1?** | 1.59±0.49 | 1.60±0.49 | -0.07 | 0.942 | 1.56±0.50 | 1.60±0.49 | -0.61 | 0.543 |
| **Knowledge regarding complications of DM** | | | | | | | | |
| **When to do retina examination in DM type 1?** | 1.39 ± 0.77 | 1.42 ± 0.85 | -0.38 | 0.705 | 1.35±0.73 | 1.43±0.85 | -0.72 | 0.475 |
| **When to do retina examination in DM type 2?** | 1.48 ± 0.79 | 1.54 ± 0.98 | -0.54 | 0.590 | 1.24±0.58 | 1.58±0.98 | -2.71 | 0.007 |
| **Knowledge of prevention DM** | | | | | | | | |
| **Recommended Diet** | 2.83 ± 0.56 | 2.79 ± 0.60 | 0.60 | 0.549 | 2.73±0.65 | 2.81±0.58 | -1.01 | 0.313 |
| **Carbohydrates type** | 1.39 ± 0.66 | 1.49 ± 0.76 | -1.16 | 0.246 | 1.55±0.73 | 1.45±0.75 | 0.93 | 0.355 |
| **Dose physical examination decrease the DM risk?** | 1.01 ± 0.10 | 1.06 ± 0.30 | -1.40 | 0.021 | 1.08±0.36 | 1.04±0.26 | 0.95 | 0.345 |

**Student's t-test; two-tailed P < 0.05 is considered as significant.**

## * ANOVA test analysis

The analysis of ANOVA test results (Tables 3and 4) reflects that there are no significant statistical difference among age groups and educational status affects knowledge of diabetes P.values were above 0.05 .

ANOVA test of marital status showed (Table 5) widow found to have lower diabetic knowledge in comparing to single and married respondents (P.value 0.048). A Tukey post hoc test revealed that there was statistically significantly difference between widowed (1.33 ±0.82, P. value=0.027) and single (1.00±0.00, P. Value=0.027)

Part of this study is to assess the knowledge of the employee regarding the DM type 1 risk factors (Table 6). ANOVA showed that retired had the higher awareness in comparing to employee participant (P.Value 0.028) regarding that viral-mediated autoimmunity may also trigger self-destruction or infection of the pancreatic islet cells. (58) Person of the retired who cover (31%) of the total participants who had awareness regarding that viral disease could be a trigger to be affected with DM type1.

Retired showed significant higher awareness in comparing with other Occupational status groups among that overweight is highly increase the DM type 2 ( P.Value 0.034).

**Table (3) Association of attitude of respondents towards the knowledge, risk factors, complications and prevention of diabetes with Age groups**

| Questions | Age group | | | | | F | Sig. |
|---|---|---|---|---|---|---|---|
| | 18-28years (n= 39) | 29-39 years (n=52) | 40-50years (n=154) | 51-61years (n=154) | 62-72years (n=42) | | |
| | | | Knowledge of diabetes | | | | |
| what's the cause of DM Symptoms? | 1.18±0.39 | 1.13±0.47 | 1.18±0.39 | 1.17±0.38 | 1.26±0.45 | 1.57 | 0.180 |
| What's the DM type 1 cause? | 1.15±0.37 | 1.23±0.43 | 1.10±0.30 | 1.14±0.35 | 1.12±0.33 | 1.47 | 0.209 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **What's the DM type 2 cause?** | 1.69±0.47 | 1.62±0.49 | 1.57±0.50 | 1.56±0.50 | 1.57±0.50 | 0.60 | 0.664 |
| **Is DM type 1 considering as an autoimmune condition?** | 1.54±0.51 | 1.62±0.49 | 1.59±0.49 | 1.59±0.49 | 1.62±0.49 | 0.18 | 0.949 |
| | | | | | | | |
| **Knowledge of Risk factor** | | | | | | | |
| **Dose lifestyle dependent on Fast food increase the DM risk?** | 1.10±0.31 | 1.02±0.14 | 1.06±0.24 | 1.05±0.22 | 1.00±0.00 | 1.45 | 0.216 |
| **Which type of DM that effected by overweight?** | 1.15±0.51 | 1.46±0.50 | 1.47±0.50 | 1.42±0.50 | 1.45±0.50 | 0.32 | 0.862 |
| **Dose sedentary lifestyle increase DM risk?** | 1.05±0.22 | 1.02±0.14 | 1.05±0.23 | 1.03±0.16 | 1.02±0.15 | 0.68 | 0.609 |
| **Dose viral mediated autoimmunity trigger DM type 1?** | 1.69±0.47 | 1.63±0.49 | 1.63±0.48 | 1.55±0.50 | 1.48±0.51 | 1.76 | 0.137 |
| | | | | | | | |
| **Knowledge regarding complications of DM** | | | | | | | |
| **When to do retina examination in DM type 1?** | 1.46±0.85 | 1.56±1.00 | 1.36±0.85 | 1.43±0.79 | 1.38±0.66 | 0.62 | 0.646 |
| **When to do retina examination in DM type 2?** | 1.62±0.88 | 1.50±0.96 | 1.60±1.04 | 1.46±0.86 | 1.48±0.86 | 0.56 | 0.695 |
| **Knowledge of prevention DM** | | | | | | | |
| **Recommended Diet** | 2.82±0.56 | 2.60±0.80 | 2.83±0.55 | 2.84±0.53 | 2.71±0.67 | 2.09 | 0.081 |

| Carbohydrates type | 1.49±0.76 | 1.54±0.75 | 1.48±0.77 | 1.37±0.68 | 1.67±0.82 | 1.55 | 0.186 |
|---|---|---|---|---|---|---|---|
| Dose physical examination decrease the DM risk? | 1.03±0.16 | 1.00±0.00 | 1.06±0.32 | 1.04±0.25 | 1.10±0.37 | 0.89 | 0.470 |

**One way ANOVA test; two-tailed P <0.05 is considered as significant.**

**Table (4) Association of attitude of respondents towards the knowledge, risk factors, complications and prevention of diabetes with Educational level**

| Questions | Educational level | | | | F | Sig. |
|---|---|---|---|---|---|---|
| | Primary school (n= 3) | Intermediate school (n=23) | High school (n=106) | University degree (n=322) | | |
| **Knowledge of diabetes** | | | | | | |
| what's the cause of DM Symptoms? | 1.33±0.58 | 1.26±0.45 | 1.19±0.39 | 1.20±0.40 | 0.33 | 0.806 |
| What's the DM type 1 cause? | 1.00±0.00 | 1.13±0.34 | 1.14±0.35 | 1.14±0.34 | 0.17 | 0.919 |
| What's the DM type 2 cause? | 1.67±0.58 | 1.57±0.51 | 1.57±0.50 | 1.59±0.49 | 0.12 | 0.948 |
| Is DM type 1 considering as an autoimmune condition? | 1.33±0.58 | 1.43±0.51 | 1.63±0.48 | 1.59±0.49 | 1.29 | 0.276 |
| **Knowledge of Risk factor** | | | | | | |
| Dose lifestyle dependent on Fast food increase the DM risk? | 1.00±0.00 | 1.09±0.29 | 1.05±0.21 | 1.05±0.22 | 0.27 | 0.845 |
| Which type of DM that effected by overweight? | 2.00±0.00 | 1.39±0.50 | 1.45±0.50 | 1.45±0.50 | 1.32 | 0.266 |
| Dose sedentary lifestyle increase DM risk? | 1.00±0.00 | 1.04±0.21 | 1.03±0.17 | 1.04±0.20 | 0.15 | 0.928 |
| Dose viral mediated autoimmunity trigger DM type 1? | 1.67±0.58 | 1.35±0.49 | 1.60±0.49 | 1.61±0.49 | 2.07 | 0.104 |
| **Knowledge regarding complications of DM** | | | | | | |

| When to do retina examination in DM type 1? | 2.33±1.53 | 1.17±0.49 | 1.50±0.92 | 1.40±0.83 | 2.29 | 0.077 |
|---|---|---|---|---|---|---|
| When to do retina examination in DM type 2? | 1.33±0.58 | 1.74±1.14 | 1.56±0.90 | 1.40±0.83 | 0.50 | 0.682 |
| **Knowledge of prevention DM** | | | | | | |
| **Recommended Diet** | 2.33±1.15 | 2.83±0.58 | 2.83±0.54 | 2.79±0.60 | 0.78 | 0.504 |
| **Carbohydrates type** | 1.00±0.00 | 1.65±0.83 | 1.49±0.73 | 1.45±0.74 | 0.96 | 0.413 |
| **Dose physical examination decrease the DM risk?** | 1.00±0.00 | 1.00±0.00 | 1.08±0.36 | 1.04±0.25 | 0.70 | 0.555 |

**One way ANOVA test; two-tailed P <0.05 is considered as significant.**

**Table (5) Association of attitude of respondents towards the knowledge, risk factors, complications and prevention of diabetes with marital status**

| Questions | marital status | | | | | |
|---|---|---|---|---|---|---|
| | married (n= 403) | single (n=42) | widowed (n=6) | divorced (n=3) | F | Sig. |
| **Knowledge of diabetes** | | | | | | |
| **what's the cause of DM Symptoms?** | 1.20±0.40 | 1.17±0.38 | 1.33±0.52 | 1.33±0.58 | 0.43 | 0.732 |
| **What's the DM type 1 cause?** | 1.14±0.34 | 1.10±0.30 | 1.17±0.41 | 1.67±0.58 | 2.62 | 0.050 |
| **What's the DM type 2 cause?** | 1.58±0.49 | 1.64±0.48 | 1.67±0.52 | 1.00±0.00 | 1.66 | 0.174 |
| **Is DM type 1 considering as an autoimmune condition?** | 1.60±0.49 | 1.52±0.51 | 1.50±0.55 | 1.33±0.58 | 0.65 | 0.583 |
| **Knowledge of Risk factor** | | | | | | |
| **Dose lifestyle dependent on Fast food increase the DM risk?** | 1.05±0.22 | 1.05±0.22 | 1.17±0.41 | 1.00±0.00 | 0.62 | 0.605 |
| **Which type of DM that effected by overweight?** | 1.45±0.50 | 1.48±0.51 | 1.67±0.52 | 1.33±0.58 | 0.46 | 0.709 |
| **Dose sedentary lifestyle increase DM risk?** | 1.03±0.17 | 1.07±0.26 | 1.17±0.41 | 1.33±0.58 | 4.10 | 0.007 |

| Dose viral mediated autoimmunity trigger DM type 1? | 1.58±0.49 | 1.69±0.47 | 1.67±0.52 | 1.67±0.58 | 0.67 | 0.571 |
|---|---|---|---|---|---|---|
| **Knowledge regarding complications of DM** | | | | | | |
| When to do retina examination in DM type 1? | 1.40±0.81 | 1.50±0.97 | 1.83±0.98 | 1.67±1.15 | 4.10 | 0.007 |
| When to do retina examination in DM type 2? | 1.51±0.93 | 1.71±0.97 | 1.50±1.22 | 2.00±1.73 | 0.86 | 0.464 |
| **Knowledge of prevention DM** | | | | | | |
| Recommended Diet | 2.78±0.61 | 2.95±0.31 | 2.67±0.82 | 3.00±0.00 | 1.31 | 0.271 |
| Carbohydrates type | 1.45±0.74 | 1.48±0.71 | 2.00±0.89 | 2.33±1.15 | 2.46 | 0.062 |
| Dose physical examination decrease the DM risk? | 1.05±0.27 | 1.00±0.00 | 1.33±0.82 | 1.00±0.00 | 2.65 | 0.048 |

One way ANOVA test; two-tailed P <0.05 is considered as significant.

**Table (6) Association of attitude of respondents towards the knowledge, risk factors, complications and prevention of diabetes with Occupational status**

| Questions | Occupational status | | | F | Sig. |
|---|---|---|---|---|---|
| | Employee (n= 266) | Not employee (n=75) | Retired (n=113) | | |
| **Knowledge of diabetes** | | | | | |
| what's the cause of DM Symptoms? | 1.21±0.41 | 1.19±0.39 | 1.17±0.38 | 0.57 | 0.568 |
| What's the DM type 1 cause? | 1.15±0.35 | 1.13±0.34 | 1.12±0.32 | 0.34 | 0.714 |
| What's the DM type 2 cause? | 1.57±0.50 | 1.63±0.49 | 1.59±0.49 | 0.38 | 0.683 |
| Is DM type 1 considering as an autoimmune condition? | 1.61±0.49 | 1.56±0.50 | 1.56±0.50 | 0.67 | 0.513 |
| **Knowledge of Risk factor** | | | | | |
| Dose lifestyle dependent on Fast food increase the DM risk? | 1.05±0.22 | 1.05±0.23 | 1.04±0.21 | 0.06 | 0.938 |
| Which type of DM that effected by overweight? | 1.41±0.49 | 1.48±0.50 | 1.55±0.50 | 3.41 | 0.034 |
| Dose sedentary lifestyle increase DM risk? | 1.04±0.20 | 1.04±0.20 | 1.03±0.16 | 0.25 | 0.781 |
| Dose viral mediated autoimmunity trigger DM type 1? | 1.63±0.48 | 1.64±0.48 | 1.49±0.50 | 3.69 | 0.026 |

| | | | | | |
|---|---|---|---|---|---|
| **Knowledge regarding complications of DM** | | | | | |
| **When to do retina examination in DM type 1?** | 1.39±0.82 | 1.49±0.99 | 1.43±0.75 | 0.51 | 0.603 |
| **When to do retina examination in DM type 2?** | 1.53±0.95 | 1.64±1.11 | 1.47±0.78 | 0.75 | 0.473 |
| **Knowledge of prevention DM** | | | | | |
| **Recommended Diet** | 2.82±0.56 | 2.75±0.64 | 2.78±0.62 | 0.46 | 0.633 |
| **Carbohydrates type** | 1.48±0.75 | 1.57±0.81 | 1.35±0.68 | 2.16 | 0.117 |
| **Dose physical examination decrease the DM risk?** | 1.06±0.31 | 1.03±0.16 | 1.04±0.23 | 0.46 | 0.631 |
| **One way ANOVA test; two-tailed P <0.05 is considered as significant.** | | | | | |

## 5.0 Discussion

Saudi Arabia ranked the second country in the Middle East and the seventh country worldwide for the rate of diabetes (Cho, N. H.,et al 2018). Knowledge, attitudes, and DM lifestyle prevention awareness studies done on targeted population are the fundament for prevention and management plans. Though many studies established knowledge, attitude, and practice in DM, to the best of our knowledge, this is a first study about the assessment knowledge, lifestyle practices, and complications of DM among the population in the AL-Qatif, eastern province area of Saudi Arabia. The main study objective is to assess and evaluate the level of knowledge of symptoms, risk factors, causes and complications of DM in AlQatif population. Calculating the sample size was the first step in collecting the targeted population. The study was observational cross-sectional study. Critically sick patients, population under 18 years old or not resident in Al-Qatif were the excluded criteria. Meanwhile, the other studies used to interview the respondents in primary health care centers or in camping to assess them knowledge. Here, electronic questionnaire distribution through social media platforms was preferred to use in this study to collect the sample size of margin of error, which is 5.6%. Although that may lead to false high results due to submission of many responses. On other hands, consideration of many factors that may affecting the public DM knowledge and lifestyle practices was taken to give a real image about the situation in AL-Qatif city. Saudi Arabia, and further acknowledged by the other foreign studies, those found to have poor knowledge of DM among the rural population reported in India (Kiran, N. U.,et al 2015), Pakistan (Ali, Y. T.,et al 2009), Sudan (Ahmed, H. A.,et al 2014) , and Malaysia (Hamedon, T. R.et al 2014), instead of the presented study found to

have moderate to good DM knowledge level. Male and female has significantly different high knowledge than each other on the awareness of diabetes is lifestyle related disease that females are more aware that lifestyle based on overweight increase the risk of DM type 2 (P.value 0.015). In addition, Female showed to have significant better knowledge for the association with the awareness of the complication of type 2 diabetes mellitus. 81.8% of female participant had awareness about immediate performance of retina examination in DM type 2 (P.value 0.007). On the other hands, both gender had poor level of knowledge regarding when to perform retina examination in DM type 1, out of the 454, (4) females and (14) males whom makeup (4%) of total were aware that retina examination in DM type1 should be done after 5 years of diagnosis. Willing to participate in such events might be the factor for better knowledge for the complication of the disease among females than males in Saudi Arabia (Al Arawi, W. A.,et al 2020). In this study, most of the respondents attended to university degree (70.9%) females (10.8%) and males (60.1%). Meanwhile, there is no significant difference among gender and DM knowledge notwithstanding the level of education.

Mean age of questionnaire respondent was 48 years old, age group 40-50 makeup 36.8% of the total participant. There were no statistical significant difference between age groups and DM knowledge. In comparing to other study finding, that the majority of the low level of knowledge among diabetes patient was recorded in middle age groups (Abouammoh, N.A.,et al 2020).

DM type 1 is an autoimmune condition in which the insulin-producing β-cells of the pancreas are destroyed and hence the body loses its ability to produce insulin (Bluestone, J.,et al 2010). DM type 1 is usually diagnosed in children and young adults, affecting only approximately 5% of the overall diabetes population (Daneman, D. 2006). DM type 1 is believed to be an immunological disease where little is known about its risk factors. Nevertheless, epigenetic factors are possible contributors to the development of the disorder. Out of 454 respondents, (268) were not aware about that DM type 1 is an autoimmune disease. Meanwhile, Researchers have also suggested that viral-mediated autoimmunity may also trigger self-destruction or infection of the pancreatic islet cells (Jun, H.,et al 2003). Retired had the higher awareness in comparing to employee participant (P.Value 0.028). (58) Person of the retired who cover (31%) of the total participants who had awareness regarding that viral disease could be a trigger to be affected with DM type1. Few studies have examined the association between sedentary behaviors such as

prolonged television watching and obesity and diabetes. Demonstrated that increasing TV watching is strongly associated with obesity and weight gain, independent of diet and exercise. Men who watched TV more than 40 h per week had a nearly threefold increase in the risk of type 2 diabetes compared with those who spent less than 1 h per week watching TV (Frank, B Hu.2003). This study showed that married showed higher awareness regarding that the sedentary lifestyle is highly risk factor of diabetes in comparing to other marital status (P.value=0.007).

Unlike good knowledge on risk factors and symptoms of DM, (Mohieldein et al., 2011) revealed serious levels of unawareness about the complications of DM (47.7%) among Saudi non-diabetic population in Al-Qassim region (Alzohairy, M.,et al 2011). In comparing, one of the most important findings in the presented study, the DM knowledge awareness level is similar between diabetic and non-diabetic in Al-Qatif population. Except in explaining of DM type2 cause that showed diabetics had significantly more awareness (P.Value 0.013).

As diabetes Mellitus is one of the fastest-growing health problem in the world, which is now reaching to epidemic proportion in some countries. It is mainly due to consequence of life-style as lack of exercise, unhealthy diet, obesity and overweight (Zahid N. 2015). Employee groups comparing between retired and worker showed significant difference among that overweight is highly increase the DM type 2 (P. Value 0.034).Other than this, knowledge related to the diabetic diet was not recorded among the majority of Saudi patients, while 50% of the patients were aware of the significance of healthy diet for controlling diabetes (Abouammoh, N.A.,et al 2020). Similar to this study finding regarding healthy diet, it showed that 79.5% of total participant were aware that the recommended diet to have healthy lifestyle and decrease DM risk should contain high fiber, moderate amount of protein and low amount of carbohydrates and fats. There were no statistical difference regarding the relationship between Age, gender, level of education and diet awareness. Carbohydrates are an important part of a nutritional diet; they are one of the three macronutrients in the human diet that play an important role in the human body, along with protein and fat. They act as an energy source, help control blood glucose and insulin metabolism, participate in cholesterol and triglyceride metabolism, and help with fermentation (Alhawaj, AF.,et al 2020). The difference between a simple and complex carb is in digested speed and absorption beside its chemical structure. The healthiest sources include complex carbohydrates because of their blunted

effects on blood glucose. These options include unprocessed whole grains, vegetables, fruits, and legumes. While simple carbohydrates are acceptable in small amounts, white bread, sodas, pastries, and other highly processed foods are less nutritious and cause a sharp increase in blood glucose (Arthur, AE.,et al 2019).

In considering to being living healthier live and reducing risk of diabetes in the future. Lifestyles changes have a significant impact on preventing and managing diabetes. Beside diet, physical exercise three to five days a week for a minimum 30-45 minutes studies indicates that aerobic exercise and resistance training can help control diabetes. Regarding to the importance of physical exercise widowed showed lower level of awareness (p. value 0.048) instead, that the non-diabetic have higher awareness to prevent DM (P. value 0.021).

The simple changes that studies make today can have lasting positive consequences for future health and wellbeing.

## 6.0 Conclusion

In conclusion, the present study showed that Al-Qatif society had moderate to good knowledge regarding DM irrespective of demographic variable. However, need of education of population regarding DM lifestyle prevention is required to decrease the DM prevalence. As much as education of DM complications is highly required to diabetic patients improve them life quality.

## 7.0 References

Abdulmageed, SS. Iftikhar, R. Murad, MA. Sagga, BK. (2014) Assessment of the common risk factors associated with type 2 diabetes mellitus, Jeddah; Saudi Arabia; (2):616145.

Abouammoh, N.A. Alshamrani, M.A.(2020). Knowledge about Diabetes and Glycemic Control among Diabetic Patients in Saudi Arabia", hindawi journal of diabetes research , vol.6 , pp.4 .

Abu El-Asrar, AM. Ahmad, NA. Al-Ghamdi, A. Alguwaihes, A. Alotaibi, MS. AlRubeaan, K. Al-Sharqawi, AH. Ibrahim, HM. Subhani, SN. Youssef, AM.(2015 Mar). Diabetic retinopathy and its risk factors in a society with a type 2 diabetes epidemic, Saudi Arabia;Saudi National Diabetes Registry-based study; 93(2):e140-7.

Ahmed, H. A. Awadelkareem, M. A. Balla, S. A. (2014). Prevalence of diabetes, knowledge and attitude of rural population towards diabetes and hypoglycaemic event,Sudan 2013; American Journal of Health Research, vol. 2, no. 6, p. 356.

Alanazi, F. Albagawi, B. Alotaibi, Jazi S. Alqarawi, N. Alsharari, A. Paliadelis, P. (2018 Oct) Knowledge and awareness of diabetes mellitus and its risk factors, Saudi Arabia; 39(10): 981–989.

Al Arawi, W. A. Al Shamanm, U. S. (2020). Association of Demographic Variables with the Awareness of Type 2 Diabetes Mellitus Patients among the Northwest Population in Saudi Arabia, hindawi journal of diabetes research , vol.9 , pp.7.

Al-Baghli, N A. Al Elq, A H. Al-Ghamdi, A J. Al-Turki, K A. Bahnassy, A. El-Zubaier, A G.(2010). Prevalence of diabetes mellitus and impaired fasting glucose levels in the Eastern Province of Saudi Arabia; results of a screening campaign.; 51(12) : 923.

Alhawaj, AF. Sabir, S. Shah, R.(Sep 22, 2020). StatPearls Publishing; Treasure Island (FL). Physiology, Breast Milk.

Ali, Y. T. Chaudhary, R. Ulvi, O. S. et al.,(2009). Investigating the awareness level about diabetes mellitus and associated factors in Tarlai ,rural Islamabad;The Journal of the Pakistan Medical Association, vol. 59, no. 11, pp. 798–801.

Al-Mohaimeed, AA. Midhet, FM. Sharaf, FK. (2010 Jul ). Lifestyle related risk factors of type 2 diabetes mellitus in Saudi Arabia; Saudi Med J; 31(7):768-74.

Alzohairy, M. Hasan, M. Mohieldein, H. (April 2011). Awareness of diabetes mellitus among Saudi nondiabetic population in Al-Qassim region, Journal of Diabetes and Endocrinology Vol. 2(2), pp. 14-19.

Arthur, AE. Burton-Obanla, AA. Douglas, KG. Maino Vieytes, CA. Taha, HM. (September 2019). Carbohydrate Nutrition and the Risk of Cancer, Urbana, IL;USA ;8(3):230-239.

Bluestone, J. Herold, K. Eisenbarth, G.(2010) Genetics, pathogenesis and clinical interventions in Type 1 diabetes; 464(7293): 1293–1300.

Cho, N. H. Karuranga, S. Shaw, J. E. et al., (2018). Global estimates of diabetes prevalence for 2017 and projections for 2045," Diabetes Research and Clinical Practice, vol. 138, pp. 271–281.

Daneman, D. Type 1 diabetes. Lancet 2006; 367(9513): 847–58.

Frank, B Hu.(Feb 2003) Sedentary lifestyle and risk of obesity and type 2 diabetes.;38(2):103-8.

Hamedon, T. R.  Minhat, H. S. (2014) Understanding towards Diabetes Mellitus among Rural Adult Community in Malaysia, World Journal of Medical Sciences, vol. 11, no. 2, pp. 217–221.

International Diabetes Federation. IDF Diabetes Atlas, 8th ed. Brussels, Belgium: International Diabetes Federation; 2017.107843.

Jun, H. Yoon, J.(2003)A new look at viruses in Type 1 diabetes. Diabetes Metab. Res. Rev.; 19(1): 8–31.

Kiran, N. U. Kundapur, R. Moira, A. Souza, P. D. (2015).A cross sectional study to determine the prevalence of diabetes mellitus and its household awareness in the rural field practice areas of a medical college in Mangalore—a pilot study, Nitte University Journal of Health Science, vol. 5, no. 3, pp. 4–7.

Zahid N. (July 2015).Burden of Diabetes Mellitus in Saudi Arabia, Qassim; International  Journal Health Science.;9(3): V–VI.