

Knowledge about the Risk of Type 2 Diabetes among Adults with Visiting the Outpatient Clinics at Tertiary Hospital Makkah City, Saudi Arabia in 2021: A Cross-Sectional Study

RoaaAbdulkader Ahmad Alshareef¹, Emad NumanMutiq Alsubhi², Hassan Hammad Mohamed Alqurashi³, Saad Abdulatif Ahmed Almalki⁴, Abdulrahman Hashim Halawani⁵, Mohammed Seraj H Almalki⁶, Mohammed Saedan F Alshalawi⁵, Rabee Ahmad M. Alsareef⁷, Mashaal Mohammad Yahia Sindi⁸, Ahlam Abdul Hadi Al Amri⁹, Emad Abdulrahman M. Dhahwah¹⁰

¹Pediatric Emergency Consultant, Maternity and Children hospital, Makkah, Saudi Arabia.

²Director Of Outpatient Management, Maternity and Children hospital, Makkah, Saudi Arabia.

³Director Of Pediatric Outpatient, Maternity and Children hospital, Makkah, Saudi Arabia.

⁴Medical Secretary Technician, Maternity and Children hospital, Makkah, Saudi Arabia.

⁵Duty Manager, Maternity and Children hospital, Makkah, Saudi Arabia.

⁶Director Of Patient Experience Department, Maternity and Children hospital, Makkah, Saudi Arabia.

⁷Medical Coordinator, Medical Coordination and Treatment Eligibility, Maternity and Children hospital, Makkah, Saudi Arabia.

⁸Health Informatics Specialist Internal audit, Maternity and Children hospital, Makkah, Saudi Arabia.

⁹Social worker, patient experience, Maternity and Children hospital, Makkah, Saudi Arabia.

¹⁰Medical Coordinator, Medical Coordination and Treatment Eligibility, Maternity and Children hospital, Makkah, Saudi Arabia.

Abstract:

Background

Diabetes is one of the major causes of early illness and death worldwide. According to the International Diabetes Federation Atlas in 2019, global prevalence of diabetes was estimated to be (9.3%) (463 million people) rising to (10.2%) (578.4 million) by 2030 and (10.9%) (700.2 million) by 2045. Furthermore, in Saudi Arabia, according to the International Diabetes Federation Atlas, it was recently reported that

about 18.3% of the adult Saudi population suffered from DM. It has been found to be associated with a high rate of mortality, morbidity and increasing health care cost. Diabetes mellitus (DM) is a major metabolic disorder currently affecting over 350 million people worldwide. Also, another one billion people in the world are pre-diabetic, who may eventually end up with full-blown diabetes. Type 2 diabetes mellitus is fast becoming a global epidemic and the number of individuals with diabetes in the world is expected to reach 330 million by 2030. One of the primary goals of diabetes management is to prevent diabetes complications. The rate of diabetes complications diseases is significantly high in the diabetic population.

Aim of the study: The study aimed to assess the Knowledge about the Risk of Type 2 Diabetes among Adults with Visiting the Outpatient Clinics at Tertiary Hospital Makkah City, Saudi Arabia in 2021

Methods: A cross-sectional study was conducted to examine the study objectives. Convenience sampling was used to recruit adults with type 2 diabetes mellitus (DM) who visited the Medical City outpatient clinics. Data were collected the Risk of Type 2 Diabetes among Adults with Visiting the Outpatient Clinics at Tertiary Hospital

Results: knowledge of the participant toward the risk of Type 2 diabetes among Adults results show the majority of participant had high information were (43.0%) while average knowledge were (33.0%) the data ranged from (12-22) by mean $\pm$ SD (9.923 $\pm$ 4.548).

Conclusion: The presence of multidisciplinary intensive education programmers targeting type 2 DM patients, might be help for the higher levels of knowledge among our study population. Thus, increasing the efforts towards the education of patients will improve the Knowledge about the Risk of Type 2 Diabetes among Adults, including risk knowledge. Knowledge about the Risk of Type 2 Diabetes among Adults remains suboptimum among Saudi individuals. Makkah city needs to be targeted by effective educational interventions to help improve its residents' knowledge about the Risk of Type 2 Diabetes among Adults.

Keywords: Type 2 Diabetes mellitus, Knowledge, Risk, Adults, Tertiary Hospital

Introduction:

International Diabetes Federation stated that people with diabetes is expected to increase from 171 million in 2000 to 578 million in 2030 globally. In July 2020, the number of people with diabetes is calculated to be almost 463 million worldwide. [1] Saudi Arabia is

considered to be one of the highest countries in the Middle East for the incidence of diabetes mellitus. Data are lacking regarding Knowledge about the Risk of Type 2 Diabetes among Adults with Visiting the Outpatient Clinics at Tertiary Hospital in Saudi Arabia [2] Most diabetics had poor Knowledge about the Risk of Type 2 Diabetes among Adults (DM) assessing 120 DM Pakistani Patients[3]

Diabetes is a silent disease; many sufferers became aware that they have diabetes only when they develop one of its life-threatening risk .Knowledge of diabetes mellitus can assist in early detection of the disease and reduce the incidence of risk. This can be achieved by improving the knowledge about the Risk of Type 2 Diabetes among Adults [4]. The Middle East has the highest prevalence of diabetes of any world region, and Saudi Arabia has one of the highest prevalence rates of any country in the Middle East. A reported 18.5 percent of Saudi Arabian adults have diabetes, and the prevalence is increasing [5,6]

More than 10 percent of people with type 2 diabetes mellitus have one or two risk factors for foot ulceration at the time of diagnosis and a lifetime risk of 15%.[7] Since the DM type 2 can be diagnosed several years after onset, complications have already occurred.[8] Worldwide prevalence of DFU is 6.3% which is much more among DM type 2 (6.4%).[9]

The World Health Organization (WHO) has reported that Saudi Arabia ranks the second-highest in the Middle East and is seventh in the world for the rate of diabetes. It is estimated that around 7 million of the population are diabetic, and almost 3 million have pre-diabetes. Even more worrying, perhaps, is the increasing pattern of diabetes noted in Saudi Arabia in the recent past. In fact, diabetes has approximately registered a ten-fold increase in the past three decades in Saudi Arabia. Cardiovascular diseases (CVDs) are the main cause of morbidity and mortality in individuals with diabetes [10]. The risk of developing CVDs is two-to-four times higher in individuals diagnosed with diabetes than in others [11]. Inadequate knowledge of CVD risk in diabetes may lead to the failure of its early detection and prevention. Thus, it is important that individuals with diabetes have sufficient 'risk knowledge' of diabetes [12]

Diabetes is one of the major causes of early illness and death worldwide. Type 2 diabetes affects approximately 13 percent of the United States population, and the worldwide prevalence is estimated at 9.3 percent in adults, equivalent to 463 million people [13,14]. Type 2 diabetes accounts for over 90 percent of patients with diabetes [14].

Literature Review

Various studies done in our kingdom have explored prevalence of DFU and showed varying results which ranged from 26.0% to 61.8%.[15,16] DFU prevalence in Qassim region is 10.8% and the prevalence of a toe, foot or leg amputation is 2.5%.[17]

The results of one study in the US showed that Knowledge about the Risk of Type 2 Diabetes among Adults was not enough and also knowledge level of different medical groups such as general practitioners, specialists, internal medicine residents and medical students had significant differences with each other[18,19]

The 2018 Household Health Survey conducted in Saudi Arabia reported that approximately 10% of the Saudi population aged >15 years were diagnosed with diabetes, among which 17% and 13% were estimated to have coronary artery disease and stroke, respectively[20]

Several studies confirmed a low Knowledge about the Risk of Type 2 Diabetes among adults such as ischemic heart disease and stroke [21,22].

The most of systematic review has shown that there is generally low Knowledge about the Risk of Type 2 Diabetes among Adults with Visiting the Outpatient Clinics at Tertiary Hospital also about the risk factors and its complications among the Saudi population in particular . Most diabetes mellitus patients had low to moderate knowledge scores in Riyadh, Jeddah, Al Hasa, Al-Khobar, and Mecca. Also unexpectedly, health professionals in Saudi Arabia also had low knowledge scores about diabetes mellitus especially type 2.[23,24]study carried out in the United Kingdom by Wichit et al 2017. Reported better education among diabetic patients improves their ability to control the disease, resulting in better patient outcomes and reduced complications. Therefore, increasing knowledge and awareness of diabetes mellitus in the population will contribute to better community health outcomes. Increased knowledge about diabetes mellitus is needed for patients to optimize their lifestyles and improve their medication habits to get the optimum benefits and delay the onset of long-term complications. Education is also essential to help diabetes mellitus patients' families cope with the necessary lifestyle modifications and provide psychological and dietary support. Therefore, improving Knowledge about the Risk of Type 2 Diabetes among Adults is imperative, given the prevalence of the disease in Saudi Arabia. Public health centers are considered the best place to provide health education interventions for citizens both with and without diabetes mellitus.[25]

The results of one study in the Kuwait showed that Diabetes is a global issue. Kuwait is

among the high prevalence countries (20%) and has been ranked 5th. This suggests that one-fifth of the studied sample would be diagnosed in the future as diabetic. Taking into consideration this high prevalence of diabetes, it is highly recommended to increase the knowledge about diabetes in young ages.[26]

Murad et al [27] performed a case-control study in Jeddah to investigate the risk factors of T2DM. They found that smoking, hypertension, increased weight/obesity and age (above 40 years) were significant risk factors for Type 2 diabetes mellitus among the studied population. Alfadhli et al [28] found that older maternal age, high BMI, high blood pressure, previous gestational diabetes (GDM), history of delivering a malformed child and family history of diabetes were the main risk factors for GDM among Adults with Visiting the Outpatient Clinics at Tertiary Hospital

Rationale:

With the changes in major lifestyles, the prevalence of Type 2 diabetes among adults is increasing, therefore, this issue implicated to risk the diabetes outcome. The researcher has a special interest in Type 2 diabetes and its related risk, particularly in type II diabetic patient. Up to the researcher's knowledge, no published studies were conducted in Holy Capital of Makkah defined the Knowledge about the Risk of Type 2 Diabetes among Adults with Visiting the Outpatient Clinics at Tertiary Hospital Makkah City

Aim of the study:

To assess the Knowledge about the Risk of Type 2 Diabetes among Adults with Visiting the Outpatient Clinics at Tertiary Hospital Makkah City, Saudi Arabia in 2021

Methodology:

Study design:

This study is descriptive cross-sectional study was conducted among 300 of the Type 2 diabetes among adults, has been applying a convenience sampling technique.

Study Area

The study has been carried out in the city of Makkah Al-Mokarramah Makkah is the holiest spot on Earth. It is the birthplace of the Prophet Mohammad and the principal place of the pilgrims to perform Umrah and Hajj. It is located in the western area in Kingdom of Saudi

Arabia and called the Holy Capital. Contains a population around 2 million. This study was conducted at a tertiary care hospital in Makkah, Saudi Arabia. During the April to June, 2021, participants were a tertiary care hospital in Makkah, and it reflects a diversified demographic profile with a considerable portion of the population comes from rural descent, while others come from an urban one. This difference translates into biological, socioeconomic and lifestyle differences in the Makkah population.

Study Population

The study has been conducted regarding the type 2 diabetes among adults with Visiting the Outpatient Clinics at Tertiary Hospital Makkah City, Saudi Arabia in 2021 During the April to June, 2021 the period of study in 2021.

Selection criteria:

Inclusion criteria

- adult patients.
- diagnosis of Type 2 diabetes.
- attending Outpatient Clinics at Tertiary Hospital.
- Resident in Makkah province.
- sound cognitive abilities
- All nationalities
- Both males and females.

Exclusion criteria :

- Pediatric patients.
- Patients with severe cognitive impairment such as dementia or delirium.
- Patients unwilling to give written consent to participate.

Sample size

Type 2 diabetes among adults with Visiting the Outpatient Clinics at Tertiary Hospital Makkah City, Saudi Arabia in 2021. The sample size has been calculated by applying Raosoft sample size calculator based on (The margin of error: 5%, Confidence level: 95%, and the response distribution was considered to be 20%) accordingly the Sample size is (300) of the Type 2 diabetes among adults with Visiting the Outpatient Clinics at Tertiary Hospital Makkah City, Saudi Arabia in 2021 (male and female)

after official communication with the Tertiary Hospital Makkah City, and adding 10 more to decrease margin of error. After adding 5% oversampling, the minimum calculated sample has been 300. Computer generated simple random sampling technique was used to select the study participants.

Sampling technique:

Systematic random sampling technique is adopted. After that, by using random number generator, then simple random sampling technique has been applied to select the participant. Also, convenience sampling technique will be utilized to select the participants in the study. By using systematic sampling random as dividing the total Adults by the required sample size; (300).

Data collection tool

The data was collected through a questionnaire that was developed by the researchers after reviewing the related literature. It was translated into simple Arabic language to suit the understanding level of the entire study subjects. Self-administrated questionnaire was used. The questionnaire contains four sections. First section: containing items related to demographic data as age, sex, marital status, and occupation. The second section comprising questions to assess the general information regarding diabetes mellitus and Knowledge about the risk of Type 2 Diabetes such as heart diseases and stroke. The third section consisted of questions to assess the habitual factors associated of the studied participated.

Data collection technique:

Researcher has been visiting the Outpatient Clinics at Tertiary Hospital Makkah City, Saudi Arabia in 2021 after getting the approval from the ministries of health . The researcher has been obtained permission from participants. After the arrival of the participants has been explained the purpose of the study to all participants attending .

Data entry and analysis:

The data were coded and introduced to the Statistical Package of Social Sciences (SPSS, version 24). The data were analyzed to present the findings in descriptive and inferential statistics. The descriptive statistics include frequencies and percentages for categorical variables, while means, median and standard deviations were used to summarize numerical

data. The significant associations between demographic and background variables were detected at < 0.05 significance level.

Pilot study:

A pilot study has been conducted in the same sector due to the similarity to the target group using the same questionnaire to test the methodology of the study. As a feedback, the questionnaire has been clear and no defect has been detected in the methodology

Ethical considerations:

Permission from the Directorate of health , verbal consents from all participants in the questionnaire were obtained. All information was kept confidential, and results will be submitted to the department as feedback. The researcher described the aim and objectives of the study for the residents. No names were required to assure confidentiality of data, and all information was kept confidential only for this study's purposes.

Budget: Self-funded

Results:

Table 1 Distribution of demographic data(age, gender, Level of education, BMI, smoking) in our study(n=400)

	N	%
Age		
<35	100	25
35-50	160	40
>50	140	35
Gender		
Female	140	35
Male	260	65
Marital status		
Single	60	15
Married	220	55
Divorced	52	13
Widow	68	17

Level of education		
Non	24	6
Primary education	40	10
Lower secondary education	84	21
Upper secondary education	88	22
Post-secondary	64	16
Tertiary education	100	25
BMI		
Under weight	64	16
Normal	88	22
Overweight	120	30
Obese	128	32
Smoking		
Smoker	220	55
Non smoker	180	45

Table 1 shows that most of the participants (40.0%) were in the age group 35-50 years follow by the (35.0%) were in the age >50 years. Regarding the gender the majority of them were male (65.0%) while female (35.0%), also regarding **Marital status** the majority of participant are married were (55.0%) while widow were (17.0%). Regarding level of education the majority of participant are tertiary education were (25.0%) while upper secondary education were (22.0%). Regarding the BMI the majority of participant obese were (32.0%) follow by overweight were (30.0%). Regarding the smoking the majority of participant smoker were (55.0%). While non-smoker were (45.0%)

Table 2 Continues distribution of the knowledge on diabetic demographic data (Duration of DM Group, Diabetes regimen, Family history of diabetes, Chronic disease) in our study (n=400)

	N	%
Duration of DM Group		
<5 years	60	15
5-14 Y	140	35

>15 y	200	50
Diabetes regimen		
Diet only	60	15
Oral agents	72	18
Insulin injections	108	27
Oral agents and insulin injections	160	40
Family history of diabetes		
Yes	308	77
No	92	23
Chronic disease		
Asthma	140	35
High blood pressure	156	39
High fat and cholesterol	104	26
Heart diseases	76	19
Arthritis or other rheumatic diseases	32	8
Chronic disease	188	47

Table 2 shows regarding the duration of DM Group the most of the participants >15 years were (50.0%), while diabetes regimen the majority of participant used oral agents and insulin injections were (40.0%) follow by insulin injections were (27.0%), regarding the Family history of diabetes that most of the participants Yes were (77.0%) while No were (23.0%). But regarding the chronic disease the most of the participants has chronic disease were (47.0%) follow by high blood pressure were (39.0%)

Table(3) Distribution of the knowledge about the Risk of Type 2 Diabetes among Adults

Knowledge		
	N	%
Weak	96	24
Average	132	33
High	172	43
Total	400	100

Range	12-22.
Mean+SD	9.923+4.548

Table 3 Regarding knowledge of the participant toward the risk of Type 2 diabetes among Adults results show the majority of participant had high information were(43.0%) while average knowledge were(33.0%) the data ranged from(12-22) by mean $\pm$ SD(9.923+4.548).

Figure(1) Distribution of the knowledge about the risk of Type 2 Diabetes among Adults

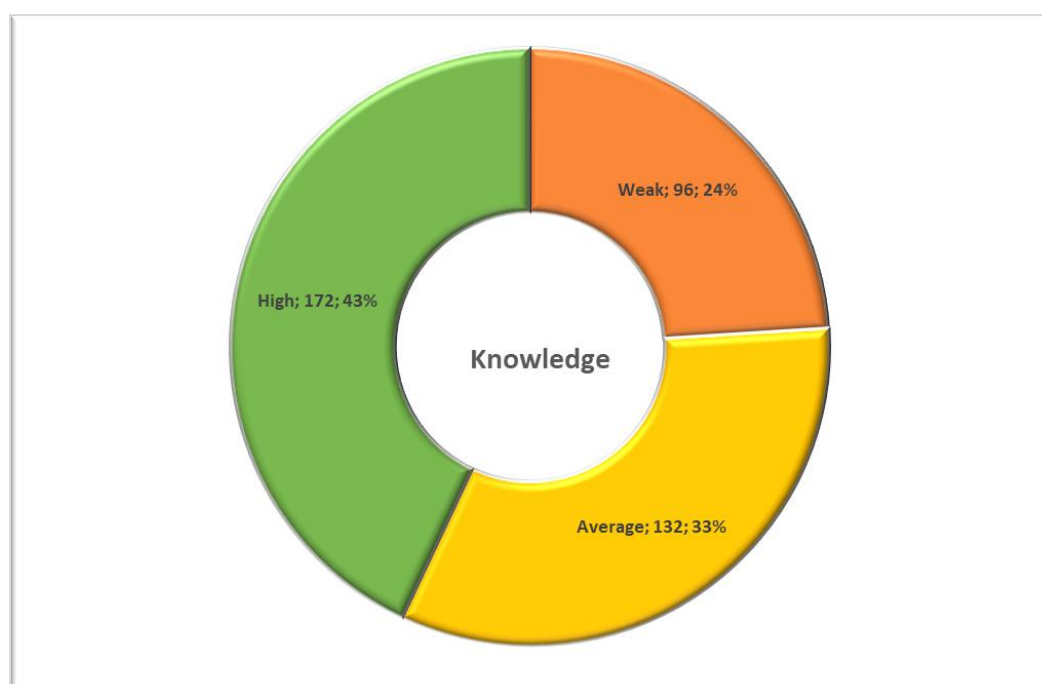


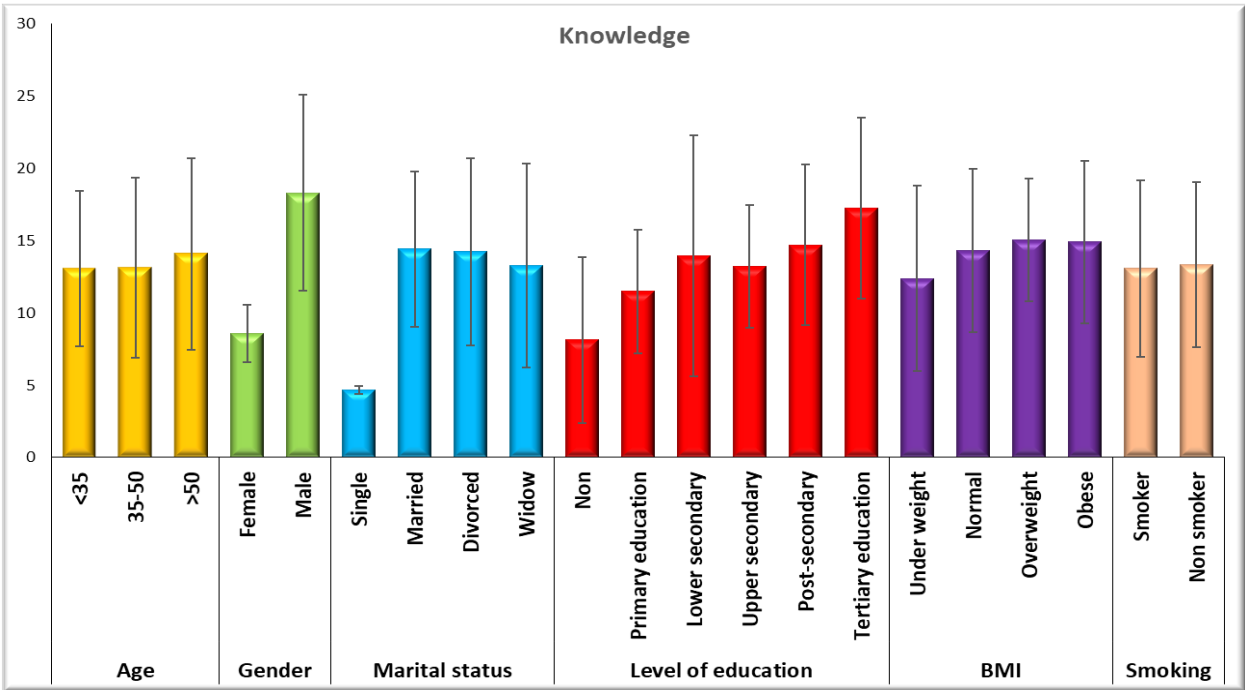
Table 4 Distribution the relation between knowledge about the risk of Type 2 Diabetes among Adults and socio-demographic

		N	Knowledge	F or T	ANOVA or T-test	
			Mean $\pm$ SD		Test value	P-value
Age	<35	100	13.039 $\pm$ 5.355	F	1.022	0.52
	35-50	160	13.127 $\pm$ 6.215			
	>50	140	14.062 $\pm$ 6.596			
Gender	Female	140	8.585 $\pm$ 1.974	T	16.539	<0.001*
	Male	260	18.266 $\pm$ 6.769			

Marital status	Single	60	4.662 ± 0.278	F	8.43	<0.001*
	Married	220	14.393 ± 5.386			
	Divorced	52	14.232 ± 6.46			
	Widow	68	13.278 ± 7.053			
Level of education	Non	24	8.112 ± 5.728	F	4.021	0.028*
	Primary education	40	11.462 ± 4.244			
	Lower secondary education	84	13.92 ± 8.339			
	Upper secondary education	88	13.199 ± 4.232			
	Post-secondary	64	14.689 ± 5.544			
	Tertiary education	100	17.2115 ± 6.257			
BMI	Under weight	64	12.359 ± 6.398	F	1.308	0.272
	Normal	88	14.317 ± 5.647			
	Overweight	120	15.025 ± 4.215			
	Obese	128	14.89 ± 5.595			
Smoking	Smoker	220	13.052 ± 6.076	T	0.431	0.666
	Non smoker	180	13.308 ± 5.695			

Regarding age, results show no significant relation between knowledge and age were $F=1.022$ and $P\text{-value}=0.52$, increase (in >50years), the mean +SD were (14.062 ± 6.596) . Regarding gender show a significant relation between knowledge and gender were $T=16.539$ and $P\text{-value}=0.001$ increase in male the mean +SD were (18.266 ± 6.769) . Regarding marital status there is a significant relation between knowledge and marital status were $F=8.43$ and $P\text{-value}=0.001$, increase (in married), the mean+ SD were (14.393 ± 5.386) . Regarding Level of education there is a significant relation between knowledge and Level of education were $F=4.021$ and $P\text{-value}=0.082$, increase(Tertiary education), the mean +SD were (17.2115 ± 6.257) . Regarding BMI is no significant relation between knowledge and BMI were $F=1.308$ and $P\text{-value}=0.272$, increase in (Overweight), the mean +SD respectively were (15.025 ± 4.215) . Regarding Smoking there is no significant relation between knowledge and Smoking were $T=0.431$ and $P\text{-value}=0.666$, increase(Non smoker), the mean +SD respectively were (13.308 ± 5.695) .

Figure(2)Distribution the relation between knowledge about the risk of Type 2 Diabetes among Adults and socio-demographic



Discussion

The current assessment surveyed a large number of participants, 400 participants, adults visiting the Outpatient Clinics at Tertiary Hospital in order to assessment the current knowledge about the risk of Type 2 Diabetes among Adults Visiting the Outpatient Clinics at Tertiary Hospital Makkah City, Saudi Arabia in 2021.

Although the prevalence of diabetes mellitus (DM) is high among populations in the Middle East and Gulf countries, patients often lack the knowledge about risk and skills to self-manage their condition [29].There may be a gap between knowledge about the risk of Type 2 Diabetes among Adults with Visiting the Outpatient Clinics at Tertiary Hospital, the study aimed to assess the Knowledge about the risk of Type 2 Diabetes among Adults with Visiting the Outpatient Clinics at Tertiary Hospital Makkah City, Saudi Arabia in 2021.

Despite the high prevalence. Cross-sectional studies have suggested that the prevalence of T2DM in Saudi ranges from 10% to 30%[30].This is the first study to assess to assess the Knowledge about the Risk of Type 2 Diabetes among Adults with Visiting the Outpatient Clinics at Tertiary Hospital Makkah City .

In the present study, shows that most of the participants (40.0%) were in the age group 35-50 years, the gender the majority of them were male (65.0%), also regarding Marital status the

majority of participant are married were(55.0%). Regarding level of education the majority of participant are tertiary education were(25.0%), the BMI the majority of participant obese were(32.0%), the smoking the majority of participant smoker were(55.0%). While non-smoker were (45.0%) (See table1)

In a Jordanian study [31] there was dominance in male and young age participants. A study from Turkey showed that 50% of participant students were males [31] . A study from Ghana [32] showed more prevalence of males and married and those with age of 30-39 years old . Most of in Ghana study participants showed a moderate level of knowledge not similar to our results reported. In Bahraini study, it was reported an average knowledge about the risk of Type 2 Diabetes among Adult [32]

Our study revealed that regarding the knowledge on diabetic demographic data(Duration of DM Group, Diabetes regimen, Family history of diabetes, Chronic disease) shows regarding the duration of DM Group the most of the participants >15 years were (50.0%), while diabetes regimen the majority of participant used oral agents and insulin injections were (40.0%), the Family history of diabetes that most of the participants Yes were (77.0%), the chronic disease the most of the participants has chronic disease were (47.0%) follow by high blood pressure were(39.0%)(See table2)

This finding is in accordance with a study done in Dubai and new study done in Asser, Saudi Arabia.[33] This finding is much better than what the previous studies reported duration of DM group(16.6%),[30] and diabetes regimen(22%),[28] and (37.8%).[30]

in our study finding that showed a high level of knowledge about the risk of Type 2 Diabetes among Adults (43.0%). show knowledge of the participant toward the risk of Type 2 diabetes among Adults results show the majority of participant had high information were (43.0%) while average knowledge were(33.0%) the data ranged from(12-22) by mean $\pm$ SD(9.923+4.548)(See table 3)

These results are not in line with who found that the majority of the screened T2DM patients had poor knowledge about diabetes, also we found (28.0%)percent of the participants were average knowledge about risk of diabetes.[34] This estimate agrees with previous research results in the region and somewhat exceeds estimates from some under-developed countries[30]. Another study finding is not similar to a number of previous study results that showed an inadequate level of knowledge and awareness of diabetes mellitus among the respondents in Saudi Arabia [28].

Al-Aboudiet al.[35] reported that 15% of the study participants in Riyadh had inadequate knowledge of DM, while 72% had moderate knowledge, the respondents in Dammam were found to obtain low scores regarding knowledge and attitudes toward diabetes mellitus. In another survey by Al Malki et al. [29], in light of this result, it is interesting to know that a similar study was done in Singapore similar a Chinese study reported inadequate knowledge of diabetes and its related factors among college students.[22].

In our study found that relation between knowledge about the risk of Type 2 Diabetes among Adults and socio-demographic, a significant relation between knowledge and gender, marital status, level of education were $P\text{-value}=0.001$ while no significant relation between knowledge age and smoking $P\text{-value}= 0.666$.(See table 4)

similar to our results reported a study by Al-Maskari et al. among patients with diabetes mellitus reported that age and gender and were related to diabetes mellitus Practices, and observed a higher Practices score among males than females ($p < 0.001$). That study also found there was a significant difference between knowledge scores of postgraduate (19.67) and undergraduate (14.74) respondent ($p < 0.001$) [36]. Similarly, a study by Amissah et al 2017. showed significant associations for all demographic variables (including diabetes mellitus status) with awareness scores [32]; another study was carried out exclusively among secondary school students in Riyadh by Almalkiet al 2018[29].

Conclusion:

Our study revealed that more than half of the participants had good Knowledge about the Risk of Type 2 Diabetes among Adults with Visiting the Outpatient Clinics at Tertiary hospital. However, the role of physicians and medical staff in annual health education is crucial. An awareness program implementation for diabetic risk care is highly needed. Health authorities in the region should offer special efforts to improve the level of knowledge through regular health education campaigns about risk of Type 2 Diabetes, Simultaneously, incorporation of health education messages about major chronic diseases will provide opportunities for increasing of the Knowledge regarding risk of Type 2 Diabetes.

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