

The Outcome of Type 2 Diabetes Mellitus among Adults of Saudi Arabia in the year 2020-2021.

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Abstract— Background Chronic complications of diabetes remain the chief problems in diabetic care. Studying factors associated with complications of type 2 Diabetes Mellitus can help in developing prevention strategies for Diabetic complications. The aim of the study is to evaluate the pattern of chronic complications of type 2 diabetes mellitus. Methodology This study is based on an electronic questionnaire that consists of 4 sections. The sample will include >300 diabetic patients of age 35-60 years and will be based on Quota sampling method. All data will be cleaned, coded, and entered using PSPP. Result The study included >300 participants with diabetes mellitus. It was found that 73% were type 2, and around 26% of them were of the age of 51-60 years. Out of the 255 type 2 diabetic patient, about 48 % had Heart attack, 35% had neuropathy, 35% had nephropathy, 36% had retinopathy, 43% had foot ulcers, 25% had stroke, 52% had periodontitis, 49% had depression, 59% had hypertension, 33% had a limb amputation. It was denoted that 45% of patients who often drink coffee experience less than 5 chronic complications. About 56% of those who had less than 5 chronic complications had poor quality of life. Conclusion The study showed that people with type 2 diabetes mellitus usually suffer from less than 5 chronic complications due to many factors including the consumption of unhealthy diet, inactivity and sedentary lifestyle. Finally, early diagnosis and following a healthy life style can help patients prevent serious complications and outcomes.

Index Terms— Complications, Diabetes Mellitus, Factors associated, Knowledge on the topic, Quality of life.

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1 INTRODUCTION

DIABETES mellitus (DM) is a metabolic disorder that is characterized by chronic hyperglycemia; it is a common and potentially disabling chronic disease [1]. In patients with diabetes mellitus, years of poorly controlled hyperglycemia lead to multiple, primarily vascular, complications that affect small vessels (microvascular), large vessels (macrovascular), or both. Glycosylation of serum and tissue proteins with formation of advanced glycation end products deposits in the basement membrane of arteries. In small arteries and capillaries, the diffuse thickening of basement membrane along with functional abnormalities (increased capillary permeability and disturbed platelets) complicates to form diabetic retinopathy in retinal capillaries, diabetic nephropathy in renal glomeruli and diabetic neuropathy in capillaries of peripheral nerves. In medium and large arteries, similar mechanism of thrombus formation develops into accelerated atherosclerosis and hyaline arteriosclerosis. The leading risk factors of Diabetes Mellitus type 2 can be modifiable or non-modifiable. Modifiable risk factors are Obesity/overweight, impaired glucose tolerance, Sedentary lifestyle, Non-modifiable risk factors are >45 years of age, Family history and Ethnic background, Hispanic, Native, African, Asian Americans and Alaska natives

Diabetes Mellitus Type 2 presently afflicting 194 million people worldwide and is estimated to rapidly increase to 333 million people in 2025 as a consequence of longer life expectancy, sedentary lifestyle and changing dietary patterns.² The incidence of HF in patients with clinically diagnosed DM is approximately 2.5 times that in patients without DM, the prevalence of DM which now is about 415 million persons worldwide is projected to increase by an additional 50 % to 642 million by 2040.³ Chronic complications of diabetes remain the chief problems in diabetic care, and cause a lack of fitness to work, disability, and premature death. ⁴ Studies report that inflammation underlying nonhealing wounds in patients with type 2 diabetes mellitus influences plasma miRNA concentrations and miR-191 modulates cellular migration and angiogenesis via paracrine regulation of zonula occludens-1 in which delay the tissue repair process. ⁵ Type 2 diabetes mellitus (T2DM) showed that a general representation of anxiety, depression, and other psychological conditions existed among this population. ⁶ Over the past century, diabetes mellitus was considered to be a rare medical condition. However, surveys of the global burden of disease indicate that non-communicable diseases will become the leading cause of mortality worldwide in 2030 [7].

Studying the factors associated with complications of type 2 Diabetes Mellitus can help in developing prevention strategies for Diabetic complications. It is expected that diabetes with better glycaemic control will have less complications than those with poor glycaemic control. It is contemplated that patients with untreated Diabetic patients will have higher probability of suffering from complications of Diabetes. To evaluate the pattern of chronic complications of type 2 diabetes mellitus in Saudi Arabia in the year 2020-2021.

2 METHODOLOGY

? It is an observational descriptive cross-sectional study design (2020-2021). The study took place in Diabetic Adults from ages 20- ≥60 in Riyadh, Kingdom of Saudi Arabia. The data was collected from 1,104 Diabetic adults by non-probability quota sampling technique. The study was based on a questionnaire that is prepared especially for it. It consisted of 4 sections: Identification, types of complication, risk factors associated with complication and Quality of life.

Scores of Quality of Life (out of 27)

Good	25- 27
Moderate	15- 24
Poor	<15

It was an electronic questionnaire written in English and Arabic. All data was cleaned, coded, and entered using SPSS. The results were expressed in tables and graphs as frequencies and percentages (as shown in dummy table annex II). Suitable statistical tests were used. A p≤value was considered significant. The protocol of the study was reviewed and approved by the Institutional Review Boards of the Faculty of, Al-Maarefa University. Permission was taken the same time the participants open the questionnaire link. The data will be kept confidential secured to maintain the privacy. Moreover, data was only used for this research.

3 RESULTS AND DISCUSSION

Variable	Frequency	Percentage
Type		
Diabetes Mellitus type1	95	27.1%
Diabetes Mellitus type2	255	72.9%
Age		
Less than 20years	12	4.7%
20 - 30	13	5.1%
31 - 40	61	23.9%
41 - 50	64	25.1%
51-60	66	25.9%
Older than 60	39	15.3%
Age at Diagnosis		
Less than 20years	30	11.8%
20 - 30	133	52.1%
31 - 40	49	19.2%

41 - 50	31	12.2%
Older than 60	1	0.4%
Duration Diabetes		
Less than one year	6	2.4%
1-5	41	16.1%
6-10	32	12.5%
11-15	43	16.9%
16-20	70	27.4%
More than 20	63	24.7%
The close relatives that suffer from Diabetes		
Father	51	20.0%
Mother	47	18.5%
Father and mother	60	23.5%
Sibling (brother or sister)	33	12.9%
Father or mother & sibling	12	4.7%
None	52	20.4%
Nationality		
Saudi	162	63.5%
Non-Saudi	93	36.5%
Marital status		
Single	33	12.9%
Married	169	66.3%
Divorced	32	12.6%
Widowed	21	8.2%
Educational status		
Intermediate school or below	52	20.4%
High secondary school	73	28.6%
Baccalaureus	83	32.6%
Postgraduate graduate	47	18.4%
Occupations		
Employed (government sector)	73	28.6%
Employed (private sector)	44	17.3%
Freelancer	39	15.3%
Un-employed	32	12.5%
Student	17	6.7%
House wife	50	19.6%
Income		
less than 5000	51	20.0%
5000 - 10000	74	29.0%
11000 - 20000	64	25.1%
21000 - 30000	30	11.7%
31000 - 40000	15	5.9%
More than 40,000	21	8.3%

51-60	11	4.3%
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the age of 20-30. It was found that about 27% have been having it for 16-20 years. The close relatives that suffer from diabetes were their parents as in 23% of them were their fathers and mothers. Around 63% were Saudis. And (66%) of the participants were married. About 33% of participants were having bachelor's degree and 46% of our participants were employed (government / private sector) 20% have incomes that less than 5000 SR and 29% between 5000-10000 SR. Around (77%) of patients had fatigue, (60%) of patients had sleep disturbance, about (62%) had muscle cramps, and (47%) had weakness among 250 patients of DM. Moreover, 60% of patients at the age of diagnosis of 20-30 yrs were with > 3 symptoms. There is a association between duration of being diabetes and the symptoms, where longer the duration of diabetes, more persistent were the symptoms. (p value= 0.003). The pattern of chronic complications of Diabetes Mellitus type, Out of 255 diabetic patient, about 48 % had Heart attack, 43% had foot ulcers, 25% had stroke, 52% had periodontitis, 49% had depression, 59% had hypertension. (χ^2 square= 3.929 p value= 0.047). Markingly, 80% of patient who are between the age of 41-50 have less than 5 complications, while 44% of patients who are older than 60 have more than 5 complications.

Patients with less than 5 complications were (68%) of those who had diabetes mellitus for more than 10 years. This association is statistically significant (p value= 0.047). Around 91% of patients who were diagnosed between the age of 51-60 have less than 5 complications. Around 27% of Current smoker had more than 5 complications, whereas 26% of none-smoker had more than 5 complication. Around 21% of very obese participants and 36% of those with normal weight had more than 5 complications. Around 79% of people who always/ often exercised had less than 5 complications and 52 % of people who rarely/ never exercised had less than 5. There was relationship between exercise and chronic complications of diabetes mellitus type 2. This association is statistically significant (p value= 0.000)

The data demonstrates that 79% of Patients who always controlled have less than 5 complications and 21% have more than 5 complications, 36% and 56% among those who had always and never controlled blood glucose respectively.

There were less than 5 complications among (83%) of people who always monitoring themselves and 44% of people who never monitoring themselves. This association is statistically significant (p value= 0.000)

About 80% of those who were always compliant to treatment and 42% of those who were not compliant to treatment with less than 5 complication. (P value= 0.000)

About 83% of those who were always compliant to diet and 51% of those who were not compliant to diet were with less than 5 complication. This association is statistically significant (P value= 0.000).

Around 26% of the diabetic patients who always have high fibers on their food had more than 5 complications and (69%) among those who never have high fiber foods. (63%) of People who rarely and 24% of People who always consume fruits and vegetables on their meals had More than 5 complications This

3.1 Results

This study included a total of 350 diabetic mellitus patients, 73% were type 2. Around 26% where between the age of 51-60 yrs. About (25%) of these patients were diagnosed between

association is statistically significant, P value= 0.03

Around (71%) of People who always had high fats on their meals had less than complications And 84% of People who never had high fats on their meals This association is statistically significant (P value= 0.000. 68 % and (91%) of people who always and never have high carbohydrates on their foods had less than complications This association is statistically significant(P value= 0.000).

Our data denotes that (68%) and (85%)of patients who always and rarely drink coffee. experience less than 5 chronic complications of diabetes mellitus type 2. This association is statistically significant, P value= 0.004. 81% of patients who are between 11000-20000 income have less than 5 complications while who are between 21000-30000 income have more than 5 complications. The relationship of Education and presence of chronic complications of Diabetes Mellitus type 2 is shown. Diabetic patient with post graduate level of education 72% had less than 5 complication. 86% of those who had less than 5 complications and 14% of those who had more than 5 complications had good quality of life good This association is statistically significant, P value= 0.000. About 78% of those who were satisfied and 47% of those who were dissatisfied with the Support from friends had less than complications This association is statistically significant, P value= 0.000. 77% of those who were satisfied and 57% of those who were dissatisfied with the access to health services had less than 5 complications This association is statistically significant, P value= 0.005

3.2 Discussion

Our study showed more than half of diabetic patients were from the age group 51-60 yrs. Similarly in previous studies it was seen that patients with diabetes mellitus type 2 had the mean age of diabetes at 54 years. Contrary to our study, a study in Japan showed higher prevalence of DM was in males than in females. In our study the most common complication seen with diabetes was hypertension. Differently in Japan a study showed Diabetic foot was commonly seen with diabetes. In our study patient with less than 5 complications were 2/3rd of those who had diabetes mellitus for 16-20 years. On the contrary in a study that showed strong relation between the age of first diagnosis of DM type 2 with greater risk of developing Diabetic retinopathy. It showed that later the diagnosis of diabetes, higher was prevalence of getting diabetic retinopathy. Around less than half of Current smoker had more than 5 complications, whereas nearly half of non-smokers had 3-5 complication which is clearly different from a study that shows higher the prevalence of smoking, more were the complications. In one study that was held in KSA, showed the relation between the Satisfaction of the patient and adherence to treatment. It was seen that satisfied patients were adherent to treatment and had good QoL. Thus, more satisfied patients with treatment reported significantly better change in anxiety and depression than those who were not satisfied. In our study, majority of the diabetics who did self-monitoring had

less than 5 complications. Contrarily to our study some studies showed low level of Self-management among patients with type 2 diabetes and Similarly to our study, diabetic patients that had retinopathy as a complication and were on treatments showed maximum improvement. Similar to our study, where majority of the diabetic patients who were obese had more than 5 complications, another study found that higher number of complication of Diabetes mellitus type 2 was seen in patients with a BMI above 30.

Similarly, the individual or group education was not sufficient to improve the outcomes of diabetics but group/individual education decreased the incidence of diabetes among people who were at risk.

3.4 Summary

From the tables (I-25), the data was divided into sections: a) Demographic data b) Complications c) Quality of life

Under demographic data, the following was our observation:

- 1) More than half of the patients with Diabetes mellitus were type 2 diagnosed at an early age of 20-30 and 30% of 1/3rd of them were suffering from diabetes from 16-20 years. Around 30 % of patients were from the age group 51-60 years.
- 2) More than half were married and Saudi, half of them were employed and 1/3rd has a bachelor's degree. Higher number of patients had average salary as 5000-10,000 SR.

Under Compliaction data, the following was observed:

- 1) Persistent symptoms like muscle cramps, fatigue, sleep disturbances and weakness were common in those patients who suffered from diabetes less than 10 years.
- 2) Majority of diabetic patients had hypertension. Half of them had depression and half of them had periodontitis and Less than half of the patients came to the ER with heart attack and foot ulcers..
- 3) Patients who suffered from diabetes mellitus type 2 from 16- 20 years had their diet and medication highly controlled, thus they suffered less than 5 complications.
- 4) Queerly, nearly half of the patients who were non-smokers had more than five complication, on the other hand quarter of them who were current smokers suffered from complications more than five.
- 5) As expected, more than half of the patients who were morbid obese had more than five complications.
- 6) Expectedly Majority of them who exercised had their diabetes under control with less than five complications. On the other hand, those who barely exercised with less than five complication were half of the diabetes patients.
- 7) Surprisingly, Among Half of the diabetic patients who had their blood glucose uncontrolled only a third suffered from complications more than five.
- 8) Majority of them who monitored themselves had fewer complications. As expectedly, those who were compliant to treatment responded well with few complications.
- 9) A very close statistics was seen among those had strict diet than those who did not, suffering from fewer complications.

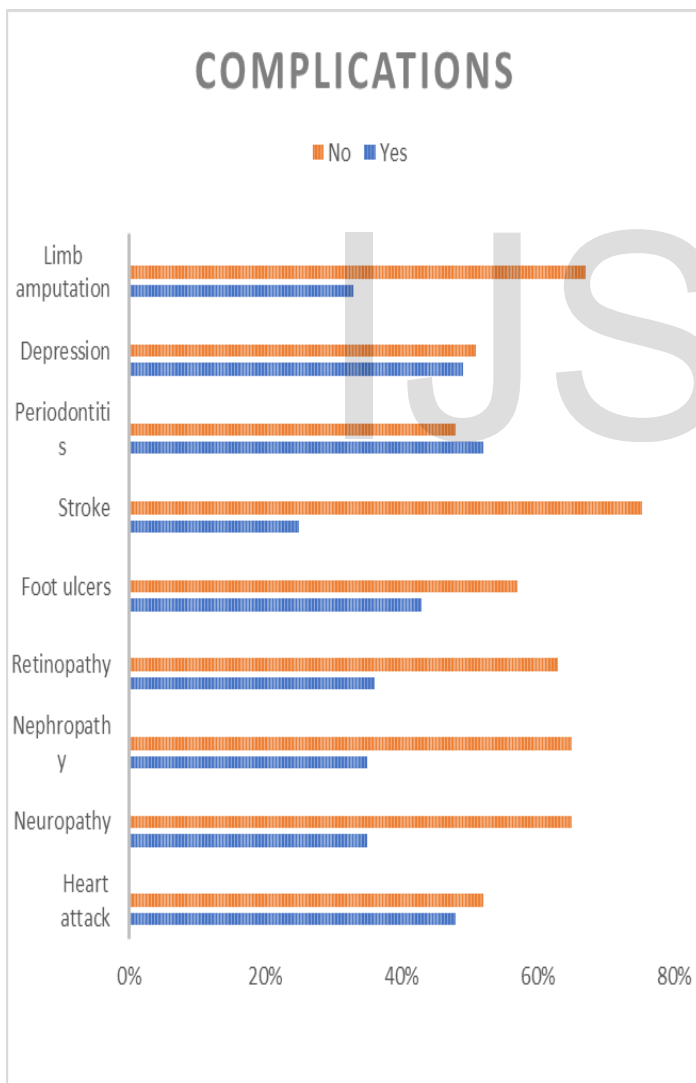
Quality of life:

1) Majority of the patients did not have high fibers, fruits, vegetables and had high amounts of fats and carbohydrates suffered from higher number of complications.

2) Unexpectedly a link was not seen among daily coffee consumers with higher number of complications. In fact, majority of the patients had daily coffee and suffered less than 5 complications of diabetes.

3) Another spectacular observation was made that even those who were post graduate and had good knowledge on diabetes mellitus type 2 suffered from its complications.

4) Majority of the patients who had fewer complications had a good quality of life, a great support from friends and family and also had easy access to health services. On the other hand, fewer of the patients who had poor quality of life, dissatisfied with support from friends, families and health services had more than five complications of diabetes.



3.5 Recommendation

Patients with long standing diabetes and those who are at

high risk of developing diabetes mellitus complications need to be detected and treated early. A healthy balanced low sugar diet is to be adopted. More efforts need to be put in rising the awareness of diabetes mellitus risks and complications. Foods containing carbohydrate from whole grains, fruits, vegetables, and low-fat milk should be included in a healthy diet. Prevention/treatment of overweight and obesity, particularly in high-risk groups. It's advisable to do an Annual check ups for diabetes mellitus complications. It is time to encourage walking every day for 30 minutes to an hour as it carries a lot of benefits and helps in controlling the disease.

4 CONCLUSION

This study found that diabetes mellitus type 2 complications are closely related to obesity, high carbohydrates and low fibre diets. Implementing better eating habits may reduce the prevalence of diabetes mellitus type 2 complications. By all counts, and with proven results. It is evident that patients who were not on glycaemic control and compliant to treatment suffered from chronic complications of diabetes mellitus type 2. And it is evident that patients with predisposing risk factors such as obesity, Age, family history, ethnic background impaired glucose intolerance and sedentary lifestyle contributed in having chronic complications of diabetes mellitus.

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