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DIABETES AND RENAL IMPAIRMENT (PREVALENCE, RISK FACTORS) IN KSA.

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Abstract:

The purpose of this study is to determine the prevalence of the assumed risk factors of renal impairment in a sample of adults in the Saudi Arabia. Renal impairment is resulted mainly by DM, along with other risk factors such as, smoking, HTN, excessive salt intake, and family history of renal impairment.

This study is showing a prevalence of DM of nearly 15% of the participants. Conclusion was made that DM, smoking, and age is significantly related to each other, and thus increasing the risk for future development of renal impairment.

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INTRODUCTION:

Diabetic kidney disease is a type of kidney disease caused by diabetes**.**

Diabetes is the leading cause of kidney disease. About 1 out of 3 adults with diabetes has kidney disease.
The main job of the kidneys is to filter wastes and extra water out of your blood to make urine. Your kidneys also help control blood pressure and make hormones that your body needs to stay healthy.

High blood glucose also called blood sugar, can damage the blood vessels in your kidneys. When the blood vessels are damaged, they don't work as well. Many people with diabetes also develop high blood pressure which can also damage your kidneys. Learn more about high blood pressure and kidney disease.

Having diabetes for a longer time increases the chances that you will have kidney damage. If you have diabetes, you are more likely to develop kidney disease if your

- blood glucose is too high
- blood pressure is too high

African Americans, American Indians, and Hispanics/Latinos develop diabetes, kidney disease, and kidney failure at higher rate than Caucasians.

You are also more likely to develop kidney disease if you have diabetes and

- smoke
- don't follow your diabetes eating plan
- eat foods high in salt
- are not active
- are overweight
- have heart disease
- have a family history of kidney failure

The aim of this study is to detect the prevalence of diabetes and renal impairment , the objectives is to determine the most common age group and gender effected by DM , also to detect the prevalence of DM and renal impairment in Saudi patients . In addition , we object to determine the relationship between smoker patients and DM and the prevalence of risk factors of renal impairment.

METHODS:

Study design:
This is an analytical cross-sectional study.

Study Setting and period:
This is an analytical cross-sectional study conducted at universities, hospitals, malls (from medical staff), KSA from April 2021until October 2021

Inclusion criteria: General population ,DM patients and Renal impairment patients.

Exclusion criteria: None

sampling method:
Participants will be randomly selected and carried out by questionnaire.

Sampling size:
A number should be collecting 750 or more participants from the general population.

Measurements:
Explanatory variables:
1. Sociodemographic characteristics: age , gender, nationality, BMI.
2. Disease related information: smoker, associated between other risk factors and level of understand questionnaire.

Outcome measures:
The outcome measure is by counting the ratio of the number of patients who have DM or Renal Impairment this will be measured using by determining the extent of DM and risk factors of renal impairment.

Prevalence study:
will be carried to test the questionnaire if easily understood and the response of the participants.
Data from the cross-sectional study will be used to calculate the sample size.

Data Management and Analysis plan:
Data will be entered and analyzed using SPSS version 23.0 Descriptive statistics will be performed and categorical data will be displayed as frequencies and percentages while measures of central tendencies and measures and dispersion will be used to summarize continuous variables.

Univariate and multivariate analysis will be performed to investigate association between age, gender, nationality, BMI and associated between risk factors of renal impairment. statistical significance is set at a P value of 0.05 or less.

Statistical analysis:
Data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 23.0 .

Descriptive statistics were displayed as frequencies and percentages for categorical variables. Measures of central tendencies (the median), and measures and dispersion (minimum – maximum) were used to summarize continuous variables, as the continuous variables were not normally distributed when tested by Shapiro-Wilk test. Univariate analysis was performed to investigate the association between the exposure factors with the outcome on the one hand, this was performed using Chi-squared test. Multivariate analysis to investigate factors independently was performed using binary logistic regression. P value was set at a significance level of < 0.05.

Literature review:

One published study could be found on diabetic nephropathy in Oman, conducted in 2005. It showed a prevalence of microalbuminuria of 27% and also found that HbA1c, serum creatinine and presence of hypertension were the most significant predictors for microalbuminuria.

Data from the central dialysis centre shows increasing incidence of diabetic nephropathy on dialysis.

There is a shortage of data in the Middle East on the prevalence of CKD among diabetic patients. However, the prevalence of CKD among the general population was 6.8% in Jordan, 5.7% in Saudi Arabia and 14.9% in Iran.

In 2008, a study of diabetic hypertensive patients in North West Bank reported that 35.5% of patients with DM and HTN had decreased renal function, which is significantly correlated with age, duration of DM and number of chronic diseases.

RESULTS:

Baseline characteristics:

The study included 788 patients in which among them were 404 males (51.3 %) and the rest were females. Age group ranged from lesser than 35 years to older than 55, with most frequent age groups were less than 35 (n= 381, 48.4%) and from 35-39 (n= 125, 15.9%).

Most of the population study is saudian (n= 598, 75.9%) and the rest are non-saudian. **The pie chart in figure 1 shows the distribution of study participants according to age groups.**

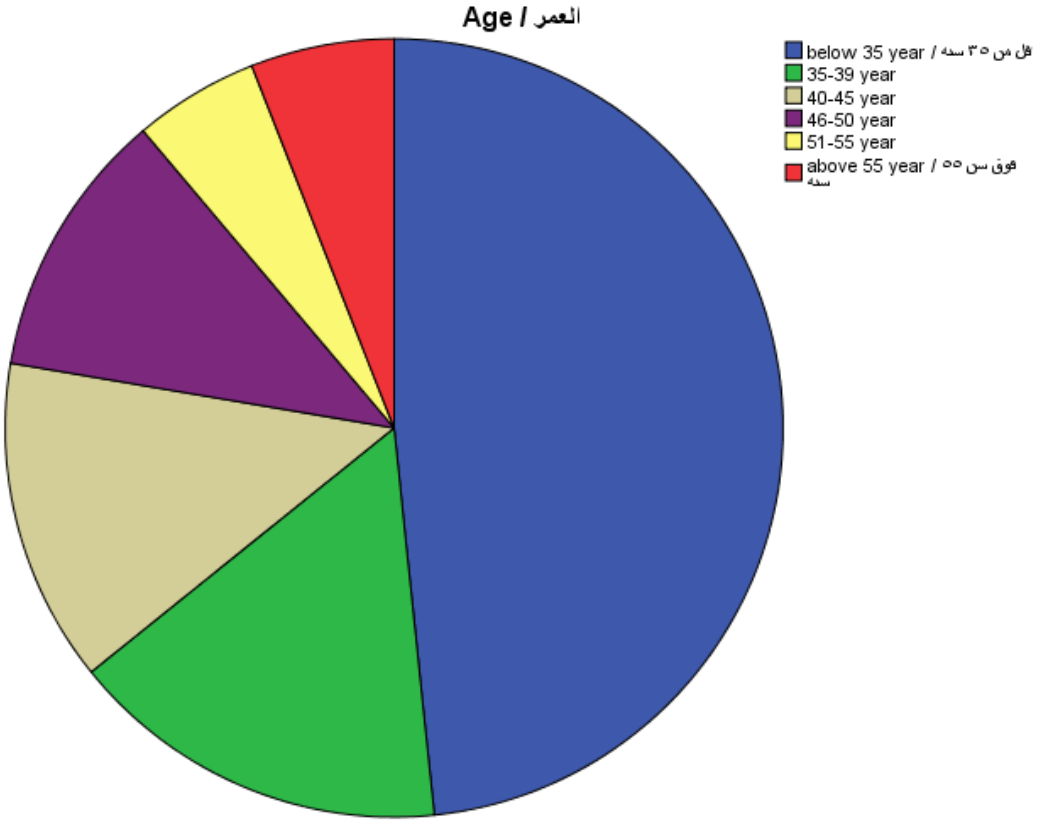

Figure 1: Distribution of study participants according to age groups.

Prevalence of Diabetes mellitus:
Results show that most of participant of the sample not diabetic (n = 659 , 83.6 %) , the rest was diabetic. **The pie chart in figure 2 shows the prevalence DM .**

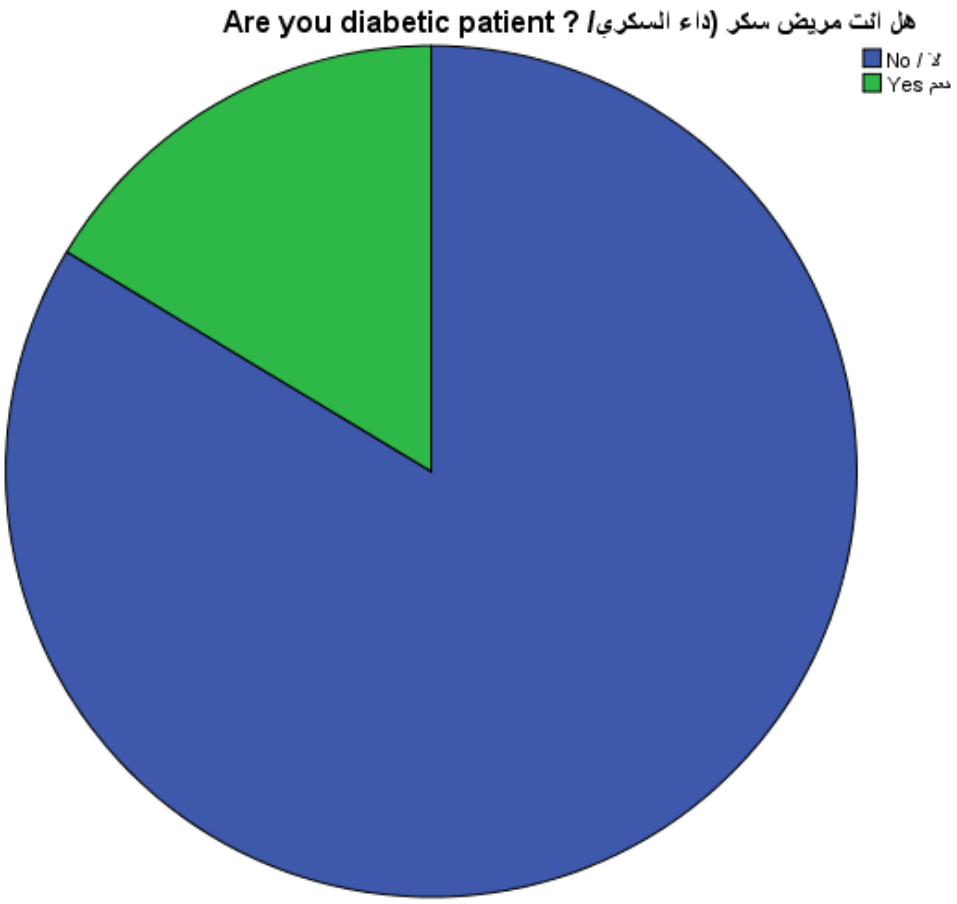

Figure 2 shows the prevalence of DM .

Relationship between Age and DM:
The most common age group that affected by DM distrubuted in the age group 46-50 (n= 30, 23.3 %) followed by 40-45 years and above 55 years (n= 23, 17.8%) the same percentage for both age group, the relationship between age and DM is statistically highly significant (P value: 0.000) **The Table 1 shows the relationship between Age and DM.**

Are your diabetic patient ? /هل انت مريض سكر (داء السكري * Age / العمر Crosstabulation

Count

		Age / العمر						Total	P value
		below 35 year / اقل من ٣٥ سنه	35-39 year	40-45 year	46-50 year	51-55 year	above 55 year / فوق سن ٥٥ سنه		
Are you diabetic patient ? / هل انت مريض سكر (داء السكري	No / لا	360	108	83	58	26	24	659	0.000
	Yes نعم	21	17	23	30	15	23	129	
Total		381	125	106	88	41	47	788	

The Table 1 shows the relationship between Age and DM.

Relationship between Gender and DM:
According to this study, nearly both gender affected by DM at the same percentage ,
(n= 66, 51.1 %) for female and (n= 63, 48.9 %) for male, the relationship between age and DM is not statistically significant (P value : 0.564). **The Table 2 shows the relationship between Gender and DM.**

Are you diabetic patient ? /هل انت مريض سكر (داء السكري * Gender / الجنس
Crosstabulation

Count

		Gender / الجنس		Total	P value
		Male / ذكر	Female / انثى		
Are you diabetic patient ? هل انت مريض سكر (داء السكري/	No / لا	341	318	659	0.564
	Yes نعم	63	66	129	
Total		404	384	788	

The Table 2 shows the relationship between Gender and DM.

Relationship between Smoker patient and DM:
According to this study, Among thr smoker or ex-smoker , there is about 60 patient affected by DM (28.2%) among diabetic patient in this study, but among non-smoker patient, there is about 69 patients affected by DM (12%), the relationship between smoking and DM is statistically strongly significant (P value: 0.000). **The Table 3 shows the relationship between Gender and DM.**

Are you diabetic patient ? /هل انت مريض سكر (داء السكري * Are you smoker ? / هل انت مدخن
Crosstabulation

Count

		Are you smoker ? / هل انت مدخن			Total	P value
		No / لا	Yes نعم	X- smoker / مدخن سابق		
Are you diabetic patient ? هل انت مريض سكر (داء السكري/	No / لا	506	117	36	659	0.000
	Yes نعم	69	53	7	129	
Total		575	170	43	788	

The Table 3 shows the relationship between Gender and DM

Prevalence of risk factors of renal impairment:
According to this study, there is a 213 people who is smoker or ex-smoker (27%), a 129 affected by DM (16.4%), a 113 suffering from high blood pressure (14.3 %), a 446 range from overweight with a body mass index (25-29.9) and obese with a body mass index above 30 (56.6), a 176 eat food with excess salt (22.3 %), a 310 does not exercise at all (39.3 %), an 87 people suffer from heart, arterial and vascular disease (11%) and 134 have a family history of kidney failure (17 %). **The Tables from 4-11 shows the prevalence of risk factors of renal impairment .**

4- Are you smoker ? / هل انت مدخن

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No / لا	575	73.0	73.0	73.0
	Yes نعم	170	21.6	21.6	94.5
	X- smoker / مدخن سابق	43	5.5	5.5	100.0
	Total	788	100.0	100.0	

5- Are you diabetic patient ? /هل انت مريض سكر (داء السكري

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No / لا	659	83.6	83.6	83.6
	Yes نعم	129	16.4	16.4	100.0
	Total	788	100.0	100.0	

6- Do you suffer from high blood pressure? / هل تعاني من ارتفاع في ضغط الدم

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No / لا	675	85.7	85.7	85.7
	Yes نعم	113	14.3	14.3	100.0
	Total	788	100.0	100.0	

7- Body Mass Index

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	underweight < 18.5	52	6.6	6.7	6.7
	Normal weight (18.5-24.9)	278	35.3	35.8	42.5
	Overweight (25-29.9)	236	29.9	30.4	72.9
	Obese >30	210	26.6	27.1	100.0
	Total	776	98.5	100.0	
Missing	System	12	1.5		
Total		788	100.0		

8- Do you eat your food with excess salt? 10. هل تأكل طعامك مع الملح الزائد

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No / لا	612	77.7	77.7	77.7
	Yes نعم	176	22.3	22.3	100.0
	Total	788	100.0	100.0	

9- Do you do any kind of physical sport exercise? هل تمارس أي نوع من أنواع الرياضة البدنية

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Exercise daily / امارس الرياضة بشكل يومي	180	22.8	22.8	22.8
	exercise weekly / امارس الرياضة بشكل اسبوعي	298	37.8	37.8	60.7
	I do not exercise / لا امارس الرياضة	310	39.3	39.3	100.0
	Total	788	100.0	100.0	

10- Do you suffer from heart, arterial and vascular disease? / هل تعاني من امراض القلب و الشرايين و الاوعية الدموية

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No / لا	701	89.0	89.0	89.0
	Yes نعم	87	11.0	11.0	100.0
	Total	788	100.0	100.0	

11- Do you have a family history of kidney failure? / لديك تاريخ عائلي من الفشل الكلوي

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No / لا	654	83.0	83.0	83.0
	Yes نعم	134	17.0	17.0	100.0
	Total	788	100.0	100.0	

DISCUSSION:

Prevalence of Diabetes mellitus shown in this study, is somewhat comparable to other studies which are showing prevalence rates ranging between 8 – 12%. Age group in which DM is the highest is middle aged people. This is also supported by other studies, which indicates older ages of first detection of DM types 2.

Smoking is a risk factor for DM, according to a study published by Nagasawa Y, et. all. DM in turn is a significant risk factor for renal diseases, especially CKD.

Renal impairment is also associated with obesity, HTN, and family history of renal failure.

Keywords:
DM , Risk factors , Renal impairment

Data availability:
they are available upon reasonable request.

Conflict of interest:
Authors have no conflict of interest to declare

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Ethical considerations:
Administrative approval will be sought from the unit of biomedical ethics research committee Ethical approval will be sought from the ethical committee of the faculty of medicine, king Abdelaziz university. An informed consent will be sought from the participants.

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