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Original Research Article

Association of Smoking with Kidney Dimensions on Ultrasound in Pakistan

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Abstract: Ultrasound is a favourite first line imaging technology for the evaluation of kidneyfunction. Pakistan, which use tobacco products more than 72 percent of the adult male population. Cigarette smoking has emerged over the past few years as an important independent renal risk factor, apart from its conventionally recognized carcinogenic effects and its adverse function as a driver of cardiovascular illness. Smoking is closely linked to significant clinical findings due to changes seen in renal function. The possible association between sensitivity to tabaco smoke and renal ultrasound measurements is yet to be examined. We hypothesized that tobacco consumption is correlated with decreased renal measurements. ***Objective:*** The possible association between sensitivity to tabaco smoke and renal ultrasound measurements is yet to be examined. We hypothesized that tobacco consumption is correlated with decreased renal measurements. ***Approach*:** This was an observational cross-sectional study in which we observed 385 male patients on Ultrasound within Age range of 20Years to 80Years. We assessed all patients by self-questionnaire. Data was collected from private sector hospital Gujrat, Pakistan. ***Results:*** There were 385 people in total who were evaluated. A statistically important relation was established between kidney measurements and the following independent variables. There was no statistically important correlation between kidney, high blood pressure or diabetes. All smoking participants have equal echogenicity. ***Conclusions:*** Individuals with a longer smoking history had smaller kidneys. This is especially important considering that statistically significant associations between renal dimension and smoking. As we observe 385 males on ultrasound and assessed by self-questionnaire. In which 40.3% have hypertension and 10.1% are diabetic. 270 patients from 385 have decreased dimensions. Our results show the length, width and parenchymal thickness are decreased .70.1 % smokers have decreased dimensions. There was no statistically effect of hypertension and diabetes on kidney dimensions.

Key words: Kidney, Ultrasound, dimensions, diabetes, hypertension.

BACKGROUND

In a population cigarette smoking is a commonly associated risk factor leading to development of chronic kidney disease [1]. In order to evaluate CKD, Sonography will be used in place of conventional radiographs as to consider it as a standardized tool to elaborate the abnormalities of kidney size along with measurement of kidney dimensions while considering the factors like age and sex [2]. There have been arguments over the present evidence available which can prove the validity of cigarette smoking as an independent major risk factor between researchers of different communities.(1) Hence in order to suggest later findings which help to understand this, the aim of my study is to assess the effect of cigarette smoking in the development of CKD in adult male general population [1].

INTRODUCTION

Chronic kidney disease (CKD) refers to a heterogeneous group of conditions that impair kidney structure and function [3]. It is widely accepted worldwide as a problem that is correlated with major morbidity and mortality [4, 5]. Early disease phases are asymptomatic and sometimes reversible [3] However, precisely detection of CKD Groups (e.g. seniors, women, etc.); and certain ethnic groups (including Asians) are not necessarily falling under this criterion [6]. Underprivileged populations are adversely affected by inequity in service access.

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Ultrasound is the favorite first-line imaging tool for pre-diagnosed renal dysfunction [7, 8]. CKD individuals also have renal defects, which can be detected effectively by ultrasound [9]. The glomerular filtration rate is closely correlated with both cortical thickness [10] and renal volume [8, 11]. GFR is considered to be one of the leading indicators of kidney function and pathology. [11, 12]. It has been shown that cortical echogenicity is associated with renal histopathology [13].

Smoking is closely linked to significant clinical findings due to changes seen in renal function and the development of diseases [14, 15]. One study showed that men with > 5 packages per year (PY) had more than 10 times higher risks of end-stage renal failure than non-smokers [16]. The higher risk is especially important in areas such as Pakistan, which use tobacco products more than 72 percent of the adult male population [17].

The standard renal measurements as shown by simple radiography and contrast tests have been well established. Relatively little has been published about sonographic assessment of renal scale. While anomalies of the kidney reflected by a change in renal size can often be measured subjectively, an accurate calculation is often useful. Unlike contrast studies, ultrasonographic studies make use of a form of physiologic assessment that is not subject to geometric magnification. Therefore, one would assume that ultrasonography analysis might provide a reliable method of assessing renal measurements [18].

Nephrologists are encouraged to recognize renal risk factors due to the world's high incidence of chronic kidney disease (CKD) and a strong rise in patients with end-stage renal disease. Cigarette smoking has emerged over the past few years as an important independent renal risk factor, apart from its conventionally recognized carcinogenic effects and its adverse function as a driver of cardiovascular illness (CVD). Although a significant number of studies have reported a deleterious impact of renal smoking), some primary aspects of renal smoking injury are unknown. While renal reasons are not necessarily due to smoke [19].

This research is aimed to improve understanding of the possible consequences of smoking and other CKD risk factors. The correlation between the renal measurements and there have been some independent variables assessed, like cigars, started smoking at less than 25 years of age, height, medical history, and weight. We hypothesized that the period of exposure to cigarette smoke will be associated with improvements in sonographic renal features compatible with CKD.

MATERIALS AND METHODS

This was a observational cross sectional study in which we observe 385 male patients on Ultrasound within Age range of 20Years to 80Years.we assessed all patients by self-questionnaire.

And Data was collected from private sector hospital Gujrat, Pakistan

Inclusion criteria

- Diabetes mellitus
- Hypertension

Exclusion criteria

- All pathologies except diabetes and hypertension
- Individuals below the age of 20 and above 80

STATISTICAL ANALYSIS

Sample size n=385 cases is calculated with confidence level =95% and Estimated proportion as P=0.50. Desired precision of estimate as d=0.05

RESULTS

As we observe 385 males on ultrasound and assessed by self-questionnaire. In which 40.3 %have hypertension and 10.1 % are diabetic.270 patients from 385 have decreased dimensions. Our results show the length, width and parenchymal thickness are decreased .70.1 % smokers have decreased dimensions. There was no statistically effect of hypertension and diabetes on kidney dimensions.

Table -1: Hypertension*in smokers

HTN					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	155	40.3	40.3	40.3
	no	230	59.7	59.7	100.0
	Total	385	100.0	100.0	

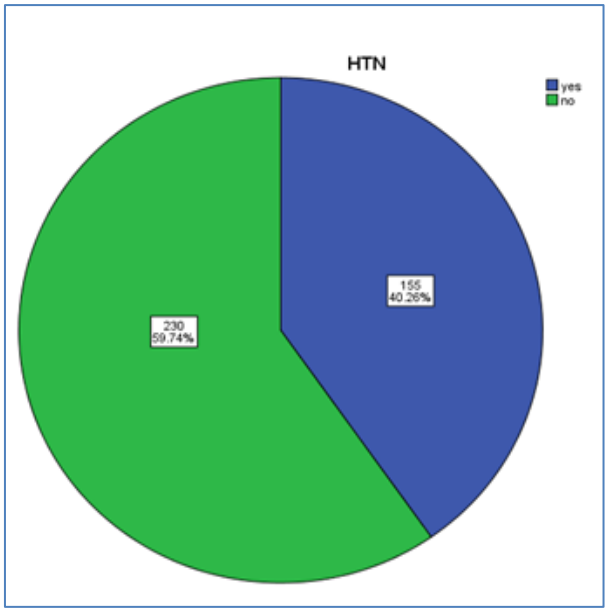

Table-2: Diabetes mellitus*In smokers

DM					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	yes	39	10.1	10.1	10.1
	no	346	89.9	89.9	100.0
	Total	385	100.0	100.0	

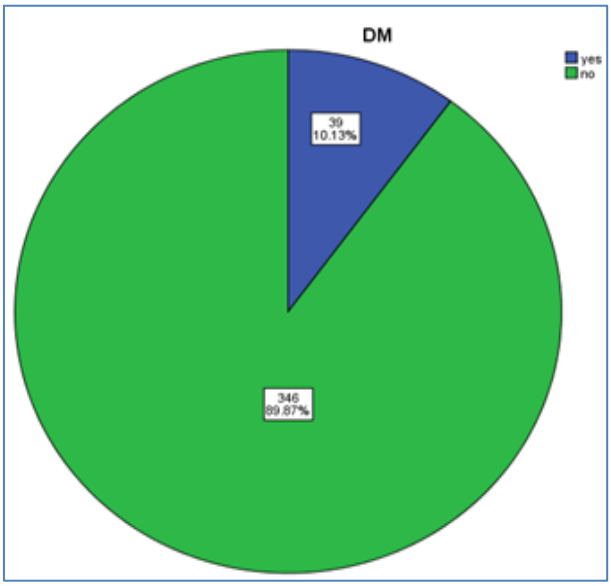

Table-3: Age groups

Age					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	35-45	115	29.9	29.9	29.9
	46-55	194	50.4	50.4	80.3
	56-66	76	19.7	19.7	100.0
	Total	385	100.0	100.0	

Table-4: Cross tabulation of Right kidney length in smokers

right kidney length					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Small (less than 8.5cm)	270	70.1	70.1	70.1
	Normal (8,5-10.5cm)	38	9.9	9.9	80.0
	Larger (greater than 10.5cm	77	20.0	20.0	100.0
	Total	385	100.0	100.0	

Table-5: Cross tabulation of Right kidney length in smokers

left kidney length					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Small (less than 11)	270	70.1	70.1	70.1
	Normal (12.O)	38	9.9	9.9	80.0
	Large (greater than 12.0)	77	20.0	20.0	100.0
	Total	385	100.0	100.0	

Table-6: Cross tabulation of Right kidney width in smokers

right width					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Lower Width (5.2)	270	70.1	70.1	70.1
	Middle (5.9)	38	9.9	9.9	80.0
	Upper (3.3)	77	20.0	20.0	100.0
	Total	385	100.0	100.0	

Table-7: Cross tabulation of left kidney width in smokers

left width					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Lower width (5.0)	270	70.1	70.1	70.1
	middle width (5.4)	38	9.9	9.9	80.0
	Upper (5.7)	77	20.0	20.0	100.0
	Total	385	100.0	100.0	

Table-8: Cross tabulation of parenchymal thickness in smokers

parenchyma thickness					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Lower (less than 14mm)	270	70.1	70.1	70.1
	Normal (14-18mm)	38	9.9	9.9	80.0
	Larger (greater than 18mm)	77	20.0	20.0	100.0
	Total	385	100.0	100.0	

DISCUSSION

PY smoking was associated with decreased renal measurements and the beginning of smoking at the age of 20 or younger. In particular, owing to the lack of a statistically important interaction between kidney measurements and HTN and DM, the opposite correlation between the smoking and renal dimensions is noteworthy.

Although it has been long known that the risk of impairment in renal function increases considerably by smoking [20], the risk ratio in HTN and DM patients is commonly thought to be higher [19, 21-23]. One potential cause for this is that HTN and DM in the research participants have not yet officially been diagnosed.

Latest survey studies on socio-demographic inequalities in prevalence, diagnosis, and hypertension Treatment in Pakistani adults revealed that less than a third of respondents had become aware of their hypertension [24]. Similar studies for diabetes mellitus have been published, indicating that nearly three-quarters of the diabetes mellitus populations are not conscious of their chronic condition [25, 26].

The risk of CKD, particularly for those with high accumulated amounts (> 30 PY), has been demonstrated to increase significantly by smoking [7]. Furthermore, numerous experiments have shown that ultrasound-method kidney measurements, including weight, width, and parenchymal thickness, are associated with renal activity [26-29].

For instance, one study showed that after body height correction, sonographic measurements have been significantly associated with GFR, especially renal lengths and parenchymal thickness [9]. This research is the first to prove that decreased kidney smoking with PY smoking is substantially linked to early smoking at 20 or younger years. Smoking in stable patients with diabetes is an independent indicator of micro-albuminuria [30].

Moreover, the risk multiple factor intervention trials (MRPI) have shown an elevated risk for end-stage renal diseases for smokers relative to non-smokers following age, race, wages, blood pressure, DM, a previous history of myocardial infarction, and serum cholesterol regulation [31, 32]. This is significant because the involvement of urinary albumin provides a sensitive predictor of glomerular injury. Additional research is required to examine the microscopic effects of smoking on the kidney and to investigate whether smoking cessation reverses injury.

The score [33] did not usually generate results in this population sample indicating that the assessment of relatively stable individuals or those with the early-stage disease could have minimal utility. In addition, non-parametric procedures suggested that the median echogenicity in all groups was comparable, consistent with the previous studies which argued that the only echogenicity was a weak predictor for chronic diseases [13, 34, 35]. Although there may be clinical benefits for the difference between echogenic and natural kidneys, particularly when paired with other evaluation criteria, data collected in this study indicate that the non-binary grading might have a lower clinical value. The possible binary association between "normal" and "increased" echogenicity was not examined in this review, in accordance with the expected and confirmed use of scores. There are some drawbacks to this report. Predictive intensity is minimal, and there will be an inevitable chance of recollection, as in any cross-sectional analysis.

While kidney size can be used as a basis for clinical decision-making, questions about measuring accuracy have prompted others to request that other measurements [36] be undertaken that were not performed in this study [35]. In addition, racial homogeneity and the excessive use of male tobacco products restrict the generalizability of the sample community. Another disadvantage is that GFR, the most common renal index [12], was not used to test participants.

However, several studies have demonstrated that ultrasound is linked to GFR [11, 37] and ultrasound is ideal in resource-poor conditions for assessments of chronic kidney disease 38]. The GFR benchmark is insulin, which is seldom used as inconvenient although costly [7, and in certain instances, sonographic evaluation can be even more precise than some endogenous labels[38].

CONCLUSION

Higher history of smoking was related to decreased Sonographic kidney dimensions after controlling for HTN and DM. HTN and DM still have no major effect on kidney measurements, and the efficacy of echogenicity is doubtful. As we observe 385 males on ultrasound and assessed by self-questionnaire. In which 40.3 %have hypertension and 10.1% are diabetic.270 patients from 385 have decreased dimensions. Our results show the length, width and parenchymal thickness are decreased .70.1 % smokers have decreased dimensions. There was no statistically effect of hypertension and diabetes on kidney dimensions.

Conflict of interest: Nil

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