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Asymptomatic women prevalence and risk factors of proteinuria

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ABSTRACT

Introduction: Proteinuria is an established predictor of developing renal disease. *Aim:* To assess the risk factors and prevalence of proteinuria in asymptomatic women. *Method:* Descriptive cross-sectional community-based study was conducted in the Taif city. Four centers were chosen at random, and samples were taken from each of them, all women over the age of 18 years. Between February and March 2022, the study was carried out. The information was gathered using an interview-based questionnaire and a urine dipstick to check for proteinuria. *Result:* Interviews with 400 female participants in total took place. The average age was 1.15250, and 42.8% of them were between the ages of 20 and 30. A college degree or other higher education was held by almost 41% of the participants. A prevalence of 0.4 was found among the 160 study participants, had proteinuria. Obesity (18%), a poor diet (33.5%), high blood pressure (26.8%), and a lack of exercise (60.5%) were the top four risk factors for proteinuria. Only 23.8% of the samples (76.2%) have a family history of chronic disease, and the distribution of chronic disease was 10.5%. More than two thirds of the samples (76.2%) do not have any chronic diseases. Inadequate renal function (12%), high cholesterol (5.8%), diabetes (18%), and hypertension (18%) were all present. *Conclusions:* Proteinuria was highly prevalent. It has been established that lack of exercise, a diet, family history, BMI, hypertension, and diabetes are statistically significant risk factors for proteinuria.

Keywords: sociodemographic, prevalence of proteinuria and proteinuria risk factors

1. INTRODUCTION

Proteinuria is the medical term for when there are too many proteins in the urine. Urine rarely contains any protein in healthy individuals; abundance is a sign of sickness. Severe proteinuria can result in nephrotic syndrome, which worsens body edema. Proteinuria frequently has no symptoms and may only be discovered by accident. End-stage renal disease (ESRD), all-cause mortality rates, and cardiovascular mortality rates are all well-known predictors of proteinuria (Ramirez et al., 2002). Recent research suggests that even in the non-diabetic population, low grades of proteinuria or microalbuminuria may be linked to early renal disease (Ramirez et al., 2002). Determining the risk

factors that cause the emergence of proteinuria has become more important because such research may make it easier to focus preventative and therapeutic efforts to delay the progression to serious renal impairment (Ramirez et al., 2002). Regardless matter the cause, chronic kidney failure is a growing public health issue on a global scale (Rosas et al., 2005). There are other negative effects associated with impaired kidney function besides the complications and influence on end-stage renal disease developing (ESRD).

A growing body of scientific evidence points to a meaningful connection between proteinuria and the progression of other conditions like neurologic and serious cardiovascular diseases (CVD). Notably, growing evidence suggests that early detection and treatment can prevent or delay some of these negative outcomes (Rosas et al., 2005). Unfortunately, under diagnosis and/or under treatment of renal disease often leads in missed opportunities for prevention (Rosas et al.,2005). Lack of longitudinal research identifying risk factors for ESRD is a significant obstacle in identifying persons at risk for developing kidney disease. In addition to being a key indicator of both primary and secondary nephropathies, additionally, proteinuria has a different pathogenic role in the emergence of these diseases. Along with the serum creatinine level, a urine test for red blood cells, and a renal ultrasound, the fundamental nephrological examination also includes qualitative and quantitative information on proteinuria. Although it cannot distinguish between microalbuminuria and Bence-Jones proteinuria, the dipstick test is frequently used to check for proteinuria (free light chains, for instance, in multiple myeloma) (Vachek et al., 2018).

Proteinuria is a sign of renal damage and is frequently noticed before any noticeable drop in glomerular filtration rate. In addition to being a danger indicator for renal function decrease, nowadays, proteinuria is widely acknowledged as a separate risk factor. for the advancement of renal disease and cardiovascular disease (Currie et al., 2013). Although the glomerular basement membrane thickening and mesangial expansion are the typical pathological alterations in DKD, these changes by themselves do not easily explain how individuals develop proteinuria. Our focus has changed to include these glomerular filtration barrier cells in the emergence of proteinuria in DKD as a result of recent developments in the biology of podocytes and glomerular endothelial cells. In this review, the pathophysiological mechanisms at the cellular level can cause proteinuria to develop in DKD patients are discussed (Jefferson et al., 2008).

One of the most crucial instruments in the modern pediatric nephrology diagnosis process is the urine dipstick. The most effective way to treat the most common disorders, such as proteinuria, hematuria, and urinary tract infection, is with this test. It provides trustworthy information for a very small money outlay (Mohammed et al., 2020). A significant public health issue, chronic kidney disease places a financial strain on global health care budgets. Early identification of renal disease was crucial for determining how quickly it will proceed to end stage renal disease (ESRD). Since the Kingdom of Saudi Arabia lacks available information about proteinuria screening, this study used dipstick screening for proteinuria and related risk factors to find kidney disease early. As a result, chances will exist to stop the progression of kidney injury.

2. MATERIALS AND METHODS

Descriptive cross-sectional community based study, was conducted in the Taif city. Taif governorate is classified as a category (A) governorate and it consists of 19 administrative centers, of which eight centers are in category (A): Al-Shifa, Al-Hada, Ashira, Al-Sail Al-Kabeer, Al-Atif, Al-Mahani, and Qaya, in addition to the Taif Center random, four centers were selected, and samples were collected from them,the sample size was calculated using OpenEpi software. The study included all persons who were above 18 and had lived in Taif at least one year. If participant had renal disease, high blood pressure or diabetes is excluded. We got informed consent from 400 study participants. Interviews of the participants were taken after explaining the study procedure and obtaining the informed written consentand a survey using a pre-designed, pre-tested proforma was conducted. The three-month trial took place between February and March 2022. The information was gathered using an interview-based questionnaire and a urine dipstick to check for proteinuria. Urine from the midstream was collected in a pristine plastic container. The urine is tested within half hour by dipstick and result obtains immediately by change in color. The sample is repeated if positive by early voiding urinary screening.

The variables included in the data collection proforma were sociodemographic variables like age, level of education and risk factors variables like: Diet, history of chronic disease, exercise and then blood pressure (BP) was measured by Omron blood pressure apparatus and according American Medical Association (AMA) guidelines, individuals was diagnosed with hypertension if systolic BP>140 mmHg and/or diastolic BP>90 mmHg on at least two occasions and According to American Diabetic Association (ADA) guidelines, two abnormal blood sugar values—fasting blood sugar of 126 mg/dl or post-meal blood sugar of 200 mg/dl—or a random blood sugar of 200 mg/dl along with the conventional symptoms of diabetes (polyphagia, polyuria, and polydipsia—were

diagnostic of diabetes. By dividing weight in kilograms by the square of height in meters, the height, weight, and body mass index (BMI) were computed. All of this ware meager to evaluate the risk elements of proteinuria.

The data collected were entered in MS Excel and analysis was done using statistical software IBM SPSS version 20.0. All the categorical variables were described as proportions. Descriptive statistics in term of frequency tables with percentages and Means, standard deviations were presented with relevant table representation for quantitative data. Chi square test was done to compare between two proportions. P value of 0.05 or less is considered statistically significant.

Ethical consideration

The study had obtained the ethical clearance from ethical committee at Al -Taif University No (HAO-02-T-105) before data collection. No potential identifiers such as name, email or phone no. At the outset of the questionnaire, participants were questioned for their agreement. Message for explaining the major aim of the research was written at the beginning of the survey in order to give the participants clarifications about the research. By agreeing to answer the survey, that has considered as approval of the participants to involving in the study. Additionally, all of the collected data were kept with the researchers in order to protect persons' confidentiality who involved in this study.

3. RESULTS

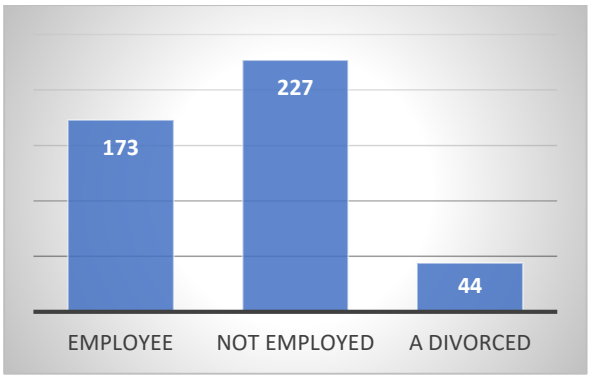
A total of 400 female members were questioned. The Std The average age of study participants was 1.15250 years; nearly half (42.8%) of them were in the 20 to 30 year age range, followed by the 41 to 50 year age range (20.5%), and only 17.8% were over the age of 51. and only 19% were illiterate, with roughly 41% having completed at least 10 years of normal school and about 29.3% having a postgraduate degree (Table 1, graph 1 and 2). The prevalence of proteinuria was 0.4% among the 160 study participants, with proteinuria present in 40% of them (Table 2).

Table 1 Demographics data include, Age, Level of education (n=400)

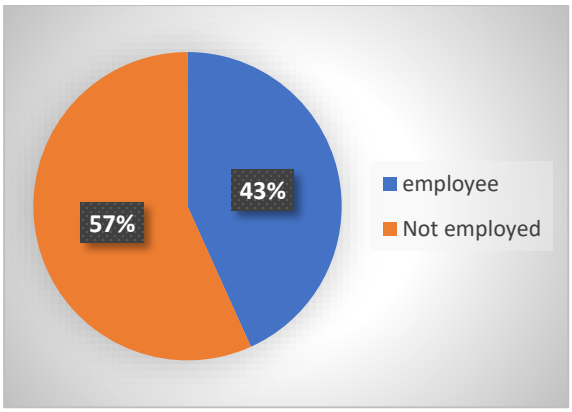
Variables	Frequency	Percent	Mean	Std. Deviation	PV
Age:					
20 to 30	171	42.8	2.1325	1.15250	.008
31 to 40	76	19.0			
41 to 50	82	20.5			
> 51	71	17.8			
TOTAL	400	100			
education levels					
Illiterate	76	19.0	2.9225	1.12902	.134
Some study(read and write)	43	10.8			
Complete 10 years of regular school	117	29.3			
University or postgraduate education	164	41.0			
TOTAL	400	100			

Table 2 Distribution of study participant according to resalt of urine albumin (n=400)

Variables	Frequency	Percent	Mean	Std. Deviation
Proteinuria				
Positive	160	40.0	1.6000	.49051
Negative	240	60		
TOTAL	400	100		



Graph 1 Marital status among study sample (n=400)



Graph 2 Work status among study sample (n=400)

According to the research, the biggest risk factor for proteinuria (60.5%) was a lack of activity, which was then followed by a poor diet (33.5%), high blood pressure (26.8%), obesity (18%), and high blood sugar levels (lowest risk factor) (Table 3). Only 23.8% of the sample (more than two thirds) had a family history of a chronic illness, which was distributed as follows: high cholesterol (10.5%), diabetes (5.8%), hypertension (18%), and impaired kidney function (12%) (Table 4). When asked why they do not eat a healthy diet, more than half of the study sample (66.5%) responded that they don't feel the need to modify their diet (12.5%), followed by (10.7%) getting bored with a certain dish and (10.3%) not having a choice (Table 5).

Table 3 The Risk factors ofproteinuria in study sample (n=400)

Variables	Frequency	Percent	Mean	Std. Deviation	PV
Eating un healthy Diet	134	33.5	.6500	1.07256	.007
High Blood pressure	107	26.8	1.9475	.76564	.001
High Blood Sugar	26	6.5	1.3300	.59328	.080
BMI (Obese)	72	18.0	2.7025	.81894	.000
Exercise	242	60.5	1.6050	.48946	.000
Family history of chronic disease	95	23.75	5.9325	1.96917	.000

Table 4 Distribution of family history of chronicdsease among sample size (n=400)

Variables	Frequency	Percent	Mean	Std. Deviation
No filmy history of chronic disease	305	76.2	5.9325	1.96917
Hypertension	18	4.5		
Diabetes	23	5.8		
High cholesterol	42	10.5		
Insufficient kidney function	12	3.0		
TOTAL	400	100		

Table 5 The causes of eating unhealthy diet (n=400)

Variables	Frequency	Percent	Mean	Std. Deviation
Eating healthy diet	266	66.5	.6500	1.07256
I don't have a chance to choose	41	10.3		
Boredom from selected food	43	10.7		
I don't feel that I need to change the diet	50	12.5		
TOTAL	400	100		

4. DISCUSSION

In our study population, proteinuria was present 0.4% of the time. This prevalence was lower than a cross-sectional study by Manan Jhawar and Venkatachalam Jayaseelan in urban Puducherry, India, which revealed a prevalence of 9.3% in a neighborhood served by an urban health center (UHC) and its surrounding communities (Jhawar et al., 2017). It might be because the other study was carried out on an older population because the average age of the participants in that study was 38.5 years whereas the average age of the participants in our study was 35.5 years and it is not far from Tamil Nadu's adult rural population's 0.47% prevalence of proteinuria (Ahmed et al., 2006). The percentage of women whose high blood pressure and/or high blood sugar levels were found were determined to be 26.8% and 6.5% respectively as potential causes of proteinuria.

In our study, we discovered a number of people who reported feeling well and being free of any hypertension or diabetes mellitus indications or symptoms. resembled a cross-sectional study conducted by Manan Jhawar and Venkatachalam Jayaseelan remarkably, which discovered percentages of 27.9% and 13.5%, respectively (Jhawar et al., 2017), and according to a cross-sectional study conducted in Tamil Nadu's Villupuram district, 18% and 24.3%, respectively, of people had diabetes mellitus and hypertension (Kazancioğlu et al., 2013). The research conducted by Ramirez et al., (2002) revealed that dipstick-positive proteinuria was independently correlated with blood pressure readings, even at levels considered to be within the normal range; however a study conducted by Kazancioğlu et al., (2013) found a prevalence of hypertension of 23.3%.

The current investigation revealed that statistically significant risk variables for proteinuria included diabetes mellitus and hypertension (p value .001, .080). One of the most important yet controllable risk factors for ESRD in the twenty-first century is obesity. By lowering podocyte density and raising glomerular capillary wall tension, glomerular hypertrophy and hyperfiltration may hasten kidney damage (Kazancioğlu et al., 2013). An extensive epidemiologic study from Sweden showed how obesity contributes to chronic kidney disease. Additionally, a study by Kazancioğlu et al., (2013) discovered that, compared to BMIo25 kg/m2, being overweight (BMIX25 kg/m2) at age 20 was significantly related with a threefold increased risk for developing chronic kidney disease (CKD). Obesity (BMIX30 kg/m2) in men and morbid obesity (BMIX35 kg/m2) in women was associated with three- to fourfold increase in the chance of developing CKD over the course of a lifetime.

A cross-sectional cohort research examining the connection between proteinuria and BMI in a sizable Japanese population found that proteinuria was considerably more common in men with a BMI 20.4 kg/m2 than in women with a BMI 18.4 kg/m2. In contrast, proteinuria was also substantially linked with a BMI 25.5 kg/m2 in men as opposed to a BMI 22.5 kg/m2 in women (Sato et al., 2013). While unhealthy eating is the highest percentage of the factors contributing to the occurrence of proteinuria (33.5%).

In our research, we found the causes of eating an unhealthy diet I don't think I need to change my diet (12.5%), while the second-ranked reason was being bored with the cuisine I chose. According to the study, obesity is a statistically significant risk factor for proteinuria (p value.000) (10.7) because overweight people make up 39.8% of the sample, and the lowest causes were I have no choice in the matter (10.3%), Furthermore there was a significant link (P value.007) between eating an unhealthy diet and having proteinuria. In a prior study, we discovered that 2.4% of women and 3.9% of men had proteinuria after a year of follow-up. After adjusting for age, baseline lifestyle scores, hypertension, diabetes mellitus, and hypercholesterolemia, there was a reduced (or increased) for each change in the overall healthy lifestyle scores, there is an increased (or decreased) Proteinuria risk is present in both males and women (odds ratio (OR) 0.87; 95% confidence interval (CI), 0.81-0.94). Similar results were obtained from stratified analyses based on age, hypertension status, or diabetes mellitus (Wakasugi et al., 2017).

Proteinuria caused by exercise is often not harmful and is more of a function of exercise intensity than exercise duration. Most likely to experience it are athletes who compete in sports like running, swimming, rowing, football, or boxing. It is likewise temporary and lasts for about 24 to 48 hours. Exercise-induced proteinuria can easily be recognized (Saeed et al., 2012), More than half of the group in our study (60.5%) engaged in exercise, and there was a highly statistically significant correlation between

activity and proteinuria (P value .000). Most crucially, even after accounting for age, sex, race, diabetes, hypertension, and socioeconomic position, Drawz et al., (2012) report a significantly higher risk for ESRD associated with a positive family history (adjusted hazard ratio of 1.93; 95% confidence interval, 1.22-3.07). There is no research showing the relationship between the family history and proteinuria our study showed a statistical relationship between family history and present of proteinuria (p value.000).

5. CONCLUSIONS

In our study population, there was a significant amount of proteinuria, which was typical of most studies conducted worldwide. Exercising, eating poorly, having a family history, measuring one's body mass index (BMI), having high blood pressure, and having diabetic mellitus, statistically significant risk variables for proteinuria were discovered. Increased early detection, beginning treatment of proteinuria risk factors that can be changed, and proper treatment for CKD will result from knowledge of the risk factors and implementation of screening of at-risk groups. This will lessen, and early detection of CKD risk factors could be beneficial to lessen the financial burden brought on by the expense of renal replacement therapy. Exploring solutions to reduce the growing chronic renal disease burden in various contexts can be aided by more study (CKD).

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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