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EPIDEMIOLOGY OF CHRONIC KIDNEY DISEASE AMONG OLDER ADULTS IN HAIL, SAUDI ARABIA: COMMUNITY BASED STUDY

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ABSTRACT

Chronic Kidney Diseases (CKD) is becoming a major public health problem among elder in Saudi Arabia. The high prevalence of diabetes and hypertension is a main factor aggravating this problem. The aim of this study is to determine the prevalence of CKD and CKD risk factors among adult population in Hail region – Saudi Arabia. This is a cross sectional survey collected data from around 5000 Saudi from general population during the period from 2012 to 2013. Participants were selected from PHCs by simple random method. A team of physicians, paramedicals and medical students shared in data collection from 30 PHCs out of 105 in Hail Region, KSA, during a comprehensive survey for CKD.The GFR estimation was done for 775 individuals, among whom, 393/775 (50.7%) were found with impaired kidney function). Of the 393 persons with CKD, 2/775(0.6%), 7/775(0.9%), 97/775(12.5%), 206/775 (26.6%) and 81/775 (10.5%) were found with stage V, Stage IV, stage III and stage IV of the CKD, respectively.In almost every country the proportion of elder people is increasing as a result of longer life expectancy due to the development of Primary Health Care services. Chronic kidney disease (CKD) is a very common clinical problem in elderly patients and is associated with increased morbidity and mortality. CKD is a disease of older people, and simple treatments can slow the progression of the disease and improve quality of life.

KEYWORDS: Chronic Kidney Disease (CKD), Elderly, GFR, Risk Factors, Saudi Arabia

The increasing of proportion of elderly population and the increasing prevalence of Chronic Kidney Diseases (CKD) put CKD on the top of Public Health Problem in Saudi Arabia (Ginawi I, 2014). Also the high prevalence of diabetes, hypertension and chronic renal failures, automatically will increase the burden of those diseases and overwhelmed the health care system (Ginawi I, 2014). In presence of Chronic kidney disease (CKD) together with other non-communicable diseases like diabetes or hypertension have poor health outcomes (Andrew S, 2014). Globally the prevalence of CKD including its milder forms is about 5-7% and is likely to be more in developing countries (Sheela P, 2016).Chronic kidney disease is defined as a Glomerular Filtration Rate (GFR) of <60 ml/min/1.73m2 or damage of the kidney markers, for example albuminuria, for more than 3 months (United nation report, 2014).Chronic kidney disease(CKD) is a condition characterized by a gradual loss of kidneyfunction over time (Kidney Disease Outcomes Quality Initiative (Sheela P, 2016). Screening for early identification of individuals with CKD is an important issue that provides substantial opportunities for effective and usefulinterventions that minimize the risk of kidney failure, or complications of renal dysfunction (K/DOQI, 2004). Signs of kidney damage characteristically include proteinuria but other markers of damage, such as persistentglomerulonephritis or structural damagefrom polycystic kidney disease; can also be present (Hussain, 2014).The prevalence of chronic kidney disease (CKD) is one of the most serious public health problem growing among elderly (William M, 2016).This high prevalence of CKD in the elderly can be explained by increasing of the prevalence of main risk factors for CKD; diabetes and hypertension as well as due to new definitions that have expanded the estimated glomerular filtration rate (eGFR) range for CKD (May M, 2014).

CKD is associated with end-stage renal disease (ESRD) and increases morbidity and mortality and cost of the health care system (US renal data, 2013).Various creatinine-based formulae are used to estimate GFR, including the Modification of Diet in Renal Disease (MDRD) and Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equations. Few older adults were included in the development of these estimating equations, although validation of these equations using iohexol or measured creatinine clearance as the reference standard in older cohorts have generally shown that these equations are reasonably accurate (Leila M, 2013).Agencies that monitor growth and aging trends worldwide (e.g., World Health Organization, United Nations, and U.S. Department of Commerce) have increased the number of reports focusing on demographic profiles of Arab countries. Total average life expectancy for 2014 was 74.8 years (72.8 male and 76.9 female) and predicted to increase. In 2013, the WHO estimated approximately 4.3% of the population in Saudi Arabia to be between 55 and 64 years of age and about 2.79

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percent were aged between 65 years and above (United nation report, 2012).However the United Nations (2012) predicts the population of Saudi Arabian persons aged 65 and above will continue to increase, and this older population will make up 18.4% of the total population in 2050 (Murphy D, 2010). And this increase in the number of older population will make a direct impact on health care system, staffing, care costs, programs and service availability; as well as indirect impact on the funding of all other aspects of other services. As a population, older patients with advanced chronic kidney disease have a tendency to present later for dialysis (nancy J, 2016), have a higher number of comorbid conditions, are at higher risk of cognitive dysfunction (Reodrick P, 2002)and have increased levels of frailty (Kurella M, 2005), all combined with potential sensory impairments such as declining vision. Nutrition is also often a major problem for these patients. All these factors make any treatment modality difficult for older patients with end-stage renal disease (ESRD) (Johansan KL, 2007).

As far as our knowledge the studies investigating demographic risk factors especially the age in Saudi Arabia are limited. Also there were a very few attention was paid to the importance of age with kidney function. Therefore the aim of this study is to Determine the prevalence of CKD and CKD risk factors among adult population in Hail region; measure population distribution of renal function; and identify associated risk factors in CKD patients detected.

MATERIALS AND METHODS

This is a cross sectional survey collected data from around 5000 Saudi from general population during the period from 2012 to 2013. Participants were selected from PHCs by simple random method. A team of physicians, paramedicals and medical students shared in data collection from 30 PHCs out of 105 in Hail Region, KSA, during a comprehensive survey for CKD. Participants were recruited to the local PHC in each area before one week of the campaign. Data were collected by the physicians of the team using standard questionnaire, which included socio-demographic data, previously diagnosed diseases (hypertension, kidney and cardiovascular diseases, diabetes and others) and familial history of hypertension, diabetes, kidney, kidney stones, urinary tract infection, cardiovascular diseases, analgesic abuse and herbal use. In general elderly is refer to those 65 years of age or above, there is heterogeneity in function, lifestyle, and life expectancy. Although some younger patients have worse physiological impairment than certain octogenarians. So in this study, elderly means those age 65 years or above unless otherwise mentioned. An analytical cross-sectional study was carried out in 2013–2014, combining epidemiological and clinical elements, including active screening for CKD cases and risk factors in the population aged ≥65 years in in Hail region. GFR was calculated using the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) creatinine equation (Dousdanpanis P, 2012). CKD was indicated based on the presence of protein urea and level of GFR. All individuals with a glomerular filtration rate (GFR) <60 mL/min/1.73 m2, were regarded as having KCD. CKD stages were categorized according to the following:

Stage I: Kidney with normal GFR (90 ml/min/1.73m2or above).

Stage II: Kidney with mild decrease in GFR (60 to 89 ml/min/1.73m2).

Stage III: Kidney with moderate decrease in GFR (30 to 59 ml/min/1.73m2).

Stage IV: Kidney with severe reduction in GFR (15 to 29 ml/min/1.73m2).

Stage V: Kidney failure (GFR less than 15 ml/min/1.73m2).

ETHICAL CONSIDERATIONS

Written informed consent was obtained from all participants, who agreed with publication of their results, ensuring confidentiality. All patients received clinical follow-up by local health services.

RESULTS

The total number of study population was 775 with 505 males and 270 females. The minimum age was 65 years old and the maximum was 101 years with a mean age of 73 years. The GFR estimation was done for 775 individuals, among whom, 393/775 (50.7%) were found with impaired kidney function). Of the 393 persons with CKD, 2/775(0.6%), 7/775(0.9%), 97/775(12.5%), 206/775 (26.6%) and 81/775 (10.5%) were found with stage V, Stage IV, stage III and stage IV of the CKD, respectively, as shown in figure 1.

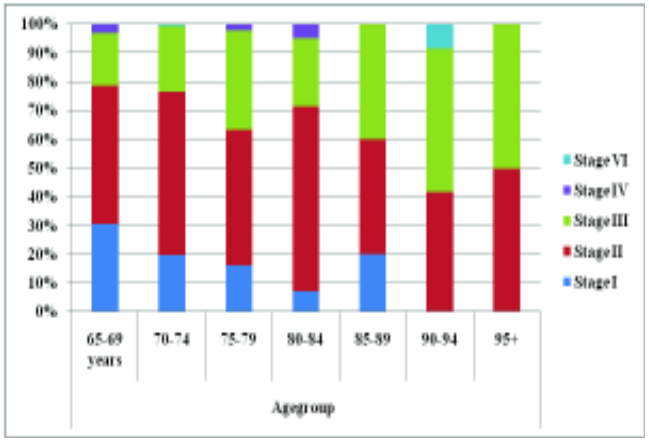

Figure 1: Description of the Study Population Age and Different Stages of CKD

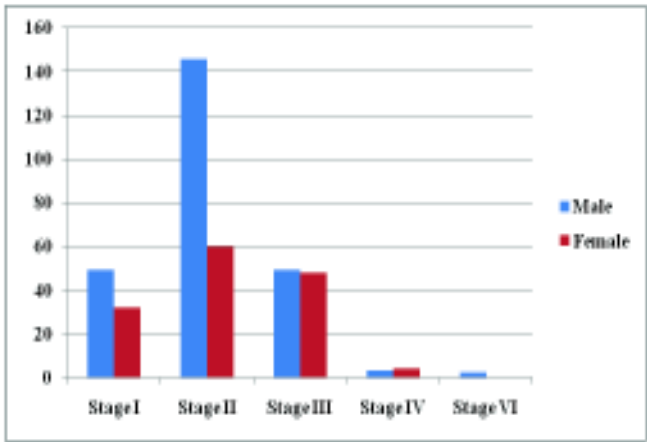

Figure 2: Description of the Population By Gender and Different Stages of CKD

Concerning the distribution of different stages of chronic kidney diseases, it's obviously that the end stage VI was present among men only. On the other hand, the prevalence of stage II was more frequent among men than women, while stage IV was slightly increased among women. The rest of stages (I & III) are more frequent in men than women as indicated in Fig 2.

Figure 3, summarizes the relationship between the main risk factors (diabetes, hypertension and obesity)and the age. However, the peaks for most risk factors were at age range 70-74 years, followed by age range 65-69 years. And the lower age group was 95 years and above.

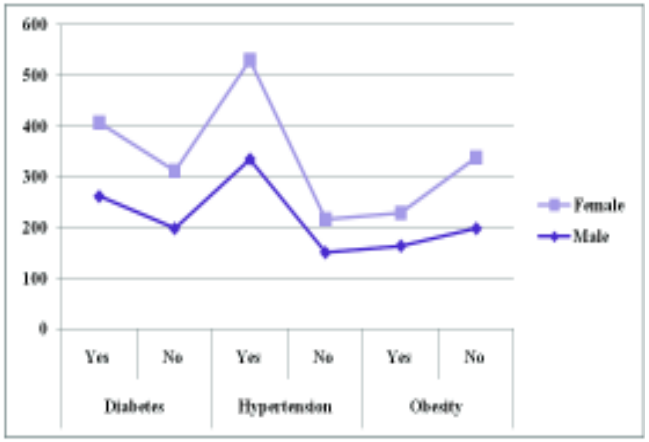

Figure 3: Relationship between the Main Risk Factors (Diabetes, Hypertension and Obesity) and Age

Table 1 shows the relationship between other risk factors and age. However, the peaks for most risk factors were at age group of 70-74 years, followed by age range 65-69 years, hence the lower group was 95 years and above.

Table 1: Distribution of the Study Population by Some Risk Factors for CKD and Age Group

Age group	Diabetes	Hypertension	Obesity	Renal stones	UTI	CHF	NSAIDs	Herbal use
65-69	143	148	95	10	15	1	28	24
70-74	130	167	102	10	21	3	29	20
75-79	57	91	66	2	10	5	14	11
80-84	45	62	42	2	7	3	14	9
85-89	18	34	14	2	3	0	6	4
90-94	9	17	12	2	2	1	5	3
95+	5	12	8	1	1	0	3	1

DISCUSSION

The study showed that there is a high prevalence of CKD in the elderly in Hail region. The findings of the present study showed similar prevalence of CKD with age among the elder people with that reported from USA, Canada and Europe (Chris E, 2008). This is mostly precipitated by the high prevalence of main risk factors for

CKD such as diabetes, hypertension and obesity (I Ginawi, 2014). To develop prevention and control strategies for CKD the work on those diseases is highly needed so as to reduce their burden. And the identifying of those group of diabetic and hypertensive patients is needed so as to target them with suitable intervention. On the other hand there was a need to expand the active detection of existing perception of health care, social, and economic at both the individuals and the community level. It is so interesting that a large proportion of our sample was diagnosed to have diabetes mellitus and hypertension in addition to their renal impairment. In many cases, the most plausible cause for CKD was diabetes, hypertension or both. It's well known that the morbidity and mortality statistics are now shifting from infectious diseases to non-communicable diseases (NCDs) in many developing countries, including Saudi Arabia and (NCDs) are considered as the primary cause of death among adults in Saudi Arabia, a World Health Organization report showed that (78%) of the total deaths during 2014 are from NCDs, of which (46%) of them from cardiovascular diseases (Levey S, 2009).Saudi Arabia was exposed to a great epidemiological changes, rapid economic development and ageing population. There for a major movements were happened in lifestyles in term of: high caloric and rich fat-diet consumption; low physical activity and subsequently rapid increase in prevalence of obesity among different age-groups (I Ginawi, 2014). However it is responsible of an increase in the prevalence of diabetes mellitus and hypertension (WHO, 2014). However, Saudi Arabia is among the top 10 countries with higher prevalence of diabetes globally (Alhyas L 2012). A study from Saudi Arabia revealed that the prevalence of DM of 23.7% (United nation report, 2014).Our results in this elderly population from Hail region – Saudi Arabia are consistent with other studies showing an increased prevalence of CKD among in the elderly (Aghogho, 2016).

STRENGTHS AND LIMITATIONS

The strength of the study is that, it is a unique study in the region and even in the Kingdom of Saudi Arabia as it's a first community based study. The study could detect the advanced stages of renal disease which are already diagnosed by tertiary care hospitals and very few of earlier stages.

CONCLUSION AND RECOMMENDATIONS

The prevalence of CKD among older people continue to rise, therefore we recommend more integration between physician nephrologists, Family physicians and primary care in the community and social care for elderly. Also simple treatments through endorsed guidelines can slow the progression of the disease and improve quality of life. Provision of amore comprehensive preventive strategy and better care plan for CKD should be achieved by future international collaborative efforts and research.

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