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 kidney function 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 useful interventions 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 damage from 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
percent were aged between 65 years and above (United
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,
paramedics 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.
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.

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>
<thead>
<tr>
<th>Age group</th>
<th>Diabetes</th>
<th>Hypertension</th>
<th>Obesity</th>
<th>Renal stones</th>
<th>UTI</th>
<th>CHF</th>
<th>NSAIDs</th>
<th>Herbal use</th>
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<tr>
<td>65-69</td>
<td>143</td>
<td>148</td>
<td>95</td>
<td>10</td>
<td>15</td>
<td>1</td>
<td>28</td>
<td>24</td>
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<tr>
<td>70-74</td>
<td>130</td>
<td>167</td>
<td>102</td>
<td>10</td>
<td>21</td>
<td>3</td>
<td>29</td>
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<td>57</td>
<td>91</td>
<td>66</td>
<td>2</td>
<td>10</td>
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<td>62</td>
<td>42</td>
<td>2</td>
<td>7</td>
<td>3</td>
<td>14</td>
<td>9</td>
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<tr>
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<td>34</td>
<td>14</td>
<td>2</td>
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<tr>
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<td>8</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**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.

REFERENCES


GINAWI: EPIDEMIOLOGY OF CHRONIC KIDNEY DISEASE AMONG OLDER ADULTS IN HAIL, SAUDI ARABIA…


