The Prevalence and Risk Factors for Chronic Kidney Diseases in Kericho County, Kenya

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Abstract

There is rising number of reported cases of kidney diseases from Kericho County. The number of patients attending the local hospitals' hem dialysis has increased in the recent past. From the reports at MTRH, most patients attending dialysis come from Kericho County. Approximately seven out ten patients attending hem dialysis are from Kericho County. This was a mixed methodology research. The prevalence of CKD was determined by reviewing admission data of adult medical patients in the years 2013, 2014 and 2015. The risk factors profile of CKD patients was assessed using a cross-sectional study design. The study population included doctors, nurses and patients. The study used questionnaires, document analysis and interview schedule as the main data collection instruments. The study adopted both the qualitative and quantitative analysis in order to achieve the objectives of the study. Content analysis was used to analyse secondary data. The study found that 57.0% (13 patients) of patients with CKD had used traditional medicines prior to onset of the disease. Doctors and nurses agreed that herbal concoctions may lead to kidney injury directly or indirectly through other side effects that cause dehydration; physical inactivity leads to increased prevalence of CKD via development of obesity, hypertension and diabetes. Tobacco smoking, alcohol abuse and use of over the counter NSAIDs could lead to increased prevalence of CKD in the region. The 3 year average prevalence of CKD was 0.4%, with 78.3% being less than 50 years of age, and 91% having low to medium income ratings. The doctors and nurses were in agreement that exposure to agrochemicals, physical inactivity and herbal medication could be risk factors for CKD. The study concluded that there was an increasing prevalence of end stage renal disease in Kericho County with presence of associated risk factors such as lifestyle, dietary, occupational and cultural factors.

Introduction

The prevalence of chronic kidney disease is on the increase globally, and currently estimated at 10% of the world population, and responsible for 1 million deaths annually. Chronic kidney disease shifted from position 27 in 1990 to position 18 in 2010 on the global list of leading causes of mortality (Jha et al., 2013). The increasing disease burden will result in a greater strain on limited healthcare resources, negatively impacting on the economy, especially in low and middle-income countries (LMIC). The estimated overall prevalence of CKD in sub-Saharan Africa (SSA) is 13.9%, with insignificant difference between the rural (16.5%) and urban (12.4%) communities (Alice, 2016).

Chronic kidney disease (CKD) is a spectrum, ranging from mild stage 1 disease to severe stage 5 disease (end stage renal disease - ESRD), which requires renal replacement therapy in form of hem dialysis or renal transplant. Management of ESRD is very costly to families and the society at large, and is associated with very high morbidity and mortality (El Nahas, 2005). The risk factors for CKD in SSA are broadly due to communicable and non-communicable diseases. The major communicable disease contributing to CKD in SSA is Human Immune deficiency Virus (HIV) epidemic, with the prevalence of HIV associated CKD estimated at 25% in infected patients in Kenya. The chronic non-communicable conditions escalating the prevalence of CKD include diabetes and hypertension, whose prevalence is increasing in line with global trends due to epidemiological transition in SSA (Malindisa, 2016).

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Globally, over 2 million people require renal replacement therapy to be alive, yet this number may only represent 10% of people who actually need treatment to live. The majority of the 2 million people reside in 5 affluent countries; – the United States, Japan, Germany, Brazil (LMIC), and Italy. These five countries represent only 12% of the world population. The major barrier to accessing care is the prohibitive cost required to sustain treatment (Liy anage et al., 2015). In the LMIC early diagnosis and treatment of early renal disease due to hypertension and diabetes can reduce progression to end stage renal disease and will be cost effective. Unfortunately many patients present late with complications (Chertow et al., 2004.)

In India, the burden of CKD has significantly increased, although exact figures vary from region to region. The increase is attributed to the increasing prevalence of diabetes, hypertension and ischemic heart disease in tandem with the global trends. The awareness level among the people is poor. At least 70% of the people live in rural areas with limited access to health care services with the result that CKD is often diagnosed in advanced stages (Plattner, 2013).

In sub-Saharan Africa, the statistics come mainly from urban and peri-urban populations. In 2009 Afolabi and his colleagues put the prevalence among Nigerians in a family practice population at 10.7% (Plattner, 2013). The prevalence of CKD in Ghana has varied over the years; from 1.6% per million people to 4% among hypertensive patients in the Greater Accra region (Agarwal,2009). Recently, a prevalence of 46.9% has been recorded among hypertensive in Ghana (Osafo, 2011).In sub-Saharan Africa, just like in many LMIC, CKD affects mainly young adults in their productive years andis a significant cause of deathin the young adults (Stanifer et al., 2016). A Tanzanian study found the prevalence of ESRD to be 75patients per million populations. In another cohort study of 26 patients, the main risk factors for ESRD were hypertension (30.8%), chronicglomerulonephritis (23.8%), nephritic syndrome(15.4 %), obstructive uropathy (7.7%),and polycystic kidney (3.9%) and underdetermined (15.4%).Early diagnosis and treatment of the underlying risk factors, avoidance of primary kidney insults and institution of secondary preventive measures is imperative in primary prevention or delaying, or possibly halting progression of chronic kidney disease (Dickstein et al, 2008).

In Kenya, there is increased prevalence of CKD, which is partly explained by high risk factors such as lifestyle factors and demographic factors. The increasing life-style related diseases include hypertension, diabetes and metabolic syndrome, in both urban and rural populations (Sigamani, 2012). The level of awareness of CKD and the lifestyle related disease is low and hence the late presentation of patients with complications. Cost of treatment of advanced CKD is substantial. Less than 10% of end stage renal disease patients have access to any kind of renal replacement therapy. There is limited data on CKD to aid in planning interventional measures among the rural and peri-urban communities of Rift Valley and Western Kenya. In the absence of data to highlight the seriousness of this unfolding global epidemic (Johansen et al., 2012), government, communities, patients and healthcare givers will not institute preventive measures, which are known to slow or even stop progression of early stages of CKD. The largest proportion of the Kenyan population (76%), just like in many other LMIC, lives in the rural areas (Kenya demographic profile, 2014.) Other LMIC are experiencing a similar rise in the prevalence of CKD as illustrated below.

In a country with limited resources, it is only appropriate that efforts are directed toward prevention of CKD by targeting the already known risk factors rather than focusing on treatment of those with ESRD. High-risk characteristics that are associated with CKD prevalence can be modified, slowing and even arresting further decline of renal function (Almeida, 2012). The causal roles of kidney specific risk factors such as non-steroidal anti-inflammatory drugs use, lifestyle illnesses, herbal medicine and environmental toxins are well documented and efforts to document their association with CKD will improve health promotion (Chertow et al., 2011). Kidney disease results in the loss or reduction of functioning enthrones. There are also several complications associated with the increased prevalence of CKD. These are anemia, mineral and bone disorders, cardiovascular risks and dyslipidemia (Johansen, 2004).

Statement of the Problem

Chronic kidney disease is a serious public health concern because of the large physical and economic burden on society. CKD leads to high spending on medical expenses, which are costly, and healthy family members have to spend more of their time in hospitals taking care of the sick relatives. Because of this large burden, it is important to determine what risk factors are associated with the development and progression of the disease, especially in early stages. Studies on the prevalence of CKD risk factors help in focusing attention to the magnitude of the burden and planning preventive measures.

Serious deficiencies in knowledge and awareness in intensive care units continue to exist. Although much research has been done on chronic kidney diseases in general, little has been done focusing particularly on factors contributing to the prevalence of these diseases. There is rising number of reported cases of kidney diseases from Kericho County. The number of patients attending the local hospitals hemodialysis has increased in the recent past. From the reports at Moi Teaching Referral Hospital, most patients attending dialysis come from Kericho County. Approximately seven out ten patients attending hemodialysis are from Kericho County. There could berisk factors in the area contributing greatly to this increasing prevalence of chronic kidney diseases in the county.

The problem of this study was to establish the prevalence and risk factors for chronic kidney diseases. The specific objectives were to; determine the prevalence of CKD among adult inpatients; examine occupational exposures among patients with chronic kidney diseases and assess cultural, lifestyle and dietary factors among patients with chronic kidney diseases.

According to White (2009) the incidence and prevalence of CKD has increased in recent years in both developed and developing countries including sub Saharan Africa (SSA) In SSA, CKD affects mainly young adults in their productive years andis a significant cause of death. A study conducted in Tanzania revealed that the prevalence of ESRD is estimated to be 75patients per million populations. Studies follow-up of 26 patients; the main primary cause of ESRD was hypertension (30.8%) chronic glomerulonephritis (23.8%), nephritic syndrome (15.4%), and obstructive uropathy (7.7%), polycystic kidney (3.9%) and underdetermined (15.4%).Early diagnosis and treatment of the underlying cause and of secondary preventive measures is imperative in patients with chronic kidney disease, as it may delay, or possibly halt progression (Agarwal, 2009).

There is no local data on CKD prevalence, however regionally a study done in Nigeria reports a prevalence of 12.4%. Early identification and management of CKD has been shown to reduce the adverse outcomes, which include kidney failure and cardiovascular disease. This review reveals that 4 million Kenyans are living with CKD and no study has been conducted in Kenya and that little in known on the prevalence and risk factors to CKD in Kericho County.

The study adopted the PRECEDE – PROCEED model which was first developed and introduced in the 1970s by Green and colleagues. PRECEDE is based on the premise that, just as a medical diagnosis precedes a treatment plan, an educational diagnosis of the problem is very essential before developing and implementing the intervention plan. Predisposing factors include knowledge, attitudes, beliefs, personal preferences, existing skills, and self-efficacy towards the desired behavior change. Reinforcing factors include factors that reward or reinforce the desired behavior change, including social support, economic rewards, and changing social norms. Enabling factors are skills or physical factors such as availability and accessibility of resources, or services that facilitate achievement of motivation to change behavior (Gielen, 2008).

This model was relevant to the study because it was a participatory model for creating successful community health promotion and other public health interventions. It is based on the premise that behavior change is by and large voluntary, and that health programs are more likely to be effective if they are planned and evaluated with the active participation of those people who will have to implement them, and those who are affected by them. Thus health and other issues must be looked at in the context of the community. Interventions designed for behavior change to help prevent injuries and violence and improve heart-healthy behaviors.

This study reviewed factors contributing to prevalence of chronic kidney diseases. Are view of the literature was conducted to determine the existing body of knowledge on the research topic and to identify any possible commonalities or differences that exist in the searched literature. This enabled the researcher to provide a framework for the study by placing it in the context of current knowledge on prevalence of chronic kidney diseases.

Methodology

This study adopted a cross-sectional survey research design. Cross-sectional studies involve data collected at a defined time. They are often used to assess the prevalence of acute or chronic conditions, or to answer questions about the causes of disease or the results of intervention. They illustrated issues as they exist in the current situation; they may be used to describe some feature of the population, such as prevalence of an illness, or they may support inferences of cause and effect (Ott & Longnecker, 2015). This design was adopted to illustrate the prevalence and risk factors to chronic kidney diseases in Kericho County.

According to Mugenda (2009), target population is a population to which a researcher would like to generalize the result of the study. The study targeted doctors, nurses and patients at Kericho District Hospital. The total population for the study was 97.

Table 1: Target Population

Strata	Target population
Doctors	15
Nurses	59
Patients	23
Total	97

Source (Kericho County Website, 2015)

This population was considered because the doctors and nurses understand the major factors contributing to the prevalence of chronic kidney diseases. The patients were considered for the study because they understand their background and mostly interact with the factors, which could contribute to prevalence of chronic kidney diseases. Census was employed such that all the 15 doctors and 59 nurses participated in the study. Purposive sampling was used to select the patients with CKD (23 patients).

Research Instruments

The study adopted the use of questionnaires, document analysis and interview schedule as the main data collection instrument. Questionnaires were used to collect the required information from the study population. By using self-administered questionnaires information about the factors contributing to prevalence of chronic kidney diseases and other related data was obtained. The questionnaire was developed based on the literature review and reference was also made to the problem identified and objectives set. Questionnaires were administered to nurses.

Document analysis is the systematic examination of instructional documents. The researcher obtained secondary data mainly through existing patients' records to ascertain the prevalence of CKD. The study also employed interview schedules to collect data on the factors contributing to prevalence of chronic kidney diseases. The researcher made appointments to conduct interviews with doctors and selected patients with CKD in Kericho District Hospital. The questions on the interview schedule were guided by the research questions of the study.

Statistical Treatment of Data

The data collected was analyzed using descriptive and inferential statistics. The study adopted both the qualitative and quantitative analysis in order to achieve the objectives (prevalence of CKD patients; occupational exposures among patients; cultural, lifestyle and dietary factors among patients with chronic kidney diseases) of the study but the main data was qualitative. Content analysis was used to analyse secondary data. Data from the interview schedules was organized, coded and overarching themes in the data were build; reliability and validity in the data analysis was ensured and lastly finding possible and plausible explanations for findings. Analysis was done using SPSS (Version 20) a computerized statistical package by encoding responses from questionnaires and providing understandable descriptive results.

Ethical Considerations

To ensure that the study complied with the ethical issues pertaining research undertaking, a permission to conduct the research was sought from the respective authorities. A full disclosure of all the activities concerning the study was explained to the authorities and this involved the study intention, which was only for learning purposes. A high level of confidentiality and privacy was observed and the findings of the study were only submitted to the University and the Kericho District Hospital. A letter of introduction was also obtained from the University to serve as evidence of the purpose of the study. In respect for the informants and in order to protect them from abuse resulting from the data they gave for the research, data was presented in such a way that it does not link to individuals who gave it except by the researcher who might need to seek clarification during analysis of data. Participation in the study by the respondents was free and voluntary in that they could withdraw at any time of the study.

The study is beneficial to the community because it will enlighten them on the risk factors of CKDs hence enable them to avoid the risk factors and reduce the prevalence of chronic kidney diseases.

Results and Discussions

Demographic Characteristics of the Respondents

The study sought to establish the demographic characteristics of the respondents including gender, age, education level, income and occupation of the patients. The study results were as follows:

Table 2: Gender of the Respondents

Patients		
Gender	Frequency	Percent
Male	13	56.5
Female	10	43.5
Total	**23**	**100**

Fifty-six point five (56.5) % of the respondents with CKD were males while 43.5% were female. This may suggest a higher prevalence of CKD in males compared to the females, or it could have been a coincidence that many males attended the hospital at the time of the interview. Surprisingly, all the doctors interviewed were of the opinion that CKD was common in males than females.

Table 3: Age of the Respondents

Patients with CKD

Age bracket	Frequency	Percent
Below 30 Years	4	17.4
31-40 Years	7	30.4
41-50 Years	7	30.4
Over 50 Years	5	21.7
Total	**23**	**100**

The majority (78.3%) of the subjects with CKD were below the age of 50 years, which represents the young adults who are economically productive. The age of onset of CKD may be important in next research, since the disease appear early in our setup. According to the doctors interviewed, majority of CKD patients are adults and rarely children.
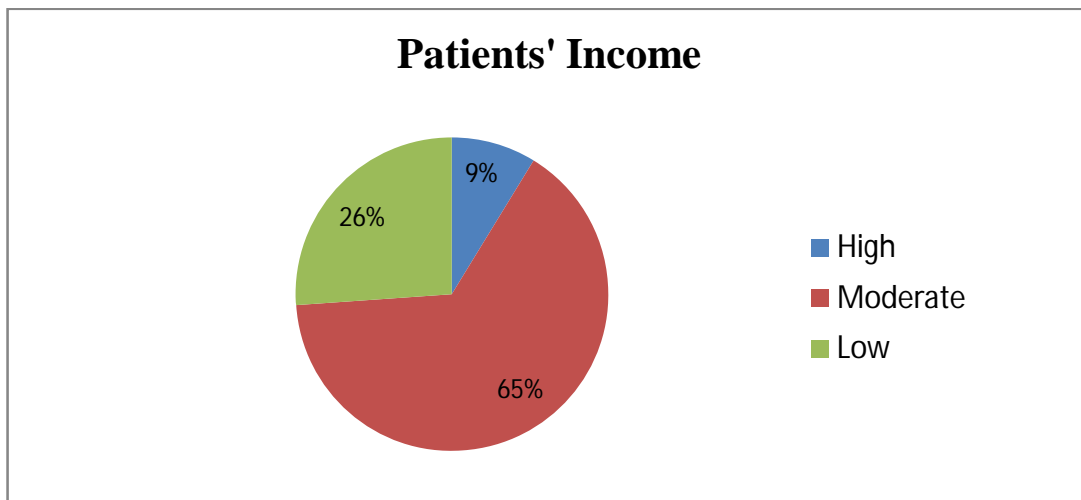

Figure 3. Income of the patients.

The study results on the income of the patient respondents indicated that 9.0% rated their income as high, 65.0% rated their income as moderate whereas 26.0% rated their income as low. Therefore, majority of CKD patients had moderate to low income. During the interview of doctors, they suggested that low to moderate income played a role in delayed diagnosis and proper management of CKD, and that patients may resort to herbal remedies which worsen their condition. On the other hand, the high-income group is prone to diseases of lifestyle such as hypertension and diabetes, which leads to CKD (The basis for the classification of income was as suggested by Yusuf et al., 2011).
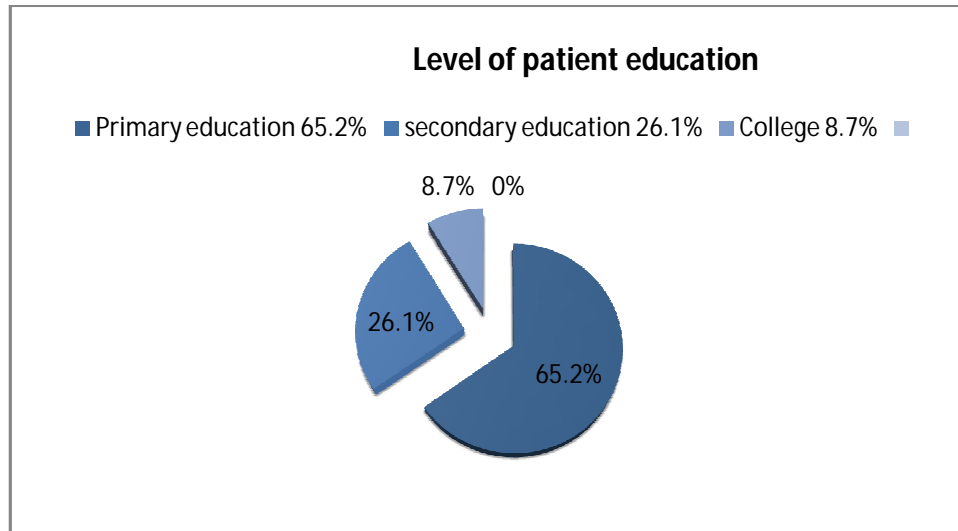

Figure 4. Level of patient education

Majority of patients (65.2%) had a low level of education (primary school), with 8.7% only having attended college level education. On the influence of education, majority of the doctors were in agreement with the possibility that low level of education may cause delay in seeking appropriate medical treatment, while those with a higher level of education may seek treatment early, and may be aware of the risk factors of CKD.

Prevalence of Chronic Kidney Diseases

The clinical and epidemiological studies show a clear relationship between numerous risk factors and the initiation and progression of CKD. Although kidney function declines with age and exhibits considerable individual variation among healthy subjects, indications are that environmental, lifestyle factors and relevant genetic milieu accelerate the disease progression (Sigamani, 2012). The study sought to establish the prevalence of CKD among adult medical patients admitted in Kericho District Hospital. The study used document analysis to analyze this objective and records of between 2013 and 2015 were used. The study results were as follows:

Table 4: Prevalence of Chronic Kidney Diseases

Year	Total No of Patients Admitted	Total with CKD	Percent
2015	6040	28	0.46
2014	5571	22	0.39
2013	4248	13	0.31
Total	15859	63	0.40

The study results on the prevalence of CKD indicated that in 2015 out of 6040 patients admitted, 28 (0.46%) had chronic kidney disease, in 2014 out of 5571 patients admitted 22 (0.39%) had chronic kidney disease, in 2013 out of 4248 patients admitted 13 (0.31%) had chronic kidney disease. The results indicate a progressive increase in the frequency of patients diagnosed with chronic kidney diseases at Kericho county referral hospital. The prevalence of chronic kidney disease among hospital admissions at Kericho county hospital ranged from 0.31, 0.39 and 0.46% in the year 2013, 2014 and 2015 respectively, with an average of 0.41% (41 people per 10,000 populations).

This average is below the estimated Kenya national prevalence of about 10 % (1000 per 10,000), which is based on the global estimates of CKD (Levey, 2007)The possible explanation for this difference could be explained by the fact that only patients referred for dialysis (i.e. those with end stage renal disease) were captured in the hospital statistics, whereas the national figure encompasses patients with all stages of CKD, probably over a longer period of time.

The average is also lower than the estimated prevalence in sub-Saharan Africa of 13.9% (Stanifer et al., 2014) because of the same reason. However, when compared to studies that have specified the prevalence of end stage renal disease; this average prevalence is twice as high than what's reported in literature. In an international study comparing the relationship of CKD prevalence and ESRD, the prevalence of ESRD was 0.2% (Steiner et al., 2006). In another study of the United States of America (USA) population, the prevalence of stage 5 was again 0.2%, with the majority of the patients (51.8%) being females. Majority of the study patients (78.3%) were below the age 50 years, with the male predominance of 56.5%, and a combined low to moderate income rating of 91%.

Occupational Exposures among Patients with Chronic Kidney Diseases

Table 5: Occupation of the Patients

Occupation	Frequency	Percent
Farming	13	56.5
Business	7	30.4
Employed	3	13.0
Total	**23**	**100**

The study findings on the occupation of the respondents indicated that 56.5% of the patients were engaged in farming, 30.4% were engaged in business activities while 13.0% were employed. This shows that majority of the patients were engaged in farming activities. All the doctors interviewed agreed that some occupations might influence the development of chronic kidney disease in the region.
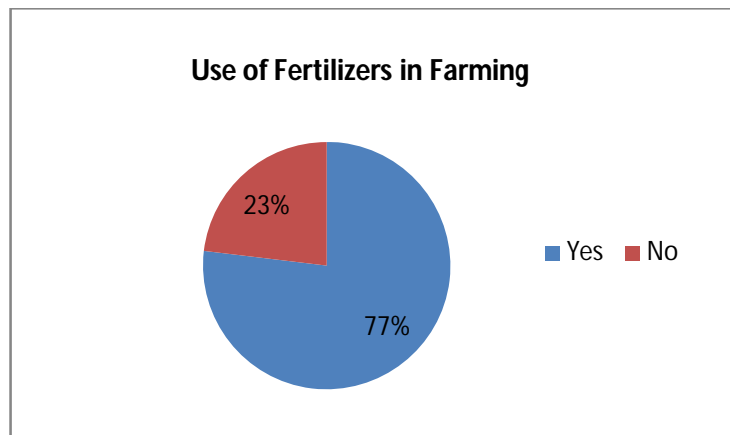

Figure 5.Use of fertilizers in farming.

The study results on the use of fertilizers in farming indicated that 23.0% of the patients did not use fertilizers and agrochemicals when planting before being diagnosed with CKD while 77.0% used fertilizers and agrochemicals when planting before diagnosis of CKD. This may suggest an association between use of fertilizer and agrochemicals, and development of CKD. Among those who used fertilizers and agrochemicals when planting before being diagnosed of CKD majority reported to have used CAN and DAP fertilizers during planting. Exposure to these agricultural fertilizers contaminates soils and water sources used, which can lead to chronic kidney diseases. Majority (90%) of the doctors interviewed noted that agricultural practices have an influence on chronic kidney diseases. The study sought to establish the opinion of the nurses on the influence of occupational exposures on prevalence of CKD. The findings were was follows:

Table 6: Occupational Exposures and Prevalence of CKD

Statements		D	TD	TA	A	TOTAL	MEAN
The use of agrochemicals is associated with prevalence of CKD	F	0	0	20	39	59	3.66
	%	0	0	33.9	66.1	100	
The continued and frequent use of agrochemicals increases the risk of CKD	F	0	0	29	30	59	3.51
	%	0	0	49.2	50.8	100	
The use of pesticides contributes to prevalence of CKD	F	0	0	28	31	59	3.53
	%	0	0	47.5	52.5	100	
The kind of fertilizers used by the residents contributes to prevalence of CKD	F	0	0	23	36	59	3.61
	%	0	0	39.0	61.0	100	

KEY: F-Frequency; D-Disagree; TD-Tend to Disagree, TA-Tend to Agree; A-Agree

The results indicate that nurses were of the view that use of agrochemicals is associated with an increased prevalence to CKD (mean of 3.66) and agreed that the continued and frequent use of agrochemicals increases the risk of CKD with a mean of 3.51.When asked if the type of fertilizer influenced the development of CKD, a majority of the nurses were of the view that the type of fertilizers used by the residents did contribute to high prevalence of CKD (mean of 3.61). With regard to use of pesticides, most nurses agreed that use of pesticides contributes to prevalence of CKD as revealed by a mean of 3.53. The study findings indicated that majority of the respondents were of the view that use of agrochemicals, pesticides and fertilizers is associated with increased prevalence of CKD in the region. All the doctors interviewed indicated that use of agrochemicals is linked to the development of chronic kidney, especially if the people don't use protective gear.

The occupation of the CKD patients was mainly farming (56.5%), and even those who were employed (13%) or doing non-agricultural businesses (30.4%) did engage in small-scale farming, utilizing agrochemicals. The use of agrochemical was common at a rate of 77% prior to development of CKD among the patients. Use of agrochemicals such as phosphate fertilizer, which are contaminated with heavy metals, pesticides and herbicides cause soil and water pollution, secondarily contaminating the human food chain (Robinson, 2014). Analysis of artificial fertilizers such as calcium ammonium nitrate (CAN) and di-ammonium phosphate (DAP) indicates that 70% of the fertilizer content is filler material derived from toxic industrial wastes or sludge, with the remaining 30% being the necessary elements of potassium, phosphate and nitrates. The filler material contains heavy metals like, mercury, lead, and cadmium, arsenic and nickel, to mention but a few. Consumption cadmium, lead or mercury in contaminated agricultural products and water may result in escalation of multiple diseases, including CKD. Cadmium specifically leads to proteinuria, glomerular and tubular damage, and was associated with a disease referred to itaiitai in Japanese farmers (Robinson, 2014).

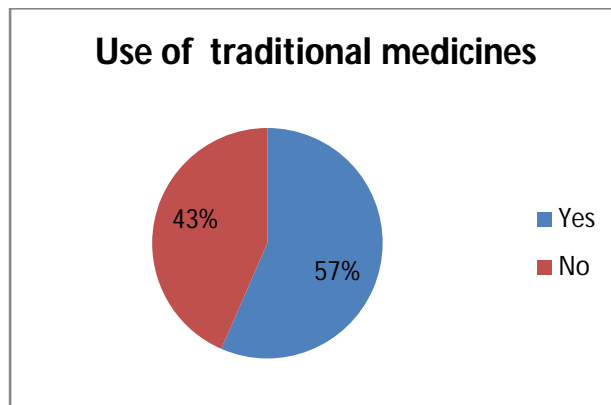**Cultural Factors on Prevalence of Chronic Kidney Diseases**

Figure 6.Patients' use of traditional medicines.

The study results on patients' use of traditional medicines indicate that 43.0% did not use traditional medicines while 57.0% used traditional medicines. This shows that majority of the patients interviewed used traditional medicines to cure ailments before diagnosis of chronic kidney disease.

As regards whether the patients have ever heard someone who used traditional medicines and got more ill, 43.0% noted that they have not heard someone who used traditional medicines and got more ill while 57.0% had heard of someone who used traditional medicines and got more ill. This shows that majority of the respondents had heard of someone who used traditional medicines and got more ill. This further indicates that use of traditional medicines could have an influence on the prevalence of CKD.
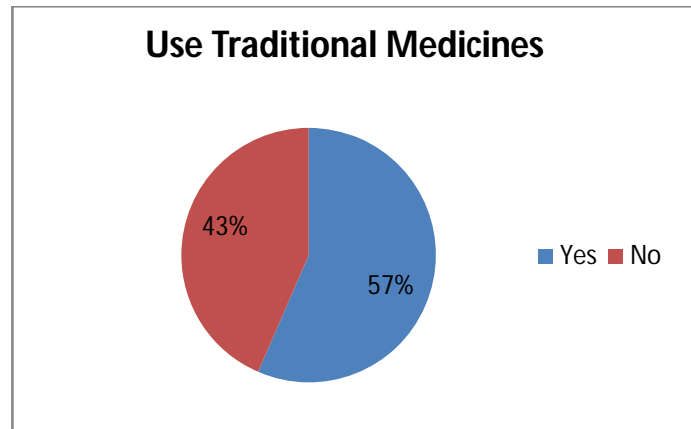

Figure7. Patients' Heard Someone Use Traditional Medicines.

Table 7: Traditional Medicines and Prevalence of CKD

		Frequency	Percent
Patients reported Use of traditional Medicines	Yes	42	71.2
	No	17	28.8
	Total	59	100
Nurses heard of patient using traditional Medicines	Yes	30	50.8
	No	29	49.2
	Total	59	100

Most of the nurses (71.2%) noted that patients reported use of traditional medicines for ailments before being diagnosed of CKD while the remainder (28.8%) didn't. When nurses were asked about hearing of patients using herbal medicines prior to development of kidney disease, 50.8% of them reported having heard someone use traditional medicines and gotten ill, while 49.2% said they've never heard someone used traditional medicines and get ill.

Doctors on the other hand agreed that use of herbs is hazardous to health, causing damage to the kidney since the dosage isn't clear. They added that culture might promote practices that put males at a higher risk of developing CKD. For example, it's the males who spray the cows and crops in general. It's culturally accepted to seek herbal treatments for many ailments in the African communities. The study found that 57.0% of patients with CKD had used traditional medicines prior to onset of the disease. A similar percentage (57%) had heard of people falling ill after use of traditional medicines. A clue on how cultural practices may interact with both traditional and non-traditional risk factors and influence progression, and prevalence of CKD in SSA is provided in a study done on a hospitalized Zambian population. Patients reporting use of herbal remedies had adverse drug reactions that could promote renal injury and increase cases of CKDs. The major drawback of the local remedies was lack of standardized dosing protocols and poor understanding of their side effects. Sometimes side effects are misinterpreted or perceived to be beneficial effect of the remedies (White, 2009.) Subsequent literature review on use of African herbal medicine (AHM), labeled as "popular medicinal plants " and how they are linked with observed adverse drug reactions in African countries confirmed inadequate information on indications, dosage and contraindications of these preparations (White, 2012.)

Herbal preparations from other continents, especially Asia, have existed for a long time and the use in certain medical conditions is well documented. The most common Asian preparations are those from China, collectively referred to as Traditional Chinese herbal medications (TCHM).

Their use is slowly increasing and we currently have Chinese clinics in some parts of the country, including Eldoret in the rift valley. The TCHM are frequently used in conjunction with western pharmacotherapy for treatment of chronic kidney diseases (CKD) in China and many other Asian countries, and locals may use them in a similar way or alone. Several TCHM are associated with significant adverse effects, including nephrotoxicity. However, reporting of adverse effects associated with TCHM has been inadequate.

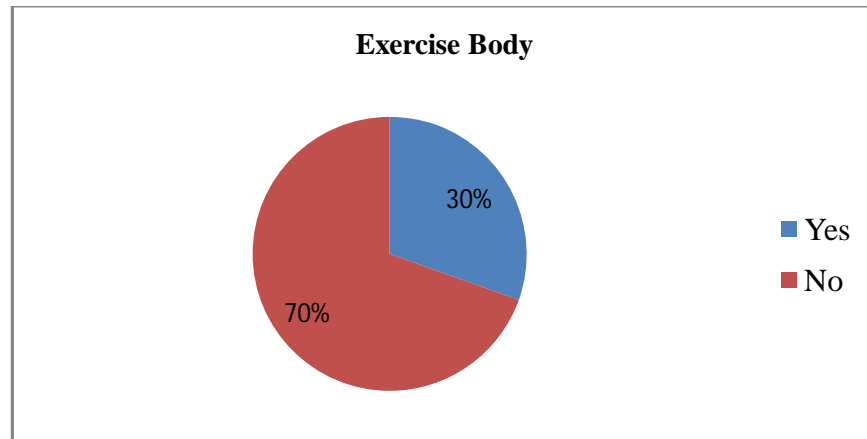**Lifestyle Factors on Prevalence of Chronic Kidney Diseases**

Figure 8.Exercise body before diagnosed of CKD.

The study results on whether the patients frequently exercised their bodies before diagnosis of CKD indicated that 30.0% frequently exercised their bodies while 70.0% of the patients did not. The majority (70%) who didn't exercise mentioned that body exercise and play was meant for children. The Doctors too agreed that physical inactivity influences development of CKD by contributing to overweight, which may lead to hypertension and diabetes.
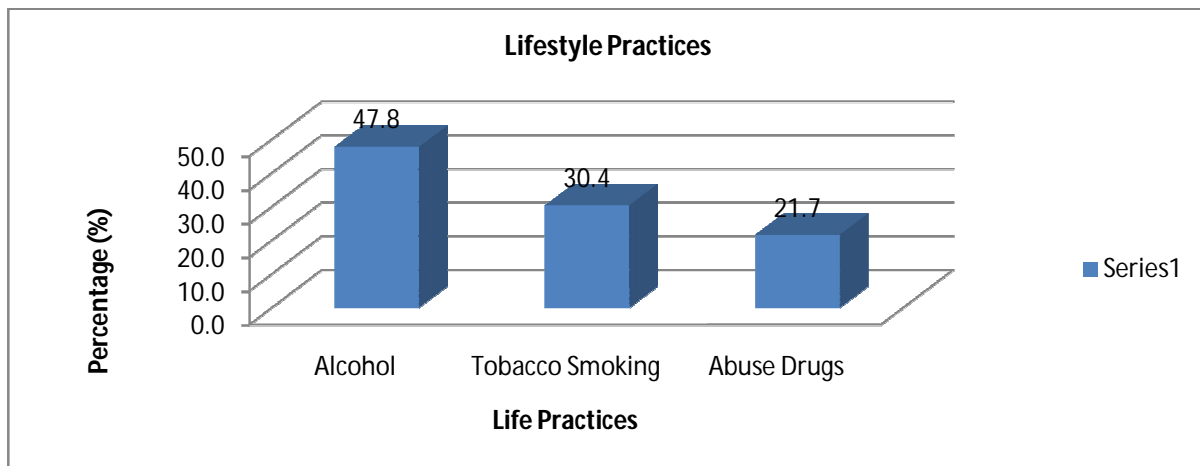

Figure 9.Lifestyle practices before diagnosis.

The study findings further on lifestyle practices indicated that 47.8% took alcohol before diagnosed of CKD, 30.4% of the patients smoked tobacco before diagnosed of CKD while 21.7% of the respondents abused over the counter drugs before diagnosed of CKD. Four patients (17.4%) didn't use alcohol, tobacco or over the counter drugs in the period before onset of chronic kidney disease. The patients who took alcohol said that they did so because alcohol intake was part and parcel of life in the area. Those who used over the counter drugs did so because it was cheaper, easily accessible and didn't need a prescription.

Table 8: Lifestyle Factors and Prevalence of CKD

Statements		D	TD	TA	A	TOTAL	MEAN
Lack of physical exercise has an impact on prevalence of CKD	F	0	0	24	35	59	3.59
	%	0	0	40.7	59.3	100	
There is relationship between the weight of a person and the prevalence of CKD	F	0	0	30	20	59	3.61
	%	0	0	50.8	33.9	100	
Alcohol drinking contributes to majority of the cases of CKD in the area.	F	0	0	22	37	59	3.47
	%	0	0	37.3	62.7	100	
Smoking contributes to prevalence of CKD among most people in the area	F	0	0	27	32	59	3.42
	%	0	0	45.8	54.2	100	

KEY: F-Frequency; D-Disagree; TD-Tend to Disagree, TA-Tend to Agree; A-Agree

The study findings indicated that nurses were of the view that physical inactivity has an impact on the prevalence of CKD(mean of 3.59) and when asked whether there is relationship between the weight of a person and the prevalence of CKD they agreed with a mean 3.61. When asked if alcohol contributes to majority of CKD, a mean of 3.47 were affirmative. The nurses also concurred that smoking contributes to prevalence of CKD amongst the people in the area with mean of 3.42. These views of nurses suggest a general agreement amongst them pointing to a relationship between physical inactivity, the weight of a person and smoking with, the prevalence of CKD in the county.

According to the doctors, over the counter drugs are harmful to one's health especially prolonged use of paracetamol and NSAIDs. Physical inactivity is harmful and may lead to diabetes and eventually CKD. As regards smoking and drinking of alcohol, majority of the doctors interviewed agreed that they can damage the kidneys, eventually leading to CKD. The majority (70%) of CKD patients didn't exercise and mentioned that body exercise or play was meant for children. The study findings further on lifestyle practices indicated that before diagnosed of CKD 47.8% of the patients took alcohol, 30.4% smoked tobacco while 21.7% abused over the counter drugs.

In epidemiological studies, overweight and obesity, which are a consequence of physical inactivity, are independently linked to proteinuria among diabetics (Hall et al., 2014), and hypertensive subjects. Obesity may also aggravate existing nephropathies and is also associated with increased risk of graft failure after renal transplantation. Further evidence for a link between obesity and kidney damage is provided by the fact that weight loss in the obese reduces proteinuria and hyper-filtration (Cheema, 2007). The patients with obesity have high prevalence of other lifestyle diseases (diabetes, hypertension), which interact with genetics, environment and other bad lifestyle habits like smoking in initiating and progression of CKD. Unquestionably, much of the excess risk for CKD observed among people with obesity is linked to the increased prevalence of hypertension and/or type II diabetes. However, it also appears that obese individuals diagnosed with hypertension and diabetes are at a higher risk of developing nephropathy, compared with leaner subjects with these conditions, independent of blood glucose control and other factors. The health worker's opinion supported the above lifestyle relationships with CKD.

The majority (89.8%) of the nurses were of the opinion that low levels of body exercise (physical inactivity) may be associated with increased prevalence of CKD, while 90.3% believed that overweight and obesity increase the prevalence of CKD. With regard to alcohol intake and tobacco smoking, 86.8% and 85.5% respectively were of the view that these two habits contribute to development of CKD in the region. According to the doctors, over the counter drugs are harmful to one's health especially prolonged use of paracetamol and NSAIDs. Physical inactivity is harmful and may lead to diabetes and eventually CKD. As regards smoking and drinking of alcohol, majority of the doctors interviewed noted that smoking and alcohol lead to CKD.

These findings were supported by Wimalawansa & Wimalawansa (2014) who noted that Obesity contributes significantly to the burden of chronic diseases such as cardiovascular disease, cancers, type II diabetes, and hypertension, among others. The alarming increment of obesity worldwide has been paralleled by a steadily increasing incidence of CKD as a result of type II diabetes and hypertension. Much of the excess risk for CKD observed among people with obesity is associated with increased prevalence of hypertension and/or type II diabetes.

It also appears that obese individuals diagnosed with hypertension and diabetes are at a higher risk of developing nephropathy, compared with leaner subjects with these conditions, independent of blood glucose concentration and other factors. Obesity may also aggravate existing nephropathies and is also associated with increased risk of graft failure after renal transplantation.
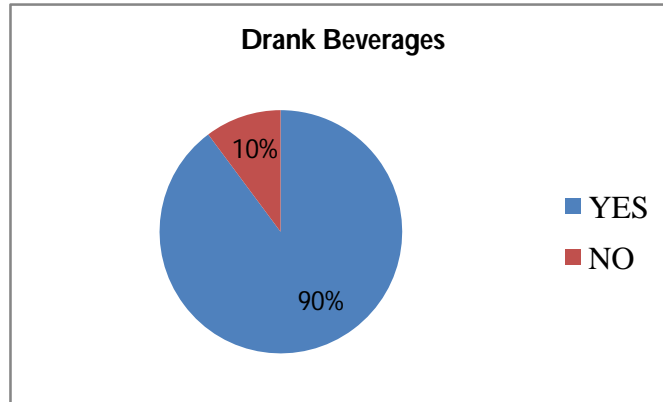
Drank Beverages

10%

90%

■ YES
■ NO

Figure 10.Drank beverages before diagnosis.

The question on whether the patients drank beverages (tea) prior to development of CKD found that only 10.0% did not drink beverages (tea) while 90.0% drank beverages (tea). This shows that majority of the patients drank beverages (tea) before diagnosed of chronic kidney diseases.
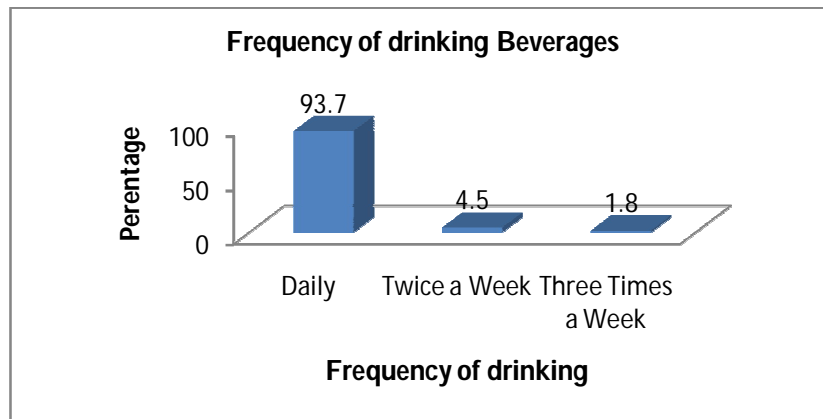
Frequency of drinking Beverages

93.7

100

Perentage

50

0

4.5   1.8

Daily   Twice a Week Three Times
                              a Week

Frequency of drinking

Figure 11.Frequency of drinking beverages.

As regards the frequency of drinking beverages (tea), 93.7% of the patients reported that they drank beverages (tea) on daily basis, while 6.3% drank tea twice or thrice a week. This shows majority of the respondent drank beverages (tea) on daily basis. The reason for the high intake of tea by the patients was due to the fact that tea is a major cash crop in the area, it is sold cheaply to farmers and sometimes given free to those working in the factories. The patients have grown taking tea and love it, and can't imagine going a day without a cup, according to their own words during the interview
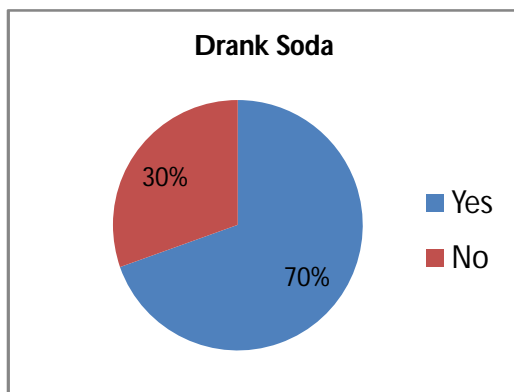
Figure 12.Drinking of cold beverages.

The study results indicated that 30.0% of the patients did not drink soda before being diagnosed of CKD whereas 70.0% did drink soda. This gives the impression that majority of the patients drank soda before being diagnosed of chronic kidney disease. As regards the level of salt intake before diagnosis of CKD, majority of the patients said that they added table salt frequently to their food because it made food taste better.

Table 9: Drinking of Cold Beverages

Nurses Responses	Frequency	Percent
Yes	20	33.9
No	39	66.1
Total	59	100

The study findings indicated that 33.9% of the nurses agreed that cold beverages may contribute to CKD while 66.1% disagreed. The study sought to confirm the influence of dietary practices on prevalence of chronic kidney diseases; the responses were based on the following statements and the study results were as follows;

Table 10: Dietary Practices and Prevalence of CKD

Statements		D	TD	TA	A	TOTAL	MEAN
Beverage(tea) intake contributes to the	F	0	7	33	19	59	3.20
prevalence of CKD	F%	0	11.9	55.9	32.2	100	
The continued and frequent intake of	F	0	9	30	20	59	3.19
beverages(tea) increases the risk of CKD	%	0	15.3	50.8	33.9	100	
High salt intake contributes to the risk of CKD	F	0	0	22	37	59	3.63
	%	0	0	37.3	62.7	100	
Soda consumption is associated with majority	F	0	0	27	32	59	3.54
of the CKD cases in the area	%	0	0	45.8	54.2	100	

KEY: F-Frequency; D-Disagree; TD-Tend to Disagree, TA-Tend to Agree; A-Agree

The study results indicated that nurses were of the view that beverage (tea) intake contributes to the prevalence of CKD (mean=3.20); Nurses were of the view that continued and frequent intake of beverages (tea) increases the risk of CKD with a mean of 3.19;when asked whether high salt intake contributes to the risk of CKD they agreed with a mean of 3.63 whereas on their view that soda consumption is associated with majority of the CKD cases in the area they agreed with a mean of 3.54. This study results indicated that majority of the nurses were of the opinion that high salt intake, tea and soda may contributes to the risk of chronic kidney diseases among patients in this locality. The doctors were in agreement that increased salt intake might cause kidney damage by overworking it or by predisposing the person to develop hypertension. The study found that majority of the CKD patients (90%) drank beverages, mainly tea. Among those drinking tea, 93.7% drunk 1-2 cups once a day, 4.5% twice a week and 1.8% drunk tea thrice a week. The other beverage commonly consumed by the patients with CKD was soft drinks (soda).

The study results indicated that 70.0% of the respondents did drink soda before diagnosed of CKD whereas 30.0% of the patients didn't. The majority of the nurses (66.1%) didn't believe intake of cold beverages might contribute to development of CKD through obesity and its related complications of hypertension and diabetes. Majority of the patients confirmed that they liberally took salt, adding it every meal (table salt) before the diagnosed of CKD. Though majority had reduced intake, they complained that food was tasteless in its absence and not enjoyable. The relationship between dietary factors and chronic kidney disease is complex and may be indirectly related via predisposition to lifestyle related illness.

A cross sectional Chinese study looked at the association between the dietary factors and chronic kidney disease based on estimated glomerular filtration rate (eGFR) in adults with metabolic syndrome. The study found a significantly inverse correlation between eGFR and nutrient intake (energy, protein intake, cholesterol intake, carbohydrates intake, sodium intake, calcium intake and actual protein/energy ratio.) Logistic regression analyses showed that actual protein intakes/recommended protein intakes (APIs/RPIs) were significant independent predictors of eGFR< 60-ml/min•1.73 m^2 (Sigamani, (2007).

Conclusions

The average prevalence of CKD was lower than the estimated national, sub-Saharan and global levels of 10-13.9% due to differences in definition of CKD, with the county hospital recording only patients who were referred for dialysis. However when compared to studies reporting ESRD, the local average prevalence over 3 years was at least twice as high (0.41% compared to 0.2% in literature).

Many of the ESRD patients in the study were much younger compared to those reported in literature, meaning the disease affected a population that is economically active. Farming was the main economic activity, though the remaining patients practiced agriculture on a smaller scale besides being employed and used agrochemicals. Majority of these patients were exposed to use of agrochemicals, mainly phosphate fertilizers and herbicides, which may contaminate soils and water, causing kidney disease. The type of occupation and exposure to agrochemicals especially if the user doesn't put on protective clothing or if they're ingested in water or farm produce could lead to renal damage.

Patients with CKD had used traditional medicines prior to onset of the disease. Side effects of herbs are sometimes misinterpreted as desirable and can worsen kidney disease through dehydration. Herbal concoctions may lead to kidney injury directly or indirectly through other side effects that cause dehydration. The cultural role playing that allocates certain responsibilities to a certain gender, like spraying agrochemicals being a chore done mainly by males, as a risk factor for CKD in males.

Physical inactivity was common at a level of 70% among patients with CKD. The doctors and nurses agreed that physical inactivity leads to increased prevalence of CKD via development of obesity, hypertension and diabetes. These may explain the increased prevalence of CKD in non-farming patients. The healthcare providers also agreed that tobacco smoking, alcohol abuse and use of over the counter NSAIDs could lead to increased prevalence of CKD in the region.

Intake of cold beverages may have adverse effects on the kidney; while the doctors were of the opinion that intake of cold beverages could cause kidney disease through development of lifestyle related illnesses. The doctors and nurses however agreed that addition of table salt, which was a common practice by most patients prior to development of CKD, could lead to CKD. Many said that salt reduction has made their food tasteless and not enjoyable, indicating the difficulty in changing the habit.

Recommendations

The study made recommendations for policy, practice and research as follows:

For Practice

   i. Educate people on the need and importance of physical fitness
  ii. People should take precautions when handling agrochemicals
 iii. Reduce intake of alcohol, tea, sodas, over the counter medications and avoid smoking.
 iv. Avoid use of herbal medications

For Policy

    i. The government should have a policy where all foods are well labeled to show the quantity of sodium

    ii. The government should abolish smoking and put in place measures that make smoking and alcohol intake expensive and punishable by law.

    iii. The county hospital and administration should put in place preventive measures to reduce prevalence of CKD; these would include patient education, posters on CKD and information through the media (e.g. radio).

    iv. The government should insist on proper documentation of diseases in order to have reliable records for planning purposes.

For Research

    i. Further research using different study designs like case-control or cohort studies or experimental studies should be done to show association of the various risk factors and CKD.

    ii. Improved case definition of CKD is needed at the county hospital and countrywide in order to document all cases of CKD, not just those requiring hemodialysis.

    iii. A study on factors associated with late health seeking behaviour of CKD patients should be done in order to design strategies to improve early diagnosis and referral.

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