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Research Article

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Assessment of Magnitude and Factors Associated with Chronic Kidney Disease Among Patients on Follow-Up at Arbaminch General Hospital, Southern Ethiopia 2022 Gc

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Abstract

***Background**: Chronic kidney disease (CKD) is among Non-communicable (NCD) diseases is a global public health problem. Chronic kidney disease, from some hospital-based studies in Sub-Saharan Africa (SSA), has epidemiological characteristics that are strikingly different from those observed in other regions. Rather than hypothesizing or making assumptions based on Western evidence, it is critical for developing countries to recognize the true nature of the disease and its prevalence. This study is therefore set out to determine the prevalence and associated factors of chronic kidney disease in Arbaminch General Hospital MRC. **Objective:** To assess the magnitude and factors associated with CKD among patients on follow-up at AMGH, southern Ethiopia from June 16-27, 2022.*

***Methods**: A facility-based Cross-sectional study was conducted on all patients who had follow-up and visits at Arbaminch General Hospital MRC during the study period. Single population proportion formula and systematic random sampling are used for sample size determination and sampling technique respectively. A structured questionnaire was used to collect data. The data was collected by trained medical students from interviews, charts, and clinical Measurements. Data was checked for completeness, edited, coded, and entered into SPSS version 21.0 statistical software for cleaning and analysis. Statistical significance was considered at the level of significance of 0.05%, and adjusted odds ratio (AOR) with a 95% confidence interval (CI) to present the estimates of the strength of the association.*

***Result:** This study finding indicated the overall magnitude of CKD was 15.7%. DM was associated with chronic kidney disease (AOR; 2.538, 95% CI; 1.183-5.443), a cardiac illness associated with CKD (AOR; 4.459, 95% CI 1.970-10.094) eating processed food was an independent predictor of CKD.*

***Conclusion**: In conclusion, the overall magnitude of CKD in Arbaminch General Hospital was 15.7% regarding comorbidity (96.1%) of the participants had medically confirmed comorbidities other than CKD, of which 48.6% had HTN, 40.0% D.M., and 17.9% had a cardiac illness. D.M., CVD, and eating processed food are associated factors of chronic kidney disease.*

***Keywords:** Assessment, Magnitude, Associated factors, Chronic, Kidney Disease. Glomerular Filtration rate, Proteinuria.*

1. Introduction

1.1. Background

Chronic kidney disease (CKD) is among Non-communicable diseases (NCD), which cause significant morbidity and mortality globally [1]. Chronic Kidney disease is defined as kidney damage for more than three months, as evidenced by a decreased glomerular filtration rate of < 60ml/min or other markers of kidney damage with or without decreased GFR (2). Different makers of kidney damage: (A) Abnormalities on Urinalysis: Persistent proteinuria, (B) Abnormalities on imaging: shrunken kidneys, polycystic kidneys, (C) Histologic abnormalities on renal biopsy specimens [2]. For the determination of GFR in adult patients with stable serum creatinine, we use the MDRD or CKD-EPI formula [2]. The most typical causes of chronic kidney disease are hypertension, diabetes mellitus, glomerulonephritis, polycystic kidney disease, and obstructive uropathy, cumulatively accounting for >90% of the CKD disease burden worldwide [1, 2]. Staging according to cause, GFR, and albuminuria allows for a more complete description of risk for the primary adverse outcomes of CKD (12). The GFR (G-stages): G1 − GFR >90 mL/min per 1.73 m 2, G2 − GFR 60 to 89 mL/min per 1.73 m 2, G3a − GFR 45 to 59 mL/min per 1.73 m 2, G3b − GFR 30 to 44 mL/min per 1.73 m 2, G4 − GFR 15 to 29 mL/min per 1.73 m 2, G5 − GFR <15 mL/min per 1.73 m 2 or treatment by dialysis (12). Albuminuria staging has been added because of the graded increase in risk for mortality, progression of CKD, and ESRD at higher levels of albuminuria, independent of GFR A1 − ACR <30 mg/g (<3.4 mg/mmol) A2 − ACR 30 to 299 mg/g (3.4 to 34.0 mg/mmol) A3 − ACR ≥300 mg/g (>34.0mg/mmol) [3]. CKD is usually asymptomatic in its early stages. Symptoms appear in later stages in association with complications. Uremia leads to disturbance of virtually every organ system function fluid, electrolyte, and acid-base disorders, disorders of calcium phosphate, bone manifestations, and cardiovascular, hematologic, gastrointestinal, and nutritional abnormalities [1].

Essential laboratory tests include Serum creatinine and urea (Estimated GFR), Urinalysis (protein urea), 24urine protein/albumin or spot urine albumin to creatinine ratio (ACR), electrolyte (Calcium, Phosphate, potassium) [2]. Renal Ultrasound in CKD shows shrunken echogenic kidneys except in diabetic nephropathy, HIVAN, and CKD [3]. Principles of management of CKD include (A) Identifying the underlying cause and treat accordingly, (B) Slowing the progression of decline in GFR, (C) detecting and managing complications, and (D) Improving quality of life and survival [2]. Treatment of the cause of CKD includes optimized glucose control in DM patients, control of BP in hypertensive patients, and immune-modulatory agents for glomerulonephritis [1]. Slowing the Progression of CKD by reduction of intraglomerular hypertension and proteinuria using drugs like ACE-I and ARBs and treatment of complications on each system accordingly [2].

Other measures: Nephrotoxins should be avoided, and Dose adjustment has to be made for drugs with primarily renal excretion and nutritional support [1, 2]. Patients should be serially evaluated for Renal Replacement Therapy (RRT) eligibility. Clear indications for dialysis include pericarditis or pleurisy, progressive encephalopathy or neuropathy, intractable muscle cramps, persistent anorexia, nausea and vomiting, refractory hyperkalemia, refractory hypervolemia [2].

1.2. Statement of problem

CKD is a global public health concern that spreads rapidly [3, 4]. Due to numerous environmental, racial, socioeconomic, and rural-urban variations, the prevalence of CKD varies greatly around the world [5]. Although the disease's burden is fairly well-known in developed countries, growing evidence suggests that the burden of chronic kidney disease in developing countries could be much greater than portrayed through data [5]. The incidence of CKD is usually exacerbated in developing nations due to the co-occurrence of infectious causes that predispose to CKD, such as chronic glomerulonephritis and the human immunodeficiency virus [4, 6]. In Ethiopia, the emerging burden of no infectious disease has become a severe public health concern which had a significant impact on CKD [4]. A recent systematic review and meta-analysis estimated that the global pooled prevalence of CKD ranges from 11–13%, and the prevalence in sub-Saharan Africa is 13.9 %. The pooled estimate of CKD among patients with chronic illnesses in Ethiopia is 21.71% [4, 7]. The burden of CKD is increasing and is mainly associated with poor community awareness, insufficient data, and poor healthcare infrastructure [8, 9]. Although old age populations are at high risk of developing CKD in the developed world, there are terrifying reports emerged stating young Africans are at high risk of mortality and long-term disabilities when compared with their counterparts in the developed world [10]. The epidemiology of CKD in sub-Saharan Africa differs from that of other regions in that it mainly affects the economically productive young age group. The risk of CKD, like HIV infection, hypertension, diabetes, and other infectious diseases, is increasing in sub-Saharan Africa [7]. Both early stages of CKD and ESRD are associated with high morbidity and increased healthcare utilization. Roughly fifty percent of dialysis patients have three or more comorbid conditions, hospitalizations and hospital days are 1.9 and 12.8 per patient-year, respectively, and self-reported quality of life is far lower in dialysis patients than in the general population [3]. Despite the magnitude of the resources committed to the treatment of ESRD and the substantial improvements in the quality of dialysis therapy, these patients continue to experience significant mortality and morbidity and reduced quality of life [3]. Patients with CKD, particularly ESRD, are at increased risk of mortality, particularly from cardiovascular disease; survival probabilities for dialysis patients at one, two, and five years are approximately 81, 65, and 34 percent, respectively [3]. Chronic kidney disease is often misdiagnosed in developing countries, where patients receive no care due to financial costs and a lack of availability and access to dialysis therapy, where healthcare is a luxury rather than a fundamental right. Other problems that patients face include a lack of access to transplant centers, issues with quality and safety, and abuse related to transplant tourism [5]. CKD is understudied, especially in low- and middle-income countries, and limited community-based published reports on CKD in Ethiopia are available so far. The available studies are not representative because they are taken from high-risk groups, like diabetes and HIV patients [5, 8, 9]. Even though CKD is a worrisome situation that can cause a country like Ethiopia to suffer from its economic and public health aspects, there is a severe information gap in the area [6]. Rather than hypothesizing or making assumptions based on Western evidence, it is critical for developing countries to recognize the true nature of the disease and its prevalence [5]. Therefore, this study is useful for providing baseline information on the overall

prevalence and factors associated with CKD among patients on follow-up at AMGH MRC, forwarding recommendations, and initiating investigators to work further on the same and/or other related issues to decrease the overall impact of this deadly and disabling illness

1.3. Significance of the study

CKD is under study, so this study is relevant to providing information about the magnitude and severity of the problem in the area where this research is undertaken. Therefore, this study helps provide baseline information for further investigation. It also forwards recommendations for patients and health professionals on preventing CKD and halting disease progression by giving information about CKD-associated factors. It also showed the impact of this illness on the patient's quality of life and the economic and social burden on the patient, families, and the country level, which will invite policymakers to give appropriate attention and integrate the issue into future health policy.

2. Literature Review

2.1. Prevalence

A community-based cross-sectional survey study was conducted between August 2007 and June 2008 in Thailand on 3459 participants with a CKD prevalence of 17.5%. CKD Stages I and II, 8.5% and 9.3% in males and females, respectively, were as high as the aggregates of Stages III, IV, and V, 7.8% and 9.3% in males and females. [11].

According to a population-based research conducted in 2014 involving 1,016 older adults living in urban and rural areas of Rio Branco, the overall prevalence of chronic kidney disease was 21.4% in older adults [12]. In a study in 2009 in Brazil in the medical inpatient unit on 826 medical records of patients. CKD prevalence was 12.7%. [12].

A systematic review assessed the chronic kidney disease (CKD) burden among the general population and high-risk groups on the entire African continent based on studies covering Africa from January 1, 1995, until April 7, 2017. The prevalence of CKD ranged from 2% to 41% (pooled prevalence: 10.1%; 95% CI 9.8% to 10.5%). The prevalence was reported to range from 2% to 41% (pooled estimate: 16.5%) in the West/Central-West, followed by the Central region where the prevalence ranged from 12% to 17% (pooled estimate: 16%), in the Southern where the CKD prevalence range was 6%–29% (pooled estimate: 12.2%), in Eastern where the prevalence ranged from 7% to 15% (pooled estimate: 11.0%), and in the North where the prevalence ranged from 3% to 13% (pooled estimate: 4%). In sub-Saharan Africa, the prevalence ranged from 2% to 14% (pooled prevalence: 14.02%). [13].

In a cross-sectional survey of 489 teachers in Cape Town, South Africa, in 2016, the crude prevalence of CKD using the CKD-EPI equation was 6.1%, while the age-adjusted prevalence was 6.4% [14].

A cross-sectional study was conducted at the outpatient diabetes and hypertension clinics of the Effia-Nkwanta Regional Hospital (ERH) and the Takoradi Government Hospital (TGH) in the Sekondi-Takoradi metropolis between December 2012 and May 2013 screened 382 consecutive patients a prevalence of CKD in patients with Hypertension of 22 % and in patients with diabetes of 27 %. In patients with both Hypertension and diabetes, the prevalence was 74 %, and 26 % had category G4 CKD. [15].

In a 2010 cross-sectional study of 454 participants in the community of Osun State, South Western Nigeria, the overall prevalence of CKD was 18.8 [16].

A systematic review and meta-analysis in 2021 revealed that the pooled prevalence of CKD among patients with chronic illnesses in Ethiopia was 21.71%. The highest prevalence of CKD among patients with chronic diseases was from Oromia (32.55%), while the least is from Addis Ababa, the capital city of Ethiopia (15.41%). The pooled prevalence of patients with Stage 2(30.76%) was the most prevalent, followed by Stages 1(26.16%) and 3 (13.88%) [4].

A cross-sectional study in adult patients admitted to Ayder Hospital Medical Ward Ethiopia was conducted from October 20, 2017- to March 20, 2018 G.C. on 572 participants. The prevalence of CKD was 17.3 %, 61.5 % were stage 5, 12.8 % were stage 1, 7.8% were stage 3, and 15.3% were in stage 4 CKD [17].

A cross-section study design was conducted at Jimma University Medical Center in 2019 on 208 participants. The overall prevalence of chronic kidney disease was 6% of the majority; 41 75.6% of CKD were detected at an early stage, while 14.8% had moderately increased risk for chronic kidney disease, and 9.3% were a high-risk group. [18]

Institution-based cross-sectional study was conducted from July to August/2020. In Northwest Ethiopia, referral hospitals, namely, the University of Gondar Teaching Referral Hospital (UOGTRH), Felege Hiwot Referral Hospital (FHRH), and Debre Markos Referral Hospital (DMRH) for all hypertensive patients aged 18 years. The total prevalence of CKD among hypertensive patients was 17.6. [19].

A cross-sectional study was conducted from January 1 to April 30, 2020, in the inpatient settings of Dessie Referral Hospital on 369 patients. Overall, 33.9% of the patients had some degree of CKD, 3.0% had stage 1, 11.9% had stage 2, 9.5% had stage 3a, 4.1% had stage 3b, 3.8% had stage 4, and 1.6% had stage 5 CKD. [20].

A retrospective, descriptive hospital cohort study carried out during the period 2001-2002 (Black Lion Specialized Hospital, St. Paul's Hospital Millennium Medical College and Zewditu Memorial Hospital) 422 participants 49(11.6%) of participants have stage 2, 82(19.4%) of the participants have stage 3, 62(14.7%) stage 4 and 163(38.6%) stage 5 CKD respectively. This shows that the prevalence of CKD is higher for stage 5 and lower for stage 3 and stage 4. [21].

A community-based cross-sectional study was conducted in the Sheka zone, Southern Nation, Nationality and People Region (SNNPR), Southwest Ethiopia, 0n 2018, with 326 participants. The overall prevalence of CKD was 7.4%, and about 7.05% of the participants had stage 1 and stage 2 CKD. 0.3% of them had chronic renal failure (stage 3a-5). [8]

A facility-based cross-sectional study was conducted at Butajira Hospital of Southern Ethiopia (September 2013 to October 2013). On 214 participants, the prevalence of CKD in this study was 17.3.2% and .14.3%, according to the MDRD and C-G equations, respectively. 17.3% had stage 3 CKD (14.0% stage 3A and 3.3% stage 3B), and 0.9% had stage 4 CKD. [22].

2.2. Associated factors of chronic kidney disease

According to study conducted between August 2007 and June 2008 in Thai on 3459 participants Hypertension was the main cause of CKD (16%), followed by diabetic nephropathy (15%), chronic glomerulonephritis (13%), tubule interstitial/obstructive (8%), primary glomerular diseases (6%), systemic lupus erythematosus (3%) and polycystic kidney disease (3%). The causes of CKD were undetermined in 20 %. (10). CKD was about 1.7, 3.6, and 7.3 times for ages 40–59, 60–69, and ≥70 years, respectively, compared with ages <40. Subjects with diabetes had about 2.7 times higher prevalence of CKD than non-diabetic subjects. Subjects with Hypertension had a risk of having CKD of about 2.0 times higher than non-hypertensive subjects. Subjects with a history of kidney stones had about 2.7 times higher risk of CKD relative to subjects who had never had a history of kidney stones. Females had about a 70% higher risk of having CKD than males. Subjects who reported the use of traditional medicine have about 20% higher risk of having CKD than subjects who did not. [11]

According to a 2010 study conducted in the Ilie community in Osun State, South Western Nigeria, with 454 participants, 26.7% had Hypertension, 3.7 % had diabetes, and 2.7% had obesity. 7 % had a history of cigarette smoking, 3.1% had haematuria, and 1.1 % had ova of Schistosoma haematoid bum [16].

According to a Systematic review and meta-analysis in 2021, Hypertension was significantly associated with CKD. The pooled estimates of developing CKD among hypertensive patients are three times higher when compared with normotensive patients. [4]

According to a study conducted on adult patients admitted to Ayder Hospital Medical Ward Ethiopia, conducted from October 20, 2017 - March 20, 2018, G.C. on 572 participant's Hypertension, a history of recurrent urinary tract infection, and a history of using nephrotoxic drugs were significantly associated with CKD. [17]

According to a study conducted at Jimma University Medical Center 2019 on 208 participants, Patients with uncontrolled blood pressure were 2.22 times at risk for chronic kidney disease than those with controlled blood pressure. Patients who were not using angiotensin-converting enzyme inhibitors (ACEIs) were4.35 times more likely to develop chronic kidney disease when compared to users [18]

According to a study conducted from July to August/2020. In Northwest Ethiopia referral hospitals, namely, the University Teaching Referral Hospital (UOGTRH), Felege Hiwot Referral Hospital (FHRH), and Debre Markos Referral Hospital (DMRH) o all hypertensive patients aged 18 years, CKD was 8.65 times higher among those who had diastolic blood pressure greater than 90mmHg as compared to their counterparts. Patients with a duration of Hypertension≥10 years were more likely to develop CKD as compared to patients with a duration of Hypertension <10 years. Stage II HTN patients were 2.61 times higher than those with stage I HTN. The of having CKD was 4.59 times higher among proteinuria as compared to those patients free from proteinuria. Patients with the comorbid disease were seven times more likely to develop CKD as compared to their counterparts. Regarding serum creatinine, patients with creatinine greater than than1mg/dl had 8.9 times higher odds of CKD than serum creatinine less than 1mg/dl. Patients with dyslipidemia had 3.5 times higher odds of CKD as compared to patients with no dyslipidemia. [19].

According to a study conducted from January 1 to April 30, 2020, at the inpatient settings of Dessie referral hospital on 369 patients, older age, male gender, with a family history of kidney disease, diabetes, Hypertension, respiratory disease, HIV and systolic blood pressure were associated with albuminuria. [20].

According to a study conducted from 2001-2002 (Black Lion Specialized Hospital, St. Paul's Hospital Millennium Medical College, and Zewditu Memorial Hospital), 422 participants with diabetes mellitus (18.2%), Hypertension (60%), cardiovascular disease (19.4%) and cholesterol (1.9%) [20].

According to a study conducted in the Sheka zone, Southern Nation, Nationality and People Region (SNNPR), Southwest Ethiopia 0n 2018 with 326 participants. Participants who had Hypertension were 2.61 times more likely to have CKD than those who didn't have Hypertension and participants whose ages>40 were 3.187 times more likely to exhibit CKD than those whose ages were 18–39 years. However, central obesity and age showed borderline significant [8].

According to a study conducted in Butajira Hospital of Southern Ethiopia (September 2013 to October 2013).on 214 participants, the duration of diabetes was associated with a high prevalence of CKD (32.4%). CKD prevalence was significantly higher among participants with low monthly income<500ETB than those with ≥500ETB. However, there were no significant differences in CKD prevalence among participants with and without current smokers and among those with less than high school and high school or higher education levels. Family history of kidney disease was associated with a higher prevalence of CKD than its absence: 42.5% vs. 12.6% by MDRD and 55.0% vs. 16.7% by C-G. Obesity was associated with a high prevalence of CKD compared with lack of obesity: 45.2% vs. 13.7% by MDRD and 45.2% vs. 20.2% by C-G. Hypertension, reported in 58.2% of the total participants, was not associated with a high proportion of CKD; however, elevated systolic blood pressure (≥140mmHg) was associated with a higher prevalence of CKD: 30.0% vs. 15.5% [22].

2.3. Conceptual frame work.

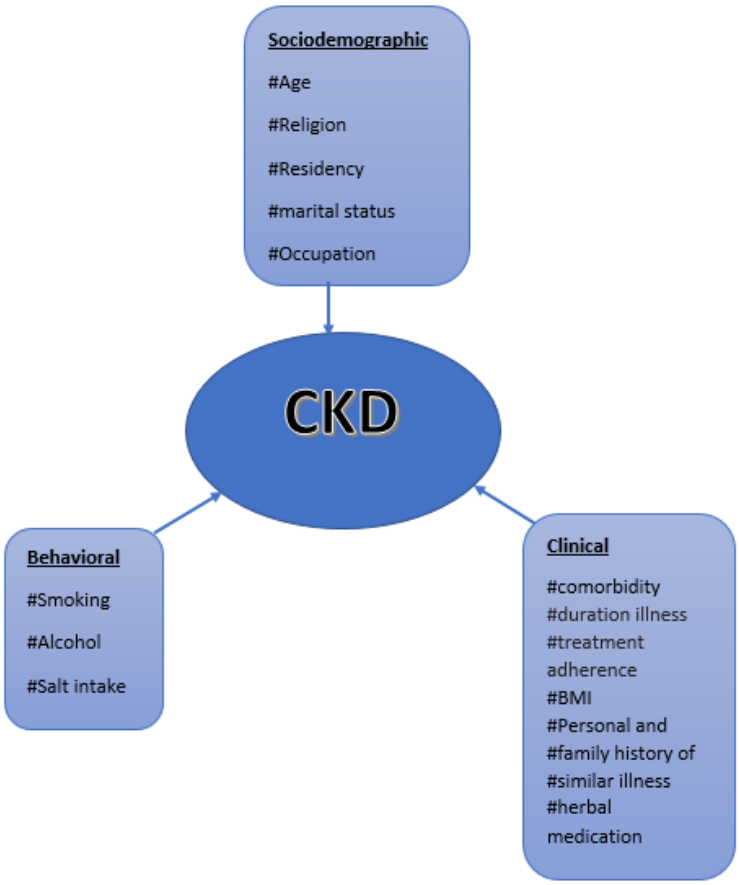

Figure 1: Associated factors of CKD adapted by researchers, Arbaminch university, June 26 20222.

3. Objective

3.1. General Objective

- ✓ To assess the magnitude and factors associated with CKD among patients on follow-up at AMGH, southern Ethiopia, from June 16-27, 2014, EC

3.2 Specific Objective

- ✓ To assess the magnitude of CKD among patients on follow-up at AMGH, southern Ethiopia, from June 16-27, 2014, EC
- ✓ To identify factors associated with CKD among patients on follow-up at AMGH, southern Ethiopia, from June 16-27, 2014, EC

Methods

4.1. Study Area

The study was conducted at Arbaminch General Hospital, located in Arbaminch, which is 500km from Addis Ababa, the capital city of Ethiopia & 250 KM from Hawassa. The hospital was established in 1961 EC during Emperor Haile Selassie. It was the only hospital in the town until recently that continued to serve many patients. Annually, around 200,747 individuals visit the hospital. There are over 200 beds that are actively serving 410 workers (251 health professionals and 159 administrative staff). [27].

According to the January monthly audit, around 1,275 patients visited MRC. Of this, 57% were female and 43% were male, 77.3% of patients were from Arbaminch City, 10.9% were from Arbaminch Zuria, and the remaining 11.8% were from other places (Mirab Abaya, Bonke, Konso, and Chencha). 48% of patients have cardiovascular illness, including hypertension, heart failure, and ischemic heart disease; 39% of patients have endocrine illnesses, including DM and thyroid. The remaining 13% of patients have other GI, respiratory, and infectious diseases. Ten internists, two general practitioners, and two nurses give the service.

4.2. Study period and Study design

The study was conducted from June 17-26 GC. A cross-sectional facility-based survey was conducted.

4.3. Population

4.3.1 Source population

All patients who have follow up at Arbaminch General Hospital MRC.

4.3.2. Study population

All patients who visited Arbaminch General Hospital MRC during the study period

4.2.3. Sample population

Selected patients who visited Arbaminch General Hospital MRC during the study period

4.4. Inclusion and Exclusion Criteria

Inclusion Criteria

Adult patients who visit Arbaminch General Hospital MRC

Exclusion Criteria

Critically ill patients. (Vital sign derangement who were sent to ER)

Patients with incomplete medical records were excluded.

4.5. Sample Size determination and sampling technique

4.5.1 Sample size

The sample size was calculated using the single population proportion formula.

$$n = \frac{(Z\alpha/2)2\ p\ (1-p)}{d2}$$

$$= \frac{(1.96)20.217(1-0.217)}{(0.05)2}$$

= 261

Then add 10% of 261 =26 for non-responders, making the final sample size 287

=287

Where n = the estimated sample size,

Total population during the study period

Na= adjusted sample size

P = prevalence of CKD=21.7 % (4)

d= margin of error (0.05)

Z= confidence interval = 1.96

4.5.2. Sampling Techniques

A systematic random sampling technique was used.

K value from the formula given below:

N=425: according to the monthly audit of February, a total of 1275 patients visited the clinic

Our study duration is ten days, making N=1275/3=425

K (Sampling interval) =N (Source population)/ n (sample size)

= 425/287 = 1.5

The first number was decided by lottery method

4.5. Data Collection Instruments and Techniques and Variable

A semi-structured questionnaire was used to collect data on participants' socio-demographic economic, behavioral, and co-morbidity-related characteristics. The data was collected by trained medical students (c2) on duty from the chart, interview, and clinical measurements. Data collectors will measure the height, weight, blood pressure, and waist circumference of all participants following standardized procedures after they have vested the respective physician. Blood pressure readings were performed using a digital blood pressure apparatus after the participant had remained in a sited position for three to five minutes. Weight, height, and waist circumference were measured in light clothing with shoes. Waist circumference was measured using tape measures on the umbilicus. Height was taken to the nearest 0.1 cm with a portable audiometer (Seca 274, Germany), and weight was measured to the nearest 0.1k.g on mechanical Seca (Seca761, Germany). Waist circumference measurements were taken to the nearest 0.1cm. Blood pressure and all anthropometric measurements were taken twice, and their averages were used in all analyses.

Variable

- Dependent variable
- CKD
- Independent variable
- Sociodemographic
- Sex
- Residence
- Occupation
- Income
- Educational level
- Marital status
- Behavioral
- smoking,
- alcohol
- nutritional(salt)
- exercise)
- clinical
- comorbidity
- (DM, HTN, renal stone, RVI)
- duration illness
- treatment adherence
- BMI
- Personal and family history of similar illness
- Medication (including herbal medication)

4.6. Data Quality Control and Data Processing and Analysis

Before data collection, Tools were given to advisors to be commented on. Discussions were held between group members to gain a common understanding. The questionnaire was prepared in English to maintain data quality, whereas it was translated into Amharic for the respondents. Instrument calibration was done daily to ensure the accuracy of measurements. The completeness of the data was cross-checked daily; when incomplete data was found, the card was reassessed. Data was checked for completeness, edited, coded, and entered into SPSS version 21.0 statistical software for cleaning and analysis. Bivariate and multivariate binary logistic regression analyses were to identify associated factors. Statistical significance was considered at the significance level of 0.05%, and an adjusted odds ratio (AOR) with a 95% confidence interval (CI) was used to present the estimates of the strength of the association.

4.8 Ethical Consideration

Before beginning data collection, an official letter was taken from the School of Medicine and submitted to the responsible body. During data collection, informed consent was obtained from all respondents after explaining the purpose of the study, and the information taken from them was kept confidential.

4.9 Dissemination of finding

The findings of this research will be disseminated to Arbaminch General Hospital staff officers, Arbaminch General Hospital internal medicine head office, and Arbaminch University College of Medicine and Health Science School of Medicine and School of Public Health. After it gets approval from all these bodies, finally be disseminated to different websites to be available to everyone who needs to know about this issue.

5. Results

5.1 Socio-demographic characteristics

From the total 287 planned study participants, a complete response rate was obtained of 280(97.5%). The mean age of participants was 52.00. The proportion of female participants (51.1%) was relatively higher than male participants (48.9%) and (52.5%) of patients were greater than the age of 50 years. Regarding occupation (30.7%) were farmers and (27.5%) were government employees. 2500 ETB is the average monthly income.

Table 5. 1: Descriptive statistics sociodemographic of study participants

Variable		Frequency(n)	Percent (%)
Age	18—30	20	7.1
	31-50	113	40.4
	>50	147	52.5
	Total	280	100
Sex	Male	137	48.9
	Female	143	51.1
	Total	280	100
Religion	Catholic	7	2.5
	Muslim	26	9.3
	Orthodox	108	38.6
	Protestant	138	49.3
	Others	1	0.4
	Total	280	100
Marital status	Divorced	10	3.6
	Married	215	76.8
	Never married	22	7.9
	Widowed	33	11.8
	Total	280	100
Occupation	Daily laborer	10	3.6
	Farmer	86	30.7
	Government employee	77	27.5
	Job seeking	5	1.8
	Merchant	48	17.1
	Non-governmental employee	36	12.9
	Student	6	2.1
	Other	12	4.3
	Total	280	100
Monthly income	<=2000	101	36.1
	>2000	179	63.9
	Total	280	100
Residency	Rural	98	35
	Urban	182	65
	Total	280	
Educational status	Illiterate	52	18.6
	Primary school	85	30.4
	Read write only	45	16.1
	Secondary and above	98	35
	Total	280	100

5.2 Behavioral condition

Among the total participants (3.9%) were smokers and (16.8%) of respondents chew chat, (22.9%) were alcohol drinkers and (17.1%) do regular physical exercise.

Table 5. 2: Descriptive statistics of behavioral and physical characteristics of study participants.

Variable		Frequency(n)	Percent
Cigarette smoking			
	Yes	11	3.9
	NO	269	96.1
	Total	280	100
Chewing chat	Yes	47	16.8

	No	233	83.2
	Total	280	100
Alcohol drinking	?		
	Yes	64	22.9
	No	216	77.2
	Total	280	100
Physical exercise	yes	48	17.1
	no	232	82.9
	total	280	100
Eating canned food	Yes	72	25.7
	No	208	74.3
	Total	280	100
Daily water intake	.		
	=<2 liter	158	56.4
	>2 liter	122	43.6
	Total	280	100
Herbal medicine intake	Yes	64	22.9
	No	216	77.1
	Total	280	100
Added salt to food	.		
	Never	35	12.5
	Occasionally	163	58.2
	With each meal	82	29.3
	Total	280	100

5.3 Clinical condition

Regarding co-morbidity (96.1%) of the participants had medically confirmed comorbidities other than CKD: of which 48.6% had HTN, 40.0% of them had DM and 17.9% had cardiac illness.

Table 5. 3: Descriptive statistics of the clinical condition of study participants.

Variable			Frequency(n)	Percent (%)
Comorbidities other than CKD		Yes	269	96.1
		No	11	3.9
		Total	280	100
Which of these comorbidities	Hypertension	Yes	136	48.6
		No	144	51.4
		Total	280	100
	RVI	Yes	19	6.8
		No	261	93.2
		Total	280	100
	CVD	Yes	50	17.9
		No	230	72.1
		Total	280	100
	DM	Yes	112	40
		NO	168	60
		Total	280	100
	Asthma	Yes	22	7.9
		No	258	82.1
		Total	280	100
	Kidney stone	Yes	11	3.9
		No	269	96.1
		Total	280	100
	Other	Yes	26	9.3
		No	254	90.7
		total	280	100

Others: CLD (6), stroke (5), Goiter (4), AGN (4), hematologic malignancy (4), RA (3)

5.4 Drug adherence questions

Table 5. 4: Descriptive statistics of drug adherence of study participants.

Variable		Frequency	Percent
Do you ever forget to take your medicine?	Yes	124	44.3
	No	156	55.7
	Total	280	100
Do you feel careless at times about taking your medicine?	Yes	149	53.2
	No	131	46.8
	Total	280	100
Do you forget to bring along your medicine when you travel away from home?	Yes	103	36.8
	No	177	63.2
	Total	280	100
Do you stop taking your medicine because you feel sick due to the side effects of the medicine?	Yes	70	25
	No	210	75
	Total	280	100
Do you decide to take less of your medicine?	Yes	69	24.6
	No	211	75.4
	Total	280	100
Do you stop taking your medicine because you feel Better?	Yes	72	25.7
	No	208	74.3
	Total	280	100
Do you sometimes get annoyed that you have to keep taking your medicine every day?	Yes	167	59.6
	No	113	40.4
	Total	280	100
Do you miss taking your medicine because you run out of it at home?	Yes	122	43.6
	No	158	56.4
	Total	280	100

5.5 Bivariate and multivariable analysis of associated factors

Bi-variate binary logistic regression analysis was done to select potential candidate variables for the multivariable logistic regression analysis. Based on p-value criteria cutoff point <= 0.05.

The result showed seven variables are candidates for multivariable logistic regression. These were: cigarette smoking, amount of daily water intake, salt consumption, DM, cardiac illness, RVI, age, and HTN were added by criteria of biological plausibility. The results of AOR, COR, and cross-tabulation are presented in the table below

Table 5.5: Factors associated with CKD, adjusted logistic regressions southern Ethiopia, 2022.

Variable	Chronic kidney disease		COR with 95% CI	**P VALU E**	AOR with 95% CI
	Yes	No			
Age					
18-30	1	19	0.224(.029-1.742)	0.276	3.459(.371-32.207)
31-50	15	98	0.651(0.329-1.286)	0.251	3.691(0.36-34.368)
>50	28	119	1		1
Cigarette smoking					
Yes	4	7	3.271 (0.915-11.691)	0.709	1.354(0.275-6.659)
No	40	229	1		1
Eat canned food					
Yes	21	51	3.312(1.698-6.459)	.007	2.919(1.341-6.351)
No	23	185	1		1
Daily water intake					
<2liters	14	108	1.808(.912-3.584)	.101	1.971(.876-4.436)
>=2 liters	30	128	1		1
Salt intake					
Never	10	25	6.160(1.922-19.738)	0.062	3.380(0.943-12.121)

Occasionally	29	134	3.333(1.239-8.966)	0.225	2.024(0.648-6.3321)
Always	5	77	1		1
DM					
Yes	23	89	1.877(.967-3.644)	.017	2.538(1.183-5.443)
No	19	138	1		1
HTN					
Yes	25	111	1.537(.787-3.000)	.207	1.711(.743-3.941)
No	17	116	1		1
Cardiac illness					
Yes	17	33	.250(1.949-1.949)	.001	4.459(1.970-10.094)
No	25	194	1		1
RVI					
Yes	5	14	.486(.165-1.431)	.178	2.478(.663-9.266)
No	37	213	1		1

6. Discussion

This study investigates the prevalence and factors associated with CKD among patients on follow-up at AMGH, Southwest Ethiopia. The results are based on 280 participants' findings, which show that 44 (15.6%) participants have CKD. This finding is comparable with the prevalence of CKD, 17.5%, in a community-based cross-sectional survey conducted in Thailand with 3459 participants between August 2007 and June 2008. [11], 12.7% of Studies conducted in 2009 in Brazil's medical inpatient unit, 7% to 15% (pooled estimate: 11.0%) in a systematic review assessed the prevalence of CKD burden among entire Africa from January 1 1995 until April 7, 2017. [13]. A cross-sectional study in adult patients admitted to Ayder Hospital Medical Ward Ethiopia was conducted from October 20, 2017 - March 20, 2018, G.C. on 572 participants the prevalence of CKD was 17.3 %. An institution-based cross-sectional study was conducted from July to August/2020. In Northwest Ethiopia referral hospitals, namely, the University of Gondar Teaching Referral Hospital (UOGTRH), Felege Hiwot Referral Hospital (FHRH), and Debre Markos Referral Hospital (DMRH). The total prevalence of CKD among hypertensive patients was 17.6. (19), A facility-based cross-sectional study was conducted in Butajira Hospital of Southern Ethiopia (September 2013 to October 2013) on 214 participants prevalence of CKD in this study was 17.3.2 %. [22]. In our study, D.M. was associated with chronic kidney disease (AOR; 2.538, 95% CI; 1.183-5.443), This was similar to reports from the USA, where high levels of Hemoglobin A1C were associated with CKD [28], in southern Ethiopia, uncontrolled diabetes mellitus was independently associated with CKD (4). According to a study conducted in Butajira Hospital of Southern Ethiopia (September 2013 to October 2013) on 214 participants, a Longer duration of diabetes was associated with a high prevalence of CKD (32.4%). According to a study conducted between August 2007 and June 2008 in Thai3459 participants, Hypertension was the leading cause of CKD (16%), followed by diabetic nephropathy (15%). This study also revealed that cardiac illness eating processed food and were independent predictors of CKD; this supports previous reports that CVD and kidney disease are closely interrelated and that disease of one organ causes dysfunction of the other [24]. The adverse effects of sodium on BP values are amplified in CKD patients as a result of fluid overload and direct toxicity on the heart, vascular system, and kidney. [20].

7. Strength and Limitations of The Study

Strengths

- ✓ The study has a high response rate; from the 287 planned study participants, a complete response rate of 280 (97.5%) was obtained.
- ✓ Having a rigorous scale of measures (logistic regression), the findings depict the actual practices of the study area. Therefore, it is hoped that in the future, the predictors can be employed more widely for further research.

Limitations

- ✓ Methodological limitations: the study was fully quantitative. However, future researchers can use a mixed approach for a better finding in a different approach.
- ✓ The time given for the analysis of results was just one week, and researchers were not familiar about

8. Conclusion

In conclusion, the overall magnitude of CKD in Arbaminch General Hospital was 15.7% regarding comorbidity (96.1%) of the participants had medically confirmed comorbidities other than CKD, of which 48.6% had HTN, 40.0% D.M., and 17.9% had a cardiac illness. D.M., CVD, and eating processed food are associated factors of chronic kidney disease.

9. Recommendation

- ✓ We recommend physicians have a high index of suspicion for early diagnosis and take measures to halt the disease progression diagnosis of CKD
- ✓ We recommend other researchers conduct studies on CKD with analytic study designs like cohort /case-control and qualitative methods to increase knowledge in the study area.
- ✓ We recommend that policymakers understand the social and economic burden of the diseases and give special attention

Abbreviations

Abbreviation	
ACR	**Albumin to Creatinine Ratio (Spot Urine)**
ACEI	**Angiotensin Converting Enzyme Inhibitors**
AMGH	**Arbaminch General Hospital**
AMU	**Arbaminch University**
ARBS	**Angiotensin Receptor Blockers**
AKI	**Acute kidney Injury**
BUN	**Blood Urea Nitrogen**
CBC	**Complete Blood Count**
CR	**Creatinine**
CKD	**Chronic Kidney Disease**
CKD-EPI	**Chronic Kidney Disease Epidemiologic Collaboration**
GFR	**Glomerular Filtration Rate**
GC	**Gregorian Calendar**
HCT	**Hematocrit**
KDOQI	**Kidney Disease Outcomes Quality Initiative**
MRC	**Medical Referral Clinic**
MDRD	**Modification Of Diet In Renal Disease**
KM	**Kilometer**
SPSS	**Statistical Package for The Social Science**
SNNPR	**Southern Nations Nationality and Peoples Region**
RRT	**Renal Replacement Therapy**

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