



**HAWASSA UNIVERSITY**

**COLLEGE OF MEDICINE AND HEALTH SCIENCE**

**SCHOOL OF PUBLIC HEALTH**

**MAGNITUDE OF KIDNEY STONE AND ITS ASSOCIATED FACTORS  
AMONG ADULT POPULATION IN ARBEGONA WOREDA, SIDAMA  
REGION, ETHIOPIA**

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**JUNE, 2024**

**HAWASSA, ETHIOPIA**

**MAGNITUDE OF THE KIDNEY STONE AND ITS ASSOCIATED  
FACTORS AMONG ADULT POPULATION IN ARBEGONA WOREDA,  
SIDAMA REGION, ETHIOPIA**

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**A RESEARCH THESIS SUBMITTED TO HAWASSA UNIVERSITY  
COLLEGE OF MEDICINE AND HEALTH SCIENCE SCHOOL OF  
PUBLIC HEALTH IN PARTIAL FULFILMENT OF THE REQUIREMENT  
FOR DEGREE OF MASTERS IN PUBLIC HEALTH IN EPIDEMIOLOGY**

**JUNE, 2024**

**HAWASSA, ETHIOPIA**

## **Declaration**

I undersigned, declared that this was my original work, has never been presented in this or any other University by another person, and that all the resources and materials used for this research thesis were duly acknowledged.

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## **ACKNOWLEDGMENT**

I would like to extend my acknowledgment to Hawassa university and college of medicine and health sciences school of public health, for giving me this research thesis undertaking opportunity. Next, I would like to thanks my advisor's Dr Kebede Tefera (PhD) and Mrs Terefe Markos (MPH) for their constructive comments, continuous supports and suggestions during the process to did this research thesis. Then my gratitude goes to NORADA PROJECT for their supporting budget to did this research thesis. And also, my gratitude goes to Sidama regional health office for their supporting the necessary information to did this research thesis. Finally, I would like to pass my sincere thanks Arbegona district Administration and Arbegona district health office for their cooperation providing me baseline information on issues related to my study. My gratitude goes to my study's participants of Arbegona woreda, data collectors, radiologist, laboratory technologist and supervisors.

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## **Acronyms and Abbreviation**

AOR	Adjusted odd ratio
BMI	Body mass index
CI	Confidence interval
CKD	Chronic kidney disease
COR	Crude odds ratio
DM	Diabetic mellitus
ETB	Ethiopian birr
HUCMHS	Hawassa University, college of medicine and health science
HUCSH	Hawassa University Comprehensive Specialized Hospitals
HTN	Hypertension
MPH	Masters of public Health
n	Number of sample size
PH	Power of hydrogen
SPSS	Statistical package for social science

## **Abstract**

**Background:** Kidney stones are a prevalent public health problem in globally, and its magnitude is increasing throughout the year. Different factors can contribute the occurrence of the kidney stone. There was not enough study conducted on the magnitude and associated factors of the kidney stone among adult population in Ethiopia especially in Arbegona woreda. This study provides the way to generate tailored and evidence-based recommendations that guide all stakeholders to take actions.

**Objective:** To assess the magnitude of the kidney stone and its associated factors among adult population in Arbegona woreda, Sidama region, Ethiopia.

**Methods:** A community based cross-sectional study were conducted. Four hundred eighty-three households in seven kebeles were chosen using multi-stage sampling techniques. Data was collected using interviewer administered questionnaire and people was screened for kidney stone by using ultrasound and urine analysis. The data was cleaned, categorized and analysed using statistical package for social science version 26. Descriptive and analytical statistics were done. The association between variables were analysed using bi variable analysis. The variables with p-values less than 0.25 in bi variable analysis was taken and analyses to in multivariable logistic regression model and multi variable logistic regression was statistical significance were declared at p value < 0.05, with 95% confidence interval.

**Result:** Among the 483 study participants 270(55.9%) was male. Over all prevalence of kidney stone among adult population was 34.4% (95% CI, (30.2, 38.7%)). After adjusting for the possible confounders, hypertension (AOR (95% CI = 6.6(2.4, 17.8))), diabetes melletus (AOR (95% CI = 9.6(1.04, 87.7))), family history of kidney stone (AOR (95% CI =13.7(8.5, 24.3))), person previously treated with kidney problem (AOR (95% CI =8.8(3.9, 19.6))) and who consume Kocho every day (AOR (95% CI =4.8(1.5, 15.6)) were found to be significant factor for kidney stone among adult population in Arbegona woreda, Sidama region.

**Conclusion:** The magnitude of kidney stone was high in the community. Hypertension, diabetes mellitus, Kocho, family and personal history of kidney stone were significantly associated with kidney stone.

**Key words:** Kidney stone, Magnitude, Risk factors, Arbegona woreda

## **1. INTRODUCTION**

### **1.1 Background**

Kidney stones refer to small, hard mineral deposits that form in the one or both kidneys (1). There are different types of kidney stones, those are calcium oxalate, calcium phosphate, uric acid, struvite and cystine stones. Among them most common type of kidney stone is calcium oxalate, which forms when calcium and oxalate combine in the urine and that create a hard crystal (2). Uric acid stones are formed when there is an excess amount of uric acid in the urine, and struvite stones are developed as a result of certain types of bacterial infections. Cystine stones are formed when there is an inherited condition that causes an excess amount of cystine to be excreted in the urine (3).

There are several risk factors that increase the occurrence of kidney stones. These include dehydration, family history, obesity, a high salt or protein diet, certain medical conditions such as obesity, inflammatory bowel disease, HTN, DM and gout, certain medications, a sedentary lifestyle, and age and gender (4). A sedentary lifestyle, age, gender, with men being more likely to develop kidney stones than women. Therefore, maintaining a healthy lifestyle and staying hydrated can help prevent kidney stones (5). Nutritional factors have been suggested as one of the risk factors in the development of kidney stones (6).

Untreated kidney stone is presented with severe pain, urinary obstruction and if not treated surgically can cause a hydronephrosis and kidney failure. It is a condition cause a poor quality of life and high health care costs (7). Lifestyle modifications can prevent the formation of kidney stone: such as staying hydrated, reducing salt and animal protein intake, and increasing dietary calcium and citrus intake (6).

## **1.2 Statement of the problem**

Kidney stone is among non-communicable diseases which cause significant morbidity and mortality globally (8). Mankind has been affected by urinary stones since centuries dating back to 4000 before Christ. The prevention of renal stone recurrence remains to be a serious problem in human health (9). Kidney stone disease is an increasing urological disorder of human health, affecting about 12% of the world population. It has been associated with an increased risk of end-stage renal failure. The etiology of kidney stone is multifactorial (1). Around 15% of adults face the condition of kidney stones at some point in their lifetime. In 2015, 22.1 million cases of kidney stones were reported around the world. Out of these, 16,100 cases resulted in death (10) .

Kidney diseases have risen from the world's 13th leading cause of death to the 10th. Mortality has increased from 813 000 in 2000 to 1.3 million in 2019 (11). Kidney stone disease is common in industrialized countries, affecting 10–15% males and 3– 5% females in the United States and its prevalence is still rising. In the United States, kidney stone affects 1 in 11 people, and it is estimated that 600,000 Americans suffer from urinary stones every year (12). Over 3 million people in the UK have chronic kidney disease (CKD), with 61,000 people being treated for kidney failure. There are 40,000 - 45,000 premature deaths in the UK each year due to CKD. Over a lifetime, 6% of women and 11% of men will have kidney stones at least once (1). In Africa, there is limited research on the topic, and the available studies are outdated.

Due to kidney stones, there is difficulty passing urine may progress to kidney disease, if there is a blockage. The Complications of kidney stones that can potentially put a patient's life in danger are: Renal or kidney damage: Prolonged kidney stones damage the kidneys adversely. The patient is not even aware of the seriousness of the condition. Therefore, they do not seek proper treatment in time, resulting in a worsening of the condition (13). CKD: Recurrent kidney stones can lead to loss of kidney function over time. CKD can lead to failure of one or both kidneys and can have fatal complications. Kidney infection Sepsis: If kidney stones get stuck in any part of the urinary tract, the urine and bacteria build-up in the area can lead to urinary tract infections.

This can even lead to abscess formation and lead to kidney infections. In the long run, kidney infections can lead to sepsis and can result in death (10) .

Renal failure or Renal loss: kidney stones can cause both acute renal failure and chronic renal failure (10). Hydronephrosis: a large kidney stone can block the ureter and obstruct the passage of urine. This can lead to a condition called hydronephrosis in which the kidney swells due to fluid build-up in the kidney. Hydronephrosis can lead to failure of the kidney. The treatment of this condition requires dialysis. In the absence of dilation, various complications can arise resulting in even death. A lot of budget is spent treating kidney failures. Kidney stone can cause significant morbidities and has a wide economic impact (14). Kidney stone disease is a common chronic disorder associated with painful stone episodes, lost work days and significant health care costs (15).

Together with Dr Tilaneh L. a sub-specialist surgeon's at HUCSH in 2023 close and critical observation causing the inception of this particular research project, indicated that many patients from Arbegona woreda were admitted for kidney stone surgery in HUCSH compares with other woreda. Answering the question why such high hospital admission from Arbegona Woreda in Sidama Region? Needs proper research-based evidence. People could learn the common risk factors for kidney stone formation and could adopt preventive health behavior to promote their own health. Knowing the risk factors for development of kidney stone is key to the public's informed decision making.

Despite the observed higher magnitude of people attending for surgical kidney stone removal procedure from Arbegona woreda, the actual magnitude and the factors associated with kidney stone formation is not yet studied. Therefore, this community based cross sectional study were intended to determine magnitude and associated factors kidney stones among adult population of Arbegona woreda residents.

### **1.3 Significance of the studying**

The purpose of this study was to assess the magnitude and associated factors of kidney stones among adult population in the Arbegona woreda, Sidama, Ethiopia. Therefore, this study result might input information to addressing the burden: Kidney stones are a common urological problem in the worldwide, and they can cause significant morbidity and healthcare costs. Knowing the magnitude of the kidney stones in the Arbegona woreda were help healthcare professionals and policymakers to assess the burden of the disease and allocate resources accordingly.

To identifying the risk factors: Studying the risk factors of kidney stones in the area can helps to identify the causes of the disease and develop ways to prevent it in the residents of Arbegona woreda. Public health interventions: the information collected during the study can be used to develop prevention strategies tailored to the residents of the Arbegona woreda. Local community members were also benefit from raising awareness created due to the studies of kidney stone magnitude and associated factors, including how to make lifestyle changes to reduce the risk of developing kidney stones.

Furthermore, since no similar study were done in this study area, the result of this study was used as an input for other study. In addition, the finding obtained from this research were used as an input for researchers who was interested to examine further study on this area.

## **2. LITERATURE REVIEWS**

### **2.1. Overview of Kidney Stones**

Kidney stones or nephrolithiasis are a common urological disease, which can seriously affect health and quality of life in populations worldwide. They can cause significant morbidity including urinary tract infection, flank pain, hydronephrosis, decreased renal function (16). Archeological findings give profound evidence that humans have suffered from kidney and bladder stones for centuries. Bladder stones were more prevalent during older ages, but kidney stones became more prevalent during the past 100 years, at least in the more developed countries. The prevalence of urolithiasis in a given population was dependent on the geographic area, racial distribution, socio-economic status and dietary habits (17). The prevention of stone recurrence requires better understanding of the mechanisms involved in stone formation (18).

Kidney stones have been associated with an increased risk of CKD, end-stage renal failure, cardiovascular diseases, DM, and HTN (19). The symptoms of kidney stone are related to their location whether it is in the kidney, ureter, or urinary bladder (1). Initially, stone formation does not cause any symptom. Later, signs and symptoms of the stone disease consist of renal colic (intense cramping pain), flank pain (pain in the back side), hematuria (bloody urine), obstructive uropathy (urinary tract disease), urinary tract infections, blockage of urine flow, and hydronephrosis (dilation of the kidney). These conditions may result in nausea and vomiting with associated suffering from the stone event (20).

### **2.2. Epidemiology of Kidney Stones**

According to a review article, the prevalence of kidney stones varies from 1% to 15% of the world population and its prevalence is higher among males than female (7). The prevalence of the kidney stone in the worldwide are reported different rate as 1–5% in Asia, 5–9% in Europe, and 7–15% in North America. While in Saudi Arabia, nearly 20% of individuals suffer from kidney stone, it is seen in only 4% of the population of China (7). The systematic review and meta-analysis published in the journal *European Urology* in 2019, the overall prevalence of

kidney stones in the general population varies from 1 to 20% depending on the location and ethnicity of the population studied (21).

The study conducted in the United States reported that the prevalence of patients with kidney stones increased from 3.8% in the year 1976 to 8.8% in 2012. The men are more affected by kidney stone than women 10.6% and 7.1% respectively (12). The performed the present meta-analysis to assess the kidney stone prevalence in mainland China from 1990 through 2016 was 7.54%. The prevalence in age groups of <20 years, 20-29 years, 30-39 years, 40-49 years, 50-59 years, and 60 years and older was 0.27%, 3.15%, 5.96%, 8.18%, 9.14%, and 9.68%, respectively and its prevalence increased with age. The males are more likely to suffer from the kidney stone disease than females 10.34% and 6.62% respectively (16).

The study conducted on the prevalence of kidney stones and associated factors in the Shunyi district of Beijing, China 3.61% were diagnosed with kidney stone formation (2). The study that was done on Urolithiasis Patient in Iraqi shows that it is more prevalent among male than female patients and which is commonly presented with the clinical features of flank pain (65%), dysuria (10.7%), nausea, vomiting (10.7%), and hematuria (13.6%) (22). The study that was done on the magnitude and risk factors of kidney stone disease in the southeast of Iran people accounting for 24.08% of the population had kidney stones (23).

The one study conducted in Egypt in 2013 reported that the prevalence of the kidney stone rate is 10.6% in the general population (24). The study that was done on the magnitude of urolithiasis and cholelithiasis Ethiopia in thirteen years trend in hospital based retrospective study shows that overall prevalence of stone diseases among hospital admitted patients in one referral hospital was 12.5%., among them 2.3% was urolithiasis and 10.2% was gallstones. In the last thirteen years, trends in overall stone prevalence were increased by 10.8% (25). The study conducted on the prevalence of CKD among adult population in Southwest Ethiopia was 7.4% (8). The pooled estimate of the prevalence of the CKD among patients with chronic illnesses in Ethiopia is 21.71% (26).

Among the surgically treated patients referred from all over the country, 2.3% urolithiasis cases were determined in the last 13 years in Ethiopia retrospective analysis of Cases at St. Paul ' S

referral hospital (27). Recent studies have reported that the prevalence of urolithiasis has been increasing in the past decades in both developed and developing countries habits (28).

### **2.3. The Urinary System and Stones**

The urinary filtrate is formed in the glomerulus and passes into the tubules where the volume and content are altered by reabsorption or secretions. Most solute reabsorption occurs in the proximal tubules, whereas fine adjustments to urine composition take place in the distal tubule and collecting ducts. The loop of Henle serves to concentrate urine composed of 95% water, 2.5% urea, 2.5% mixture of minerals, salts, hormones, and enzymes. In the proximal tubules, glucose, sodium, chloride, and water are reabsorbed and returned to the blood stream along with essential nutrients such as amino acids, proteins, bicarbonate, calcium, phosphate, and potassium. In the distal tubule, the salt and acid-base balance of blood is regulated (29).

### **2.4. Types of Kidney Stones**

There are four main types of kidney stones, each with distinct compositions and characteristics. These are: calcium oxalate, uric acid, struvite, and cystine stones (21). Calcium oxalate stones are the most common type of kidney stones, making up approximately 80% of cases. These stones are composed of calcium oxalate and can form due to excessive calcium intake, overproduction of oxalate by the liver, or a decrease in urine volume (12). Uric acid stones are the second most common type of kidney stones, comprising approximately 5-10% of cases. These stones are composed of uric acid and may develop in individuals with gout or those who consume a high-purine diet (12).

Struvite stones are less common and constitute approximately 10-15% of kidney stones (30). These stones are composed of magnesium, ammonium, and phosphate and may form as a complication of chronic urinary tract infections (12). Cystine stones are the least common type of kidney stones, making up less than 1% of cases (30). These stones are composed of cystine, an amino acid that may be overproduced due to a genetic condition (12). Overall, understanding the types of kidney stones is crucial for effective diagnosis and management of kidney stone disease.

## **2.5. Factors that contribute to the formation of kidney stones**

Several factors contribute to the formation of kidney stones, including genetics, diet, lifestyle, and environmental factors. Genetics play a significant role in the development of kidney stones. Research has shown that inherited conditions such as cystinuria, hyperoxaluria, and primary hyperparathyroidism can increase the risk of developing kidney stones (31). Additionally, family history has been found to be a significant risk factor for kidney stones (32). Diet is another important factor that influences kidney stone formation. Similarly, high salt intake can cause dehydration and lead to calcium and uric acid stone formation (6).

Lifestyle factors such as occupation and physical activity can also contribute to the development of kidney stones. Some studies have found that individuals who perform heavy physical activity are at an increased risk of developing kidney stones (33). Conversely, sedentary lifestyles can increase the risk of obesity, which is a significant risk factor for kidney stone formation (34). Gender, HTN, obesity, DM, and personal habits like alcohol consumption and cigarette smoking are the factors that contribute to the development of kidney stones (23). Male gender, drinking white spirits, and a history of urolithiasis are potentially associated with kidney stone formation (2).

Environmental factors such as temperature and geographic location can also play a role in kidney stone formation. Hot and humid climates have been associated with an increased risk of kidney stones due to greater fluid losses and thus higher concentrations of stone-forming substances in the urine (35). Furthermore, living in an area with hard water can lead to calcium-based stone formation (36). Another study also found that high intake of animal protein, sodium, sugar, and low intake of calcium, citrate, potassium, and water were independent risk factors for incident kidney stone formation (37).

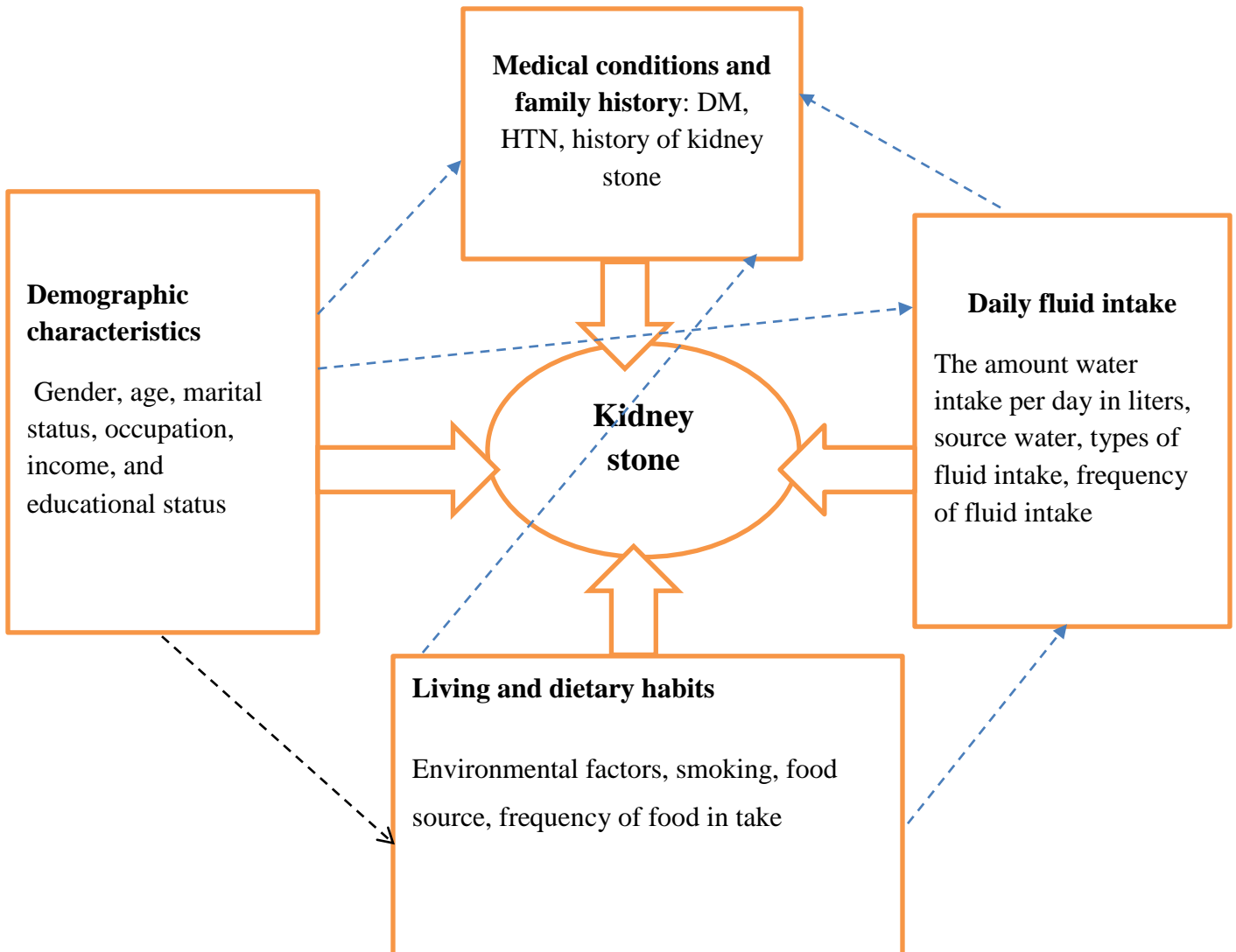
Kidney stones were more common among obese than normal-weight individuals 11.2% compared with 6.1%. Obesity and DM were strongly associated with the kidney stone (12). A Systematic review and Meta-Analysis the determinants of CKD among diabetic Patients in Ethiopia the analysis found that the pooled burden of CKD among patients with diabetes was 18.22% and the factors such as HTN, DM and family history of kidney stone were found to have significant association with CKD (38). The study conducted in the south west of Ethiopia on

chronic kidney disease HTN, age greater than 40 years old, and Behavioral characteristics significantly associated with chronic kidney disease (8).

Among the surgically treated patients referred from all over the country were determined in the last 13 years in Ethiopia retrospective analysis of cases at St. Paul ' S referral hospital. It is higher in males than females. Nearly one quarter of the cases with urolithiasis occurred in the age group 30 and 39 years. Urolithiasis increased in men and declined in women as age increased (27). The current review revealed a higher burden of CKD among patients with DM in Ethiopia. The presence of HTN, type II DM, and duration of DM for a longer duration were found to be independent determinants of CKD among patients with diabetes (38).

The burden and determinants of CKD among DM Patients in Ethiopia a systematic review and meta-analysis 36 % had experienced 2 to 4 clinical stone events, 21 % 5 to 10 episodes and 43 % more than 10. HTN and DM were significantly more prevalent among the cases that also had higher BMI than controls (38). It affects all ages, sexes, and races, but occurs more frequently in men than in women within the age of 20–49 years (39). In conclusion, kidney stones are a multifactorial disorder influenced by genetics, diet, lifestyle, and environmental factors. Understanding the various factors that contribute to kidney stone formation can help in prevention and treatment strategies.

## 2.6 conceptual frame work of kidney stone.



*Figure1. The conceptual frame work for the study of magnitude of kidney stone and its associated factors among adult population in Arbagona woreda, Sidama region, Ethiopia, 2024 (33,34, 37, 38, 39).*

### **3. OBJECTIVES**

#### **3.1 General Objectives**

To assess the magnitude of the kidney stone and its associated factors among adult population in Arbegona woreda, Sidama region, Ethiopia 2024

#### **3.2 Specific Objectives**

1. To determine the prevalence of kidney stones among adult population in Arbegona woreda, Sidama region, Ethiopia 2024
2. To identify factors associated with kidney stones among adult population in Arbegona woreda, Sidama region, Ethiopia 2024

## **4. METHODOLOGY**

### **4.1 Study setting /area**

The study would be conducted in Sidama regional State. Sidama regional state is one of the regions which is located in South Ethiopia. In Sidama regional state there were 37 woreda found, among them the study would be conducted in Arbegona woreda. Its distance from Hawassa the capital city of Sidama regional state is 77 Kilometers and from Addis Abeba which is capital city of Ethiopia is 342 Kilometers. Arbegona is bounded in north with Kokosa woreda, Oromia region and Gorche woreda, in south with Bona Zuriya woreda, in east with Bura and Bensa woreda, and in west with Shafamo woreda. It has an altitude range of 1,320 to 2,915 meters above sea level. The climate condition of this woreda is 75% of Dega and 25% is Woinadega. There are 30 rural kebeles and 1 urban kebele. The woreda has 156,038 inhabitants from which 77,332 are male and 78,706 are women. The primary economic activities in Arbegona Woreda are agriculture, livestock rearing, and trade. The main crops cultivated in the Woreda include coffee, maize, beans, and vegetables. The people of Arbegona Woreda belong to the Sidama ethnic group, and their language is Sidaamu Afoo. In terms of water sources, the area is blessed with a number of rivers and streams that provide water for both irrigation and household use. However, much of the population still relies on traditional sources such as hand-dug wells, which can be unreliable and unsafe (40).

### **4.2 Study design and period**

A community based cross-sectional study was conducted from March 2024 to April 2024

### **4.3 Source population**

All adult population residents who were living in Arbegona woreda

### **4.4 Study Population**

All adult population residents living in the selected kebeles of Arbegona woreda

### **4.5 Study units**

Randomly selected adult individuals in selected kebeles and actually being interviewed.

## 4.6 Inclusion and exclusion criteria

### 4.6.1 Inclusion criteria

The inclusion criteria of participants were the age of >18 years old and who lives more than 3 years in Arbegona woreda.

### 4.6.2 Exclusion criteria

Household members who were unable to give response voluntary.

## 4.7 Sample size determination procedures

The sample size was determined by using single population proportion formula and double population formula for the factors associated with kidney stone using Open Epi info software. For single population proportion,  $N = (Z_{\alpha/2})^2 P(1-P) / d^2$ , where  $Z_{\alpha/2}$  = the value under standard normal table at 95 % level of CI which is 1.96, proportion for 7.4 % taken from previous findings (8), margin of error d which will be set at 3 %. The assumptions for the calculation will 95 % CI, 80 % power, design effect of 2, and a 10 % non-respondent rate. Finally, a total sample size was 483. For the objective two, using double population's proportion formula with the previous studies result from on the most important variables as follows:

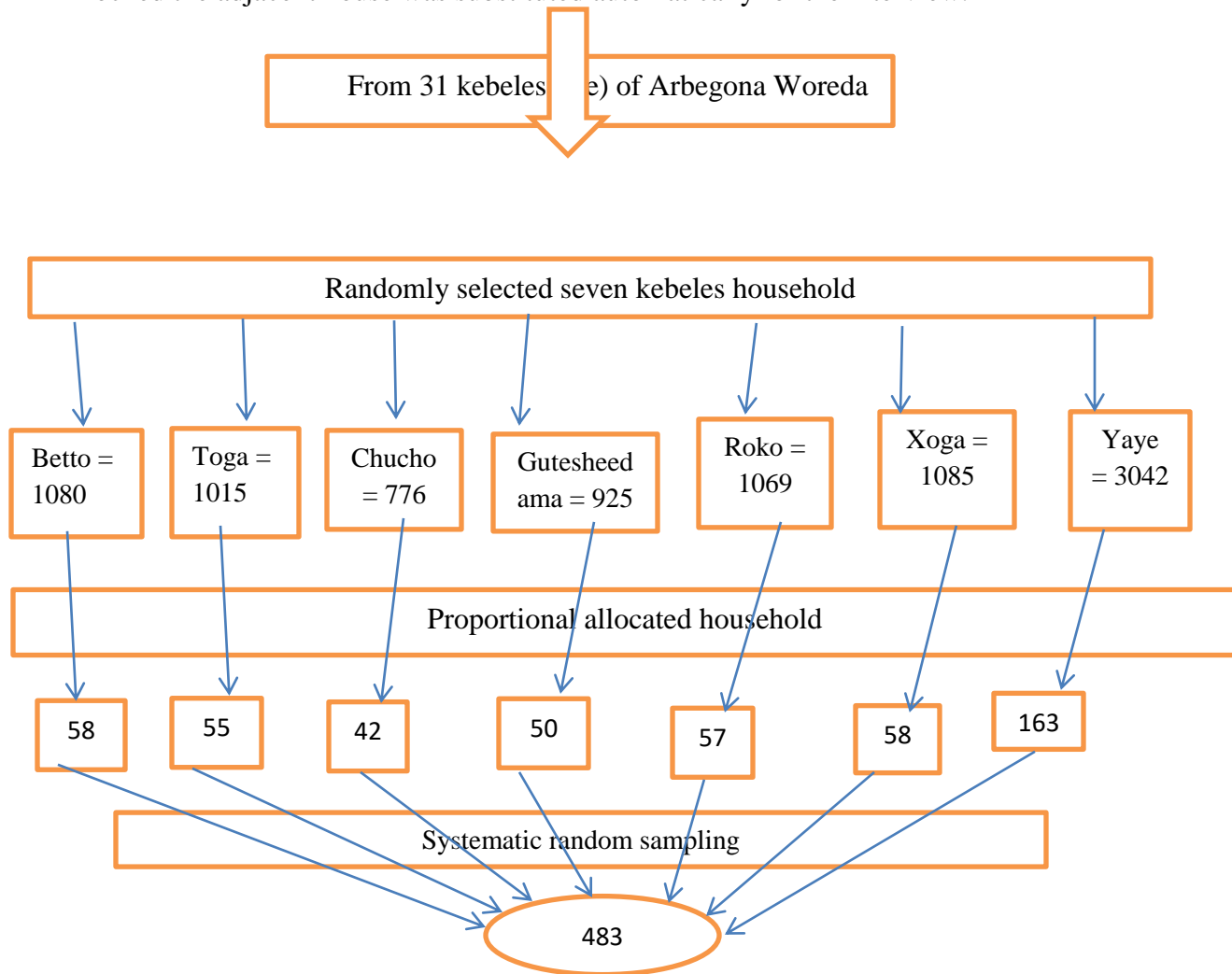
*Table1. Sample size determination for the study of magnitude of kidney stone and its associated factors among adult population in Arbagona woreda, Sidama Ethiopia 2024*

Variables	%of outcome in non-exposed	AOR	CI	Power	Design effect 2	Sample size by adding 10% for non-response rate	Reference
HTN	4.7	4.1	95%	80	2	475	(8)
DM	96.6	0.01	95%	80	2	102	(41)
Family history of kidney	93.6	0.01	95%	80	2	81	(41)

Finally taking by largest sample size, 483 households were included in the study

#### 4.8 Sampling technique and procedure

The Arbegona woreda was selected purposively for the study. In the study areas of the Arbegona Woreda had 31 kebeles. A multi-stage sampling technique was employed to select representative sample of households in the selected village. Among 31 kebeles, 7 (23%) of them were selected using a simple random sampling technique (lottery method). The sample size was proportionally allocated based on the household's number of each selected kebeles. Then systematic random sampling was used using every k interval. If one household have more than one adult by using lottery methods one person was selected. Whenever the selected household would be found locked the adjacent house was substituted automatically for the interview.



*Figure2. Schematic diagram for how the household were selected for a study of the magnitude of kidney stone and its associated factors among adult population in Arbagona woreda, Sidama region, Ethiopia 2024*

#### **4.9 Data collection tools and procedures**

Data was collected via a pretested structured questionnaire adapted from different literatures. The questionnaires were first prepared in English language and then it was translated to Sidaamu afoo and back into English language to ensure the consistency between the two versions. The questionnaire contained close ended questions. The questionnaires were designed to obtain information on socio-demographic, risk behavior related, and another factor. Finally, the structured Sidaamu afoo version questionnaire were used for data collection. Two BSc nurses and two BSc midwives who were speak well in Sidaamu afoo were collected the data and three additional BSc degree holder public health office (HO) professionals were supervise the data collectors. Both data collectors and supervisors were trained for two days on the study instruments and data collection procedures. Data was collected through face to face interview with the study subjects after coming to consensus on the importance of the study to the study subjects. The health extensions were informed the study participant in each selected kebele by using systematic random sampling was used using every k interval to go Arbegona primary hospital and all transportation birr was covered by the investigators. In addition, the study's participant screenings for kidney stone by using portable ultrasound imaging by radiologist (radiology specialized Doctor) and urine testing was performed by laboratory technology using urine dipstick without any cost payment in Arbegona primary hospital. If the study participants were diagnosed or screened positive for kidney stone was well advised and informed to go hospitals and to take necessary treatment.

#### **4.10 Variables**

##### **4.10.1 Dependent variables**

Kidney Stone

##### **4.10.2 Independent variables**

**Socio-Demographic characteristics:** gender, age, income, source of water, educational status and occupation.

**Behavioral and Dietary factors:** milk and milk product, meat, amount of daily water intake, source of drinking water, dietary salt intake, cigarette smoking and alcohol intake.

**Medical conditions:** DM, HTN, previously treated with kidney problem and family history of kidney stone, joint pain

#### **4.11 Operational definitions of terms**

**Kidney stones:** refers to any amount of mineral that deposits in the renal calyces and pelvis that are found free or attached to the renal papillae, ureter, urinary bladder and urethra and confirmed by using ultrasound and urine analysis (42).

**Dipstick urine analysis:** refers to a laboratory test that examines the physical and chemical properties of a person's urine to determine if they have findings suggesting possibility or risk for kidney stones. This test may help to identify the presence of substances in the urine that can lead to the formation of kidney stones, such as calcium, oxalate, uric acid, or cystine (41).

**An ultrasound test for kidney stones:** uses sound waves to create images of the kidneys, ureters, and bladder. It is a non-invasive and painless test that can help diagnose the presence and size of kidney stone (43).

**Poor knowledge of kidney stone:** the study participants who were response less than 50% about kidney stone related questions.

**Good knowledge of kidney stone:** the study participants who were response greater than 50% about kidney stone related questions.

#### **4.12 Data quality assurance**

A pre-test was done before the actual data collection began (5% of the sample size) at Bona worda, which is adjacent of the study area. Two days of training was given to data collectors and supervisors for the study's objective, the confidentiality of information, and the handling of the data collection procedures. The completed questionnaires were collected daily after checking the data's completeness and consistency and providing timely feedback by supervisors. Supervision was held regularly during the data collection period.

#### **4.13 Data processing and analysis**

The data was entered by using Epi data Version 4.6 and then export to SPSS 26 Version software for analysis. Descriptive and analytic statistics were used to describe using measure of central location and measure of dispersion by using tables and graphs. Binary logistic regression analysis was done to determine the preliminary relationship between the dependent and independent variables. Goodness of fit was checked by using Hosmer-Lemeshow goodness of fit. Finally, factors that was found significant at  $p < 0.25$  on binary logistic regression analysis was selected to perform multivariable logistic regression to identify factors significantly associated with the kidney stone. Results from the multivariable logistic regression was reported in the form of AOR at 95% CI with 0.05 levels of significance.

#### **4.14 Ethical Consideration**

The research ethical approval letter was obtained from the research and ethics review committee of HUCMHS department of public health Institutional Review Board (IRB) (Approval No: IRB/215/16). The preceding permission was obtained from Arbegen Woreda health office. Before data collection, informed written consent was obtained from the study participants. Each client was informed about the objective of the study and the assurance of confidentiality. For Individual were told that they are free to leave the study at any time. Confidentiality of client data will be assured by omitting client identifiers and giving code numbers. Thus, the name and address of the client will not be recorded in the data abstraction formats.

## 5. RESULTS

### 5.1 Socio-demographic characteristics

A total of 483 participants were included in the study with the response rate of 100%. The median age of respondents was 34. Most participants were within the age category between 19–40 (309 (64.0%)) years. The proportions of male participants 270(55.9%) were relatively higher than female participants. The most study participants were married 418(86.5%) and around the half percent occupation of study participants were farmers. The median monthly income of the study participants was 2000 ETB. The more than half percent of the study participants were used spring water for drinking.

*Table 2. Socio-economic and demographic characteristics of study participants in Arbegona woreda, Sidama region Ethiopia, 2024 n=483*

Variables	Category	Frequency	Percent (%)
Sex	Male	270	55.9
	Female	213	44.1
Age	19-30	154	31.9
	31-40	155	32.1
	41-50	96	19.9
	51-60	47	9.7
	61-70	20	4.1
	71-82	11	2.3
Marital status	Single	59	12.5
	Married	418	86.5
	Others	6	1.2
Occupation	Farmer	238	49.3

	Government employee	127	26.3
	Merchant	54	11.2
	Student	64	13.2
Educational status	unable to read and write	141	29.2
	read and write	24	5.0
	Primary and secondary school	171	35.4
	College and above	147	30.4
Month income (Median 2000 ETB)	<2000 ETB	302	62.5
	>=2000 ETB	181	37.5
Source of drinking water	Spring water	253	52.4
	Tap water	225	46.6
	Ground water	5	1.0

Others: Divorced and Widowed

## 5.2 Behavioral and Dietary factors

More of study participants were used Koch every day 303(62.2%) and Injera occasionally 358(74.1%) for consumption. Around 451(93.4%) of the study participants was consume meat at occasionally. Among the study participants 203(42.0%) was consume vegetables usually and 259(53.6%) were consume fruits occasionally. Most of the study participants 446(92.3%) was drinking water less than two liters per days.

**Table 3. Dietary and behavioral characteristics of study participants in Arbegona woreda, Sidama region Ethiopia, 2024 n=483**

Types	Frequency of consumption	Frequency (n)	Percent (%)
Kocho	Every day	303	62.7
	Usually	112	23.2
	Occasionally	68	14.1
	Every day	25	5.2

Injera or bread	Usually	100	20.7
	Occasionally	358	74.1
Meat	Every day	6	1.2
	Usually	26	5.4
	Occasionally	451	93.4
Vegetable	Every day	105	21.7
	Usually	203	42.0
	Occasionally	175	36.3
Fruits	Every day	38	7.9
	Usually	186	38.5
	Occasionally	259	53.6
Sugar	Every day	84	17.4
	Usually	178	36.8
	Occasionally	221	45.8
Milk	Every day	60	12.4
	Usually	198	41
	Occasionally	225	46.6
Amount of daily water	<2 liter	446	92.3
	>2 liter	37	7.7
	Total	483	100

### 5.3 Knowledge Assessment and Clinical Information

Overall assessment knowledge status of kidney stone was 297(68.1%) of study participant have poor knowledge. Out of 483 study participants 46(9.5%) were didn't heard about renal stone. The remaining were got information about kidney stone from friends and neighbours 194(44.4%), radio and television 37(8.5%) and health workers 206(47.1%). Among the study participants 137 (28.4%) were didn't knew symptoms of kidney stone and 77(15.9%) didn't thought kidney stone to be cured. Among the study participants one fourth (24.6%) have flank pain and 186(38.5%) have urinary complain.

**Table 4. Knowledge assessment and clinical information of study participants for kidney stone in Arbegona woreda, Sidama region Ethiopia, 2024 n=483**

Variables	Responses	Frequency (n)	Percent (%)
Do you hear about renal stone?	Yes	436	90.3
	No	47	9.7
Source of information	Friends and neighbours	194	44.4
	Radio and television	37	8.5
	Health workers	206	47.1
Do you think kidney stone can be diagnosed?	Yes	451	93.4
	No	32	6.6
Do you think drinking a lot of water can prevent kidney stone	Yes	460	95.2
	No	23	4.8
Do you think improving eating system can prevent kidney stone?	Yes	457	94.6
	No	26	5.4
Do you think improving life style can prevent kidney stone?	Yes	450	93.2
	No	33	6.8
Do you know symptoms of kidney stone?	Yes	346	71.6
	No	137	28.4
Do you think kidney stone to be cured?	Yes	406	84.1
	No	77	15.9
Do you think kidney stone can cause long term problem?	Yes	451	93.4
	No	33	6.6
Do you have flank pain	Yes	119	24.6
	No	364	75.4
Do you have urinary complain	Yes	186	38.5
	No	297	61.5

Over all knowledge of kidney stone	Good	139	31.9
	Poor	297	68.1

#### 5.4 Medical conditions and symptoms

Based on assessment of medical conditions 58(12%) of study participant had HTN. Out of 483 study participants 15(3.1%) have DM. Among the study participants 85(17.6%) have previously treated with kidney problem and 137(28.4%) have family history of kidney stone. 23(4.7%) of the study participants have joint pain.

*Table 5. medical condition of the study participants in Arbegona woreda, Sidama region, Ethiopia, 2024 n=483*

Variables	Response	Frequency (n)	Percent (%)
HTN	Yes	58	12
	No	425	88
DM	Yes	15	3.1
	No	468	96.9
Previously treated with kidney problem	Yes	85	17.6
	No	398	82.4
Family history of kidney stone	Yes	137	28.4
	No	346	71.6
Joint pain	Yes	23	4.8
	No	460	95.2

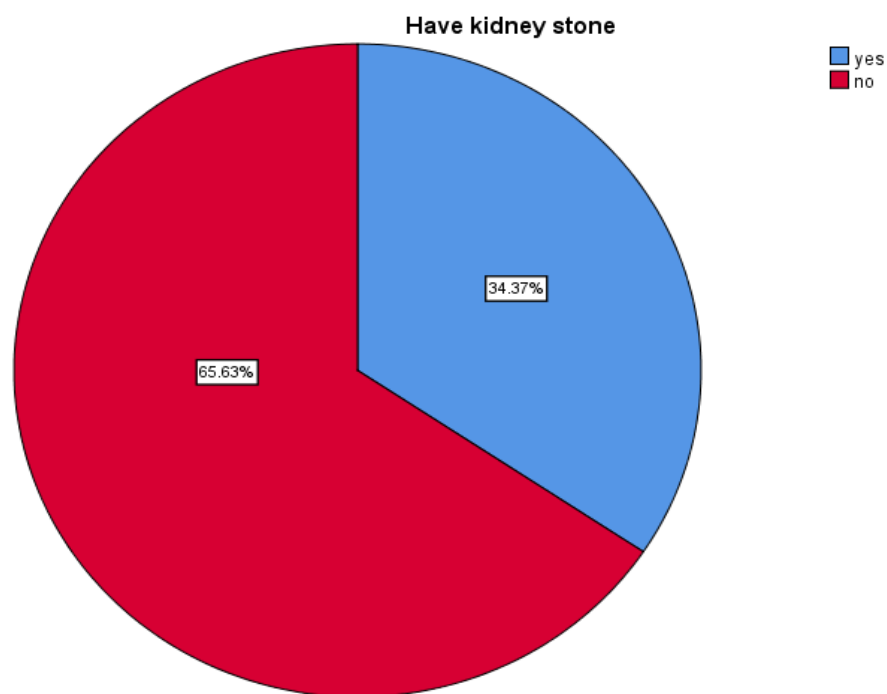
#### 5.5 Laboratory results of urine analysis

According to laboratory investigation of urine analysis 309(63.9%) of the study participants have urine PH less than six and 37(7.6%) have specific gravity of urine greater than 1.03. As result of laboratory of urine investigation shows 82(18.0%) of study participants have blood in urine, 57(11.8%) have leukocyte in urine and 103(21.3%) have protein in urine.

*Table 6. Urine analysis results of the study participants in Arbegona woreda, Sidama region, Ethiopia, 2024 n=483*

Variables	Category	Kidney stone	
		Yes n (%)	No n (%)
PH of urine	<6	92(19.0%)	217(44.9%)
	6-7.5	74(15.4%)	100(20.7%)
Specific gravity of urine	1.005-1.03	153(31.7%)	293(60.7%)
	>1.03	13(2.7%)	24(4.9%)
Blood in urine	+1	22(4.6%)	16(3.3%)
	+2-3	33(6.8%)	11(2.3%)
	No	111(33.0%)	280(58.0%)
Leukocyte in urine	+1	23(4.8%)	3(0.6%)
	+2-3	12(2.5%)	19(3.9%)
	No	131(27.1%)	295(61.1%)
Protein in urine	+1	26(5.4%)	11(2.2%)
	+2-3	59(12.2%)	7(1.4%)
	No	81(16.8%)	299(62.0%)

## 5.6 Prevalence of kidney stone



*Figure 3. prevalence of kidney stone of the study participants in Arbegona woreda, Sidama region Ethiopia, 2024*

Based on the findings 166 (34.4%) (95% CI, (30.2, 38.7%)) of respondent who had kidney stone. Among them 98 (59.04%) was males.

## 5.7 Factors associated with kidney stone

From bivariate logistic regression flank pain, urinary complain, family history of kidney stone, DM, HTN, previously treated with kidney problem, kocho, milk, joint pain, gender, educational status and PH of urine were candidate variables for multivariable analysis having a p-value of 0.25. To control the effects of confounder, multivariable analysis was carried out. In multiple logistic regressions, DM, HTN, who consume kocho every day, flank pain, family history of kidney stone and personal history of kidney stone were statistically significantly associated with kidney stone.

The people who have been diagnosed with DM were nearly ten times more likely develop kidney stone than who didn't have DM, AOR (95% CI = 9.6 (1.04, 87.7)). The people who have HTN were developed kidney stone nearly seven times than the people didn't have HTN, AOR (95% CI = 6.6(2.4, 17.8)). The People who have family history of kidney stone significantly greater odds of being to have kidney stone than the people who were not have family history of kidney stone, AOR (95% CI = 13.7 (8.5, 24.3)). The People who have previously treated with kidney problem were nine times more likely to develop kidney stone than who didn't have personal history of kidney stone, AOR (95% CI = 8.8(3.9, 19.6)). The People who consume kocho every day were nearly five times more likely to develop kidney stone than who didn't consume kocho every day, AOR (95% CI = 4.8(1.5, 15.6)).

**Table 7: Factors associated with kidney stone among adult population in Arbegona woreda, Sidama Region, bivariable and multivariable analysis 2024 n=483**

Variable	Category	Kidney stone		COR (95%CI)	AOR (95%CI)	P value
		(n = 483)				
		Yes	No			
DM	Yes	13	2	13.4 (3.0, 60.0)	9.6(1.04, 87.7) **	0.046
	No	153	315	1		
HTN	Yes	36	22	3.7 (2.1, 6.6)	6.6(2.4, 17.8) **	0.001
	No	130	295	1		
Family history of	Yes	98	39	10.3(6.7, 18.5)	13.7(8.5, 24.3) **	0.001

kidney stone	No	68	278	1	1	
Previously treated with kidney problem	Yes	53	32	4.2 (2.6, 6.8)	8.8(3.9, 19.6) **	0.001
	No	113	285	1	1	
Joint pain	Yes	13	10	2.6(1.12, 6.0)	1.8(0.42, 7.9)	0.429
	No	153	307	1	1	
Flank pain	Yes	102	117	2.72(1.45, 15.2)	1.3(0.67, 9.4)	0.001
	No	64	200	1		
Urinary complain	Yes	79	107	1.8(1.2, 2.6)	0.69(0.32, 1.5)	0.339
	No	87	210	1	1	
PH of urine	<6	92	217	0.6(0.39, 0.84)	0.58(0.27, 1.22)	0.150
	6-7.5	74	100	1	1	
Gender	Male	98	172	1.2(0.8, 178)	1.25(0.59, 2.66)	0.558
	Female	68	145	1	1	
Educational status	Unable to read and write	53	88	1.6(0.95, 2.6)	1.96(0.35, 2.7)	0.940
	Read and write	15	9	4.3(1.75, 10.6)	4.9(0.89, 20.5)	0.069
	Primary and secondary school	57	114	1.3(0.8, 2.1)	1.54(0.55, 3.3)	0.522
	College and above	41	106	1	1	
Kocho	Every day	123	180	2.2(1.2, 4.1)	4.8(1.5, 15.6) **	0.009
	Usually	27	85	1.03(0.5, 2.1)	3.4(0.12,12.4)	0.067
	Occasionally	16	52	1	1	
Milk	Every day	29	31	1.9(1.1, 3.4)	2.17(0.6, 5.0)	0.300
	Usually	63	135	0.95(0.63, 1.43)	1.25(0.56, 2.8)	0.58
	Occasionally	74	151	1	1	

## 6. DISCUSSION

In this community based cross-sectional study the magnitude and associated factors of kidney stone among adult population was investigated in the Arbegona woreda of Sidama region, Ethiopia. Four hundred eighty-three study participants were enrolled in the study. Among them 270(55.9%) was males. According to this finding the prevalence of kidney stone was (34.4%) (95% CI, (30.2, 38.7%)). This finding was high compared to the findings in the other places. The overall prevalence of kidney stones in the general population varies from 1 to 20% (21). In Asia 1-5%, Europe 5-9%, North America 7-15%, Saudi Arabia 20%, China 4% (7), United States 8.8% (12), Iran 24.08% (23) and Egypt 10.6% (24). The possible reason for this discrepancy might be the size of sample size, difference in socio-demographic characteristics, the type of chronic illnesses, the age group of the population studied, the cultural difference across the population, the data source (primary or secondary data), types of study design, methods used for diagnosis the study setting and the study population.

As this study result demonstrated that sex has no statistically significance with kidney stone. But, the study conducted in Europe (4), North America (7), United States (12), Iran (23) and Egypt (24) male gender has high prevalence of kidney stone formation than female. This difference might be the difference between sample size, study design and cultural differences.

According to this study finding people who have HTN was statistically significant associated with kidney stone, AOR (95% CI = 6.6(2.4, 17.8)). This result was in line with study done in other places like China (16), Iran (23), Saudi Arabia (7), America (29), Switzerland (35) and British (42). But, the study that was conducted in Ethiopia on trends in the occurrence of kidney stone shows HTN was not statistically significant with kidney stone (27). The possible reason might be times of study period, study design, size of sample size and environmental factors.

In this study the people who have DM was statistically significant with kidney stone, AOR (95% CI = 9.6(1.04, 87.7)). This study was supported by the study that was done in United Kingdom (36), Iran (23), Iraq (22), China (16) and Saudi Arabia (7).

The finding of this study shows that family history of kidney stones was statistically significant associated with kidney stone formation, AOR (95% CI =13.7(8.5, 24.3)). The result of this study was in line with the study that was done in Saud Arabia (7), China (16), Iran (23), America (29), Switzerland (35) and British (42), United Kingdom (36) and Iraq (22).

According to this study results the people who were previously treated with kidney problem significantly associated with kidney stone, AOR (95% CI =8.8(3.9, 19.6)). This was also similar to study done in Saud Arabia (7), China (16), Iran (23), America (29), Switzerland (35) and British (42), United Kingdom (36).

As this study shows the people who were consume Koch every day statistically significant associated with kidney stone, AOR (95% CI =4.8(1.5, 15.6)). There was no any other study done on the association between kidney stone and kocho consumption. The reason might be the people who consume Koch with milk and meat. Milk contains calcium, this might be the risk for kidney stone especially for calcium oxalate type.

## **7. CONCLUSION AND RECOMMENDATION**

### **7.1 conclusion**

The findings of this study show that kidney stone prevalence was high and the disease remains a public health problem in Ethiopia especially in the study area. The overall prevalence of the kidney stone disease among adult population in Arbegona woreda was 34.4%. Hypertension, DM, kocho, family history and previously treated with kidney problem was significantly associated with kidney stone.

### **7.2 Recommendation**

#### **Policy makers**

Policymakers and programmers need to design strategies and encourage high-risk populations to be screened as early as possible. Policy makers to pay attention to the instituting preventative measures to minimize stone diseases in the population.

#### **For community**

In order to prevent the progress to kidney stone, we recommend that early detection, follow up and take appropriate treatment of kidney stone.

#### **To researchers**

The researchers have to do further nationwide studies on the prevalence and incidence of kidney stones. Further yearly reports might be needed to assess if kidney stone disease was on the rise. The have to do research on kidney stone to assess the underlying cause by using different factors.

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## **9. ANNEX**

### **Annex -I:**

#### English Version Information Sheet

Introduction: This is an information sheet prepared to conduct a research on determining the magnitude and associated factors of kidney stone among adult population in Arbegona Woreda.

The principal investigator is Daniel Dakama (BSC) at HUCMHS school of public health. Thus, the information will be detailed as follows. Study title– To assess magnitude and associated factors of kidney stones among adult population in Arbegona Woreda, Sidama region, Ethiopia, 2024. Purpose: To determining the magnitude and associated factors of Kidney stones among adult population in Arbegona Woreda.

Procedure and duration: First of all, I selected you to take part in this study randomly. There are some questions to answer. By interviewing you, the questioner will be filled. The interview will take around 25- 30 minutes. Risks: The risks of being participating in this study are very minimal, only taking your few minutes. Benefit: At this moment you may get some benefit by being involved in this study but the information you provide is very important to solve problems on kidney stone issue. Confidentiality: The information that you provide us will be confidential. The questioner will be coded to exclude showing your name on questioner and consent form.

Rights: Participation in this study is fully voluntary. You have the right to declare not to participate in this study and you have the right to with draw from participating at any time.

Contact address: If there is any questions or unclear idea any time about the study or the procedures, do not hesitate to contact and speak to Principal investigator with phone number: +251928781645 or e-mail address danieldakama224@gmail.com.

**Annex II: Consent Form**

Dear participant; my name is ..... I am collecting data for an investigator from HUCMHS school of public health who will be conducting a study on the magnitude and associated factors of kidney stones among adult population of Arbegona Woreda.

You are selected randomly and your participation is very important in investigating to determine the magnitude and associated factors of the kidney stone. So here are some questions for you to answer which are important for the study. For your participation in this study, no payment will be granted or has no any special privilege given to you. Besides, you're not obligated to answer any question which you do not wish to answer. If you fill discomfort to respond any of the questions, please feel free to jump it any time you wish. Filling the questionnaire will take about 25-30 minutes. The information that you gave will be kept confidentially and won't be accessed to a third party; only be used for the research purpose and burnt at the end of the survey. Are you willing to participate in this study? a) Yes (continue to interview) b) No (stop)

**Data Collecting Tool**

**A. Demographic Data**

<b>A. Demographic Data</b>		
S.NO	Questions	Response
1	Participant Code	
2	Age of participants	_____ in years
3	Gender	a) Male b) Female
4	What is Your Marital Status?	a) Single b) Married c) Divorced d) Widowed

5	What is Your Educational Status?	a) Unable to read and write b) Read and write c) Primary School d) Secondary School (9-12) e) College and above
6	Which Kebele are you living in?	_____
7	What is Your Occupation?	a) Farmer b) Merchant c) Office Work d) Driver e) Other (Specify).....
8	What is your income per month?	_____ per month

**B. Dietary profile and fluid taking habit**

1. How Frequent do you use/consume the Following diets?

Types of diet	Frequency of consumption				
	Every day	Usually	Occasionally	Rarely	Not at all
Kocho					
Milk/Dairy Products					
Injera/Bread					
Meat					
Vegetables					
Fruits/fruit Juices					
Sugar cane					
Sugar					

2	Which fluid do you usually drink?	a) Water b) Soda/Soft drink c) Beer d) Coffee and Tea
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		e) Other (Specify).....
3	What is the estimated total fluid volume you usually drink per day?	
4	What is your water source for drinking?	a) Spring water b) River water c) Hand Dug well/Ground Water d) Tap water e) Bottled/Mineral Water f) Rain Water g) Other (Specify).....
5	How do you store your water at home?	a) Plastic Container/Jerican b) Pot c) Stainless Steel d) Bottle of Glass e) Other (Specify)...
6	How long do you store water at home in days?	
<b>C. Knowledge Assessment and Clinical Information</b>		
1	Have you ever heard of Urinary Tract Stone Disease/Renal Stone/ Urolithiasis?	a) Yes b) No
2	Have you ever been diagnosed with renal stone Disease?	a) Yes b) No
3	If you yes for question 2, did you get any treatment?	a) Yes b) No
4	If you said yes question 3, by which method of treatment did you get?	a) Medication b) Surgery c) Counselling on increased fluid intake d) Other (Specify)_____
5	Do you have Family history of renal stones?	a) Yes b) No

6	If Yes to the question no 5, what treatment did he/she get?	a) Medication b) Surgery c) Other, specify.....
7	Do you have any flank pain?	a) Yes b) No
8	Do you have any Urinary Complain (Pain during Urination, Reddish discoloration)?	a) Yes b) No
9	Have you ever been diagnosed with hypertension?	a) Yes b) No
10	Have you ever been diagnosed with diabetes mellitus?	a) Yes b) No
11	Do you have pain/ swelling in your joints?	a) Yes b) No
12	Do you have been used smoking?	a) Yes b) No

**D. Urine Dipstick Results:**

PH		
Specific Gravity		
Blood	Yes	No
Leukocytes		
Nitrite		
Protein		
Glucose		
Ketone		
Urobilinogen		
Bilirubin		

**E. Imaging Findings on Abdominopelvic Ultra sound**

Participant Code	
<b>Imaging Findings</b>	

Is there Urolithiasis	a) Yes	b) No	
If yes for above, please, mark with '√' on the detail list below			
Right Renal Stone	Right Hydronephrosis/ Hydroureteronephrosis	Mild	
Left Renal Stone		Moderate	
Right ureteral stone		Severe	
Left ureteral Stone	Left Side Hydronephrosis/ Hydroureteronephrosis	Mild	
Bladder Stone		Moderate	
Urethral Stone		Severe	
Other Urologic Findings (Specify			
Incidental Non-Urological Findings			

### **Gafa I: Sidaamu Afii Mashalaqete Qoola**

Eo: kuni mulu qoccaa deerranna ledo amadasiisantino saga'late amanyoote, qarqarunna akkatu gara buuxate assinanni xiinxallora odoo aate qixxeessinoonni qoolaati. Darga Arbgona, Sidama, Ethiopia, 2016 MD. Qaru xiinxallaanchi Danieeli Daqamiho

**Xiinxallote eo:** mulu qoccaa deerranna ledo amadasiisantino saga'late amanyoote, qarqarunna akkatu gara buuxate assinanni xiinxallooti. Darga Arbgona, Sidama, Ethiopia, 2016 MD. **Loosu harinshonna yanna:** ate hedeweelchu garinni doorroommohehu, xiinxallote aana odoo aate miinu heeraheraati. Koye xa'muwa nootera dawaro qolattora shaqqillunni xa'mineemmohe. Xa'mote yanna 20-30 daqiiqa adhitanno. **Regecco:** tenne xiinxallo beeqqa mittore nafa ate aana gawajjo diafidhino. **Horo:** xa aattonke duduwi mulu qarra xiinxallote tirate lowo horo afirino.

**Maafuda agara:** tenne ati aatto/ta dudowo eweli uyino yine wole mittohono dikullanni. Su'makki borreessinannikki daafo ayi uyino duduwootirono dianfanni. **Qoosso:** tenne xiinxallo beeqqate gadachannori dino. Tenne xiinxallo beeqqa hoogate hattono injaa giwihero meereroho agure fulate wo'ma qoosso noohe. **Xaada hasiritoro:** xa'mo woy huluullo heedhuhero aante noo bilbilu kiironni qara xiinxallote harunsaancho coyishiisha dandaatto/ta. Bibilu kiironni +251928781645 or emaile danieldakama224@gmail.com.

## **GAFA II: Fajjote Qoola.**

Xiinxallote beeqaango; ane sumi ..... ani Hawaasi Yuniversite Arbagooni woradi giddo mulu qoccaa deerranna ledoo amadasiisantino saga'late amanyoote, qarqarunna akkattu gara buuxate assinanni xiinxallo duduwo xinqeemmohho. Ati aatto/tta duduwi mulu qoccaa qarra tirate lowontanni hasiisssanno. Xaa aane noo xa'muwara dawaro aattora/aattara shaqqilluni xa'minneemmo. Xiinxallote beeqaango ikkottohura uyinnaheri woxu woyi wolurichi baxxinori dino. Tenne xiinxallo beeqqa hoogate hattono injaa giwihero meereroho agure fulate wo'ma qoosso noohe. tenne ati aatto/tta dudowo eweli uyino yine wole mittohono dikullanni. Su'makki borreessinannikki daafo ayi uyino duduwootirono dianfanni. Xiinxallo beeqqate mahooyye yaatto/tta?

ee (harunsino) malaatisi \_\_\_\_\_

dee'ni (dihasureemmo)

Gafa I: xamo

Sagga'late amangyooti mulu qoccaara sayiise reqqeci assanottana hooganotta afate assinanni xiinxallooti, darga Aribegoonu, Sidaama, Wodiidi Etiyopiya

**Taje gambba assinanni uduunnicho**

**Gumulo afidhino xa'muwa**

<b>A. Ayiimatenna dagoomitte taje</b>		
<b>A. K</b>	<b>Xa,mo</b>	<b>Dawaro</b>
1	Xiinxallote beeqqaanchi/cho kodde.....	
2	Dirikki me'eha?	_____diroti
3	Tee/koo	c) labbaaha d) Meyaata
4	Adhamate/galtite deerra	e) diadhino f) adhino g) tirino h) gunnicha
5	Rosikki deerri Mageeshaati?	a) boorreessanna nabbawa didandaanno      b) boorreessanna nabbawa dandaanno c) umi dirimi roso (1-8) d) layinki dirimi roso (9-12) e) kolleejjenna hakki roore
6	Hiitte                      olliira/qabalera heeratto/tta?	_____
7	Loosikki maati?	a) irshu losaancho b) daddalaancho c) birote looso d) oofaancho e) rosaancho

		f) woloota (badde kuli) .....			
8	Aganunni mageeshi eo afiratto/tta?	_____			
<b>B. Horonsi'nanni sagalenna horonsi'nanni ago</b>					
1. Konni woroonni noo sagalla hiikko garinni horonsiratto/tta?					
Sagalete dana		Mageesha ganye saga,lano			
		Barru baala	Roore woyte	Sae sae	Shiima/hedeweelcho Horo dihoronsiranno
Wassa					
Addo /adote sircho					
Budeena /daabbo					
Maala					
Gati kaasho					
Gumma /gummate huunco					
Shoonkoora					
Sukaare					
2	Hiite aggatto duucha woyiite horonsiratto/tta?	a) Waa b) shota agatto c) biira d) bunnanna shae d) woloota (badde kuli)			
3	Hedotenni mittu barri giddo mageeshi du'namaancho agatto/tta(kubbaayunni)?	_____			
4	Agatto waaa hiikinni afiratto/tta?	a) Waa b) shota agatto c) biira d) bunnanna shae d) woloota (badde kuli)			
5	Mine waa mayi giddo woratto/tta?	a) jaricanaho b) gambayichoho c) xaasaho d) burcuqqote e) woloota (badde kuli) ...			
6	waa mine mageeshi gesha	_____barra			

	keeshiishatto/tta?	
<b>C. Mulu qoccaa daafiro noo egenno afate</b>		
1	Mulu xissore macciishite egennootto/tta?	a) ee b) dee'ni
2	Mulu qoccaa afante egentinohe?	a) ee b) dee'ni
3	Xa'mo 2 ee yoottoro, hakkawote hikkiminnu owaante afirootto/tta?	a) ee b) dee'ni
4	Xa'mo 3 ee yoottoro/yoottaro, hiitto hikkimannu owaante afirootto/tta?	a) xagicho/kiniine b) dare gowa c) waa batise aga amaalloonni d) woloota (bade kuli)_____
5	Sirchikkira mulu qoccaa xisso leeltinohu no?	c) ee d) dee'ni
6	Xa'mo 5 ee yoottoro/yoottaro, isi/isera aasinooni hikkiminnu owaante maati?	a) xagicho/kiniine b) dare gowa c) waa batise aga amaalloonni d) woloota (bade kuli) .....
7	Hallu xiso noohenni?	c) Ee d) dee'ni
8	Shumate doogo xisso nooheni (shumate giira, shumaaratto wote xisso, shuma dana soorrama)?	c) Ee d) dee'ni
9	Muudeete xiiwo lexxitinohe yine kulle egenninonnihe?	a) Ee b) dee'ni
10	Sukkare xisso marmarreenna afante egentinohe?	a) Ee b) dee'ni
11	Mikitate xisso woyi darshe nooheni?	a) Ee b) dee'ni

12	Sigaara wiliishattoni/willishattani?	a) Ee b) dee'ni
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**F. shuumate labiratorete guma**

PH		
Specific Gravity		
Blood	Yes	No
Leukocytes		
Nitrite		
Protein		
Glucose		
Ketone		
Urobilinogen		
Bilirubin		

**G. Imaging Findings on Abdominopelvic Ultra sound**

Ayimate kaarde	
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**Afaminno guma**

Is there Urolithiasis	b) Yes	b) No
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If yes for above, please, mark with '√' on the detail list below

Right Renal Stone	Right Hydronephrosis/ Hydroureteronephrosis	Mild	
Left Renal Stone		Moderate	
Right ureteral stone		Severe	
Left ureteral Stone	Left Side Hydronephrosis/ Hydroureteronephrosis	Mild	
Bladder Stone		Moderate	
Urethral Stone		Severe	

Other Urologic Findings (Specify

Incidental Non-Urological Findings

