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Original Research

Awareness of Nephrolithiasis in educated community of Azad Kashmir Pakistan

Muhammad Soaib Said[a], Iqra Saleem[b], Rizwan Saleem[c*], Asif Mehmood Hashmi[b], Izharullah[b], Amer Hayat Khan[a], Amjad Khan[d], Nazir Suliman[b], Shanza Younas[b], Muhammad Husnain[e]

[a]Discipline of Clinical Pharmacy, School of Pharmaceutical Sciences, Universiti Sains Malaysia
[b]Department of Pharmacy, University of Poonch Rawalakot Azad Kashmir
[c*]Department of Medicine and Surgery, University of Autonoma de Madrid, Spain.
[d]Department of Pharmacy, Quaid-i- azam University, Islamabad, Pakistan
[e]Department of Eastern Medicine, University of Poonch Rawalakot Azad Kashmir

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Correspondence:
rizwan.rizwan@estudiante.uam.es

Abstract

Background: Renal stone is an important health problem in the world and is the most common disease in urinary tract system. It is particularly a common problem in many countries Knowledge and lifestyle attitude of individuals towards renal stone plays a role in delivering optimum management.
Primary Study Objective: To determine the public awareness of renal stones causes, symptoms and management among the population of AJK Pakistan
Setting: General population of all the ages were under consideration and data were taken from general population
Participants: This study was conducted on 100 patients of different areas
Methods: The data of this quantitative cross-sectional study was collected from participants of AJK. Participants were given a self-administered questionnaire written in English from. August 2020 to September 2020.individuals of all the ages are included in this study.
Results: Out of hundred participants we determine the awareness among the educational community of AJK. All category of individuals is involved in our research like married and unmarried people and students with arts and science subjects. About 13% male and 87% female are involved in our research with different ages.
Conclusion: This data indicates that the participants are to some degree aware of some aspects of renal stone prevention, symptoms and modes of diagnosis and treatment. Individuals who experienced renal stones were more knowledgeable in some respects. Further emphasis on public awareness of renal stones is recommended.

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Introduction

Kidney is pair of bean-shaped organs, they are located just below the rib cage one on each side of your spine. Each kidney is about 4 or 5 inch long. The kidneys are central to homeostasis [1]. Through sensory mechanisms they regulate blood pressure, water, sodium, potassium, acidity, bone minerals and hemoglobin. All of the blood in your body passes through them several times a day. But their core function is the excretion of the waste products of metabolism i.e., urine. Each kidney has around a million tiny filters called nephrons. If blood stops flowing into a kidney, part or all of it could die. That can lead to kidney failure. [2]

Basic function of kidney

Regulation of extracellular fluid volume. The kidneys work to ensure an adequate quantity of plasma to keep blood flowing to vital organs.

Regulation of osmolarity.

Regulation of ion concentrations. [3].

Regulation of ph.…

Excretion of wastes and toxins.

Production of hormones. [4]

Nephrolithiasis (kidney stone)

Kidney stones are small, hard deposits made of minerals and salts that form inside your kidneys. Diet, excess body weight, some medical conditions, and certain supplements and medications are among the many causes of kidney stones [5,6]

Types of kidney stones

Stones are classified by their location in the urinary system and their composition of crystals.

Calcium stones

Calcium oxalate crystals are the most common cause of kidney stones — hard clumps of minerals and other substances that form in the kidneys [7]. These crystals are made from oxalate combined with calcium. Having too much oxalate or too little urine can cause the oxalate to crystalize and clump together into stones [8].

Calcium phosphate

Calcium phosphate (called a Randall's plaque), erodes through the urothelium and is a nidus for CaOx deposition calcium phosphate is a minor component of up to 30% of calcium oxalate stones as well. [9] The cause of calcium phosphate stone is often obscure but most often related to high urine ph. Some patients with incomplete phosphate stones may have incomplete renal tubular acidosis [10].

Uric acid stones

Uric acid is a waste product that comes from chemical changes in the body. Uric acid crystals do not dissolve well in acidic urine and instead will form a uric acid stone [11,12].

Struvite stones

Struvite stones are not a common type of stone. These stones are related to chronic urinary tract infections (UTIs). Some bacteria make the urine less acidic and more basic or alkaline. [13] Magnesium ammonium phosphate (struvite) stones form in alkaline urine. These stones are often large, with branches, and they often grow very fast [14].

Cystine stones

Cysteine is an amino acid that is in certain foods; it is one of the building blocks of protein [15]. Cystinuria (too much cysteine in the urine) is a rare, inherited metabolic disorder [16]. It is when the kidneys do not reabsorb cysteine from the urine. When high amounts of cysteine are in the urine, it causes stones to form. Cysteine stones often start to form in childhood [17].

Prevalence

Several investigations have stated an increase in incidence rate of kidney stones. An increased prevalence in 20 years to 74-year-old adults was demonstrated by a survey in 1994, from 3.2% in 1976-1980 to 5.2% in 1988-1994. [18] Continuous increase in the overall prevalence to 8.8% was revealed by data analysis of 2007 to 2010 surveys. Incidence history of kidney stones was reported more in males than females (10.6%. -7.1%) [19], with the increase in age group, prevalence of nephrolithiasis was also increased. Variations were also observed in race and civilization [20].

Risk factors

Factors that increase your risk of developing kidney stones include:

Dehydration: This is the most common cause and the easiest to remedy. Kidney stones form when urine contains more crystal-forming substances than the fluid in urine can dilute. Therefore, not drinking enough water each day can increase your risk of kidney stones [21].

Diet: Studies have shown that eating a diet that is high in sodium can increase your risk of certain types of kidney stones. Too much sodium in your diet increases the amount of calcium your kidneys must filter and significantly increases your risk of kidney stones. In addition, diets that are high in protein and sugar can increase your kidney stone risk. At the same time, your urine may lack citrate in your urine, which is known to prevent crystals from being able to adhere to one another, creating an ideal environment for kidney stones to form. For most patients, a low-protein, low-sodium, and moderate-calcium diet is recommended. Specific dietary recommendations will be based upon your stone composition and evaluation of your metabolism [22]

Family history: If someone in your family has had kidney stones, you're more likely to develop stones than someone without a family history [23]

Obesity: High body mass index (BMI), large waist size, and weight gain have all been associated with an increased risk of both a single episode and recurrent episodes of kidney stones [24].

Digestive diseases and surgery: Certain disorders of the digestive system can affect calcium, electrolyte, and water absorption, which may increase your risk of forming kidney stones. Common disorders include gastric bypass surgery and inflammatory bowel diseases, such as Crohn's disease and ulcerative colitis [25].

Metabolic condition: Metabolic conditions that may increase your risk of kidney stones include renal tubular acidosis, cystinuria, and hyperparathyroidism [26].

Urinary tract infections: Patients who suffer from chronic urinary tract infections may form larger stones up in the kidney. These are commonly called struvite or infection stones [27]

Diagnosis of kidney stone

Blood testing. Blood tests may reveal too much calcium or uric acid in your blood. Blood test results help monitor the health of your kidneys and may lead to doctor to check for other medical conditions [28].

Urine testing. The 24-hour urine collection test may show that you are excreting too many stone-forming minerals or too few stone-preventing substances. For this test perform two urine collections over two consecutive days [29].

Imaging. Imaging tests may show kidney stones in your urinary tract. High-speed or dual energy computerized tomography (CT) may reveal even tiny stones. Simple abdominal X-rays are used less frequently because this kind of imaging test can miss small kidney stones.

Ultrasound, a noninvasive test that is quick and easy to perform, is another imaging option to diagnose kidney stones [30].

Analysis of passed stones. You may be asked to urinate through a strainer to catch stones that you pass. Lab analysis will reveal the makeup of your kidney stones. Your doctor uses this information to determine what is causing your kidney stones and to form a plan to prevent more kidney stones [31].

Treatment

Treatment for kidney stones varies, depending on the type of stone and the cause.

Small stones with minimal symptoms

Most small kidney stones won't require invasive treatment. You may be able to pass a small stone by:

Drinking water. Drinking as much as 2 to 3 quarts (1.8 to 3.6 liters) a day will keep your urine dilute and may prevent stones from forming. Unless your doctor tells you otherwise, drink enough fluid — ideally mostly water — to produce clear or nearly clear urine [32].

Pain relievers. Passing a small stone can cause some discomfort. To relieve mild pain, your doctor may recommend pain relievers such as ibuprofen (Advil, Motrin IB, others) or naproxen sodium (Aleve) [33].

1.8.4-Medical therapy. Your doctor may give you a medication to help pass your kidney stone. This type of medication, known as an alpha blocker, relaxes the muscles in your ureter, helping you pass the kidney stone more quickly and with less pain. Examples of alpha blockers include tamsulosin (Flomax) and the drug combination dutasteride and tamsulosin [34].

Large stones and those that cause symptoms

Parathyroid glands Open pop-up dialog box

Kidney stones that are too large to pass on their own or cause bleeding, kidney damage or ongoing urinary tract infections may require more-extensive treatment. Procedures may include [35].

Using sound waves to break up stones. For certain kidney stones — depending on size and location — your doctor may recommend a procedure called extracorporeal shock wave lithotripsy (ESWL). [36] ESWL uses sound waves to create strong vibrations (shock waves) that break the stones into tiny pieces that can be passed in your urine. The procedure lasts about 45 to 60 minutes and can cause moderate pain, so you may be under sedation or light anesthesia to make you comfortable [37]. ESWL can cause blood in the urine, bruising on the back or abdomen, bleeding around the kidney and other adjacent organs, and discomfort as the stone fragments pass through the urinary tract [38]

Surgery to remove very large stones in the kidney. A procedure called percutaneous nephrolithotomy (nef-row-lih-THOT-uh-me) involves surgically removing a kidney stone using small telescopes and instruments inserted through a small incision in your back [39].

You will receive general anesthesia during the surgery and be in the hospital for one to two days while you recover. Your doctor may recommend this surgery if ESWL is unsuccessful [40].

Using a scope to remove stones. To remove a smaller stone in your ureter or kidney, your doctor may pass a thin lighted tube (ureteroscope) equipped with a camera through your urethra and bladder to your ureter. Once the stone is located, special tools can snare the stone or break it into pieces that will pass in your urine. Your doctor may then place a small tube (stent) in the ureter to relieve swelling and promote healing. You may need general or local anesthesia during this procedure [41].

Parathyroid gland surgery. Some calcium phosphate stones are caused by overactive parathyroid glands, which are located on the four corners of your thyroid gland, just below your Adam's apple. When these glands produce too much parathyroid hormone (hyperparathyroidism), your calcium levels can become too high and kidney stones may form as a result. [42] Hyperparathyroidism sometimes occurs when a small, benign tumor forms in one of your parathyroid glands or you develop another condition that leads these glands to produce more parathyroid hormone. Removing the growth from the gland stops the formation of kidney stones. Or your doctor may recommend treatment of the condition that's causing your parathyroid gland to overproduce the hormone [43].

Medication

Medications can control the amount of minerals and salts in the urine and may be helpful in people who form certain kinds of stones. The type of medication your doctor prescribes will depend on the kind of kidney stones you have. Here are some examples [44].

Calcium stones. To help prevent calcium stones from forming, doctor may prescribe a thiazide diuretic or a phosphate-containing preparation [45].

Uric acid stones. Doctor may prescribe allopurinol (Zyloprim, Aloprim) to reduce uric acid levels in your blood and urine and a medicine to keep your urine alkaline. In some cases, allopurinol and an alkalizing agent may dissolve the uric acid stones [46].

Struvite stones. To prevent struvite stones, doctor may recommend strategies to keep your urine free of bacteria that cause infection, including drinking fluids to maintain good urine flow and frequent voiding. In rare cases long-term use of antibiotics in small or intermittent doses may help while after surgery to treat your kidney stones [47].

Cystine stones. Along with suggesting a diet lower in salt and protein, doctor may recommend that you drink more fluids so that you produce a lot more urine, If that alone doesn't help, doctor may also prescribe a medication that increases the solubility of cystine in your urine [48].

Prevention

Prevention of kidney stones may include a combination of lifestyle changes and medications.

Lifestyle changes

You may reduce your risk of kidney stones if you

Drink enough fluid each day

If you are not producing enough urine, your health care provider will recommend you drink at least 3 liters of liquid each day (about ten, 10-ounce glasses) [49]. This is a great way to lower your risk of forming new stones. Aim to replace fluids lost when you sweat from exercise or in hot weather. All fluids count but try to drink water or mostly no-calorie or low-calorie drinks. This may mean limiting sugar sweetened or alcoholic drinks [50].

Reduce the amount of salt in your diet

This tip is for people with a high sodium diet and high urine calcium or cystine. You may benefit from avoiding foods that have a lot of salt. The Centers for Disease Control (CDC) and other health groups advise not to eat more than 2,300 mg of salt per day [51].

Eat plenty of fruits and vegetables

Eating at least 5 to 9 servings of fruits and vegetables daily is recommended for everyone. Eating fruits and vegetables gives you potassium, fiber, magnesium, antioxidants, phytate and citrate. These elements are known to help keep stones from forming [52].

Eat foods with low oxalate levels

Learning how to control oxalate in your diet depends on why your oxalate levels are high in the first. You may be asked to limit certain high-oxalate foods. Oxalate is found in many plant foods, but mostly spinach, rhubarb, and almonds. It is usually not necessary to stop eating foods that contain oxalate since they are healthy foods. Rather, you can eat calcium-rich foods with meals to control your urinary oxalate level. Calcium lowers the oxalate level in your body [53].

Eat less meat If you have cystine or calcium oxalate stones and your urine uric acid is high, animal protein may be to blame. If your health care provider believes your diet is increasing your risk for stones, he or she will tell you to eat less meat. This includes fish, seafood, poultry, lamb, and game meat. You may be asked to eat animal protein only once per day or less and eat smaller portions. The amount to limit depends on how much you eat now and how much your diet is affecting your uric acid levels [54]. Continue eating calcium-rich foods but use caution with calcium supplements. Calcium in food does not influence your risk of kidney stones. Continue eating calcium-rich foods unless your doctor advises otherwise [51].

Ask doctor before taking calcium supplements, as these have been linked to increased risk of kidney stones. You may reduce the risk by taking supplements with meals. Diets low in calcium can increase kidney stone formation in some people. Ask doctor for a referral to a dietitian who can help you develop an eating plan that reduces your risk of kidney stones [50].

Global prevalence of Nephrolithiasis

The main purpose of this study was to estimate the prevalence of kidney stones and number of people of all ages with nephrolithiasis. According to the National Health and Nutrition Examination Survey, the overall prevalence of self-reported kidney stones from 2007–2010 was 8.8%, with a higher prevalence among men (10.6%) than women (7.1%).[1] This prevalence represents a 70% increase over the last reported prevalence (5.2%) derived from an NHANES sample (1988–1994), and the increased prevalence was observed across all age groups and in both sexes [50].

Prevalence of nephrolithiasis in Pakistan

Primary hyperoxalurias (PH) are devastating, autosomal recessive diseases causing renal stones. Undifferentiated hyperoxaluria is seen in up to 43% of Pakistani pediatric stone patients. High rates of consanguinity in Pakistan suggest significant local prevalence. From January 2010 to December 2010, a total of 2838 new patients with stone disease were treated at a tertiary care center. The medical files of 278 patients presenting with stone disease and renal failure were reviewed and compared with a cohort of 878 patients with normal renal functions.

Prevalence of nephrolithiasis in Azad Kashmir

Total 100 educated participants selected randomly in District Poonch of Azad Jammu & Kashmir. The mean prevalence of Kidney stones was 1.77% in target area. The prevalence is higher in male (1.01%) then female (0.76%). The prevalence of kidney stones is not of great concern in AJ&K. [61]

Material and Method

The aim of this study is to assess knowledge and awareness of the educated community regarding kidney stones in District Poonch. To ascertain the knowledge about kidney stones, respondents were asked to respond a series of statements about kidney stones awareness. Residents of any area other than the district Poonch were not eligible to participate. Survey was conducted in educated community of Rawalakot.

Data was collected during the month of august and September 2020. No restriction was placed on the bases of age and gender to ensure maximum participants. A questionnaire was prepared to assess knowledge and awareness was then distributed to the participants. Baseline demographic information include, name, age, gender, marital status, education level and subject.

Results and Discussions

A specific and dominant disease overlapping Kashmir is kidney stones. National health and nutritional examination survey the overall prevalence of kidney stone is 8.8%. Each year more than half a million people go to emergency rooms for kidney stone problems. It is estimated that one in ten people will have a kidney stone at some time in their lives and a leading disease in Kashmir. The study was conducted to evaluate the awareness of kidney stone in educated community of District Poonch. It is a disease of kidney caused by crystal-forming substance. Awareness about kidney stones is very important because it damage kidneys by blocking the flow of urine and causing bleeding and infection.

We five students conducted a survey to evaluate the knowledge and awareness about kidney stones in educated community of District Poonch AJK. The study was conducted to find the basic knowledge of kidney stones in community. A self-made questionnaire was used to evaluate knowledge and awareness of this disease. Questionnaire consisting of simple questions,

was questioning about basic knowledge of this disease from educated community of District Poonch especially in Rawalakot city whose literacy rate 99%. It is on top in all over Pakistan, according to official figures, the literacy rate in AJK is 72 percent (compared to 58 percent across Pakistan). Primary school enrollment is 95 percent for boys and 88 percent for girls which is higher than any other region of Pakistan & Rawalakot is on top.

One hundred educated individuals were included in this study survey, which include both males and females, both students and employees belonging to both fields of study, Sciences and Arts.

This study was conducted in educated community of district Poonch especially in Rawalakot. Study was conducted in The University of Poonch Rawalakot, in different colleges of Rawalakot.

All the individuals included in survey were belong to Kashmir

The total number of individuals included in survey was 100(13 males and 87 females) Including 58 students, and 42 employees.

Above charts show that the participants involved in survey were mostly college or university students as majority of participants lie between 17-29 years of age (66%), including 58%students and 42% employee, reason for this is, these people are in touch of fresh knowledge and they are keen of getting and improving their knowledge. Employees were also included in the survey, but they are cut off to regular course of education, so they seldom revise their previous knowledge. Out of 100 participants, 64 were unmarried and 36 were married Out of total 100 individuals 73 belong to Sciences and 27 belong to Arts.

When question about awareness of kidney stones, 94% answered as Yes, it means a large majority of persons is aware of kidney stones out of which 91% were aware about the local name of nephrolithiasis as kidney stones while only 6% an9 % answered above questions respectively, as No so they don't know about kidney stone and its local name.

82% people gave right answer about targeted organ of kidney stones as they know that it is a disease of kidney but a few as 18%people are unaware of nature of this disease. This result is quite satisfactory because if majority of people know about targeted organ of this disease, then it is pretty sure that they also know about its effect on kidney.

A large number in educated community is aware of causative agent and way of cause of this disease as 76% and 24% show awareness for these questions respectively. This is clear from above results that if participants know cause of this disease, then it is very easy for them to take preventive measures to avoid this disease.

Our educated community is poor in awareness of "what kind of disease kidney stone is? Because participants do not know Kidney stones are hard deposits made of minerals and salts that form inside your kidneys. Diet, excess body weight, some medical conditions, and certain supplements and medications are among the many causes of kidney stones.

Educated community of Rawalakot is unaware that it is metabolic disorder only 33% of people were familiar with this. New study says that people with metabolic abnormalities are at increased risk of developing kidney disease like acidosis, cystinuria, and hyperthyroidism.

Even our educated community is not aware that there is no vaccine for kidney stone, educated community of Rawalakot takes medicines as its vaccination. Large number of participants (54%) involved in survey has knowledge that kidney stones can only be treated with medicines but enough number of participants (46%), doesn't agree or they don't have knowledge of this question.

Calcium channel blockers, alpha blockers for kidney stone treatment. Other types of medications are sometimes used to speed the passage of kidney stones. Calcium channel blockers and alpha blockers are two classes of drugs that have been shown to speed the passage of kidney stones by relaxing the spasming ureter. Thazoid diuretics, potassium citrate reduces the risk formation in kidney

Community is unaware of treatment duration of kidney stones, because large number (57%) gave wrong answer about its treatment duration but only 43% of educated community is aware of actual treatment duration of kidney stones.

Kidney stone take an average of 31 days to pass. Stones that are 4–6 mm are more likely to require some sort of treatment, but around 60 percent pass naturally. This takes an average of 45 days. Stones larger than 6 mm usually need medical treatment to be removed.

Very poor knowledge of educated people was revealed after the assessment about relapse of kidney stone, only small numbers of participants are aware of right answer that it can relapse despite of once treated.

Many stones will recur within 5-7 years, with a larger number peaking at two years. As kidney stone patients age, their rate of new stone formation appears to decline, and remissions are common after the age of 50

Community has fair knowledge that this disease is not heredity and can't pass from generation to generation but some kidney conditions have known inherited genetic components. Common hereditary kidney disorders include: Autosomal Dominant Polycystic Kidney Disease, a generally late-onset condition that leads to progressive cyst development. 50% of educated community is unaware of long-term effect of kidney stone, that it effects urinary tract and cause pain but 50% community is well aware that kidney stones damage urinary tract and cause severe pain and vomiting. Community has excellent awareness that blood tests are necessary for the diagnosis of kidney stones. When community was questioned that do, they think that kidney stones is one of leading disease in Kashmir, the response was surprising because only 33% people think that it is true but 67% are unaware of its threats in the community. People are well aware of the fact that individual once treated for kidney stones, can lead his / her normal life as previous but a few do not agree with this statement.

Conclusion

As the kidney stone prevails in highly in the whole Pakistan and Kashmir, so the people in the district

Poonch are mostly aware about this disease. The awareness of kidney stone in the educated community of district Poonch is highly appreciable as high ratio in educated community has fair knowledge about kidney stone but some point's still need attention and need knowledge to strengthen their awareness.

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Table 1: General information and strength of participants

	Total participants	100		
01.	Nationality	Kashmir		Pakistan
		100		00
02.	Gender	Male		Female
		13		87
03.	Age	17-29 years	30-39 years	40-55 years
		66	12	22
04.	Status	Students		employee
		58		42
05.	Subject	Science		Arts
		73		27
06.	marital status	Married		unmarried
		36		64
	Questions	Right answer		Wrong answer
07.	Purpose of Performa?	88		12
08.	What are kidney stones?	94		06
09.	Nephrolithiasis in common language?	91		09
10.	How do you know about kidney stone?	By self-study		By another person
		46		54
11.	How long do you know about kidney stone?	From 1year		More
		21		79
12.	Way to improve knowledge?	Books		Visual media
		66		34
		Right answer		Wrong answer
13.	Kidney stone is disease of?	82		18
14.	What kind of disease is?	23		77
15.	Causative agent?	76		24
16.	Cause of kidney stone?	53		47
17.	Does it spread by dehydration	78		22
18.	Can it spread by diet	81		19
19.	Does it spread by urinary tract infection	96		04
20.	Is it metabolic disorder	33		67
21.	Is there any medication for it	19		81
22.	It can only be treated with medicines?	54		46
23.	Duration of treatment?	43		57
24.	Kidney stones cannot relapse?	36		64
25.	Is it a genetic disease?	53		47
26.	Long time effect of kidney stones?	50		50
27.	Is there need of blood test for diagnosis of kidney stones?	98		02
28.	Is it one of leading disease in all over Kashmir?	33		67
29.	Individual can lead normal life after treatment for kidney stone?	61		39
30.	Awareness of kidney stone?	Fair knowledge		Poor knowledge
		66		34

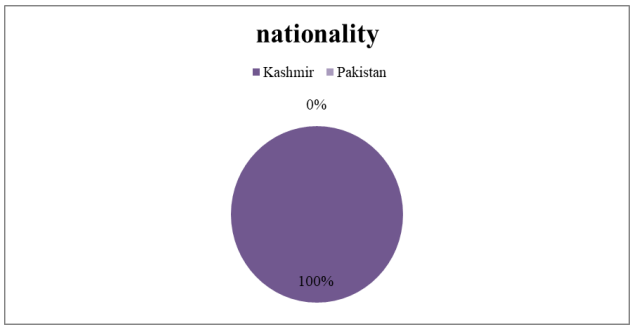

Figure 1: Belongings of Participants

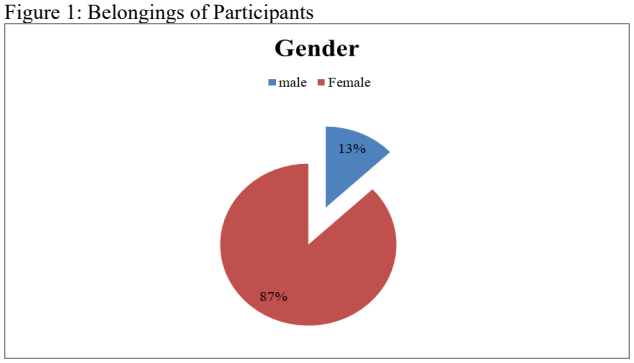

Figure 2: Gender involve in the study

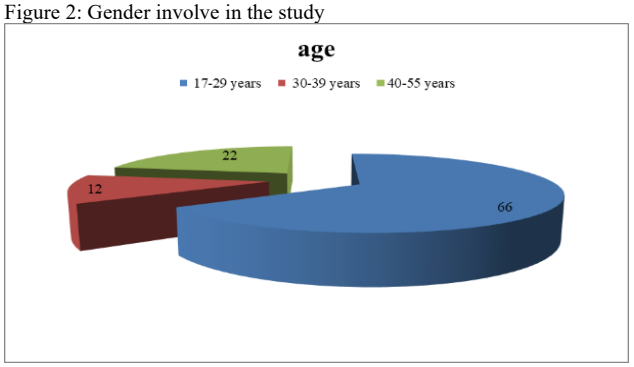

Figure 3: Age of Participants

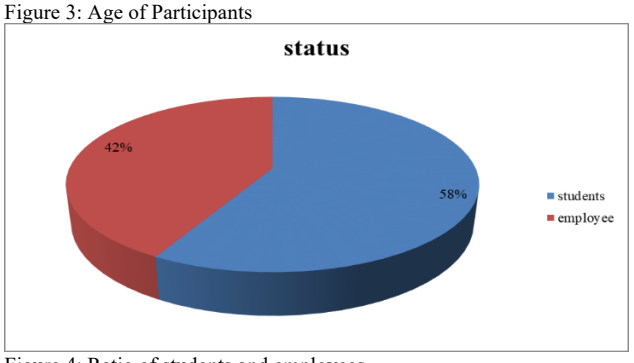

Figure 4: Ratio of students and employees

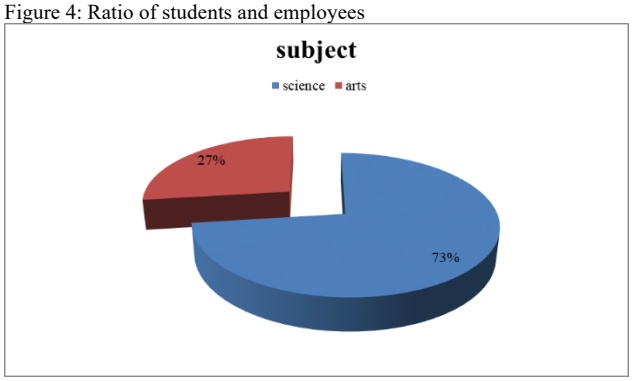

Figure 5: Data related to education of participants

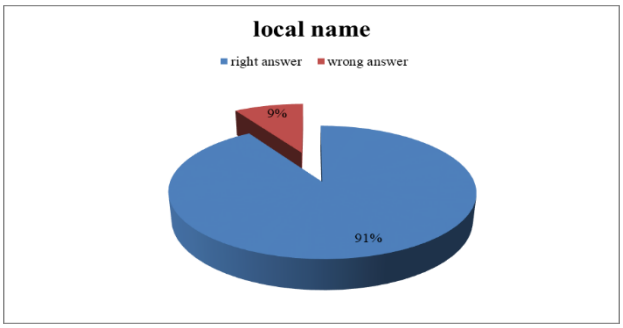

Figure 6: Wrong and right answer ratio

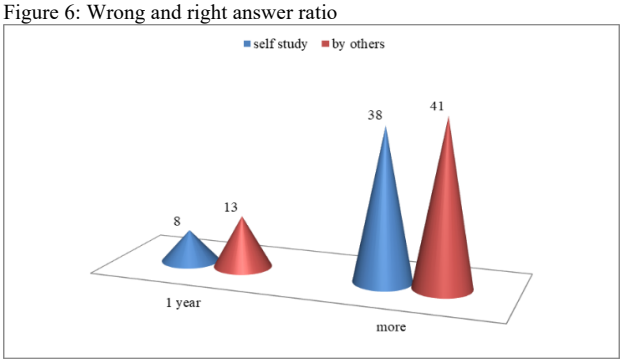

Figure 7: Ratio of knowledge self-study or by others

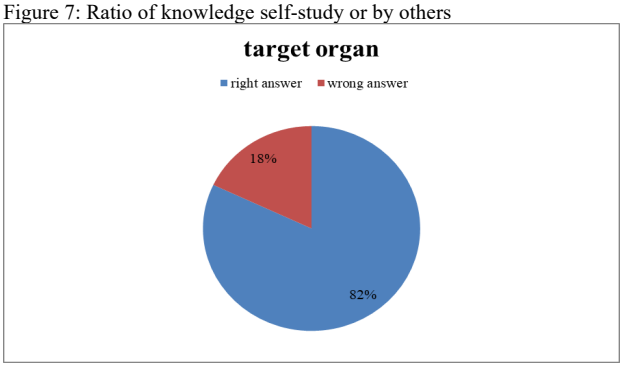

Figure 8: Knowledge about targeted organ

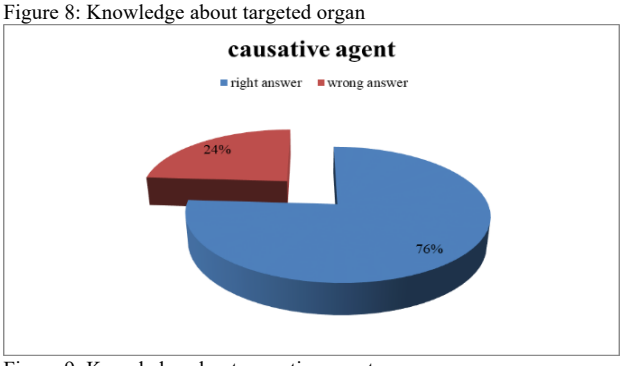

Figure 9: Knowledge about causative agent

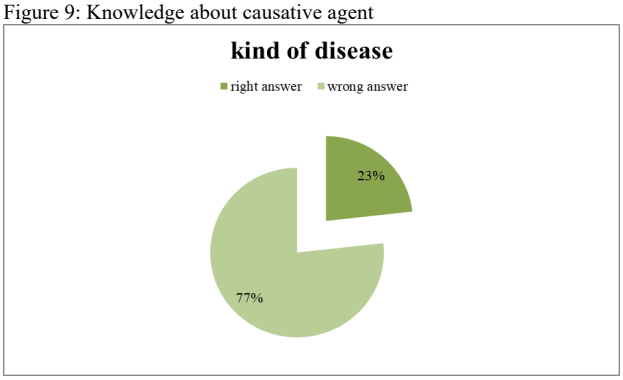

Figure 10: Disease knowledge

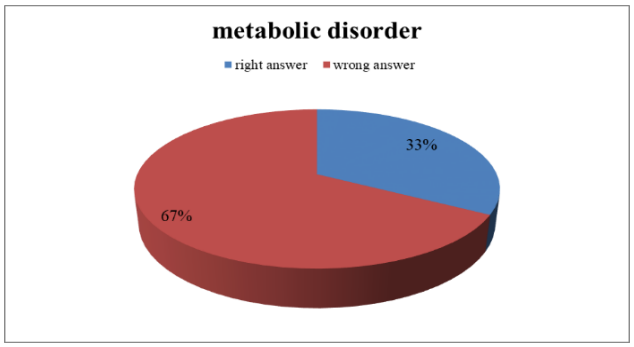

Figure 11: Ratio of knowledge about metabolic disorder

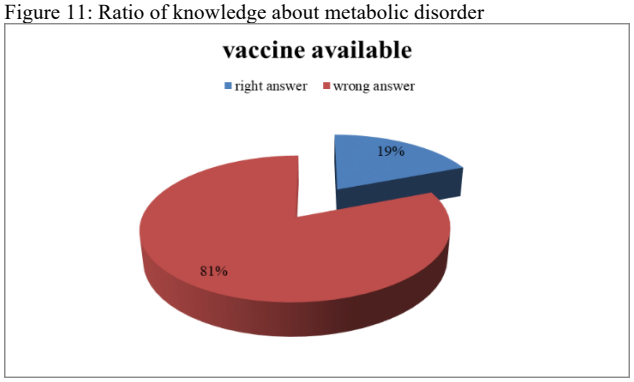

Figure 12: Knowledge about availability

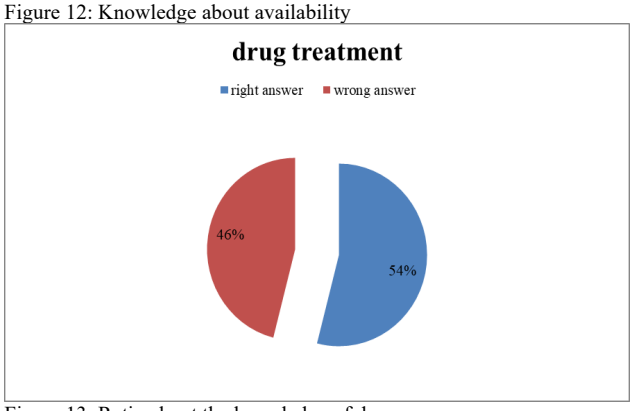

Figure 13: Ratio about the knowledge of drugs

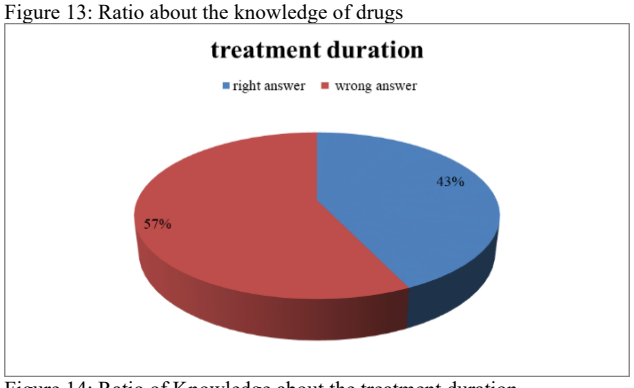

Figure 14: Ratio of Knowledge about the treatment duration

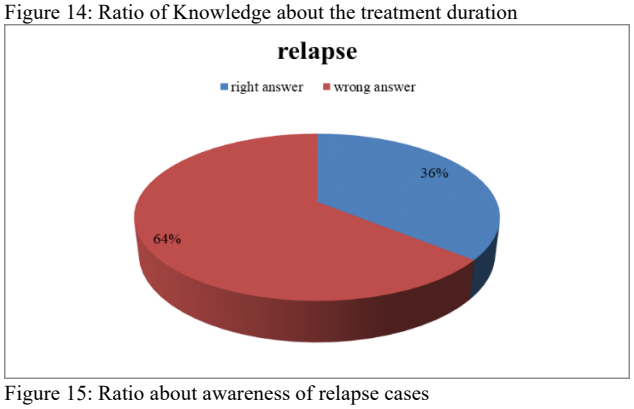

Figure 15: Ratio about awareness of relapse cases

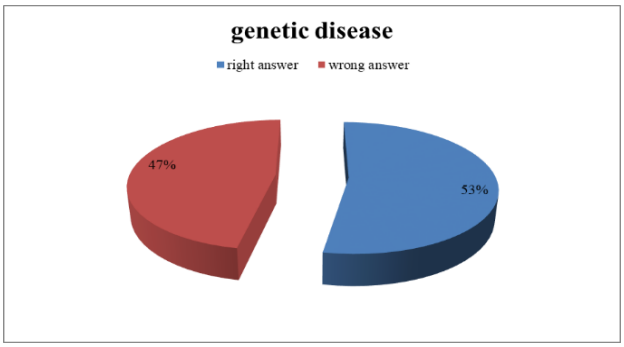

Figure 16: Ratio about the genetic awareness

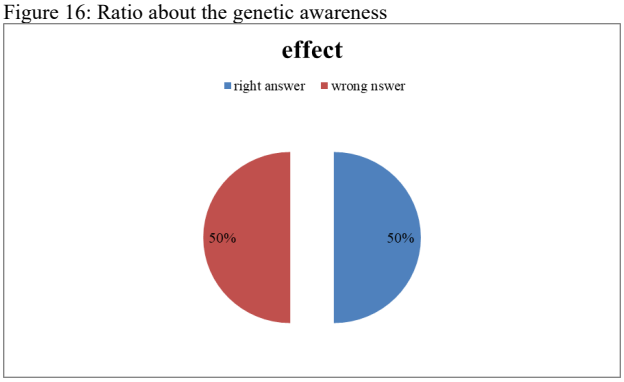

Figure 17: Knowledge about the effect of disease

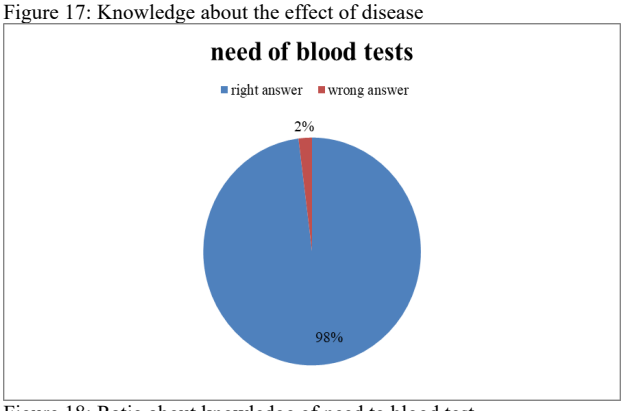

Figure 18: Ratio about knowledge of need to blood test

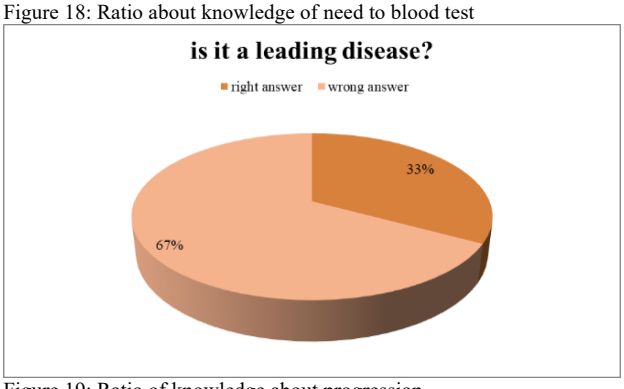

Figure 19: Ratio of knowledge about progression

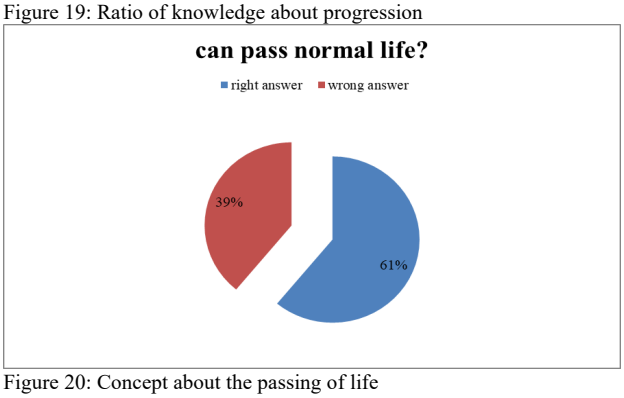

Figure 20: Concept about the passing of life