International Journal of Pharmaceutical Science Invention
ISSN (Online): 2319-6718, ISSN (Print): 2319- 670X
www.ijpsi.org Volume 10 Issue 1 ǁ January 2021 ǁ PP. 25-33

Incidence of alterations in an urine test can be used to indicate a probable disease in students

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ABSTRACT: *Perform a general urine test (EGO for its acronym in Spanish), on students between 18 and 25 years old who are taking the degree of Pharmaceutical Chemist Biologist, would result useful to know the prevalence of renal and extra renal diseases in this population and to evaluate their associated with habits and lifestyle. Objective: To conduct an urinalysis for students that indicates the presence of some physiopathological alteration. Methodology: an urinalysis was performed on each sample taken from each students, the which consisted of physical, chemical and microscopic evaluation. Results: From 129 students, 71% were women and 29% men, concern the 3 phases (physical, chemical and microscopic), the differences were not statistically significant in the measured parameters. Conclusion: No alterations detected in the urine of population studied, suggesting that the incidence of kidney disease in the students was low numbers.*
KEYWORDS: general urine test, physical examination, chemical, mycoscope

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Date of Submission: 05-02-2021 Date of acceptance: 18-02-2021

I. INTRODUCTION

An urine test o urinalysis is the evaluation physical, chemical and microscopic of urine. A uroanalysis cost of a set of tests that detect and measure of semi-quantitative way different components including intermediary products of metabolism, cell fragmens and bacteria. There are many disorders that can be detected early through the finding of abnormalities in the urine. These findings include the presence of elevated concentrations of certain constituents that are not normally found in urine in significant amounts. It is possible that these substances are found in the urine for different reasons: there is a high concentration of it in the blood so that the body tries to reduce the excess by eliminating it in the urine, there is a lesion in the kidney that affects the filtering capacity of the kidney or it is an infectious process caused by bacteria or some microorganisms (Lorenzo, 2016; Campoverde, 2016).

It is considered that the best sample is the first urine in the morning because it has a higher concentration of components and there is a greater probability of detecting abnormalities, if any. For a good collection of the sample requires specific measures, for a reliable result is necessary to analyze the sample in time before it begins to degrade and is altered the result (Vicente y Campos, 2017).

II. PHYSICAL STUDY

In the physical study we analyze what is possible to detect with some senses, the color, the smell, the appearance of turbidity, the presence of foam in the sample.

Appearance: the urine is clean, transparent the appearance of turbidity may be due to numerous causes to be investigated; presence of epithelial cells, mucus, prostatic fluid, fecal matter. Pathological causes such as pyuria, chylluria, lipiuria, presence of excessive crystals (Lozano, 2016).

Color: the normal color of urine ranges from light to dark yellow, depending on the hydration of the patient. The observation of the color of urine brings us closer to the diagnosis of systemic diseases, such as endocrine-metabolic, hematological, neoplastic diseases and congenital errors of metabolism (Campuzano et al., 2007).

Table No. 1. Clinical significance of urine color

Color	Cause	Clinic Meaning
Colorless or light yellow	Heavily diluted urine	Polyuria, diabetes insipidus, abundant fluid intake.
Intense yellow	Concentrated urine	Dehydration, fever, oliguria, liver damage.
Brown	Bilirubin, melanin	Hepatocellular diseases, melanosarcomas, alkaptonuria.
Red	Hemoglobin	Injury to the kidney, malformations, nepholithiasis, cancer, necrosis, severe hypertension, or prenseica of some syndrome (symphrome of Goodpasture.
	Myoglobin	Paroxysmal and gait myoglobinuria, trauma, infections.
	Red blood cells	Menstrual contamination.
White	Crystals, lipids, infectious process.	Quiluria, piuria, lipiuria, hiperoxaluria.
Greenish blue	Blue Diaper Syndrome	Metabolic disorder.
	Pseudomonas	Bacterial infection.

III. CHEMICAL STUDY

pH: The pH values are between 5 and 6. The pH helps determine the blood acid-base equulibrium and kidney function. This can be altered by the presence of a disease such as acidosis or alkalosis metabolic or respiratory, in the case of malnutrition and diabetic ketosis this is diminished, the presence of a pH alkaline can be due to an infectious process caused by bacteria, in turn the urinary pH value does not helps to identify crystals present in the urinary sediment (Méndez et al., 2014; Lozano, 20016).

Density: The normal value of the urinary density is from 1.005 to 1.030, it indicates the weight of the solutes present in the sample, the renal function and the hydration status of the patient. The concentration of solutes in urine varies with water intake, the status of tubular cells, and the influence of antidiuretic hormone (ADH) on water reabsorption in the distal tubules (Flasar, 2009).

Proteins: They are the main marker of kidney damage and should not normally be reported in the urine, a positive result indicates a lesion in the glomerulus, caused by some pathologies such as kidney polycystic, diabetic nephropathy, nephrosis, lupus nephritis, benign orthostatic proteinuria, glomerulonephritis, pyelonephritis and among others. There are, however, physiological states such as exercise and fever that can give
leads to increased protein excretion in the urine in the absence of kidney disease. In the normal kidney only a small amount of low molecular weight protein filters into the glomerulus. The structure of the membrane prevents the passage of high molecular weight proteins (Hinoztrosa, 2001).

Glucose: The amount of glucose that appears in the urine depends on the blood glucose level, the speed of glomerular filtration and the degree of tubular reabsorption. Usually, there is no glucose in the urine until the blood glucose level exceeds 160-180 mg/dL, which is the normal kidney threshold for glucose. When the blood glucose value exceeds the kidney threshold, the tubules cannot reabsorb all the filtered glucose, and glycosuria occurs. Some diseases, such as diabetes mellitus, Cushing's syndrome, hyperthyroidism and presence of tumors, cause a positive glucose result (Valez y Vives, 2015).

Ketone: Ketone bodies are the result of increased metabolism of fatty acids by an insufficient energy intake of carbohydrates. The predominance of lipolysis over lipogenesis produces an increase in the levels of free fatty acids in serum. This is observed in decompensated diabetes, during fasting, pregnancy or on a low-carb diet (Campoverde 2016).

Blood: When intact erythrocytes are found in the urine, the term hematuria is used and indicates that somewhere in the urinary tract there is bleeding. According to the origin, hematuria is subdivided into glomerular, non-glomerular renal and urological etiology. Some diseases such as hereditary nephritis, glomerulonephritis, hypercalciuria, lumbago hematuria syndrome, nephrolithiasis, an infectious process cancer or any malformation, may cause the presence of hematuria in the patient (Campoverde, 2016; Rivera, 2017).

Bilirubin: Under normal conditions conjugated bilirubin is not present in the urine. See due to obstruction of the extrahepatic biliary tract. Conjugated bilirubin is soluble in water and therefore can be found in the urine of patients with obstructive jaundice, liver or bile duct cancer, some liver damage such as cirrhosis or hepatisis It is possible that some hereditary synromes are reflected, Gilbert syndrome, Dubin-Johnson syndrome, Crigler-Naijar syndrome, by eliminating bilirubin in the urine (Strasiger y Schauto 2010).

Urobilinogen: Normally such small amounts are found in the urine that range from 0.2 to 0.5 mg/dL, but when a higher concentration is obtained it must be correlated with bilirubin. Urobilinogen levels are increased by any condition that increases bilirubin production (Strasiger y Schauto 2010).

Nitrites: They are metabolic products of some microorganisms, are directly proportional to the the amount of these present in the sample, that is to say, to greater canridad of nitrites greater amount of microorganisms, indicate the presence of an infectious process, 90% of urinary tract infections are caused by bacteria, but also some parasites or fungi, the common organisms that cause urinary tract infection, are Escherichia coli, Enterobacter, Citrobacter, Klebsiella and Proteus (Strasiger y Schauto 2010).

V. MICROSCOPIC STUDY

The microscopic examination of urine, is a procedure not replaceable for the assessment of a general examination of urine, since in the process of sedimentation can be found multiple components that can give data of a pathology in progress, before even have symptoms. The most common elements found in the microscopic evaluation are:

Erythrocytes: The presence of more than 3 erythrocytes per field in a man or more than 5 in a woman, is considered a pathological state and can be related to a large group of diseases, some of which are as important as those that affect the glomeruli or others whose diagnosis is key as in the case of neoplastic processes. Bloody urine may be due to a problem in the kidneys or some other part of the urinary tracts such as, cancer, kidney lesion, infectious process, kidney stones, glomerulonephritis, insificiency renal, or it can be a bleeding disorder (hemophilia) (Campoverde, 2016; Rivera, 2017).

Leukocytes: Indicate the presence of an infectious or inflammatory process at the renal level or in the urinary tract, as well as the presence of kidney stones, tumors, systemic diseases, malformations, medications and adjacent irritative disorders. The presence of eoinophils in the urine is caretcateristico of allergic nephritis and can appear in other pathologies as some glomerulonephritis, pyelonephritis, fatty renal embolism and among others (Ruiz y López, 2018).

Epithelial cells: Epithelial cells in the urine can come from any site in the body. urinary tract, from the proximal contoured tubules to the urethra, or from the vagina. A marked increase indicates inflammation of the portion of the urinary tract from which they come. It is normal to observe cells in the sediment but when malignant cells are present and show an unusual appearance, the nucleus the relation nucleus cytoplasm is not the good one or there is a greater number of nuclei, they indicate us that the patient goes through a state of carcery or necrosis (Jimenez y Ruiz, 2010).

Cylinders: The formation of cylinders occurs in the distal and collector tubules, when the acidification and concentration of the urine reaches its maximum. They originate from the thickening or precipitation of proteins (Laredo, 2010).

a) **Cylinders granular**: Formed by several types of cells, it is found in advanced kidney disease (Laredo, 2010).
b) **Cylinders wax**: They are proteins of the plasma and they are formed in certain conditions, inside the tubular light by the denaturalization of these plasmatic proteins, also it is in an advanced kidney disease or in terminal stage (Laredo, 2010).
c) **Cylinder hyaline**: They are formed by mucoproteins, they can be observed in healthy people, but mostly in patients with pyelonephritis, chronic kidney disease or glomerulonephritis (Laredo, 2010).
d) **Cylinder erythrocyte:** They are composed of more or less dense erythrocytes that adhere to a fundamental substance hyaline, originated by some injury at renal, glomerular level or in urinary tract (Laredo, 2010).
e) **Cylinder leukocyte**: White blood cell compounds, present in cases of pyelonephritis, glomerulonephritis, insterstitial nephritis, or kidney inflammatory processes (Laredo, 2010).

Crystals: Among the factors that allow their formation are changes in pH, temperature and concentration. Crystals commonly found in acidic urine are uric acid, calcium oxalate and amorphous urates. Less frequently there are crystals of calcium sulfate, sodium urates, hippuric acid, cystine, leucine, tyrosine, cholesterol and sulfonamide. The crystals that indicate some pathology are cystine, leucine, cholesterol and tyrosine (Ruiz y López, 2018).

Bacteria: Normally there are no bacteria in the urine at the kidney and bladder level, but it can be contaminated by bacteria in the urethra, in the vagina or from external sources. The presence of bacteria is reported according to their number (low, moderate amount, etc.), but in the routine examination no studies are performed to identify the exact organism (Ruiz y López, 2018).

Mushrooms: It is not usual the presence of fungi in a sample of urine, the presence of these are due to an infectious process, the fungus that appears more frequently in the urine is the Candida albicans (Ruiz y López, 2018).

Mucus: Infections are more frequent in women and can be one of the causes of mucus in the urine. Gonorrhea or Chlamydia are diseases of sexual transmission that can cause the excessive presence of mucous filaments in the urine as they produce an increase in vaginal secretions and urinary tract. Kidney stones, cancer, cause an excessive production of mucus, this generates as a defense mechanism (Campusano et al., 2007).

VI. METHODOLOGY

The processing of the samples was carried out in the Toxicology and Pharmacy laboratory of the Faculty of Chemical Sciences of the Health Science Area of the University of Zacatecas 129 urine samples were analyzed and collected from students of both sexes, from a range between 18 and 25 years old, belonging to different semesters of the Degree in Pharmaceutical Chemistry Biologist of the Academic Unit of Chemical Sciences of the University of Zacatecas Mexico.

Every The student signed an informed consent form, a health survey was administered and the student was given an explanation of the correct instructions for the collection of the urine sample.

In the criteria for non-inclusion, minors were considered to be those who did not belong to the academic unit, students with pharmacological treatment at the time of study and pregnant women at as to the disposal criteria were: no signed informed consent or withdrawal of consent, sample that was not collected correctly, contaminated samples, insufficient sample, an incomplete survey or no answer, sample out of the established time and the impossibility to take the sample.

To process the sample, the procedure outlined by the Clinical and Laboratory Standards Institute (CLSI) in its GP16-A3 guide was taken into account. The sample that was requested from the participants was the first urine of the morning, from the medium stream, collected in containers provided by the laboratory, and was processed within two hours of being collected.

All urine samples collected were subjected to physical, chemical and microscopic examination. For the physical study, the sample was gently mixed in the collection vial, a 10 ml aliquot was taken from a 15 x 100 mm test tube and the color and turbidity of the urine was evaluated.

The chemical study used SIEMENS Multistix 10SG test strips, the interpretation of the test strip colors and their intensity was done by comparing the colors developed on the test strip's reaction zones with the color chart included by the manufacturer, on the that the possible tones within the limits of the measuring range are presented, together with the concentration equivalent. The readings were taken under adequate light and at the indicated time.

For the microscopic examination, the sample is centrifuged at 1500 rpm for 5 minutes in a UNICO PowerSpin fixed-angle centrifuge without actuating the brake. The tube is carefully removed from the centrifuge and one milliliter of urine is extracted from the top of the supernatant and stored in the pipette. The rest of the supernatant is carefully decanted, with the inclination of the tube only reaching a horizontal position. The tube is then placed back in a vertical position and the milliliter of urine that had been removed is returned to it, then the sediment is gently resuspended. Two drops of Sternheimer-Malbin dye are added to the test tube, homogenized, 50 µL of the preparation is aspirated, placed on a slide and covered with a coverslip of 22 x 22 mm2 taking care not to form bubbles. The preparation was observed at optical microscope for the search of: erythrocytes, leukocytes, bacteria, epithelial cells, cylinders, crystals, yeast, mucus filaments.

It was taken into account for the disposal of the sample that the World Health Organization as well as Official Mexican Standard NOM-087-ECOL-SSA1-2002, Environmental Protection - Environmental Health - Biological-Infectious Hazardous Waste - Classification and Management Specifications, establish that waste such as urine can be directly disposed of in the drainage, sanitary or latrine.

An internal quality control was carried out for which 10% of samples were taken at random and the study was repeated to make a comparison of the results obtained for the first time. The data obtained were reported for each patient on a results sheet, which was given to each study participant within two days.

This study was approved by the Ethics Committee of the Health Sciences Area Coordination and by the research ethics committee CONBIOETICA-32-CEI-20180927, of the Academic Nursing Unit. The study is in accordance with the institutional norms of the General Health Law (title five) and was carried out in accordance with the 1964 Helsinki Declaration and its revision in 2013. It also takes into account the guidelines CIOMS (Council for International Organizations of Medical Sciences), guideline 13 and guideline 8.

VII. RESULTS

A descriptive analysis was carried out for the variables of interest expressing the variables as means and standard deviation, medians and interquartile ranges, the results of the qualitative variables were expressed in frequencies and percentages. The 95% confidence intervals of the most important variables were calculated, using a significance level of 0.05.

The 129 students who participated in the research, 71% (92) were female and 29% (37) were male, aged 18-25. The average age of women was 20.96 ±1.716 and for men 21.11 ± 1.646 as shown in Figure 1, there was no significant difference in the average age between men and women (p=0.5255).

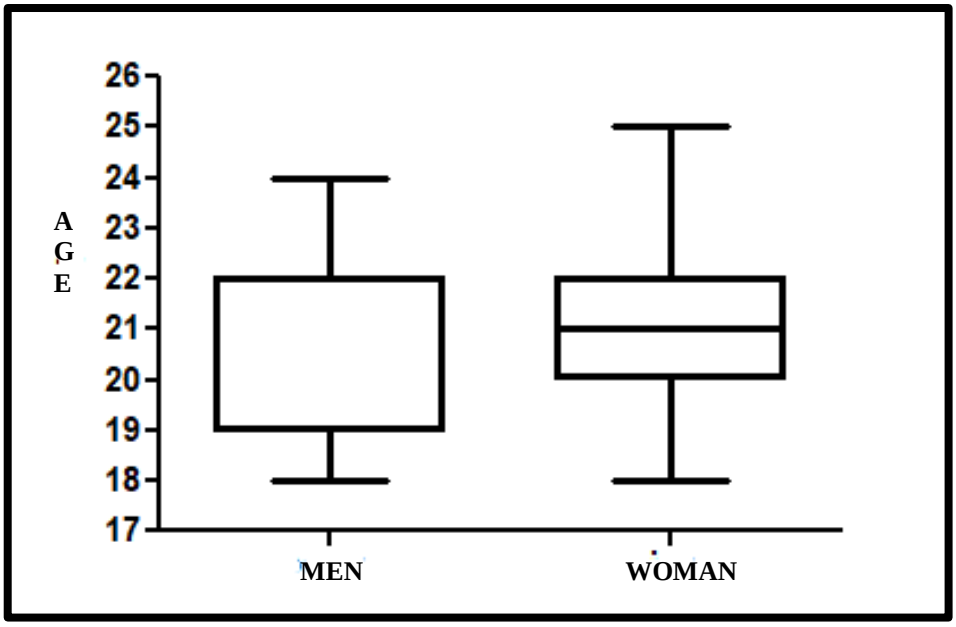

Figure No. 1: The age of students. The box diagrams represent the medians and interquartile ranges. The data were analyzed using the U-Mann Withney test

Regarding the parameters measured by the chemical examination of urine, no significant difference was found in the normal values of the numerical variables, nor differences between men and women. An example of this is the pH (the average in men 6.230 ± 0.4654, in women an average of 6.075 ± 0.6154 (p=0.3198) and the urine density (the average in men 1.019 ± 0.006830, in women 1.018 ± 0.006544 (p=0.8358), as shown in Figure 2 and 3.

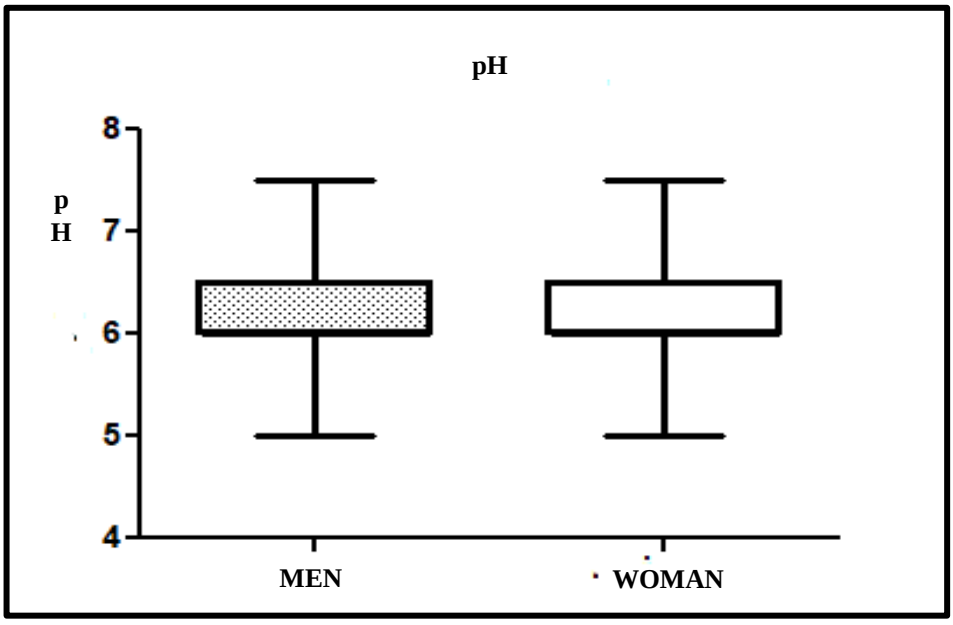

Figure No. 2: pH of the urine samples tested. The box diagrams represent the medinas and interquartile ranges. The data were analyzed using the U-Mann Whitney test.

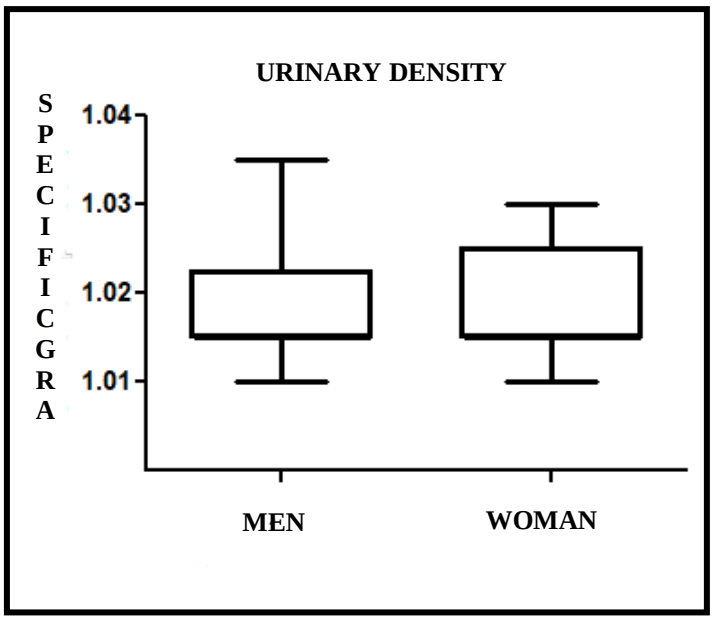

Figure No. 3: Urinary density of the analyzed samples. The box diagrams represent the medians and the interquartile ranges. The data was analyzed using the U-Mann Whitney test.

The ratio analysis (Fisher's exact test) of the chemical examination of the urine showed a significant association between the female students and the hemoglobin parameter, with a value of p= 0.0330.

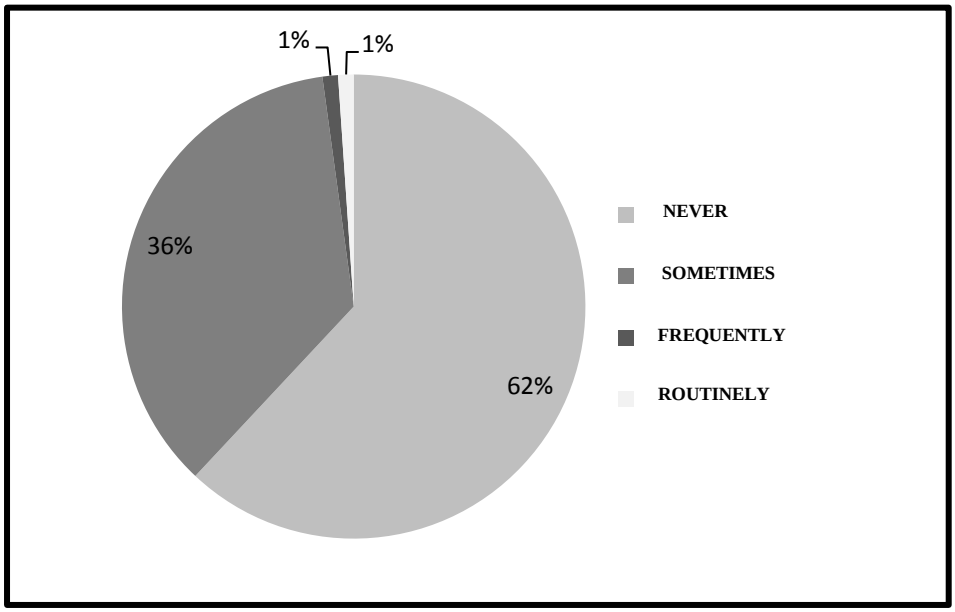

Figure No. 4: Percentage of students who routinely take a general urine test.

62% of students never take a general urine test, 36% do it sometimes and 1% do it frequently or routinely

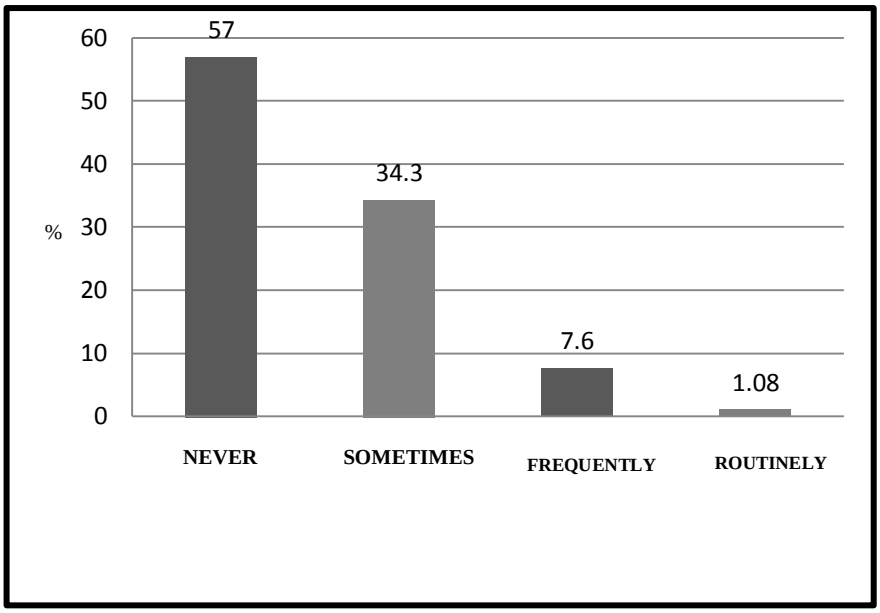

Figure No. 5: Percent of students making preventive visits to the doctor.

57% of students never visit a doctor routinely, 34.3% visit sometimes, 7.6% frequently, and 1.08% routinely.

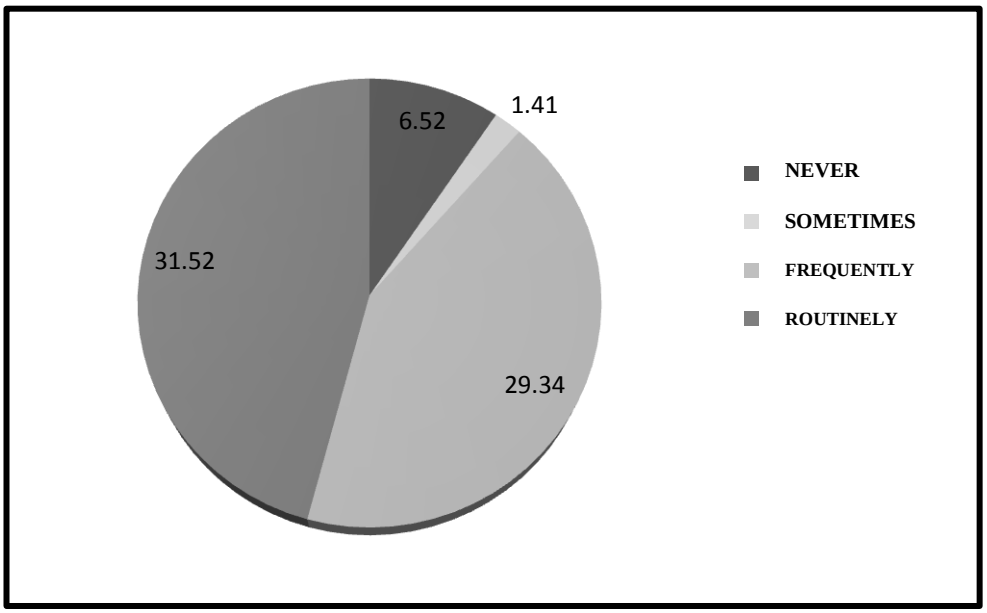

Figure No. 6: Percentage of students consuming water adequately.

46% of students routinely consume 2L, 43% frequently and 9% never consume that amount of water or sometimes do and 2% sometimes do.

VIII. DISCUSSION

According to the results of this research, a greater presence of women was observed in the university where the study was carried out. Of the total participants, 71% were women and 29% men; this proportion is consistent with current trends in women's participation in higher education as an expression of their autonomy and human development.

In the physical examination there were few samples in which some alteration was observed, most of them were between gold and light yellow and very few showed abundant sediment and turbidity; regarding the smell only two samples showed a foul smell, caused by an infectious process. As there were so few samples in which the physical parameters were altered, they were not significant in the study.

Regarding the parameters of the chemical test, there were no statistically significant differences from the reference values reported in the literature and established for a young population (Manzanares, 2014; Strasinger and Schauto, 2010). However, a positive association was found between hemoglobin values and the female population tested, which may be due to the fact that they were in the menstrual period at the time of sampling. some pathology that is more frequent in the female sex due to the fact that the rest of the variables that were analyzed were not found altered, which makes it doubtful that it is some physiological disorder, with the exception of 3 female patients who showed to have urinary tract infection at the time of the analysis, since added to the presence of hemoglobin, other characteristic parameters related to infections were found altered (Lozano, 2017: Lucas et al,. 2016).

In the microscopic part of the uroanalysis, no alterations were found that were outside of what was reported in the literature. There was not presence of cylinders, malignant cells, crystals of clinical importance, etc., Most of the samples that presented crystals were urates or amorphous phosphates, whose presence is considered normal in this kind of samples due to metabolism or water consumption, and they do not indicate physiological alteration.

Due to the fact that a prevalence study was conducted, it is not surprising that no statistically significant differences and associations in the parameters analyzed, because the The population studied is young and mostly free of disease. According to the INEGI, the The main causes of death in young people between 15 and 25 years old are homicides, accidents car, suicides, heart disease, malignant tumors, ranking up to the seventh place the renal insufficiency (INEGI ,2019). Our results are encouraging since they indicate that the The growing change in the Westernised diet and lifestyle of the last few decades has not havoc even on the health of our young population. In a study conducted at the University of Veracruz, in which a uroanalysis was performed on all new students, were results consistent with ours, which supports our findings (Lopez et al., 2010).

Normally a general urine test is ignored by the general population, as they consider it a "simple study" or to be done only when indicated by the doctor, 61.95% of the students uroanalysis is not performed routinely and only 1.08% consider it part of their activities of health prevention. Periodic health checks are an opportunity to identify problems in a timely manner and establish the relevant corrections (Escobar and Pico, 2013) 57% of the Students evaluated do not go to the doctor in a preventive way and only 1.08 % do. Unfortunately, the Q.F.B. population, despite being educated in the clinical area, does not applies his health knowledge to his own lifestyle.

Young people in general have favorable beliefs about health care, but at the same time have unhealthy practices, which if maintained over time will become risk factors. Some studies on the lifestyles of college students have shown the existence of unhealthy lifestyles, suggesting that students abandon healthy habits and acquire unhealthy ones during their college years (Cecilia et al., 2017). At present study found that 7.93% of participating students did not consume adequate water replacing it with soda or energy drinks, however, fortunately more than half of students 60.86% consume at least 2 liters of water per day, without this meaning that they avoid drinks Mexico is one of the countries with the highest sugar content in the world. consumption of soft drinks, resulting in a high rate of deaths associated with the consumption of these drinks. Soft drinks contain high levels of phosphoric acid which has been associated with stones and other kidney problems (PROFECO, 2013).

In this study, it was observed that Q.F.B. students at the Universidad Autónoma de Zacatecas did not present alterations in the parameters that comprise a general examination of urine that indicate the presence of some related pathology. The age of the participants is an important factor to take into account However, some types of behavior such as smoking, a poor diet, and a lack of food are healthy, sedentary lifestyle or excessive alcohol or soda consumption may contribute to the to increase the risk of morbidity and mortality, which reveals the importance of creating programs University students who modify and promote healthy lifestyles.

IX. CONCLUSION

The general examination of urine is an excellent diagnostic tool carried out in the clinical laboratory that helps to determine the presence of renal, hepatic and metabolic disorders so that their realization on a regular basis allows early diagnosis of physiopathological disorders and prevent long-term health complications.

The objective of the work was fulfilled, by means of it we managed to determine that fortunately the students of the degree of Biologic Pharmaceutical Chemist are an apparently sa population and do not suffer from renal or extra renal diseases.

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Martínez-Becerra MS (MC), et. al. "Incidence of alterations in an urine test can be used to indicate a probable disease in students." *International Journal of Pharmaceutical Science Invention,* vol. 10(01), 2021, pp 25-33. Journal DOI- 10.35629/6718