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Research Article

Evaluation of Lithogenic Parameters in Patients with Obesity, Dra. Nerza Paz Health Center, Tegucigalpa, Honduras, January-March 2022

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Abstract

Background: Global progress accompanied by changes in eating patterns is associated with an unprecedented health situation: obesity.

Objective: To evaluate the lithogenic parameters in patients with obesity, Tegucigalpa, Honduras, January - March 2022.

Methodology: Characterized as a simple random non-probabilistic cross-sectional descriptive study, with the participation of 79 participants with sociodemographic variability, the weights, heights and a general urinal examination was carried out to define some general alterations through its results.

Results: The majority of women participated in young ages, of urban origin, hypertension, DM2 and obesity greater than 30 BMI led the statistics.

Keywords: *Urolithiasis; Obesity; Body Mass Index; Kidney Disease; Honduras*

Introduction

Global progress accompanied by changes in eating patterns is associated with an unprecedented health situation: obesity. This has led health sciences to rethink concepts about the functions and activities of fat cells, which went from being conceptualized as energy storage to also producing molecules associated with chronic systemic inflammation [1,2].

In men, Saliba [3] in a cohort study found an association between obesity and risk of urinary infection. A positive energy balance maintained over time will result in the accumulation of adipose tissue, which is considered the central feature of obesity. In addition, it is known that there are various genetic factors that predispose to weight gain [4].

The ENSANUT 2012 reports that in Mexico 73% of women and 69.4% of men in adulthood are overweight/obese; for Yucatan, the values of overweight and obesity were 82% for women and 78.6% for men in adulthood, in both cases higher than the national average

[5].

Obesity is related to the increased risk of suffering from some metabolic diseases; cardiovascular and some types of cancer [11]. It is a multifactorial disease in which intrinsic factors such as genetics, race, age, sex may be involved; and extrinsic factors such as geographic, climatic, food and those related to work activity, etc [6].

At the international level, it is described that the prevalence of UL varies significantly with respect to geographic location, ranging from 8 to 19% in men, and from 3 to 5% in women; Over time, an increase in prevalence and incidence has been seen in countries such as Germany, the USA and Iran [7].

In Mexico, few epidemiological studies have been carried out regarding UL. A national survey carried out at the Mexican Social Security Institute (IMSS) reported a mean prevalence of UL of 2.4/10,000 inhabitants; also reports that Yucatan ranks first with the highest frequency (5.8/10,000 inhabitants) [8].

Another study carried out in the open population of Yucatan refers to a prevalence of 550/10,000 inhabitants. LU is due to an imbalance between the amount of inhibitors (citrate, magnesium) and promoters (calcium, uric acid, phosphates, oxalates) of crystallization in the urine; different changes in the chemical composition of urine can create a favorable environment for the formation of kidney stones; this occurs when the concentration of promoters such as calcium oxalate, calcium phosphate, uric acid, and cystine is high enough, in combination with low urine volume [9,10].

In addition, an inverse relationship between excess weight and urinary pH is reported, that is, the higher the degree of obesity, the more acidic the urine, increasing the risk of developing UL; the above, coupled with inadequate eating habits such as diets rich in purines, oxalates, phosphates and proteins, modify the pH of the urine and, therefore, favor the formation of uric acid or calcium phosphate stones depending on the pH value present [11,12].

It is known that an increase in urinary sodium excretion is a promoter of increased urinary calcium excretion, thus increasing the probability of UL formation; the increase in urinary sodium excretion is related to a higher consumption of salt in the diet [13,14].

Methodological Design

With a type of cross-sectional descriptive study, with the participation of 79 patients between January and March 2022, with a type of convenience non-probabilistic sampling, the tests of height, weight and calculation of Body Mass Index were carried out, as well as Using urinalysis, data were analyzed using EpiInfoV7.2. Minors were excluded.

Result

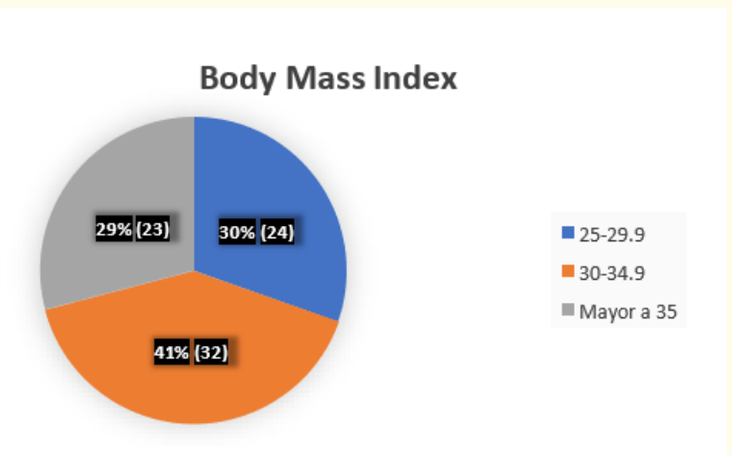
According to the results regarding sociodemographics, it was interesting to know that the majority of people who attend the care center were between 45 - 57 years old with 30.4% (24), followed by the range between 32 - 44 years old. With 25.3% (20), in turn, that the majority were found with a primary school degree with 41.8% (33) of urban origin in 83.5% (66), being "housewife" in 57% (45), in terms of marital status, married and free union share an equal percentage with 35.4% (28), with women being the majority with 78.5% (62) (See table 1).

Age	F	%
19 - 31	15	19
32 - 44	20	25.3
45 - 57	24	30.4
58 - 70	16	20.3
Over 71	4	5
Total	79	100

Scholarship	**F**	**%**
Illiterate	4	5.1
Primary	33	41.8
Secondary	28	35.4
University	14	17.7
Total	79	100
Origin	**F**	**%**
Rural	13	16.5
Urban	66	83.5
Total	79	100
Occupation	**F**	**%**
Housewife	45	57
Professional	10	12.7
Businessman	1	1.2
Other occupations	23	29.1
Total	79	100
Marital status	**F**	**%**
Single	20	25.3
Married	28	35.4
Free Union	28	35.4
Not Consigned	3	3.9
Total	79	100
Sex	**F**	**%**
Men	17	21.5
Woman	62	78.5
Total	79	100

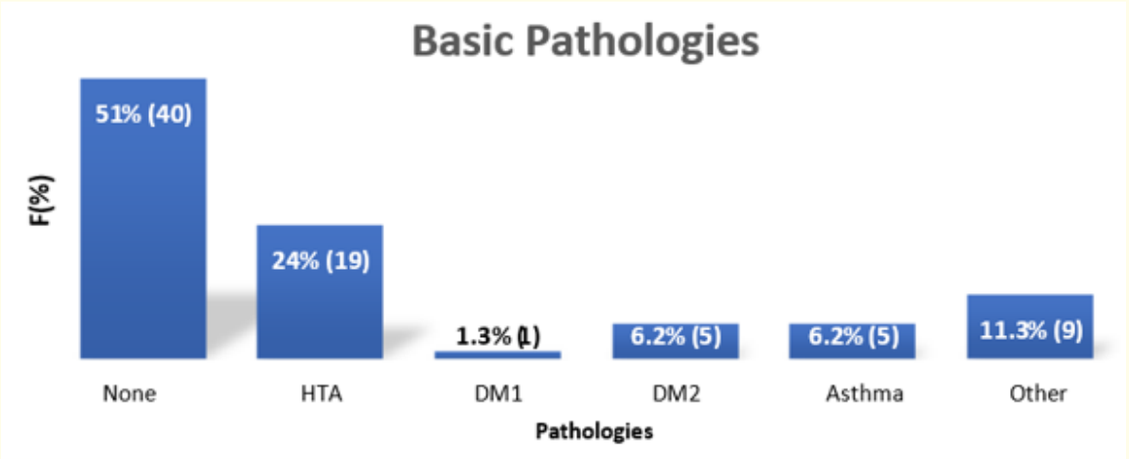
Table 1: *Distribution of the sociodemographic variables of the population under study (n = 79).*

The mass index that predominated the statistics was 30 - 34.9 with 41% (32), followed by 25 - 29.9 with 30% (24) and finally greater than 35 with 29% (23) (See graph 1).



Graph 1: *Distribution of the body mass index of the participating subjects (n = 79).*

Regarding the basic pathologies that the participants had, 24% (19) already had hypertension, followed by Asthma and DM2 with 6.2% (5) equal, 1.3% (1) suffered from DM1 and other pathologies made up 11.3% (9) (See graph 2).



Graph 2: *Distribution of the base pathologies found in the analyzed patients (n = 79).*

Regarding the laboratory values analyzed and their relationship with gender and age ranges, it was evident that there are more women than men participating, being a mechanism of choice for convenience and by their own decision, more women were willing to participate given the sample, being these 62 of 79, in terms of the yellow color was more frequent in women with 60 of 79, versus 17 who were men, on the other hand in terms of acid reaction, women obtained 52 of 79, followed by 5 of 79 in alkaline and the same value of 5 of 79 in neutral. Regarding the Appearance, the women obtained a slight cloudy appearance in 43 of 79, followed by Cloudy in 19 of 79, in terms of the presence of blood 4 women were positive, traces being found in 7 of 79 women and Positivity + and ++ in a single frequency of 1 of 79 with respect to women. It is important to highlight that Leukocyturia was Positive in 5 women, Positive + in 9 of them and Positive ++ in 2 women. Regarding the assessment of ages, the yellow color was found more frequently between the ages of 45 - 57 years with 24 participants, the acid reaction was found in the same age range and the same frequency of 24 of 79 participants, the cloudy aspect was found in 20 of 79 participants between 45 - 57 years of age with more relevance, it should be emphasized that the variability of the blood findings was found positive in 2 of 79 between 19 - 31 years, traces in 6 of 79 between 32 and 57 years old and positive + and ++ were found in 2 of 79 between 32 and 57 years old. Leukocyturia was found positive in 4 of 79 participants between 32-57 years old and positive + in 6 of 79 in the same age range above (See table 2).

Laboratory Values	**Sex**		**Age**				
Color	**Men**	**Woman**	**19-31**	**32-44**	**45-57**	**58-70**	**More than 71**
Yellow	17	60	14	20	24	15	4
Pale yellow	0	2	1	0	0	1	0
Total	17	62	15	20	24	16	4
Reaction	**Men**	**Woman**	**19-31**	**32-44**	**45-57**	**58-70**	**More than 71**
Acid	15	52	10	15	24	15	3
Alkaline	0	5	0	3	0	0	1
Neutral	2	5	5	2	0	0	0
Total	17	62	15	18	24	15	4
Appearance	**Men**	**Woman**	**19-31**	**32-44**	**45-57**	**58-70**	**More than 71**
Slight Cloudy	17	43	10	11	20	15	4
Cloudy	0	19	5	9	4	1	0

Total	17	62	15	20	24	16	4
Blood	**Men**	**Woman**	**19-31**	**32-44**	**45-57**	**58-70**	**More than 71**
Negative	16	49	12	16	19	15	3
Positive	0	4	2	0	1	1	0
Traces	1	7	1	3	3	0	1
Positive +	0	1	0	1	0	0	0
Positive ++	0	1	0	0	1	0	0
Total	17	62	15	20	24	16	4
Leukocyturia	**Men**	**Woman**	**19-31**	**32-44**	**45-57**	**58-70**	**More than 71**
Negative	17	46	13	15	18	14	3
Positive	0	5	0	2	2	1	0
Positive +	0	9	1	3	3	1	1
Positive ++	0	2	1	0	1	0	0
Total	17	62	15	20	24	16	4

Table 2: *Distribution of the urinalysis profile according to sex and age (n = 79).*

Discussion

In industrialized countries such as the United States, there has been a progressive increase in the prevalence of lithiasis during the last 4 decades. Metabolic syndrome affects 25% of adults in the US and is associated with a 30% increased risk of stone disease [15].

In addition to the potential sequelae associated with kidney stones, such as pain, infection, obstruction or taking anti-inflammatory drugs, nephrolithiasis is considered a risk factor for chronic kidney disease (CKD) [16].

At the international level, it is described that the prevalence of UL varies significantly with respect to geographic location, ranging from 8 to 19% in men and from 3 to 5% in women; Over time, an increase in prevalence and incidence has been seen in countries such as Germany, the USA, and Iran [17]. In Mexico, few epidemiological studies have been carried out regarding UL. A national survey conducted at the Mexican Social Security Institute (IMSS) reported a mean prevalence of UL of 2.4/10,000 inhabitants. The predominance of LU in males (1.4:1) has also been reported by other authors [18].

Renal lithiasis predominated in females (56.2%), compared to prevalence studies in the city of Buenos Aires, which is 4% for the general population (3.6% women and 4.3% men) [19].

For the present study that was carried out in Tegucigalpa, there are convergences and divergences with the international literature, for example, some authors mention that men are more affected and others women, to be the case in the present study it was women, without However, it was the women who obtained a participation greater than 70%. Regarding ages, there was a certain convergence when denoting that patients under 70 years of age already have signs of renal alterations.

Studies have already reported an inverse relationship between excess weight and urinary pH, that is, the higher the degree of obesity, the more acidic the urine, increasing the risk of developing UL; the above, coupled with inadequate eating habits such as diets rich in purines, oxalates, phosphates and proteins, modify the pH of the urine and therefore, favor the formation of uric acid or calcium phosphate stones depending on the pH value present [20].

Recalling that for this study all the patients were obese, however, many of these were already in advanced degrees of obesity, an approximate third of them were already found to be older than 35, which is a degree of obesity that requires attention by professionals of nutrition.

A study conducted by Vega showed that at the level of family history of kidney stones (OR = 2.22; 95% CI 1.88 - 2.65), arterial hypertension (OR=1.68; 95% CI 1.39 - 2.02) and overweight/obesity (OR = 1.31; 95% CI 1.12 - 1.54) [21]. Regarding the base pathologies, convergences were found, in the first instance that all the patients were obese, but HTA 24% (19), followed by Asthma and DM2 with 6.2% (5) equal.

An acid urinary pH (pH < 5.5) favors uric acid stones, while an alkaline urinary pH (pH>7) favors struvite stones. Other aspects to take into account is that they are formed as a consequence of repeated infections by urease-producing organisms [22].

These bacteria, called urealytic bacteria, have the ability to hydrolyze urea with the release of ammonia and carbon dioxide, which increases the pH of the urine and favors the crystallization, often mixed, of ammonium and magnesium phosphate (struvite), calcium phosphate and ammonium urate. These bacteria are *Proteus*, *Ureaplasma urealyticum* or certain strains of *Klebsiella* or *Serratia* [22].

Another analysis carried out by Calao mentioned that he found that 83% of the patients had at least one alteration in the stone profile, with the morbidly obese group showing the greatest number of abnormalities in the stone profile [22].

Studies mention that acid urine contributes to the formation of uric acid stones and alkaline urine favors the appearance of calcium stones, likewise a pH above 7.5 is related to struvite stones [22].

The values of the urinalysis profile in the study carried out in Tegucigalpa, was acid and 6.3% (5) alkaline. The appearance of Slight Cloudy was predominant with 75.9% (60), in Blood 82.2% (65) was negative. Many of these patients had urinary tract infections.

Conclusion

The greatest participation occurred in women, aged between 30 - 50 years, with mostly urban origin, the average Body Mass Index was in a third of the sample greater than 35 BMI, HTA, DM2 and Asthma which stand out in the statistics found, although HTA is more relevant.

Regarding the urological profiles, acidity and alkalinity was the most relevant data, obtaining greater convergence with the international literature regarding the probabilities of generating a type of kidney stone in the future or already suffering from it.

Important aspects that resulted from the crossing of the variables is that more women were participants, as well as that the age ranges that presented the most colors, reactions, aspects, blood and leukocyturia were found between 32 and 57 years of age, respectively. to the pathologies, the arterial hypertension present in 19 subjects, was the one that more frequencies of anomalous data were found.

Conflicts of Interest

The authors of this article declare that they have no conflicts of interest.

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