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HYPERURICEMIA: PHYSIOLOGY, CLINICAL PRESENTATION AND PHARMACOLOGICAL MANAGEMENT; A PRACTICE BASED STUDY FROM HYDERABAD, SINDH, PAKISTAN.

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Abstract:

The frequency of hyperuricemia patients is increasing in the clinical practice especially the arthralgia cause being the changing life style probably. Uric acid a normal end product of purine metabolism gets accumulated in joints following rise in plasma concentration either due to excessive production or reduced excretion. This results into gouty arthritis, hypertension, renal stones requiring dual management with dietary restriction and pharmacological intervention. The current observational research study was carried out in Orthopedic Consultant clinic and Liaquat University of medical and health sciences. Serum uric was measured in 374 Patients selected through non-probability consecutive sampling using device method at consult clinic. SPSS 22nd version and t-test was used for data analysis, mean serum uric acid of the population was 5.01mg/dl however hyperuricemia was seen in 10.91%(41) while 89.09%(333) were having normal range. Minimum uric acid was 1.3mg/dl in the study population while maximum was noted as 13.20mg/dl. The mean serum uric acid in male group was 5.23±1.31mg/dl while it was female 4.70±1.76mg/dl in female group of patients and the difference was significant statistically (p-0.005)

Conclusion: *Hyperuricemia is found in almost 11% of study subjects while and there exists significant difference between the two genders.*

Keywords: *Gout, Uric Acid, hyperuricemia, Arthralgia.*

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INTRODUCTION:

Uric acid is produced as a result of purine catabolism following hypoxanthine, xanthine to uric acid influenced by xanthine oxidase. Being a weak acid with a pKa 5.75-10.3 (ionization constant) uric acid gets ionized and forms urate 99%at the physiological pH of 7.40 in ECF(extracellular Fluid). Under normal Physiological conditions about 700mg of uric acid is faced by the human body on daily basis (exogenous and endogenous) 30% of which is broken by intestinal flora to expel into feces stool and the rest 70% (500 mg) gets excreted in urine unchanged disturbance in the process results in hyperuricemia which is a level above 6.8 mg/dl at physiological conditions[1]. Uric acid crystals gets deposited in synovial fluid initiating the inflammatory process by leucocyte infiltration, inflammatory mediators release, leukotriene as well as enzymatic hydrolysis and cause being either excessive production or reduction in excretion [2]. Patients with hyperuricemia may remain asymptomatic or present with gout, renal stones or combined. Patients may present with pain and swelling of the Big toe, painful joint, knee joint in particular tendon rupture of hand or wrist due to gout is also reported in literature [3]. Hyperuricemia may present as a co-morbid condition with HTN, diabetes, IHD or metabolic syndrome [4]. An estimated 8.3 million adults in USA suffer with hyperuricemia with a prevalence of 3.9% [5]. The prevalence of hyperuricemia in general population is reported as 2% [6]. MSU (mono sodium urate) is believed to get deposited in joint at a uric acid level above the 6.8mg/dl [7]. 19.4% gouty tophi are reported to be associated with hyperuricemia from France[8].Possible risks to be clinically counseled are to reduce chocolates and other high protein diets but certain drugs like diuretics (loop, thiazide), anti-tuberculous (ethambutol, pyrazinamide)and antipyretic(Aspirin) should also be kept in mind on drug history. Therapeutic goal by European Guidelines for the management of chronic hyperuricemia is to keep the serum uric acid <6 mg/dl [9]. The treatment options are NSAIDS, colchicine, xanthine oxidase inhibitors, uricosuric agents, pegloticase, interleukin-1 inhibitors and glucocorticoids [10]. Despite the availability of multiple therapeutic options unfortunately the compliance is very poor that is between 18-26% [11].

METHODOLOGY:

Patients (374) were selected from the orthopedic consultant clinic and LUMHS from November 2016 to November 2017 with predominantly joint pain complain through non probability sampling technique including all age subjects. Device method and lab methods were adopted to assess serum uric acid levels at clinic and LUMHS lab respectively. Blood samples were drawn with aseptic measures. Descriptive analysis including mean, SD, percentage, frequency, minimum and maximum were measured on SPSS version 22 and mean of males and females was compared using t-test at a significance level of p- value <0.05.

RESULTS:

Total 374 patients were evaluated 55.60% (208) were male and 44.40% (166) were females, majority of them 96% (359) were muslins while 4%(15) were non-muslins(Figure 1). Population mean uric acid was 5.01mg/dl with 1.3mg/dl as minimum and 13.20mg/dl as maximum, hyperuricemia (>6.8mg/dl) was found in10.91 %(41) of the population while 89.09 %(333) patients were found as normal or border line uric acid levels (Table 1). Mean of uric acid was 5.23±1.31mg/dl in males and 4.70±1.76mg/dl in female group with a significant difference in between p-0.005 (Tables 2).

Table 1: Description of various parameters in study population.

S. No	Parameters	Description
1.	Male	208(55.60%)
2.	Female	166(44.40%)
3.	Muslims	359(96%)
4.	Non-Muslims	15(4%)
5.	Minimum	1.3mg/dl
6.	Maximum	13.20mg/dl
7.	Population Mean	5.01mg/dl
8.	Normal level<6.8mg/dl	333 (89.09%)
9.	High levels>6.8mg/dl	41(10.91%)

Table #2. Comparison between mean serum uric acid levels in males and females

Parameter	Gender	N	Mean	Std. Deviation	t-score	P-Value
Uric acid Mg/dl	Male	208	5.23	1.31	2.8	0.005
	Female	166	4.70	1.76		

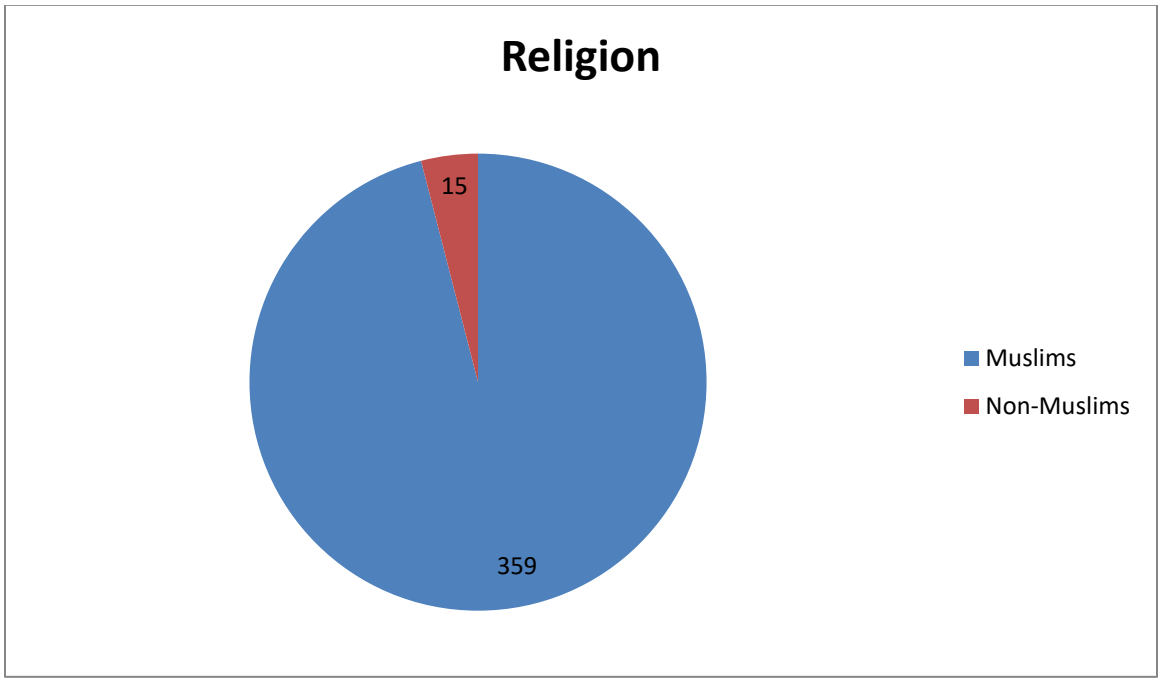

Figure 1: Study Population distribution in terms of religion.

DISCUSSION:

The results of our current study are inconsistent with the results of study by Yanyan Zhu et al (2011) as he reported mean of uric acid 6.14 mg/dl for females and 4.87 mg/dl for male but we found 5.23mg/dl for male and 4.70 mg/dl for females [5]. Similarly our current finding differ with what we find previously in April (2017) showing females with slightly higher level serum uric acid 5.1mg/dl than 4.6mg/dl of males[12]. Research by Jamshed et al. (2016) on CAD (coronary artery disease) patients associated with uric acid alterations he reported 7.2mg/dl as mean uric acid level in male subjects whereas female subjects were reported having mean 5.9mg/dl uric acid serum levels his finding were totally different from our observations that may partially be due to the difference between the two different populations in both studies [13]. Finding from the research results of Dasti MA et al. (2015) also fall in contrast to our findings, the population mean he reported was 13.74mg/dl while we found it as 5.01mg/dl while the mean serum uric acid level in males was 11.74mg/dl whereas for females he found it as 14.43mg/dl that was much higher than our current findings his research population was hypertensive patients that may have some additional association or impact on the mentioned variable [14]. Another study by Choi HY et al (2017) reported 5.93mg/dl uric acid as mean in male group as compared to 4.37 mg/dl of the female group although inconsistent with our findings but it did show the significant difference between the two genders [15]. Allopurinol (xanthine oxidase Inhibitor with active

metabolite) and NSAIDs (non-steroidal anti-inflammatory drugs) remained the frequently used drugs having multiple advantage and few side effects certainly. We could not cover multiple study parameters due to our financial constrains that was the weakness of our study. We recommend Public health awareness educational programs at various community levels for various aspects of the hyperuricemia and its impact on life with methods to control it at primary health care level.

CONCLUSION:

About 11% of the population is suffering from the hyperuricemia and there is significant gender difference as for as serum uric acid level is concerned

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