

Original Article**PREVALENCE OF HYPERURICEMIA AT A TERTIARY CARE CENTRE OF JUMLA, NEPAL: A RETROSPECTIVE STUDY*****Tirtha Narayan Shah¹, Abdullah Rain², Ram Jiban Prasad³, Umeshwar Prasad Thakur³, Navin Kumar Sah⁴**¹Department of Biochemistry, ²Department of Surgery, ³Department of Anatomy, ⁴Department of Biochemistry, Karnali Academy of Health Sciences, Jumla, Nepal. ⁴Janaki Medical College, Janakpur, Nepal.Submitted: 10th – August – 2023, Revised: 6th – September- 2023, Accepted: 16th – October- 2023**DOI:****ABSTRACT****Background**

Purines after its metabolism, gives rise to the formation of uric acid as an end product. More than 70% of its excretion is done by the renal system and lesser portion by intestinal and biliary system. Hyperuricemia is caused by the abnormalities in serum uric acid (SUA) metabolism and its impairment in renal function leading to the urate retention.

Methods

Observational descriptive cross sectional study (retrospective chart review) done from 16th July 2021 to 15th July 2022 to determine the prevalence of hyperuricemia. The data entered in Microsoft Excel 2007 and analyzed in SPSS (statistical package for social sciences) version 16.

Results

In this study, total participants were 1491 of which male was 553 (37.08%), and female was 938 (62.91%). Prevalence of hyperuricemia was 9.99% in the total population. 16.09% male and 6.39% female population were hyperuricemic.

Conclusions

Besides various factors of the health hazards, hyperuricemia is also one of them and sometimes may go undiagnosed. Timely diagnosis and its treatment may protect against cardiovascular events, hypertension, renal disorders, etc.

Keywords: CKD, GFR, Hyperuricemia, Uric acid

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INTRODUCTION

Uric acid which is excreted by the kidneys in urine is the end product of the purine metabolism¹. High level of serum uric acid (SUA) is found in the individuals with decreased glomerular filtration rate (GFR) leading to decreased renal clearance. Jung et. al., in their studies have shown that high level of SUA has a positive impact in the pathogenesis of both chronic kidney disease (CKD) and acute renal damage². Beside CKD, hyperuricemia is also one of the significant factors in the development of hypertension³. Prolonged hyperuricemia is one of the major causes of chronic gout and renal failure⁴. Besides other complications, hyperuricemia in adults was also associated with metabolic syndrome, type 2 diabetes, chronic kidney diseases, and coronary artery disease⁵⁻⁷.

In the study done by Acharya et.al., hyperuricemia was present in 71 patients (80%), while 19 patients (20%) had normal uric acid levels⁸. The prevalence of hyperuricemia was 25.18% in the study done by Sinha and Gaire in 2019 and among the hyperuricemic population, the prevalence in men and women was 25.33% and 25.05% respectively⁹. A similar study in Lumbini zone in 2014 got overall prevalence of hyperuricemia as 17.38% and among the hyperuricemic population, the prevalence in men and women was 17.20% and 23.64% respectively⁴. Hyperuricemia was diagnosed in 5 – 30% of general population in the past several decades, the prevalence of hyperuricemia varied greatly and appeared to be increasing^{10,11}. In Nepal, the prevalence of hyperuricemia was 21.42%¹².

In a study, hypertensive patients with coexisting hyperuricemia were reported to be at a greater risk of uncontrolled hypertension, in spite of good compliance with their antihypertensive treatment¹³. Alcohol consumption, one of the causes of hyperuricemia, has been increasing over the years across all ethnicities and age groups in Nepal¹⁴. Purine content is high in pulse or legumes and its 71% consumption is obtained from own farm production in this region. This area is declared as pocket for beans and legume production¹⁵. Therefore, it is necessary to study the prevalence of hyperuricemia in Karnali Province, Nepal because early diagnosis and its prevention will help the individual to suffer less

with the complications of hyperuricemia.

METHODS

This was a hospital-based retrospective study conducted among the patient visited in the laboratory of Karnali Academy of Health Sciences, Jumla, Nepal from 16th July 2021 to 15th July 2022 (1/4/2078 to 31/3 2079 BS) and got their serum uric acid estimation done. Data has been collected from the records present in the hospital laboratory computer software. All the collected data were entered in MS-excel. Statistical package for social science (SPSS 16.0) was used for data analysis. The ethical approval was obtained from the Institutional Review Committee of Karnali Academy of Health Sciences (Ref: 079/080/24). All the details of patientlike hospital identification number, patient's name, sex, and age were included as the study population with variant age group (< 20 years to >80 years) where as the patients with incomplete details were excluded. The total number of patients in study population was 1491 during the one year of study period.

Serum Uric acid level was measured in fully automated biochemistry analyzer Zybio EXC 200 using its uric acid kit (Uricase method) as per its guidelines. The normal control of uric acid level is varying from male and female as 2.5 – 7.0 mg/dl and 1.5 – 6.0 mg/dl were categorized respectively¹⁶.

RESULTS

In our study, total participants were 1491 of which male was 553 (37.08%), and female was 938 (62.91%). Prevalence of hyperuricemia was 9.99% in the total population. 16.09% male and 6.39% female population were hyperuricemic. Male and female population were categorized in different age groups as shown in Table 2 and 3 respectively.

Prevalence of hyperuricemia in male was found to be 3.77%, 17.85%, 19.09% and 13.15% in less than 20 years, 21 to 40 years, 41 to 60 years and 61 to 80 years. Prevalence of hyperuricemia was not recorded in the age groups of more than 80 years in this study as shown in (Table 2)

Prevalence of hyperuricemia in female was found to be 9.57%, 5.25%, 6.64% and 8.08% in less than 20 years, 21 to 40 years, 41 to 60 years and 61 to 80 years. Prevalence of hyperuricemia was not

recorded in the age groups of more than 80 years in this study as shown in table 3. Moreover, 2.89% of the male and 0.10% of the female were found to be hypouricemic in this study.

Table 1: Prevalence of hyperuricemia in different genders.

Gender	Normal	Elevated	Low	Total	Prevalence %
Male	448	89	16	553	16.09
Female	877	60	1	938	6.39
Total	1325	149	17	1491	9.99

Table 2: Prevalence of hyperuricemia in different age groups in male.

Age Group	Normal	Elevated	Low	Total	Prevalence %
<20	46	2	5	53	3.77
21 – 40	156	35	5	196	17.85
41 – 60	175	42	4	220	19.09
61 – 80	64	10	2	76	13.15
>80	7	0	0	7	0
Total	448	89	16	553	16.09
	(81.01%)	(16.09%)	(2.89%)	(100%)	

Table 3: Prevalence of hyperuricemia in different age groups in female.

Age Group	Normal	Elevated	Low	Total	Prevalence %
<20	73	8	1	82	9.57
21 – 40	397	22	0	419	5.25
41 – 60	309	22	0	331	6.64
61 – 80	91	8	0	99	8.08
>80	7	0	0	7	0
Total	877	60	1	938	6.39
	(93.49%)	(6.39%)	(0.10%)	(100%)	

DISCUSSION

Due to the high and increasing prevalence of the hyperuricemia globally, it's a major public health issue¹⁷⁻¹⁹. In this study, of the total participants of 1491 who came for their serum uric acid estimation done, 9.99% of it was found hyperuricemic which was within the range of hyperuricemia as diagnosed in 5–30% of general population¹⁰. Even in some other Asian countries, prevalence of the hyperuricemia varied like China had 6% to 25%, Taiwan 10% to 52%, and Indonesia 18%²⁰. According to the studies done the prevalence of hyperuricemia in India was 44.6%, which was decreased later to 25.8% in 2018²¹⁻²².

The prevalence of hyperuricemia varies with age and gender in the study result. We found the prevalence of hyperuricemia more in male than female patients. The P value of study population is not significant with <0.005 which is compared with other scientific studies. Similar studies had

conducted reported higher serum uric acid levels in males than females²³⁻²⁴.

In the studies conducted the levels of serum uric acid were found to be elevated as the different age group²⁵⁻²⁶. In the study, we found the maximum prevalence of hyperuricemia in the age group of 41 to 60 years of male where the normal uric acid level was found in the age group of more than 80 years included male patients, whereas in the female patients, we found the maximum prevalence of hyperuricemia in <20 years of age group. The normal level of uric acid was found in more than 80 years of age group. In contrast, many studies have found that an elevated serum uric acid level is associated not only with purine intake from seafood, meat, and beer but also the presence of endogenous metabolic disorders where the enzymatic activity of xanthine oxidase is increased due to presence of tissue oxidative stress^{25,27-33}.

LIMITATIONS

This study doesn't simulate the status of hyperuricemia in the entire population of this region as the study population are only the patients who visited the hospital and got their serum uric acid estimation done. There may be some individuals having hyperuricemic conditions and have visited other hospitals for their assessment of SUA and treatment or ignored and remained undiagnosed. Association between the SUA levels and different patient conditions like history of antigout, antihypertensive or antidiabetic medications, diet, smoking status, alcohol consumption, or other comorbidities etc were limited. Moreover, there was no healthy control group, which limited the ability to compare the SUA levels between patients of different comorbidities and healthy individuals.

CONCLUSIONS

In conclusion, hyperuricemia is a health hazard that may go undiagnosed often. Keeping in mind, its unwanted complications, patients who have risk factors for elevated SUA levels must be monitored for hyperuricemia at regular intervals. Timely diagnosis and its treatment will prevent from many complications like cardiovascular events, hypertension, renal disorders, etc and thus maintain the quality of life.

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