

Prevalence of Hyperuricemia in Hypertensive Population of Western U.P.

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Abstract: ***Background and objective:** The prevalence rate of hyperuricemia (HU) is comparatively higher in Asian countries than in the Western regions. Patients with coexisting HU and hypertension (HTN) are at greater risk of uncontrolled HTN, metabolic syndrome, and complications. This study aims to determine the prevalence of HU in individuals with HTN in Western U. P. **Materials and methods:** A cross-sectional, observational study conducted in tertiary care center in Western U. P. Primary inclusion criteria were either a history of HTN or blood pressure systolic blood pressure (SBP) ≥ 140 and diastolic blood pressure (DBP) ≥ 90 mm Hg. A structured Google form was created to record the clinical, and biochemical parameters of patients visiting the OPD and IPD. The data was consolidated and analyzed using Microsoft Excel. Screening for HU among individuals with HTN was based on serum uric acid (SUA) levels >7 and >6 mg/dl for men and women, respectively. The data were analyzed by using SPSS version 25.0 software. **Results:** Among the study population 528 individuals had HTN. The mean age of the study participants was 57.4 ± 10.5 years with a male - to - female ratio of 1: 1. The total prevalence rate of HU among individuals with HTN is 22.3% (N=118). Gender-wise analysis indicated that 51.7% (61) of the males and 48.3% (57) of the females had HU, Among the patients with HTN and HU, 75% were overweight with a body mass index (BMI) of ≥ 25 kg/m². **Conclusion:** Western U. P. overall HU prevalence rate was comparable to that in other regions of U. P. Results from the participating individuals having HU with HTN shows prevalence of 22.3%. The varying prevalence rate can be attributed to the diversity in genetic background or (family history of HU), sociocultural habits and metabolic perturbations. Understanding this prevalence rate can help strengthen the HU prevention measures to improve quality of life.*

Keywords: Hyperuricemia, Hypertension.

1. Introduction

Hyperuricemia (HU) has long been recognized to be associated with the risk of developing hypertension (HTN). The prevalence of HU has steadily increased globally during the past 4 decades (1, 2). The prevalence of HU has been increasing, especially in Asian countries, including India (~25.8%) compared to the Western countries, including United States of America (21 - 22%) (1, 2). The overall prevalence rate of HU in the Indian population with HTN is 25 - 28% (2). The major treatments include diet and lifestyle changes and xanthine oxidoreductase inhibitors. Other treatments include pharmacological interventions using angiotensin II/nephrilysin inhibitors, atorvastatin, fenofibrate, losartan, metformin, sodium/glucose cotransporter 2 inhibitors, and sevelamer. Few studies (2, 3) have documented a higher prevalence of HU (24 - 37.33%) in patients with HTN as compared to healthy normotensive individuals (6 - 14%). Losartan, used to treat HTN has also shown effectiveness in the reduction of serum uric acid (SUA) levels in both animal and human studies. (1, 2, 4) HU plays an important part in the development of HTN, often co-occurring and leading to increased health risks (4). HTN and HU are independent risk factors for cardiovascular diseases and their co-occurrence increases the risk exponentially. HU can increase the risk of developing HTN by almost 35%. In India, a significant variation in the HU prevalence rate is expected across different regions owing to its socioeconomic, geographical, and cultural diversity.

A screening process for HU among the population with HTN is not currently being implemented. HU screening in patients with HTN conducted via SUA estimation can help alleviate further development of urate deposition and prevent further disease related morbidity and mortality. However, there is a lack of epidemiological data on the prevalence of HU in subjects with type 2 diabetes mellitus (T2DM) and/or

HTN in the population of Western U. P. Therefore, we have assessed the prevalence of HU among patients with HTN and its associated risk factors in the Western U. P. population.

2. Materials and Methods

A cross-sectional, observational study conducted in tertiary care center in Western U. P. All the study participants were provided written informed consent before enrollment in the study. Office blood pressure was measured twice within 5 minutes. The lower of the two readings was noted as the office blood pressure. A standard digital blood pressure measuring instrument was used. SUA was measured using the photometry method. Reference values are males <7 mg/dL and females <6 mg/dL. Literacy rate and socioeconomic status were collected using the general questionnaire method.

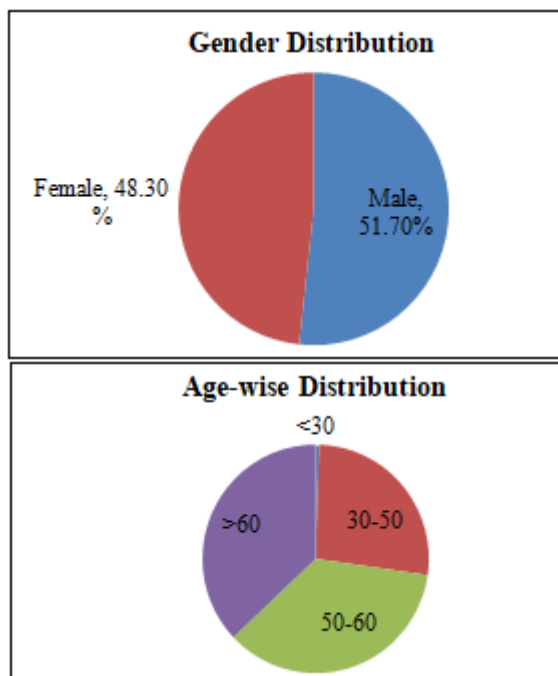
Inclusion and Exclusion Criteria

A structured Google form was created to record the clinical, and biochemical parameters of patients visiting the OPD and IPD. Data were filtered to include all individuals with HTN, defined as systolic blood pressure (SBP) ≥ 140 and diastolic blood pressure (DBP) ≥ 90 mm Hg. The data was consolidated and analyzed using Microsoft Excel. Screening for HU among individuals with HTN was based on SUA levels >7 mg/dL for men or SUA >6 mg/dL for women. Pregnant women or lactating mothers and individuals <18 years of age are excluded from the study. Individuals not willing to provide written consent were also excluded from the study. The data were analyzed by using SPSS version 25.0 software.

3. Results

Among the study population 528 individuals had HTN. The mean age of the study participants was 57.4 ± 10.5 years with a male - to - female ratio of 1: 1. The total prevalence rate of HU among individuals with HTN is 22.3% (N=118). Gender - wise analysis indicated that 51.7% (61) of the males and 48.3% (57) of the females had HU.

Over 80% of the individuals suffering from HU were at least 50 years old and above, with a male - to - female ratio of 1: 1. Around >70% of the study population was 50 years old and above. Among the patients with HTN and HU, 75% were overweight with a body mass index (BMI) of ≥ 25 kg/m².



4. Discussion

We conducted an observational study involving rural population (N = 528) to determine the co - occurrence of HU in patients with HTN. In this study, we assessed the prevalence of HU among the population with HTN in patients visiting our centre (both OPD & IPD). The HTN among the population was defined by blood pressure level $>140/90$ mmHg. The male - to - female ratio in our study was 1: 1. We screened for HU in patients with HTN based on SUA levels (>7 mg/dL for men or SUA > 6 mg/dL for women).

Our study observed a prevalence rate of HU among individuals with HTN is 22.3% (N=118). In a retrospective study conducted across health clinics in India, the prevalence of HU was 25.8% among patients with HTN and T2DM (2). Compared to other Asian countries the prevalence rate of HU was higher in India.

Various studies have reported HU as an independent risk factor for T2DM and HTN. The co - occurrence of HTN and HU is commonly observed, increasing the risk of cardiovascular diseases. Elevated SUA levels induce

endothelial dysfunction, which reduces insulin - stimulated nitric oxide induced vasodilatation in skeletal muscle. This results in reduced glucose uptake in skeletal muscles. A 2011 study reported that for every 1mg/dL increase in SUA levels, the relative risk for developing HTN was 1.13. The risk was more pronounced among the younger population and females (3). Hence, screening of SUA levels at regular periods may serve as a suitable, rapid, reliable, affordable, and less invasive procedure to prevent the onset or progression of HTN.

Compared to the previous large - scale retrospective studies field (1, 2) conducted in a population - based in India, our study's prevalence of HU was lower. This could be caused by geographical location, genetic variation, population characteristics (high - risk), therapeutic regimen, and socioeconomic factors (5).

The HU and HTN have common risk factors, such as age, gender, obesity, lipid profile, comorbidities, and hypertriglyceridemia. In a cross - sectional study (6), conducted in India, the prevalence rate of HU in normotensive individuals was 12.1% which was significantly lower than the prevalence rate we observed in our study. Therefore, it can be speculated that the prevalence of HU was higher in patients with HTN than in the general population, as HU is considered a positive risk factor for the development of HTN.

In accordance with previous studies, (7, 8) age was confirmed as an independent risk factor for HU. In our study, $>80\%$ of the individuals suffering from HU were 50 years or above. The increased incidence of HU in the elderly can be attributed to their reduced renal function status (7). In our study, the prevalence rate of HU in both sexes was similar, contradicting the findings of previous studies (1, 2).

The current study is mainly concentrated on HU prevalence in rural areas. However, a previous study conducted in India (9) reported that the ratio of individuals with HU in urban and rural areas was 1: 1.129. This can be because of the different lifestyles and diets among urban and rural regions.

5. Conclusion

Western U. P. overall HU prevalence rate was comparable to that in other regions of U. P. Results from the participating individuals having HU with HTN shows prevalence of 22.3%. The varying prevalence rate can be attributed to the diversity in genetic background or (family history of HU), sociocultural habits and metabolic perturbations. Understanding this prevalence rate can help strengthen the HU prevention measures to improve quality of life.

6. Limitations of the Study

This study is an observational study with no control group.

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