

Distribution Pattern of Serum Uric Acid Level Before and After National Festival Dashain Among Patients Visiting Tertiary Hospital, Kathmandu, Nepal

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ABSTRACT

Introduction: Dashain, one of the national festivals in Nepal, celebrated with excessive consumption of high purine content foods, alcoholic and soft beverages. These foods have been associated with higher Serum Uric Acid (SUA) levels leading to hyperuricemia. This study was intended to evaluate the distribution pattern of SUA level a month before and after this festival for two consecutive years.

Methods and Materials: The data of 5818 patients visiting Clinical Biochemistry Laboratory, Tribhuvan University Teaching Hospital for SUA test (a month before and after Dashain festival for two consecutive years; 2017 - 2018 A.D.) were collected and analyzed. The statistical analysis was done using SPSS version 21. Continuous variables were expressed as mean \pm SD taking 95% confidence interval and p values of <0.05 was considered to be statistically significant. Mann-Whitney U test was used to compare the variables.

Results: The mean SUA levels before and after Dashain in two consecutive years were $333.5 \pm 112.1 \mu\text{mol/L}$ and $334.2 \pm 114.7 \mu\text{mol/L}$ in 2017 A.D. and $322.6 \pm 103.9 \mu\text{mol/L}$ and $343.2 \pm 111.4 \mu\text{mol/L}$ in 2018 A.D. There was a significantly elevated level of the mean SUA level after Dashain festival in 2018 among both sexes (p-value <0.05). The age-wise distribution of mean SUA after the Dashain festival was consistent with increasing age among the study population.

Conclusion: The study concluded that the Dashain festival has an impact on increasing the SUA level.

Keywords: Serum Uric Acid, High Purine diets, Dashain festival

INTRODUCTION

Uric acid is the end product of purine metabolism.¹ Its level differs significantly within individuals as the result of high purine diet, conditions with high nucleic acid turnover and enzymatic defects in purine metabolism.²⁻⁴ Some studies have shown the intake of alcohol as one of the prime reasons for hyperuricemia.⁵ The consumption of meat products, sugar-sweetened drinks and other purine-rich foods have shown to be the reason for hyperuricemia, a condition of elevated Serum Uric Acid (SUA) level.^{7, 8} The higher prevalence of hyperuricemia has been shown among Nepalese population.^{9, 10} This condition has been associated mostly with dietary habits and other various clinical conditions.^{11, 12} The dietary pattern varies with different festivals celebrated in Nepal, among them Dashain is one of the national festivals celebrated for days by many ethnic groups wherein families gather annually.^{13, 14} This festival is celebrated with high intake of meat products, alcoholic and sugar-sweetened soft beverages (high purine content foods).¹⁵ The increased turnover of such foods during the celebration of the festival could be one of the reasons for the increased prevalence of hyperuricemia among the Nepalese population. Hence, this study was carried out aiming to investigate the distribution pattern of SUA level

before and after the Dashain festival among the Nepalese population visiting the tertiary hospital of Kathmandu, Nepal.

METHODS AND MATERIALS

This cross-sectional study was conducted among 5,818 different patients visiting Tribhuvan University Teaching Hospital (TUTH), Kathmandu before and after the Dashain festival for two consecutive years (2017 – 2018 A.D.). This study was aimed only to observe the distribution pattern of SUA a month before and after the Dashain festival. Thus, all patients seeking biochemistry laboratory services of TUTH during this study period were enrolled. The data of SUA levels were obtained from the Department of Biochemistry, TUTH, a month before Dashain (27 August – 27 September 2017 and 16 September – 16 October 2018) and a month after Dashain (6 October – 6 November 2017 and 25 October – 25 November 2018) for two consecutive years.

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The samples with incomplete patient detail, repeated samples, insufficient volume, hemolyzed, icteric and lipemic samples were excluded. The serum separation was carried out by centrifugation and the estimation of SUA was done by the uricase method (Giese Diagnostic kit) using a fully automated routine chemistry autoanalyzer (BT 3500, Biotechnica, Italy).¹⁶The result generated by the analyzer was validated by the daily use of three levels of internal quality control sera by Randox (USA). Ethical approval for this study was taken from the Institutional Review Committee (IRC) of the Institute of Medicine (IOM), Tribhuvan University.

The statistical analysis was done using SPSS version 21. Categorical variables were expressed in frequency and percentage whereas continuous variables were expressed as mean ± SD taking 95% confidence interval and p values of <0.05 was considered to be statistically significant. Mann-Whitney U test was used to compare the variables.

RESULTS

The mean age of the enrolled patients in the study was 44.7± 16.1 years with 50.10% being females. The gender-wise distribution of SUA levels is shown in Figure 1. The mild elevated mean SUA level was observed in the year 2017 with 333.5 ± 112.2 μmol/L before Dashain and 334.2 ± 114.7 μmol/L after Dashain.

Similarly, in the year 2018, the mean SUA level before and after Dashain was 322.6 ± 103.9 μmol/L and 343.2 ± 111.4 μmol/L respectively (at 95% CI).

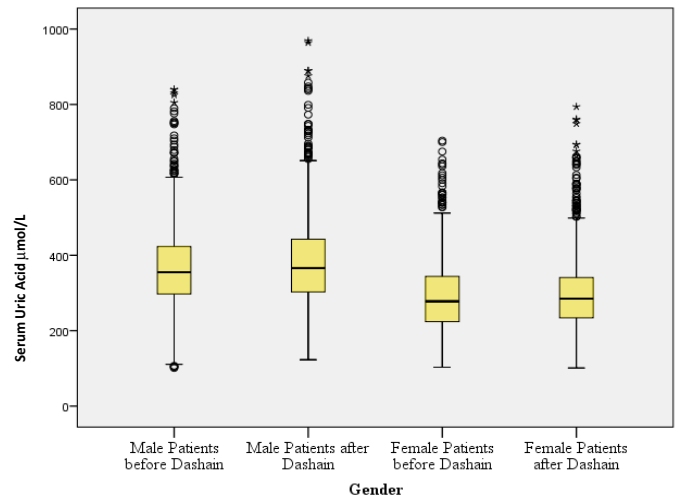


Figure 1: Gender-wise distribution of SUA a month before and after the Dashain festival.

The gender-wise mean SUA level before and after the Dashain festival among different patients visiting TUTH showed significantly elevated mean SUA level after the Dashain festival among both sexes in the year 2018 A.D with p-value <0.05, at 95% CI. However, the differences in the year 2017 A.D. were not statistically significant with p-value >0.05, at 95% CI. (Table 1.)

Table 1: The Mean SUA level before and after the Dashain festival for two years

Year	Sex	n	SUA μmol/L Mean ± SD	Mean Rank	p-value
2017	Before Dashain Males	714	369.5 ± 112.7	722.8	0.324
	After Dashain Males	753	378.9 ± 118.1	744.6	
	Before Dashain Females	670	295.2 ± 98.1	742.7	0.697
	After Dashain Females	805	292.3 ± 93.8	734.1	
2018	Before Dashain Males	697	359.8 ± 104.3	681.6	0.001*
	After Dashain Males	739	380.7 ± 111.7	753.3	
	Before Dashain Females	727	286.9 ± 90.1	685.3	0.001*
	After Dashain Females	713	304.3 ± 97.0	756.3	

** Mann-Whitney U test

The age-wise distribution of mean SUA level among different age groups of study population presented the increased level of mean SUA level after the Dashain festival (at 95% CI). (Table 2.)

Table 2: The age-wise distribution of mean SUA level before and after the Dashain festival

Age Group (Years)	Before Dashain (n)	SUA μmol/L Mean ± SD	After Dashain (n)	SUA μmol/L Mean ± SD
10 – 20	119	333.8 ± 96.2	126	330.4 ± 121.1
21 – 30	527	320.9 ± 104.8	531	333.1 ± 106.1
31 – 40	635	321.2 ± 105.1	631	336.9 ± 102.8
41 – 50	588	321.5 ± 108.5	651	324.2 ± 97.2
51 – 60	467	337.2 ± 107.0	526	342.6 ± 117.4
61 – 70	297	344.2 ± 102.1	325	354.9 ± 129.3

71 – 80	119	329.5± 108.9	159	358.8± 154.2
81 – 97	56	325.4 ± 121.2	61	396.4 ± 131.9
Total	2808		3010	

DISCUSSION

Among numerous festivals celebrated in Nepal, Dashain is the most anticipated festival with long days celebration among the Nepalese community by various ethnic groups. The rituals during this festival include a slaughter of animals and worshipping goddess at different holy places of Nepal.^{13,15} The festive foods during this festival include meat products and often includes alcoholic beverages among most of the ethnic groups. The festivity remains for weeks and these festive foods are potent to cause hyperuricemia. Hence, this study was carried out to endeavor the distribution pattern of SUA level a month before and after the Dashain festival among the Nepalese population. Since, the consumption of these high purine content diets, alcohol and sugar-sweetened soft beverages varies among both vegetarian and non-vegetarian populations, this study included both categories seeking laboratory service at TUTH during the study period for two consecutive years.

The findings of our study showed the increased mean SUA level after the Dashain festival for two consecutive years, however, the statistically significant elevated level was observed only in the year 2018 A.D. for both sexes. The change in consumption of purine-rich festive food might be the reason for significantly elevated SUA in the year 2018, however, due to the limitations in the study, the exact reason could not be established. In contrast to our findings, the higher prevalence of hyperuricemia was shown among men only by Kumar S. et. al. study in one of the districts of Nepal. A similar study by Singh P. et. al.¹⁰ in one of the regions of Nepal had concluded a higher prevalence of hyperuricemia among females than males.

The augmented consumption of alcoholic beverages and festive foods enriched with high purine content during the festival might be the reason for the elevated SUA level in our study after Dashain. The dietary influences of such foods causing hyperuricemia has also been concluded in the study by Makinouchi T. et. al.¹⁷ and Ryu K. A. et. al.⁸ In concordance to our study, the study done in Taiwan by Tsai Y. T. et. al.⁴ has shown the relationship between high purine content foods and hyperuricemia. Furthermore, a study done in Eastern Nepal by Yadav S.K. et. al.¹⁸ has shown alcohol consumption as one of the causative factors for hyperuricemia.

The study on the Chinese population by Villegas R. et. al.² had associated dietary habits with hyperuricemia wherein the consumption of high purine contents foods, vegetables and

meat products were the prime reason for hyperuricemia. This conclusion of the study has supported the findings of our study from both vegetarian and non-vegetarian populations. The higher consumption of meat products and other high purine content vegetables are both significantly associated with hyperuricemia which is also enhanced by alcoholic beverages. Similarly, the study done in the United Kingdom by Schmidt J. et. al.⁷ has associated SUA with dietary habits where the level of SUA was highest among vegans followed by meat eaters, fish eaters and vegetarians. In the study by Choi J. W. et. al.¹⁹ among American people, the finding represented the association of elevated SUA level with excessive consumption of sugar-sweetened soft drinks.¹⁹ These multiple studies had stated the role of various foods and drinks behind hyperuricemia that had buttressed the Dashain festive dietary habits of the Nepalese population attributing to an increasing level of uric acid post-Dashain.

The age-wise distribution of the mean SUA level in our study presented the elevated level of SUA among all age groups after the Dashain festival. The elevated mean SUA level after the Dashain festival was consistent with increasing age and might suggest the risk of hyperuricemia with festive food and aging. Nevertheless, the distribution of mean SUA levels was inconsistent with age before the Dashain festival.

CONCLUSION

From this study, we can conclude that the Dashain festival has an impact on increasing the SUA level.

LIMITATIONS

Since this was a single centered study and based on patients visiting a tertiary hospital, this study might not represent the entire community to set a definitive conclusion and recommendation. The detailed dietary and drinking habit during the festival, clinical history, medications and ethnicity, if included, could have strengthened the impact of the study. Moreover, the study was also conducted on different patients before and after the Dashain festival, if the same patients were followed after the festival with detail variables mentioned above, it would yield a concrete conclusion.

Conflict of Interest

We declare that we have no conflict of interest.

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