ISSN 0976 – 3333

Available Online at www.ijpba.info

International Journal of Pharmaceutical & Biological Archives 2014; 5(4): 56 - 59

ORIGINAL RESEARCH ARTICLE

Correlating sleep habit to blood pressure in the apparently healthy Nepalese adults

Amatya M[1], Gorkhali B[2], Islam MN[3], S Shrestha[4]

[1]PhD Scholar, Singhania University, Jhunjhunu, Rajasthan, India
[2]Department of Nursing, Nepal Medical College, Kathmandu, Nepal
[3]Department of Physiology, Chitwan Medical College, Chitwan, Nepal
[4]All Nepal College of Technical Education, Chabahil, Kathmandu, Nepal

Received 22 May 2014; Revised 04 Aug 2014; Accepted 14 Aug 2014

ABSTRACT

Introduction: Recent reports describe that excess as well as inadequate sleep is associated with adverse health effects such as hypertension and cognitive functions impairment. Both long and short term sleep deprivation have been demonstrated to cause increase in blood pressure in hypertensive as well as normotensive subjects. In Nepalese population, hypertension is reported to be highly prevalent and rising sharply. The relation between hypertension and sleep duration has not been studied in the Nepalese population.

Methods: In a cross-sectional descriptive study, blood pressure was measured and sleep habits were interviewed in 515 apparently healthy and ambulatory adult population in Kathmandu, the Nepalese capital city.

Results: Mean age of participants was 29.51years (SD 8.11, range 16-54), males comprised 74.4%. Mean sleep duration was 7.53 hours, 10% had less than 7 hours sleep and 7% had more than 9 hours sleep. Hypertension, prevalent by 12.38%, was not correlated with duration of sleep. A tendency to sleep deprivation was observed as 16.33% of systolic and 13.2% of diastolic hypertension cases were in less sleep group but none in excess sleep group.

Conclusion: Most of the Nepalese adults have about 8 hours of night sleep. Prevalence rate of hypertension in Nepalese adult population is low and is not correlated with sleep duration.

Key words: Hypertension, Nepalese adults, sleep duration.

INTRODUCTION

Most adults take a consolidated seven-hour sleep during the night.[1] Sleep is a circadian event that is recuperative and removes the feelings of fatigue, and also produces an improvement in cognitive ability; individuals then feel ready to face the rigors of a new day.[2]An association between sleep duration and mortality was first described over 40 years ago and since then, interest in sleep as a risk factor for adverse health has grown.[3] Generally, a U-shaped association between sleep and mortality has been reported by different studies. Individuals with both short and long sleep durations have a greater mortality risk than those with intermediate sleep durations. Recent works even suggest sleep duration of an individual to have predictive value in a number of diseases.[4,5] Several studies have found higher rates of mortality or coronary heart disease with both long (>8 hours/night) and short (<7 hours/night) usual sleep durations.[3,6-10] Short-term experimental sleep restriction for as little as 1 night has been reported to increase blood pressure in both healthy[11-13] and hypertensive subjects.[14] Gottlieb et al have reported an increased incidence of hypertension by usual sleep deprivation of less than eight hours per night, particularly by extreme deprivation of less than 6 hours per night.[15]

Typical daily sleep duration has been declining among adults in the United States for more than a generation, with median sleep duration falling from eight hours per night in the 1950s to seven hours per night in recent years, with more than one-third now sleeping fewer than seven hours per night.[16] Much of this reduction in sleep duration reflects voluntary sleep restriction, with nearly half of individuals reporting that they restrict sleep

Corresponding Author: Mrigendra Amatya, **Email:** amatyam01@gmail.com

in order to watch television, use the Internet, or work.[17] The same can be generally said of the population all over the world owing to the globalized and growing habit of watching television, using the Internet, and other similar screen-engaging activities.

In the Nepalese population, a very high prevalence rate of hypertension, about one-third of the population, has been reported recently.[18] Also, a very sharp rise in its prevalence is trending.[19] Researchers have explored associations and correlations with risk factors such as socio-economic status, smoking, alcohol, indoor staying physical activity, and associated metabolic conditions. This study explores the possible association between sleep habits and resting blood pressure in a sample population of Kathmandu, Nepal and is the first study of its kind in the Nepalese adults.

MATERIALS AND METHODS

A cross-sectional, descriptive study was conducted in the period of August-October, 2014 among the general population in the Nepalese capital city of Kathmandu. Apparently healthy and consenting adult people of either sex were selected and recruited by mixed random and convenience sampling techniques. Information on general characteristics and sleep habits was collected by verbal conversation. Information on sleep hours and patterns were based on participants' recall of average and typical weekdays. Participants were divided into three groups by sleep duration: less sleep (less than seven hours of night sleep), adequate sleep (7-9 hours of night sleep), and excess sleep (more than nine hours of night sleep).[20] Blood pressure was measured in sitting position from non-dominant arm, by using aneroid sphygmomanometer and stethoscope, and after providing 10 minutes of rest. Hypertension was determined as a systolic blood pressure (SBP) exceeding 140 mmHg and / or diastolic blood pressure (DBP) exceeding 90 mmHg.[21] Heart rate was measured by taking radial pulse for one minute. Confidentiality of information and measurements of the participants was assured.

Data tabulation and analysis was done by software SPSS version 11.5. Groups were compared by ANOVA and Chi square and strength of correlation was determined by Pearson's correlation coefficient with levels of significance set at 95%.

RESULTS

Of the total 515 participants, complete information on age, gender, heart rate, blood pressure, and sleep habits were obtained or measured for 361 (missing in 29.9%, n=154). Most participants were younger adults, had normal heart rate and blood pressure, and had adequate hours of night sleep (table 1). Males comprised 74.4% (n=383) and 25.6% (n=132) were female.

Table 1: General characteristics of participants

Characteristics	Number	Mean ± SD	Std.	Range
Age in years completed	486	29.51±8.111	0.37	38 (16-54)
Resting heart rate, per minute	464	79.13±9.567	0.44	80 (60-140)
Systolic blood pressure, mmHg	472	119.35±9.930	0.46	66 (90-156)
Diastolic blood pressure, mmHg	472	80.51±8.087	0.37	55 (56-111)
Bed time, hours & minutes	434	9.58±1.01	0.04	11.5(1.0-12.5)
Wake up time, hours & minutes	430	5.57±1.02	0.03	9.5 (2.5-12.0)
Total sleep, hours & minutes	428	7.53±1.05	0.01	8.0 (4.0-12.0)

Table 2: Comparison of heart rate and blood pressure in different sleep groups

Groups by sleep duration	HR (mean ± SD)	SBP (mean ± SD)	DBP (mean ± SD)
Less sleep	80.91±9.194	120.18±11.275	80.12±8.044
Adequate sleep	78.65±9.423	118.75±9.880	80.34±8.131
Excess sleep	80.97±14.568	116.63±7.942	77.19±8.126
Total	79.03±9.921	118.70±9.869	80.06±8.148

Table 3: Prevalence of hypertension in different sleep groups

Blood Pressure (mmHg)		Less sleep	Adequate	Excess sleep	Total (%)
Systolic	Normal	32	315	32	379 (88.55%)
	Hypertension	8 (16.33%)	41 (83.67%)	0	49 (11.45%)
Diastolic	Normal	33	310	32	375 (87.62%)
	Hypertension	7 (13.2%)	46 (86.8%)	0	53 (12.38%)

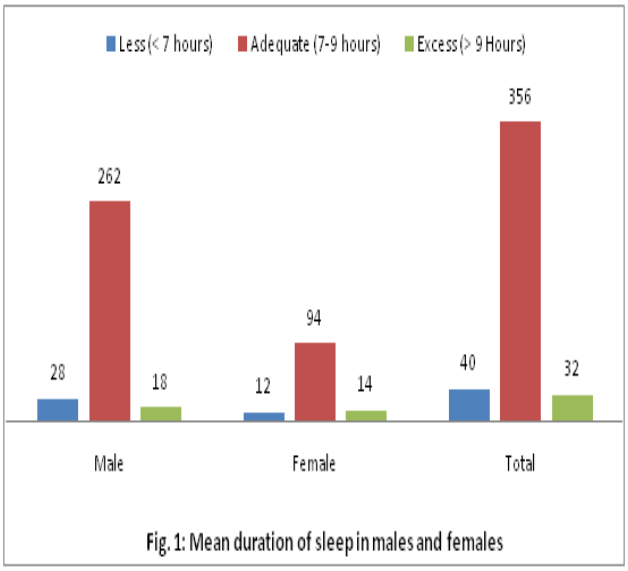

Fig. 1: Mean duration of sleep in males and females

While most had a mean duration of nearly 8 hours of night sleep, about 10% had less sleep and over 7% had excess sleep (fig 1). Mean duration of sleep was comparable in males and females, but

the percentage of females having more than 9 hours sleep was more than in males.

The cardiovascular parameters were compared in the groups of participants having less, adequate, or excess sleep duration. While blood pressures seemed lower in those having excess sleep and SBP higher in the group with less sleep, none of the differences were of statistical significance (table 2). Also by Pearson's correlation, duration of sleep had negative correlation with age, SBP, and DBP but not to the extent of statistical significance. Only age had a significantly strong correlation with SBP (Pearson's coefficient = 0.138, p value = 0.003).

The overall prevalence of systolic hypertension (SBP > 140 mmHg) and diastolic hypertension (DBP > 90 mmHg) were 11.45% and 12.38% respectively (table 3). None of the participants having more than 9 hours sleep had hypertension while 16.33% of systolic hypertension and 13.2% of diastolic hypertension cases were in the less sleep group.

DISCUSSION

Recent reports of very high and sharply increasing prevalence rate of hypertension in the Nepalese community[18,19] and the association of inadequate sleep duration with hypertension prompted this study.[9-11] Apparently healthy and ambulatory Nepalese adults were asked of their sleep habits and their resting heart rate and blood pressures were measured. Our results showed that 11.45% of the population had systolic hypertension (resting SBP > 140 mmHg) and 12.38% had diastolic hypertension (resting DBP > 90 mmHg), which are very low figures as compared to the cited reports. The plausible reason for this difference in prevalence could be the sampling error. The cited studies were based on household surveys and included older population while we had recruited only the ambulatory population with a younger age averaging 29.5 years.

A spectrum of sleep hours and habit were reported by the participants. Most of the participants had an adequate duration of night sleep. This was a cross-sectional study, but the impact of television viewing and engaging in other screen activities such as mobile gaming and computer use on individual sleep habits was highlighted by many of the respondents. Most of the hypertensive participants were in the adequate sleep group but none of the participants in excess sleep group had hypertension. Some hypertensive participants were in the less sleep group and this observation supports the other studies that less sleep increases blood pressure. However, the association of less sleep to higher blood pressure could not be established statistically in this study. We hadgrouped the participants into only two groups (normotensive or hypertensive) and therefore, the spectrum the blood pressure distribution was not considered.Most of the hypertensive participants had blood pressure only slightly higher than this value. This could be the reason for the statistically weak association of less sleep to hypertension.

The findings of this study may be limited by the cross-sectional model of the study, participation by only ambulatory people, and the information on sleep habits being entirely based on the individual's recall of an average sleep. We recommend a more detailed and structured enquiry into sleep habits and hours of individuals to improve the quality and extent of information. Likewise, measurement of blood pressure several times in a day would be desirable to minimize the effects of different activities the participants were possibly engaged in before entering the study. Finally, as hypertension is labeled as a disease or condition of multifactorial causation, evaluating the role of sleep in the context of several other physiochemical and psychological conditions, both long and short terms, is desirable.

CONCLUSION

The prevalence of hypertension in the ambulatory adult Nepalese population is low. Most people have an adequate duration of night sleep. An association between blood pressure and sleep duration was explored in this study, for the first time in the adult Nepalese population, but could not be established statistically.

REFERENCES

1. Ancoli-Israel S, Ayalon L, Salzman C. Sleep in the elderly: normal variations and common sleep disorders. Harv Rev Psychiatry 2008; 16:279-286.
2. Waterhouse J, Fukuda Y, Morita T. Daily rhythms of the sleep-wake cycle. Journal of Physiological Anthropology 2012; 31:5. http://www.jpjphysiolanthropol.com/content/31/1/5.
3. Hammond EC. Some preliminary findings on physical complaints from a prospective study of 1,064,004 men and women. Am J Public Health Nations Health 1964; 54:11-23.
4. Gangwisch JE, Heymsfield SB, Boden-Albala B, *et al*. Short sleep duration as a

risk factor for hypertension: analyses of the first National Health and Nutrition Examination Survey. Hypertension 2006; 47:833-839.

5. Patel SR, Hu FB. Short sleep duration and weight gain: a systematic review. Obesity 2008; 16(3):643-653. DOI:10.1038/oby.2007.118.
6. Wingard DL, Berkman LF, Brand RJ. A multivariate analysis of health-related practices: a nine-year mortality follow-up of the Alameda County Study. Am J Epidemiol 1982; 116:765-75.
7. Enstrom JE, Kanim LE, Breslow L. The relationship between vitamin C intake, general health practices, and mortality in Alameda County, California. Am J Public Health 1986; 76:1124-30.
8. Kripke DF, Garfinkel L, Wingard DL, Klauber MR, Marler MR. Mortality associated with sleep duration and insomnia. Arch Gen Psychiatry 2002; 59:131-6.
9. Ayas NT, White DP, Manson JE, et al. A prospective study of sleep duration and coronary heart disease in women. Arch Intern Med 2003; 163:205-9.
10. Patel SR, Ayas NT, Malhotra MR, *et al*. A prospective study of sleep duration and mortality risk in women. Sleep 2004; 27:440-4.
11. Lusardi P, Mugellini A, Pretti P, Zoppi A, Derosa G, Fogari R. Effects of a restricted sleep regimen on ambulatory blood pressure monitoring in normotensive subjects. Am J Hypertens 1996; 9:503-5.
12. Kato M, Phillips BG, Sigurdsson G, Narkiewicz K, Pesek CA, Somers VK. Effects of sleep deprivation on neural circulatory control. Hypertension 2000; 35:1173-5.
13. Meier-Ewert HK, Ridker PM, Rifai N, *et al*. effect of sleep loss on C-reactive protein, an inflammatory marker of cardiovascular risk. J Am Coll Cardiol 2004; 43:678-83.
14. Lusardi P, Zoppi A, Preti P, Pesce RM, Piazza E, Fogari R. Effects of insufficient sleep on blood pressure in hypertensive patients: a 24-hour study. Am J Hypertens 1999; 12:63-8.
15. Gottlieb DJ, Redline S, Nieto FJ, *et al*. Association of usual sleep duration with hypertension: the sleep heart health study. SLEEP 2006; 29(8):1009-1014.
16. Sleep in America Poll 2003. Washington: National Sleep Foundation; 2003.
17. Sleep in America: 2000. Washington: National Sleep Foundation; 2000.
18. Sharma SK, Ghimire A, Radhakrishnan J, *et al*. Prevalence of hypertension, obesity, and metabolic syndrome in Nepal. International Journal of Hypertension 2011; Article ID 821971, 9 pages. http://dx.doi.org/10.4061/2011/821971.
19. Vaidya A, Pathak RP, Pandey MR. Prevalence of hypertension in Nepalese community triples in 25 years: a repeat cross-sectional study in rural Kathmandu. Indian Heart Journal 6402 (2012) 128-131.
20. Sleep Health Foundation. Sleep needs across life span. e-Brochure 2011. www.sleephealthfoundation.org.au.
21. US Department of Health and Human Services. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7). National Institute of Health. NIH publication no. 03-5231, May 2003.