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Assessment of life style and psychosocial factors in hypertensive vs normotensive individuals

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Despite the growing number of evidences on the efficacy of lifestyle modifications in the control of blood pressure, the approach is less frequently adopted by hypertensive patients. The aim of the present study was to assess the modifiable life style factors in diagnosed hypertensive patients as compared with healthy counterparts. A total of 300 male and female subjects were enrolled in the study which were further grouped as normotensives (n=150) and hypertensive (n=150) subjects. A self-administered questionnaire was given to the patients to obtain the sociodemographic information, anthropometric measurements and lifestyle factors such as physical activity, sleeping habits, addiction, family and medical history, time management and stress. Global physical activity questionnaire, Epworth sleepiness scale, time management scale and Holmes Rahe stress scale were used to assess physical activity, excessive daytime sleepiness, time management and stress respectively. The present study showed low level of perception regarding the healthy life style behaviors ($p < 0.05$). There were higher occurrences of sedentary life style ($p < 0.05$), physical inactivity ($p < 0.05$), obesity ($p < 0.05$), sodium intake ($p < 0.05$), stressful behavior ($p < 0.05$), and sleep disturbances ($p < 0.05$) while no significant differences were observed in smoking and time management ($p > 0.05$) in hypertensive patients than controls. This study signifies a significant positive association between modifiable life style factors and risk of hypertension. Increased physical activity, healthy eating behavior, improved sleeping habits, stress management and weight control could be the effective medical approach to control the level of blood pressure and to prevent the tendency of future comorbidities.

Keywords: Hypertension, modifiable life style factors, stress, comorbidities

INTRODUCTION

The preponderance of hypertension is approximated to be about 26% globally with maximum cases in developing regions. Globally high blood pressure is the foremost cause of early mortality; therefore hypertension is also named as "silent killer" (Sa'adeh, Darwazeh, Khalil, and Zyoud, 2018). Recent studies have found two thirds of hypertensive patients in Asian countries. Progression of syndrome is strongly related with elevated systolic blood pressure, high pulse pressure, senescence and the pervasiveness of

heart and vascular pathologies (Jr, Levy, and Black, 2000). Current approximation exhibits that globally, almost 1 billion humans encounter hypertension. Nevertheless by 2025, this figure is presumed to enhance to 1.56 billion individuals surviving with hypertension (Ezejimofor, et al., 2018).

Hypertension is defined as a condition when systolic blood pressure is more than or equal to 140 mmHg and diastolic blood pressure is more than or equal to 90 mmHg (Mihardja, et al., 2018). The classification/stages of hypertension include

Normal blood pressure: <120/<80 mmHg, Elevated blood pressure: 120/<80 to 129/<80mmHg, Stage 1 hypertension: 130/80 to 139/89 mmHg, Stage 2 Hypertension: \geq 140/90mmHg (Flynn, et al., 2017).

Hypertension affects multiple organ system and enhances the chances of organ destruction and early mortality (Anand et al., 2018). Risk of having cardiovascular diseases and deaths enhanced significantly in Diabetes mellitus and the chances of having repetitive myocardial infarction and cardiac arrest is nearly 26% higher in diabetics than in non-diabetics (Chaddha, Smith, Palta, and Johnson, 2018). Framingham Heart Study indicated that the occurrence of hypertension is nearly two fold in obese people as compared to non-obese and a number of studies have explained that sluggishness is linked with higher risk of hypertension, stroke, diabetes mellitus, cardiac disorders, cancer, metabolic syndrome and death (Kokubo, 2014). Evidence indicates that the risk of high blood pressure knot in families. Hence a strong marker of hypertension risk is the family history (Al-Farsi, Zakwani, Elshafie, and Woodhouse, 2018). Until menopause, the occurrence of hypertension is less in women as compared to men (Reckelhoff, 2018)

One of the known factors that plays an important role in the development and aggravation of hypertension is intellectual stress that is sensed by the brain and produce neuro-endocrine reaction in either a quick or ever-lasting aspect. The strongest risk factor for heart and vascular diseases is high blood pressure and an important step to prevent it is appropriate modifications in lifestyle (Kokubo, 2014). Lifestyle modifications along with medications are capable for the effective management of majority of hypertensive cases (Kielty et al., 2018). The treatment of hypertension is associated with a number of threats because these drugs can stop heart diseases, the estimate of B.P management has been deficient (Hozawa, 2011). Recently, 6 items that are recommended in 2017 high blood pressure clinical practice guidelines as non-pharmacological treatment are DASH diet, decreased Na intake, intake of potassium supplements, increased exercise, weight loss and decreased alcohol intake (Bando et al., 2018). Sodium intake and obesity are the strong risk factors of hypertension. Worldwide the cause for approximately 1.65 million cardiovascular mortality per year is extra sodium utilization because majority people of the world uses greater

amount of salt than their requirements (Frieden and Jaffe, 2018). Mortalities which are related to cerebrovascular and cardiovascular diseases can be effectively lessen by early diagnosis and proper management of high blood pressure (Deshpande and Chaudhary, 2018) but globally 9.4 million mortalities /year occur because of hypertensive complications and this large number clearly point out the need for further betterment of hypertensive management (Lebeau et al., 2018). Smoking is another strong independent risk factor of hypertension which can cause sharp rise in B.P and heart rate. Smoking also causes elevated ambulatory B.P in smokers. Physical activity is associated with decreased systolic blood pressure, body weight, waist circumference and insulin resistance and increased HDL-C levels (Huang, Duggan, and Harman, 2008). Numerous studies have shown the higher prevalence of excessive day time sleepiness in hypertensive patients. EDS most commonly occurs due to sleep apnea, insufficient sleep duration, illicit use of drugs and by some medical or psychiatric conditions. EDS has been estimated to affect 37% of the US adult population. Several studies report the presence of EDS as an independent risk factor in hypertensive patients. EDS could be a result of alcohol intake, obesity, age, and physical activity which are also the known risk factors of hypertension (Williams et al., 2014).

The aim of the present research study was to investigate the healthy life style behaviours in hypertensive patients.

MATERIALS AND METHODS

The current study was ethically approved from the Institutional Health Research Ethics. This case control study was conducted in two public health hospitals for a period of 6 months. The size of the study group recruited for the research was calculated using the Open Epi calculator. A total of 300 patients, with a mean age of 45 years were enrolled into the study. Of all patients, 50% were female and 50% were male. Selection of the subjects was done by simple random sampling. The subjects selected were further grouped as normotensive individuals (n=150) and hypertensive individuals (n=150). The hypertensive subjects who were on medical treatment were included in the study whereas those hypertensive subjects who had cognitive disturbances were excluded from the study. Life style modification was taken as the dependent variable while socio-economic variables, gender, duration of diagnosis of hypertension, family

history and other co morbidities were taken as independent variables.

STUDY TOOLS:

A suitably designed and validated questionnaire was used to collect data consisted of questions to find the relation of healthy and unhealthy lifestyle interventions on the progression of hypertension. The questionnaire was filled in at face to face interview along with written informed consent. The questionnaire have questions related to age, sex, marital status, diet, salt intake, addictive behaviours, smoking and alcohol intake, family history, knowledge of

disease, life style modification, adherence to prescribed medications or drug compliance. Anthropometric measurements were done by Body mass index, waist circumference and waist hip ratio. Lifestyle modification was assessed in each patient based on lifestyle behaviors such as physical activity, nutrition status, sleep habits, time management skills and stress management which were evaluated by using Global physical activity questionnaire, Epworth sleepiness scale, Time management scale and Holmes and Rahe stress scale respectively.

Table1: Health risk variables among normotensive and hypertensive patients

Characteristics	Normotensives	Hypertensives	Pearson Chi ²	P value
BMI				
Under weight	7	6	11.45	0.01
Normal weight	57	31		
Over weight	70	93		
Obese	16	20		
Waist Circumference			20.86	<0.01
Normal	82	43		
High	68	107		
Waist Hip Ratio			1.45	0.48
Normal	75	85		
High	75	65		
Physical Activity			69.71	<0.01
Low Physical Activity	48	113		
Moderate Physical Activity	90	21		
Intense Physical Activity	12	16		
Salt Intake				
Low	17	37	11.44	0.003
Normal	114	104		
High	19	9		
Excessive Daytime Sleep				
Enough Sleepiness	86	46	26.21	<0.01
Excessive Sleepiness	60	85		
Dangerously Sleepiness	4	19		
Time Management				
Ill Time Management	88	108	6.35	0.09
Fair Time Management	47	30		
Good Time Management	10	9		
Excellent Time Management	5	3		
Stress				
Mild Stress	87	48	20.57	<0.01
Moderate Stress	53	84		
Severe Stress	10	18		

p: p value compared between Hypertensive and Normotensive groups (Chi square Test) Significance was considered at the level of $p \leq 0.01$

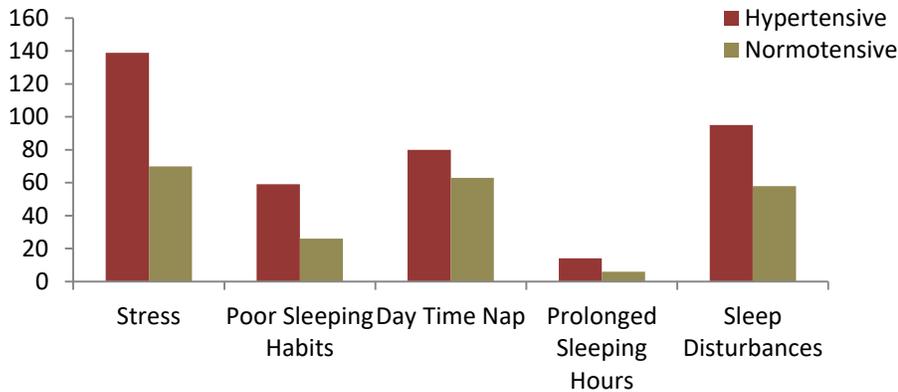


Figure 1: Comparison Chart for Comparing Stress, Sleep Pattern and Quality

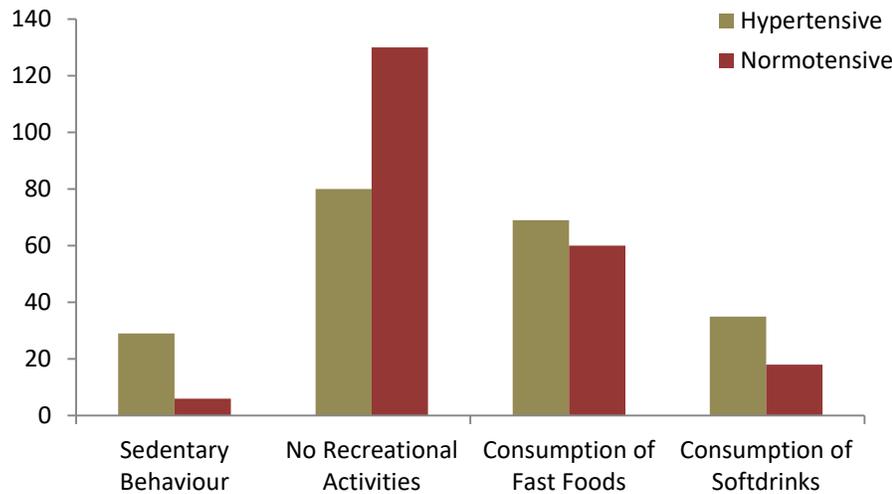


Figure 2: Life Style and Diet Trends in Normotensive and Hypertensive Group

Data were analyzed by using Statistical software SPSS, version 20. Descriptive statistics expressed as mean, percentages and frequencies were used to describe the sample. Associations among qualitative variables of the study were evaluated using Chi square test. P<0.05 was considered as statistically significant.

RESULTS

Our study showed that out of 150 samples in hypertensive patients the mean systolic blood pressure was 148mm/Hg while diastolic blood pressure was found to be 92mm/Hg. Overall, 75.3

% of the hypertensive patients were overweight and obese, 71.3% had higher waist circumference and 43.3 % had high waist hip ratio. 75.3% reported the sedentary life style or physical inactivity, 70% had no recreational activities, 28% had poor sleeping habits while 50.7% of patients showed family history of hypertension.

As presented in Table 1, there was a significant difference in BMI, waist circumference, physical activity, high salt intake, excessive daytime sleepiness and occurrence of stress p< 0.05) in hypertensive subjects than those of normotensives. Unhealthy diet with consumption

of fast food and soft drinks were higher in hypertensive patients but were insignificant. Waist hip ratio and time management did not show significant results ($p < 0.05$). The results shown that hypertensive patients were more prone to poor sleeping habits than control group. Moreover, normotensive subjects were tending to better life style strategies compared to hypertensive subjects.

DISCUSSION

Our study showed that hypertensive patients were found to be unable to achieve the recommended B.P range (140/90 mmHg). Gender was not associated with the presence of hypertension. In the present study we examined the influence of several life style factors on the presence of hypertension. This study found the excessive daytime sleepiness (EDS) in hypertensive patients than controls ($p < 0.05$). To date in hypertensive patients, none of the studies have investigated the role of EDS, ill time management and poor medication adherence in hypertensive patients. The present study has also reported obstructive sleep apnea, insufficient sleep, and poor sleep quality in these patients.

A study conducted by Williams et al (2014) reported the strong relationship of excessive day time sleepiness with the medication non-adherence to prescribed medications. Most of the hypertensive patients in our study did not show the adherence to medication which is consistent with the previous studies suggesting the possible relationship of medication non-adherence to EDS but the exact mechanism underlying this association is not clearly understood. Few studies have linked the cognitive impairment and presence of co morbidities to be the one cause of this association (Ohayon, Guilleminault, Priest, Zully, and Smirne, 2000; Williams et al., 2014). Awareness of the hypertension and modification in life style could result in the prevention and management of hypertension. The patients in our study were from middle socioeconomic background with low illiteracy rates which is also a contributing factor in the attitude and behavior towards the disease. Previous researches found the higher incidence of hypertension in illiterate subjects.

Exercise has numerous benefits in the management of B.P and its consequent conditions. Improvement in physical activity, BMI and diet has been shown to ameliorate the risk of cardiovascular problems (Bollampally et al., 2016). The present study showed the significant

association of sedentary life style and lack of regular exercise with hypertension ($p < 0.05$) which are in line with the results of recent studies. High sodium intake in hypertensive patients is observed which can further increase the risk of future cardiovascular complications in these patients. According to WHO guidelines, in patients with high BMI body weight should be normalized whereas Salt intake should not be greater than 1.5g sodium/ day (Rust and Ekmekcioglu, 2017).

Exposure to chronic psychosocial stress can also be a major confounding factor in hypertension (Hu et al., 2015). A growing body of literature shows that low socioeconomic status, occupational stress, social isolation, marital stress and racial discrimination can have a major impact on the development of hypertension (Liu, Li, Li, & Khan, 2017). This study also observed that stress is significantly associated with hypertension ($p < 0.05$) which is in concordance with the recent researches showing positive correlation of hypertension with physical and functional cognitive decline and dementia (Czuriga-Kovacs, Czuriga, and Csiba, 2016; Fellows and Schmitter-Edgecombe, 2018).

In our analysis, BMI and waist circumference have shown significant association with the incidence of hypertension. These findings were consistent with the previous studies demonstrating higher BMI and waist circumference in hypertensive patients. Higher BMI, WC and WHR are significantly associated with the incidence of hypertension (Xiao et al., 2016). Improvement in physical activity, BMI and diet has been shown to ameliorate the risk of cardiovascular problems (Diaz-Martinez et al., 2018). Waist hip ratio is not found to be significantly associated with hypertension in our study. Some studies have shown that waist circumference exhibit a strong influence on hypertension than waist hip ratio. Fast food consumptions and usage of soft drinks are also found to be higher in hypertensive patients but they failed to reach significance. Out of home eating and junk food consumption is associated with weight gain, hypertension, cardiovascular diseases and metabolic syndrome (Bahadoran, Mirmiran, and Azizi, 2015). Excessive intake of added sugars especially in soft drinks directly contributes in the elevation of blood pressure (He and MacGregor, 2015; Souza Bda, Cunha, Pereira, and Sichiari, 2016).

CONCLUSION

The current study suggested that the physical

inactivity, urbanised sedentary life style, obesity, high intake of added sugars and salt, exposure to persistent stress and sleep disturbances like EDS are believed to be associated with increased risk of hypertension. There should be screening for sleep related disturbances particularly EDS in hypertensive patients. Other than obesity and diabetes the associated co morbidities such as sleep and stress should also be included in the management of hypertension. Patient's adequate knowledge, awareness and positive attitude with improved medication compliance will have major benefits in hypertensive patients.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

UF and AB designed the study, performed data collection, data analysis and revised the manuscript. MS, MI and GY performed statistical analysis of data, literature review and wrote the manuscript. All authors read and approved the final version.

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REFERENCES

Al-Farsi, Y. M., Zakwani, A. A., Elshafie, O., & Woodhouse, N. J, 2018. Preliminary study to establish the prevalence of familial hypertension in Oman. *European Journal of Basic and Clinical Medical Sciences*, 1(1), 5-9.

Anand, T., Shaffi, M., A, M. P., Rajendrakumar, A. L., Sreemathy, L., Nayar, K. R., et al, 2018. Prevalence of hypertension and prehypertension among a coastal population

in South India: Baseline findings from a population-based health registry project in Kerala. *Elsevier*, 155, 107-109.

- Bando, M., Fujiwara, I., Imamura, Y., Takeuchi, Y., Hayami, E., Nagao, N., et al, 2018. Lifestyle habits adjustment for hypertension and discontinuation of antihypertensive agents. *Journal of Hypertension*, 7(1), 1-7.
- Bazan , I., Marshall, J., Kim, S. -J., Shan, P., & Lee, P, 2018. Mitochondrial Proteins Regulate Experimental Pulmonary Hypertension. *ATS Journals*, 197.
- Bu, L., Huo, C., Xu, G., Liu, Y., Li, Z., Fan, Y., et al, 2018. Alteration in brain functional and effective connectivity in subjects with hypertension. *Frontiers in Physiology*, 9(669).
- Chaddha, A., Smith, M. A., Palta, M., & Johnson, H. M, 2018. Hypertension control after an initial cardiac event among Medicare patients with diabetes mellitus: A multidisciplinary group practice observational study. *J Clin Hypertens*, 20, 891-901.
- Demeulenaere , M., Devreese , K., Vanbelleghem , H., De Zaeytijd , J., Vande Walle , J., Van Biesen , W., et al, 2018. Thrombomodulin and endothelial dysfunction: A disease-modifier shared between malignant hypertension and atypical hemolytic uremic syndrome. *Nephron*, 1-13.
- Deshpande, A. V., & Chaudhary, S. M, 2018. Prevalence of hypertension amongst spouses in urban area of Nagpur city, Maharashtra, India. *International Journal of Community Medicine and Public Health*, 5(4), 1381-1384.
- Ezejimofor, M., Uthman, O., Chen, Y. F., Ezejimofor, B., Ezeabasili, A., Stranges, S., et al, 2018. Magnitude and pattern of hypertension in the Niger Delta: A systemic review and meta-analysis of community-based studies. *Journal of global health*, 8(1), 1-13.
- Flynn, J. T., Kaelber, D. C., Baker-Smith, C. M., Blowey, D., & Carroll, A. E, 2017. Clinical practice guideline for screening and management of high blood pressure in children and adolescents. *Pediatrics.*, 140(3), 1-72.
- Frieden, T. R., & Jaffe, M. G, 2018. Saving 100 million lives by improving global treatment of hypertension and reducing cardiovascular disease risk factors. *J Clin Hypertens*, 20, 208-211.
- Hozawa, A, 2011. Attributable fractions of risk

- factors for cardiovascular diseases. *J Epidemiol*, 21(2), 81-86.
- Jr, J. L., Levy, D., & Black, H. R., 2000. Importance of systolic blood pressure in older Americans. *Hypertension Journal of the American Heart Association*, 35, 1021-1024.
- Kielty, H., Casey, M., Glynn, L., Molloy, G., Durand, H., Newell, J., et al, 2018. Apparent treatment resistant hypertension: A feasibility study. *Journal of Medical Students, Galway*, 4, 17.
- Kokubo, Y, 2014. Prevention of hypertension and cardiovascular diseases: A comparison of lifestyle factors in Westerners and East Asians. *Hypertension Journal of the American Heart Association*, 63, 655-660.
- Lebeau, J.-P., Biogeu, J., Carré, M., Mercier, A., Auger, I. A., Rusch, E., et al, 2018. Consensus study to define appropriate inaction and inappropriate inertia in the management of patients with hypertension in primary care. *BMJ Open*, 1-11.
- Mihardja, L., Delima, D., Massie, R. G., Karyana, M., Nugroho, P., & Yunir, E, 2018. Prevalence of kidney dysfunction in diabetes mellitus and associated risk factors among productive age Indonesians. *Journal of Diabetes & Metabolic Disorders*, 53-61.
- Munakata, M, 2018. Clinical significance of stress-related increase in blood pressure: Current evidence in office and out-of-office settings. *Hypertension Research*, 41, 553-569.
- Reckelhoff, J. F, 2018. Gender differences in hypertension. *Current Opinion in Nephrology and Hypertension*, 27(3), 176-181.
- Rimoldi, S. F., Scherrer, U., & Messerli, F. H, 2014. Secondary arterial hypertension: When, who, and how to screen? *European Heart Journal*, 35, 1245-1254.
- Sa'adeh, H. H., Darwazeh, R. N., Khalil, A. A., & Zyoud, S. H, 2018. Knowledge, attitudes and practices of hypertensive patients towards prevention and early detection of chronic kidney disease: A cross sectional study from palestine. *Clinical Hypertension*, 24(6), 1-13.
- Singla, R., Singh, H., Gupta, A. K., & Sehgal, V. K, 2018. A study of anti-hypertensive drug prescription patterns in hypertensive post-menopausal women. *Int J Med and Dent Sci*, 7(1), 1594-1603.
- Staff, A. C., & Dechend, R, 2018. Preeclampsia: What does the brain tell us? Can we blame the eclampsia risk on a malperfused placenta? *Hypertension Journal of the American Heart Association*, 72, 65-67.
- Stevens, S. M., Rizk, H. G., Golnik, K., Andaluz, N., Samy, R. N., Meyer, T. A., et al, 2018. Idiopathic intracranial hypertension: Contemporary Review and Implications for the Otolaryngologist. *The Laryngoscope*, 128, 248-256.
- Vinke, P., Jansen, S. M., Witkamp, R. F., & Norren, K. v, 2018. Increasing quality of life in pulmonary arterial hypertension: Is there a role for nutrition? *Springer*.