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A STUDY ON LIFESTYLE FACTORS AND NUTRITIONAL STATUS OF HYPERTENSIVE SUBJECTS

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ABSTRACT

To study the lifestyle factors and nutritional status of hypertensive subjects. One twenty (120) patients were selected from Punjab Agricultural University Hospital, Ludhiana in the age group of 45 to 60 years including (60 male and 60 female). It was found that age was one of the important risk factors contributing towards hypertension. Further it was also reported that majority of the selected subjects i.e. 85% of males and 93.3% of females were from urban areas. Sedentary lifestyle and stress at home place were also found to be the major risk factors of prevalence of hypertension. Among dietary factors percent adequacy of fats and oils among the selected subjects was found to be very high i.e. 152.4 and 194.5% among males and females respectively. This could be one of the major factors contributing to prevalence of hypertension.

Keywords: Hypertension, Lifestyle, Stress and Blood Pressure

INTRODUCTION AND REVIEW OF LITERATURE

Hypertension (HTN) is an increasingly important medical and public health issue. The progress of both developed and developing nations at the cost of healthy lifestyle of their people leads to stress, sleeplessness, sedentary lifestyle, increased intake of alcoholic beverages and processed foods. Therefore, because of such drastic lifestyle changes, it is one of the most important life-threatening conditions in the world[1]. The World Health Organization (WHO) has estimated that about 62% of cerebrovascular disease and 49% of ischemic heart disease burden worldwide are attributable to suboptimal blood pressure levels (systolic blood pressure (SBP) > 115mmHg). In addition, hypertension is the topmost risk factor for death worldwide[2]. The WHO report states that a 2% reduction in diastolic blood pressure could prevent 3, 00,000 deaths from CVD by 2020[3]. The proportion of hypertension steadily increases with age, being highest in 40-55 years group. The onset of hypertension was maximum in the age group of above 46 years. With aging the arteries become less elastic, leading to increase in blood pressure[1]. Body Mass Index (BMI) has also been significantly and independently associated with blood pressure levels. The association between body mass index and hypertension was greater in men

under 45 years of age in whom a maximum of 60% of hypertension could be attributed to being overweight. In both men and women receiving antihypertensive treatment, body mass index was positively associated with blood pressure. Overweight individuals with hypertension were less likely to achieve normal blood pressure on treatment[1]. A study on 8302 men and 9139 women of age group 25 to 64 years, with a follow up of 11 years, having no history of antihypertensive drug use, coronary heart disease, stroke, and heart failure at baseline (1600 incident cases of drug-treated hypertension), concluded that regular physical activity and weight control could reduce the risk of hypertension and there was equal protective effect of physical activity in both sexes regardless of the level of obesity[1]. Junk food consumption increased the risk of both general and abdominal obesity; therefore, consumption of junk food should be reduced via restricting TV advertisements and increasing taxes on junk foods[1]. In India, hypertension in general population is largely undetected and very scanty information is available regarding the nutritional status and lifestyle factors in the hypertensive subjects of age group 45-60 years. Therefore, keeping in mind the increasing prevalence of hypertension and the previous available data, the study was planned with the objective of studying the nutritional status and lifestyle factors of selected hypertensive subjects.

MATERIALS AND METHOD

Selection of Subjects

The subjects comprised statistically adequate sample of one hundred and twenty (120) hypertensive patients attending OPD at PAU, Ludhiana hospital. The sample was selected from the PAU hospital using the purposive sampling technique. The subjects comprised statistically adequate sample of one hundred and twenty (120) hypertensive patients attending, PAU, Ludhiana hospital. The sample was selected from the PAU hospital using the random sampling technique.

Inclusion Criteria: Age group 45 to 60 years, both sexes (male and female), diagnosed with hypertension, able to communicate and accept to participate in the study.

Exclusion Criteria: Hypertensive patients free from other associated diseases such as diabetes mellitus and renal diseases.

Locale of Study

The present study was conducted in the outpatient department of the hospital of the Punjab Agricultural University, Ludhiana, Punjab. This hospital was purposely selected because it has no dietary department and that the impact of researcher's counselling could be studied unbiased.

Selection of Subjects

The subjects comprised statistically adequate sample of one hundred and twenty (120) hypertensive patients attending, PAU, Ludhiana hospital. The patients had been selected according to the following criteria: age 45 to 60 years, both sexes (male and female), diagnosed with hypertension, able to communicate, accept to participate in the study, free from other associated diseases such as diabetes mellitus and renal diseases. The sample was selected from the PAU hospital using the random sampling technique.

Study Tool Used: Questionnaire

A well structured Questionnaire/ Interview Schedule was developed to elicit the demographic information, lifestyle related information, health record, **anthropometry,** clinical assessment, dietary intake and physical activity pattern.

Pilot Testing

A pilot of 10 subjects was undertaken for pretesting the questionnaire. Thereafter,

necessary modifications were incorporated. The modified questionnaire was then used in the present study. These respondents were excluded from the final sample.

Measurement of Blood Pressure

The blood pressure (BP) readings of the subjects were taken from their medical files. The blood pressure was checked with a sphygmomanometer by the physician and the nurse of the hospital.

Biochemical Assessment

In biochemical assessment, blood cholesterol profile of the subjects was noted from their medical files. It was assessed in the hospital laboratory.

Dietary intake

In order to assess the dietary intake of the subjects, a dietary survey was carried out by using "24 hour recall method" for three consecutive days. The daily intake of nutrients was calculated by using Indian Nutrition Software Diet Cal-A Tool for Dietary Assessment and Planning[8]. The food intake was compared with suggested dietary intake for balanced diet recommended by ICMR (2010) while nutrient intake was compared with Dietary Recommended Allowances (RDA) of ICMR (2010)[9].

Physical activity pattern

PADM (Physical Activity Diary Method) was used to record the time spent on different activities of the day during which the dietary survey was carried out. Physical Activity Ratio (PAR) given by FAO/WHO/UNU (2004) was used to calculate Physical Activity Level (PAL) of the subjects[10]. The mean PAL was calculated using the following formula:

PAL=Σ (Time spent on each activity (min) x energy cost of each activity (kcal) /1440

The lifestyle of the subjects was determined on the basis of physical activity level (PAL) of the subjects. FAO/WHO/UNU (2004)[10] classification was used to categorize the subjects of different age groups into three following lifestyle categories:

FAO/WHO/UNU (2004)[10] classification of Physical Activity Level

Category	PAL Value
Sedentary or light activity lifestyle	140-1.69
Active or moderate activity lifestyle	170-1.99
Vigorous or vigorously active lifestyle	200-2.40

Statistical Analysis

Mean, standard deviation and percentages for the various parameters were computed. Paired t-test, **z test, correlation or regression coefficient** and their statistical significance were used to analyse the **data obtained from the survey.**

RESULTS AND DISCUSSION

Socio-Demographic Profile

The demographic profile of the respondents i.e. age, education level, social status, type of family, community, type of work and total income has been presented in Table 1.

Age

Age was found to be one of the powerful risk factor for developing hypertension. From previous research reviews it has been shown that hypertension was more prevalent in people of 45 years and above[11].This is in accordance with the results of the present study where the mean age of the studied subjects was more than 50 years. This can be attributed to the age related changes in arterial stiffness and decreased elasticity. It was reported that 26.7 % of males and 43.3 % of the females were from the age group 45-50 years, 30% of the males and 26.7 % of the females were from the age group of 50-55 years and maximum number of males

and females i.e. 43.3 and 30 % respectively from the age group of 55-60 years and the mean age of subjects was above 50 years in both males and females.

Community

Lifestyle of urban and rural population is almost altogether different. The present study revealed that the prevalence of hypertension was more among the subjects dwelling in urban areas, as 85% of males and 93.3% of females belonged to urban area (Table 1). It has been observed from the past reviews of many studies that prevalence of hypertension was more in urban areas than rural areas[11].

Physical Activity Pattern and Physical Activity Level

For studying the routine physical activity pattern of the subjects, time spent on routine activities of the subjects was recorded. It was found that there was no significant difference between the sleeping hours of male and female subjects. Maximum hours of the day, by both male and females, were spent on activities like sleeping, light activities while sitting and sitting idle and chatting with colleagues, neighbours and friends. Females were found to be more involved in some of activities of higher energy expenditure than males ($p<0.05$) like in personal care and house work. On the other hand, men were more involved in light activities while sitting than women ($p<0.05$). Though few men were involved in high intensity activity but there was a significant difference between high intensity activity pattern of men and women ($p<0.05$). (Table 2 and Fig 1)

Compelling evidence from many lifestyle related studies has shown that, an unfit and sedentary way of life increased the risk of hypertension and also led to its chronic forms i.e. cardio vascular diseases. According to a study aimed to analyse the level of physical activity for people with high blood pressure cared for in a health centre revealed that 80% of participants presented low or moderate levels of physical activity[13]. Increased level of physical activity can lower BP, independent of concomitant changes in weight reduction and systolic BP among individuals having routine of aerobic exercise. In addition to a direct beneficial effect on BP, increased physical activity can also lower BP by facilitating initial weight loss and by promoting maintenance of weight loss, once achieved[14]. It has been proved that persons, who exercised for 30 min or more on most even, if not all days of the week, significantly lowered their blood pressure than those who did not do any physical activity at all[15].

Physical Activity Level (PAL): By calculating PAL it was observed that majority of subjects were living sedentary life having PAL value between (1.4-1.69) as per FAO/WHO/UNU (2004)[10] classification. Hence, it can be concluded that sedentary lifestyle pattern was most common among hypertensive subjects under study.

Psychological health

Present study revealed that majority of the subjects i.e. 73.3% of females and 71.7 % of males were often stressed, (Table 1) majority of them respectively considered home as their stress place and personal issues were the main reason being under stress.

Stress has been found to be one of the important risk factors of hypertension. In a study on 4100 normotensive black and white men and women of age 18 to 30 years, with a follow-up period of 13 years. BP responses to 3 psychological challenges—cold presser, star tracing, and video game tasks—were measured. It was observed that the larger was the stress, the earlier hypertension occurred[16]. Yoga has been found to play an important role for stress management in hypertension[17].

In the present study most of the subjects chose one or other stress bursting activity according to their choice. It was found that 61.7% of males and 31.7 % of females preferred to be with their friends when stressed; 26.7% of males and 13.3 % of females preferred to stay alone; 33.3% and 13.3% of males and females, preferred to listen to music when stressed; 26.7% and 43.3% of males and females watched T.V. while stressed, respectively. (Table 1)

Sleep

Several past studies had confirmed that diminished sleep or absence of nocturnal dipping, leads to hypertension and particularly night time BP levels are associated with significant increases in cardiovascular morbidity and mortality. Both sleep deprivation and insomnia had been linked to increase in incidence and prevalence of hypertension[18].

Present study revealed that most of the subjects were having adequate sleep hours. It was shown that 73.3% of males and 70% of the females were having sleep for 6-8 hours. Few subjects i.e. 18.3% of males and 16.7% of females were having sleep for < 6 hours. Only 13.3% of females and 8.3%of males had sufficient sleep of >8 hours.

Family history/Genetics

Family history or genetics is an important non modifiable risk factor for hypertension. Prevalence of hypertension was significantly higher ($p<0.05$) in patients (29.3%) with family history of than those without family history (24.4%)[19].

The results of the present study were also in accordance with past reviews, It was reported that 60% of males and 63.3% of females had positive family history of hypertension. Majority of those who had any family history of hypertension was linked to mother. Mothers of 30% of males and 30%of females were suffering from hypertension and 11.7% of males had a family history of both parents and siblings suffering from hypertension.

Other health problems

In the present study, diabetic and renal patients were excluded, so that the effect of complications of these two disorders doesn't affect the results of the study. Many other health problems were still diagnosed in the subjects. It was observed that most of the subjects were also suffering from other health problems like Hypothyroidism among 5% males and 11.7% females; Coronary Artery Disease among 18.3% males and 3.3% females. Other problems like asthma, arthritis, regurgitation, gall stones, peptic ulcers and uric acid were also reported (Table 1). Past studies had also revealed that hypertension was linked with several other health problems especially coronary diseases. The World Health Organization (WHO) has estimated that about 62% of cerebrovascular disease and 49% of ischemic heart disease burden worldwide were attributable to suboptimal blood pressure levels (systolic blood pressure, SBP > 115mmHg), an observation consistent across groups defined by sex, age, and ethnicity. In addition, hypertension was the topmost risk factor for death worldwide[1].

Intake of supplements

As several minerals like calcium, magnesium and potassium are lost with the use of antihypertensive drugs, hence requirement of such nutrients is very high and dietary sources are usually found to be inadequate to replenish the losses. Supplements of vitamin and minerals were better and safe substitutes for expensive conventional drugs for hypertension. Therefore, medical doctors had encouraged to incorporate dietary supplement into regimen employed for hypertension management[20].

Present study revealed that 5 and 16.7% of males and females, respectively were taking supplements in addition to their regular medicine. Majority of the subjects i.e. 95 and 83.3% of males and females respectively were not taking any additional supplement required.

Dietary Intake of the Subjects

Improper dietary intake of individual is one of the major factors that lead to hypertension. Adequate evidence is available from studies conducted within and across populations, to link several nutrients, minerals, food groups and dietary patterns with an increased or decreased risk of CVD. Dietary fat is associated with an increased risk of CHD. Dietary sodium is associated with elevation of blood pressure, while dietary potassium lowers the risk of hypertension and stroke. Regular frequent intake of fruits and vegetables is protective against hypertension, CHD and stroke [22]. It had been proved that the patients with hypertension consume food with an excess of fat and a shortage of fibre, antioxidant vitamins, Potassium, Calcium and Magnesium[11]. The total food rations of rural dwellers consisted of larger amounts of fat, cholesterol and vitamin A compared to those of city dwellers. Same study had shown that incorrect dietary intake among patients with hypertension often related to the coexistence of overweight and obesity. Saturated fat and Trans fatty acids in diet increases cholesterol and blood pressure which in turn causes cardiac diseases[23]. DASH (Dietary approach to stop hypertension) diet could be started at younger age to avoid complication due to hypertension .For this the food should be balanced with less oil, less sugar, less saturated fat, more fruits, more vegetables and high fibre diet for the hypertensive's to control their blood pressure.

Data regarding daily intake of nutrients and their percent adequacy has been presented in (Table 3 and Fig 2). It was found that percent adequacy of energy and fat was more in females as compared to their male counterparts. Values being 87.3 and 82.8%; 105 and 104.4%, for females and males, respectively. However, in both the cases energy intake was found to be inadequate as compared to the RDA[1]. Percent adequacy of other nutrients namely Vitamin C, Calcium, Iron and Magnesium was found higher in case of male subjects as compared to females. However, intake and percent adequacy of Potassium was found to be lower in both the groups, which might be a contributing factor for prevalence of hypertension among the surveyed subjects.

Similar results were reported by past studies that hypertensive subjects with high calorie intake diet showed an increase in BP, serum lipids and BMI which might be the major contributor in precipitation of hypertension and also in increasing risk of cardiovascular morbidity and mortality[24].

CONCLUSIONS

From the interpretation of data collected under present study it can be concluded that Age was one of the important risk factors contributing towards hypertension. Further it was concluded that majority of the subjects i.e. 85% of males and 93.3% of females were from Urban Areas. Sedentary lifestyle and stress at home place were found to be contributing factors towards hypertension among University non teaching staff. **Obesity** was also one of the reasons of hypertension among the subjects under study. Compelling evidence of higher intake of visible fat and oils was found in the present study which led to hypertension. Percent adequacy of fats and oils was very high i.e. 152.4 and 194.5% among males and females respectively. It could

Table: 1 Socio Demographic and other Lifestyle factors profile of the selected subjects

PARTICULARS		Total (N=120)			
		Males (n=60)		Females (n=60)	
		No.	%	No.	%
Age(in years)	45-50	16	26.7	26	43.3
	51-55	18	30	16	26.7
	56-60	26	43.3	18	30
	Mean±SD	53.9±4.5		52.1±5.0	
Community	Rural	9	15	4	6.7
	Urban	51	85	56	93.3
Stress frequency	Daily	43	71.7	44	73.3
	Few times a week	7	11.7	6	10
	Rarely	10	16.7	10	16.7
Stress place	Home	35	58.3	41	68.3
	Workplace	5	8.3	8	13.3
	Both	20	33.3	11	18.3
Home place stress	Personal	47	78.3	42	70
	Economic	1	1.7	-	-
	Personal and Economic	5	8.3	4	6.7
	Social	-	-	1	1.7
	All	2	3.3	5	8.3
	None	5	8.3	8	13.3
Work place stress	Workload	12	20	14	23.3
	None	34	56.7	39	65
Practices during overstress	Going with friends	37	61.7	19	31.7
	Stay alone	16	26.7	8	13.3
	Listen music	20	33.3	8	13.3
	Watching T.V	16	26.7	26	43.3
Family history	+ve history	36	60	38	63.3
	-ve history	24	40	22	36.7
Relation	No history	24	40	22	36.7
	Mother	18	30	18	30
	Father	8	13.3	8	13.3
	Both parents	3	5	12	20
	Both parents &siblings	7	11.7	-	-
Other Health Problems	None	39	65	47	78.3
	Hypothyroidism	3	5	7	11.7
	Coronary Artery Disease	11	18.3	2	3.3
	Asthma	-	-	1	1.7
	Arthritis	3	5	5	8.3
	Regurgitation	1	1.7	-	-
	Gall stones	1	1.7	1	1.7
	Peptic ulcer	-	-	1	1.7
	Uric acid	1	1.7	-	-
Nutritional Supplements Intake	Taking	3	5	10	16.7
	Not taking	57	95	50	83.3

Figure no: 1 Physical activity profile of the selected subjects

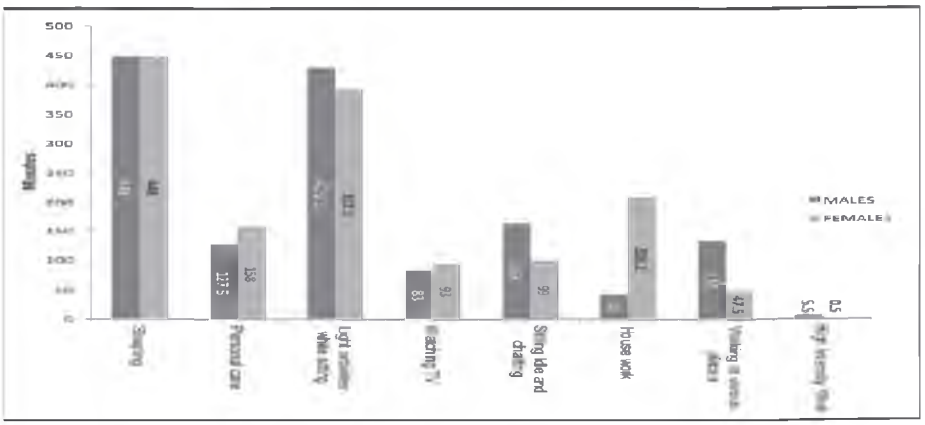


Table2: Physical activity profile of the selected subjects

Activities	Total Males (n=60)	Total Females (n=60)	z-value
Sleeping	448±57.7	448±66.6	0^{NS}
Personal care	127.5±24.3	158±34.1	5.64*
Light activities while sitting	429.5±94.2	392.5±78.5	2.34*
Watching TV	83±40.4	93±39.4	1.37^{NS}
Sitting Idle and chatting	163±51.9	99±43.2	7.28*
House work	42±34.3	208.2±65.3	17.33*
Walking at various places	133±67.2	47.5±31.1	8.95*
High Intensity Work	5.5±16.9	0.5±3.8	2.23*
Physical Activity Ratio (PAL)	1.61	1.68	

*Significant at 5% NS -Non significant FAO/WHO/UNU (2004)

also be concluded that daily higher consumption of fats in routine diet was one of the reasons of hypertension among the selected subjects.

RECOMMENDATION

From the results of the present study it can be recommended that by managing weight through proper dietary intake and by lowering intake of fats, the problem of hypertension can be controlled. Furthermore by following various techniques of distressing like yoga, meditation etc. The severity of the hypertension can be reduced to some extent.

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Figure no: 2 Percent adequacy of Nutrients

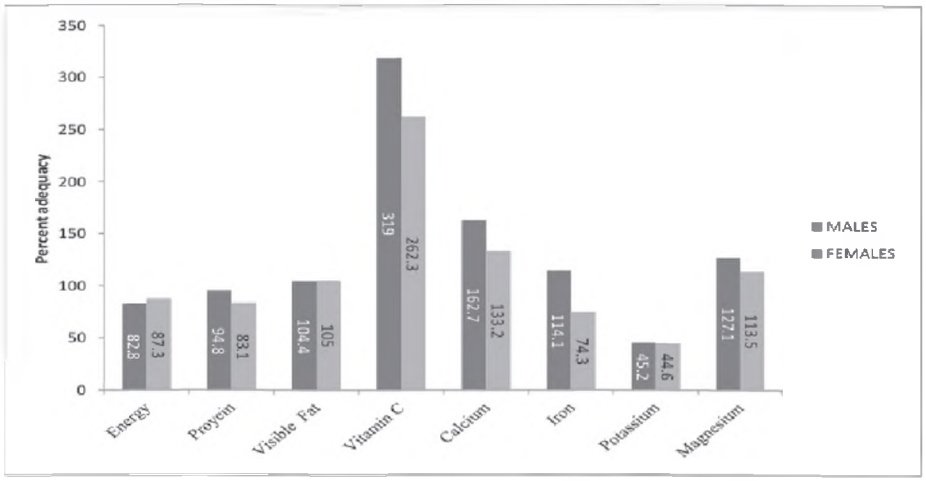


Table 3: Intake and percent adequacy of nutrients

Nutrients	Males (n=60)			Females (n=60)		
	Nutrient Intake	RDA	Percent Adequacy (%)	Nutrient Intake	RDA #	Percent Adequacy (%)
Energy (kcal)	1921±501.4	2320	82.8	1659±447.4	1900	87.3
Protein (g)	57±16.4	60	94.8	46±10.5	55	83.1
Visible fat (g)	26± 5.3	25	104.4	21± 3.1	20	105
Vitamin C (mg)	128±133.2	40	319	105±64.8	40	262.3
Calcium (mg)	976±391.2	600	162.7	799±255	600	133.2
Iron (mg)	19±10.4	17	114.1	16±6.1	21	74.3
Potassium (mg)	1693±419.2	3750	45.2	1437±351.6	3225	44.6
Magnesium (mg)	432±116.2	340	127.1	352±107.9	310	113.5

#RDA -Recommended Dietary Allowances, ICMR (2010)

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