SUMMARY

Hypertension (HTN) or arterial blood pressure or simply high blood pressure termed as the ‘Silent Killer’ is currently one of the greatest health problems of civilization and has been recognized as a major risk factor for several cardiovascular diseases (CVD). Keeping these factors in view the present study entitled “Nutritional status of selected Hypertensive subjects from Palampur region of Kangra District” was planned and executed. A sample of 130 subjects was randomly selected from the selected area. The data was collected by using questionnaire cum interview schedule and wherever possible cross checking and indirect queries were raised to help ascertain authenticity of the data. The detailed information was collected regarding dietary / nutrient intake, information regarding Hypertension, anthropometry and nutrition counselling was given to the subjects. The data collected was tabulated and analysed using standard methods.

Following were the main findings of the study:

- Out of the total hypertensive subjects (N=130), 54.61 per cent (N=71) were male and 45.39 per cent (N=59) were female subjects.
- Majority (50.77%) of the subjects were of age 50 & above, followed by 37.69 per cent in the age group 40-50 years (26.76 % of male; 50.85% of female) and remaining (11.54%) were in the age group 30-40 years of age (11.27% of male; 11.86% of female).
- General information revealed that majority of the hypertensive subjects were married (86.15%), belonged to upper caste (48.46%), had nuclear families (70.77%) and were Hindu (85.38%) by religion. Majority of them had 4-6 members (56.15%) in their families, were living in pacca (96.92%) houses, however, in rented (54.62%) houses. Majority of the subjects had no land holding (48.46%) and out of those having land, 35.38 per cent had no produce from land. Moreover, majority (76.92%) of the subjects were not found to rear animals.
- Literacy level of the subjects was found to be high. Majority of the subjects were graduate (32.31%), post graduate (29.23%) and senior secondary by educational qualification. Moreover, significant (P<0.01) association was found between literacy level and degree of Hypertension.
Occupation significantly (P<0.01) affected the degree of Hypertension. Majority of the male subjects were of service category (57.75%), however, females were housewives (50.85%).

Majority of the subjects belonged to high income group. 26.92 per cent of the total subjects had total monthly family income Rs. 25000/- and above followed by Rs. 15000-20000 /- (20.00%) income group. Significant (P<0.01) association was found between total family income and degree of Hypertension of the male subjects, however, non significant in case of female subjects.

Monthly expenditure pattern revealed that all the subjects keep monthly share for food, health and miscellaneous expenses, however, 86.15 per cent of the total subjects keep share for education and 31.52 per cent for personal expenses.

Majority of the male subjects (39.44%) had Hypertension condition diagnosed for 6-10 years and 1-5 years for females. Majority of the hypertensive subjects experienced no symptoms (42.31%). Headache (30.00%) was the most experienced diagnostic symptom, however, giddiness (18.46%), easy fatigue (17.69%), insomnia (14.61%), breathlessness (13.08%), chest pain (10.77%) were also commonly experienced by the subjects.

Only 25.38 per cent of the total subjects had no family history, 44.61 per cent had family history of the disease and the remaining 30.00 per cent did not know about family history. Majority of the male subjects (48.57%) had father and mother of female (43.48%) subjects having history and moreover, Hypertension (46.55%) and heart disease (27.59%) were common diseases prevalent in family members.

The mean systolic BP of male subjects was found to be 141.31±0.54 and 138.00±0.45 mm Hg of female subjects and moreover the highest SBP was recorded of subjects in the age group 40-50 years. The mean diastolic BP of male subjects was found to be 88.19±0.23 and 88.33±0.22 mm Hg of female subjects. Moreover, a significant (P<0.01) difference was with respect to male and female systolic BP, however, non significant for DBP of the subjects.

Majority of the male subjects were found to be at Stage I (50.70%) degree of Hypertension (BP 140-159 or/90-99mmHg), whereas, majority of the female subjects were Pre hypertensive (54.24%) i.e. BP 120-139 or / 80-89 mmHg. Moreover, a significant (P<0.01) association was found between age and degree of Hypertension of the subjects.

84.61 per cent of the total subjects were found to use antihypertensive medications; however, only 72.73 per cent of them were taking medicines regularly. Medicines were used by the
subjects once (59.09%) or twice (40.91%) a day. There were subjects found who are likely to stop medications (26.69%) or reduces drug amount (16.92%) when BP was under control for a longer time. Majority of the subjects were also found not regular about BP check ups (43.08%).

- Only 26.92 per cent of the total subjects had no other complications and rest (73.08%) had complications besides Hypertension. The condition of Hypertension was further complicated with overweight problem in most of the subjects (60.42% of male; 65.96% of female subjects). In addition dyslipidemia (18.75%), diabetes (16.67%) and heart disease (10.42%) in male subjects, whereas, diabetes (20.83%), kidney disease (14.89%) and hormonal imbalance (12.77%) in female subjects were also commonly prevalent.

- More precise information of body weight showed that only 60.00 per cent of the total subjects check body weight, however, 34.60 per cent of them check whenever gets chance. Majority of the subjects considered them overweight (49.23%) and 70.31 per cent of them were doing efforts to control body weight. Dietary modifications (66.67%), exercise (64.44%) and fasting (15.55%) were the ways adopted to control body weight. 77.78 per cent of them lost some weight and reported improvement in Hypertension condition.

- Only male subjects reported personal habits of smoking, drinking and some addictions (tambakoo, khainni etc.). Most of the male subjects (56.34%) had smoking habit, out of which 37.50 per cent became moderate smokers, whereas, 32.26 per cent of non smokers left smoking after diagnosis. Drinking habit revealed that 61.97 per cent of the male subjects were alcoholics, out of which 54.54 per cent became moderate drinker and 40.74 per cent of non drinker left drinking after diagnosis of the disease.

- 67.60 per cent of male and 45.76 per cent of female subjects were found to live a stressful life. Among male subjects, family (54.17%) and occupational stresses (50.00%) were common; however, female subjects had more of family stresses (77.78%). Moreover, majority of the subjects were found to eat less (72.27% of male; 61.54% of female) under stressful conditions. Sleeping disorders mostly insomnia was also common among hypertensive (53.52% of male; 62.71% of female) subjects. A non significant association was found between various risk factors like smoking, drinking, stress and sleeping disorders with the degree of Hypertension of the subjects.
Anthropometric measurements of male subjects revealed that mean height (162.08±0.29 cm), weight (70.83±0.26 Kg), waist (93.28±0.39 cm), WHR (0.97±0.003) and WHtR (0.58±0.003) were found to be higher than that of female subjects i.e. 157.28±0.25 cm, 68.39±0.52 Kg, 86.00±0.37 cm, 0.84±0.005 and 0.55±0.006, respectively. However mean hip circumference, MUAC and BMI of female subjects (102.10±0.21 cm, 26.85±0.05 cm, 28.11±0.22 cm) were found to be higher than that of male (95.00±0.24 cm, 26.33±0.14 cm, 27.13±0.19 cm) subjects. The derived indices indicated that majority of the subjects were overweight (55.38%) according to BMI (25.00-29.99) and majority of the subjects i.e. 42.31 and 50.00 per cent depicted elevated metabolic risk for CVD according to WHR (≥0.8 for male; ≥0.95 for female) and WHtR (≥0.50), respectively. Moreover, significant (P<0.01) difference was found between mean anthropometric measurements of male and female subjects.

A wide range of variation was observed with respect to common meal pattern of the hypertensive subjects. The observed meal timings were found to be early morning, before breakfast, breakfast, mid morning, lunch, mid noon, evening, dinner and after dinner. The highest odds were found to be for tea (63.85%) at early morning, to Chap+Veg combination (36.92%) at breakfast and tea got highest odds at lunch timings followed by Chap+Veg combination (26.92%). Majority of the subjects were found to have tea (48.46%) at mid noon, taking Chap+Veg combination (33.08%) besides tea (33.85%) at evening timings and taking Chap+Veg combination (29.23%) at dinner. Majority of the subjects were taking salad (66.92%) at dinner. Moreover, majority of the subjects were not taking anything during before breakfast (38.46%), mid morning (44.61%) and after dinner (53.08%) timings.

Liking for method of cooking revealed that majority (47.69%) of the subjects liked mixed foods followed by pressure cooked foods (34.61%). Dinning out habits revealed that 50.77 per cent of the subjects dine outside regularly. Majority (39.39%) of the subjects were found to dine outside for ceremonial functions. Moreover, frequency varied from fortnightly (25.76%) to rarely (21.21%) dinning outside.

Eating habits revealed that majority of the male subjects were found to be non vegetarian (52.12%), whereas, 49.15 per cent of female subjects were vegetarian. Moreover, significant (P<0.05) association was found between degree of HTN and frequency of taking non vegetarian foods by male subjects, however, non significant for female subjects.
Very few i.e. 4.62 per cent of the total subjects (only male) reported food allergies. Majority (66.67%) of them were allergic to brinjal followed by colocasia (33.34%) and soy bean oil (16.67%) allergy.

Majority of the subjects (56.34% of male; 42.37% of female) had liking for moderate salt in the food products. Though all the subjects were prescribed to reduce salt consumption, 64.79 per cent of male and 59.32 per cent of female subjects modified salt consumption and all stated improvement in Hypertension condition. Moreover, non significant association was found between salt consumption pattern and degree of Hypertension.

Food preferences in terms of overall frequency of consumption of listed foodstuffs revealed that frequency varied from weekly to rarely consumption for most of the foodstuffs from various selected categories. More frequent i.e. daily consumption was observed for bread (7.04% of male; 3.39% of female), mango (8.45% of male; 6.78% of female), whole milk (59.15% of male; 59.32% of female), curd (33.80% of male; 42.37% of female), pure ghee (7.04% of male; 25.42% of female), refined oils (60.56% of male; 66.10% of female), cumin seeds (90.14% of male; 100.00% of female), tea (90.14% of male; 83.05% of female), and pickles (4.22% of male; 5.08% of female), whereas, only male subjects were found to consume daily radish (46.48%), banana (5.63%), butter (7.04%), biscuits (18.31%) and namkeens (7.04%).

Alternate day consumption by both male and female subjects was observed for noodles, semolina (only male), of all the pulses excluding bengal gram by female subjects, of all the vegetables excluding lotus stem and knol-khol, of all green leafy vegetables excluding lettuce by female subjects, all the fruits excluding litchi and chikku, milk products excluding sweets and cheese (only female), of all fats / oils excluding butter and vanaspati ghee (only female), only eggs among animal foods, of ground nuts and almonds ((only male) among condiments / nuts, of tea and coffee among beverages, of sauces / ketchups, potato chips (only female) and soups among processed foods.

Nutrient intake by hypertensive subjects revealed that among proximate constituents, the intake of energy, protein, total fat, visible fat and fibre constituents was found to be the highest by male subjects of age group 30-40 years, whereas, by the male subjects of age group 40-50 years for carbohydrate intake. On the other hand, the intake by female subjects of age group 40-50 years was found to be the highest for energy, protein, total fat and fibre, however, by female subjects of
age 30-40 years for visible fat and carbohydrate constituents. The mean intake of majority of the constituents by the subjects i.e. energy, protein, visible fat and fibre was found to be higher than the RDA.

The intake of mineral constituents by the hypertensive subjects revealed that the intake of Na, K, Mg, P and Fe was found to be highest by the male subjects of age group 40-50 years, whereas, by the subjects of age group 30-40 years for Ca and Na : K ratio. On the other hand, the intake of K, Mg, P and Fe was found to be the highest by female subjects of age group 30-40 years, however, by females of age group 40-50 years for Na, Ca and Na: K ratio. Moreover the mean intake of minerals i.e. Na, P and Na: K ratio was found to be higher, whereas, lower than the RDA for Mg and Fe by the hypertensive subjects.

A wide range of variation was observed with respect to vitamin intake by the hypertensive subjects. The intake of Vitamin A, C and riboflavin was found to be highest by the male subjects of age group 30-40 years; whereas, by the subjects of age group ≥50 years for thiamin and niacin. On the other hand, by female subjects, the highest intake of vitamin A and riboflavin was observed by the subjects of age group 40-50 years, of vitamin C and thiamin by the subjects of age group 30-40 years and of niacin by the subjects of age group ≥50 years. Moreover, the intake of vitamin C and thiamin was found to be higher, however, lower of vitamin A and niacin by male and female subjects when compared with the respective RDA.

The mean energy intake of all the subjects (3156.03±28.60 Kcal by male; 2695.33±10.90 Kcal by female) was found to be significantly (P<0.01) higher than the energy expenditure (2515.51±5.82 Kcal by male; 2452.38±11.63 Kcal by female) by the subjects.

Correlation studies revealed that a positive correlation was found of systolic as well as diastolic BP with the energy intake, total fat intake, sodium intake, weight, waist, hip, BMR, whereas, negative correlation was found of systolic BP as well as diastolic BP with potassium intake and height of all the hypertensive subjects. Whereas, a wide range of variation was observed with respect to systolic and diastolic blood pressure and among male and female subjects for rest of the factors studied.

Better understanding and improvement in the knowledge of hypertensive subjects participated (N=50) in the education cum counselling programme was observed. Majority of the total subjects
(42%) had medium gain in knowledge; moreover, female subjects had higher gain in knowledge (36%) than the male (24%) subjects.

**SUGGESTIONS AND RECOMMENDATIONS**

- **Epidemicity of Hypertension**, the ‘Silent Killer’ calls for the need of making essential BP measurements by the doctors in hospitals of the outdoor patients too.
- Self BP measurement by hypertensive subjects should be encouraged, as it can help patients by providing information on response of medications and improves patient’s adherence with therapy too.
- As evident from the study findings, nutrition education / counselling improved knowledge and awareness of the subjects, thereby would prove beneficial approach in the management of Hypertension, both as definitive intervention and as an adjunct to drug therapy. Therefore, doctors should educate the patients and also highlighting the need for a dietician in the health care team for Hypertension.
- Public health approaches, such as reducing calories, saturated fat, salt in processed foods and sodium reduction in the food supply (e.g. at restaurants) should be encouraged to achieve downward shift in population’s BP towards normal BP range. Thus potentially reducing morbidity, mortality and the lifetime risk of an individual’s becoming hypertensive.
- **Lifestyle modifications are strongly recommended.** Adoption of healthy lifestyle by all persons is critical for the prevention of high BP, thereby reducing risk of CVD.

  Major lifestyle modifications to lower BP may include:

  ✓ Adoption of the dietary approach to stop Hypertension (DASH) eating plan.
  ✓ Dietary sodium reduction.
  ✓ Physical activity.
  ✓ Weight reduction in overweight or obese.
  ✓ Quitting smoking.
  ✓ Moderation of alcohol consumption.