



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating 2017: 5.03

TPI 2017; 6(12): 368-372

© 2017 TPI

www.thepharmajournal.com

Received: 13-10-2017

Accepted: 14-11-2017

#### Anirban Goswami

Regional Research Institute of Unani Medicine, Patna, under CCRUM, Ministry of Ayush, India

#### Salma Sultana

Regional Research Institute of Unani Medicine, New Delhi, under CCRUM, Ministry of Ayush, India

#### Shaista Urooj

Regional Research Institute of Unani Medicine, New Delhi, under CCRUM, Ministry of Ayush, India

#### Correspondence

##### Anirban Goswami

Regional Research Institute of Unani Medicine, Patna, under CCRUM, Ministry of Ayush, India

## Socio-demographic study of hypertension and its risk factors

Anirban Goswami, Salma Sultana and Shaista Urooj

### Abstract

The aim of this study was to assess the socio-demographic factors in prevalence of hypertension and its risk factors, among patients attended in OPD at Regional Research Institute of Unani Medicine, New Delhi, India. In this context study subjects were either having the disease hypertension or having symptoms related to the same. Habit of smoking, tobacco chewing, alcohol intake, high BMI and laziness is a social problem increasing day by day and has a clear association with the problem of hypertension. More over people having hypertension generally suffer from the problem of anxiety, vertigo, palpitation, headache, laziness, breathlessness and vice versa. Hence this is an understood fact that if some people suffer from these above mentioned symptoms may have a chance to reach to the problem of hypertension or people having hypertension may suffer from these symptoms. More over age, gender and family history may be a contributing factor in developing a disease like hypertension. Hence in this study it is tried to show the risk of hypertension in view of socio-demographic factors.

The overall mean±sem age of study hypertension patients was 57.38 ± 1.32 years (59.88 ± 2.47 years in men and 52.18 ± 2.47 years in women) and non- hypertension was patients was 40.49 ± 1.38 years (42.65 ± 1.88 years in men and 37.83 ± 2.02 years in women). Median-unbiased estimation was used to assess the odds ratio to identify association of hypertension with socio-demographic factors and its risk factors. In this study, Age, Gender, habit of chewing tobacco, alcohol intake, BMI, anxiety, vertigo, palpitation, headache, laziness, breathlessness and family history of hypertension was found to be significantly associated with hypertension. Significant association was not found with Income Group, Dietary Habits, Residence and Smoking Status.

Hence it is clear that socio-demographic factors related to hypertension and its risk are subject to having a cause and effect relationship. This underscores the need for preventive efforts to changes in lifestyle modifications which may lower the chance of a person to developed hypertension.

**Keywords:** Hypertension, Socio-demographic, Prevalence, Association.

### 1. Introduction

Hypertension is defined as a sustained elevation of blood pressure greater than or equal to 140 mm Hg systolic pressure or greater than or equal to 90 mm Hg diastolic pressure under rest. The prevalence of hypertension has been increasing in India, both in rural and urban regions. The prevalence of hypertension in urban areas of India ranged from 2.6-5.2 % between 1960 and 1980 and it has increased to 20-33 % last decade. The high prevalence of hypertension in the current study (32.2%), confirms this increasing trend. Another two studies carried out in rural areas of Haryana (1994-95) demonstrated 4.5% prevalence of hypertension (JNCVII criteria) while urban areas of Delhi had a higher prevalence of 45% during 1996-97 (Yadav S. *et al*, 2008) [24].

In Unani system of Medicine hypertension (Zaghtuddum) and its clinical features described by Unani physician under the heading of 'Imtila' (congestion). Al Razi (820 AD), Majoosi (930 AD) and Ibn Sina (980 AD) have described the Imtilain detail and divided into two categories (Razi, 1997; Ibn Sina, 1927) [19,8] as Imtila bi Hasb al-Aw'iyā and Imtila bi Hasb al-Quwa. Imtila bi Hasb al-Aw'iyā (repletion in regard to vessels) is an increase in blood volume leading to increased vascular pressure. In this condition, blood volume increases which raises intra-arterial pressure making the pulse hypervolemic. Such patient develops the tendency of frequent epistaxis, headache, visual disturbance and rupture of blood vessel causing the death. According to Allama Samarqandi, one of the causes of Khafaqan (palpitation) is Imtila-i-Damwi. In another description under the chapter of eye diseases, a term Zaght al Sharayein was used which means pressure in the blood vessels due to Imtila of blood that may affect brain as well as heart and lead to coma and paralysis. It is also quoted that Shabkiah-i-Mashimah (blood vessels beneath the brain) are ruptured due to Imtila-i-Uruq wa

Intifakh-i-Uruq (congestion and distension of blood vessels) and lead to Ru'af (epistaxis) which also justifies that the symptomatology as well as the complications arising from hypertension were very clear to Unani Scholars (Ibn Sina, 1927) [8].

It is classified as either primary (essential) or secondary. About 90–95% of cases are termed "primary HTN", which refers to high blood pressure for which no medical cause can be found. The remaining 5–10% of cases (secondary HTN) is caused by other conditions due to the involvement of kidneys, arteries, coronary heart, or endocrine, etc system (CDC, 2009-10) [6]. Although the exact cause of primary hypertension is unknown, there are several risk factors that have been associated with the condition. These risk factors are also associated with other non-communicable diseases (NCDs) such as diabetes mellitus, cancers, CVD, chronic respiratory disease, asthma, musculo-skeletal disorders, etc. These factors can be depends on lifestyle patterns.

The life style patterns that can be adjusted or changed to prevent the development of the disease. These risk factors include; obesity, excessive salt intake, inactivity or lack of exercise, tobacco use, smoking habit, alcohol consumption, etc. This includes geographic considerations, genetic socio-economic, socio-cultural and dietary, nutritional status etc. While the risk factors and their impact on hypertension is documented by well designed studies in the Western countries, systematically conducted studies using rigorous epidemiological techniques are lacking in India. The epidemiological studies to assess the prevalence of Hypertension are urgently needed in developing countries like India to determine the baseline against which future trends in risk factor levels can be assessed and preventive strategies planned to promote health. The urban population is very prone to development of cardiovascular diseases with Sidhu *et al* putting to figure at 20.15 % (Sidhu *et al.*, 2005) [20]. So, we need to have systematic data to determine the magnitude of

hypertension and its associated risk factors, and to establish a baseline data so as to influence the prevention of hypertension and utilization of health resources to confront the increasing burden of morbidity and mortality from hypertension. In this concerns, that an assessment of the prevalence of hypertension and its associated risk factors is the focus of this study.

The objective of this study was to find out the association with demographic & socioeconomic status, risk factors and prevalence of hypertension.

**Methods**

The data for this study was collected during 2016-17 at Regional Research Institute of Unani Medicine, New Delhi. Data on socio-demographic factors such as age, sex, height, weight, systolic, diastolic blood pressure and life style factors like laziness and habit of smoking, chewing tobacco, alcohol intake, etc, was collected from patients attended in GOPD. Positive diagnosis of hypertension was made when the resting systolic blood pressure was  $\geq 140$ mmHg and/or diastolic blood pressure  $\geq 90$ mmHg (Bakari and Onyemelukwe, 2005) [4]. BMI was calculated using a simple equation: body weight in kg divided by height in  $m^2(kg/m^2)$ .

The selected variables described in Table 1 and qualitative data was expressed by the percentages. The Chi-square test was used to find the association between hypertension and selected demographic & socioeconomic and its risk factors. On the other hand, median-unbiased estimation (Nicolas, 2004) [12] was used to calculate the odds ratio (ORs) and their respective 95% confidence intervals (CIs) to assess the hypertension regarding demographic and socioeconomic factors. All the statistical analyses were done by using the ‘R’ software(version 3.4.1), p-value <0.05 is considered as statistically significant.

**Table 1:** Description of variables

Sl. No.	Name of variable	Type of variable	Characteristic
1.	Hypertension	Categorical	Non- hypertensive = no existence of hypertension Hypertensive = existence of hypertension
2.	Age-Group	Continuous	Age in year
3.	Gender	Categorical	Male and Female
4.	Socio-economic status	Categorical	Below Poverty Line, Higher Income Group, Middle Income Group, Lower Income Group
5.	Dietary Habits	Categorical	Mixed, Vegetarian, Non Vegetarian
6.	Smoking Status	Categorical	No= No habit of cigarette smoking Yes=At least one cigarette smoke per day
7.	Habit of Chewing Tobacco	Categorical	No=No Habit of chewing tobacco Yes=Habit of chewing tobacco
8.	Habit of Alcohol Intake	Categorical	No= No habit of Alcohol Intake Yes= Habit of Alcohol Intake
9.	Family history	Categorical	Positive= Who has family history of hypertension Negative= Who has no family history of hypertension
10.	BMI	Continuous/ Categorical	Underweight: BMI <18.50 Normal: BMI=18.50 - 24.99 Overweight: BMI $\geq$ 25.00 Obesity: BMI $\geq$ 30.00
11.	Anxiety	Categorical	No= No symptoms of feeling of worry, nervousness, or unease Yes=Symptoms of feeling of worry, nervousness, or unease
12.	Vertigo	Categorical	No=No symptom of Vertigo Yes= Symptom of Vertigo
13.	Palpitation	Categorical	No= Heart beat at normal Yes= Heart beat too hard or too fast, skipping a beat, or fluttering.
14.	Headache	Categorical	No= No symptom of Headache Yes= Symptom of Headache
15.	Laziness	Categorical	No=Physical activity $\geq$ 30 minutes per day Yes= Physical activity <30 minutes per day

## Results & Discussion

A total 508 subjects were selected in the present study. The overall mean±sem age of study hypertension patients was 57.38 ± 1.32 years (59.88 ± 2.47 years in men and 52.18 ± 2.47 years in women) and non-hypertension was patients was 40.49 ± 1.38 years (42.65 ± 1.88 years in men and 37.83 ± 2.02 years in women). Table 2 shows socio-demographic status of the subjects with or without hypertension. In this study, the prevalence of hypertension increased significantly with increasing age. The prevalence of hypertension increased from 13.56% among the younger age group (30 years and below) to 75% among those who were aged 60 years and above. The increasing prevalence of hypertension with age represents the biological effect of increased arterial resistance due to thickening arterial wall that comes with age or due to aggregation of the other risk factors which tend to increase with age advancement (Martins *et al.*, 2001) [11].

The proportion of hypertension was higher among males (55.03%) compared to that in females (42.02%) (OR: 1.68; 95% CI: 1.06-2.68; p= 0.03). This result also confirms with the current study that women have lower systolic blood pressure (SBP) levels than men during early adulthood, while the opposite is true after the sixth decade of life (Priscilla and Elizabeth, 2008) [16]. But, the incidence of hypertension increases more rapidly in women older than 60 years. The highest prevalence rates of hypertension were observed in elderly women (>75%), aged > 75 years (Priscilla and Elizabeth, 2008) [16].

The Socio-economic status was found to be non-significantly associated with hypertension. In this connection, characteristics such as family income would be better indicators of socioeconomic status, but in these populations these were not always easy to assess because of that many families had multiple irregular incomes, and extended families. In some studies, no association found between income and hypertension (Julia *et al.*, 2006) [9]. Beside of that dietary habits showed non-significantly associated with hypertension. The prevalence of hypertension was higher among non-vegetarian 51.43% as compared to vegetarian 40.54%.

In this study showed that prevalence of hypertension was higher among smokers 53.29% as compared to non smokers 46.10%. Although the odds of having hypertension among smokers were 1.33(CI: 0.84-2.09; p= 0.21) times that of non-smokers, leads to a result not statistically significant. But, it has been reported that regular and long time cigarette smoking is associated with higher blood pressure in other studies (Alikor *et al.*, 2013; Onwuchekwa *et al.*, 2012) [2,14]. Cigarette smoking has been shown to increase BP. Smoking causes an acute increase in BP and heart rate and has been found to be associated with malignant hypertension (Oviasu, 1978) [15].

The addictions of chewing tobacco increases the risk of hypertension (Bakari and Onyemelukwe, 2005) [4]. The chemicals in tobacco can damage the lining of artery walls, causing arteries to narrow and increases blood pressure. Eventually second hand smoke can also increase blood pressure. Prevalence of hypertension was higher among tobacco chewers 62.84% as compared to non tobacco chewers 31.20%. The odds of having hypertension among tobacco chewing patients were 3.70 (CI: 2.29-6.06; p<0.01) times that of non tobacco chewing patients proves to be a statistically significant result.

The present study showed that odds of having hypertension

among patients addicted with alcohol was 5.71 (CI: 2.09-20.50; p<0.01) times that of with non alcoholic persons, this finding was statistically significant. Prevalence of hypertension was higher among patients addicted with alcohol 84.00% as compared with alcoholic persons 47.00%. Similar positive association was found in the study conducted in Uttharkhand district by Saxena *et al.* (Pooja, 2013) [18]. In this connection alcohol intake also increases the risk factor in the development of hypertension. A person who consumes alcohol has 1.3 times more risk of having hypertension in some part of his lifetime than the non alcoholic persons. The alcohol intake raises the risk of hypertension and the cardiovascular disorders and stroke.

In this study, subjects with family history of hypertension was found statistically significant association with higher prevalence of hypertension compared to those having no family history, p<0.01, odds of having hypertension among those who have family history and not family history was 0.41 (CI: 0.26-0.66; p<0.01), this finding is consistent with reports by previous researchers (Abaci *et al.*, 2006; Piccini and Victora, 1994; Freitas *et al.*, 2001) [1, 17, 7].

The prevalence of hypertension increased significantly with increasing BMI. There was tendency of increase in blood pressure with increasing BMI. The odds for developing hypertension increased with increasing BMI. The risk factor in development of hypertension is obesity. Obesity or excess relative weight is found to be associated with increased risk of disease morbidity and mortality (Tyagi, 2007) [22]. Generally obesity is related to abnormal lipid profile values i.e increased serum cholesterol, serum triglyride, LDL and decreased HDL values.

Prevalence of hypertension was higher among patients with anxiety 94.16% as compared to without anxiety 5.84%. The present study showed that odds of having hypertension among patients with anxiety was greater than one (p<0.01) time that of without anxiety, this finding was statistically significant. Generally, anxiety increases blood pressure, systemic vascular resistance, sympathetic activity, plasma renin activity, the homeostasis model, and blood lipids. First, anxiety increases blood pressure in short term, and the white coat effect derived from anxiety is a typical example (Spruill *et al.*, 2007; Ogedegbe *et al.*, 2008) [21,13]. But, some study showed individuals with anxiety having a higher risk of developing hypertension than those without anxiety leads to the fact that anxiety is associated with hypertension. (Bacon, 2014) [5].

Hypertension is a major circulatory disease that can affect the peripheral and/or central auditory and vestibular systems. Many studies in past have addressed the association between hypertension and dizziness and/or vertigo (Anália *et al.*, 2013) [3]. In our study, vertigo was found significantly associated with hypertension. Odds of having hypertension among patients with vertigo was than one (p<0.01) times that of without vertigo. Prevalence of hypertension was higher among patients with vertigo 72.96% as compared without vertigo 9.82%.

In the present study, palpitation was found significantly associated with hypertension. Odds of having hypertension among patients with palpitation was than one (p<0.01) times that of without palpitation. Prevalence of hypertension was higher among patients with palpitation 77.09% as compared without palpitation 12.40%. Generally, individuals having the problem of hypertension suffers from palpitation. The palpitation may feel as if the heart has stopped or is pounding out of control. Recurring palpitations occurring along with

chest pain and/or fatigue and sweating is an indication of a serious heart problem, which may have been caused by hypertension. The symptom of palpitation with hypertension once described in review paper by Thomas G. Pickering, Lynn Clemow (Thomas and Lynn, 2008) [23]. Headaches are very common hypertension symptoms. It is often recurring and feels like a pounding or pulsing in head. When blood pressure rises, it affects the head, causing vision distortion and nosebleeds. In our study, it was found that headache significantly associated with hypertension (Thomas and Lynn, 2008) [23]. Prevalence of hypertension was higher among patients with headache 77.17% as compared without headache 9.68%.

Laziness is defined as a person not doing continuous or accumulated exercise for at least 30 minutes per day. In this study laziness was found significantly associated with hypertension. It is evident that physical activity may prevent hypertension. The mechanisms by which physical activity may reduce BP and prevent the development of hypertension are unclear. Prevalence of hypertension was higher among lazy patients 76.09% as compared non lazy patients 11.29%. This concurs with the observation made by a previous study concluded that a relationship between physical activity and incident hypertension and the strongly evidence supports a role for physical activity in the prevention of hypertension (Keith and Daichi, 2013) [10].

**Table-2:** Distribution of demographic factors & socioeconomic characteristics and Sex-differences regarding demographic factors & socioeconomic characteristics in study subjects:

Variables	Hypertension		Chi-Square Value (p-value)	Odds ratio by median-unbiased estimation			
	Non-hypertensive No. (%)	Hypertensive No. (%)		Odds Ratio (OR)	95% Confidence Interval of OR	p-value	
Age-Group	18-30	51 (86.44)	8 (13.56)	84.38 (<0.001) <sup>S</sup>	1.00 (reference)	-	-
	31-40	51 (76.12)	16 (23.88)		1.97	0.78-5.31	0.14 <sup>NS</sup>
	41-50	14 (29.17)	34 (70.83)		14.74	5.82-41.81	<0.01 <sup>S</sup>
	51-60	15 (35.71)	27 (64.29)		11.00	4.28-31.20	<0.01 <sup>S</sup>
	>60	23 (25.00)	69 (75.00)		18.40	7.94-47.75	<0.01 <sup>S</sup>
Gender	Male	85 (44.97)	104 (55.03)	4.43 (0.04) <sup>S</sup>	1.00 (reference)	-	-
	Female	69 (57.98)	50 (42.02)		1.68	1.06-2.68	0.03 <sup>S</sup>
Socio-economic status	Below Poverty	9 (64.29)	5 (35.71)	6.9 (0.07) <sup>NS</sup>	1.00 (reference)	-	-
	HIG	21 (56.76)	16 (43.24)		1.35	0.37-5.28	0.64 <sup>NS</sup>
	MIG	81 (54.00)	69 (46.00)		1.51	0.48-5.25	0.47 <sup>NS</sup>
	LIG	43 (40.19)	64 (59.81)		2.62	0.81-9.29	0.10 <sup>NS</sup>
Dietary Habits	Mixed	13 (50.00)	13 (50.00)	1.52 (0.46) <sup>NS</sup>	1.00 (reference)	-	-
	Vegetarian	22 (59.46)	15 (40.54)		0.68	0.24-1.91	0.47 <sup>NS</sup>
	Non Vegetarian	119 (48.57)	126 (51.43)		1.05	0.46-2.41	0.89 <sup>NS</sup>
Smoking Status	No	76 (53.90)	65 (46.10)	1.30 (0.25) <sup>NS</sup>	1.00 (reference)	-	-
	Yes	78 (46.71)	89 (53.29)		1.33	0.84-2.09	0.21 <sup>NS</sup>
Tobacco Chewing Habit	No	86 (68.80)	39 (31.20)	28.49 (<0.01) <sup>S</sup>	1.00 (reference)	-	-
	Yes	68 (37.16)	115 (62.84)		3.70	2.29-6.06	<0.01 <sup>S</sup>
Alcoholic Habit	No	150 (53.00)	133 (47.00)	11.14 (<0.01) <sup>S</sup>	1.00 (reference)	-	-
	Yes	4 (16.00)	21 (84.00)		5.71	2.09-20.50	<0.01 <sup>S</sup>
Family history	Negative	55 (38.46)	88 (61.54)	13.36 (<0.01) <sup>S</sup>	1.00 (reference)	-	-
	Positive	99 (60.00)	66 (40.00)		0.41	0.26-0.66	<0.01 <sup>S</sup>
BMI	Underweight	15 (93.75)	1(6.25)	208.05 (<0.01) <sup>S</sup>	0.41	0.01-2.18	0.35 <sup>NS</sup>
	Normal	136 (84.47)	25 (15.53)		1.00 (reference)	-	-
	Overweight	2 (2.22)	88 (97.78)		216.13	62.59-1467.43	<0.01 <sup>S</sup>
	Obesity	1 (2.44)	40 (97.56)		185.00	37.73-4457.60	<0.01 <sup>S</sup>
Anxiety	No	145 (94.16)	9 (5.84)	236.69 (<0.01) <sup>S</sup>	1.00 (reference)	-	-
	Yes	9 (5.84)	145 (94.16)		242.44	99.47-683.69	<0.01 <sup>S</sup>
Vertigo	No	101 (90.18)	11 (9.82)	111.14 (<0.01) <sup>S</sup>	1.00 (reference)	-	-
	Yes	53 (27.04)	143 (72.96)		24.19	12.48-51.25	<0.01 <sup>S</sup>
Palpitation	No	113 (87.60)	16 (12.40)	122.93 (<0.01) <sup>S</sup>	1.00 (reference)	-	-
	Yes	41 (22.91)	138 (77.09)		23.27	12.70-45.05	<0.01 <sup>S</sup>
Headache	No	112 (90.32)	12 (9.68)	132.31 (<0.01) <sup>S</sup>	1.00 (reference)	-	-
	Yes	42 (22.83)	142 (77.17)		30.76	15.98-64.25	<0.01 <sup>S</sup>
Laziness	No	110 (88.71)	14 (11.29)	121.83 (<0.01) <sup>S</sup>	1.00 (reference)	-	-
	Yes	44 (23.91)	140 (76.09)		24.45	13.09-48.74	<0.01 <sup>S</sup>

S=Statistically significant / NS= Statistically non-significant

**Conclusion**

Age, Gender, Tobacco Chewing Habit, Alcoholic Habit, BMI, Anxiety, Vertigo, Palpitation, Headache, Laziness & Family history were significantly associated with hypertension and Socio-economic status, Dietary Habits & Smoking Status were non-significantly associated with hypertension in the

present study. Hence the study leads to establish the fact that these life style factors are important risk factors for hypertension. In health care delivery system it is important to screen people for hypertension and counsel them about lifestyle modification and risk reduction. Hence, healthy lifestyle changes like change in tobacco chewing, alcoholic,

promotion of balanced diet complemented by regular physical activity, and maintaining appropriate weight for age etc. should be promoted through behaviour change communications to reduce the prevalence of hypertension.

#### Acknowledgment

The authors are extremely thankful to The Director General, CCRUM, New Delhi for his valuable guidance, encouragement and providing necessary research facilities.

#### References

1. Abaci A, Oguz A, Kozan O. *et al.* Treatment and control of hypertension in Turkish population: a survey on high blood pressure in primary care (the TURKSAHA study). *Journal of Human Hypertension*. 2006; 20(5):355-361.
2. Alikor CA, Emem-Chioma PC, Odia OJ. Hypertension in a rural community in rivers state, Niger Delta region of Nigeria, *The Nigerian Health Journal*. 2013; 13(1):18-25.
3. Anália Rosário Lopes, Michelle Damasceno Moreira, Celita Salmaso Trelha, Luciana Lozza de, Moraes Marchiori. Association between complaints of dizziness and hypertension in non-institutionalized elders. *Int. Arch. Otorhinolaryngol*. 2013; 17(2):157-162.
4. Bakari AG, Onyemelukwe GC. Indices of obesity among type-2 diabetic Hausa-Fulani Nigerians, *International Journal of Diabetes and Metabolism*. 2005; 13(1):28-29.
5. Bacon SL, Campbell TS, Arsenault A, Lavoie KL. The impact of mood and anxiety disorders on incident hypertension at one year. *Int J Hypertens*. 2014; 2014: 953-094.
6. Center for Disease control and Prevention (CDC). Data from National health and Nutrition Examination Survey, 2009-2010. Hypertension Among Adults in the United States, 2009-2010.
7. Freitas OC, Resende de, Carvalho F, Neves JM. *et al.* Prevalence of hypertension in the urban population of Catanduva, in the State of São Paulo, Brazil. *Arquivos Brasileiros de Cardiologia*. 2001; 77(1):9-21.
8. Ibn Sina Al, Qanun Fil Tib. Urdu translation by G.H. Qantoori, Shiekh Mohd Basheer and Sons, Lahore. 1927; 2(1):29.
9. Julia M, van Weissenbruch MM, Delemarre-van de Waal HA, Surjono A. The influence of socioeconomic status on blood pressure of Indonesian prepubertal children. *J Hum Hypertens*. 2006; 20(7):546-548.
10. Keith M. Diaz, and Daichi Shimbo. Physical Activity and the Prevention of Hypertension. *NIH Public Access*. 2013; 15(6):659-668.
11. Martins D, Nelson K, Pan D, Tareen N, Norris K. The effect of gender on age related blood pressure changes and the prevalence of isolated systolic hypertension among older adults: data from NHANES III. *Journal of Gender Specific Medicine*. 2001; 4(3):10-13.
12. Nicolas PJ. *Statistics for Epidemiology*, 1st Edition 2004. Chapman & Hall. 2004; 73-81.
13. Ogedegbe G, Pickering TG, Clemow L, *et al.* The misdiagnosis of hypertension: the role of patient anxiety. *Arch Intern Med*. 2008; 168(22):2459-2465.
14. Onwuchekwa AC, Mezie-Okoye MM, Babatunde S. Prevalence of hypertension in Kegbara-Dere, a rural community in the Niger Delta region, Nigeria, "Ethnicity & Disease". 2012; 22(3):340-346.
15. Oviasu VO. Arterial blood pressures and hypertension in a rural Nigerian community. *African Journal of Medicine and Medical Sciences*. 1978; 7(3):137-143,
16. Priscilla Igho Pemu, and Elizabeth Ofili. Hypertension Women: Part I. *J Clin Hypertens (Greenwich)*. 2008; 10(5):406-410.
17. Piccini RX, Victora CG. Systemic arterial hypertension in a urban area of Southern Brazil: prevalence and risk factors. *Revista de Sa' ude P' ublica*, 1994; 28(4):261-267.
18. Pooja MY. Prevalence of hypertension among rural population of Doiwala Block, Dehradun, Uttarakhand, India. *Recent Research in Science and Technology*. 2013; 5(1):21-4.
19. Razi ABMZ. *Kitab al-Hawi* (Urdu translation). CCRUM, New Delhi. 1997; I:239-242.
20. Sidhu S, Kumari K, Prabhjot K. Socio-demographic Variables of Hypertension among Adult Punjabi Females. *Journal of Human Ecology*. 2005; 17(3):211-215.
21. Spruill TM, Pickering TG, Schwartz JE, *et al.* The impact of perceived hypertension status on anxiety and the white coat effect. *Ann Behav Med*. 2007; 34(1):1-9.
22. Tyagi R. Body composition and nutritional status of the institutionalised and non-institutionalised senior citizens. *EAA Summer School eBook*. 2007; 1:225-2319.
23. Thomas GP, Lynn C. Paroxysmal Hypertension: The Role of Stress and Psychological Factors. *The Journal of Clinical Hypertension*. 2008; 10(7):576-581.
24. Yadav S. *et al.* Prevalence & risk factors of pre-hypertension & hypertension in an affluent north Indian population *Indian J Med Res*. 2008; 128:712-720.