

Awareness about hypertension among entry year undergraduate health science students in Gulf Medical University, Ajman, UAE

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ABSTRACT

Context: Hypertension is a colossal problem experienced by one in three adults, leading to 1,000 deaths in a day that people need to be aware of various aspects regarding blood pressure.

Objective: To determine the level of awareness about hypertension among entry year undergraduate health science students in Ajman, UAE.

Materials and methods: A cross sectional study among students enrolled in first year, in the four academic programs, with the use of a validated, self-administered questionnaire on different domains of hypertension such as general knowledge, symptoms, complications, risk factors, treatment and management as well as sources of information. Each factor/statement was given a score of one if it was answered correctly and zero for a wrong answer. Out of a total score, a score of fifty percent and above was considered as good knowledge and a score less than fifty percent considered no knowledge. The data was analyzed by SPSS 20, Chi square and Fisher exact test was done.

Results: Out of 161 participants, 130 participants were ≤ 19 years where female accounted for 72.3%, and 82 participants were Non Arabs. Domain with highest level of awareness was treatment and management (99%), followed by general knowledge (95%), risk factors (85%), symptoms (80%), lastly complication (70%). Some knowledge gaps were identified in the domains : general knowledge (not curable – 35.4%, classification-42.9%), symptoms (difficulty in breathing – 35.4%, epistaxis – 36.6%), complication (kidney - 40.4%), risk factors (coffee intake – 21.1%, smoking cessation – 21.7%, regular cell phone usage – 23.6%, lack of vitamin D -33.5%, male gender – 34.2%). Regarding treatment and management the importance of regular eye checkup was the least one known by the participants (65.8%). Majority of the participants -74.5% - reported World Wide Web and internet as their source of information. Overall, no significant association was noted except for prior health related course and family history of hypertension.

Conclusion: The study shows overall good level of awareness in all domains with some gaps noted in domains such as knowledge of definition of hypertension, symptoms, complication and risk factors, whereas knowledge on treatment and management was comparatively good. A larger study would enable health promotion activities tailored to the needs of this age group.

Keywords: Knowledge, entry year, medical students, hypertension

INTRODUCTION

According to Joint National Committee 7, hypertension is classified into two stages, depending on systolic blood pressure and diastolic blood pressure¹.

There are several risk factors contributing to hypertension, such as age, gender and ethnicity. It is common in men over 45 and women over 55. As compared to Caucasian or Hispanic American race, African American is under more risk of developing hypertension. Positive family history², being overweight and obese are also additional risk factors. Other lifestyle factors that contribute to hypertension are – smoking, stress³, cell phone use⁴ and physical inactivity² and, consumption of alcohol³, increase salt intake, reduced potassium intake² and high fructose^{5,6}. Chronic diseases like diabetes, renal insufficiency, and obstructive sleep apnea are directly linked to hypertension³. Recent studies show that hypertension is on great increase, about 27% in children and adolescents in about 13 year period, linking to the risk factor of salt intake⁷.

As blood pressure gradually increases with age, proper management leads to prevention of hypertension, cardiovascular diseases, stroke and renal diseases⁸⁻¹¹. People diagnosed with hypertension demand pharmacological and non-pharmacological treatment. Management comprises of different categories of prevention and treatment of patient diagnosed with hypertension. Prevention is done at primary, secondary and tertiary levels. According to DASH (Dietary Approaches To Stop Hypertension Diet) in year 2012 studied, less salt serving at tables makes the blood pressure low,¹² it also decreases cardiovascular events which includes hypertension as well¹³. The DASH diet highlights on fruits, vegetables, and low-fat dairy products and is reduced in fat and cholesterol¹⁴. The Joint national committee 7 encourages intake of potassium to control high blood pressure¹⁵.

Study done in Riyadh, Saudi Arabia assessed knowledge of primary health care physicians and noted that currently working physicians had low level of knowledge about one third of doctors knew the definition of hypertension¹⁶. In a community study done on Hispanic subjects, knowledge about hypertension on risk factors and treatment was well known compared to definition and etiology¹⁷. In gulf region, deficiencies in knowledge were noted in students regarding risk factors of hypertension.¹⁸ In South Korea, insufficient knowledge of hypertension has been implicated to non-adherence to medication prescribed to hypertensives.¹⁹ As seen in literature awareness on different aspect of hypertension such as definition, classification, symptoms, risk factor, and management is important for prevention and compliance. Ongoing research on awareness plays a major role in primary prevention. Knowledge related to hypertension in the students of health care professions across the globe and especially in the United Arab Emirates is limited. Hence, this study was conducted to assess the level of awareness about hypertension among entry year undergraduate health science students in GMU, Ajman, UAE.

MATERIALS AND METHODS

It was a cross sectional study among students enrolled in first year, in the four academic programs in Gulf Medical University, Ajman, United Arab Emirates (UAE). The study was approved by the Ethics Committee of the Gulf Medical University. The data was collected using a pre-tested, structured, self-administered questionnaire. The questionnaire included socio-demographic variables like age, gender, nationality, parental profession, background education and questions on the knowledge

regarding hypertension (definition, communicability, classification, prevention, curability and age of presentation), symptoms (severe headache, problems of vision, redness of skin, fatigue, diarrhea, bleeding from nose, difficulty in breathing), organs affected/conditions (eyes, kidney, heart, brain, diabetes mellitus), risk factors (age, gender, family history, lifestyle factors, conditions), treatment and management (medication, exercise, weight control, diet, adherence to treatment, regular medical checkups). Each factor/statement was given a score of one if it was answered correctly and zero for a wrong answer. Out of a total score, a score of fifty percent and above was considered as good knowledge and a score less than fifty percent considered less knowledge. This was validated by two subject experts. Data was analyzed using SPSS 20. Chi Square test was used to find association between knowledge of various domains and socio-demographic characteristics, which showed no significance later, Fisher exact test was also performed.

RESULTS

The study was conducted among 161 entry year students to assess the knowledge regarding hypertension with respect to socio-demographic characteristics, background education, parental profession, family history of hypertension, and any relative in the health related field.

Table 1. Socio-demographic characteristics of the participants (N=161)

Variables	Groups	Gender			
		Male		Female	
		No.	%	No.	%
Age group in years	≤ 19	36	27.7	94	72.3
	>19	12	38.7	19	61.3
Academic program	MBBS	28	43.8	36	56.2
	DMD	10	21.3	37	78.7
	Pharm D	7	21.2	26	78.8
	BPT	3	17.6	14	82.4
Nationality	Arabs	31	39.2	48	60.8
	Non-Arabs	17	20.7	65	79.3
Background Education	High School	42	28.4	106	71.6
	Others	6	46.2	7	53.8
Parental Profession	Health related	15	40.5	22	59.5
	Others	33	26.6	91	73.4
Immediate relative in the health related profession	Yes	26	34.7	49	65.3
	No	22	25.6	64	74.4
Prior Health related course	Yes	7	53.8	6	46.2

	No	41	27.7	107	72.3
Family History of Hypertension	Yes	14	26.9	38	73.1
	No	34	31.2	75	68.8

Table 1 shows socio-demographic characteristics of participants. Of the 161 participants, majority 113 (70.2%) were females and the remaining males. Among the males, 36 (75.0%) were in the age group less than or equal to 19 years and the remaining 12 (25.0%) were in the age group greater than 19 years. Among females participants, 94 (83.2%) were in the age group less than or equal to 19 years and the remaining 19 (16.8%) were in the age group greater than 19 years. The mean age was 18.5 ± 1.32 years. The mean age for male participants was 18.6 ± 1.57 and female participants 18.4 ± 1.20 .

Out of 161 participants, highest numbers of students were from MBBS followed by DMD, Pharm D and BPT. Among male participants, 28 (58.3%) were from MBBS program followed by 10 (20.8%) from DMD program, 7 (14.6%) from Pharm. D program, and 3 (6.3%) from the BPT program respectively. With regard to female participants, 36 (31.9%) were from MBBS program, 37 (32.7%) from DMD program, 26 (23.0%) from Pharm. D program, and 14 (12.4%) were from BPT program respectively. With regard to the nationality of the participants, the respondents were categorized into Arabs and Non-Arabs. Non Arabs were more in number than Arabs comprising 82 of total. Among the Arabs, 48 (60.8%) were females and remaining were males.

Of the total participants, 148 completed grade twelve and 13 had under gone other courses like bachelor, foundation, and advanced placement in addition to grade twelve. Similarly it was observed that, of the total participants, 75 (46.5%) had immediate relatives in health care related professions. Among these, 49 (65.3%) were female participants relatives and 26 (34.7%) were male participants relatives. Among the participants, only 13 (8.0%) had under gone health related course before entering the current program. Of the total participants, 52 reported family history of hypertension.



Figure 1. Distribution of participants according to total knowledge score

Of the 49 questions 0.6% correctly answered 42; Majority of them correctly answered 34 to 38 questions. More than 95% had good awareness score. Distribution of participants by total score is presented in Figure 1.

Among the total participants, heart, brain, eye, and kidney were correctly identified as the organs affected in hypertension by 149 (92.5%), 105 (65.2%), 97 (60.2%), and 65 (40.0%) respectively. Seventy five (46.6%) reported correctly that diabetes mellitus is not due to hypertension.

Among the total participants, 144(89.4%) were aware about the definition of hypertension. With regard to the statement on ‘categorized into five stages’ 69 (42.9%) had the correct knowledge. Hypertension is not preventable was correctly answered by 121(75.2%) of the participants, only 57 (35.4%) were having the correct knowledge about the cure of hypertension and 130(80.7%) were having the knowledge that hypertension can occur at any age respectively.

It was observed that majority of the participants knew the symptoms of hypertension. Of all the participants, 139 (86.3%) had correct knowledge that severe headache as one of the symptoms of hypertension. Vision related problems were reported by 106 (65.8%) as one of the symptoms of hypertension followed by 128 (79.5%) reported that fatigue/tiredness as one of the symptoms of hypertension.

Table 2. Knowledge on risk factors of hypertension among the participants (N=161)

Items	Knowledge score ≥10		Knowledge score <10	
	(good knowledge)		(poor knowledge)	
	No.	%	No.	%
Increasing age	137	85.1	24	14.9
Family history of hypertension	134	83.2	27	16.8

Obesity/Overweight	142	88.2	19	11.8
Presence of Cardiovascular diseases	136	84.5	25	15.5
Presence of Gastric cancer	107	66.5	54	33.5
Male gender	55	34.2	106	65.8
Physical inactivity	124	77.0	37	23.0
Stress	151	93.8	10	6.2
Consumption of chips and salted nuts	129	80.1	32	19.9
Consumption of herbal tea	22	13.7	139	86.3
Presence of Sleep disorders	118	73.3	43	26.7
Increase coffee intake	34	21.1	127	78.9
Eating fast food	127	78.9	34	21.1
Presence of Diabetes Mellitus	82	50.9	79	49.1
Lack of Vitamin D	54	33.5	107	66.5
Use of saturated oil	110	68.3	51	31.7
Smoking cessation	35	21.7	126	78.3
Intake of fruits and vegetables	134	83.2	27	16.8
High cholesterol	134	83.2	27	16.8
Regular cell phone use	38	23.6	123	76.4

Table 2 shows the knowledge of risk factors of hypertension among the participants. The most common risk factor that the participants were aware about was stress, accounting for 151 (93.8%). Following it were overweight, increasing age, presence of CVS disease, family history of hypertension and hypercholesterolemia having 142 (88.2%), 137 (85.1%), 136 (84.5%), 134 (83.3%) and 134 (83.2%) respectively. The next common risk factors reported were consumption of chips and salted nuts, consumption of fast food, physical inactivity, sleep disorders accounting for 129 (80.1%), 127 (78.9%), 124 (77.0%) and 118 (73.3%) respectively. The list is furthered by use of saturated oil and presence of diabetes mellitus contributing to 110 (68.3%) and 82 (50.9%). The least common risk factors known by the participants were male gender, lack of Vitamin D, regular cellphone usage and coffee intake gaining 55 (34.2%), 54 (33.5%), 38 (23.6%) and 34 (21.1%) respectively. The percentages of participants aware of the fact that smoking cessation and herbal tea consumption reduces the risk of hypertension were 35 (21.7%) and 22 (13.7%).

It was observed that 156 (96.9%) of participants knew that drugs are available for hypertension, 143 (88.8%) of participants knew that regular exercise prevents hypertension, 123 (76.4%) of participants knew that weight gain needs to be controlled, 142 (88.2%) of participants knew that patients with hypertension should not consume alcohol, 150 (93.2%) of participants knew that patients with hypertension should not smoke, 133 (82.6%) of participants knew that patients with hypertension should have regular diet and 149 (92.5%) of participants knew that salt restriction prevents hypertension, 148 (91.9%) of participants knew that patients with hypertension should adhere to the treatment schedule, 147 (91.3%) of

participants knew that regular checkup of blood pressure plays important role in preventing hypertension, 106 (65.8%) of participants knew that regular eye checkup is essential as hypertension affects eyes, and 154 (95.7%) of participants knew that regular medical checkup can actually prevent hypertension.

The source of information on hypertension among participants shows that a higher number 120 (74.5%) of participants gained from Internet and World Wide Web. Following it Family members, Health professionals, Books/magazines/journals, Television/radio, and relatives were reported as source of information by 110 (68.3%), 97 (60.2%), 95 (59.0%), 93 (57.8%) and 92 (57.1%) respectively.

DISCUSSION

The present study assessed knowledge of hypertension in different aspects like definition, symptoms, complication, risk factors and treatment among undergraduate health science students in medical university.

Awareness among public on knowledge of hypertension was found to be quite poor²⁰. A study done in Tribhuvan university teaching hospital among hypertensive patients, Kathmandu, Nepal showed 56% were aware about the definition of hypertension while in the present study 89.4% of participants are well aware²¹. A rural community in Thailand showed that 22.5% were aware that HTN is a non-communicable disease²². Tribhuvan study reported that the middle age group (40 – 59years) as the most common age group for hypertension while in the present study 80.7% of participants that hypertension can occur at any age. The present study showed that 35.4% of participants are aware of the fact that hypertension is not curable as compared to the Tribhuvan's study, which had shown that only 16% knew it was not curable, but another 62% of the participants knew it was controllable²¹.

Study done in Riyadh, Saudi Arabia noted that currently working physicians, about one third of doctors knew the definition of hypertension.¹⁶ In a study done on Hispanic subjects, knowledge about hypertension on risk factors and treatment was good as compared to definition and etiology¹⁷. Study regarding awareness of symptoms of hypertension reported that 68% reported chronic headache compared to the present study which is (86.3%). The level of awareness was less among the subjects as compared to the participants in the present study²¹. Research was done on lifestyle of hypertensive patients before and after the diagnosis of hypertension in Kathmandu²³. It was concluded that awareness on symptoms such as head ache was 47% compared to 86.6% in the present study. Study regarding awareness and management of hypertension and hypercholesterolemia in Japan concluded that males who were aware were 65.7% and females 72.7%. The awareness regarding high blood pressure was higher than the awareness about hypercholesterolemia²⁴. According to research done, Nigeria 84% reported stroke as main complication of hypertension and only a few subjects associated an eye problem that is retinal failure²⁵. Our research differs from finding of Kusuma's et al²⁶. Viera et al., 2008 has revealed that more than 75% of Americans are aware of relationship between hypertension, stroke and heart diseases²⁷.

A similar study among entry year students in medical university found that about 70% of participants were aware of risk factors stress, high cholesterol and obesity, about 60% were aware of high salt intake and high calorie diet as risk factors, about 50 % were not aware of risk factor male gender, increasing age, and positive family history of CVD, while only 46.4% of participants were aware of coffee intake as risk factor²³. While in our study about 80% of participants were aware of

risk factor stress 93.8%, high cholesterol 83.2%, obesity 88.2%, increasing age 85.1% and family history of hypertension 83.2%, while only 34.2% of participants were aware of male gender as risk factor. The finding conveys the message that participants are not much aware of modifiable and non-modifiable risk factors. Study done in Seychelles, reported smoking as a cause of high blood pressure, while present study only 21.7% were aware that smoking cessation would reduce risk of hypertension²⁸. These shows the participants in present study are aware that smoking is a risk factor of hypertension. A recent study on knowledge and perceptions about hypertension reported that common and comprehensive knowledge was deficient²⁹. A research done in China³⁰, has shown that most common source of knowledge on hypertension was health publications (50.6%). In the present research, the most common source of information had been Internet and World Wide Web (74.5%) whereas in the Chinese study it was the least common source (7.8%)³⁰. The limitations to this research include that the results cannot be generalizable to the entire university students as the sample size is less and done among entry year students only. Another limitation is the use of self-reported data and the assumption that participants responded honestly and accurately.

CONCLUSION

Study conclude that majority of the participants had a good level of knowledge (more than 95% of the participants had knowledge score more than 50%) with regard to definition of hypertension, symptoms, complications, risk factors, and treatment and management. The association observed was not statistically significant. Most reported source of information was Internet and World Wide Web.

The present study provides an overview of awareness on knowledge regarding different aspects of hypertension and its association with sources of information and socio-demographic factors.

1. Large scale research can be conducted among these groups as sufficient information is not available in the scientific literature
2. Research on students of health care and Non-health care professions

REFERENCES

1. Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) NIH Publication No. 03 - 5231. May 2003 [Accessed on 2013 July 17]. Available from: URL: <http://www.nhlbi.nih.gov/guidelines/hypertension/phycard.pdf>
2. Health Guide. High Blood Pressure, from A.D.A.M. Review date 2012 May 22. [Accessed on 2013 July 15]. Available from: URL: <http://health.nytimes.com/health/guides/disease/hypertension/risk-factors.html>
3. High blood pressure (hypertension), Risk factors. Mayo Clinic, 2012 Aug 3 [Accessed on 2013 July 15], Available from: <http://www.mayoclinic.com/health/high-blood-pressure/DS00100/DSECTION=risk-factors>
4. New Research Shows What Raises and Lowers Blood Pressure: Cell Phones, Salt and Saying Om.2012 May 15 [Accessed on 2013 July 18]. Available from: URL: <http://www.sciencedaily.com/releases/2013/05/130515094925.htm>
5. Johnson RJ, Perez-Pozo SE, Sautin YY, et al. Hypothesis: could excessive fructose intake and uric acid cause type 2 diabetes? *Endocr Rev.* 2009;30:96-116.
6. Johnson RJ, Segal MS, Sautin Y, et al. Potential role of sugar (fructose) in the epidemic of hypertension, obesity and the metabolic syndrome, diabetes, kidney disease, and cardiovascular disease. *Am J Clin Nutr.* 2007;86:899-906.
7. Elevated Blood Pressure Increasing Among Children, Adolescents. American Heart Association. 2013 July 15 [Accessed on 2013 July15]. Available from: URL: <http://www.sciencedaily.com/releases/2013/07/130715164729.htm>

8. Franklin SS, Gustin Wt, Wong ND, et al. Hemodynamic patterns of age-related changes in blood pressure. The Framingham Heart Study. *Circulation*. 1997;96(1):308-315.
9. Vasan RS, Larson MG, Leip EP, et al. Assessment of frequency of progression to hypertension in non hypertensive participants in the Framingham Heart Study: a cohort study. *Lancet*. 2001;358(9294):1682-1686.
10. Franklin SS, Larson MG, Khan SA, et al. Does the relation of blood pressure to coronary heart disease risk change with aging? The Framingham Heart Study. *Circulation*. 2001;103(9):1245-1249.
11. Vasan RS, Beiser A, Seshadri S, et al. Residual lifetime risk for developing hypertension in middle-aged women and men: The Framingham Heart Study. *JAMA : the journal of the American Medical Association*. 2002;287(8):1003-1010.
12. Hummel SL, Seymour EM, Brook RD, et al. Low-sodium dietary approaches to stop hypertension diet reduces blood pressure, arterial stiffness, and oxidative stress in hypertensive heart failure with preserved ejection fraction. 2013 Nov 1 [Accessed on 2013 July 15]. Available from: URL: <http://www.ncbi.nlm.nih.gov/pubmed/23033371>
13. Fung TT, Chiuve SE, McCullough ML, et al. Adherence to a DASH-style diet and risk of coronary heart disease and stroke in women. *Arch Intern Med*. 2008 Apr 14;168 (7):713-20. doi:10.1001/archinte.168.7.713. [Accessed on July 23]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/18413553?ordinalpos=1&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_RVDocSum
14. Appel LJ. Lifestyle modification as a means to prevent and treat high blood pressure. 2003 July [Accessed on :2013 July 16]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12819311>
15. Whelton PK, He J, Cutler JA, et al. The effects of oral potassium on blood pressure: meta-analysis of randomized controlled clinical trials. *JAMA* 1997;277:1624-1632. [Accessed on: 2013 July 23]. Available from: URL: <http://www.ncbi.nlm.nih.gov/pubmed/9168293>
16. Al-Khashman AS. Screening for hypertension. Assessing the knowledge, attitudes and practice of primary health care physicians in Riyadh, Saudi Arabia. *Saudi Med J*. 2001 Dec; 22(12):1096-100 [Accessed on 2013 July 23]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11802184>
17. Ailinger RL. Hypertension knowledge in a Hispanic community. *Nurs Res*. 1982 Jul-Aug; 31(4):207-10. [Accessed on 2013 July 23]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/6920657>
18. Shaikh RB, Mathew E, Sreedharan J, et al. Knowledge regarding risk factors of hypertension among entry year students of a medical university. *J Family Community Med*. 2011 Sep-Dec; 18(3): 124-129. doi: 10.4103/2230-8229.90011 [Accessed on 2013 July 23]. Available from: URL: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3237200/>
19. Kim EY, Han HR, Jeong S, et al. Does knowledge matter? : intentional medication non adherence among middle-aged Korean Americans with high blood pressure. *J Cardiovasc Nurs*. 2007 Sep-Oct;22(5):397-404 [Accessed on 2013 July 23]. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17724422>.
20. Reddy KS. Hypertension control: Challenges and opportunities. *Natl Med J India*. 2000; 13:1-2.
21. Bhandari B, Bhattarai M, Bhandari M et al. Awareness of disease and self-care among hypertensive patients attending Tribhuvan university teaching hospital, Kathmandu, Nepal. *Journal of Nobel Medical College* (2012), Vol.1 No. (Accessed on 2013 Dec 11) Available from: URL: http://www.google.ae/url?sa=t&rct=j&q&esrc=s&source=web&cd=3&cad=rja&ved=0CDUQFjAC&url=http%3A%2F%2Fnejournal.info%2Findex.php%2FJoNMC%2Farticle%2Fdownload%2F7296%2F5912&ei=hY-oUvzMI4PA0QWLo4DABw&usg=AFQjCNFAdIm0436oKQqsmge_E3_6GQOgKA&bvm=bv.57799294%2Cd.d2k
22. Aung MN, Lorga T, Srikrajang J, et al. Assessing awareness and knowledge of hypertension in an at-risk population in the Karen ethnic rural community, Thasongyang, Thailand. *Int J Gen Med*. 2012;5:553-561.
23. Acharya, R. and Chalise, H. Life style of patient before and after diagnosis of hypertension in Kathmandu. *Health*. 2011;3:490-497. Doi: 10.4236/health.2011.38081. Available from: URL: <http://www.google.ae/url?sa=t&rct=j&q&esrc=s&source=web&cd=26&cad=rja&ved=0CEsQFjAFOBQ&url=http%3A%2F%2Fwww.doaj.org%2Fdoaj%3Ffunc%3Dfulltext%26ald%3D1018554&ei=oo2oUqnLOILQ0QWvkoHIAw&usg=AFQjCNEsbUUrAtn3LbqNHIDdGaMY4hMbjA&bvm=bv.57799294%2Cd.d2k> . (Accessed on 2013 Dec 12)
24. Tanaka T, Okamura T, Yamagata Z, et al. HIPOP-OHP Research Group: Awareness and treatment of hypertension and hypercholesterolemia in Japanese workers: the High-Risk and Population Strategy for Occupational Health Promotion (HIPOP-OHP) Study. *Hypertens Res* 2007;30:921-928. Available from: URL: <http://www.nature.com/hr/journal/v30/n10/abs/hr2007126a.html>. (Accessed on 2013 Dec 12)

25. Abdullahi AA, Azmat J. Knowledge of hypertension among the staff of university of Ibadan, nigeria. *J ournal of public health and epidemiology* 2011 march;3(5):204-09. Available from: URL: http://www.academia.edu/976664/Knowledge_of_hypertension_among_the_staff_of_University_of_Ibadan_Nigeria. (Accessed on 2013 Dec 11).
26. Min H, Chang J, Balkrishnan R. Socio-demographic Risk Factors of Diabetes and Hypertension Prevalence in Republic of Korea. *Int.J. Hyperten.* 2010.pp.1-6.
27. Viera AJ, Cohen LW, Mitchell CM, et al. High Blood Pressure Knowledge among Primary Care Patients with Known Hypertension: A North Carolina Family Medicine Research Network (NC-FM-RN) Study. *JABFM.* 2008;21(4):300-308.
28. Aubert L, Bovet P, Gervasoni JP, et al. Knowledge, attitudes, and practices on hypertension in a country in epidemiological transition. *Hypertension.* 1998;31:1136–45.
29. Kusuma YS, Gupta SK, Pandav CS. Knowledge and Perceptions about Hypertension among Neo-and Settled-Migrants in Delhi, India. *CVD Prev. Control.* 2009;4:119-129.
30. Xu T, Wang Y, Li W, et al. Survey of prevalence, awareness, treatment, and control of hypertension among Chinese governmental and institutional employees in Beijing. *Clin Cardiol.* 2010; 33:E66–72. Available from: URL: <http://onlinelibrary.wiley.com/doi/10.1002/clc.20704/pdf> .(Accessed on 2013 Dec 11).