EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 4
Issue: 11
406-410
Year: 2017

COMPARISON OF ANTHROPOMETRY, BODY COMPOSITION AND KNOWLEDGE, ATTITUDE, PRACTICE BETWEEN NORMOTENSIVE AND HYPERTENSIVE ADULTS OF ASIAN INDIANS ORIGIN: A COMMUNITY BASED CROSS SECTIONAL STUDY

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Article Received on 02/09/2017 **Article Revised on 23/09/2017** **Article Accepted on 13/10/2017**

ABSTRACT
There is little doubt on the fact that poor knowledge, attitude and practices (KAP) is one of the key factors for high prevalence of hypertension and related cardiovascular complications. However, there is a paucity of data on KAP in hypertension both in India and abroad. The present work was aimed to investigate awareness and activity level through KAP model between normotensive and hypertensive individuals. A total of 461 participants including 187 men and 274 women from Kolkata and suburb took part in this study. All participants divided into three age groups: Group I (30 – 44 years), Group II (45 – 59 years) and Group III (60^{+} years). Each age group was further classified into Normotensive (NT) and Hypertensive (HT) using standard *cut-offs*. All anthropometric measurements were collected using standard techniques. Information on socio-economic characteristics as well as respondents' awareness and activity was recorded in a pre-designed close ended schedule. Left arm systolic (SBP) and diastolic (DBP) blood pressure was taken from participants. Analysis of variance (ANOVA) was also used to compare NT vs. HT for anthropometric variables, body composition measures and blood pressure. ANOVA revealed significant differences for BMI, MWC, FM, FMI, PBF, SBP, DBP, MAP and VFL between HT and NT in Group II only. It was further observed that KAP for modifiable cardiovascular risk factors such as intake of extra salt, alcohol consumption etc., were almost non comparable in the study population.

KEYWORDS: KAP, hypertension, metabolic syndrome, rural-urban, Asian Indians.

INTRODUCTION
Hypertension (HTN) is a strong predictor and important causal factor for premature death and disability due to myocardial infarction, stroke and other cardiovascular complications.[1] Over past few decades its mortality and morbidity is now shifted from economically developed countries to economically developing countries experiencing a rapid transition from communicable to non communicable diseases.[2-5] The prevalence of HTN and its death rate continuously increasing in these countries is strongly associated with economic progress, demographic transition, urbanization and westernization resulting dramatic change in life style including sedentary activity, unhealthy diet and psychosocial stress.

Globally, 972 million adult people (including 333 million in developed and 639 million in developing countries) had HTN in 20000, projected to increase 1.56 billion by 2025.[3-5] In India, prevalence of hypertension is nearly similar in both sex and continuously increasing. In 2000, 60.4 million men and 57.8 million women were affected by HTN estimated to increase 107.3 million and 106.2 million in men and women respectively. As per the report of Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India, the overall prevalence of HTN will by 159.46 per thousand individuals in India by 2020.[6]

However, it is well accepted and well recognized that HTN and other cardiovascular risk factors (CVRFs) including obesity, type 2 diabetes mellitus (T2DM) can control nonpharmaceutically i.e. through life style modification such as increase physical activity, weight reduction, maintain DASH (Dietary Approaches to Stop Hypertension) diet, stop tobacco consumption and reduction in alcohol consumption in both affected people and most importantly in non affected people who have the risk to develop CVRFs. Furthermore, improvement in public awareness and activity level can control and decreases the risk of CVRFs including HTN. In a number of studies,[2-6] it was noted poor awareness and activity level is another key factor for high prevalence of HTN and other cardiovascular complications. But in

India, this information was very limited. Keeping this view in mind, present study was aimed to investigate awareness and activity level through KAP model (Knowledge, Attitude and Practice) between normotensive and hypertensive individuals. This model is particularly helpful to measure public awareness and activity between these two groups.

METHODS

Study Population

The present cross sectional study was conducted in adult population (30-80 years) of Bengalee community in between January and March 2015 by door-to-door visit near Barasat ($22^0$43`34.1616``N and $88^0$28`29.8560``E) and Kolkata ($22^0$34`21.5220``N and $88^0$21`50.0112``E), West Bengal, India. A total of 461 participants including 187 men and 274 women took part in this study. All participants divided into three age groups: Group I (30 – 44 years), Group II (45 – 59 years) and Group III (60^+ years). Each age group was further classified into Normotensive (NT) and Hypertensive (HT) using standard *cut-offs*.[7] An appointment was requested to the respondent's respective homes for data collection.

KAP schedule

Information on socio-economic characteristics as well as respondents' awareness and activity was recorded in a pre-designed close ended schedule. Only one individual was chosen from each household to avoid intra household clustering of responses to HTN.

Anthropometry and body composition measures

All anthropometric measurements namely height, weight, circumferences of waist and hip were collected using standard techniques.[7] Height and weight (in light clothing) was measured to the nearest 0.1 cm and 0.5 kg, respectively. Circumferences of minimum waist (MWC) and maximum hip (MHC) were measured to the nearest 0.1 cm using an inelastic tape. The indices of body mass index (BMI) and waist hip ratio (WHR) were then calculated using standard equations. Body composition measures namely percentage of body fat (PBF) and visceral fat level were measured using portable body fat monitor (Omron HBF-302, Omron Corporation, Tokyo, Japan). Fat mass (FM), fat free mass (FFM), fat mass index (FMI), fat free mass index (FFMI) were then calculated using standard equation.

Blood pressure

Left arm systolic (SBP) and diastolic (DBP) blood pressure was taken from the participants with the help of an Omron MI digital electronic blood/pulse monitor (Omron Corporation, Tokyo, Japan). Two BP measurements were taken and averaged for analysis. A third measurement was only taken when the difference between the 2 measurements was ≥5 mmHg and subsequently, the mean was calculated. A 5-minute relaxation period between measurements was maintained throughout the study. Mean arterial pressure (MAP) was calculated subsequently using standard formula.

MAP = DBP + 1/3 (SBP-DBP).

Statistical analyses

Mean and standard deviation (SD) of anthropometric measures, body composition and blood pressure were undertaken separately by age groups and blood pressure category (NT vs. HT). Analysis of variance (ANOVA) was also used to compare NT vs. HT for anthropometric variables, body composition measures and blood pressure.

All statistical analyses were performed using SPSS (PC + Version 17). A p value <0.05 was considered as significant.

RESULTS

Mean and standard deviation (SD) of anthropometric, body composition and blood pressure variables by age groups and blood pressure category are presented in **Table 1**. It was observed that HT individuals had higher mean age, weight, BMI, MWC, MHC, WHR, FM, FMI, FFM, FFMI, PBF, SBP, DBP, MAP and VFL compared to NT participants in virtually all age groups. Analysis of variance (ANOVA) revealed significant differences for BMI, MWC, FM, FMI, PBF, SBP, DBP, MAP and VFL between HT and NT in Group II only.

Participants' knowledge, attitude and practice are presented in **Table 2**. It was observed that KAP for modifiable cardiovascular risk factors such as intake of extra salt, alcohol consumption etc., were quite consistent in the study population.

Table 1: Descriptive statistics in normotensive and hypertensive participants by age group.

	Group – I (30 – 44 yrs)			Group – II (45 – 59yrs)			Group – III (60 – 80yrs)		
Variables	**NT (n =127)**	**HT (n =73)**	**ANOVA (*P*- value)**	**NT (n =86)**	**HT (n =84)**	**ANOVA (*P*- value)**	**NT (n = 24)**	**HT (n = 67)**	**ANOVA (*P*- value)**
Age (years)	36.63±4.31	38.68±4.78	0.002	50.97±4.02	51.63±4.20	0.293	66.04±7.35	67.45±6.35	0.375
Height (cm)	155.23±8.42	155.00±8.38	0.849	156.94±8.53	155.67±9.61	0.364	155.63±9.79	154.61±10.06	0.670
Weight (kg)	59.04±10.14	61.99±10.82	0.055	56.94±10.73	61.05±10.25	0.012	52.94±11.99	55.61±11.94	0.350
BMI	24.47±3.562	25.74±3.68	0.017	23.09±3.82	25.24±4.03	<0.001	21.71±3.69	23.17±3.89	0.114
MWC (cm)	80.81±9.77	83.87±9.57	0.033	80.43±9.98	85.77±9.39	<0.001	78.24±13.00	82.42±11.72	0.149
MHC (cm)	89.40±7.11	90.41±6.96	0.334	86.84±7.02	91.22±7.64	<0.001	84.89±7.55	87.11±7.97	0.238
WHR	0.90±0.08	0.93±0.07	0.035	0.93±0.008	0.94±0.007	0.182	0.92±0.10	0.94±0.09	0.209
FM (kg)	19.05±5.43	20.34±5.31	0.103	17.23±5.55	20.93±5.36	<0.001	16.52±5.33	18.58±6.21	0.152
FMI	7.97±2.41	8.55±2.42	0.107	7.10±2.52	8.78±2.65	<0.001	6.93±2.50	7.88±2.81	0.145
FFM (kg)	39.99±7.05	41.65±8.02	0.131	39.71±8.44	40.13±7.97	0.741	36.42±11.14	37.03±8.98	0.790
FFMI	16.50±1.81	17.20±2.05	0.013	15.99±2.38	16.46±2.28	0.190	14.78±3.32	15.28±2.28	0.417
PBF	31.89±6.20	32.74±5.85	0.396	30.17±7.49	34.29±6.72	<0.001	32.01±10.08	33.36±8.41	0.524
SBP (mmHg)	121.47±9.86	146.90±15.83	<0.001	123.45±9.48	156.01±17.05	<0.001	125.21±16.12	162.63±19.91	<0.001
DBP (mmHg)	80.22±5.88	96.78±7.77	<0.001	79.76±6.10	94.57±7.36	<0.001	74.54±8.59	90.58±10.61	<0.001
MAP (mmHg)	93.97±6.31	113.49±8.99	<0.001	94.32±6.50	113.05±8.66	<0.001	91.43±9.74	114.60±12.23	<0.001
VFL	7.46±3.44	9.18±3.88	0.001	8.02±4.38	9.88±4.38	0.006	7.00±3.76	9.22±4.80	0.043

BMI – body mass index, MWC – minimum waist circumference, MHC – maximum hip circumference, WHR – waist hip ratio, FM – fat mass, FMI – fat mass index, FFM – fat free mass, FFMI – fat free mass index, PBF – percentage of body fat, SBP – systolic blood pressure, DBP – diastolic blood pressure, MAP – mean arterial pressure, VFL – visceral fat level

Table 2. KAP by age-groups and blood pressure status (NT vs. HT)

Participants	I (30 – 44)		II (45 – 59)		III (60 – 80)	
response	Normotensive (n=127)	Hypertensive (n=73)	Normotensive (n=86)	Hypertensive (n=84)	Normotensive (n=24)	Hypertensive (n=67)
Knowledge						
Obesity	106(83.5)	65(89.0)	69(80.2)	73(86.9)	16(66.7)	52(77.6)
Sedentary activity	82(64.6)	54(74.0)	62(72.1)	62(73.8)	17(70.8)	42(62.7)
Extra salt	115(90.6)	69(94.5)	77(89.5)	78(92.9)	19(79.2)	59(88.1)
Alcohol	80(63.0)	52(71.2)	63(73.3)	58(69.0)	15(62.5)	35(52.2)
Tobacco	76(59.8)	43(58.9)	55(64.0)	41(48.8)	7(29.2)	24(35.8)
Attitude						
Loose extra pounds	104(83.5)	63(86.3)	67(77.9)	73(86.9)	15(62.5)	50(74.6)
Regular exercise	84(66.1)	54(74.0)	61(70.9)	62(73.8)	17(70.8)	42(62.7)
Reduce salt	113(89.0)	69(94.5)	76(88.4)	78(92.9)	19(79.2)	58(86.6)
Reduce alcohol	79(62.2)	51(69.9)	63(73.3)	61(72.6)	16(66.7)	39(58.2)
Stop Tobacco	75(59.1)	43(58.9)	55(64.0)	41(48.8)	7(29.2)	25(37.3)
Practice						
Loose extra pounds	57(44.9)	34(46.6)	43(57.0)	46(54.8)	7(29.2)	25(37.3)
Regular exercise	27(21.3)	18(24.7)	24(27.9)	28(33.3)	6(25.0)	26(38.8)
Reduce salt	78(61.4)	51(69.9)	62(72.1)	57(67.9)	15(62.5)	47(70.1)
Reduce alcohol	119(93.7)	65(89.0)	80(93.0)	81(96.4)	24(100)	64(95.5)
Stop Tobacco	97(76.4)	50(68.5)	49(57.0)	62(73.8)	14(58.3)	45(67.2)

% are expressed in parenthesis

DISCUSSION

Over past few decades, India is experiencing an economic progress and demographic transition. Besides it urbanization and westernization favoring dramatic changes in life style associated with sedentary activity, dietary changes take place for high prevalence of cardiovascular risk factors including hypertension.[2,4,6,7] It also indicates low level of awareness and activity at the population level.[6, 7] KAP assessment is better and probably best to know about public health as its measures awareness and activity at the population level and provides better idea about public health literacy as well as to understand about the required control and prevention strategy.

Control and prevention of HTN through life style modification such as maintaining of normal body weight, increase physical activity, adoption DASH eating plan, sodium restriction, reduction in alcohol consumption, stop tobacco consumption can reduces the risk of developing other CVRFs such as type II diabetes, obesity etc.[2,4] Obesity, abdominal obesity, central and total body fat distribution strongly associated with HTN.[3, 9] An individual's body weight, obesity, abdominal obesity, body fat can be modifiable through life style intervention. In this study low level of activity to control HTN through maintain normal body weight, regular physical activity among the NT and HT of all age group also evident. Although activity is somewhat better in comparison to awareness in case of tobacco and alcohol consumption. It is because of larger proportion of female (n=274) compared to male counter part, who never smoke or consume tobacco and alcohol.

In this study we found a reasonable gap between public awareness and activity level in both NT and HT individuals of all age group. Although control rate is little better in HT individuals. In developed countries, it was found that awareness and control rate was much better in comparison to developing countries and it is continuously increasing. At the same time prevalence of HTN and its mortality rate is decreasing due to their consistent effort to increase public health literacy at the population level.[5, 10-12] On the other hand, poor awareness and activity level is responsible for growing epidemic trend of hypertension in developing countries.[2,4,12] It also indicates there is a mismatch between health care professionals and general population. To overcome this problem improvement in health care systems, proper guidelines and strategic changes are urgently required in public health approach by policy makers to increase public health literacy at the population level.

However, some shortcomings are associated with this study including small sample size, proportion of women were unintentionally much greater because of their larger availability during day time. Moreover, geographical and ethnic variation, socio-economic and cultural disparity does exist in Asian Indian population. Therefore, further studies are required at the community and population level to better comprehend the applicability of KAP approach in cardiovascular health. Further, respondents' mood as well as place and time may affect this type of study.

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