Prevalence of High Blood Pressure among the Auto Rickshaw Drivers and its Relation with Body Composition Indicators

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ABSTRACT: A cross-sectional study was conducted among adult male aged 15-60 years who were engaged in auto rickshaw driving (n=202) and compared with control sample (n=268) after matching age, sex and socio-economic background. The mean systolic blood pressures were 134.01 and 121.09 mmHg while the mean diastolic pressures were 91.88 and 79.52 mmHg among auto rickshaw drivers and controls respectively, MAP shows there is a significant difference between auto rickshaw drivers and control group. Different anthropometric indicators like BMI, WHR, WHtR showing a statistical significant different is present between auto rickshaw drivers and control group ($p<0.001$).There is a significant ($p<0.05$ and $p<0.01$) positive correlation found between blood pressures and all the anthropometric indicators. The results suggest that obesity or over weight is associated with increasing blood pressure and auto rickshaw drivers are showing more number of high blood pressure compared to control group.

INTRODUCTION

Health is elusive, although it is the primary concern of all living organisms. World Health Organization (WHO,'48) described health as a 'state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'. Different factors are responsible for the expression of the health of any individual. One of the major factors is physical or occupational activities, which broadly considered under the life style pattern. Such kind of occupational activities or *occupational* hazards have an *effect* on the *health* and socio-economic status. A number of workplace intrinsically has health risk, such as different health risk factors are associated with the driving occupation and this occupation may lead to poorer health.

High blood pressure or hypertension is ranked as the third most important risk factor in South Asia (Lim *et al.*, 2010). WHO rates hypertension as an important causes of premature death worldwide (Mackay and Mensah, 2004). Hypertension exerts a considerable public health burden on cardiovascular

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health status and healthcare systems in India (Srinath *et al*, 2005). In India 57% of all stroke deaths and 24% of all coronary heart disease (CHD) death take place for hypertension (Gupta, 2004).

Occupation related stress has been considered as an important cardiovascular risk factor (Heydari *et al.,* 2010). Non-communicable disease is rising considerably and shows rising tendency in consider to the developing countries of the Middle East (Khosropanah *et al.,* 2010). While cardiovascular diseases and their main risk factors including hypertension, diabetes, obesity, lack of sufficient exercise, smoking and high blood fats are the most important causes of mortality and morbidity in most developed countries, non-communicable diseases among middle-income population have affected the communities and the leading cause of death worldwide (Tohidi *et al.*, 2010). On the other hand, a number of factors are considered as predisposing factors to hypertension such as obesity or increased Body Mass Index. Several indices such as BMI, WHR and WHtR are used as, an indicators of obesity (Seidell *et al.*,'97).

There are several risk factors implicated in the aetiology of hypertension such as age, geographic considerations, genetic, socio-economic, ethnicity, dietary, occupational, and nutritional status etc. Among them, occupation is one of the important causes of hypertension (Rau, 2014). Biologically it is evident that low density lipoprotein (LDL) leads to deposition of cholesterol in the wall of artery which obstruct blood flow and increased blood pressure. Some other factors also responsible for the increase of blood pressure, like certain mental stress, alcohol consumption, smoking, excess salt intake etc. The occupation, auto rickshaw driving has a cumulative effect of physical and mental stress. The physical stress concerns their long time uninterrupted sitting position and frequent mental stress.

The objective of the present study is to examine the blood pressure profile of auto rickshaw drivers compared to controls.

The study was aimed to find out the relation between blood pressure and various anthropometric variables (mainly related to obesity) and also find out best anthropometric predictor for high blood pressure among auto rickshaw drivers and compared with control group of the region.

MATERIALS AND METHODS

Sampling: A cross-sectional study was conducted during May to September in the year 2013, among the auto rickshaw drivers of Sonarpur and surrounding area of South 24 Parganas, West Bengal, India. Auto route selected as Sonarpur, Rajpur and Garia. Age-group considered was 18 to 60 years, which belongs to the adult age-group. Age-group selected as per the minimum age which considered for the permission of license. Total 470 samples were collected, of which 202 were auto rickshaw drivers and 268 controls belonging to same socio-economic condition. Different occupational categories considered as control group, such as agricultural labour, business, daily labour, government service, non government service, self employed etc. Area was selected by the deliberate sampling technique, on the basis of majority of the auto rickshaw drivers. The control population (non auto rickshaw drivers) was selected from the same area. A number of 202 adult (aged 18-60 years) auto rickshaw drivers were selected out of almost 400 auto rickshaw driver through random sampling method on the other hand 268 number of control populations were taken by the same method. At the time of taking the demographic data and also during the time of taking anthropometric measurements some auto rickshaw drivers were excluded those who are physically challenged, taking high blood pressure medicines and did not able to answer when necessary questions were placed before him. Therefore, only males, who are apparently healthy and able to give proper answer at the time of asking some questions in relation to demography were included and taken into consideration as a study participant.

Data collection: Data were collected from the research participants using a proper schedule, which contains age, sex, religion, education, occupational activities, anthropometric measurements and blood pressure etc. Data were collected after obtaining the oral informed consent, all the regulation of standard protocols were maintained for collecting anthropometric measurements (Stewart *et al.,* 2011).

Anthropometric measurements: All the measurements were taken after following standard protocol. Anthropometric measurements were collected from the research partners on the basis of the guidelines of The International Society for the Advancement of Kinanthropometry (ISAK). The international standards guideline for anthropometric assessment was followed as given in Stewart *et al.*, 2011. Body stature (in cm) measured by Martin's anthropometer (on nearest ±0.1 cm), body mass (in kg) were measured by a reliable weighing machine (on nearest ±0.1 kg), waist and hip circumference (in cm) were measured by an anthropometric measuring tape (on nearest ±0.1 cm). Heights were measured in upright position with the help of Martin's Anthropometer with a maximum difference of ±0.1 cm. A reliable weighing machine with a maximum difference of ±0.1 kg was used for measuring body mass. The standard measurement of the waist and hip circumference were carried out using a measuring tape with intervals of ±0.1 cm. Waist circumference represented an average of three measurements of waist diameter at midpoint between iliac crest and lower border of tenth rib. The hip circumference was determined by measuring the distance around the human body at the level of maximum posterior extension of the buttocks. Standard formula was used at the time of calculating body composition indicators (BCIs). Body mass index (BMI) was calculated as, weight in kilogram divided by height in meter square (kg/m^2). The Waist Hip ratio (WHR) and the Waist Height ratio (WHtR) was estimate for classifying the regional fat distribution.

Blood pressure measurements: Blood pressure (in mmHg) were measured by using a standard error free mercury sphygmomanometer and a stethoscope. At the time of taking measurements, the participants were seated in a chair with back supported, feet on the floor and legs uncrossed. The measurements (on nearest ±1.0 mmHg) were taken 3 times at a 5 minute time interval for the accuracy and then the mean value was obtained, which considered as actual blood pressure value. Systematically blood pressure measurements cannot be done within 30 mints of taking a meal. SBP and DBP were collected through this particular technique. Mean Arterial Pressure (MAP) can be reasonably approximated by using the following equation MAP = DBP + {1/3(PP)}, where PP = (SBP - DBP), here PP = Pulse pressure, SBP = Systolic blood pressure, DBP = Diastolic blood pressure (Pocock and Richards, 2009).

Statistical analysis: Collected data were analyzed by using Statistical Package for the Social Science (SPSS, version 18.0). Mean and standard deviation (±SD) were calculated for the analysis of descriptive statistics and for the inferential analysis correlation coefficient was used. All these statistical analysis tries to understand the relation between anthropometric variables and blood pressure, significant level is considered as $p<0.05$.

RESULTS & DISCUSSION

Present study reveals that out of total 470 participants, 202 are auto rickshaw drivers and the rest 268 are control group. Table 1 is descriptive statistics of both groups; all data are expressed as mean (SD). The mean age of the auto rickshaw drivers is 41.59 ±9.78 years and for controls it is 35.01 ±13.24 years.

TABLE 1

Differences of anthropometric indicators among auto rickshaw drivers and control group

Anthropometric indicators and blood pressures	Auto rickshaw drivers (n = 202) Mean (SD)	Control group (n =268) Mean (SD)	t-value
Body Height (cm)	165.28 (5.83)	163.55 (5.98)	3.134*
Body Weight (kg)	65.54 (11.04)	59.73 (11.14)	5.626**
Waist Circumference (cm)	86.82 (9.82)	80.13 (10.92)	6.861**
Hip Circumference (cm)	92.18 (7.23)	86.99 (7.66)	7.451**
BMI (kg/m2)	23.97 (3.71)	22.29 (3.69)	4.875**
WHR (WC/HC)	0.94 (0.053)	0.92 (0.071)	3.526**
WHtR(WC/Ht)	0.52 (0.060)	0.49 (0.065)	6.067**
SBP (mmHg)	134.01 (12.38)	121.09 (11.73)	11.536**
DBP (mmHg)	91.88 (11.53)	79.52 (8.71)	13.228**
MAP (mmHg)	105.92 (11.20)	93.38 (9.01)	13.444**

Significance: *p<0.01; **p<0.001

Differences of mean anthropometric indicators and blood pressures among two groups (auto rickshaw drivers and control group) are presented in Table 1. It exhibits that auto rickshaw drivers have higher mean value in respect of anthropometric indicators and blood pressures compared to the control group. Significant differences are found after using statistical analysis as independent samples t-test, here t-value of all anthropometric and blood pressure measurements along with some indices showing significant differences between two groups ($p < 0.01$ and < 0.001).

TABLE 2

Occupation-wise mean arterial classification distribution

MAP category group	Auto rickshawdrivers	Control
Optimal	25 (12.38)*	141 (52.61)
Normal	29 (14.36)	59 (22.01)
High Normal	48 (23.76)	39 (14.55)
Grade 1 Hypertension	72 (35.64)	28 (14.45)
Grade 2 Hypertension	28 (13.86)	1 (0.38)

Pearson Chi-Square value 130.017 ($p<0.001$); *Figures in parenthesis indicate percentage

Table 2 shows that percentage of optimal and normal mean arterial pressure category is higher among the control group rather than auto rickshaw drivers. Percentage of higher mean arterial pressure value (grade 1 and grade 2 hypertension) is found among the auto rickshaw drivers. It is very clearly showing in figure 1, i.e. graphical representation of occupation wise mean arterial pressure category distribution. This column diagram represents an enormous difference in optimal and grade 1 hypertension category; in case of optimal category the majority found in control group where as majority of auto rickshaw drivers are belongs to grade 1 hypertension category. It is now clear that, a long time practice of driving as an occupation have a bad impact on blood pressure, which may very harmful factor for the increase of cardiovascular diseases.

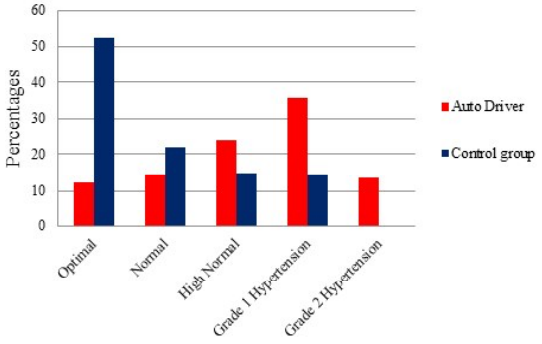

Figure 1: Occupation-wise mean arterial pressure category distribution

TABLE 3a

Frequency distribution of BMI between two groups

BMI category	Auto rickshaw drivers	Control group
Underweight	9 (4.5)*	36 (13.4)
Normal	112 (55.4)	166 (61.9)
Overweight	71 (35.1)	57 (21.3)
Obese	10 (5.0)	9 (3.4)

Pearson Chi-Square value 19.387 ($p<0.001$) *Figures in parenthesis indicate percentage

The study exhibits that the frequency of higher BMI people are more among the auto rickshaw drivers compared to the control group. Chi-square test and the frequency distributions are showing in the Table 3a. Percentages are showing here along with the frequency to reduce the error of unequal number of sample size. Percentage of normal BMI category is less among the auto rickshaw drivers compared to control group. Differences of frequency distribution is statistically analyzed by chi-square test, the value of chi-square shows that a significant differences is present between two groups ($p<0.001$).

TABLE 3b

BMI category-wise differences of blood pressures among auto rickshaw drivers and control people

Body Mass Index (kg/m^2)	Systolic blood pressure (mmHg)			Diastolic blood pressure (mmHg)		
	Auto rickshaw drivers	Control group	t-value	Auto rickshaw drivers	Control group	t-value
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Underweight (<18.5)	125.11(5.97)	112.94 0(8.18)	4.17**	84.55 (08.43)	71.81(07.56)	4.42*
Normal (18.5 - 24.9)	132.78 (11.89)	121.45 (11.94)	7.76**	90.73 (11.01)	79.78 (08.41)	9.39**

Contd...

Overweight (25 - 30)	136.34 (11.98)	123.61 (11.06)	6.17**	92.93 (11.44)	82.14 (07.44)	6.15**
Obese (>30)	139.20 (18.94)	131.11 (06.33)	1.21*	103.80 (12.60)	89.11 (04.26)	3.32*

Significance: *P<0.01, **P<0.001

TABLE 3c

BMI category-wise differences of mean arterial pressures among auto rickshaw drivers and control group

Body Mass Index (kg/m^2)	Mean arterial pressure (mm Hg) Auto Rickshaw drivers Mean (SD)	Control group Mean (SD)	t-value
Underweight (<18.5)	98.07 (7.53)	85.52 (6.78)	4.86**
Normal (18.5 - 24.9)	104.75 (10.74)	93.67 (8.84)	9.389***
Overweight (25 – 30)	107.40 (11.04)	95.96 (7.91)	6.579***
Obese (>30)	115.60 (13.54)	103.11 (4.74)	2.620*

Significance: *P<0.05, **P<0.01, ***P<0.001

Systolic, Diastolic and Mean arterial pressure are shown an increasing trend in respect of increasing BMI among both groups (Auto rickshaw drivers and Control group). On the other hand, each BMI category represents higher blood pressure value among auto rickshaw drivers compared to the control group. Statistically differences are analyzed through independent sample t-test, mean value of all types of blood pressure (SBP, DBP and MAP) exhibits significantly difference between the groups, except SBP of obese category. SBP of obese category cannot showing the significant difference, may be due to small sample numbers.

It is clear from table 3b and 3c that an occupational effect is functioning on blood pressure and a relation is present between blood pressure and BMI. BMI indicate proportional body weight or body mass compared to body height, the table 3a showing that auto rickshaw drivers have more body mass compare to control group which is one of the major factor for cardiovascular diseases.

TABLE 4a

Frequency distribution of WHR between two groups

WHR category	Auto rickshaw drivers	Control group
Excellent	13 (6.4)*	53 (19.8)
Good	28 (13.9)	55 (20.5)
Average	66 (32.7)	64 (23.9)
High	68 (33.7)	60 (22.4)
Extreme high	27 (13.4)	36 (13.4)

Pearson Chi-Square value 26.088 (p<0.001)

*Figures in parenthesis indicate percentage

Table 4a shows distribution of the frequency of the WHR category between the auto rickshaw drivers and control group. Percentages of normal WHR category (excellent and good) are less among the auto rickshaw drivers compared to control group. On the other hand, obese WHR categories (high and extreme high) are showing opposite results, higher among the auto rickshaw drivers. Differences of frequency distribution is statistically analyzed by chi-square test, the value of chi-square shows a significant differences (p<0.001) between two groups.

TABLE 4b

WHR category wise differences of blood pressures among auto rickshaw drivers and control people

Waist Hip Ratio (Waist/Hip)	Systolic blood pressure (mmHg) Auto rickshaw drivers Mean (SD)	Control group Mean (SD)	t-value	Diastolic blood pressure (mmHg) Auto rickshaw drivers Mean (SD)	Control group Mean (SD)	t-value
Excellent (<0.85)	125.69 (11.39)	113.94 (10.15)	3.65*	82.61 (10.36)	74.43 (07.50)	3.257*
Good (0.85-0.90)	128.11 (08.73)	119.64 (12.14)	3.28**	86.25 (08.77)	77.45 (09.20)	4.18**
Average (0.90-0.95)	130.97 (12.36)	121.59 (09.89)	4.76**	89.88 (10.98)	79.62 (06.95)	6.34**
High (0.95-1.00)	137.71 (11.20)	124.62 (11.94)	6.39**	95.10 (10.70)	82.80 (08.92)	7.01**
Extreme high (>1.00)	142.22 (11.80)	127.08 (10.62)	5.34**	98.93 (11.68)	84.53 (07.34)	5.99**

Significance: *P<0.01, **P<0.001

TABLE 4c

WHR category-wise differences of mean arterial pressures among auto rickshaw driver and control group

Waist Hip Ratio (Waist/Hip)	Mean arterial pressure (mmHg) Auto rickshawd rivers Mean (SD)	Control group Mean (SD)	t-value
Excellent (<0.85)	96.97 (10.21)	87.60 (07.60)	3.71*
Good (0.85-0.90)	100.20 (7.78)	91.51 (09.54)	4.16**
Average (0.90-0.95)	103.58 (10.71)	93.61 (06.68)	6.34**
High (0.95-1.00)	109.30 (10.43)	96.74 (09.36)	7.13**
Extreme high (>1.00)	113.36 (10.77)	98.71 (07.75)	6.28**

Significance: *P<0.01, **P<0.001

Category of WHR shows more or less similar result like BMI category, Table 4b and 4c describes differences of blood pressure (SBP, DBP and MAP) in respect of WHR category. It has been observed that in every stage of WHR classification the mean value of SBP and DBP increases but higher mean values were found among auto rickshaw drivers compared to controls. MAP calculated for better understanding and it has also been found that the mean value of MAP is higher among auto rickshaw drivers compared to controls. Difference of mean value of blood pressure is statistically analyzed through independent sample t-test. The result of t-test value showing a significant differences is present between the mean values among auto rickshaw drivers and the control group ($p<0.01$ and $p<0.001$). WHR is the proportional circumference of the waist or central region of the body compare to the circumference of hip, this is also important indicator for the assessment of obesity.

TABLE 5a

Frequency distribution of WHtR between two groups

WHtR category	Auto drivers	Control group
Very Slim	11 (05.4)*	56 (20.9)
Slender	17 (08.4)	48 (17.9)
Normal	91 (45.0)	93 (34.7)
Over weight	38 (18.8)	47 (17.5)
Obese	38 (18.8)	21 (07.8)
High obese	07 (03.5)	3 (01.1)

Pearson Chi-Square value 44.083 ($p<0.001$)
*Figures in parenthesis indicate percentages

Table 5a shows distribution of the frequency of WHtR category between the auto rickshaw drivers and control group. This table illustrates maximum percentage of auto rickshaw drivers are normal, overweight and obese category where as in control group majority are belonging to very slim, slender, normal and overweight category. The difference in frequency distribution is statistically analyzed by chi-square test, a significant ($p<0.001$) difference is found on the different category of both groups.

TABLE 5b

WHtR category wise differences of blood pressures among auto rickshaw driver and control people

Waist Height Ratio (Waist/Height)	Systolic blood pressure (mmHg) Auto drivers Mean (SD)	Control group Mean (SD)	t-value	Diastolic blood pressure (mmHg) Auto drivers Mean (SD)	Control group Mean (SD)	t-value
Abnormally slim (<0.35)	–	–	–	–	–	–
Very slim (0.35-0.43)	122.64 (8.02)	113.70 (09.12)	3.025**	79.91 (08.09)	73.96 (07.08)	2.48*
Slender (0.43 - 0.46)	132.71(11.34)	118.65 (11.95)	4.22***	92.29 (07.65)	76.96 (08.87)	6.33***
Normal (0.46-0.54)	132.19(11.85)	122.60 (11.39)	5.59***	89.97 (11.31)	80.95 (08.49)	6.12***
Overweight (0.54-0.58)	135.82(13.58)	126.57 (11.01)	3.46**	92.71 (11.46)	83.13 (07.43)	4.65***
Obese (0.58-0.63)	138.63(9.96)	126.14 (10.03)	4.60***	97.00 (09.40)	84.43 (06.75)	5.40***
High obese (>0.63)	143.71(16.43)	130.33 (08.08)	1.31ns	102.14(17.46)	89.33 (07.23)	1.19ns

Significance: *P<0.05, **P<0.01, ***P<0.001

TABLE 5c

WHtR category wise differences of mean arterial pressures among auto rickshaw driver and control group

Waist Height Ratio (Waist/Height)	Mean arterial pressure (mmHg) Auto driver Mean (SD)	Control group Mean (SD)	t-value
Abnormally Slim (<0.35)	–	–	–
Very Slim (0.35-0.43)	94.15 (07.47)	87.21 (06.91)	3.008*
Slender (0.43 - 0.46)	105.76 (07.72)	90.85 (09.12)	6.011**
Normal (0.46-0.54)	104.04 (10.92)	94.83 (08.62)	6.359**
Overweight (0.54-0.58)	107.08 (11.63)	97.61 (07.86)	4.466**
Obese (0.58-0.63)	110.88 (08.86)	98.33 (07.32)	5.524**
High Obese (>0.63)	116.00 (16.07)	103.00 (07.51)	1.307ns

Significance: *P<0.01, **P<0.001

Waist height ratio wise differences of blood pressures among the auto rickshaw drivers and control people depicts in Table 5b and Table 5c. It is evident that the mean value of SBP, DBP and MAP are lower among control group and higher among drivers. Statistical differences are examined through the independent sample t-test, the result showing t-value is significantly different between the two groups, except high obese category (>0.63) because the number of sample is very low in this particular category. Waist height ratio mainly indicates central obesity of an individual in respect of body height. Central obesity is another major factor cardiovascular disease, the result showing the risk of cardiovascular problem is relatively higher among the auto rickshaw drivers.

TABLE 6

Correlation of coefficient between blood pressures and anthropometric variables

	Auto rickshaw drivers			Control group		
Anthropometric indicators	SBP (mmHg)	DBP (mmHg)	MAP (mmHg)	SBP (mmHg)	DBP	MAP
Height	0.037	0.037	0.039	0.089	0.143*	0.131*
Weight	0.263**	0.295**	0.299**	0.360**	0.429**	0.433**
Waist circumference	0.327**	0.343**	0.356**	0.411**	0.468**	0.480**
Hip circumference	0.214**	0.229**	0.236**	0.330**	0.401**	0.402**
BMI	0.265**	0.308**	0.309**	0.360**	0.415**	0 .424**
WHR	0.350**	0.362**	0.377**	0.353**	0.376**	0.396**
WHtR	0.312**	0.332**	0.343**	0.394**	0.438**	0.453**

Significance: *P<0.05, **P<0.01

Table 6 represents correlation of coefficient of blood pressure with anthropometric variables and obesity indicators (BMI, WHR, WHtR). It shows a positive correlation in the two groups, auto rickshaw drivers and control group. This table shows that obesity indicating anthropometric variables are positively correlated with blood pressure ($p<0.05$ & $p<0.01$), only body height positively correlated but not significant among auto rickshaw drives. Body height is not directly affecting on cardiovascular system. However, all obesity indicators have significant positive correlation with blood pressure. It is clear that, blood pressure is statistically correlated with the obesity indicators among both groups, but the cardiovascular risk is higher among the auto rickshaw drivers.

TABLE 7a

Stepwise multiple regression between anthropometric variables as independent variable and blood pressure as dependent variable among the studied participants

Dependent variables	Auto rickshaw drivers				Control group			
	B	R^2 change	t-value	p-value	B	R^2 change	t-value	p-value
SBP	0.327	0.107	4.900	0.0001	0.411	0.169	7.343	0.0001
DBP	0.343	0.118	5.165	0.0001	0.468	0.219	8.640	0.0001
MAP	0.356	0.127	5.387	0.0001	0.480	0.231	8.928	0.0001

Note: All anthropometric variables are independent variables and dependent variables are Blood pressure (SBP, DBP, MAP). From all anthropometric variables only body mass selected as Predictor for the blood pressure (SBP, DBP, MAP) among auto driver and control group.
B: "beta" value of the regression coefficient.

TABLE 7b

Stepwise multiple regression between Body Composition Indicators (BCIs) as independent variable and blood pressure as dependent variable among the studied participants

Dependent variables	Auto driver				Control group			
	B	R^2 change	t-value	p-value	B	R^2 change	t-value	p-value
SBP	0.350	0.122	5.277	0.0001	0.394	0.155	6.990	0.0001
DBP	0.362	0.131	5.495	0.0001	0.438	0.192	7.940	0.0001
MAP	0.377	0.142	5.762	0.0001	0.435	0.205	8.295	0.0001

Note: All BCIs are independent variables and dependent variables are blood pressure (SBP, DBP, MAP). From all BCIs only WHR selected as Predictor for the blood pressure (SBP, DBP, MAP) among auto driver, and WHtR selected as Predictor for the blood pressure (SBP, DBP, MAP) among control group.
B: "beta" value of the regression coefficient.

Table 7a and Table 7b showing multiple regression coefficient of auto rickshaw drivers and control group, which indicate the most important factor for the increase of blood pressure. In the table 7a dependent variables are blood pressure (SBP, DBP and MAP) on the other hand independent variables are all the anthropometric variables. This table indicates among the both groups body mass is the significant predictor of blood pressure. R^2 change indicates SBP, DBP and MAP are predict by the body mass 10%, 11% and 12% among the auto rickshaw drivers as well as 16%, 21% and 23% among the control group.

In the Table 7b dependent variables are blood pressure (SBP, DBP and MAP) other hand independent variables are all the body composition indicators. This table indicates WHR is the significant predictor of blood pressure among the auto rickshaw drivers and WHtR is the significant predictor of blood pressure among the control group. R^2 change indicates SBP, DBP and MAP are predict by the WHR 12%, 13% and 14% among the auto rickshaw drivers as well as WHtR 15%, 19% and 20% among the control group.

CONCLUSION

In respect of anthropometric indicators Auto rickshaw drivers are taller, heavier, large size waist and hip, as well as more BMI, WHR, WHtR score than control group. Similarly their SBP, DBP and MAP score are also higher than control.

To conclude whether high BP among auto rickshaw drivers are due to simple overweight or because of other occupational hazard have classified whole population into four BMI categories underweight, normal, overweight and obese; and data shows that auto rickshaw drivers having higher SBP, DBP and MAP irrespective of BMI categories, and also the differences are statistically significant. The same is also true for WHR categories. SBP, DBP and MAP in respect of excellent, good, average, high and extreme high are statistically higher among auto rickshaw drivers than control.

However, when we compared SBP, DBP and MAP in respect of WHtR categories it was again significantly higher among auto rickshaw drivers except high obese group where differences are statistically non significant.

In case of correlation coefficient between blood pressure (SBP, DBP & MAP) and anthropometric variables (weight, waist circumference, hip circumference, BMI, WHR and WHtR) have significant positive correlation among auto rickshaw drivers and control group, except height of auto rickshaw drivers, although the risk is higher among the auto rickshaw drivers.

Stepwise multiple regressions between anthropometric variables and blood pressure shows the most important factors for increasing blood pressure is body mass among auto rickshaw drivers and control group. In the same, stepwise multiple regressions between body composition indicators and blood pressure shows WHR is the significant predictor of blood pressure among auto rickshaw drivers and WHtR is the significant predictor of blood pressure among control group.

Therefore it is evident that blood pressure (SBP, DBP & MAP) are statistically higher among auto rickshaw driver due to this unique occupational hazard.

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