Prevalence of Hypertension among the Urban Slum Muslim Women of Kolkata, West Bengal

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ABSTRACT: Hypertension is the most prevalent non-communicable disease (NCD) of both developed and developing countries now-a-days. The present study is an endeavor to assess the prevalence of hypertension among the Muslim slum women of Kolkata, West Bengal. This cross-sectional study was carried out among a total of 100 married Muslim women of age-group 15-44 years residing in slums of Narkeldanga in Kolkata city. A significant difference ($p<0.001$) was observed in the mean systolic blood pressure (SBP), mean diastolic blood pressure (DBP), and in duration of breast feeding and method of fertility control in the sample of women studied. Except height, all anthropometric measurements (Wt, BMI, MUAC and WC) were found to be significantly higher ($p<0.001$) among the hypertensive women. The age-specific mean difference (ANOVA) was found to be statistically significant($p<0.001$) with respect to SBP and DBP. This study suggest that more attention is required for the health care of urban poor slum women who are vulnerable and marginalized section of the society.

INTRODUCTION

Non-Communicable Diseases (NCDs) is rising rapidly in low- and middle-income countries (WHO, 2011). Around 60.3% of the total deaths worldwide is attributable to non-communicable diseases in 2005 (Strong *et al*., 2005). By 2020, it is estimated that non-communicable diseases including hypertension will outstrip communicable diseases as the leading cause of death (Reddy *et al*., 2005). Demographic changes, rapid urbanization, rise in overweight and obesity and lifestyle changes are some of the main contributing factors of NCDs.

Hypertension, one of the major public health challenges is burden in both developed and developing countries and constitutes a major risk factor for cardiovascular disease. The World Health Organization estimates a prevalence rate of 10-16% using the cut-off of 160/95 mmHg (Akinkugbe,'97). With the current revised definition of 140/90 mmHg this prevalence will be much higher. The rise in overweight and obesity is particularly worrying because of the associated health consequences such as cardiovascular diseases, diabetes, cancer and osteoarthritis (Asfaw, 2006). It is estimated that by 2025, three quarters of the obese population will live in non-industrialized countries (WHO, 2005).

The United Nations expert group in 2002 defined slum as "human settlement that has inadequate access to safe water, sanitation and other infrastructure, poor structural quality of housing, overcrowding and

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insecure residential status" (UN, 2003). About one billion people of the world population are estimated to be living in slum or squatter settlement (UNDP, 2005).

The explosive population growth in the urban cities is due to increased industrial activities which created opportunities for both skilled and unskilled workers and resulted in the migration of people from rural to urban cities which in turn led to overstretching of the limited infrastructural facilities available in the cities. The government in turn fails to provide affordable housing and poor urban planning. Under this circumstance, the low-income segment of the population is forced to live in crowded slum with poor sanitary conditions (Riley *et al*., 2007).

Urban slum dwellers are not only exposed to communicable diseases due to poor sanitary conditions but also to NCDs such as hypertension. They are equally exposed to unhealthy lifestyle factors such as potentially harmful dietary practice, physical inactivity, substance use (alcohol, tobacco etc.) and non-adherence to treatment. However, the prevalence, magnitude and risk factors of NCDs in slums are not known (Daniel *et al*., 2013) especially among the women of reproductive age groups. Hypertension was more prevalent among the poorer women and was strongly associated with their cardiovascular risk (Khan *et al*., 2013). The prevalence of hypertension was much higher among the urban population than the rural (Anchala *et al*., 2014) and was even much higher among the tribal women of Visakhapatnam (Naidu, 2016). High prevalence of hypertension was also observed among the women of West Bengal (Dutta and Ray, 2012) and an association of hypertension and age, education, weight, height and BMI were also revealed among the urban slum women of Kolkata, West Bengal (Saha *et al*., 2008). Women of reproductive age are commonly exposed to antihypertensive medications and fetal risks, since large properties of pregnancies are unplanned. Therefore, further study is required to define safe motherhood (Bateman *et al*., 2012). Studies on the prevalence of hypertension are sparse among the slum dwellers and until recently no such study has been reported on the urban slum Muslim women of the reproductive age groups. Under this predicament, the present study is an endeavor to assess the prevalence of hypertension among the urban slum women of reproductive age of Kolkata, West Bengal.

MATERIALS AND METHODS

The present community based cross-sectional study was carried out among the urban slum Muslim women (reproductive age-group: 15-44 years) of Narkeldanga, Kolkata. A total of 100 married slum women in the age-group 15 to 44 years were apparently selected to participate in the study using a purposive random sampling method. Pregnant women and those who were not willing to participate were excluded. From each participant, an informed consent was obtained. A pre-tested structured schedule was used to collect data on the socio-demographic profile, reproductive performance, behavioral risk factors by interview method. All anthropometric measurements (height, weight, WC and MUAC) were recorded following the standard procedures (Hall *et al*., 2007). Weight and height were measured using scales with an accuracy of 0.1 kg and 0.1 cm respectively, using Martin's Anthropometer and the standard weighing machine. Weight was measured with light clothing and without shoes. Height was measured with the subject stand erect position on a flat surface and the head oriented in the Frankfort horizontal plane. The mid-upper arm circumference (MUAC) and waist circumference (WC) was measured using a non-stretchable measuring tape to the nearest 0.1 cm.

The diagnosis of hypertension was based on systolic blood pressure e" 140 mmHg and diastolic blood pressure e" 90 mmHg (according to James *et al*., 2014).

Blood pressure was recorded using a mercury sphygmomanometer after the structured schedule had been filled to ensure at least 10 min rest before a resting blood pressure was taken. Three reading were carried out while the mean was taken as the reading for each individual. The body mass index (BMI) was calculated using weight in kilogram divided by the square of the height in meter. The BMI was classified using the WHO classification (1997). BMI <18.5 kg/m^2 was regarded as underweight, BMIe"18.5-24.9 kg/m^2 as normal and BMI e"25.0-30.0 kg/m^2 as overweight and BMI>30.0 kg/m^2 was classified as obesity.

Classification of blood pressure in adults (age ≥18 years):

Blood pressure	SBP (mmHg)	DBP (mmHg)
Pre-hypertension	<120	<80
Hypertension	120-139	80-89
Stage-1	140-159	90-99
Stage-2	≥160	≥100

Source: James *et al*., 2014.

Data was analyzed using standard statistical procedures using SPSS version 16.0. Chi-square test was performed to evaluate differences in categorical variables. Fisher's exact test was used when cell size was less than 5. The student's t-test was used to compare continuous variables. Analysis of ANOVA was also used to compare more than three groups with their mean differences. $p<0.05$, 0.01 and 0.001were considered as the significant level

RESULTS

TABLE 1

Prevalence of different stages of blood pressure of the studied population according to JNC-8 (2015)

Blood pressure status	Number	Percentage
Normal	58	58
Pre-Hypertensive	23	23
Hypertensive	19	19
Total	100	100

The above table shows the distribution of different stages of blood pressure levels among the participants. According to this table, 58% of the women possess normal blood pressure and 23% are in the pre-hypertensive group and 19% of the women are hypertensive.

TABLE 2

Demographic characteristics, behavioral risk factors and reproductive characteristics by hypertensive status.

Characteristics				Hypertensives (n=19)		Normotensives (n=81)		p- value
		Mean age		Mean	35.217	Mean	30.76	0.0185*
				SD	0.05	SD	8.08	
Age-group (in years)		Total number	Percentage	Total	Percentage number	Total	Percentage number	p- value
15-24		33	33	3	15.8	30	37	0.0535
25-34		32	32	5	26.3	27	33.3	
35-44		35	35	11	57.9	24	29.6	
Education	Non literate	73	73	16	84	57	70.4	0.2653
	Literate	27	27	3	16	24	29.6	
Family income(¹)	≤5000	47	47	8	42.1	39	48.1	0.5117
	5000-10000	44	44	8	42.1	36	44.4	
	≥10000	9	9	3	15.8	6	7.4	
Physical Activity	Light work	55	55	8	42.1	47	58	0.2094
	Moderate Work	45	45	11	57.9	34	41.9	
	Hard Work	0	0	0	0	0	0	
Behavioral	Alcohol consumption	0	0	0	0	0	0	0.9715
Risk Factors	Smoking	0	0	0	0	0	0	
	Chewing	53	53	10	52.6	43	53.1	
	No Chewing	47	47	9	47.4	38	46.9	
Number of conception	0 to 1	18	18	5	26.3	13	16	0.0564
	2 to 3	40	40	3	15.8	37	45.7	
	≥4	42	42	11	57.9	31	38.3	
Duration of breast feeding	None	25	25	11	44	14	17.3	0.0016**
	6 Months	23	23	4	17.3	19	23.5	
	1-2 years	40	40	2	5	38	46.9	
	2 years or more	12	12	2	16.6	10	12.3	
Methods of fertility control	None	45	45	2	4.4	43	53.1	0.0006***
	Medicine	30	30	12	40	18	22.2	
	Operation	25	25	5	20	20	24.7	

Chi-square (χ^2) test : difference significant at *p<0.05, **p<0.01, ***p<0.001

The mean age of hypertensive women (35.22±7.05) was significantly higher ($p<0.05$) than the normotensive women (30.76±8.08), see Table-2. Majority of the women in the hypertensive group (57.9%) were in the age group 35-44 years and in the normotensive group (37.0%) was in the age group 15-24 years. Age showed a significant relationship with hypertension. Maximum women in the hypertensive group (84.0%) were non-literate while 70.4% of the women in the normotensive group were non-literate and 29.6% of the women had primary and secondary education. Hypertensive women belong to a higher income group ($\geq$ ₹ 10,000/-) compared to the normotensive women. No significant difference was observed in education, family income and physical activity between the two groups. Smoking and alcohol consumption were not reported by a single participant. About half of the participants were chewers but no significant difference was observed between the two groups.The reproductive performance of the women revealed that maximum percentage of the women in the hypertensive group had more no. of conception compared to the women in the normotensive group. The duration of breast feeding is significantly higher ($p<0.01$) among the women of the normotensive group. A significant difference ($p<0.001$)is also observed in the method of fertility control between the women of the two groups.

TABLE 3

Anthropometric characteristics of the studied population.

Anthropometric variables	Hypertensive (n-19)		Normotensives (n-81)		t test	p - value
	Mean	SD	Mean	SD		
Height (m)	1.50	0.06	1.52	0.11	0.09	NS*
Weight (kg)	58.31	5.14	53.4	8.01	2.55	<0.05
BMI (kg/m^2)	25.78	1.52	22.9	3.42	3.58	<0.001
MUAC (mm)	297.9	8.8	261.6	16.6	3.63	<0.001
WC (mm)	879.6	25.2	840.7	37.2	4.32	<0.001

Note: *Not-significant; t- test; differences significant at $p < 0.05$.

Table 3 shows that except height, all anthropometric measurements (weight, BMI, MUAC & WC) were significantly ($p<0.05$) higher among the hypertensive women compared to the women in the normotensive group.

TABLE 4

Prevalence of systolic blood pressure (SBP) and diastolic blood pressure (DBP) among the slum women

Hypertension	SBP		t test	DBP		t test
	Mean	SD		Mean	SD	
Yes	132.21	7.8	5.72	92.63	2.85	6.94
No	112.79	14.28		75.59	10.57	

Note: t- test; differences significant at $p < 0.001$.

Table 4 represents the prevalence of systolic blood pressure (SBP) and diastolic blood pressure (DBP) among the slum women of the two groups.The mean systolic blood pressure of the hypertensive women is 132.21±7.80 and that of the normotensive women is 112.79±14.28. The mean diastolic blood pressure of the hypertensive women is 92.63±2.85 and that of the normotensive women is 75.59±10.57. A significant difference ($p<0.001$)is observed in mean SBP & mean DBP between the women of the two groups. Figure 1 shows the distribution of the women in the different BMI categories.

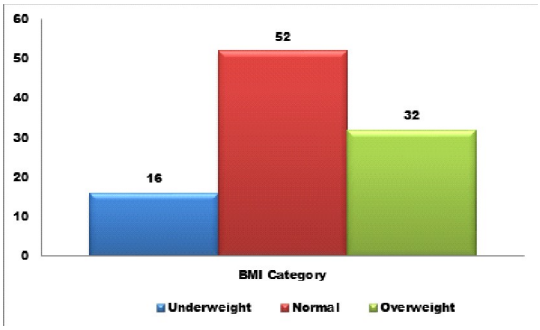

Figure 1: Distribution of the slum women on the basis of their BMI categories

TABLE 5

Nutritional status (based on BMI) and blood pressure of the slum women.

Nutritional Status by BMI	Hypertension (Total number=19)		No Hypertension (Total number=81)		p-value
	Number	Percentage	Number	Percentage	
BMI<25 (Non-Obese)	2	10.5	66	81.5	<0.001
BMI ≥ 25 (Overweight &Obese)	17	89.5	15	18.5	

Chi-Square test: differences significant at $p < 0.001$.

The above Table 5 represents the association of hypertension with body mass index (BMI). A significant association ($p<0.001$) was found between the hypertensive women and normotensive women.

TABLE 6

Age specific mean difference of the systolic and diastolic blood pressure

Age-group	SBP		F Value	p value	DBP		F Value	p value
	Mean	SD			Mean	SD		
15-24	107.66	17.49			71.72	10.87		
25-34	116.42	12.15	12.907	<0.001	79.4	10.83	11.989	<0.001
35-44	124.57	10.69			84.05	9.68		

Note: ANOVA; differences significant at $p < 0.001$..

The Table 6 shows the prevalence of hypertension was found to increase steadily with age. The mean systolic and diastolic blood pressure levels in the age group 15-24 years was 107.66±17.49 and 71.22±10.87 while in the age-group 25-34 years was 116.42±12.15 and 79.40±10.83 and in the age-group 35-44 years was 124.57±10.69 and 84.05±9.68 respectively. The age specific mean difference in the systolic and diastolic blood pressure was found to be statistically significant ($p<0.001$).Figure 2 shows an increasing trend of mean systolic and mean diastolic blood pressure with age.

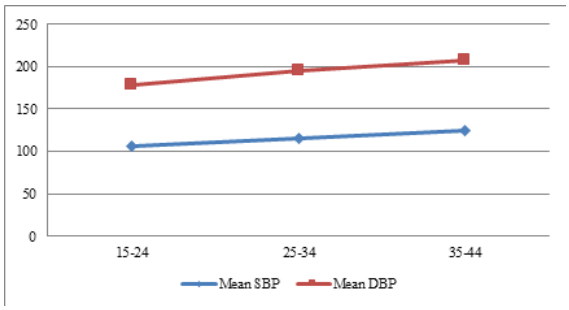

Figure 2: Mean SBP and DBP with age.

DISCUSSION

The prevalence of hypertension among slum dwellers in our study was 19%. This was higher than 8.6% (Reddy and Prabhu, 2005), 10.7% (Patnaik *et al*., 2012) and 15.4% (Anand *et al*., 2007) but less than 21.4% (Viswanathan and Tharkar, 2010) as reported from several studies among slum dwellers in India. Similar studies observed higher prevalence among elderly women in slum area of India (Pawar *et al*., 2010; WHO, 2001). This may be due to highly selective population with risk factors for hypertension (i.e. post-menopausal women) in these studies. The findings of the present study are more or less in concordance with 19.04% (Kokiwar *et al*., 2012) and17.9% (Yuvraj *et al*., 2010).

A significant association was observed between hypertension and age. This is in congruence with the findings of several studies reported from India (Greenlund *et al*., 2004; Kaur *et al*., 2012; Meshram *et al*., 2012; Reddy *et al*., 2007; Todkar *et al*., 2009).

Hypertension prevalence increased with age and tended to be higher in women in the elder age categories. Our reported hypertension prevalence is consistent with that of recently published reports (Addo *et al*., 2007; Dzudie *et al*., 2012; Hendriks *et al*. 2012; Joshi *et al*., 2014).

The mean systolic and diastolic blood pressure was lower than the slum dwellers of Lagos, Nigeria (Daniel *et al*., 2013). In the present study no significant association was found between hypertension and thesocio demographic variables. This is in converse

with the studies reported from India (Meshram *et al*., 2012) and West Bengal (Baldisserotto *et al*., 2016; Dutta and Ray, 2012).

In the present study a significant relationship was observed between BMI and hypertension. This is in accordance with (Daniel *et al*., 2013; Dua *et al*., 2014; Dutta and Ray, 2012 and Saha *et al*., 2008).These studies and the present study as well shows significant association of BMI categories between the hypertensive & normotensive groups. The present study is consistent with a similar finding from Australia which shows that women who breastfed were less likely to develop high blood pressure than the women who had never been pregnant or were pregnant but did not breastfed (Lupton *et al*., 2013). Our study revealed a significant age-specific mean difference (ANOVA) of systolic and diastolic blood pressure. Similar finding is reported by Daniel *et al*., 2013.

Hypertension is one of the major public challenges worldwide and so also in India and it constitutes a major risk factor for cardiovascular disease. Studies on the prevalence of hypertension are sparse among the slum dwellers and until recently no such study has been reported on the urban slum Muslim women of the reproductive age group. The prevalence of hypertension among the slum women of Kolkata was 19%.Hypertension prevalence increased with age but no significant association was found with the socio demographic risk factors (education, family income, physical activity) and behavioral risk factors. Duration of breast feeding and method of fertility control shows a statistically significant association with hypertension. Significant association ($p<0.001$)was observed in all anthropometric variables (weight, BMI, MUAC, WC) except height and the SBP &DBP between the hypertensive and normotensives women. Significant difference was found between the obese and the non-obese group. The age-specific mean difference (ANOVA) was found to be statistically significant with respect to SBP & DBP.

Therefore, health intervention program which includes health education on healthy practices (breast-feeding, fertility regulation etc) and also how to use available resources to prepare healthy diet and healthy living conditions of the urban slum dwellers. Policy makers should consider strategies to prevent non-communicable disease like hypertension. More attention is required for the urban poor slum women who are marginalized and have become a vulnerable group in the society. Hence this study unwraps an open podium for further research and augment targeted health intervention for early diagnosis and appropriate management of hypertension.

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