An Epidemiological Study on Determinants of Hypertension among Female Residents of Urban Slum of Rajkot City, Gujarat

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Abstract :

Introduction: The prevalence of hypertension ranges from 20% to 40% in urban adults and ranges from 12% to 17% in rural adults in India. In informal settlements like slums, Non-Communicable Diseases (NCDs) are at particular risk of going undetected by formal health registries until presentation in a late stage of disease or death. NCDs among women have major health challenges. **Objectives:** To assess prevalence, determine factors responsible for Hypertension and study the treatment and control status of confirmed cases. **Methods:** This is a cross sectional study conducted among 405 slum women of age 35 years or more in Rajkot city. Interview, anthropometric measurements and Blood Pressure were measured for all participants. **Results:** Total 191(47.16%) women were diagnosed with hypertension. There was a statistically significant association between age groups, occupation, Body Mass Index (BMI), remaining busy in household work, walking, practicing healthy habits and hypertension. Out of all study participants, 75(39.26%) were aware of their hypertensive status. Out of those aware, 57(76.00%) were treated and out of those treated only 20(35.08%) were adequately treated. **Conclusion:** Studied population had poor awareness, poor treatment status and inadequate control of hypertension.

Key words: Control Status, Hypertension, Slum, Women

Introduction:

The epidemiological transition has shown the shift of diseases from communicable to non-communicable diseases, such as cardiovascular disease, hypertension, diabetes, cancer and obesity.[1] Non-Communicable Diseases (NCDs) kill 40 million people each year, equivalent to 70% of all deaths globally. Each year, 15 million people die from a NCD between the ages of 30 and 69 years; over 80% of these "premature" deaths occur in low- and middle-income countries.[2]

Worldwide, raised blood pressure is estimated to cause 7.5 million deaths, about 12.8% of the total of all deaths. This accounts for 57 million Disability Adjusted Life Years (DALYS) or 3.7% of total DALYS.[3] The prevalence of hypertension ranges from 20% to 40% in urban adults and ranges from 12% to 17% in rural adults in India.

Despite the high prevalence; prevention, detection, treatment, and control of hypertension is still suboptimal and unsatisfactory. Hypertension is usually essential or primary, silent and asymptomatic; making it one of the worst risk factor for a number of non-communicable diseases. Hypertension has silent and asymptomatic nature; therefore, adheres to 'rule of halves'.[4]

Slums are characterized by urbanization, a lack of urban planning, overcrowding, and exclusion from social, health, and other services. In informal settlements, chronic non- communicable diseases are at particular risk of going undetected by formal health registries until presentation in a late stage of disease or death; this has been attributed to a lack of access to health services and inadequate or inappropriate care when services are sought. [5] This pattern of health-seeking behaviour typically results in an undue human cost and financial burden on existing health systems, underscoring the need for non-communicable disease (NCD) data to advise health interventions targeting the urban poor.[6]

NCDs are the leading cause of death for women worldwide. They cause 65% of all female deaths, amounting to 18 million deaths each year. In many low- and middle-income countries, the low socio-economic, legal and political status of girls and women is increasing their exposure and vulnerability to the risk factors of NCDs. Women living with NCDs experience specific challenges in accessing cost-effective prevention, early detection, diagnosis, treatment and care of NCDs, particularly in developing countries. Women slum dwellers are particularly vulnerable to negative health outcomes.[7] Hence, this study was carried out to assess the prevalence of selected non- communicable diseases and their determinants among urban slum women.

Method:

This study was conducted in Rajkot city which is divided into 3 zones, central, east and west in which there are total 18 wards. Study was conducted during June 2016 to March 2017. Assuming 50% of slum women to be having hypertension, thus considering prevalence to be 50%, with 95% confidence interval and 10% allowable error, sample size of 400 was obtained with the formula of $N= 4pq/l^2$. So, it was decided to study 405 slum women covering 135 from each of the three zones.

The study was conducted in one slum area from each zone making a total of three slum areas. One slum area was randomly selected from each of the three zones from the list given by Corporation authority. After surveying the boundaries of the slum area, each slum area was divided into three subareas and 45 women from each of these subareas, making 135 from each slum, were included in the study. For each subarea, first household was selected randomly from the centre of that area. Nearest door to the first house was taken as second house till the desired sample for that area was achieved. An enquiry regarding an eligible participant was made and included as designated participant in the study.

Women of age 35 years or more were included in the study while pregnant women, women unable to give satisfactory interview and/or unfit for examination were excluded from the study.

Data collection:

Pre-tested and semi-structured questionnaire was used. The questionnaire was filled by personal interview in local language after taking written consent. Privacy was ensured and individual results were kept confidential.

Questionnaire included information regarding participant's socio-demographic profile like age, occupation, income and questions regarding risk factors. Anthropometric measurements (Height and weight) and clinical examination i.e. Blood Pressure measurement was also carried out.

Blood Pressure was recorded in sitting position in right arm to the nearest 2 mm Hg using mercury sphygmomanometer. Two readings were taken 5 minutes apart and the mean of two was taken as blood pressure. Variation in blood pressure measurements was minimized by ensuring 10 minutes rest before BP recording; using standard cuffs for adults fitted with standard mercury sphygmomanometer; placing the stethoscope bell lightly over the pulsatile brachial artery and the same observer recording the blood pressure. Height was measured in centimetres by non-stretchable measuring tape with 0.5 cm accuracy. Weight was recorded in kilograms on digital weighing machine (Omron). Throughout the study same weighing machine was used. BMI was calculated from the height and weight measurement. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m^2). Modified Prasad classification was used to categorise participants from class I to V based on their socio-economic status. Hypertension was defined according to 8th report of Joint National Committee (JNC VIII).[8] Accordingly, any individual who had Systolic Blood Pressure (SBP) of 140 mm Hg or greater and/or Diastolic Blood Pressure (DBP) of 90 mm Hg or greater or who reported to be known hypertensive was diagnosed as hypertensive. Awareness status was determined based on cases who were known hypertensive. The treatment status was defined as taking any pharmacological treatment for hypertension. Controlled hypertension was defined as those who were on treatment and had a BP of <140/90 mm Hg.

The data entry was done in Microsoft Office Excel 2007 and analysis was done by using Microsoft Office Excel 2007 and &Epi info Software (Version 7.1.5.2) from CDC, Atlanta, U.S.A. Chi square test was used to know the association of Hypertension with various factors. Ethical clearance was taken from the Institutional Ethical Committee (IEC), P.D.U. Government Medical College, Rajkot to conduct the study.

Results:

It is evident from Table 1 that total 191 (47.16%) women were diagnosed with hypertension. 75 (18.52%) were known cases of hypertension and 116 (28.64%) women were newly detected with hypertension. According to stages of hypertension, 80 (19.75%) women were having stage 1 hypertension and 36 (8.89%) women were having stage 2 hypertension. It is found that majority of women, i.e.112 (27.65%) were in pre-hypertension category followed by 102 (25.19%) women who were having normal blood pressure.

Table 2 shows that mean age of study participants was 49 years Mean systolic blood pressure was 134 mm Hg while mean diastolic blood pressure was 86 mm Hg.

As evident from Table 3, out of all women, 191 (47.16%) were hypertensive and highest proportion of hypertension i.e. 112 (59.26%) was found in age group of 50 or more years and an increasing trend of hypertension with age was seen. Highest proportion of hypertension, 49 (62.82%) was found in retired women whereas lowest proportion, 99 (40.08%) was found in housewives. There was statistically high significant association between occupation and hypertension.

A very high proportion of hypertensive women, 126 (59.43%) were found in BMI category of 25 or more while 65 (33.68%) belonged to less than 25 BMI category and the difference is statistically highly significant. Proportion of hypertension was

Table 1: Distribution of participants according to their Blood Pressure measurement (N=405)

Category (BP in mm Hg)	Frequency	Percentage (%)
Normal Blood Pressure (⩽120 and ⩽80)	102	25.19
Pre-hypertension (120-139 or 80-89)	112	27.65
Known case	75	18.52
Stage 1 Hypertension (140-159 or 90-99)	80	19.75
Stage 2 Hypertension (⩾160 or ⩾100)	36	8.89
Total	**405**	**100.00**

Table 2: Descriptive statistics of various variables (N=405)

Variable	Mean	SD	Minimum	Maximum
Age (in years)	49	12.55	35	90
Systolic Blood Pressure (mm of Hg)	134	17.52	100	220
Diastolic Blood Pressure (mm of Hg)	86	8.18	68	140

Table 3: Association of hypertension with various variables on applying chi square test

Particulars	Variables	Status of Hypertension				Test of significance
		Normo tensive n (%)	Pre - hypertensive n (%)	Hyper tensive n (%)	Total n (%)	
Age groups	35-50	68 (31.48)	69 (31.94)	79 (36.58)	216 (53.33)	**χ^2 = 21.366; df = 2; p = 0.000**
	⩾50	34 (17.99)	43 (22.75)	112 (59.26)	189 (46.67)	
	Total	**102 (25.19)**	**112 (27.65)**	**191 (47.16)**	**405 (100.00)**	
Occupation	Housewife	69 (27.94)	79 (31.98)	99 (40.08)	247 (60.99)	**χ^2 = 15.508; df = 4 ; p = 0.003**
	Job/ Own business/ Labourer	21 (26.25)	16 (20.00)	43 (53.75)	80 (19.75)	
	Retired	12 (15.38)	17 (21.80)	49 (62.82)	78 (19.26)	
	Total	**102 (25.19)**	**112 (27.65)**	**191 (47.16)**	**405 (100.00)**	
Socio economic class*	I/II	15 (23.08)	19 (29.23)	31 (47.69)	65 (16.05)	**χ^2 = 1.043; df = 4; p = 0.903**
	III	37 (26.06)	42 (29.58)	63 (44.36)	142 (35.06)	
	IV/V	50 (25.25)	51 (25.76)	97 (48.99)	198 (48.89)	
	Total	**102 (25.19)**	**112 (27.65)**	**191 (47.16)**	**405 (100.00)**	
BMI#	<25	70 (36.27)	58 (30.05)	65 (33.68)	193 (47.65)	**χ^2 = 32.963; df = 2; p = 0.000**
	⩾25	32 (15.09)	54 (25.48)	126 (59.43)	212 (52.35)	
	Total	**102 (25.19)**	**112 (27.65)**	**191 (47.16)**	**405 (100.00)**	
Remain busy in household work	Yes	81 (29.45)	76 (27.64)	118 (42.91)	275 (67.90)	**χ^2 = 9.484; df = 2; p = 0.009**
	No	21 (16.15)	36 (27.69)	73 (56.16)	130 (32.10)	
	Total	**102 (25.19)**	**112 (27.65)**	**191 (47.16)**	**405 (100.00)**	
Walking (In kilometres)	⩽1	71 (21.39)	92 (27.71)	169 (50.90)	332 (81.98)	**χ^2 = 16.003; df = 2; p = 0.000**
	>1	31 (42.46)	20 (27.40)	22 (30.14)	73 (18.02)	
	Total	**102 (25.19)**	**112 (27.65)**	**191 (47.16)**	**405 (100.00)**	
Total sleep duration (In hours)	<6	6 (20.69)	10 (34.49)	13 (44.82)	29 (07.16)	**χ^2 = 8.231; df = 4; p = 0.083**
	6-9	77 (29.50)	65 (24.90)	119 (45.60)	261 (64.44)	
	>9	19 (16.52)	37 (32.17)	59 (51.31)	115 (28.40)	
	Total	**102 (25.19)**	**112 (27.65)**	**191 (47.16)**	**405 (100.00)**	

* as per Modified Prasad classification
# BMI - Body Mass Index

maximum, 73 (56.16%) in women who did not remain busy in household work. The relationship between remaining busy in household work and hypertension is statistically highly significant. Among 332 (81.98%) who walked 1 kilometer or less, around half i.e. 169 (50.90%) were hypertensive. Statistically high significant association between walking and hypertension is found. A very high proportion of hypertension, 176 (48.48%) was found among women who were not practicing healthy habits, like, exercise, diet related practices like avoiding junk food, including fruits, vegetables, regular health checkups etc. There is statistically high significant association between practice of healthy habits and hypertension. There is no relationship between other variables like socio-economic class, total sleep duration and addiction with hypertension in this study.

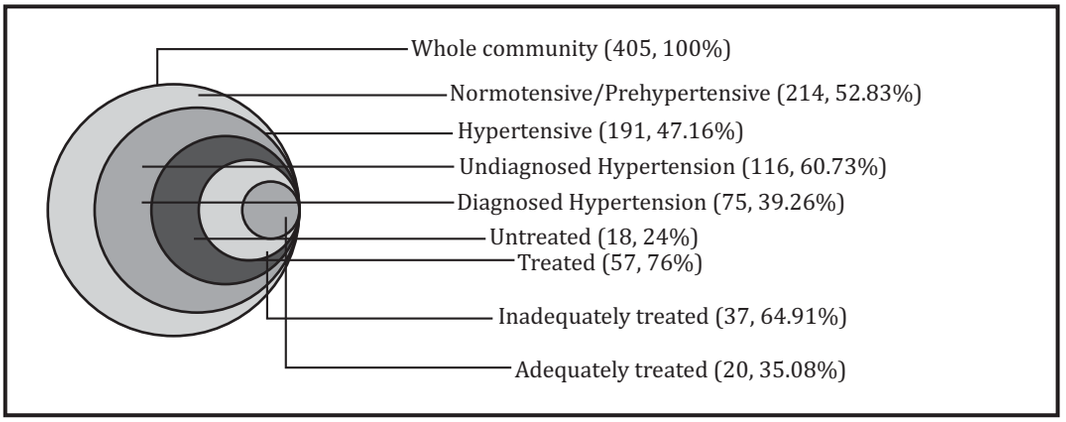
Figure 1 shows that out of all study participants i.e. 405 women, 191 (47.16%) had hypertension. The prevalence of self-reported hypertension was 39.26% which means that 75 out of 191 women were aware of their hypertensive status and 116 (60.74%) were not aware of their status. Out of those aware, 57 (76.00%) were treated and out of those treated only 20 (35.08%) women were adequately treated.

Discussion:

The present cross sectional study was conducted to know the prevalence and association between Hypertension and various risk factors and to know the awareness, treatment and control status of known cases.

The present study reports prevalence of hypertension to be 47.16%. A study conducted by Tushar Acharyya (2010) [9] in the Urban Slums of North 24 Parganas District, West Bengal among participants in age group 25-64 showed the overall prevalence of hypertension to be 34.2% which is lower than present study. The difference is likely to be due to higher age group of participants in current study. Similar findings as in present study were seen in a study conducted by Kanica Kaushal et al (2016) [10] in an urban adult population of Himachal Pradesh in which out of total 400 participants, 208 (52%) had hypertension. Pawar AB et al (2010) [11] in a study done among elderly women more than 60 years age in slums of Surat city showed total prevalence of hypertension to be 73.3% and the new case detection rate was found to be 38%. The prevalence is higher than present study due to higher age group of participants in this study. Raghupathy Anchala et al conducted a systematic review and meta-analysis (2013)[12] among adults more than 18 years of age which showed overall prevalence of Hypertension in India to be 29.8%. Significant differences in prevalence were noted between rural and urban parts of India, 27.6% in rural and 33.8% in urban. Sanjeet Panesar et al (2013) [13] showed age 40–49 years (P=0.020) and 50–59 years (P=0.012), clerical/professional occupation (P=0.004), abnormal waist circumference ($\geqslant$90 cm in males and $\geqslant$ 80 cm in females (P=0.001), above-average daily salt intake (P=0.000) were significantly associated with hypertension. Om Prakash Das et al (2014) [14]

Figure 1: Application of 'Rule of halves' in hypertension among study participants (N=405)



found the prevalence of hypertension to be significantly associated with age, sex, family history and BMI. Siraj Ahmad (2015) [15] conducted a study among adults in urban area of north India and found a significant association between age, socio-economic class, BMI, dietary excess salt, physical activity, self-perceived stress and hypertension.

The prevalence of self reported hypertension among diagnosed patients was 67% i.e. 139 were aware. Of these, 123 (88%) were under treatment for hypertension out of which 43 (35%) got adequately treated. These findings are supported by a similar study carried out in urban slum of Devangere, karnataka by Varadaraja Rao BA et al (2014).[16] The overall prevalence of hypertension in this population was 36.7% i.e. 367 out of 1000 had hypertension. Of these 367 individuals, only 127 (34.6%) were known hypertensive. Of the 127, only 87 subjects (68.5%) were under any kind of antihypertensive therapy. Of these 87 individuals, only 21 (24.1%) had blood pressure under control. In another study conducted by Sanjeet Panesar et al (2013) [17] the prevalence of hypertension was 17.4% out of which about 26 (48.1%) subjects were aware of their status. Only 21 (38.9%) were on treatment and among them only 10 (18.5%) subjects had their blood pressure controlled. A study done in urban population of south India by R Deepa et al (2003) [18] showed the overall prevalence of hypertension to be 22.1% i.e. 279 out of 1262 had hypertension. Of these, only 104 (37.3%) were known hypertensive of which only 52 subjects (50%) were under any kind of antihypertensive therapy. Of them only 21 (40%) had blood pressure under control. Raghupathy Anchalaet al[12] showed the pooled estimate for awareness of Blood Pressure (BP) in rural and urban India to be 25.1% and 41.9% respectively. The pooled estimate for the percentage of treated among those diagnosed with Hypertension in rural and urban areas to be 24.9% and 37.6% respectively and the pooled estimate for percentage of hypertensive patients having their BP under control in rural and urban India to be 10.7% and 20.2% respectively.

In the present study, measurement of Hypertension is done as per ACC/AHA (American College of Cardiology/ American Heart Association) guidelines in which average of two readings of Blood Pressure is taken. So, Hypertension prevalence in this study may be high when compared to other studies considering WHO guidelines for Hypertension measurement.

Conclusion:

The findings of present study contrasts with the earlier belief that hypertension is the disease of affluent. A high prevalence of Hypertension is found in women residing in slum areas. A significant association is found between hypertension and various factors have been found. The rule of halves, when taken as a standard of measurement, showed that the study population had poor awareness; poor treatment status and inadequate control of hypertension. There is an urgent need to conduct similar researches in other cities and states to find the exact burden and treatment status of this silent disease so that required measures can be adopted.

Recommendation:

Regular screening programme with an objective of early identification of Hypertension among these women should be conducted. Health education and regular follow up of such cases can prevent disease development. Looking to poor treatment status among established cases, proactive community based case management system needs to be developed.

Declaration:

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Conflict of interests: Nil

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