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PREVALENCE OF HYPERTENSION AND DIABETES MELLITUS AT SELECTED URBAN SLUMS IN BANGALORE: A CROSS SECTIONAL STUDY

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ABSTRACT: BACKGROUND: Non communicable diseases are increasingly affecting urban slum people. This study was carried out by our institute at the behest of MOHFW, GOI, as a combined initiative with the Director of Health & Family Welfare Services, Karnataka State and Bruhat Bengaluru Mahanagara Palike. **OBJECTIVES:** To estimate the prevalence of Hypertension and Diabetes Mellitus among the residents of selected slums of Bangalore. To correlate the association of these morbidities with variables such as overweight/obesity. **MATERIALS AND METHODS:** Study design: Cross-sectional study. **STUDY DURATION:** October 2010-Feb. 2011. **STUDY SETTING:** Slums in and around the urban field practice area of Bangalore Medical College and Research Institute (BMCRI). Study sample: one thousand three hundred and six (1306). **SAMPLING METHOD:** All slums under BMCRI urban field practice area and few adjacent urban slums chosen at random. **METHODOLOGY:** People aged more than 30years were pooled in by the local link health workers to the camps. A pre-tested, semi-structured questionnaire was used. Blood pressure (Using sphygmomanometer) and random blood sugar (Glucometer) were measured. Hypertension was classified as per JNC VII criteria and Diabetes as per the ADA guidelines. **RESULTS:** 1306 subjects participated at the survey. 255 were males and 1051 were females. Average age being 51.88+20 years. 209(16%) subjects were using tobacco in any forms. 88(6.7%) subjects had family H/O Diabetes and 46(3.5%) had Hypertension in the family. 417(31.92%) were found to be having Diabetes and 247(18.9%) were diagnosed as hypertensives. 147(11.2%) subjects were having both Diabetes and Hypertension. **CONCLUSION:** The reason for high prevalence of the morbidities seemed to be lack of awareness regarding health care seeking and lack of compliance to treatment. Subjects with diagnosed morbidities were given health education and referred to higher center for further management.

KEYWORDS: Diabetes Mellitus, Hypertension, Urban Slum, Prevalence.

INTRODUCTION: Common NCDs are Cardio vascular diseases, Cancer, Diabetes & COPD. Four common risk factors for NCDs include Tobacco, Unhealthy diet, Physical inactivity & Alcohol. Diabetes is an important cause of morbidity and mortality worldwide, and with hypertension and obesity it is an important risk factor for cardiovascular disease, a leading global cause of death.[1,2,3]

Increasing burden of NCDs in our Country likely to threaten the stretched health services, compounded by the fact that a large number of HTN & DM go undetected. In India, deaths due to NCDs projected to increase to 66% by 2020. High prevalence of Hypertension and Diabetes among the poor, which leads to chronic cardiovascular and nervous system morbidity. Tobacco and Alcohol consumption also are quite high, contributing to cancer cases among them. Access to health care and its affordability is a cause of concern for them. This Survey program to obtain a baseline of the health status of urban poor with focus on Diabetes and Hypertension, was an initiative of MOHFW, GOI.

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OBJECTIVES: 1) To estimate the prevalence of Hypertension and Diabetes Mellitus among the residents of selected slums of Bangalore. 2) To correlate the association of these morbidities with variables such as overweight/obesity.

MATERIALS & METHODS: Bangalore city slums were identified as one among the 4 city slums in the Country, to conduct the health survey camp on NCDs. This program was launched on October 2nd '10, and was implemented during the months of October 2010-Feb. 2011. Mobile clinics with a trained Doctor and paramedics were organized to conduct the screening procedure in notified slums. It was conducted between Wednesdays-Saturdays from 2-6pm and on Sundays from 10-1pm every week for 10 weeks. Done under the public-private partnership initiative with liaisoning between MOHFW, GOI (Through their Regional Directors) framing the program initiative, the Directorate of Health & Family Welfare Services (Through their Project Directors) and Bruhat Bengaluru Mahanagara Palike (BBMP) (Through their Chief/City/Zonal Health Officers) acting as nodal agencies and Medical colleges in Bangalore city (totally seven in number) implementing the Program. Dept. of Community Medicine, BMCRI, through its personnel at the outreach health center at Bangalore coordinated the implementation of the survey. Slum areas covered by BMCRI were: Sonnenahalli, Austin town, Vannarpet, Annayyappa Garden, Vinayaknagar (Shanthinagar), Parvathipura, Chikkamavalli.

ESTIMATED TARGET POPULATION: Slum population is estimated to constitute about 25% of the total population of a City. Out of this, about 50% population is of 30 years and above age group, and about 50% this age-group population would avail this facility. As per 2001 census, Bangalore population was 57,01,446 and its slum population numbered 4,30,501. As per 2011 census, Bangalore's population is 95,88,910. As per the survey conducted by BBMP during 2008, our Institute was allotted 7 slum areas. Were expected to cover a total of 1,08,131 population in these slums. The beneficiaries being 27,000 in number. The JNC VII classification of hypertension was used in the survey for measurement and classification of hypertension.[4]

Category	Blood Pressure
NORMAL	<120/<80
PRE HYPERTENSION	120-139/80-89
STAGE I	140-159/90-99
STAGE II	>160/>100
Table 1: HYPERTENSION CLASSIFICATION. JNC VII criteria	

Further Clinical Stratification:
1) Accelerated HYPERTENSION >180/>110
2) Isolated Systolic HYPERTENSION >140/<90

DIABETES MELLITUS CLASSIFICATION[5]:
ADA guideline for Diabetes:
1) Symptoms of Diabetes+Casual Plasma glucose concentration ≥200 mg/dl, (Casual – any time of the day without regard to time since last meal),
2) Fasting plasma glucose ≥126 mg/dl,(Fasting – no calorie intake for at least 8 hrs),
3) 2 hrs plasma glucose during OGTT ≥200 mg/dl (OGTT according to WHO criteria).
4) HbA1c ≥6.5%.

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Grades of Obesity based on BMI[6]

BMI GRADING	BMI Kg/m^2
UNDERWEIGHT	<18.5
NORMAL	18.5-24.9
OVERWEIGHT	25-29.9
OBESITY I	30-34.9
OBESITY II	35-39.9
EXTREME OBESITY	>40
Table 2: grades of Obesity based on BMI	

Grading of Obesity for Asians was used in the current survey.[7]

BMI	CLASSIFICATION
<18.5	UNDERWIGHT
18.5-23	NORMAL WEIGHT
23-27.5	PRE-OBESE
27.5	OBESE
Table 3: Grades of Obesity for Asians	

Waist Circumference: High risk:
- Men >102 cm,
- Women >88 cm.

SURVEY METHODOLOGY: Medical Colleges arranged for the mobile campaign van, where in trained Doctors and Paramedics conducted the survey. Man power for the survey, logistics such as BP apparatus and Computers for data entry were provided by the Medical Colleges. Glucometers, glucose strips, lancets & stationaries were provided by the MOHFW, GOI through their Regional Director's Office located at Koramangala, Bangalore. Daily allowance (As charges for confectionaries) for the Medical college team was provided by the State Directorate, through their funds from NRHM. BBMP had carried out the IEC campaign, before the commencement of the survey.

Link workers from the BBMP Hospitals guided the health teams during their work in the outreach areas, and also mobilized beneficiaries. Logistic support in the form of spirit, cotton and waste disposal was provided by the BBMP. Training to the health team was provided by the City Nodal Officer, BBMP. High BP & Diabetics were duly referred to the nearby Government Hospitals (Victoria, Bowring, K. C. General & Jayanagar General Hospital), with a Referral card. Community Medicine depts. of the identified medical colleges, needs to send weekly reports to the State Surveillance Unit, DH & FWS. Training material developed by the GOI, and printed by the DH & FWS were displayed at all the outreach stations (BBMP Hospitals, Public places, Anganwadi centers & Mobile vans).

RESULTS: Out of a total of ~26,000 people screened in Bangalore during the survey, our Institute had screened 1306 people. Males were 255, females were 1051. Mean age of the study population was

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51.88+19 years. Point prevalence of HTN was 39.58%, DM was 18.9%, Over weight/Obesity was 68.3%. HTN correlated with increasing age, higher BMI, h/o tobacco consumption, family h/o Diabetes and family h/o HTN. DM correlated with increasing age, being male sex, higher BMI, family h/o DM and family h/o HTN. As seen, some of the variables correlating with HTN are similar to ones influencing DM occurrence.

HYPERTENSION PREVALENCE	517(39.58%)
FAMILY H/O HTN	21
FAMILY H/O DM	39
H/O TOBACCO USE	90
Table 4: Prevalence of Hypertension	

DIABETES PREVALENCE	247(18.9%)
FAMILY H/O HTN	23
FAMILY H/O DM	12
H/O TOBACCO USE	46
Table 5: Prevalence of Diabetes Mellitus	

HYPERTENSION AND DIABETES	147(11.2%)
Table 6: Prevalence of combined DM and Hypertension	

BMI		HYPERTENSION		TOTAL
		YES	NO	
>23 kg/m^2	YES	396	496	892
<23 kg/m^2	NO	121	393	514
TOTAL		417	889	1306
Chi square=27.20, p=0.000, CL=1.50-2.48, odds ratio=1.93				
Table 7: correlation between BMI and HYPERTENSION				

BMI		DM		TOTAL
		YES	NO	
>23 kg/m^2	YES	207	685	892
<23 kg/m^2	NO	40	374	414
TOTAL		247	1059	1306
Chi square=33.825, p=0.000, CL=1.96-4.05, odds ratio=2.825				
Table 8: correlation between BMI and DM				

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BMI		DM +HYPERTENSION		TOTAL
		YES	NO	
>23 kg/m²	YES	135	757	892
<23 kg/m²	NO	22	392	414
TOTAL		157	1149	1306
Chi square=25.784, p=0.000, CL=1.99-5.068, odds ratio=3.178				
Table 9: Correlation between BMI and DM and Hypertension				

DISCUSSION AND CONCLUSION: Promote evidence based non-pharmacological treatment (DASH diet, Bio-feedback, Yoga/Meditation, Physical activity). Operationalizing prevention aided by counseling protocols. Promotion of cost effective generic drugs. Self-management tools for patient's family members to cope with long term illness. NCD control involves multidisciplinary care approach affecting quality of life. Process of shift in disease pattern from CDs to NCDs is termed Epidemiological transition. Indians experience CVD deaths at least a decade earlier than people from Developed Countries. Demographic & health transitions, gene- environmental interactions and early life influences of fetal malnutrition have implications. Changes in living habits ensure behavioral risk factors are transformed to biological risk factors. For prevention of NCDs, a paradigm shift from treatment of single risk factor to a comprehensive risk factor management approach is required.

In the absence of population based nationally representative surveillance system for CVD, establishing a multi centric system (First component being this baseline cross sectional survey for risk factors) was an initial step. Interventions include primary prevention by focusing on risk prevention/reduction and secondary prevention by early detection with available diagnostic facilities. Continuing surveillance efforts would help develop evidence based cost-effective CVD prevention, detection and management strategies.

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