

## Original Research Article

# What ails the urban slums - morbidity profile of urban slum dwellers from three major cities of India

Ashish Giri<sup>1</sup>, M. Abdul Wassey<sup>2\*</sup>, Vishal Dogra<sup>3</sup>

<sup>1</sup>Research Associate, <sup>2</sup>Senior Manager Research, Clinical Domain, Piramal Swasthya Management and Research Institute, Hyderabad, India

<sup>3</sup>Chief Manager Epidemiology and Biostatistics, Piramal Swasthya Management and Research Institute, Hyderabad, India

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### \*Correspondence:

Dr. Md Abdul Wassey,

E-mail: [dr.abdulwassey@gmail.com](mailto:dr.abdulwassey@gmail.com)

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## ABSTRACT

**Background:** India today has over 61 million people residing in urban slums. Slums, on one hand, lack the basic requirements of housing, sanitation, and water supply that are detrimental for good health and on the other hand subject its residents to extreme poverty, unemployment and stress. Exposure to these environmental factors is expected to cause a distinct sort of morbidity pattern, which this study seeks to explore.

**Methods:** This cross-sectional study was a secondary data analysis of aggregated data of patients who availed health services at the mobile medical unit (MMU) of the Ujjivan program run by Piramal Swasthya in the last one year. The project has a fleet of MMUs that makes at least one predestined monthly visit to each service point in urban slums of Bangalore (42 sites), Pune (18 sites) and Mumbai (19 sites).

**Results:** Musculoskeletal disorders (30.69%) and cardiovascular diseases (25.56%) together accounted for 56.25% of the total disease burden. The analysis of blood pressure readings of all the registrations showed that the mean systolic and diastolic pressures were 129.71 and 84.92 mmHg respectively. 51.58% of all individuals had hypertension and 23.51% had diabetes.

**Conclusions:** According to the study a major proportion of urban populous seeking healthcare at the MMU are women and elderly and do so for non-communicable diseases. Hypertension and diabetes are major health threats among them. MMU could be used as an effective mode of service delivery for women and the elderly especially, for chronic diseases.

**Keywords:** Diabetes mellitus, Hypertension, Mobile medical unit, Morbidity profile, Urban slums

## INTRODUCTION

Urbanization across the last century has ushered in the rise of "megacities". These urban settlements today house more than 50% of the world's population and by 2030 are expected to accommodate five billion individuals.<sup>1</sup> With the urban population swelling to 64% in Asia alone, the next wave of urbanization and population growth is predicted to be centered in the developing nations.<sup>2,3</sup>

However, what is worrisome is the fact that, according to estimates, nearly 40 percent of this urban expansion is projected to be in the form of slums.<sup>2</sup>

India has historically been an agrarian nation. However, with the recent acceleration in the rate of urbanization this trend is seeing a reversal. 34% of the Indian population currently resides in cities, compared to only 18% in 1960.<sup>2</sup> Nearly one-third of them live in urban slums and

13.7% of them live below the national poverty line.<sup>2,4</sup> Over a million of them live in housing that is below minimum standards of comfort and sanitation and 26% of households do not have access to clean drinking water.<sup>5,6</sup> The prevalence of risky health behaviors like smoking and alcohol use is higher compared to their rural and urban counterparts.<sup>7</sup>

Various studies highlight the inequity in health and access to healthcare between the urban slum dwellers and their non-slum counterparts.<sup>8-11</sup> Results of a study showed that among urban poor, only a quarter of all pregnant females received complete antenatal care, 75% deliveries took place at home, 47.1% of under-five children were malnourished and the children in urban slums were 12% more likely to remain un-immunized.<sup>10,12</sup> In addition to the poor health, most slum dwellers do not have ready access to health facilities and the ones that do, often rely on private, unregulated providers for health services that are often of poor quality.<sup>1,4,13</sup>

Several studies have been conducted to understand the spectrum, burden, treatment-seeking behavior and determinants of illnesses in urban slums.<sup>14,15</sup> Most of these researches studies focus on self-reported morbidity, have a small sample size and are limited to, acute illnesses, illnesses of maternal and child health. The few studies that have been conducted on non-communicable diseases (NCD) have a small sample size and are limited to the elderly population in a specific geographic location.<sup>14,16</sup>

Piramal Swasthya through its Ujjivan program runs fleet of a doctor-led mobile medical units (MMU) in 4 major cities of India. The program is aimed at catering to the health needs of urban slum dwellers, with a special focus on NCDs. The absence of any study on morbidity pattern of urban slums dwellers, that takes a comprehensive view of NCDs and uses a large pool of data, collected across varied geographic background highlights the need of a study that addresses these research gaps. A study conducted on these lines has the potential to give insights that would assist in guiding and shaping future interventions on NCDs targeted at the urban slum population.

The objective of the study is to understand and compare the morbidity profile of urban slum dwellers across four major cities of India and to study the association of observed morbidity profile and gender.

## **METHODS**

This cross-sectional study was a secondary data analysis of routine program data of patients who availed health services at the MMUs of the Ujjivan program aggregated over one year (June 2018 to June 2019). The program is a joint venture of Piramal Swasthya and Ujjivan finance. The project has a fleet of MMUs that make at least one predestined monthly visit to each service point in urban

slums of Bangalore (42 sites), Pune (18 sites) and Mumbai (19 sites). Each MMU has a doctor, nurse, pharmacist and a lab technician who work together to provide primary healthcare services to the urban slum populous close to their home.

Beneficiaries who had availed services at the different MMUs in the last one year (June 2018 to June 2019), were 18 years or more and did not have any essential data fields empty were included in the study. The data collected from each beneficiary consist of beneficiary details such as age, sex, location, income level, education level, etc.), personal history (lifestyle, diet, tobacco and alcohol usage, family history of disease) along with details regarding vital health parameters [(height, weight, body-mass index (BMI), systolic and diastolic Blood Pressure (BP)], information about results of laboratory procedures (random blood sugar) and the clinical diagnosis prepared by a physician. The diseases were categorized according to the organ system and also as communicable diseases (acute bronchitis, gastroenteritis, acute rhinitis, acute otitis media, amoebiasis, colitis, conjunctivitis, infective skin conditions, infections of teeth and oral cavity, upper and lower respiratory tract infection, urinary tract infection, worm infestation, giardiasis, and influenza.), non-communicable diseases (chronic obstructive pulmonary disorder (COPD), asthma, acid peptic disease, diabetes mellitus, hypertension, arthritis, arthralgia, myalgia, cataract, osteoarthritis and injuries, and trauma) and minor illnesses (common ailments like headache, sinusitis, allergic rash, oral ulcers, constipation, dental caries, stomatitis, candidiasis, and others).

## **Statistical analysis**

The aggregated data received was cleaned and analyzed using IBM SPSS# version 25 software. #IBM Corp. Released 2017.

## **RESULTS**

### **Demographic profile**

A total of 18152 visits were made during the last one year, out of which 13231 (72.89%) were first visit, 2288 (12.60%) were second visit and 2633 (14.51%) were third or more visit. Out of the 13231 registrations (first visit), 58.30% were females, 41.68 were males and 0.02% were transgender. The percentage of female registrations exceeded that of the male in all three cities. Most of them (87.32%) were above 36 years of age, 11.16% were in between 26-35 years and only 1.52% were 18-25 years old. The percentage of individual ever married was 98.45% and 1.55% were never married. The mean BMI score was 24.72 and 42% of the total individual registered were obese, 17.44% were overweight, 8.38% were underweight and only 32.30% were normal. The number of individuals with obesity fluctuated across the cities with Bangalore having the highest (53%) and Mumbai the lowest (3%).

**Table 1: Demographic profile of urban slum dwellers from Bangalore, Mumbai and Pune.**

Demographic characteristics	Bangalore	Mumbai	Pune	Grand total
	(n=9028)	(n=1542)	(n=2661)	(n=13231)
	N (%)	N (%)	N (%)	N (%)
<b>Gender</b>				
Female	5348 (59)	886 (57)	1480 (56)	7714 (58)
Male	3680 (41)	656 (43)	1179 (44)	5515 (42)
Others			2 (00)	2 (00)
<b>Age group (in years) _</b>				
>50	4035 (45)	845 (55)	1151 (43)	6031 (46)
18-25	143 (2)	2 (0)	56 (2)	201 (2)
26-35	1066 (12)	42 (3)	369 (14)	1477 (11)
36-50	3784 (42)	653 (42)	1085 (41)	5522 (42)
Mean age	50.63±13.04			
<b>Marital status</b>				
Married	8853 (98)	1532 (99)	2641 (99)	13026 (98)
Unmarried	175 (2)	10 (1)	20 (1)	205 (1)
<b>BMI (kg/m<sup>2</sup>)</b>				
Normal	2133 (24)	1034 (67)	1107 (42)	4274 (32)
Obese	4823 (53)	44 (3)	674 (25)	5541 (42)
Overweight	1765 (20)	30 (2)	512 (19)	2307 (17)
Underweight	307 (3)	434 (28)	368 (14)	1109 (8)
Mean BMI	24.59±4.93			

BMI: individuals with BMI scores of <18.5 = underweight, (18.5-22.9) = normal, (23.0-24.9) = overweight and ≥25 =obese.

**Table 2: Morbidity profile according to organ system.**

Disease category	Bangalore	Mumbai	Pune	Grand total
	(n=9028)	(n=1542)	(n=2661)	(n=13231)
	N (%)	N (%)	N (%)	N (%)
<b>Cardiovascular diseases</b>	2367 (26)	578 (37)	437 (16)	3382 (25)
<b>Diseases of teeth and oral cavity</b>	125 (1)	41 (3)	38 (1)	204 (1)
<b>Diseases of skin, eye and ear</b>	269 (3)	132 (9)	226 (8)	627 (5)
<b>Gastrointestinal diseases</b>	384 (4)	15 (1)	889 (33)	1288 (10)
<b>Minor illnesses</b>	2404 (27)	25 (2)	33 (1)	2462 (19)
<b>Musculoskeletal diseases</b>	2837 (31)	460 (30)	764 (29)	4061 (31)
<b>Respiratory tract infections</b>	642 (7)	291 (19)	274 (10)	1207 (9)

**Table 3: Morbidity profile according to types of disease.**

Disease category	Bangalore	Mumbai	Pune	Grand total
	(n=9028)	(n=1542)	(n=2661)	(n=13231)
	N (%)	N (%)	N (%)	N (%)
<b>Communicable diseases</b>	1092 (12)	414 (27)	462 (18)	1968 (15)
<b>Minor illnesses</b>	1914 (21)	65 (4)	118 (4)	2097 (16)
<b>Non-communicable diseases</b>	6022 (67)	1063 (69)	2081 (78)	9166 (69)

### Morbidity profile

#### Morbidity profile according to organ system

Diseases when grouped according to the organ system, musculoskeletal disorders accounted for 30.69% of the total disease burden followed by cardiovascular diseases 25.56%, minor illnesses 18.61%, gastrointestinal diseases 9.73%, respiratory illnesses 9.12%, diseases of skin, eye and ear 4.74% and diseases of the teeth and oral cavity

accounted for 1.54%. The overall trend was consistent across the cities. The notable differences were the extremely high prevalence of cardiovascular (37%) and respiratory diseases (19%) in Mumbai and gastrointestinal diseases in Pune (33%).

#### Morbidity profile according to the type of disease

When grouped according to the type of disease, non-communicable diseases (NCD), communicable diseases

(CD) and minor illnesses accounted for 69.28%, 14.87%, and 15.85% respectively. NCDs accounted for the major proportion of the disease's burden in all three cities.

#### Prevalence of hypertension and diabetes based on BP and RBS readings of all beneficiaries

The analysis of Blood Pressure readings of all the registrations (including individuals who were seeking care for some other chief complaint) showed that the mean systolic and diastolic pressure were 129.71 and 84.92 mmHg respectively. 51.58% of all individuals had hypertension, 34.81% were pre-hypertensive and only 13.60% were normal. Similarly, according to the RBS readings of all individuals 23.51% registrations were diabetic, 19.78% were prediabetic and 56.71% were normal. A similar trend was seen across cities with

notable changes being the low prevalence of hypertension in Mumbai (25%) and a low prevalence of diabetes in Pune (13%).

#### Association of selected NCDs and gender among study participants

Hypertension prevalence was significantly higher among men than women in all three major cities. Women from Bangalore and men from Mumbai had a significantly higher prevalence of diabetes. The pooled prevalence did not show any statistically significant difference in the prevalence of diabetes for males and females. Obesity showed a significant prevalence among men in Bangalore and for women in Mumbai. Pune and the pooled data from three cities did not show any statistically significant difference between males and females.

**Table 4: Prevalence of hypertension and diabetes.**

Variable	Bangalore	Mumbai	Pune	Grand total
	(n=9028)	(n=1542)	(n=2661)	(n=13231)
	N (%)	N (%)	N (%)	N (%)
<b>Stages of hypertension</b>				
Normal	1080 (12)	585 (38)	135 (5)	1800 (14)
Pre-hypertension	2700 (30)	565 (37)	1341 (50)	4606 (35)
Stage 1	2759 (30)	284 (18)	720 (28)	3763 (28)
Stage 2	2489 (28)	108 (7)	465 (17)	3062 (23)
<b>Diabetes status</b>				
Normal	4888 (54)	709 (46)	1906 (72)	7503 (57)
Pre-diabetic	1816 (20)	388 (25)	413 (15)	2617 (20)
Diabetic	2324 (26)	445 (29)	342 (13)	3111 (23)

Hypertension: individuals with systolic and diastolic BP of <120 and <80= normal, (120-139) or (80-89)= pre-hypertensive, (140-159) or (90-99)= stage 1 hypertension and ≥160 or ≥100= stage 2 hypertension. Diabetes: individuals with RBS reading of <140= normal, (140-200)= pre-diabetic and >200 = diabetic.

**Table 5: Association of selected NCDs and gender among study participants.**

NCD	Male	Female	P value	Odds ratio	95% C.I.
	N (%)	N (%)			
<b>Diabetes</b>	1322 (24)	1788 (23)	0.13	0.95	0.87-1.03
Bangalore	958 (21)	1366 (26)	0.00	1.33	1.21-1.46
Mumbai	221 (34)	224 (25)	0.00	0.66	0.53-0.83
Pune	143 (12)	198 (13)	0.16	1.11	0.88-1.40
<b>Hypertension</b>	3057 (55)	3766 (48)	0.00	0.76	0.71-0.82
Bangalore	2240 (61)	3008 (56)	0.00	0.82	0.75-0.90
Mumbai	217 (33)	175 (20)	0.00	0.49	0.39-0.90
Pune	600 (51)	583 (39)	0.00	0.62	0.53-0.73
<b>Obesity</b>	3282 (59.5)	4566 (59.2)	0.7	0.98	0.91-1.05
Bangalore	2757 (74.9)	3831 (71.6)	0.00	0.8	0.76-0.93
Mumbai	16 (2.4)	58 (6.5)	0.00	2.8	1.59-4.92
Pune	508 (43.1)	677 (45.7)	0.09	1.1	0.95-1.29
<b>Undernutrition</b>	623 (10.1)	486 (6.3)	0.00	0.59	0.52-0.67
Bangalore	103 (2.8)	204 (3.8)	0.00	1.37	1.1-1.7
Mumbai	347 (52.9)	87 (9.8)	0.00	0.09	0.07-0.12
Pune	173 (14.7)	195 (13.2)	0.13	0.88	0.7-1.1

## DISCUSSION

In the current study, around 70% of all morbidities were NCDs. This could be since over 85% of the participants were over 35 years old and 46% of them were over 50 years old. There is overwhelming evidence to suggest an increased risk of NCD with age.<sup>17</sup> 58% of all registrations were women. This overrepresentation of women and the elderly could be attributed to the mobile medical unit-based service provision which is known to break down barriers related to cost, distance and autonomy that the elderly and women experience while accessing healthcare.<sup>18-22</sup> Younger men of working age, on the other hand, are unavailable during the day to access MMU based care and also do not face similar barriers while accessing secondary level hospital-based care.<sup>23</sup> The other reasons for this finding could be the fact that elderly and women experience a greater burden of diseases.<sup>19</sup>

According to the present study, the most common ailments of the urban slum populous was musculoskeletal diseases followed by cardiovascular diseases, minor illnesses/ common illnesses, gastrointestinal diseases, respiratory tract infections, diseases of the skin, eye and ear and diseases of teeth and oral cavity in descending order. Such high prevalence of musculoskeletal, cardiovascular, respiratory and gastrointestinal diseases among urban slum dwellers have been previously recorded in other studies.<sup>24-26</sup> The high prevalence of musculoskeletal diseases could be attributed to the difficult working condition, aging and menopause.<sup>27</sup> Cardiovascular diseases could be attributed to the higher presence of CVD related risk factors such as uncontrolled hypertension and tobacco use which is common among urban slum dwellers.<sup>28</sup> The high prevalence of respiratory and gastrointestinal disorders could be attributed to poor living conditions, water, overcrowding, smoking and exposure to household smoke.<sup>29</sup> The high prevalence of CVD in Mumbai and gastrointestinal diseases in Pune could be as a result of local factors like increased air pollution, smoking and alcohol consumption, unavailability of clean drinking water and inadequate sanitation.

The study showed a high prevalence of hypertension and diabetes. Other studies in urban slums have also found a high prevalence of these diseases.<sup>30-32</sup> The high prevalence of these diseases could be attributed to a higher prevalence of smoking, obesity and poor dietary habits. 41% of the participants were obese and 17% were overweight. Obesity is directly linked to both these diseases.<sup>33,34</sup> Also, the fact that a significant proportion of our participants were elderly and both these diseases are known to be more common among the elderly could have contributed to the reason for such high prevalence.<sup>17</sup>

## CONCLUSION

According to the study a major proportion of urban populace that seek healthcare at the MMU do so for

NCDs. Hypertension and diabetes are a major health threat among them and some of them are unaware of their diabetic or hypertensive status. The major beneficiaries of MMU based health care services are the elderly and women. Therefore, MMU could be used as an effective mode of service delivery for women and the elderly especially, for chronic diseases that require ongoing care.

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