Original Research Article

Effect of socio-demographic characteristics on the morbidity prevalence among the urban poor in a metropolitan city of South India

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Received: 07 November 2016

Revised: 11 November 2016

Accepted: 16 December 2016

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ABSTRACT

Background: The health needs of the urban poor is a major herculean task to the health system personnel. Hence, it is attempted to understand the role of age, education and income on the morbidity prevalence among the poor migrants dwelling in the Bangalore slums

Methods: A cross-sectional two-stage cluster random sampling design was used for selecting the slum households from various clusters in Bangalore city.

Results: Data were collected from 4005 households in the slums of Bangalore city which consists of 16737 individuals' information with the average family size of 4.18. Illness were reported as 18.5% (n=1626) and 20.1% (n=1594) for males and females respectively and the difference between these proportions are statistically significant (P=0.008). Income and educational levels are significantly (P=0.000) associated on the morbidity prevalence. The infants' morbidity rate is 17.1 and 38.1 for males and females respectively.

Conclusions: The morbidity distribution follows a quadratic pattern. Income and education have effective role on morbidity prevalence; both the variables are inversely associated on morbidity prevalence. Morbidity prevalence on age is similar to mortality curve.

Keywords: Below poverty line, Morbidity prevalence, Health insurance, Source of water, Slums, Two-stage sampling

INTRODUCTION

In the last two decades, the rate of slum population growth is more than the India's population growth rate.¹ Rapid growth of slums like mushroom in the urban areas, slum dwellers are deprived access to basic services such as clean water, toilets, health care amenities and insufficient protection measures make them vulnerable.

It is well known that the morbidity and mortality rates are higher in slum areas than non-slum areas. Health and literacy levels are inversely associated; low levels of literacy are one of the commonest factors too contributing to high morbidity prevalence in slum areas. Urban areas have good medical facilities for public, but underutilized by the slum population, because lack of good services, a very high preference for private health facilities, in spite

of higher treatment cost especially in private hospitals, but the perception that private facilities are offering high quality services is main concerns.² Slum dwellers are not ready to accept scientific explanations for the cause of disease and deaths. Most of the slum dwellers seek medical and easy accessibility care from quack and religious healers.

The health hazards of the urban slum dwellers are mainly due to poverty, malnutrition and contaminated environment where they live. In such an environment, slum dwellers are exposed to all type of communicable diseases and with malnutrition of mother and child resulted in higher rates of morbidity and mortality in the slums areas.³ With the available limited daily wages, slum dwellers are helpless to think of Nutritional/ balance diet for their family. It is a clear indication that better sanitation and water supply is the requirements for containment of morbidity and mortality rates⁴. Hence, this manuscript is prepared with objective to study the morbidity load among the urban poor who are dwelling in the slum areas. And to Study the association of morbidity prevalence with reference to socio-demographic characteristics of the slum dwellers in the Bangalore city.

METHODS

This manuscript was prepared from the data of the project entitled 'Migration, poverty and access to healthcare: a study on people's access and health systems' response in Bangalore' funded by Indian Council of Medical Research, New Delhi. A cross-sectional study of two-stage cluster random sampling was used for selecting the migrant households. Households of eligible migrants were identified from various clusters in the city. Attempts may be made to identify clusters particularly from newer slums, de-notified slums and camps, where newcomer usually reside. Snow-balling technique was used during pilot survey for identifying this type of habitations. Both qualitative and quantitative research methods were used, only quantitative data is used for this paper.⁵ Informed consent statement was approved by the NIMHANS ethical committee. Data were collected through pre-tested, well-structured interview schedule and data pertaining to socio-economic, demographic details and morbidity prevalence in the selected slums are used for this analysis. Analyzed data are presented by descriptive statistics, Chi-square test and curve fitting method.

Sample size estimation

Sample size for the quantitative survey was calculated according the relative precision formula $n = [Z^2(1-p)/(d^2 \cdot p)]$.⁶ By considering prevalence of utilization of government healthcare service, P of 15% (this rate is based on a study by Indian Council Medical Research, Delhi) and it is considered as P, allowing 10% error on P with 95% confidence interval, the sample size arrived at 2177. Since, it is a two-stage sampling by considering the

design effect (DEF) 1.7 the sample size estimated is 3701 and adjusting this sample size with 5% of non-response rate, finally the sample size 3896 is decided.

Notified and Non-notified slums were identified from the offices of municipalities, corporation, local bodies or development authorities and Snow Balling technique used for identifying the non-notified slums. A mapping work/ interview with influential person(s) of the slum areas were carried out for collecting information on number of households and age of the slum in each location (clusters). Only the slum locations which are having more than 100 households were considered as cluster for inclusion as a unit of population. The sample households were selected by two-stage cluster sampling technique, in the first stage 40 clusters selected by Probability Proportion to Size Sampling and in the second stage a fixed number of household (around 100) were selected for interview and the collected information is analyzed and presented here.⁷ Those who possess BPL card in the non-slum areas were considered as poor in the general population and this data for Bangalore is extracted from the NFHS-3 data, and used in the discussion part. From NFHS-3 data it is found that 1015 people possess BPL card and it is 28.2% to the total of Bangalore's NFHS-3 data.⁸

RESULTS

Quantitative data collection were completed from 4005 slum households in the slums of Bangalore city which consists of 16737 individual information and the average family size of the household is 4.18.

From Table 1 it is clear that only 2.7% of the dwelling structures are made up of proper materials for buildings and about 75% of the structures are *Kuccha* (made with clay/hay/tin sheets etc). Most of the dwellings are depending on the public tap for the water supply followed by hand pumps. In an illuminating city about 10% of dwellings are not having electricity connections and it is weird to note that the proportion of slum dwellings having improper electricity connection (46.5%) is more than the proper electricity connections (44.2%). About half of the households were not having any card and majority of them possess the Below Poverty Line (BPL) cards. It is obvious, that only 2.8% of the households are registered for some health insurance. Monthly income of the households ranges from Rs. 300 to Rs. 20000, the income distribution left tail is curtailed, but not as skewed as in the general population. Median monthly income is Rs. 4000, (1\$ is approximately Indian rupees 66) and the central measures indicates that the income distribution could be symmetric.

Illness were reported as 18.5% (n=1626) and 20.1% (n=1594) for males and females respectively and the difference between these proportions are statistically significant (P=0.008).

Table 1: Distribution (%) of socio-demographic and slum dwelling characteristics.

socio-demographic characteristics	%
Type of dwellings (N=4005)	
Katcha	49.0
Squatter hut	25.1
Semi pucca	19.2
Pucca	2.7
Open space	1.0
Others	3.0
Source of water supply (N=4005)	
Piped water into the house	5.6
Hand pump	14.1
Public tap	70.3
Others	10.0
Electricity connection (N=4005)	
Metered connection	44.2
Drawn from street line	46.5
No connection	9.3
Possessing card (N=4005)	
Below Poverty Line Card	36.2
Above Poverty Line card	15.2
No card	48.6
Having any Health Insurance(N=4005)	
Yes	2.8
No	97.2
Gender (N=16737)	
Male	52.6
Female	47.3

It is evident from the above table that the reported prevalence of morbidity is higher among the illiterates than literates except in two points. We can observe that in the income group which is less than Rs. 500, the reported morbidity among the literate group is more than the illiterates, nonetheless that income has effect on morbidity prevalence, and it could be that the literates are more concern about their health that they reported their sickness promptly. In general income and the morbidity prevalence are inversely proportion to each other. Income and educational levels are significantly ($P=0.000$) associated on the morbidity prevalence. In this Table 2 first two income groups, that is income less than Rs. 1000 indicates that lower income is closely associated with higher morbidity rates than the literacy levels.

Morbidity distribution is similar to the mortality pattern; it is high in the infancy and in the old age. Above graph depicts that morbidity pattern is almost same for males and females up to the age of 24 years and after that reported mortality rate is higher among the females than males. The infants' morbidity rate (not shown in the graph) is 17.1 and 38.1 for males and females respectively. The graph reveals that morbidity distribution follows a quadratic form, fitted equations and smooth graphs are also presented in the above figure. The fitted equation model is better for males than females, R^2

for male is 0.92 and it is 0.82 for females. For validating the above equations morbidity rates were predicted by using the above equations and the mean differences (absolute value of the difference) between predicted and estimated values were 0.68 and 1.57 for males and females respectively. Highest morbidity rate is observed among the widowed (22.7) group under the marital status.

Table 2: Morbidity (%) distribution by educational levels by income.

Income (INR)	Literate	Illiterate
Rs. < 500	47	11
Rs. 500-999	50	67
Rs. 1000-1999	16	24
Rs. 2000-2999	13	20
Rs.3000-4999	18	23
Rs. 5000-6999	15	14
Rs. 7000-9999	15	11
Rs. 10000+	13	17

Figure 1: Morbidity (%) distribution by age by sex.

DISCUSSION

From the analysis of data⁸ of NFHS-3 on Below Poverty Line (BPL) card a holder which is assumed as urban poor dwelling in the non-slum area of Bangalore. It is found that 99.6% of the non-slum households have the electricity in the dwellings and in the present study only 44.6% of the household have proper electricity. And only 1.5% of these non-slum populations go for open defecation and in the current study 26% of the slum populations go for open defecation. In the current study we find that slum population about 77 % and in the non-slum population 33% (NFHS-3) of them using the Public tap which is the highest proportion for both places. Therefore, public tap water supply is most important source for the urban poor who are dwelling in slum and non-slum areas. A study from NFHS-3 data revealed that Diarrhea, Fever, Cough, Low birth weight, Infants death and malnutrition are high among the slum children than non-slum children.⁹

The major causes of death among the infants are diarrhea, pneumonia, Malnutrition and fevers the most prevalent diseases identified among slum children.¹⁰ In prospective study conducted by Awasthi and Pande to assess the causes of morbidity of 1061 children aged 1.5-3.5 years from randomly selected 153 *Anganwadi* centers indicated that Incidence rate for diarrheal, skin disease and pneumonia was 79.9, 30.6 and 9.6 respectively per 100 children.¹¹

A cross sectional study in Bangalore slums conducted by Shivaraj BM reported that the family history on prevalence of Hypertension and Diabetics are highly associated and they found that 16% of the study subjects had the habit of tobacco use.¹² Patil and Nagaonkar conducted a study for the estimation of psychiatry morbidity in Mumbai slums and they have shown that prevalence of psychiatric morbidity in the Mumbai slum was 14.8%. Among them, 5.5% were associated with comorbid disorders comprised of primarily non-organic enuresis, attention deficit hyperactivity disorder and mental retardation. By performing Multivariate logistic regression analysis they concluded that nuclear family, parents not living together, large family size, and positive family history of psychiatric disorder had associated with higher odds of psychiatric morbidity.¹³

In another study for estimating morbidity prevalence on geriatric population of Mumbai, it is found that the average illness per person among study subjects was 3.10. Most of the chronic diseases were found in the age group of 60-70 years and reported the decreasing trend in later years.¹⁴ A study was conducted with objective of assessing the general and gynaecological morbidity amongst the women who attended the screening program. It is found that mean age at menarche was 13.19 years and mean age at menopause was 42.56 years. This paper revealed that Headache was the commonest complaint given by women followed by dysmenorrhoea, Low Backache, cough, Lower abdominal pain and fever. About 13.8% women had vaginal discharge. Estimated mean haemoglobin value was 11.03 and 77.7% of them were classified as anaemic. Gynaecological Morbidity per speculum and Pap smear examination was conducted among 164 women about 21% of them had cervical erosion.¹⁵

A study was conducted to find the all forms of tuberculosis in a slum area of Bangalore, among (n=1408) children in the age group of 0-14 years. It is shown that among the 0-9 year age group, 5.5% were tuberculin positive (without BCG lesions), in 0-4 years, 1.8% and 5-9 years, 11.3%. Among the X-rayed children, 47.4% had some kind of sickness, the proportion being significantly high in 0-4 year age group. And the respiratory sickness is the commonest among children of all ages followed by malnutrition (21%). upper respiratory infections were 33% among the children and it is associated with chest symptoms. Two follow-ups were conducted passively, in a slum area of

Bangalore city, each at an interval of one year with the objective to understanding the role of migration, episodes of sickness and health status of sick people, initial survey over a period of time in the pediatric age group. This study uncovered that migration had occurred up to 7% in 0-9 year age group within first year and no migration during second year in 0-4 year age group. Out of 400 children belonging to 0-14 years, had symptoms related to respiratory system. In all, 1.2% children were diagnosed as case of active primary tuberculosis. From the hospital records it is found that only 20% had attended any health facility with respiratory symptoms and most of the symptomatic do not go to hospital.¹⁷

Delhi slum study conducted by Marimuthu (2010) revealed that the morbidity pattern by age and sex groups is similar to the figure depicted in this paper except in one or two points. General morbidity prevalence was 14.7 and 16.3 for male and females respectively. About 7 % morbidity prevalence is more among the illiterate group than the literate group and this difference is statistically significant. From the multiple Logistic regression it is reported that open defecation, not having kitchen, staying in Kuccha house are some the factor associated to the reported morbidity prevalence.¹⁸ As per the Urban Health Resource Centre, India, one in every ten children died before their fifth birthday. Approximately 42% of slum children receive all the recommended vaccinations. Nearly half (56%) of child births take place at home in slums and paving way for high maternal/infants mortality in slums. Two-thirds of urban poor households do not have access to toilets and close to 40 % do not have piped water supply at the dwellings.¹⁹ Lee and Albert demonstrated that budget allocation based on the available general health statistics is not sufficient and the disease burden and battle-necks in urban especially slums is not accounted. In India most of the slums are located on the sides of sewer, Rail lines where open defecation is common. They documented that those who resided in close proximity to an open sewer were the major risk group for acquiring infection. These observations could not have been made by hospital-based or formal health statistics available by the surveillance.²⁰

Finally we conclude that reported morbidity load is more in the slums than the non-slum areas. Morbidity prevalence among the females is higher than males in slums. Although both income and education have significant inverse relation with the prevalence of morbidity, the effect income is more associated than the literacy levels. The observed morbidity pattern is similar to mortality pattern for both the genders.

The policy implication of this study implies that majority of the vulnerable poor migrants are not having BPL cards which is essential for availing not only for the subsidized healthcare services but for getting the benefits from any other welfare schemes implemented by the government. Distribution of BPL care has to be improved for the effective urban health delivery system for the poor

migrants. From this study and other study it is very clear that there is high morbidity prevalence among the urban poor migrants and only 2.8% of them are having some form of health insurance, hence the government may consider some health / social security scheme for these venerable poor migrant who are dwelling in the slums large cities.⁹

CONCLUSION

The morbidity distribution follows a quadratic pattern. Income and education have effective role on morbidity prevalence; both the variables are inversely associated on morbidity prevalence. Morbidity prevalence on age is similar to mortality curve. Slums, morbidity prevalence, two-stage sampling, health insurance, source of water, below poverty line.

Funding: Funded by 'Indian Council of Medical Research. Ref No. TF/2010/01/HSR/1'

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Marimuthu P, Babu BV, Sekar K, Sharma MK, Manikappa S. Effect of socio-demographic characteristics on the morbidity prevalence among the urban poor in a metropolitan city of South India. *Int J Community Med Public Health* 2017;4:173-7.