An Economic Analysis Of Environmental And Health Conditions Of Urban Dweller Slums In Raipur

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Abstract

One of the most emerging problems in India is environmental and health conditions of urban slums as social exclusion in India cities is the explosion of slums and informal settlements. Urban slums as social exclusion people living in these settlements experience the most terrible living and environmental conditions. Due that situation the majority of the slums population is suffering from all types of diseases and also, they were excluded from participating in the economic social, political, and cultural spheres of the city. This paper is attempted to make an economic analysis of environmental and health aspects of the living conditions of the slum dwellers in general in particular Greater Municipality of Raipur of Chhattisgarh, India. The empirical analysis identifies the incidence of chronic diseases like diabetes, blood pressure, respiration syndromes, kidney problems, skin problems and joint pains is studied. In the General sickness category cholera, typhoid, malaria, woofing cough, diarrhea, fever, digestive problems are reported

Keywords: Environmental, Health Conditions, Urban Slums, Diseases Emerging Problems

1. Introduction

Urbanization refers to migration of people from rural areas to urban areas. Majority of the people in rural areas are landless agricultural labourers, poor and middle-class peasants. Small peasants are not able to sustain themselves from cultivation as their real income is decreasing and the number of rural unemployed and underemployed is progressively increasing. There is no industrial development as majority of the people in rural areas, are migrating to urban areas. Another important reason for their migration to urban areas is adverse conditions like drought or floods. As a result they become unemployed in rural areas and move in search of jobs in urban areas. Bosel has pointed out the process of urbanization has been essentially a process of migration to the cities. The largest cities have attracted the largest number of migrants from rural areas because unlike the smallest towns, they provide a wide range of employment opportunities.

As cities grow, so do their slum population. According to the Global Report on Human Settlements (United Nations Human Settlements Program, 2003)2, 924 million people in 2001 or almost 32 percent of the world's urban population lived in slums, the majority of them in the developing world. The proportion of the urban population living in slums is about seven times as high in less developed countries (43 percent) and in more developed countries (6 percent). Although the concentration of slum dwellers is highest in African cities, in numbers alone Asia accounts for about 60 percent of urban slum residents in the world. The United Nations report estimates that if no serious action is taken, the number of slum dwellers worldwide will increase

to about two billion over the next 30 years. Globally, the slum population is set to grow at the rate of 27 million per year during the period 2000-2020, In response to these projections, the Millennium Development Goals established a target to significantly improve the lives of at least 100 million slum dwellers by the year 2020.

A number of studies (Islam, Montgomery, and Taneja, 2006; Montgomery and Hewett, 2005; Fotso, Ezeh, and Oronje, 2008) conclude that the health of the urban poor is significantly worse than the health of the rest of the urban population and is often comparable to health conditions in rural areas. Slum dwellers were found to be disadvantaged in terms of maternal health services, compared with households residing in non-slum urban areas (Rutstein, Johnson, and Montana, 2005). In Nairobi, Kenya, the under-5 mortality rate in slums (151 per 1,000 live births) was 2.5 times as high as the average under-five mortality rate in the city. There is diversity among the Nairobi slums as well, with child mortality rates varying from 123 to 254 per 1,000 live births (African Population and Health Research Centre, 2002). Other intra-urban studies have found similar disparities (Garennne, 2003). Morbidity and mortality rates can vary dramatically between areas with inadequate services (eg.. water supply, sanitation, and health care) and better-equipped slum areas in the same city. Surveys in seven slum settlements in Karachi found that infant mortality rates varied from 33 to 209 per 1,000 live births (Bartlett, 2003). In countries such as Bangladesh, Ethiopia, Haiti, and India, child malnutrition in slums is comparable to that of rural areas (UN-HABITAT, 2006). For example, in Ethiopia, child malnutrition in slums and rural areas is 47 percent and 49 percent, respectively, compared with 27 percent in non-slum areas. In Brazil and Côte d'Ivoire, child malnutrition is three to four times higher in slums than in non-slum areas.

Urbanization and Environment

The general relationship between levels of economic development and the degree of urbanization and their effect on environment are well known. They are highly correlated and depend on country's natural resources, its climatic conditions and population density. Due to uncontrolled urbanization in India, environmental degradation has been occurring very rapidly and causing shortages of housing, worsening of water quality, excessive air pollution, noise, dust and heat, and the problems of disposal of solid wastes and hazardous wastes. The situation in metropolises like Mumbai, Kolkata, Chennai, Delhi and Bangalore, is becoming worse year by year.

In India, air pollution is proving to be an issue of concern. India's ongoing population. explosion along with rapid urbanization and industrialization has placed significant pressure on its infrastructure and natural resources. According to reports, India's urban air quality ranks amongst the worlds worst. Of the three million premature deaths in the world that occur each year due to outdoor and indoor air pollution, the highest numbers are assessed to occur in India. Some cities in India have witnessed decline in air pollution levels due to various measures taken by the Governments. In fact, according to a World Bank study, Delhi, Mumbai, Kolkata, Ahmedabad and Hyderabad have seen about 13,000 less premature deaths from air pollution related diseases. The total population of India is expected to exceed 1.6 billion by the year 2050.

The population growth has mainly centered on cities with large-scale migration of rural population in search of livelihoods. In addition, high population growth rates especially in the Indo-Gangetic (IG) basin has resulted in unbalanced human concentration. The result is that IG basin is one of the most densely populated regions in the world.

Environment and Health

According to the Stockholm declaration on human environment in June 1972, "The governments and people should exert common efforts for the preservation and improvement of the human environment for the benefit of all the people and for their prosperity. Four factors are identified as the potential source of population. They include.

1. The prevailing natural conditions
2. Human population
3. The level of production and consumption
4. The level and use of technology

In the Indian cities these problems are essentially in the form of inadequate development and continuing poverty, unsafe drinking water, malnutrition, poor sanitation, inadequate housing and diseases ete. Some cities cannot but look upon planned instruments to improve the quality of life. Such planning, however, should entail a reappraisal of the objectives of development to provide more explicitly for the social and human needs of health, shelter, clean air, water and the beauty of natural surroundings. Our emphasis should be on the qualitative improvement of life as a whole rather than on the quantitative growth of various sectors of the economy.

As our late prime minister Smt. Indira Gandhi has put it "our attention cannot be diverted from the main question before us which is to bring basic amenities within the reach of our people and to give them better living conditions without alleviating them from nature and their environment, without despoiling nature of its beauty and of the freshness and purity so essential to our lives". The state of health of people does not depend only on the number of doctors and hospitals but also on clean environment. If environment is conducive to the spreading of disease, the state of health will naturally be poor. The system has to be preventive as also curative. Prof. J.Longan in a paper published in the American Journal of Tropical Medicine in 1960 was able to show environmentally transmitted diseases were responsible for the sufferings of 500 million people every year, particularly infants and children.

Review of Literature

A review of the available literature is inevitable in order to locate the progress made in the concerned arca and to identify the gaps to be filled in by the researcher. A large number of studies have been made so far on the conditions of the slum dwellers and their occupational pattern in Notified and Non- Notified slum areas with fruitful findings and policy imperatives. Though some of the studies are comprehensive, yet some gaps still persist. Many issues on the problems of urban slums and the conditions of the slum dwellers have not been adequately examined and duly focused. While the findings, analytical framework and policy proposals developed by the scholars are worthy note, the present study is a diagnostic attempt of finding

out the position, pattern and prospects of environmental and health conditions of the slum dwellers.

Adedeji Daramola and Eziyi Ibem (2010) in their study observed that Nigerian cities are witnessing high rate of environmental deterioration and are rated among urban areas with the lowest livability index in the world. It is estimated that between 20 percent and 30 percent of the urban population only enjoy decent urban life in the country. Although studies have identified various environmental problems in Nigeria, little attention has been given to their implications for sustainable development in literature.

Ian Gazeley & Andrew Newell (june2009) in their study examined the extent of overcrowding among British urban working families in the early 1900s. In particular, a much greater proportion of households in urban Scotland were overcrowded than in the rest of Britain and Ireland. They have investigated the causes of this spatial distribution of overcrowding and found that prices, especially rents and wages are the proximate causes of the phenomenon.

David Vlahov, Nicholas Freudenberg and etal. (2007) observed that cities are the predominant mode of living, and the growth in cities is related to the expansion of areas that have concentration disadvantage. The foreseeable trend is for rising inequities across a wide range of social and health dimensions. Although qualitatively different, this trend exists in both the developed and developing worlds. Improving the health of people in slums will require new analytic frameworks. The social- determinants approach emphasizes the role of factors that operate at multiple levels, including global, national, municipal, and neighborhood levels, in shaping health.

Giok Ling Ooi and Kai Hong Phua (2007) explained that the formation of slums need not be inevitable with rapid urbanization. Such an argument appears to be contradicted by evidence of large slum populations in a large number of developing countries and particularly in rapidly urbanizing regions like Asia. The evidence discussed suggests that city authorities faced with rapid urban development lack the capacity to cope with the diverse demands for infrastructural provision to meet economic and social needs. Not only are strategic planning and intervention major issues in agenda to manage rapid urbanization, but city governments are not effectively linking the economic development trajectory to implications for urban growth and, hence, housing needs. A case study is presented in support of the argument that city governments have to first recognize and then act to establish the link that is crucial between economic development, urban growth, and housing.

Elizabeth Wambui, Kimani-Murage and Augustine M. Ngindu (2007) in their study opined that a result of rapid urbanization the majority of urban residents in sub-Saharan Africa live in slums often characterized by a lack of basic services such as water and sewerage. Consequently, the urban poor often use inexpensive pit latrines. Sanitary practices in these overcrowded slums are also poor, leading to contamination of the wells. This study sought to assess sanitary practices of residents of a Kenyan urban slum and fecal contamination of their domestic water sources. This study observed that owing to the fecal contamination, there is a high possibility of the presence of disease pathogens in the water. Thus, the water from the wells

in Lang's may not be suitable for human consumption. To address this problem, treatment of the water at community or household level and intensive behavioral change in sanitary practices are recommended.

According to **Moore, Gould, and etl. (2003)** Cities offer the lure of better employment, education, health care, and culture, and they contribute disproportionately to national economies. However, rapid and often unplanned urban growth is often associated with poverty, environmental degradation and population demands that outstrip service capacity. These conditions place human health at risk.

Xuemei Bai and Hidefumi Imura (2000) in their article aims to present a theoretical and conceptual model of urban environmental evolution in East Asia that can serve as a common analytical framework for the comparative study of urban environment in this region. The model describes the division of the urban environmental evolution of this region into four sequential stages: the poverty stage, the industrial pollution stage, the mass consumption stage and the eco-city stage.

Smith and Lee (1993) examined the relationship between urbanization and environmental risk transition. The poor environmental health conditions and stress in cities actually make cities primary sources of risk factors leading to modern diseases. The authors conclude that with increasingly large proportions of people living in cities effective ways to handle the urban environmental risk transition must be identified.

Pain, Costa and etl. (1989) examined the relationship between instant mortality and selected socio-economic and health care variables in the city at Salvador Brazil. The results indicate a direct correlation between proportional infant mortality and low income. There was also an inverse relationship between proportional infant morbidity and water consumption. Similarly, the percentage of substandard housing was directly associated with infant mortality.

M.R. Narayana (2010) analyzed that the impact of economic globalization on urbanization since July 1991, with special reference to comparisons of Indian and select global experiences. India's degree of globalization, measured by internationalization of trade and capital, is shown to be low at global levels. Patterns of urbanization in the post-globalization period show higher growth and concentration of population in bigger class-size cities. Urban economic growth is increasingly contributed by service sectors, declining share of manufacturing sector and higher labour productivity.

Amitab Kundu (2009) observed that migration from rural to urban areas in India too has serious problems of comparability. The scope and coverage of data compilation have varied significantly from one census to the other and over different rounds of the National Sample Survey (NSSO). The data problems pertain not only to the distribution of migrants across different streams within and across the districts and states but also due to their duration of stay in the city. Despite these problems, however, the data on the total number of migrants are fairly robust and comparable over time.

Akie Takeuchi, Maureen Cropper and etl. (2008) made some insights into the welfare effects of slum dwellers using data for 5000 households in Mumbai in India. A model of

residential location choice is estimated in which households value the ethnic composition of neighborhoods and employment accessibility in addition to housing characteristics. The importance of neighborhood composition and employment access implies that relocation programs must be designed carefully if they are to be welfare enhancing. The value of this model is that it allows one to determine the magnitude of these effects.

Pulla Rao D. (2008) pointed out that Growth of urban slums is a serious consequence of urbanization. Slums are regarded as the major problem of urban life. They are found in all our towns and cities. They represent the highest form of human degradation. They reflect the failure of our urban planners, municipal authorities and urban technology to provide basic services like water supply, toilets, drainage, and garbage disposal etc. In most of our cities the water supply, especially in summer, does not meet the minimum needs of bathing. There is high incidence of deaths and diseases in urban poor settlements. Industrialization and urbanization are the two major sources of environmental pollution in our towns and cities. Increasing exploitation of natural resources for industrial and economic development has adversely affected the urban ecological balance between man, air, water and land resources. Water pollution leads to outbreak of epidemics.

Shivasankaraiah, Thulasi Naik and et al. (2008) in their study analyzed the environmental pollution effects, causes and concerns. Pollution is an undesirable change in the physical or biological characteristics of our air, land and water that will harmfully affect the human life. Pollution is the deliberate or accidental contamination of the environment with man's waste

Timeyin Uwejamomere, (2008) opined that there is an unacceptably weak global policy response to the water and sanitation crisis in the rapidly expanding slum areas of the developing world. Without a serious commitment to redress the low political and financing priority given to sanitation and water in housing and urban development, the growing challenges of urbanization risks will result in an unmanageable health, education and economic crisis.

A review of the available literature is inevitable in order to locate the progress made in the concerned area and to identify the gaps to be filled in by the researcher. A large number of studies have been made so far on the conditions of the slum dwellers and their occupational pattern in Notified and Non-notified slum areas with fruitful findings and policy imperatives. Though some of the studies are comprehensive, yet some gaps still persist. Many issues on the problems of urban slums and the conditions of the slum dwellers have not been adequately examined and duly focused. While the findings, analytical framework and policy proposals developed by the scholars are worthy note, the present study is a diagnostic attempt of finding out the position, pattern and prospects of environmental and health conditions of the slum dwellers. Against this background an attempt is made in the present chapter to present a brief resume of the literature available at both International and National levels relating to urbanization, living conditions, health and environmental effects of the slum dwellers.

Research Problem

Nearly 50 percent of India's populations live below the poverty line. Majority of the slum dwellers are rural immigrants who come to the cities in search of employment in the secondary and tertiary sectors of activities. They occupy government, quasi-government and private lands or purchase small extents in groups and ultimately prefer to settle in the urban areas. Majority of them live under highly congested and sub-human environmental conditions.

In Raipur the slums have been growing as a result of rapid industrialization during the last four decades. Heavy influx of labourers from rural to the port city has meant a growth in slum population at a rate higher than 6 percent per annum. Most of the Raipur slum dwellers live under sub-standard environmental conditions. On account of this the slum dwellers in the city are prone to certain particular type of diseases. The gastroenteritis, skin diseases, and respiratory infections are quite common in the slums. The health problems of the urban poor who are living in the slums can be attributed to the socio-economic features like poverty, inadequate and poor quality of nutrition, environmental factors like population, poor housing, overcrowding traffic congestion and lack of physical facilities like drains latrines and protected water supply.

The cities often called, as engines of economic growth" are no safer with regard to environmental aspects. In view of the above, the concept of sustainability has gained momentum in the World Earth Summit" at Rio De Janeiro held in June 1992 with in highlighted the need for local area action plan (LAAP) involving the urban residents, Government and NGOs to make cities livable. However, there is no particular study on the living conditions of the urban slum dwellers after Globalisation in Raipur city. Hence, an attempt has been made to analyses the living conditions of the urban slum dwellers in Notified and Non-notified slums, as the Raipur city is one of the most rapidly developing city not only in India but also in the Asian continent.

Objectives of the Study

The specific objectives of the study are:

1. To study the socio-economic conditions of the sample households in the study area.
2. To examine the factors influencing the sample household's decision to dwell in the Notified and Non-notified slums.
3. To portray the civic amenities and environmental conditions of the sample households.
4. To study the health conditions of the affected sample respondents in the study area.
5. To examine the environmental factors that effect on selected urban slum dwellers health in the study area
6. To suggest suitable measures and policy suggestions for development of slum dwellers for better standard of living in the study area.

Methodology

To study the above-mentioned objectives primary as well as secondary data have been used. The secondary data is obtained from the Census Reports of Government of India, District Statistical Handbook of Statistics, Raipur Municipal Corporation (RMC) Reports and various Government reports published by Bureau of Economics and Statistics, Government of Chhattisgarh.

For the collection of primary data, a multi-stage simple random sampling technique has been employed. For the purpose of study two urban slums ie one is Notified slum and the rest is Non-notified slum with contrasting characteristics have been selected purposively. The notified slum (Jhuggi) which is mostly affected with industrialization is located near to Raipur Jhuggi Basti (RJB) and is selected to examine the impact of industrialization on environment of Raipur city. On the other hand, the most hazardous slum in the entire city ie. Gudhiyari (Non-notified slum) is selected which is located near the railway station. In order to collect the primary data a structured and pre-tested questionnaire has been designed in such a way that it satisfies the primary objectives of the study. A total of 500 households have been approached to collect the data. In each slum 250 households are randomly selected for the study.

Techniques of Analysis

Tabular analysis of percentages is widely used and graphic analysis is presented wherever required to analyze different aspects of the problem. The Chi-square test is used for the association between age and sex in the case of chronic diseases and general sickness of the sample respondents.

Many aspects of living housing decisions involve choice of one alternative or option from a restricted choice set, for example whether or not to move, dwelling type, tenure etc. for this reason the period since late 1970's has been the development of discrete choice models of mobility behavior and dwelling selection. This is because the revealed discrete choices actually constitute a response to important qualitative and societal considerations hither to lay towards margins of mainstream housing and economies (Macknnan, 1982). Generally, a large number of variables in the social sciences are dichotomous viz., Male Vs female, literate Vs illiterate, employed Vs unemployed, married Vs un- married, guilty Vs not guilty, suffering Vs not suffering, dwelling Vs not dwelling and so on. To deal with such cases, general linear regression models are not found to be useful, but Logit or Probit regression models are of use.

The probit model is used for the factors influencing the household"s decision to dwell in the Non-notified and Notified slums in the study area. The logistic regression model is used for finding out the effect of environmental factors on health of the urban slum dwellers in the study area.

Major Findings of the Study

This study brought out some interesting findings, which are very useful in formulating policies for environmental and health aspects of the living conditions of the slum dwellers in general and Raipur in particular. Some of the important and major findings of the study are as follows:

1. The results of the logistic regression model indicate that the variable sound pollution (XI) isstatically significant at 5 percent level of value with expected positive sign. The odds ratio associated with this variable 1.37 times more likely to impact than with their counterpart's i.e. the household's one who had not suffering chronic diseases and vice-versa.

2. The variable Dust accumulation (X2) is statistically significant at 1 percent level of - value with expected positive sign. The odds ratio of this variable indicates that 2.61 times more likely to the impact on those who are suffering chronic disease than their counterparts.

3. The variable Water pollution (X4) is statistically significant at 10 percent level of - value with expected positive sign. The odds ratio shows that the sound pollution has 2.3 times more likely to impact on those who are suffering from chronic disease than their counterparts in the study area.

4. In the Non-notified slum, there were 250 observations and independent variable 3 in number to carry out the binary logit analysis. Thus, there were three independent variables to begin with. From these, Smoke pollution (X3) and Water pollution (X4) are turned out to be statistically significant at 1 percent and 10 percent levels of - value with expected positive signs. The odds ratio associated with these variables has 1.95 and 1.58 times higher the impact for those who are suffering from chronic disease compared to their counterparts and vice-versa.

5. For Notified slum, there were 250 observations and independent variable 3 in number to carry out the binary logit analysis. Thus, there were three independent variables to begin with. From these, Sound pollution (X1) and Dust accumulation (X2) are turned out to be statistically significant at 5 percent levels of - value with expected positive signs. The odds ratio associated with these variables has 1.03 and 1.62 times higher the impact for those who are suffering from chronic disease compared to their counterparts and vice-versa.

6. The result of the Probit indicates that the variable literacy status (X3) is statistically significant at 10 percent level of Chi-square value with expected positive sign. The probability of the Head of the household is illiterate then the household decision to dwell in Non-notified slum significantly increases by 26.4 percent, looking at marginal effect of this variable indicates that the magnitude of impact is very significant (3.8 percent) in the Non-notified slum when compared to Notified slum.

7. The variable family size (X4) is also statistically significant at 1 percent level of chi-square value with expected positive sign. The probability of the family size is higher than the likelihood of the household decision to dwell in Non-notified slum is higher i.e. a one percent change in family size leads to 17.5 percent of probability of chance of the household's decision to dwell in Non-notified slum. The Marginal effect of this variable clearly shows that the magnitude of impact is very large i.e. 47.6 percent in Non-notified when compared to Notified slum.

8. The variable poor income status (X5) is turned out to be statistically significant at 10 percent level of chi-square value with expected positive sign. When the household income is poor then the probability of the household decision to dwell in Non-notified Slum significantly increases by 43.1 percent, and looking at marginal effect of this

variable indicates that the magnitude of impact is significant (10.1 percent) in the Non-notified slum when compared to Notified slum.

9. Finally the variable Migrant from Rural (X6) is also statistically significant at 1 percent level of chi-square value with expected positive sign. For the household is migrating from rural area, the household decision to dwell in Non-notified slum significantly increases by 155.2 percent, looking at marginal effect of this variable indicates that the magnitude of impact is significantly very high (55.4 percent) in the Non-notified slum when compared to Notified slum.

10. The analysis of the distribution of head of the households by age reveals that 51.8 percent of the heads of the sample households is concentrated in the age group of 31-45 from of the total. The same is also observed across the Non-notified and Notified slums. Out of the total heads of the households in Non-notified slums, 59.6 percent belong to 31-45 age group where as in the Notified slums it is 44 percent. Finally, it is observed that a meager percent (6.4 percent) of the households is found in the age group of 61 and above. From the above analysis it is concluded that a majority of the heads of the sample households belongs to effective age group.

11. The analysis relating to marital status, out of the total, 77.4 percent heads are married, 19.6 percent are widows and the remaining 3 percent are un-married. The information relating to married head of the households in Notified slums is higher than the Non-notified slum. But the widow head of the households (32.2 percent) is higher in the Non-notified slum where as in Notified slum this group percentage is 16 percent.

12. The analysis of the size of the family out of the total, 25.8 percent of the households are having the family size group of 2-4, and the 23.8 percent are having 6-8 family size followed by 4-6 group (20.4 percent). The same is also observed from the Non-notified and Notified slums individually. It is very interesting to note that the family size of 8 and more in the Notified slum is more than in the Non-notified alum.

13. The study relating to the levels of education shows that out of the total, more than 50 percent of the heads of the households with primary education belong to SC category followed by BC, OC and ST category. It is interesting to note from the table that more than 49 percent are illiterates under the category of SC followed by BC (42.21 percent) and a similar picture is observed in the Non-notified slum also, but in the Notified slum 60.68 percent are illiterates under the category of BC followed by SC (31.62 percent). A similar picture is also observed from both the slums.

14. The analysis regarding the migrant status of the total sample households, 57.2 percent are migrants from rural to urban. With regard to Non-notified slum a vast majority of the sample households are migrant from rural to urban te. 75.6 percent, while in the Notified area 49.2 percent of the sample households are migrant from within the city. From this it may be inferred that the city of Raipur is becoming a prominent centre for migrants /immigrants due to growing industrial activity

15. The analysis of the occupational distribution of the sample households out of the total, almost half of the sample households belong to causal labour, while 26.6 percent are working as private employees" and 17 percent are self-employed i.e. vendors. With regard to Non-notified slums a vast majority of the households are working as causal labour and 16 percent are self-employment /vendors, while 8 percent are private employees as, and 2.8 percent belong to other activities. Only the remaining 1.2 percent belongs to the category of government servants. But in the Notified slums, about 45 percent are working as private employees, while 32 percent are casual labour.

16. The analysis relating to income of the sample households that out of the total, 25.4 percent of the households earn an average monthly income between Rs.6000-7500, while 24.2 percent of the households earn an average monthly income between Rs.1500-Rs.3000, and 16.8 percent of the households earn an average monthly income less than Rs 1500. As observed in the Non-notified slum, a major portion of the sample households earn an average monthly income between Rs 1500-3000 but in the Notified slum a majority of the households earn an average monthly income between Rs 6000- Rs 7500.

17. The analysis relating to the consumption expenditure per annum of the sample households on different items, it is observed that out of the total expenditure on food items 63.8 percent belongs to category of 20, 000 and more, while 21.6 percent belongs to the category of Rs 10, 000-Rs 20,000 and 14.6 percent belongs to less than 10, 000 income categories. As observed from the above table that for food items in the Notified slum, 68.4 percent of the households spending in the category of 20,000 spend more for food items, but in the Non-notified slum it is slightly lower on expenditure for food items.

18. The analysis relating to the availability of the drinking water, out of the total, 41 percent of the households are bringing drinking water from public tanker, 36.8 percent of the households are bringing drinking water from public tap connection and a few percent of the households are purchasing packaged mineral water from outside. With regard to Non-notified slum, more than 80 percent of the households are bringing drinking water from public tanker while in the Notified slum 73.6 percent of the households store the drinking water from public tap connection which is supplied by the municipal corporation. It is interesting to note from the table that, 22.4 percent of the households purchase the packaged mineral water, but in the Non-notified slum its only 8 percent of the households that are reported to purchase packaged mineral water.

19. From the opinion survey it is noticed that, 46.2 percent of the households opine that the drinking water is not safe which is supplied by the Municipal Corporation (Public tap connection) or service organizations (Public tanker) and a few percent of the households are not responding. As observed in the Non-notified slum, 76 percent of the households opine that the drinking water is not safe and the reason may be that a majority of the households store water from the public tanker. But in the Notified slum only a few percent of the households opine that the drinking water is not safe.

20. It can be observed from the analysis of sanitary conditions that the highest percent of households have reported that there are no lavatory facilities in their houses. It is interesting to note that no houses have lavatory facility in the non-notified slum and in the notified slum it is 32 percent. It can also be noted that a highest percentage of households have reported that on-availability of bathroom facility in their houses. It is interesting to note that no houses have bathroom facility in the Non-notified slum and in the Notified slum it is 16.4 percent, households that have bathroom facility, further the analysis relating to garbage clearance shows that, out of the total for 34.4 percent of sample households garbage clearance is done through gadda and 16.8 percent of the households is done by the roadside, for 31.4 percent of total sample households are done through public dustbins. As in the notified slum, 54.8 percent of the households it is using public dustbins for garbage clearance and in the Non- notified slum, more than 68 percent of the households are using gadda for garbage clearance.

21. The analysis which is relating to the availability of ventilators as well as double door facility in the sample household houses. With regard to ventilators out of the total, 50 of the sample households of the kitchen have ventilators. In the Non-Notified slum, 92 percent of the households are not having ventilators. With regard to double door facility, 53.8 percent of the sample households of houses have reported having double doors but in the Non-Notified slum no sample house has reported the houses are not having double doors. But in the Notified slum, 92.4 percent of the sample having double doors.

22. It has been observed from the analysis that, 38 percent of the households are using gas for cooking followed by firewood (31.6 percent), coal (20 percent) kerosene (6 percent), husk oven (2.4 percent) and the remaining 2 percent are using electric cookers. It is interesting to note that in the Non-notified slum 43.2 percent of the sample households are using firewood, 32 percent are using coal for cooking. This indicates that smoke pollution affects more on the health of the slum dwellers in the Non-notified slum when compared to Notified slum.

23. The analysis relating to the sample households facing environmental problems, it is observed that a majority of the sample households are affected by dust accumulation in the Notified slum when compared to Non-notified slum. As in the Non-notified slum most of the sample households are affected by Water pollution, Smoke pollution and Vector problems than Notified slum sample households. The Sound pollution is commonly affected by the sample households in both the slums.

24. For the analysis of the chronic diseases out of the total, 40 percent of the affected sample respondents are suffering from the chronic diseases diabetes under the age group of 31-45 followed by the age group of 60 & above (24 percent) and the age group of 46-60 (23 percent). Further it can be observed from the Table-5.1.1 that in the Non-Notified slum mostly men are affected with diabetes when compared to women. A similar scenario is also found in Notified slum. The calculated value of Chi-square is 1.78752, which is

significant at 1 percent level. It indicates that there is a significant difference between age and sex in the case of diabetes diseases in the study area.

25. For the analysis of the chronic diseases out of the total, 40 percent of the affected sample respondents are suffering from the chronic disease of Blood Pressure under the age group of 31-45 followed by the age group of 46-60 (32 percent). In the case of Non-notified slum, 60.86 percent of the respondents are suffering from "Blood Pressure" and they are females. But in Notified slum, 50 percent of the male respondents are suffering from Blood Pressure. It is found that there are no respondents suffering with Blood Pressure below 14 years age group because of the age factor. Further, the calculated value of the Chi-square is 8.12609 and it is statistically significant at 1 percent level. Hence it can be conclude that there is a significant difference between age and sex in the case of chronic disease, "Blood Pressure" in the study area.

26. With regard to AIDS, four cases are reported in the study area. Out of the total, 75 percent of the respondents are suffering with AIDS under the more productive age group of 15-30. It can be also noticed that one case is reported under the age group of less than 14. Further it can be observed from the table that the majority of the respondents are from female category. It is also interesting to note that not all the AIDS cases are reported in Non-notified slum only.

27. It can be observed from the analysis that out of the total, 34 percent of the respondents are suffering from Kidney Problems under the age group of 60 & above followed by 46-60 (28 percent), 15-30 (16 percent) and a meager percent of the respondents are suffering with this disense under the age group of less than 14, and it is also observed from the total that more than 35 percent of the female respondents are suffering from this disease under the age group of 46-60 & above. With regard to Non-notified slum, 41 percent of the respondents are suffering from kidney problems under the age group of 60 & above followed by 15-30 (ie. 23 percent) and 46-60 (20 percent). Further it can be noticed that majority of the females are affected by kidney problems. The calculated value of chi-square is 4.0444, which is significant at 1 percent level. Hence it can be concluded that there is a significant difference between age and sex in the case of kidney problems in the study arca.

28. The analysis relating to skin problems faced by the affected respondents that out of the total, 39 percent of the respondents are suffering from skin problems under the age group of 46-60 followed by 31-45 (28 percent). Further it can be observed from the total that most of the females are affected by skin diseases. A similar picture is also observed from both Notified and Non-notified slums. The calculated value of chi-square is 4.897159, which is significant at 1 percent level. Hence it can be concluded that there is a significant difference between age and sex in the case of skin problems in the study area.

29. It can be seen from the analysis that out of the total, 37 percent of the respondents are suffering from joint pains under the age group of 31-45 followed by 46-60 (30 percent) and 60 & above (25) percent). Further, it can be noticed from the total that, 52 percent of

the male respondents are suffering with joint pains under the age group of 31-45 and the rest of the age categories of females are suffering from this disease. A similar picture is also observed from the Non-notified slum. But in the Notified slum, 75 percent of the respondents are suffering from Joint pains under the age category of 60 & above followed by 46-60 (30.76 percent) and 31-45 (34.72 percent). Further, it can be observed from the Notified slum a majority of the females are suffering from this chronic disease. The calculated value of chi-square is 3.016756, which is significant at 1 percent level. Hence it can be concluded that there is a significant difference between age and sex in the case of joint pains in the study area.

30. For General sickness, it can be observed from the analysis that out of the total, 28 percent of the respondents are suffering from woofing cough under the age group of 46-60 and 26 percent each of the respondents are suffering from Woofing Cough" under the age group of <14 and 60 & above and a meager percent are reported under the age group of 15-30. Further it is observed from the table that 32.43 percent of the females are affected under the age group of 46-60 and 60 & above. With regard to Non-notified slum, 60 percent of the respondents are suffering from woofing cough under the age group of above 46 years and in this age group most of the females are affected with woofing cough. With regard to Notified slum, 50 percent of the female respondents are suffering from woofing cough under the age group of above 46 years. Further, the calculated value of chi-square is 2.668218, which is significant at 1 percent level. Hence it can be concluded that there is a significant difference between age and sex in the case of woofing cough in the study area.

31. It can be noted from the analysis that out of the total, 56 percent of the respondents are suffering from digestive problems under the age group of 31-60 followed by 60 above (21 percent), 15-30 (20 percent) and a meager percent (3 percent) are reported in the age group of less than 14 years. Further it can be observed that a majority of the females are affected by digestive problems. A similar picture is observed in both the slums. Further, the calculated value of chi-square is 3.514638 which is significant at 1 percent level. Hence it can be concluded that there is a significant difference between age and sex in the case of digestive problems in the study area.

Policy Suggestions

On the basis of the discussions on the findings of the study the possible policy implications that will help the policy makers in formulating a policy to address the situation are as follows:

- The study suggests that Raipur Municipal Corporation (RMC) should take vigorous steps to protect environment in view of the rapid growth of the city. The GVMC should streamline the sewage system to collect sewage from residentials specially form slums and commercial areas by providing effective sewage treatment plant to reduce water pollution.
- In view of the large-scale migration from the rural to urban centers necessary steps are to be taken to meet the sanitary and hygiene problems. The Community Health Department

of GVMC should prepare short run and long run programmes to meet the sanitary problems of the flooding population.

- There should be a mechanism of incentives and punishments so as to strengthen the environmental profile of the city. This requires adequate legal machinery to look for the culprits and punish them according to law and also provide incentives to those who work efficiently towards environmental protection. Further, a separate environmental cell should be established in the GVMC with executive and supervisory powers to tackle various problems related to environmental protection.

- The general awareness on environment and public health issues are to be brought in the slums by government and NGO's through street plays like drama, documentary movies and etc. That will have immense impact on the attitude towards living styles of the slum dwellers.

- Various Schemes for Slum Improvement programmes implemented by Central and State Government also. But strictly allocate to the grants for Slum improvement and slum Environmental improvement Schemes like Housing, drinking water, drainage &sewerage facilities, public health Dispensaries, and urban Infrastructure facilities.

- In the port area, the residents of the slums in and around that area leakage victims of black dust and sound pollution. The remedial steps to control these problems are erecting a dust proof net, sprinkling water on raw materials continuously for the safety of the residents.

- The residents of Gudhiyari lack of basic civic amenities as they are residing in a disputed area. The residents are exposed to hazardous pollutants that are causing all types of diseases. To safeguard them, the better option would be to relocate them to some other area which is free from pollution of air, sound and water.

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