

Vulnerability Assessment & Urban Mapping: A Sociological Analysis of Itanagar Capital Region, Arunachal Pradesh, INDIA

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Abstract:

Today the urban mapping and vulnerability assessment are necessary for government policy framing and programme implementation. The present study aims at addressing the health issues faced by the selected population through urban mapping of the area. Once the mapping is done, the analytical framework based on the findings has been described in the work. The study has described the criteria for mapping urban vulnerability, focusing on the component of health risk. The study is based on the framework of the case-study research and has included the impacts of a specific hazard risk of the health of the Itanagar Capital Region (ICR) of Arunachal Pradesh. The study also proposes a critical framework that would in the future address the planning methods toward an effective and efficient strategy to the population of the vulnerable area. The efforts have been made towards understanding the concept of risk combined with hazard, vulnerability, and exposure to diseases.

Definition wise vulnerability is the characteristics of an individual or a group of individuals and their condition that categorise their ability to anticipate, to cope up with, to resist, and build resilience to the consequence of any form of risk of hazard. This work is also dependent on the reviews and focuses on the health hazard due to natural and manmade disasters. A health hazard is determined by socioeconomic, physical location and ecological processes, which are responsible factors of the community to become more prone to epidemics. These processes are further stimulated by factors like Poverty, type of daily occupation, exclusion, marginalization and unequal distribution of services and health facilities. Due to equitable chances in life poor and marginalized sections of the society may be compelled to settle in hazardous areas. To cope with the matter and to have sustainable solutions an insight on the assessment of the vulnerability of the community is inevitable. There is a need of convergence of efforts of social scientists and public health specialists so as understand the grassroots issues and manage the disastrous conditions especially on health needs. Such local understanding will enable the community to reaffirm the sustenance and to have resilience on expected health matters.

Key Words: *Vulnerability, Health Hazard Assessment, Mapping, Strategic planning.*

1. Introduction

Vulnerability is much more than the past, present and future of a community and its rapport with the physical entity. It is to understand the population and their perceptions on value, belief, attitude and mostly the level of awareness and degree of information. The population of a community and their knowledge of risk and their reaction concerning disaster constitute the extent that is measured on the landscape of vulnerability (Hilhorst and Bankoff, 2006: 4). Vulnerability is defined as the conditions determined by physical, social, economic and environmental factors or processes, which increases the susceptibility of a community to the impact of hazards (The International Strategy for Disaster Reduction -UN/ISDR: 2004) To this the on the other way approach, the United National Development Programme (UNDP) defines vulnerability as a human condition or process resulting from physical, social, economic and environmental factors, which determine the likelihood and scale of damage from the impact of a given hazard (UNDP 2004:11). Further, Vulnerability depicts the physical, economic, political and social susceptibility or predisposition of a community to loss or damage in case of a destabilizing phenomenon of natural or anthropogenic origin (Cardona 2006: 37).

The varied definition can be interpreted and Vulnerability can be understood as an intrinsic risk component of a system or structure that is probably potent and exposed to any risk or hazard thereby comprehending the future state of physical harm and damage. It is an entity of probability that is objective to the connection of the people with their natural or built environment that is influenced or affected by the economic factors endorsed by social forces and social institutions characterized by cultural values and belief systems that contest them of a community in which they live. The relationship of environment, society and culture in different proportions to vulnerability professes a theoretical framework that encompasses the multidimensionality of disasters (Blaikie et al. 1994; Comfort et al. 1999; Cutter 1996; Hewitt 1983b). Vulnerability is also featured by the type of habitat in a given natural space within which people are differentiated as per the status in a community into more or less vulnerable individuals or groups.

The recent studies on urbanization suggest that there is an increased population in the urban cities and their peripheries. The government developmental schemes though are formulated and implemented are not strong enough in percolating to the real needy. One main reason could be these schemes are being expedited by either agency or Nongovernmental organizations are external entities and do not belong to the community in question. Services provided by such programs are in a true sense accessible by the people who are aware, literate or are some or the other way related to the expediting agencies. The urban man or for that matter the urban poor is not aware in many instances and therefore considerable disparity exists in terms of beneficiaries on facilities and services like health, education, power, water, required infrastructure, livelihood and social capital that amount to considerable vulnerability. The less privileged are forced to carry on with conditions like crowded housing, Lack of water sanitation and hygiene, and exposure to pollution and infections. Some of the government policies and program interventions are framed on either the old data or are framed as per the understanding of framers inside the air-conditioned four walls.

The most vulnerable in the community needs to be targeted and the different needs of varied vulnerable must be inclusive while making a policy. Therefore, the mapping and assessment of any vulnerable community are essential. The present study is aimed at identifying and assessing the vulnerable areas to understand the requirement of implementing more equitable health programming depending on a more comprehensive assessment approach by incorporating factors like socio-economic, cultural, environmental entities besides the biomedical components.

Arunachal Pradesh is one of the largest states in northeast India. It has international boundaries with China, Myanmar and Bhutan. The state was administered under the Ministry of Home Affairs before statehood was attained in 1987. The capital was shifted in 1974 from Shillong, Meghalaya to Naharlagun, and later to Itanagar, Arunachal Pradesh. As per the 1961 census, the entire state was under the rural status, which in 1971 was classified into 4 urban centres namely, Bomdila, Along, Pasighat, and, Tezu. In the 1981 census, the present Itanagar was recognized as an urban centre and gradually it got expanded as the capital region along with present day areas of Nirjuli and Naharlagun. In 2012, Itanagar, under inclusive approach was denominated as the municipal cooperation for holistic development.

Itanagar is a cosmopolitan city with its diversity of population and cultural practices. It also brought some of the urban problems and adversity in the process of development. There is challenge and obstacle faced by the state government to make it one of the smart cities of India. It is enduring urban problems in the form of haphazard settlements without regulated frameworks losing planned city momentums with unchecked infiltration of migrants and increasing number of vehicles causing traffic congestions. One of the major reasons could be the easy process and minimum eligibility of the bank scheme. There is no denying fact that there are social factors like the casual attitude and required behaviour change communication of the citizens that envisages the noticeable dismal growth of urbanism especially in the Itanagar Capital Region (ICR).

The emergence of a middle class in the social ladder among the persuasive egalitarian community and the gradual transition in the occupation from agrarian-forestry to the public, private and tertiary sectors has transformed the economic lives of the tribal especially in urban and semi urban areas of Arunachal Pradesh. A large section of the population however, are settled away from the main urban centres and beside urban areas, living in dilapidated dwelling structures without any modern basic amenities. Such areas are debarred of urban infrastructure like proper road, power, water supply, health facilities, etc. Such conditions may expose the population to numerous vulnerabilities.

The present study has focused on the concerned population on priority while having an understanding and analysis of their urban vulnerable assessment. The study may be significant if the urban population is to be kept healthy. Since the Itanagar Capital Region is experiencing an influx of legal and illegal migrant population from both inside and outside of the state, there is a potential growing urban varied dimension of problems most probably the health issue. Due to poverty and malnourishment of the periphery dwellers, infection and diseases become common and the population becomes prone and carriers of the potent diseases to harmful to the healthy body. This situation could worsen

in the urban space that calls for timely vulnerable assessment and thereby implementation and expediting proper need based health services to the populace.

2. Research Problems

The rapidly growing population and encroachment towards the urban periphery are threatening the modern contemporary settlement pattern in and around the capital region of Itanagar. The natural environment which surrounds the region is collapsing due to human activities of luxurious dependence on nature. In the recent decade, the human settlement in the capital region has grown at several folds according to the census report. The rate of urbanization is rapidly taking place and there are several reasons for rapid urbanization like temporary migration from the neighbouring states, migration from other districts of the state and accumulation of population serving in central government other tertiary sectors.

Most of the migratory population belong to the lower economic class who migrate to the capital region in search of manual work, work as a wage labourer in construction sites, running small shops like the grocery store, beetle nut shop, working as cobbler, barber etc. The existence of the high cost of living in the main urban centres and the high rent push them to dwell at the periphery without proper basic amenities. Additionally, there is a migratory population from the other states residing in different corners of the capital region and who often are unemployed and are not engaged with any kind of daily wage earning or perform any form of manual work. These sections of the population also include the native Arunachal Pradesh Schedule Tribes (APPST) from other districts looking for settling down in ICR and are either living on small business, contract works or farming in nearby areas.

The migrant population is suffering from many health issues due to a lack of amenities. The infrastructural development like colony roads, electricity and water supply have not been made into the urban periphery so far. The location of ICR paves incessant rainfall during the monsoon season which causes landslides due to the topographical make and soil quality. Waterlogging in the colonies due to poor drainage systems is a big menace too. The situation has further deteriorated the health conditions of the urban poor and families are suffering from many types of disease. It is prudent that urban poor family especially those living in the urban periphery are vulnerable to any kind of seasonal sickness and this condition gets worse due to the lack of good command of socio-economic factors that lead to their poor income and lack of nutrients in their daily diet.

3. Objective

The major objectives of the study are based on the future probable conclusions based on the Urban Mapping and Vulnerability Assessment of Itanagar Capital Region (ICR) and its periphery in Arunachal Pradesh, India. Following are the main objectives;

1. Recognizing the residential vulnerability.
2. Understanding the associated social vulnerability.
3. Measuring and evaluating occupational vulnerability.
4. Identification of health related vulnerability.
5. To identify and assess vulnerabilities and to propose equitable health programming through a comprehensive assessment matrix based on socio-economic, cultural and environmental and biomedical factors.

4. Methodology

The study had used the case study method by focusing on the families belonging to lower economic strata and their vulnerability assessment. The study was intensively conducted by interviewing the respondents from door to door randomly. The historical data was also recorded during the survey which helped in analysing the present situation and its changing aspects in the surrounding.

The vulnerability assessment and urban mapping survey was conducted within the Itanagar Capital Region (ICR) i.e., all the municipal wards of both Naharlagun and Itanagar. According to the Itanagar Municipal Corporation (IMC), 30 wards were taken for the study, it was found that 54 colonies were included within the wards. The survey was carried out by the trained research scholars and students of the Department of Sociology, Rajiv Gandhi

University, Rono Hills, Doimukh, Arunachal Pradesh. The survey covered entire wards along with the attached colonies of the peripheral areas of the ICR for analysis and mapping purposes.

The questionnaires were closed ended type emphasizing mainly the core issues of vulnerability among the lower economic class living in and around the different parts of the capital municipal wards. The total sample size was 1286 households which comprised of selected sample size for the study of 20 to 25 numbers of households of 54 residential colonies of 30 wards in the ICR. The samples were randomly picked and chosen during the collection of data. The survey covered both the nontribal and tribal populations residing in the capital complex region.

The questionnaire was prepared with technical support from the office of National Urban Health Mission (NHM) Naharlagun, Government of Arunachal Pradesh on their protocol of Urban Mapping and Vulnerability Assessment guideline issued by the Ministry of Health and Family Welfare, Government of India.

5. Discussant and findings

Section I- Residential Vulnerability:

Table 1. Slum Status

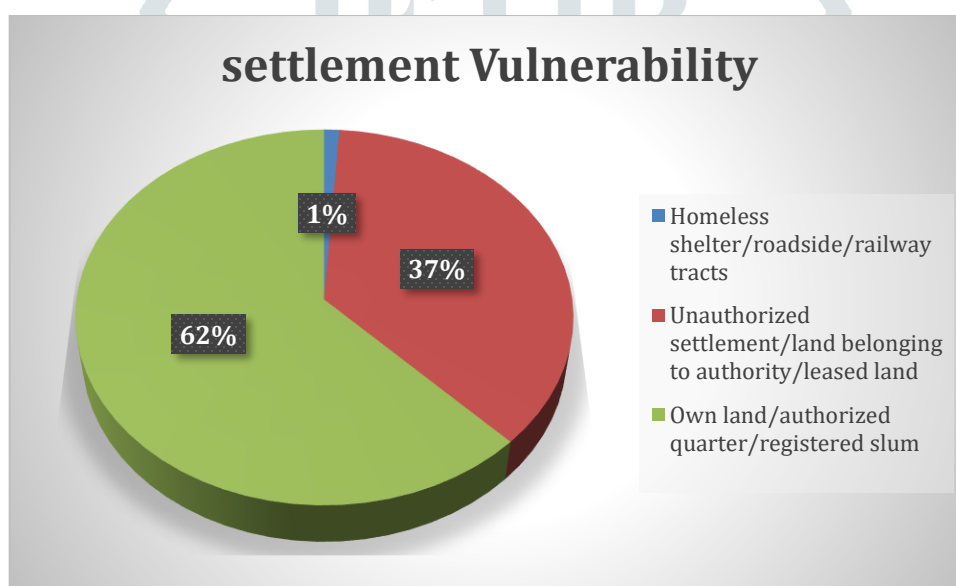
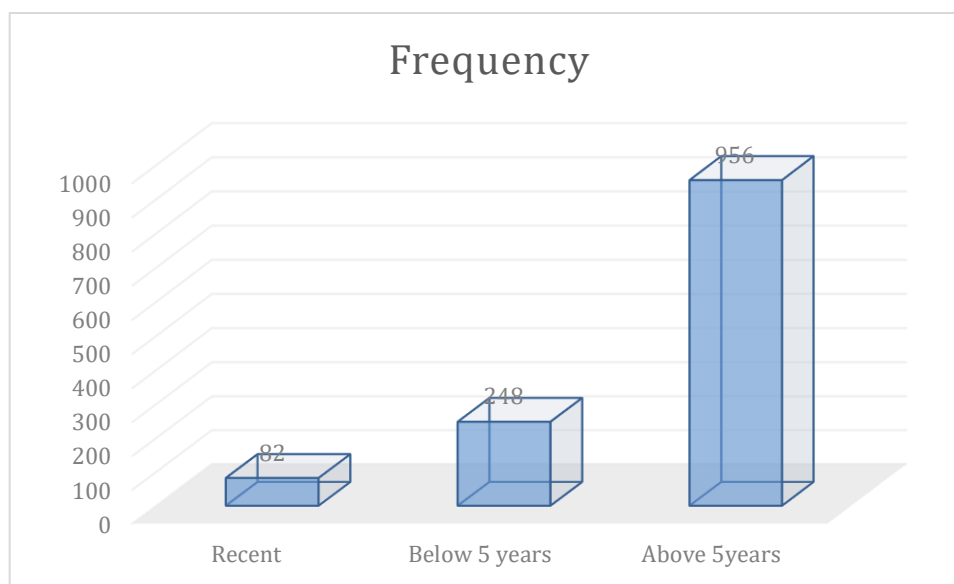


Figure 1: settlement Vulnerability

The assessment of the settlement and their residential vulnerability was surveyed across the capital region. The above table indicates that out of a total sample of 1286, 802 respondents i.e. 62.4% responded that they are settled under their land/authorized quarters/registered slum area, 470 of the respondents are living in unauthorized settlement/ land belonging to authority/leased land and 14 number of respondents of 1.1% are living under the homeless shelters/roadside/railway tracts.

Figure 2: Migration status



According to figure 2, 74.3% of the households were living in the area for more than 5 years. And 19.3% of them were below 5 years while 6.4% of them have migrated recently or they are only a seasonal migration staying less than a year.

The table represented the majority of the respondents were migrants from the state's district living in a particular place over some time. The other district's population migration is largely due to scope for employment, and better civic life found in the ICR. While the minority of the migrants represented from the neighboring state who come to work as a laborer and they signify one of the largest tenant groups in the capital region. According to the assessment analysis, they belong to vulnerable groups.

It represents the location of the households of the respondents. The respondents have got the adequate facility of ventilation and extra space. It was found that the state's tribal population belongs to this category. This category of the tribal population especially the Nyishi tribe are major migrant population coming from other parts of the districts. They have occupied the unused land and they built their houses in traditional style in the open space thereby there is adequate ventilation and space.

Besides local migrants, there is a nontribal population with 25% of them are having poor ventilation systems, densely populated neighbourhoods and confined in limited space. Due to rent price many of the poor nontribal population end up in small house with less space and improper ventilation. while 11.2% of the poor migrant families from the other states are living in a hazardous location nearby dumping ground, and river bank.

Table 3. Housing type

Parameter	Frequency	Percent
Kutcha house with weak structure	260	20.2
Pukka house	312	24.3
Permanent house structure	714	55.5
Total	1286	100.0

According to table 3, 55.5% of the respondents were having permanent housing structures made with concrete, a proper ventilation facility, and separate space for cooking. And 24.3% of the houses were made up of pukka houses with mud and tin roof and non-concrete walls/brick walls along with plastic or thatch roof. While 20.2% of housing condition were kutchha houses without properly engineered structure that was prone to collapse by natural calamity. The entire house structure was in one room with a partition or no partition, without separate cooking space with no proper ventilation to vent out the smoke releasing from the kitchen.

Table 4. Water Provision

Parameter	Frequency	Percent
Fetch water/ tanker supply	146	11.4
Common pipe/hand pump	360	28.0
Private water pipe	780	60.7
Total	1286	100.0

Table 4. shows the basic service in terms of water facility. According to 60.7% of the respondents, households are connected with water pipelines or have well of their own. And 28% of the respondents are using the common tap or hand pump. While 11.4% are living with no piped water supply they fetch the water from the community taps or water tankers which is irregular in supply.

Table 5. Drainage System

Parameter	Frequency	Percent
No drainage	280	21.8
Open drain with Pucca and Kutchha	760	59.1
Underground connected drain and paved roads	246	19.1
Total	1286	100.0

Table 5. indicates the basic services in terms of drainage systems in the locality. 59.1% of the respondents are having the provision of an open drainage system made up of kutchha and pucca construction. And 21.8% of the respondents agreed that they are not having a proper drainage system within their locality, the existent drains are always remain clogged by the plastics bottles and other waste materials and it is open pits without any closure. The community efforts to keep clean are not encouraging according to the respondents. While 19.1% of the respondents replied that there are underground connected drains and paved roads.

Table 6. Electricity facility

Parameter	Frequency	Percent
Don't have any electricity connection	20	1.6
Illegally connected the electricity without meter	110	8.6
Connection electricity connection with meter reading machine	1156	89.9
Total	1286	100.0

Table 6. shows the electrification of the households. 89.9% of respondents are having an electricity connection with a meter reading machine. And 8.6% said they have illegally connected the electricity without meter connection and they have connected the line by them. While 1.6% of the respondents said that they don't have any electricity connection into their house, they use kerosene or candle and cheap solar lamp.

SECTION II- Social Vulnerability:

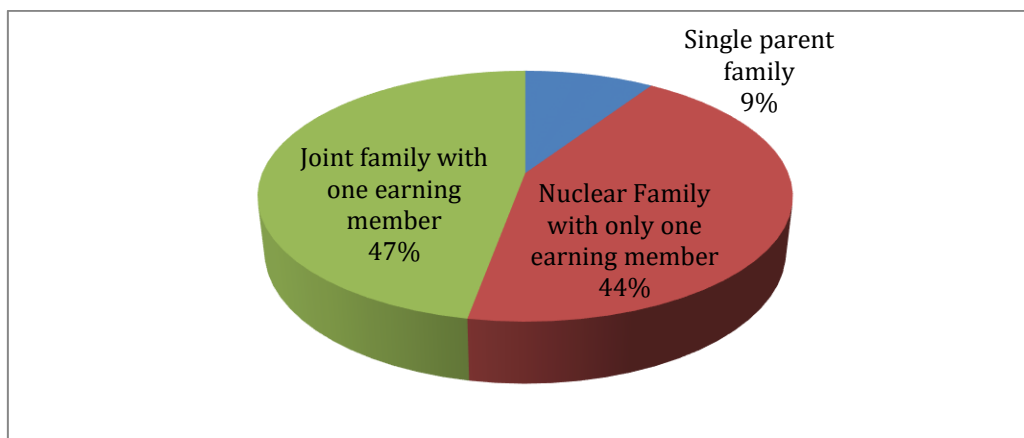


Figure 2. Type of Family

Figure 2. indicates the types of a family of the respondents. 47.1% of the respondents said that they have a joint family with a single earning member with regular income or more than one earning member with regular or irregular income. And 43.5% of the respondents is having a nuclear family with only one earning member engaged in informal sectors. While 9.3% of the respondents are headed by grown-up children or by the women-headed household or single parent family or single male in the house.

Table 7. Social Support Mechanism

Parameter	Frequency	Percent
Without any family member supporting the Community nearby	148	11.5
Family	196	15.2
	942	73.3
Total	1286	100.0

Table 7. indicates that 73.3 percent are in favor that living with the family is their sole social support mechanism. 15.2 percent say that living alone in the area but people from own community nearby act as supporting role in their life. While 11.5 percent responded that they are living far away without any family member supporting them.

Table 8. Physical Disability Status

Parameter	Frequency	Percent
Member with chronic disability members	146	11.4
Suffering from mild impairment	148	11.5
No member with a disability	992	77.1
Total	1286	100.0

Table 8. shows the 77.1 percent of the respondents do not have any members with a disability in their household. 11.5 percent responded that members are suffering from mild impairment but functional. And 11.4 percent said they have a member with chronic disability/ debilitating illness like TB, AIDS, cancer, and Kidney failure.

Table 9. Possession of Identity Proof

Parameter	Frequency	Percent
Do not have	28	2.2
Having at least one legal documents	290	22.6
Documents to prove their identification	968	75.3
Total	1286	100.0

Table 9. shows that 75.3 percent have all the necessary documents to prove their identification. 22.6 percent have at least one legal documents – Below Poverty Line card, Ration card, voter ID, Aadhar card, etc. for identification, while 2.2 percent do not have or could not obtain their legal documentation from the official sources for their identity proof.

Table 10. The episode of Harassment by the Powerful

Parameter	Frequency	Percent
Had very often a chance of harassment	94	7.3
Had rare incidence of harassment	144	11.2
Did not have harassment	1048	81.5
Total	1286	100.0

Table 10. depicts that 81.5 percent of the respondents did not have an episodes of harassment by any groups those in power. 11.2 percent had a rare incidence of harassment by any groups in power, while 7.3 percent had a very often chance of harassment by any groups in power.

Table 11. Food and Nutrition

Parameters	Frequency	Percent
No access to Anganwadi center and PDS facility	782	60.8
Access to Anganwadi center and PDS facility	158	12.3
Government ration is not available	346	26.9
Total	1286	100.0

Table 11. indicates 60.8 percent of children are not enrolled in Anganwadi center (AWC) and had no access to the PDS ration facility. 26.9 percent of the respondents have said that their children are enrolled in AWC and they have access to PDS/ government ration. While 12.3 percent shows that government ration is not available but children are enrolled in Anganwadi center.

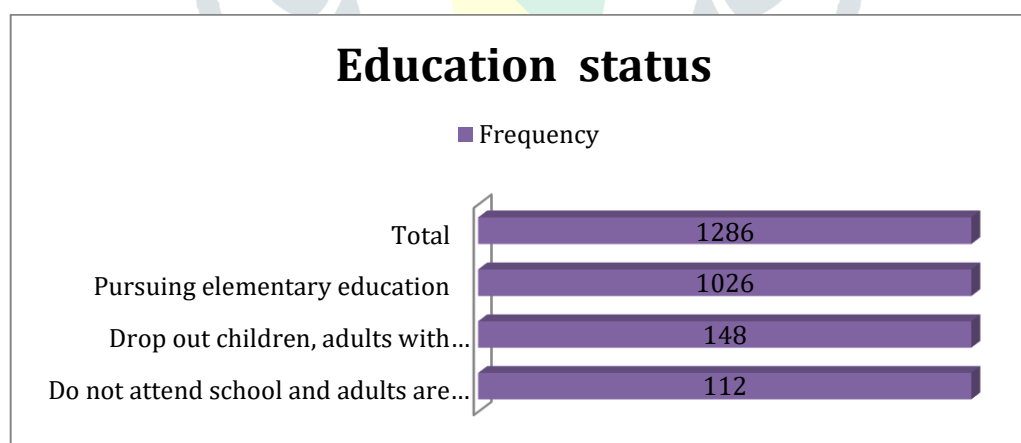


Figure 2.1 Education status

Figure 2.1 shows 79.8 percent of children pursuing elementary education and adults also have minimum elementary qualification enough to understand and read the word and sentences. 11.5 percent of young children went to school but was drop out and they remain adults with a minimum/functional literacy population. While 8.7 percent shows children in the household do not attend school and adults are illiterates.

SECTION III – Occupational Vulnerability:

Table 12. Employment Patterns

Parameter	Frequency	Percent
Daily wage earner earning below rupees 150	134	10.4
Daily wages up to 150 -500 rupees	302	23.5
Daily wages more than rupees 500	850	66.1
Total	1286	100.0

Table 12 shows 66.1 percents are regular employment or irregular employment with daily wages of more than rupees 500. It was found that 23.5 percent of daily wage earners with regular employment, daily wages up to 150 -500 rupees. While 10.4 percent of the respondents show the daily wage earner earning below rupees 150 in an irregular pattern.

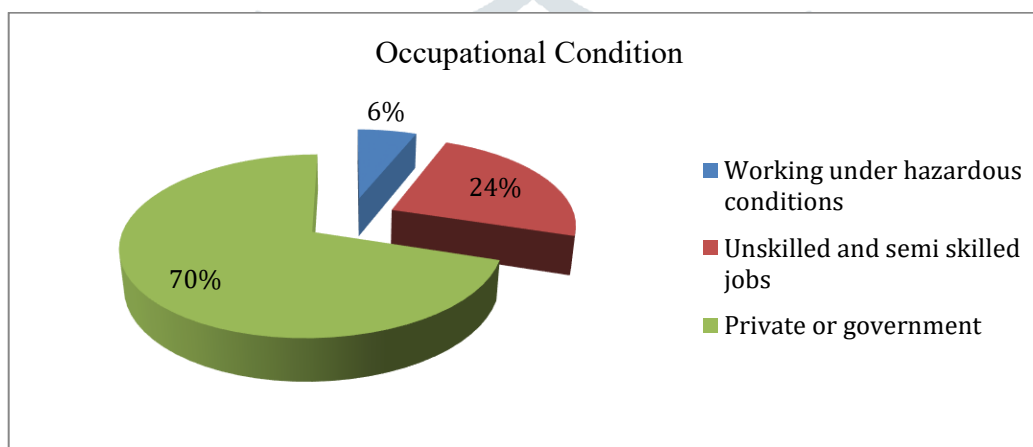


Figure 3. Occupation Condition

Figure 3. gives the picture that 70.1 percent of the respondents are engaged in both private and government jobs with regular monthly wages. 23.8 percent of the respondents are engaged in unskilled and semi-skilled jobs like street vendors, casual laborers, and domestic workers. While 6.1 percent said that they are working under hazardous conditions like rag picking, sex trade, mining, recycling waste collection, and construction sites.

3. HEALTH-RELATED VULNERABILITY:

Table 13. The proximity of Health Center

Parameters	Frequency	Percent
More than 2 km	420	32.7
Within the range of 2 km	386	30.0
Less than 1 km	480	37.3
Total	1286	100.0

Table 13. shows the 37.3 percent of the respondents said that their nearest health facility center is located less than 1 km away from their residence. 32.7 percent claimed that the distance between their home and health facility is more than 2 km. 30.0 percent have a distance within the range of 2 km.

Table 14. Status of Health Services

Parameters	Frequency	Percent
History of maternal death, child death, TB, Malaria	118	9.2
Poor health status of the family/individual	218	17.0
No cases of illness at the time of the survey	950	73.9
Total	1286	100.0

Table 14 shows the status of health and health services of the respondents. 73.9 percent reported that no cases of illness at the time of the survey. 17.0 percent have revealed that there was poor health condition of the family/individual, there were reported cases of diarrhea, TB, and other communicable diseases during the survey period. While 9.2 percent were reported with a history of maternal death, child death, death due to TB, Malaria, and other infectious diseases in the last five years.

Table 15. ANM Visits

Parameters	Frequency	Percent
Never visited	964	75.0
Visited them at least once in 3 months	216	16.8
have visited them monthly	106	8.2
Total	1286	100.0

Table 15 shows the frequency of ANM visits in the colony. 75.0 percent said that ANM had never visited them over the years. 16.8 percent have agreed that ANM had visited them at least once in 3 months. While 8.2 percent shows that ANM has visited them monthly. The frequency of visits differs from colony to colony, distance from the town center, and density of households.

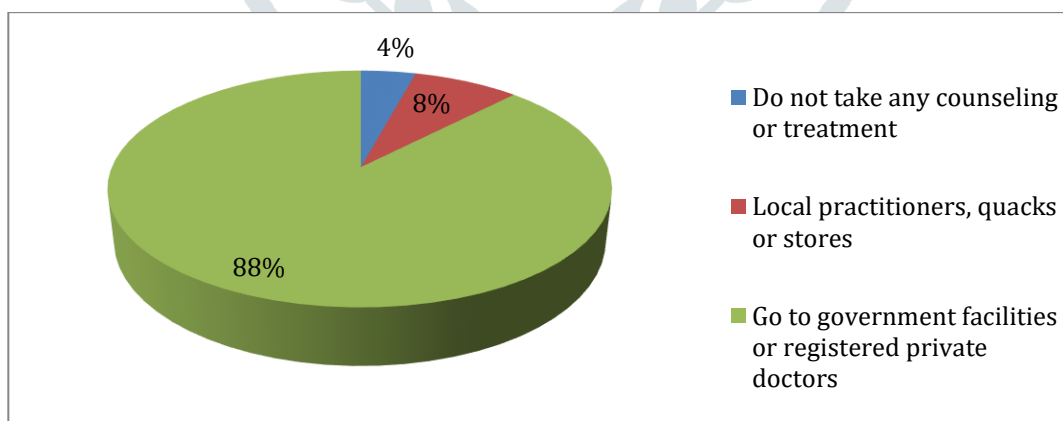


Figure 4. Health Seeking

Figure 4 shows the status of health-seeking among the urban residence. 87.7 percent of the respondents say that for any health issues and check up they go to government facilities or registered private clinics. 8.1 percent go to local practitioners, quacks, or stores for self-medication. While only 4.2 percent do not take any counseling or treatment from any medical doctors or local practitioner in case of any illness.

Limitations

The experience from the field has manifested in the researcher's mind that the assessment period and its exercise may allow in understanding the urban community in a particular situation and time frame. The nature and scope of the present circumstances shall have transition guided with internal and external forces like; need-based seasonal migrations, repatriation, rehabilitation, and relocations of inhabitants owing to adjustments to constant growth and development, etc.

The settlements and the actual number of people in urban areas could be floating and temporary which could be culminating in crude data that may not be the real figures.

Future Benefits

1. The information generated on housing, sanitation, availability of health services, etc. can benefit in the identification of actual issues as per the Millennium Development Goals(MDGs) in addressing the health conditions of the urban population. A major attempt through this study has been put forward in health interventions of a significant number of urban populations of the studied area of ICR that if not could have been unrepresented.
2. The exclusive health inclusion method of nature versus nurture with social components adopted on vulnerability in the study would benefit in understanding the actual ground requirements for evolving appropriate interventions. The urban settlements as plotted in the study will benefit the planners on health facilitation in ICR.
3. Vulnerable populations need factual based intervention and the findings of the UMVA will help mitigate basic program objectives more objectively. For instance, the reproductive health care or the urban poor and their health needs
4. When any implementing and funding organization involves the grassroots stakeholders in program planning the effectiveness of such health programmes can be much more productive consuming lesser time and recourses paving way more probability need-based strategies for the affected population.

Conclusion

Some program assessments have identified that while achieving physical and financial targets, the most disadvantaged are yet to be reached. For instance, an ICDS program study of major cities in India revealed that in the study of settlements especially of urban slums, it was reported that most of the health and education and other social welfare services were still far from rehabilitating the urban poor. This exclusion calls for a holistic approach to include the vulnerable individual and groups of the urban area. There is the need of understanding the multi-dimensional nature of the urban population in terms of lack of access to information, knowledge, technology, and community representation as to the factors that affect vulnerability. There must be interdisciplinary and cross-cultural studies of health risk management and social vulnerabilities. Social scientists and Public Health Specialists have to work together to identify problems and offer solutions towards the management of health problems.

Research aspects common for both urban strategic planning and urban vulnerability assessment have been discussed. Advances in the research of multi-scale and dynamic dimensions of urban vulnerability are far lower than those of robustness-uncertainty and cognitive Infrastructure-related stimuli are gaining ground in the urban vulnerability scope. Biophysical and comprehensive approaches foster the impact and adaptation of evaluative stages, respectively.

The research finding has indicated that the Urban Mapping and Vulnerability Assessment (UMVA) can best be operated by the researcher for the best use for future framing of policies and implementation of health related programs in the urban settlements. Despite its limitation, these findings will help promote the detection of fallacies of implementation of health programs and promote safer and spatial utilization and execution.

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