ABSTRACT

Complete health care mechanism is a complex process, which involves physical and mental health care facilities synchronized with management of social and environmental support systems. Health risk factor is the indicator of the status of overall health of a community. Assessment of health risk factor based on health hazards and multidimensional health vulnerability is essential for development of effective health care mechanism. Rural population of India in general is believed to be more vulnerable to primary and secondary health hazards. Wide ranges of visible and hidden dynamic pressures pertaining to socio-economic, socio-cultural and socio-political issues are playing dominating role in enhancing health vulnerability of rural communities. The picture is more critical for women, where women are deprived from their basic rights of health care. In this paper, an attempt has been made to develop a comprehensive model to study the health risk of the rural communities. As a case study, three villages namely Dhanipur, Roaskandhi and Sewti having different community-hazard profiles and located in different corners of Cachar district of Assam, India are covered for field work and primary data.


1. INTRODUCTION

Health is one of the most important determining factors of a person’s quality of life. The WHO's 1986 Ottawa charter defined health as a state of complete physical, mental and social wellbeing and not merely absence of diseases (Srinivas Murthy, 2013). The rate of mortality or morbidity related to both physical and mental health is directly correlated with health risk factor of a community. To evaluate the status of health of a community, we must understand the reasons behind physical ill health “Somatoticism”; mental ill health “Psychotism” and disruption in social and environmental support systems “Sociotism” of the community.
Good health status of a community depicts low health risk. That could be achieved by either resisting prevailing health hazards from striking the community or strengthening the physical, material, social and environmental support systems of the community. Hence, health risk or health status could be considered as an index for assessing status of community development or quality of life of community members.

Rural women of developing and third world countries in general enjoy poor health status to that of their male counterparts due to gender inequality, illiteracy, lack of health awareness, economic dependency, malnutrition, disproportionate work load, hazardous working environment, inequality in utilization of basic services and other social vulnerabilities (Prakruthiet al., 2013 & Inamdaret al., 2011).

Reports of Ministry of Human Resource Development, Department of Women and Child Development and other concerned agencies of India (1971 - 2001) clearly showed that, Indian women are lagging behind to that of their male counterparts almost in all fronts viz., sex ratio, literacy and education, work and employment, nutrition, infant mortality rate (Kumar et al., 2013).

The status of rural health infrastructure in India as on March 2012 is summarized below (Report on Rural Health Statistics in India, 2012).

<table>
<thead>
<tr>
<th>Type of infrastructure</th>
<th>Present status</th>
<th>Norms for 1 Sub Centre:3000-5000 population; One Auxiliary Nurse Midwife (ANM) / Female Health Worker, one Male Health Worker, Voluntary Worker.</th>
<th>Norms for 1 PHC:20000-30000 population; 1 Medical Officer,1 Pharmacist, 1 Nurse Mid-wife, 2 additional Staff Nurses, 1 Health Worker (Female)/ANM, 1 Health Educator, 1 Health Assistant (Male), 1 Health Assistant (Female)/LHV, 1 Upper Division Clerk, 1 Lower Division Clerk, 1 Laboratory Technician, 1 Driver, 4 Class IV employee .</th>
<th>Norms for 1 CHC:80000-120000 population; 4 Medical Officer,7 Nurse Mid – Wife, 1 Dresser, 1 Pharmacist/Compounder, 1 Laboratory Technician, 1 Radiographer, 2 Ward Boys, 1 Dhobi, 3 Sweepers. 1 Mali, 1 Chowkidar, 1 Aya, 1 Peon.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub Centre</td>
<td>5615</td>
<td>21.02</td>
<td>2.59</td>
<td>4</td>
</tr>
<tr>
<td>Primary Health Centre (PHC)</td>
<td>34641</td>
<td>129.66</td>
<td>6.42</td>
<td>27</td>
</tr>
<tr>
<td>Community Health Centre (CHC)</td>
<td>172375</td>
<td>645.21</td>
<td>14.33</td>
<td>133</td>
</tr>
</tbody>
</table>

As on 2012, at national average around 3.8 % sub Centres are running without female health worker, 51.6% without male health workers and 2.7% without both male and female health workers. Around 4% PHC’s are running without Doctor, 36.5% PHC’s without Lab
Technicians and 23.1% without Pharmacists. In CHC’s 51.8% of Surgeons, 40.7% of Obstetricians & Gynaecologists, 53.3% of Physicians and 43.1% of Paediatricians posts are vacant.

Government investment towards strengthening rural health services is also not adequate to fulfill the needs of vulnerable communities. In fact, not more than 10% of India’s total health budget is allocated for rural health services or 75% of India’s total population (Chillimuntha et al., 2013). There is huge gap between urban and rural health infrastructure and facilities. More importantly, most of the existing rural health services do not have adequate manpower including doctors and support staff.

In Assam, 4604 Sub Centre, 975 PHC’ and 109CHC’s are functioning as on 2012. As per record of 2011, infant mortality rate in Assam is 58/1000 in rural areas and 34/1000 in urban areas.

In practice, majority of rural population of India is yet to get due benefits of government sponsored health care facilities due to absence of effective hazard and location specific health care mechanisms. Till date, most of the rural vulnerable communities are dependent on traditional medications, self-medications, or otherwise unqualified medical practitioners to deal with their physical and mental illness.

Despite government’s initiative to create better rural health infrastructure, health risk factors of rural communities in India are either remained unchanged or increasing day by day due to augmentation of consequential vulnerability factors. We may have certain limitations in containing health hazards of our systems, but we can improve our health status in manifold by minimizing our vulnerability factors and strengthening basic support systems.

To develop an effective healthcare mechanism for rural population, we must follow comprehensive method for health risk assessment and its management addressing prevailing health hazards and progression of vulnerability in the system belongs to vulnerable community.

2. THEORY AND PROPOSED MODEL

In general, risk of a system implies probability of damage, loss and disruption under the impact of any external threat and due to prevailing unsafe conditions of the system. Disaster risk factor of any system could be estimated by assuming,

$$\text{Disaster Risk} = \text{Hazard} \times \text{Vulnerability}$$
This could be slightly modified for estimating health risk factor of a community. Health risk factor of an individual or a community could be determined from estimation of impact rating of primary and secondary health hazards to which the individual or community is exposed and probability rating due to prevailing and consequential vulnerability factors pertaining to the system belongs to the individual or community.

Health risk factor = Impact rating (H) x Probability rating (V/C)

Impact rating (IR) depicts probable impact of health hazards on the vulnerable community. Probability rating (PR) implies the probability of damage, loss and disruption, which is directly proportional to vulnerability of the system, but inversely proportional to capacity of the community (Nath et al., 2008 & Deb Nath, et al., 2014). As part of the present study, a model is developed based on Disaster Pressure and Release Model to study the health status/risk of rural community based on study of progression of vulnerability (Blakie et al., 2003).

Figure 1: Proposed model for assessing health risk factor by addressing health hazards and progression of vulnerability
This model would be useful to estimate health risk factor of vulnerable communities more precisely assuming,

a) Impact Rating is directly proportional to strength/magnitude, time of existence, and frequency of occurrence of health hazards to which the community is exposed.
b) Impact Rating is inversely proportional to length of forewarning of health hazards, response time of the community to take action.
c) Probability Rating is correlated with the progression of vulnerability involving unsafe conditions of the system, dynamic pressures pertaining to the vulnerable community, and root causes of dynamic pressures and local unsafe conditions.

In most of the cases, government policies and schemes are meant for temporary relief of the vulnerable communities by reducing Impact Rating of health hazards leaving aside the Probability Rating of the community intake. But, for effective and sustainable health care mechanism both Impact and Probability ratings are to be addressed properly. Moreover, Probability rating has close relationship with community development.

3. THE UNIVERSE OF THE STUDY

The state Assam of India is broadly divided into two river valleys viz., Brahmaputra Valley and Barak valley. Barak Valley has three districts namely, Cachar, Karimganj and Hailakandi. The three villages selected for the present study viz., Dhanipur, Sewti and Roaskandhi having different community-hazard profiles are situated in three different corners of Cachar district. The average distance from one village to another is approximately 50 to 55 kilometer. Village Dhanipur is situated under Sewrarthal Gaon Panchayat, Narshingpur Development Block, Sonai revenue circle; Rosekandivillage comes under Borjalanga Development Block, Irongmaragaon Panchayat; and Sewti village situated under Bihara development Block, Sewtigaon panchayat. All these villages are under Silchar sub-division of Cachar District. According to 2011 census, the total population of Sewti Village is 1979, out of which 1164 male and 815 female. Total population of Dhanipur is 579 with 300 males and 279 female. Total population of Rosekandy Tea garden is 4265 as per garden census report of 2010 (Census report of Roaskandhi Tea Garden, 2010 & Government of India Census report, 2011.

Dhanipur, Roaskandhi and sewti village are inhabited by the people of different socio-economic and ethnic backgrounds. Dhanipur is predominantly one tribe (Barman) village. All
the inhabitants of the village are Barman the HinduiseDimasa. Sewti village is inhabited by Bengali speaking Hindu and Muslims. Rosekandy tea garden village is dominated by the tea garden laborers with their origin in central and northern parts of India. Different communities living in these villages have different life style, socio-economic condition, value, norms and above all different attitude towards healthcare.

4. DATA ACQUISITION AND ANALYSIS

The present study is based on empirical data collected from 150 households of three villages (50 from each village) viz., Dhanipur, Sewti and Roaskandhi of Cachar district, Assam, India. Primary data were collected through structured interview schedule during the period of March 2013 to March 2015 from women respondents of 150 households. Health status of any community depends on wide range of parameters involving physical, material, social, motivational and other factors. This study is conducted based on certain parameters like economic condition, literacy, housing pattern, sources of drinking water, cooking fuel, sanitation, food and nutrition, work load, diseases, treatment, health care facilities, maternity care, status of conception, age-at-first conception, pre-natal and post–natal maternity care, doctor consultation during pregnancy, place of delivery, number of children, median interval between children, adoption of family planning etc.

![Figure 2: Distribution of households according to monthly household income in ₹ thousand](image)

It is observed that, main source of income for majority of people of Dhanipur and Sewti villages is agriculture. Whereas, Roshkandhi village is predominated by wage labours of Tea Garden. Figure-2 depicts poor economic status of majority of population of all three villages.
despite having different livelihood options. Monthly household income of majority tea garden community is confined within the range • 1000 – 4000/-. Average income of Dhanipur village community dominated by Barman tribe confined within the range • 4000 – 6000/-. But, income of Sewti village community distributed over the range • 1000 – 13000/-.  

Figure 3: Educational status of women respondents of three villages

Education and health are closely correlated with each other. Data shows, illiteracy rate among tea garden women is exceptionally high in comparison to other two village communities (Figure-3). In case of Barman tribe and Bengali communities also, women literacy rate is not satisfactory and limited up-to primary or high school level. Moreover it is found that, very few respondents are aware about their own health risk factors involving prevailing health hazards and unsafe conditions. Poor literacy rates is also liable for superstition of these communities towards dealing health related matters.

It is evident from Figure-4 that, majority of households of the respondents of all three villages have one/ two rooms thatches huts or kucha houses made up of mud wall and tin roof. These houses do not have basic amenities for maintaining healthy lifestyle. The condition of tea garden community is more disappointing. Only 15.33% families of the respondents are living in R.C.C. (pucca) houses, that too without having minimum basic facilities. That clearly indicates the correlation between economic status and living standard of the rural communities.
Figure 4: Housing pattern of households of respondents

Sanitation facility is one of the most important indicators of health status or community development of a particular community. Data shows, majority of the households (67%) of three villages do not have any sanitation facility and living in extreme unhygienic environment. Again in comparison to other two communities, condition of tea garden community is worst as far as sanitation facility is concern.

Figure 5: Sanitation facility of respondent’s families

It is also noticed, most of the households of three villages are dependent on tube-well, well, ponds, river and other ground water sources for drinking water. Very few families have access to community taps provided by garden management or state government. More importantly, quality of water of these sources never tested by any agency for microbial, arsenic or fluoride contaminants. Majority people of these villages are totally ignorant about water quality and method of purification of water. Only few families of Sewti village have ordinary water filters.
Figure 6: Types of fuel used by households of the respondents for cooking

More than 70% of total households of the study area are dependent on firewood and other biomass like crop residues, cow dung cakes etc. for cooking. Only 14% families use LPG for cooking purpose. Most of the respondents are of the view that, managing firewood and cooking are the sole responsibility of female members of the family. Regular use of firewood and other biomass fuel is also contributing in health risk of womenfolk. But, the villagers irrespective of their economic condition are totally unaware about air pollutant born health risk and risk mitigation approaches.

Healthy nourishment is a pre-requisite for attaining good health and maintaining adequate growth and body equilibrium (Qamraet.al.,2010). The choice of food or food habit of a community largely depends on economic condition, culture, belief, custom and tradition. It is observed, diet of the people of three villages primarily consists of rice, roti, pulses, seasonal vegetables, meat, fish, dry fish etc. But, people have to compromise with quality diet due to inflation, poor economic condition and low production. Moreover, unlike Dhanipur and Roskandhi villages, women respondents of Sweti village mentioned about gender discrimination pertaining to dietary status of male and female members.

Further it is observed, work load and nutritional status of the villagers, in particular women, is not properly balanced for maintaining good health. Women respondents of three villages are of the view that, despite child bearing and other household activities like cooking, cleaning, washing cloth, taking care of young and elderly person of the family; they have to work in paddy field, tea garden or as domestic helper for earning. The condition of women of Roskandhi and Dhanipur villages is more pathetic in this regard.
From figure-7 it is clear that, most of the health problems and diseases of the respondents are linked to poor nutrition, contaminated drinking water, unhygienic living condition, kitchen born air pollutants etc. Besides common disease like anemia, fever, cold and cough, gastroenteritis, diarrhea, dysentery, small pox, UTI etc.; a large section of the population is also prone to biological health hazards like malaria, encephalitis, dengue, hepatitis etc.

Present study implies, around 46% of the respondents availed Ayurvedic, Homeopathy or Allopathic treatment. Around 18.66% adopted herbal treatment based on herbs collected from jungle to treat the diseases. But, more than 35% respondents never availed any kind of treatment (Figure-8). It is also observed, for gynecological problem like irregular manse cycle, UTI, etc. women respondents neither consult with their husband nor avail modern treatment unless it becomes very complicated. Moreover, irrespective of gender, no one consults doctor for certain common diseases like pox, jaundice, and epilepsy. The most
dangerous side is their superstition towards causes of different diseases. Unlike respondents of Sweti village most of the respondents of Dhanipur and Roskandhi villages believe that, diseases mainly occur due to black magic or personal sin.

Among three villages, only Roskandhi tea garden village has one primary health centre running with one doctor, one nurse and a word boy.

In rural India, status of women largely depends on her fertility status. In general women having male child get more respect and care in the society. Women’s conception capacity largely determines women’s relationship with family and society. A brief study is also conducted to assess the reproductive health status of rural women based on different parameters.

Figure 9: Age of first conception of the respondents

Figure-9 shows wide deviation in age of first conception, ranging from less than 16 years to more than 25 years, among the women respondents.

The study further reveals, average age of first conception of the respondents belong to Barman community is much higher to that of women of other two villages. It clearly indicates that, women of Roashkandhi and Sewti villages were married at much earlier age. Barman society gives more preference on tribe endogamy and clan exogamy, so age is not a bar for girl’s marriage.

Figure 10: Respondents consulted with doctor during pregnancy
Figure-10 depicts, women respondents are more reluctant in consulting doctors during pregnancy. This may be due to poor economy, lack of awareness about health care or absence of proper health care facilities in their localities. Respondents of all three villages informed that, during pregnancy they take normal food and continue routine activities inside and outside the home.

![Figure 11: Distribution of respondents according to place of delivery](image1)

More than 55% respondents gave birth of their babies at home with the help of untrained village midwife and only 39.33% have delivered their babies at hospital (Figure-11). Slowly the scenario started improving after implementation of National Rural Health Mission in India. Pregnant women now get guidance of trained ASHA workers pertaining to reproductive health care.

![Figure 12: Distribution of the respondents on the basis of the number of children they have](image2)

Figure-12 shows, most of the respondents of three villages have 3–5 children. In some cases the number reached to 7 also. It indicates, most of the respondents are reluctant to follow two children norms of India. As a result rural women are more prone to anemia and other such health problems.
It is evident from Figure-13 that, more than 70% respondents gave birth of their babies within the time interval one to one and half year. This is one of the major concerns of health care of rural women.

Figure 14: Distribution of the respondents on the basis of adoption of family planning

Use of reversible contraceptive or adoption of family planning plays significant role in controlling population and improving health status of women and their children. But it is evident from the present study that, more than 50% respondents are reluctant to adopt family planning by any means and among them majority are from tea garden community(Figure-14).

5. DISCUSSION AND CONCLUSION

The present study is conducted based on primary data collected from three different villages having different community-hazard profiles to study the health risk factors of rural population, in particular womenfolk, based on a proposed model (Figure-1). The present study does not cover in-depth analysis on health hazards to estimate impact ratings of different primary and secondary health hazards. But, nature of health problems of
the respondents and their family members depicts, all three communities are more or less exposed to different biological and physical health hazards. Impact ratings of biological and physical health hazards are comparatively high to that of industrial/radiation health hazards in these villages.

Study of progression of vulnerability is essential for designing effective health care mechanism and fixing the responsibilities of stakeholders including vulnerable community. In this paper an attempt has been made to study the progression of vulnerability to identify the actual reasons behind health problems of rural communities.

5.1 Dominant unsafe conditions of the vulnerable communities

- The selected rural communities are exposed mostly to biological health hazards and their vectors. Women members are exposed to air pollutants pertaining to burning of firewood and other fossil fuels in kitchen.

- Almost 50% families of the respondents having 7-10 members are living in single or double room huts without having basic amenities.

- Majority of community members are living in unhygienic environment. Only around 6% families have sanitary latrine. More than 44% families do not have any type of sanitation facility and open defecation is responsible for augmentation of biological health hazards. Government of India has a plan to make India open defecation free by 2019.

- Less than 14% families have LPG connections to be used as kitchen fuel. Other families are dependent of firewood and harmful fossil fuels.

- Most of the families use tube-well, well, ponds and river as drinking water sources without having any water testing or water treatment mechanism for microbial, arsenic and fluoride contaminants. Study shows, majority of the villagers are deprived form getting proper nutrition.

- Inadequate or lack of health care facilities in and around the select villages.

- People are deprived from availing modern treatment in urban based good quality hospitals due to poor road connectivity and inadequate transport facility. It is evident that, more than 35% of the respondents never availed any kind of modern treatment for their physical illness.
5.2 Prevailing dynamic pressures responsible for generation of unsafe conditions

- Non-adoption of family planning by community members and poor economic conditions of households. On average respondents have 4-5 children and average monthly income of the respondent’s families is found to be around ₹3000/- i.e., less than ₹100/- per day.
- High rate of illiteracy and lack of knowledge about own health risk factors and health care opportunities.
- Misconception and superstition of community members towards causes and remedial measures of different diseases. Majority of community members, in particular tea garden community, believe in black magic or personal sin as causes of physical or mental illnesses.
- Costly affairs in modern treatment and non-availability of cost effective health care facilities in approachable distances.
- Child marriage, first conception at early age, lack of awareness about reproductive health care as well as gender discrimination pertaining to education, workload and nutrition towards women.
- Lack of interest of experienced and senior medical practitioners to give service in rural areas due to unregulated commercialization of health care services in India.

5.3 Major root causes of dynamic pressures and unsafe conditions

- Flexible government policy pertaining to family planning and population control.
- Lack of suitable rural health care mechanism based on proper health risk assessment addressing health hazards, progression of vulnerability; social and environmental support systems; and health status of community members.
- Urban centric and privatization of healthcare services.
- Non-consideration of health care aspects including provision for sanitation and safe drinking water facilities in the housing scheme of Government of India for poor people like IAY.
- Lack of effective organizational structure and coordination mechanism amongst state, district and local level healthcare agencies.
- Non implementation or lack of proper plan, policy and legislation for quality rural health care services in India.

It is not possible to contain health risk and improve health status of rural communities without addressing local unsafe conditions, dynamic pressures and root causes separately.
Moreover, health risk in terms of mortality and morbidity varies community to community and could be correlated with dynamic pressures pertaining to household income, illiteracy rate, adoption of family planning, awareness about health care mechanism and other hidden factors. So, hazard, location and community specific health risk assessment is essential to formulate appropriate health care mechanism. The proposed model would be useful in assessing health risk of rural communities precisely by studying prevailing health hazards and progression of vulnerability to develop effective health care mechanism for rural communities.

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