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Spatio-Temporal Distribution of Diseases and Healthcare Facilities in Sonitpur District of Assam

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ABSTRACT

Introduction: The environmental factors of Sonitpur district are highly responsible for the frequent occurrence of diseases like Malaria, Japanese Encephalitis, Diarrhea, Viral Hepatitis, Dysentery, Enteric Fever and the like. The district witnessed the frequent occurrence of such diseases from time to time. Within the district, there has been a spatial distribution of such diseases from one health block to another. Moreover, the distribution of health institutions or medical facilities like Hospitals, CHCs, PHCs and Health Sub-Centers is not uniform throughout the region. Some parts of the region have more health institutions, while some others have less number of the same.

Objectives: The main intention of the study is to examine the spread of diseases and associated factors. The work also takes care to co-relate the spread of diseases and inadequacy of medical facilities in the Sonitpur district of Assam.

Methods: The whole study is mainly based on secondary data. In a few cases, internet links are also taken into consideration for detail analytical study. The study will explain the trend of certain diseases and associated factors in the region. Moreover, an analysis of the existing health care facilities will give an idea about the availability and adequacy or otherwise of the same in the district.

Results: The study revealed that health blocks with less number of health institutions are characterized by the higher frequency of diseases like Diarrhea, Hepatitis etc. The health institutions of the same are also facing high population pressure due to the deficiency of health institutions.

Conclusion: The entire study has given an idea about the disease pattern in different health blocks of the region. The study also reflects the adequacy as well as deficiency of health infrastructure in the study area. The study will help the Medical Geographers as well as other health experts to take crucial steps for better health planning in the region.

Key Words: Endemic diseases, Frequency of occurrence, Spatial distribution, Health infrastructure

INTRODUCTION

Geography, generally, concerned with the relationship between man and environment, and in the recent time, a new branch of study known as 'Medical Geography' has been emerged into the discipline of geography which particularly deals with all the aspects of human health inclusive of the distribution pattern of diseases, nutrition and health services. Medical geography is a study of the relationship between the pathological factors which cause disease and the geographical factors which give rise to that pathological factors.¹ Medical geography sometimes referred to as 'Geography of Health'. Geography of health is concerned with the distribution and comparison of various indices of disease in the hu-

man population and the interrelation with other elements of the physical, biological and cultural environment in space. The environment may be taken as a place of risk where the man may be passively experiencing some kinds of health hazards.^{2,3}

The World Health Organization has defined health as a state of collating physical, mental and social well-being and not merely the absence of disease or infirmity.⁴ According to some geographers, the geography of health is also the study of spatial distribution or extension of health care facilities i.e. health institutions in an area. Medical geography studies the changes in health conditions and variation of diseases and associated factors. The W.H.O. definition of health projects three differ-

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ent dimensions of health. Physical, Mental and Social well-being is closely related to one another. The fourth dimension has also been suggested which is 'Spiritual' health.^{1,5,6}

Assam, the most populous state of North-East India, is endemic for diseases like Malaria, Japanese Encephalitis, Diarrhea, Viral Hepatitis, Dysentery, Enteric Fever etc. The climate of Assam which is sub-tropical humid provides favourable conditions for the occurrence of such diseases. Malnutrition and deficiency diseases are one of the major health problems of today.⁷

The district of Sonitpur in question represents the study with such diseases for further discourse concerning its environment. The natural environment in which people live and settle becomes the major aspect for a pattern of disease from which they suffer. Thus the systematic study of the spatial distribution of disease concerning the environment in which the affected person lives forms the main concept of the study of medical geography.⁵

That the peculiar environment, occupation and living condition of the people of Assam is responsible for their vulnerability towards malaria attack has been recounted by M'Cosh in his book Topography of Assam as early as 1837.^{4,6} The environmental factors of the district are highly responsible for the frequent occurrence of all these diseases.² Moreover, the distribution of health institutions or medical facilities is not uniform throughout the region. Some parts of the region have more health institutions, while some others have less number of the same. Therefore, an attempt is made here to examine the spread of diseases and associated factors. The work also takes care to co-relate the spread of diseases and inadequacy of medical facilities in the Sonitpur district of Assam.⁹ The study will formulate a better plan for better health, and will also be helpful for the health department to improve health services in the region by finding a suitable location for health institutions.

MATERIALS AND METHODS

In the study, only secondary data are used. To collect relevant data many sources have been taken into consideration.

Data concerned with the spatial distribution of various diseases in the study area have been collected from the Office of the Health & Family Welfare (IDSP), Sonitpur District, Assam. Data about the distribution of health care facilities or health institutions in the study area have been collected from the National Health Mission (NHM) office, Sonitpur District, Assam. Moreover, books, as well as journals related to Medical Geography, are also taken for detail analytical study. In a few cases, internet links have also been taken into consideration for further study.

In the study, the spatial distribution of some selected diseases along with the distribution of health care facilities are proposed to be analyzed at the block level of the Sonitpur District. The study is carried out by taking seven health blocks with certain specific diseases. Analysis has been done with absolute data on the incidence of diseases. The collected data have been systematically tabulated to show the temporal as well as the spatial variation of the incidence of diseases in all the health blocks of the district. Taking into consideration of the above methods, the proposed study has been done properly.

RESULTS

Temporal Distribution of Diseases

Sonitpur district is characterized by a wide range of disease variation within its territory. Various diseases have been found to be occurring in different parts of the district. Certain areas of the district are attributed to some specific types of diseases because the factors associated with various diseases are found to be varying from one part to another in the district. Besides environmental conditions, man's habits are also responsible for the distribution of diseases in any place.¹ Among the diseases Diarrhea, Dysentery, Viral Hepatitis, Malaria, Japanese Encephalitis, Enteric Fever etc. is found to be quite frequent in different parts of the area. However, the incidence of Dengue is also diagnosed in a few areas of the district. Table 1 and Table 2 are based particularly on the data collected from different reliable sources and hospital records:

Table 1: Temporal Distribution of Diseases (in number) in Sonitpur, 2011

Diseases	Gohpur BPHC	Behali BPHC	Biswanath BPHC	Jamuguri BPHC	Balipara BPHC	Bihaguri BPHC	Dhekiajuli BPHC
Diarrhea	5769	58	9763	4445	2443	15291	1900
Hepatitis	76	2	128	150	20	177	34
Malaria	647	1834	4194	15628	8072	7895	10064
Dengue	0	0	0	0	0	0	0

Source: Office of the Health & Family Welfare (IDSP), Sonitpur

Table 2: Temporal Distribution of Diseases (in number) in Sonitpur, 2016

Diseases	Gohpur BPHC	Behali BPHC	Biswanath BPHC	Jamuguri BPHC	Balipara BPHC	Bihaguri BPHC	Dhekiajuli BPHC
Diarrhea	5955	1150	5745	3431	5243	6336	4127
Hepatitis	0	2	3	33	0	27	4
Malaria	18	1796	1226	2984	1283	5570	5007
Dengue	0	0	0	0	0	337	0

Source: Office of the Health & Family Welfare (IDSP), Sonitpur

Spatial Distribution of Healthcare Facilities

The distribution of health care facilities may be explained in terms of the population or community for whom they serve. These health care services are considered as an essential part of a health system and it reflects an important response to health concern and the needs of the health.³

The followings are the availability of healthcare facilities in different health blocks of the district:

Sub-Centres

In the study area, the numbers of sub-centre are very high compared to the numbers of all the health care institutions. The total number of sub-centre in the study area is significantly 275. The average number of sub-centre per health block of the study area is about 39, which is satisfactory. From this perspective, sub-centres are well-developed in the study area. Table 3 shows the BPHC-wise number of Sub-Centre (SC) and the persons served by a single Sub-Centre in the study area.

Table 3: Number of Sub-Centres in Sonitpur District

BPHCs	Number of Sub-Centre	Population (Estimated Population for 2017-18)	Populations Served by a Single Sub-Centre
Gohpur	68	306896	4513
Behali	26	152251	5856
Biswanath	25	247865	9915
North Jamuguri	37	266321	7198
Balipara	38	279465	7354
Bihaguri	38	263227	6927
Dhekiajuli	43	433509	10082
Total	275	1949534	7089

Source: Office of the NHM, Sonitpur, Assam

Primary Health Centre (PHC)

In Sonitpur district the total number of PHC including the MPHC (Mini Primary Health centre) and Riverine PHC is only 35. The average number of PHC per health blocks of the district is only 5, and the persons served by a single PHC in the study area are 55,700. Table 4 shows the BPHC-wise

number of PHCs and the persons served by a single PHC in the study area.

Table 4: PHC in Sonitpur District

BPHCs	Number of PHC (Including MPHC & Riverine PHC)	Population (Estimated Population for 2017-18)	Populations Served by a Single PHC
Gohpur	9	3,06,896	34,099
Behali	2	1,52,251	76,125
Biswanath	4	2,47,865	61,966
North Jamuguri	5	2,66,321	53,264
Balipara	2	2,79,465	1,39,732
Bihaguri	5	2,63,227	52,645
Dhekiajuli	8	4,33,509	54,188
Total	35	19,49,534	55,700

Source: Office of the NHM, Sonitpur, Assam

Community Health Centre (CHC)

In the study area, the total number of CHC is very less i.e. only 9. These nine CHCs are almost uniformly distributed among the health blocks of the study area. The average number of CHC per health block hardly cross 1, which is significantly much lower than average number of PHC per health block in the study area. Hence, CHCs are also not well-developed in the study area. The table 5 shows the BPHC-wise number of CHC and also the persons served by a single CHC in the study area.

Table 5: Number of CHC in Sonitpur District

BPHCs	Number of CHC	Population (Estimated Population for 2017-18)	Populations Served by a Single CHC
Gohpur	1	306896	306896
Behali	1	152251	152250
Biswanath	1	247865	247864
North Jamuguri	2	266321	133160
Balipara	2	279465	139732
Bihaguri	0	263227	
Dhekiajuli	2	433509	216754
Total	9	1949534	216614

Source: Office of the NHM, Sonitpur, Assam

Hospitals

In the study area, hospitals are found to be well-developed. In Sonitpur district most of the hospitals belong to tea gardens which are run by private tea companies. There are many big tea gardens located in Sonitpur district, and therefore, tea garden hospitals have been established by the concerned tea company to provide health care services to the local communities. The **table 6** and **table 7** show the number of tea garden hospitals and private hospitals in the district.

Table 6: Number of Tea Garden Hospital in Sonitpur District

BPHCs	Number of Tea Garden Hospital	Population (Estimated Population for 2017-18)	Population Served by a Single Tea Garden Hospital
Gohpur	8	30,6896	38,362
Behali	5	1,52,251	30,450
Biswanath	11	2,47,865	22,533
North Jamuguri	1	2,66,321	2,66,321
Balipara	11	2,79,465	25,406
Bihaguri	0	2,63,227	
Dhekiajuli	18	4,33,509	24,084
Total	54	1949534	36,102

Table 7: Number of Pvt. Hospital in Sonitpur District

BPHCs	Number of Pvt. Hospital	Population (Estimated Population for 2017-18)	Population Served by a single Pvt. Hospital
Gohpur	0	306896	
Behali	0	152251	
Biswanath	3	247865	82621
North Jamuguri	0	266321	
Balipara	1	279465	279464
Bihaguri	2	263227	131613
Dhekiajuli	3	433509	144503
Total	9	1949534	2,16,614

Source: Office of the NHM, Sonitpur, Assam

DISCUSSION

The study, undertaken here, mainly deals with the health aspects of human beings in Sonitpur district to explain the spatial distribution of some selected diseases and extension of health institutions in the seven health blocks. The entire study consists of selected four diseases namely Diarrhea, Viral Hepatitis, Malaria and Dengue. The temporal distribution of selected four diseases in the Sonitpur district of Assam shows remarkable findings. The whole study is based on BPHC wise distribution of diseases as well as health institu-

tions in the district and the population pressure on the health institutions.

The study has found that almost all the health blocks of the study area are deprived of health services. Gohpur BPHC is the only health block that is somehow well-served by medical institutions. What is needed for other health blocks is proper and careful health planning. Systematic as well as careful health planning by the Government should be made in the deprived health blocks to improve the health status. Efforts should also be made to control Diarrhea, Hepatitis, and Malaria properly. Health institutions like PHC as well as CHC should be increased in almost all the health blocks of the district. The specialized well-equipped hospitals should be started in the deficient health blocks. The extensive health education should be spread for personal as well as public hygiene, distribution of well-equipped required medical services in proportion to the populations, and special health check-up camps especially in the deficient or suffered health blocks would solve much of the health problems of the Sonitpur District.^{7,8,9}

CONCLUSION

Disease pattern and health infrastructure are related to one another as the disease pattern is largely determined by the expansion of health facilities. In the study area, it has been found that the area characterized by the sufficient number of a health institution is affected by a particular disease in less number. It has also been found that population pressure on health institution is more where there is the insufficient number of the same. Thus, there must be sufficient health infrastructure in the deficient area to stop the spread of disease and also to stop population pressure on the same.

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