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Original Article

Geo-spatial Characterization of Leprosy Cases in Purba Bardhaman district, West Bengal: A Community Based Descriptive Study

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India continues to bear a substantial portion of the global leprosy burden in spite of achieving the national elimination goal as a public health problem. There is an absence of a robust geospatial surveillance framework which poses a significant challenge for effective program management. This study aimed to identify the geo-spatial distribution of registered leprosy cases in Purba Bardhaman district, West Bengal, and to describe their socio-demographic, environmental, and clinical characteristics to inform targeted programmatic interventions. This descriptive cross-sectional study was conducted on 512 registered leprosy cases from April 2021 to March 2022. Geo-spatial locations were captured using handheld GPS devices. Data was analyzed using QGIS software to create choropleth and heatmap maps, identifying areas of high disease concentration. The majority of cases (73.6%) were multibacillary (MB), with a significant concentration in the central part of the district. Eleven out of 23 community development blocks had a prevalence exceeding the national elimination goal. Heatmap analysis successfully identified "pockets of heat" with high case density in specific blocks. Socio-demographic data revealed a majority of male, middle-aged, and lower-middle-class individuals, with a high proportion living in poorly ventilated, kutcha houses. The application of GIS appears to be a good approach for identifying high-endemic areas, providing critical evidence for a more focused and effective leprosy control strategy. The study recommends creating a GIS database at the district level to enable real-time monitoring and guide intensified, targeted interventions to break the chain of transmission.

Key words: Leprosy, GIS, Multibacillary, Targeted Intervention

Introduction

Leprosy, a well-known disease since ancient days, comes from the term "Lepra" derived from a Greek word "léprōs" which means "scaly". In 1873, Dr. Gerhard Armauer Hansen, resident of Norway, first identified the causative organism of leprosy i.e., "*Mycobacterium leprae*". It is a chronic infectious disease mainly transmitted via respiratory droplet infection and contact transmission. Environmental factors like hot and humid climate condition in tropical and sub-tropical countries, overcrowding and lack of ventilation favors the transmission of leprosy (Park 2021, Kadri 2021).

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There are two types of leprosy, paucibacillary (PB), characterized by presence of 1-5 skin lesion, no peripheral nerve involvement without any skin smear positive at any sites and another is multibacillary (MB), characterized by presence of more than 5 skin lesions, and/or one or multiple peripheral nerve involvement. A positive skin smear independent of number of skin patches or nerve involvement, is classified as MB. MB leprosy is more infectious type as the bacterial load is more in MB cases. Apart from the suffering from physical disability the disease, it is also associated with superstitions and social stigma. The social stigma has a tremendous impact not only on the affected persons but also on the family as well as on the society (Kadri 2021).

Despite the elimination of leprosy as a public health problem (defined as achieving a point prevalence of below 1 per 10,000 population) total 1,93,840 new cases are reported only in "23 global priority countries" which is 95.9% of the total number of new leprosy cases worldwide i.e., 2,02,185 in 2019 (Global leprosy (Hansen disease) update, 2019 and 2020- WHO 2020a and 2021) In India, The National Leprosy Control Program was launched by the Govt. of India in 1955. Since then, remarkable progress has been achieved in reducing the disease burden by promoting early diagnosis and treatment have achieved elimination as a public health problem (prevalence less than 1/10,000 population) through national programme by 2005. In India, out of 36 State and Union Territories (UTs), 34 and 551districts (82.36%), out of the total 669 districts had a prevalence of <1/10,000 population (Rao & Suneetha 2018)

During January to October 2021, total 61,942 new cases were reported with a prevalence rate of 0.41 per 10,000 population and the annual new case detection ate (ANCDR) was 4.58 per lakh population in 2020-21 (Government of India, Ministry of Health and Family Welfare. Annual Report 2021-22).

As of March 31, 2025, 82,297 cases of leprosy remain under treatment, translating to a prevalence rate (PR) of 0.57 per 10,000 population. In 2024–2025, a total of 100,957 new leprosy cases were detected, giving an annual new case detection rate (ANCDR) of 7.00 per 100,000. Of these, 63.03% were multibacillary (MB), 40.07% were females, and 4.68% were children. The grade 2 disability rate stood at 1.88% among new cases, with 1,893 G2D cases detected and a G2D rate of 1.31 per million population.

Regardless of the above successes, the fact remains that India continues to account for 56-60% of new leprosy cases reported globally each year for the last 4-5years and is among the 23 "global priority countries" that contribute 95% of the world's total numbers of leprosy cases demanding a sustained effort to bring the numbers down (Rao & Suneetha 2018). In the path of leprosy elimination and towards eradication, pockets of high endemicity, hidden cases in the community and low voluntary reporting due to social stigma remain the major challenges (NLEP DDG Leprosy 2016).

In Leprosy Elimination Programme, a Geographic Information System (GIS) can help to achieve success in different aspects of this well-known ancient disease. GIS is a computer-based system which includes or rather utilizes software, hardware, people and geographic information. GIS data has a spatial or geographic reference which might be a reference that describes a feature on earth surface using a latitude & longitude, a national coordinate system etc. It stores information about an event in the world as a collection of thematic layers that can be linked together by geography (Lawson et al 2016). These maps can tell stories and communicate

relationships in a way that otherwise may not be possible with other data presentation techniques (Nykiforuk & Flaman 2011). As per WHO the application of GIS has immense potential to facilitate the implementation of National Leprosy Eradication Programme and thus help to achieve its goal (WHO 2020b). Research is needed to GIS analysis of leprosy cases at community level to identify geospatial location of cases, in turn, it would help to monitor the measurable indicators of elimination progress and quantify the effect of geospatial methods in the achievement of elimination of leprosy.

In Purba Bardhaman district of West Bengal, the annual new case detection rate during 2016-17 was 20.62/100,000 population which is about twice the National figure of 10.17 per 100,000 population and prevalence rate as of March 2017 was 1.48/10,000 population, compared to 0.66 per 10,000 population in India (NLEP – Annual Report for the year 2016-17, New Delhi). During the reporting year 2021-22, total 4702 new cases were reported in West Bengal with a prevalence rate of 0.46 per 10,000 population (Government of India, Ministry of health and family welfare. Annual Report 2021-22). No framework exists for monitoring and surveillance of leprosy using (web) GIS in public health care system in West Bengal as well as in India.

In this background, identifying spatial distribution of leprosy cases and their characteristics in a district, where no such measures have been adopted earlier, will provide important evidence for targeted programmatic intervention and may help to identify patient characteristics typical to this geographical area that were previously unexplored. The study was hence planned to generate evidences regarding the geo-spatial distribution of registered leprosy cases during 1st April 2021 to 31st March 2022 in a district of West Bengal and to describe their socio-economic, environmental, behavioral and clinical characteristics.

Materials and Methods

It was a community based descriptive observational study cross sectional in design conducted in Purba Bardhaman District of West Bengal. The study was conducted for two years, from September 2020 to August 2022 though the actual data collection period was one year.

Purba Bardhaman district of West Bengal is divided into four administrative subdivisions. Kalna subdivision consists of one municipality at Kalna and five Community Development (CD) blocks. Katwa subdivision consists of two municipalities at Katwa and Dainhat and five CD blocks. Bardhaman Sadar North subdivision consists of two municipalities at Bardhaman and Guskara and seven CD blocks. Bardhaman Sadar South subdivision consists of one municipality at Memari and six CD blocks (Bureau of Applied Economics and Statistics 2017).

In the district, the annual new case detection rate of leprosy during 2016-17 was 20.62/100,000 population which is about twice the National figure of 10.17 per 100,000 population and prevalence rate as on March 2017 was 1.48/10,000 population, compared to 0.66 per 10,000 population in India (NLEP – Annual Report for the year 2016-17).

Study population:

All registered leprosy cases from 1st April 2021 to 31st March 2022, in Purba Bardhaman district, as identified by National Leprosy Eradication Programme (NLEP) in the district were included. All “registered cases of Leprosy”, including recurrent and defaulter cases, as recognized by NLEP, in Purba Bardhaman District, who was present during the reference period of data collection, were included.

The exclusion criteria - patients who were unwilling to participate in the study and those who were not available for data collection in spite of two visits.

Sampling:

In the district total enumeration of all eligible cases, as per the criteria mentioned above, was done. According to current leprosy programme data, there was 521 registered leprosy cases in 23 CD blocks and 6 municipalities in the district during 1st April 2021 to 31st March 2022. Among them 9 cases (refused to participate 3 cases, hospitalized/ not available 3 cases, death 3 cases) were excluded from this study. Thus, total number of participants was 512.

Study tools and techniques:

A predesigned, pretested, semi-structured schedule was used for data collection regarding socio-economic, environmental and behavioral variables along with relevant records and registers of the cases. Smartphone/ handheld GPS device were used to ascertain geo-spatial location of cases and maps of Purba Bardhaman District at various administrative levels, like CD blocks, Gram Panchayat and villages was also used.

Data was collected by interviewing the study subjects using the schedule. Relevant records and registers were reviewed and finally capturing location of the leprosy cases, and of relevant landmarks like sub-centers, primary health centers, community health centers was done with the help of suitable devices.

Data collection:

Data was collected after obtaining ethical approval from the Institutional Ethics Committee of Burdwan Medical College (Memo no BMC/ I.E.C./019, dated 08th January, 2021). Permission and co-operation for conducting the study was obtained from CMOH, Purba Bardhaman district. Relevant block level and the district level administrators were informed about the purpose of this study and their co-operation was sought for successful conduction of the entire study.

Details of registered leprosy cases, including their addresses, was obtained from the Zonal Leprosy Officer (ZLO). With the help of grass-root level health workers like ASHA, households of the cases were visited. If found absent in the house one more visit was conducted. Thus, at least two attempts were made to reach the study subjects. After briefing the purpose of this study, informed consent and or assent was taken from the subjects. They were also assured about the confidentiality and anonymity. Location of the house as well as location of nearby sub-center and PHC was captured by a hand-held device or mobile (App) device for GIS mapping. Reviewing of relevant records and registers was done regarding the clinical profiles of the consentee persons at the corresponding sub-center / Primary Health Centre (PHC).

Data analysis:

Collected data was checked for completeness and consistency and then data was entered in the Excel data sheet. Data were presented in the form of tables and diagrams. Qualitative data were expressed as frequency and proportions.

Softwares like Google Earth/Google Map, Quantum Geographical Information System (QGIS) was used as analytical tools for geo spatial analysis. To describe the distribution of leprosy cases, individual case data along with coordinates (latitude and longitude) were entered in Excel Sheet and converted to Comma Separated Value format and saved. These data were then integrated to the QGIS, version 3.24 (open source), by table joining method and were projected as polygon feature in Georeferenced maps of Purba Bardhaman district and blocks to

describe the spatial distribution of leprosy cases from 1st April 2021 to 31st March 2022.

Prevalence of leprosy cases for the year 2021-22 of each community development block was calculated by dividing the total number of registered cases (both old and new cases) of a block with midyear population of the respective block which was available from District Statistical Handbook of Purba Bardhaman 2017 (Bureau of Applied Economics and Statistics) to generate the choropleth map of the district. The Heatmap tool of QGIS was applied to identify clusters, defined as aggregation of health events, of new leprosy cases. Heatmaps provide an estimation of the density of data in an area of interest. The tool draws a circle around each data point (i.e., leprosy case) and uses Kernel Density Estimation to create a density (heatmap) raster of all data points. A radius needs to be chosen that will specify the circle around each point. The result will be a raster map that shows pockets of 'heat', where there is a high concentration of points (leprosy cases). When using kernel estimation to generate heat map in QGIS, choosing the right amount of smoothing is very important to create the map, because fixed bandwidths (radius) often don't work well since populations are unevenly distributed in 3-dimentional space, and also for the feasibility of the researcher (Lawson et al 2016). Taking this into consideration in our study, 2 km radius was taken to generate heatmap for the entire district. Those blocks having significant pockets of heat were further analysed using 1 km radius.

Results

The present study was carried out in Purba Bardhaman district of West Bengal where socio cultural variation prevails from one geographical area to another. The study was planned to generate evidences regarding the geo-spatial distribution of registered leprosy cases during 1st April 2021 to 31st March 2022 in the district and to describe their socio-economic, environmental, behavioral characteristics and clinical profiles. The final sample size was 512. The response rate was 98%.

Section – 1:

Geospatial distribution of the study subjects in Purba Bardhaman district during April 2021 to March 2022

Spatial distribution of the leprosy cases according to types of leprosy in Purba Bardhaman district during April 2021 to March 2022 (n=512) is shown in Fig. 1.1.

Spatial distribution of the leprosy cases according to WHO disability grades of leprosy in Purba Bardhaman district during April 2021 to March 2022 (n=512) is shown in Fig. 1.2.

Badla (Kalna II) and Pursa (Galsi II), each reported the highest number of leprosy cases that was 38 and 35 respectively, while Madhabdihi (Raina II) and Memari municipality reported only 2 cases in the year 2021-22 (Fig. 1.3).

Fig. 1.4 shows the choropleth map of prevalence of leprosy across the different blocks of Purba Bardhaman district for the reporting year 2021-22.

Out of 23, eleven (11) community development blocks had a prevalence of more than 1 per 10,000 population which was greater than the prevalence rate of National leprosy elimination programme (defined as less than 1 case per 10,000 population). Among them Badla (Kalna II) block had the highest prevalence of 2.06 cases per 10,000 population followed by Galsi I and Ausgram II with a prevalence of 1.76 and 1.57 per 10,000 population respectively. Rest of the blocks had the prevalence in accordance with the national programme (Fig. 1.4).

It was noted that Kurmun (Burdwan I), Borsul (Burdwan II), Badla (Kalna II), Bannabagram

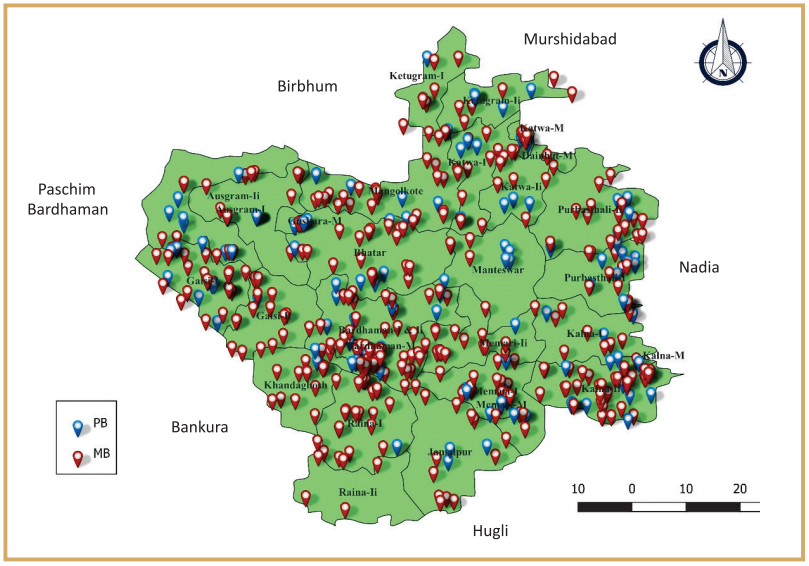

Fig. 1.1: Spatial distribution of the leprosy cases in Purba Bardhaman district. Blue icons represent the spatial distribution of the study subjects suffering from paucibacillary (PB) leprosy and the Red icons represent the multibacillary (MB) cases. *Majority of them were MB and concentrated in central part of the district.*

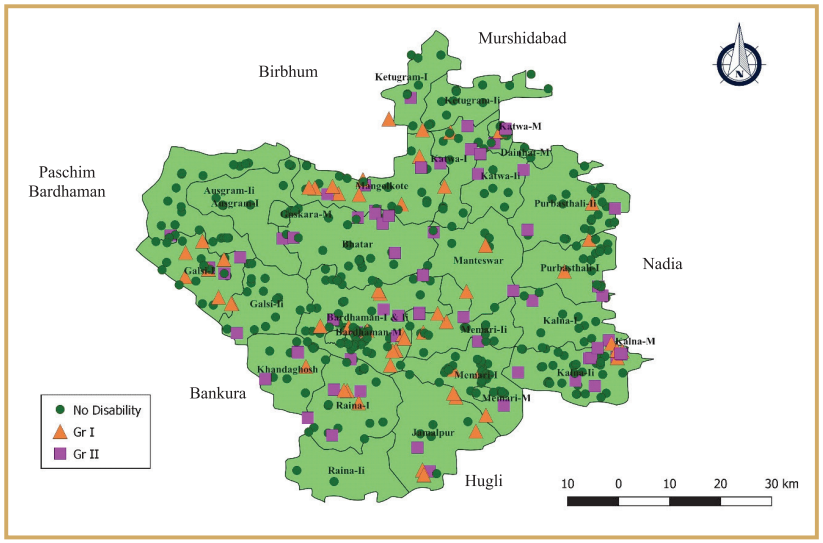

Fig. 1.2 : Spatial distribution of leprosy cases according to WHO grades of disability in entire district of Purba Bardhaman. The Green circle icon represents the study subjects without any disability, the Orange triangle icon represents the study subjects with grade I disability and the Purple rectangle icon represents the study subjects with grade II disability. *Most of the cases had no disability*.

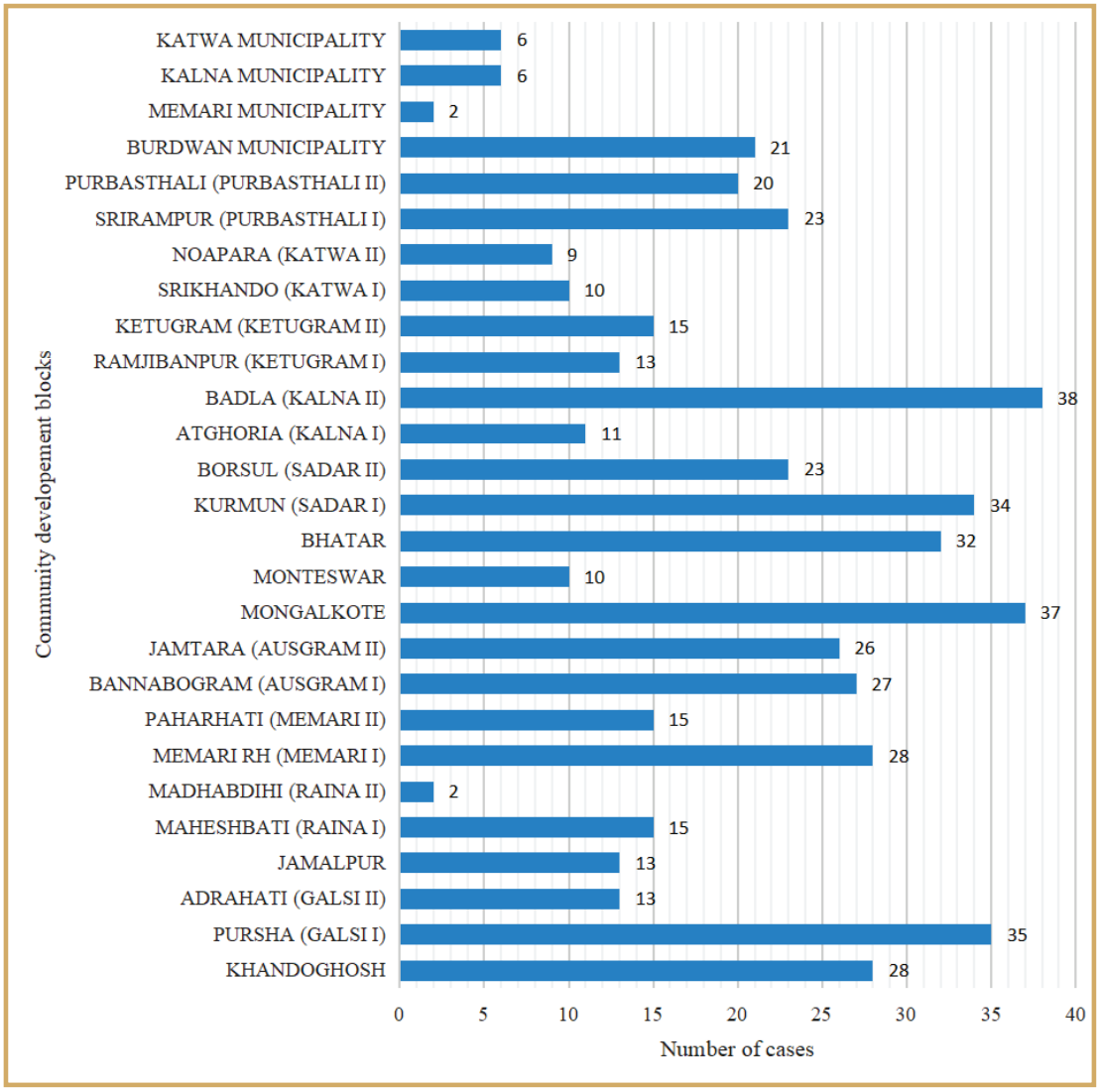

Fig. 1.3 : Total number of leprosy cases in 23 community development blocks and 4 municipalities of Purba Bardhaman district during April, 2021 to March, 2022.

(Ausgram I), Jamtara (Ausgram II), Memari I, Srirampur (Purbasthali I) blocks having the significant concentration of leprosy cases.

Section - 2:

Table 1 shows that maximum number of the study population belonged to the age group 45 to 59 years (38.6%), followed by age group 30 to 44 years (25.8%). Of them 62.7% of the study subjects were males and rest were females. Majority (85%) of them were Hindus. 47.5% of the study subjects were from schedule caste (SC), 25.2% were schedule tribe (ST) and 27.3% were

Table 1 : Distribution of study population according to their socio-demographic profile (n=512).

Variables	Frequency (%)
Age group (in years)	
<= 14	26 (5.1)
15-29	95 (18.6)
30-44	132 (25.8)
45-59	198 (38.6)
>= 60	61 (11.9)
Gender	
Male	321 (62.7)
Female	191 (37.3)
Religion	
Hindu	435(85)
Muslim	75(15)
Caste	
General	140(27.3)
SC	243(47.5)
ST	129(25.2)
Type of Family	
Nuclear	318 (62.1)
Joint	194(37.9)
Marital Status	
Married	408 (79.7)
Un-married	63 (12.3)
Widow/ widower	41 (8.0)
Occupation	
Un-employed	180 (35.2)
Employed	332 (64.8)
Education	
Illiterate	218 (42.6)
Non-formal education	122 (23.8)
Primary (class I – IV)	93(18.2)
Middle school (class V-VIII)	58 (11.3)
Secondary (class IX-X)	16(3.1)
Higher Secondary (class XI-XII) & above	5(1)
Socio-Economic Status (Modified B.G. Prasad Scale January 2022)	
Upper (≥ 8220 & above)	7 (1.4)

Upper Middle (4110-8219)	55 (10.7)
Middle (2465-4109)	131 (25.6)
Lower Middle (1230-2464)	187 (36.5)
Lower (<1230)	132 (25.8)
Family history of leprosy	
Present	43 (8.4)
Absent	469 (91.6)

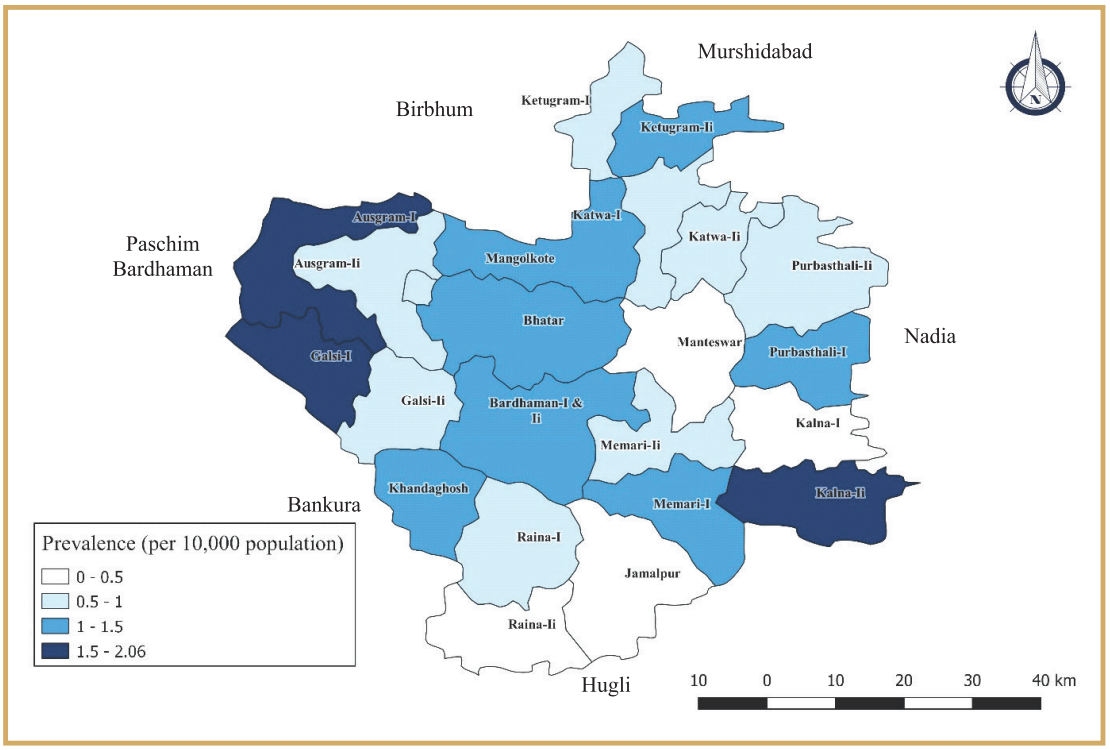

Fig. 1.4 : Prevalence of leprosy in the reporting year 2021-2022 across the different blocks of Purba Bardhaman district.

from general caste. 62.1% belonged to nuclear family.79.7% of them were married,2/3rd of the them were employed and 42.6% were illiterate. According to modified B G Prasad scale, 36.5% of them belonged to lower middle socio-economic class. Among the study subjects only 8.4% cases had positive family h/o leprosy.

55.7% of the study subjects lived in kutcha house and 84.4% lived in houses with in-adequate ventilation. 1/3rd of the study subjects lived in

Table 2 : Distribution of the study subjects according to their environmental and behavioural characteristics (n=512).

Type of House	
Kutcha	285 (55.7)
Pucca	115 (22.5)
Mixed	112 (21.9)
Ventilation	
Inadequate	432 (84.4)
Adequate	80 (15.6)
Overcrowding	
Absent	341 (66.6)
Present	171(33.4)
Practice of defecation	
Open defecation	178 (34.8)
Sanitary latrine	272 (53.1)
Non sanitary latrine	62 (12.1)
Bathing place	
At home	262 (51.2)
Pond	209 (40.8)
Community tube well	41 (8.0)
Proper handwashing*	
Yes	493 (96.3)
No	19 (3.7)
Regular bathing	
Yes	510 (99.6)
No	2 (0.4)
Sharing bed with other	
Yes	389 (76)
No	123 (24)

* *Proper handwashing= washing after defeacation, before preparing meals and before taking food (multiple response).*

overcrowded houses. Over 1/3rd (34.8%) of the study subjects practiced open defeacation and 90% of them did not practice proper domestic waste disposal management. 96.3% practiced proper handwashing methods and 76% of them shared their beds with others (Table 2).

76.4% of the study subjects were newly diagnosed and 23.6% were other (previously treated) category of leprosy among which 12.5% of them re-entered for treatment. Among the cases, nearly 3/4th of them had multibacillary (MB) leprosy and remaining paucibacillary (PB)

Table 3 : Distribution of the study subjects according to their clinical profile (n=512).

Category of leprosy cases	Number (%)
New	391 (76.4)
Relapse	26 (5.0)
Re-entered for treatment	64 (12.5)
Referred	22 (4.3)
Re classified	9 (1.8)
Clinical Types	
Paucibacillary (PB)	135 (26.4)
Multibacillary (MB)	377 (73.6)

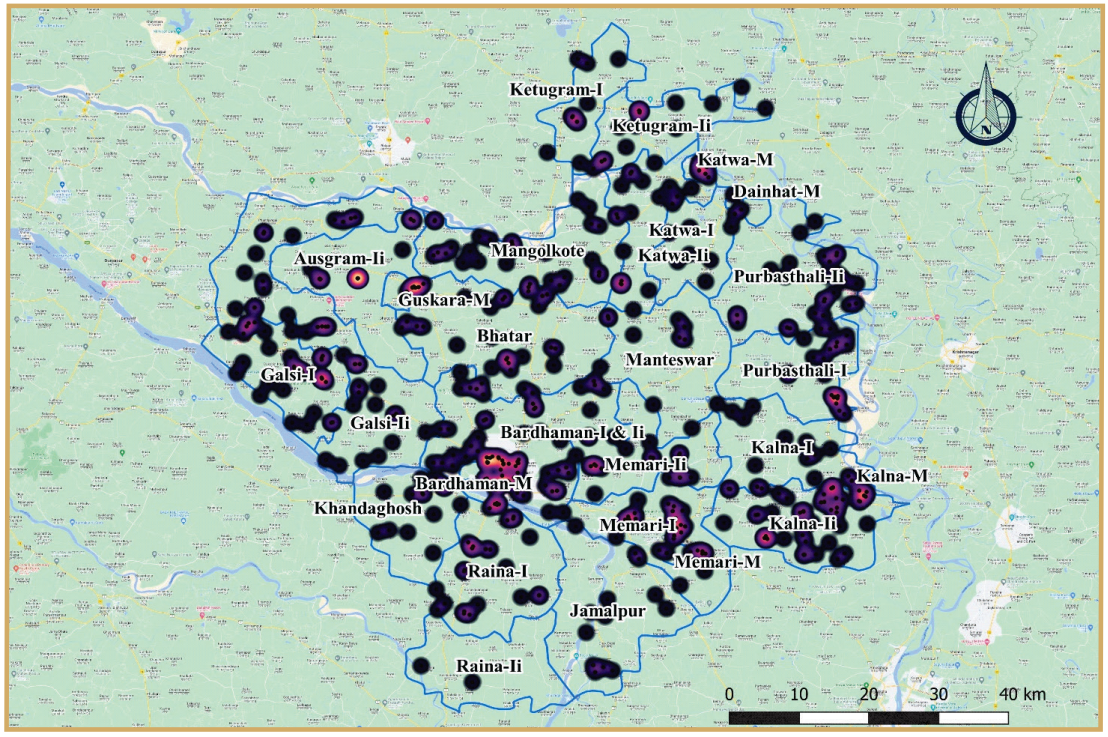

Fig. 1.5 : Pockets of heat i.e., leprosy cases concentrated areas in Purba Bardhaman district during April 2021 to March 2022.

as per current NLEP /WHO criteria (Table 3).

Discussion

According to the report of the National Sample Survey and situational analysis done in 2015 by National Leprosy Eradication Programme (NLEP), India, the major issues to be addressed by the

program were delay in case detection, hidden case-loads, low awareness regarding leprosy in the community, and the lack of quality monitoring. Being surrounded by high endemic states like Jharkhand, Odisha etc. West Bengal trends to contribute a significant proportion of leprosy cases to the national burden. In this background, this study was conducted to generate evidences regarding spatial distribution of leprosy cases and to describe their socio-demographic, clinical characteristics and epidemiological association in Purba Bardhaman district of West Bengal.

In Purba Bardhaman district, prevalence of leprosy in the year 2021-2022 across the different blocks shows that out of 23, eleven (11) community development blocks had a prevalence of more than 1 per 10,000 population which was greater than the prevalence rate of National leprosy elimination programme (defined as less than 1 case per 10,000 population). Among the Badla (Kalna II) block had the highest prevalence of 2.06 cases per 10,000 population followed by Galsi I and Ausgram II with a prevalence of 1.76 and 1.57 per 10,000 population respectively. The underlying cause may be the geographical location of these blocks as these blocks are situated at border area of the district. Galsi I and Ausgram II, these two blocks form the west border of the district which is surrounded by Birbhum, Paschim Bardhaman and Bankura districts which are also known to had the high burden of leprosy.

The remaining blocks had maintained the prevalence in accordance with the goal of the national programme. Among the low prevalent blocks, Madhabdihi (Raina II) had the lowest prevalence of 0.12 cases per 10,000 population, followed by Monteswar, Jamalpur, Atghoria (Kalna I), had prevalence of 0.39, 0.43, 0.49, whereas both Srikhando (Katwa I), Noapara (Katwa II) blocks had a prevalence of 0.51 cases per 10,000 population.

When we applied the heatmap tool to generate evidence regarding leprosy case concentrated areas in the entire district, it came to notice that pockets of heat were found mostly in the high leprosy prevalent blocks as well as some other blocks. It was noted that Kurmun (Burdwan I), Borsul (Burdwan II), Badla (Kalna II), Bannabagram (Ausgram I), Jamtara (Ausgram II), Memari I, Srirampur (Purbasthali I) blocks having the significant concentration of leprosy cases. A significant pocket of heat that is the area with high concentration of leprosy cases, was situated around Nababhat and Goda area of Kurmun (Burdwan I) block, around Hatgobindapur and Jotram area of Borsul (Burdwan II) block, around Tola and Rustampur area of Badla (Kalan II) block, around Karatia and Gushkara area of Bannabagram (Ausgram I) block, around Kotagram and behind the area of Jamtara Block Primary Hospital of Jamtara (Ausgram II) block, around Daluibazar, Chotkhanda and area near Memari I BDO office of Memari I block and around Samudragarh area of Srirampur (Purbasthali I) block of Purba Bardhaman district during the year 2021-22.

Taal et al (2022) utilizing the spatial data of registered leprosy patients from 2014 to 2018 in Pamekasan, Pasuruan regency and Pasuruan city, East-Java province, Indonesia showed that the northern subdistricts in Pamekasan had a higher new leprosy case detection rate compared to the southern subdistricts. In Pasuruan, subdistricts with the highest new case detection rate were found in the eastern part of the district. Cluster analysis was done with the different heatmap radius and cluster density for Pamekasan and Pasuruan. It showed that the clusters were evenly distributed through Pamekasan with more high-density clusters in the northern part. In Pasuruan, the clusters were focused in the

central and northeastern part of the area. There was more clustered distribution of leprosy cases in Pasuruan than in Pamekasan province.

In Bangladesh, Fischer et al (2008), in their study of 33 leprosy cases in four villages in Nilphamari district, a highly endemic area in northwest Bangladesh from 2002 to 2006, were unable to find any significant spatial cluster. The probable reason behind that the Spatial analysis at the microlevel of villages in highly endemic areas seems to be not useful for identifying clusters of patients. The search for clustering should be extended to a higher aggregation level, such as the subdistrict or regional level.

A recent study done by Ortuño-Gutiérrez et al (2022) in two blocks of Madhubani district of Bihar state, India during 2020 to 2022 among 169 newly detected leprosy patients to develop and pilot spatial methodologies to outline hamlets within villages and then identify clusters of hamlets with high leprosy incidence, revealed that five high incidence clusters including 12% of the population and 46% (78/169) of the leprosy cases which were targeted for active screening and post-exposure prophylaxis.

Recent studies from Maharastra showed the geospatial analysis can be used to analyse child cases (Gitte et al 2024) which indirectly suggest comparatively recent transmission. Another study from Maharastra revealed clustering of leprosy habitats and shifting of age specific distribution in low endemic versus high endemic districts (Surve et al 2025). Our study from West Bengal strengthens the merit of using the geospatial distribution in leprosy for identifying the targets for interventions.

Thus, GIS has gained the recognition globally by epidemiologists as an important tool for research, prevention, control of several communicable diseases as well as surveillance, planning and implementation of programmatic intervention and so many other things.

Regarding clinical profiles of the study subjects in this study, it was noted that majority (76.4%) of the study subjects were newly diagnosed and 23.6% were other (previously treated) category of leprosy. Among the other cases, 52.9% were re-entered for treatment. Majority (73.6%) of them were MB types of leprosy and among the MB cases, 67.1% were male and 32.9% were female. This is data from the programme and is to be interpreted accordingly.

Limitation

Owing to the cross-sectional study design, it was not possible to explore the spatio-temporal trends of leprosy which could help us to understand the disease dynamics better. The primary limitation of the cross-sectional study design is that because the exposure and outcome are simultaneously assessed, there is generally no evidence of a temporal relationship between exposure and outcome. Therefore, a longitudinal study in this aspect might be better suitable for establishment of the temporal relationship.

Conclusion

From this study the geo-spatial characteristics and the socio-demographic, environmental and clinical characteristics of the leprosy cases in the entire district were found out in this district which provided a better understanding with regards to the knowledge of the magnitude and dynamics of leprosy as a disease. By applying the heatmap tool, we have successfully generated visualized evidence regarding the leprosy cases concentrated in different pockets in this this district.

Recommendations

With the help of GIS and spatial analysis, the present study had found out leprosy case concentrated areas were mostly confined

within the leprosy prevalent blocks as well as some other blocks. A properly planned and intensified actions should be taken along with the ongoing activities according to NLEP in the district for active case finding and post-exposure prophylaxis to cut down the active transmission chain in the concerned areas of those blocks. A GIS database should be created at the district level by the district programme managers that will definitely help to better understand the spatio-temporal distribution as well as trends in disease dynamics.

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