



RESEARCH ARTICLE

A GEOGRAPHICAL APPRAISAL OF HEALTH CARE FACILITIES IN LAKSHADWEEP ISLANDS

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ABSTRACT

Health care facilities unlike any other amenities, is vital for any society irrespective of its population size and administrative area. It is to be highlighted that health care facilities are not only meant for providing medical facility for unhealthy people, to save life in case of emergency, but also to spread awareness about healthy life in every area where there is a presence of human life. Hence each and every life on earth is important, so is the presence of health care facility. In Lakshadweep, several government proposals and fund are allotted for health care facility, but due to regional disparity in allocation of fund and other allowances, there exist large difference in the availability, accessibility and affordability of health care facility in different islands in Lakshadweep. The Health Services plays a vital role to enable the people of Lakshadweep to lead a healthy life by promoting programmers covering preventive, primitive and curative health care. At present there are 2 Hospitals, 3 Community Health Centres, 4 Primary Health Centres, 1 First Aid Centres. In addition to these, two Ayurvedics Dispensaries, one Homeopathic Dispensary and four Dental Units are also functioning in the Islands of Lakshadweep. In the past, epidemics like cholera and smallpox used to take a heavy toll of lives. Leprosy and Filariasis were also rampant. Lack of facilities and unavailability of doctors besides ignorance and isolation caused by the difficulties of transportation and communication were the main reasons for the slow developments of health services. The present study is a geographical appraisal of the health care facilities in Lakshadweep Islands. The study reveals that inspite of various efforts to develop the health care facilities; there exist regional disparity in the availability, accessibility, affordability of health care facilities among different Lakshadweep islands.

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INTRODUCTION

According to "WHO" (1948), the concept of health is defined as, "a state of complete physical, mental and social well being of the individual and not merely the absence of disease or infirmity". Health is a positive concept emphasizing social and personal resources, as well as physical capacities". The repeated proverbs like "Health is Wealth" "Cleanliness is godliness" clearly defines the importance. A Sound mind in a sound body indicates the Universal reorganization of the importance of health. Therefore, Health has occupied the highest place in the life of man from time immemorial. Health has several dimensions; each dimension is important but its relative importance, i.e., other dimensions depends on the circumstances of an individuals or community. These dimensions are: physical, mental, nutritional, environmental, educational, socio-cultural, economic, preventative and curative (R.P.Misra, 2007). Health geography is concerned with geographical aspects of health status and health care systems of population in a certain area or region. It tries to identify the factors which affect the public health.

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The geography of health care is concerned with the recurrent themes are, spatial distribution of health services, the access to healthcare and the utilization pattern of services, and the planning of health care services. The extent to which use of services declines with distance from facilities, policy criterions and performance standards, variety in health care systems, and the reforms of national health care systems (Maaike den Dark, 2005). The present research work is a study of the existing health care facilities in Lakshadweep Island in a geographical perspective.

General introduction of Lakshadweep Islands

Lakshadweep is an archipelago of coral islands in the Arabian Sea forming the Union Territory of Lakshadweep. This archipelago consists of 12 atolls, 3 reefs and 6 submerged sand banks, in the open Indian Ocean. Lakshadweep formally known as the Laccadive, Minicoy and Aminidivi Islands is a group of islands in the Laccadive Sea, which is about 200 to 400 Kilometers off the south western coast of India. It is the tiniest union territory of India covering an area of 32 Sq. Km and is comprised of 10 inhabited and 26 uninhabited islands with a total population of 64429 people (2011 Census), which is roughly equal in number to that of the Marshall Islands.

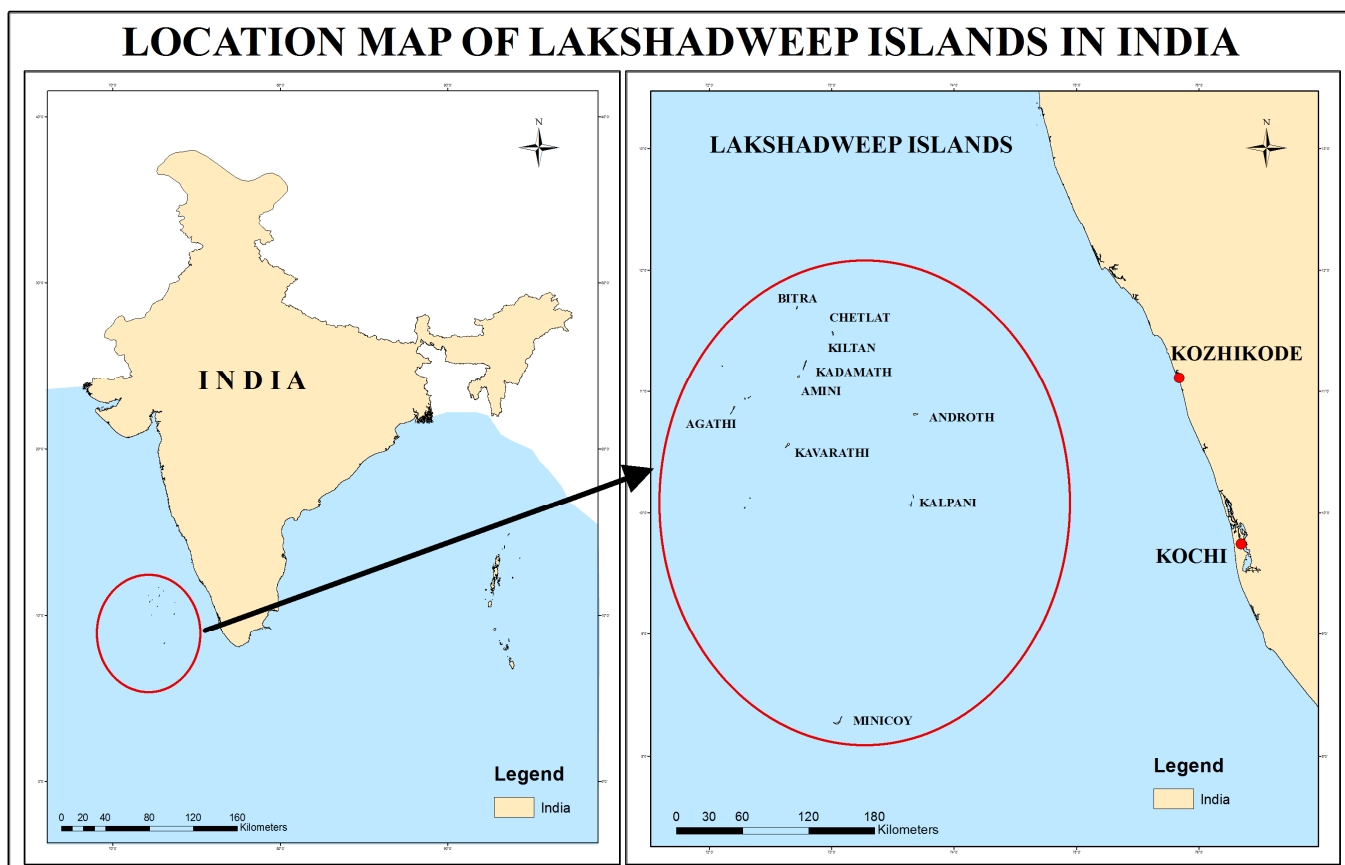


Fig. 1. Location Map of Lakshadweep Islands in India

This gives it a ranking of 627th among the 640 districts in India. The district has a population density of 2,013 inhabitants per Sq Km. The inhabited islands are Kavarathi, Agatti, Amini, Kadamat, Kiltan, Chetlat, Bitra, Androth, Kalpeni and Minicoy islands. The uninhabited islands Bangaram has been enumerated during census operation and has a population of 61 persons (2011 Census). The fig 1 shows the location map of Lakshadweep islands. Geomorphologically all islands of Lakshadweep are of coral origin and some of them like Minicoy, Kalpeni, Kadmat, Kiltan and Chetlat are typical atolls. Climate of Lakshadweep is similar to Kerala. Though the islands receive high rainfall, the lack of surface storage and the limited ground water storage capacity, makes fresh water a precious commodity.

Hydrologically as the area is covered by sandy soil, all rainfall received immediately infiltrates into the soil, reaches the ground water table and thereafter reaches the nearby sea as sub-surface runoff. Hence, there is no surface runoff or drainage channel in this Island. Demographically population growth rate over the decade 2001-2011 was 6.23%. Lakshadweep has a sex ratio of 946 females for every 1000 males and the literacy rate in Lakshadweep islands is 92.28%. Economically fishing is the main livelihood of the islanders. Coconut fibre extraction and production of fibre products is Lakshadweep's main industry. There are five coir fibre factories, five production demonstration Centres and seven fibre curling units run by the government of India. These units produce coir fibre, coir yarn, and curled fibre and corridor mattings. There is little economic inequality in Lakshadweep and the poverty index is low. Due to its isolation and scenic appeal, Lakshadweep is one of the important tourist attraction in India since 1974. As Lakshadweep is a group of isolated islands, the health care facilities here is less.

Lack of facilities and doctors besides ignorance and isolation caused by the difficulties of transportation and communication were the main reasons for the slow development of health services.

MATERIALS AND METHODS

In this study both primary and secondary data are used. The primary data was collected through field survey based on random sampling method and direct personal interview of local people from each island and government officials of various health institutions including hospitals, primary health care Centres. The secondary data was collected from various government and non government offices especially from various hospitals, panchayat office and office of science and technology at Lakshadweep. Several literatures and data regarding the health facilities in Lakshadweep available in several websites were utilized for the analysis and reference purpose. The maps are prepared using QGIS and ArcGIS 10.1 software. For the present study two sets of questionnaires has been prepared. One is to understand the health care facilities and services in hospitals. The other one is to understand the current health status of people in Lakshadweep. The survey was conducted based on sample of 315 houses. Due to the unequal distribution of population in the Lakshadweep islands samples were taken only from 10 inhabited islands. There are many other islands like Bengarem, Suheli and Cherium, where people visit as tourist and stay for one or three days but due to inaccessibility and lack of time only people inhabited in 10 islands were considered for sampling. Based on the scheduled survey people were interviewed and several information were gathered about the present health care condition what existed in 10 years back. The collected data from the primary

and secondary source were analyzed using Microsoft Excel 2007 software.

Geographical Appraisal of Health Care Facilities in Lakshadweep Islands

The status of health care facility in Lakshadweep is assessed based on the availability of health care centres in all inhabited islands, their accessibility, the medical facility provided there, availability of medicine, provision of emergency services, frequency of people visiting hospitals, common communicable diseases and the level of environmental awareness. In case of availability of advance medical facility for people in their individual island, people depending on advance medical facilities in Kavarathi island and those depending on the main land, majority of the people in Lakshadweep islands depend on the main land for the availability of advance medical facility (table 1). Based on the distance from each island to the main land, and according to the type of treatment required, people either opt to travel to Kavarathi island or move to main land.

Table 1. Distance and availability of advanced medical facilities in hospitals in Lakshadweep Islands

Name of the Island	Distance to main land (Sq. Km)	Advanced medical facilities		
		Own Island	Capital(Kamarhati)	Mainland
Minicoy	398	6%	8%	86%
Andretti	293	20.37%	29.62%	50%
Kavarathi	404	50%		50%
Kalpeni	287	10%	25%	65%
Agatti	459	10.81%	35.13%	54.05%
Amini	407	13.15%	34.21%	52.63%
Kadmath	407	11.53%	30.76%	57.69%
Kilthan	394	5.26%	26.30%	57.89%
Chetlat	432	9.09%	27.27%	63.63%
Bitra	483	0.00%	30%	70%

Among all the islands of Lakshadweep, Kavarathi island which is 404 Sq Km away from Kochi, is the only island which is equipped enough which some advanced medical facilities to serve about 50 % of the need for advanced medical facilities from in and out the Kavarathi island. For the rest of 50 % of need for advanced medical facilities people depend on the main land. In case of Bitra island which is the 483 Sq. Km away from Kochi, for 70 % of advanced medical facilities people depend on main land and about 30 % of which is available in Kavarathi Island. There is no advance medical facility in Bitra Island and people depend on the only first aid center available in the island. The Chetlat island which is around 432 Sq. Km away from Kochi, depends on the main land for about 63 % of its need for advance medical facilities, 27.27 % from Kavarathi island and about 9.09 % of its need is served in the Bitra island.

Major Health Care Issues in Lakshadweep Islands

Based on the study conducted in 10 inhabited islands among 36 Lakshadweep islands, the status of health facility was assessed by analyzing the response given by selected samples from local area and hospital officials. The following are the major problems related to the health care facilities available in the Lakshadweep islands

Transportation Problem

The lack of proper transportation facility is one of the major problems faced by people in Lakshadweep not only in case of accessing health care centres but also for various other

purposes. The airway and waterway are the only mode of transport available for them. Only Agathi Island have airport facility and some other islands have helipad. The jetty services in available in each island but is only for limited time and during the bad weather both the airway and waterway transportation is blocked. Hence in case of health emergency when immediate medical treatment is required, the transportation of patients to the nearest hospital located in another island becomes impossible

Unavailability of hospitals or primary health care centres in all inhabited islands in Lakshadweep

Access to the quality health care is continuing challenge for most rural communities. An area without a hospital not only lacks local access to vital health services, but also becomes a hub of many dietary, respiratory and other communicable diseases. In case of Lakshadweep islands at present there are 2 Hospitals, 3 Community Health Centres, 4 Primary Health Centres, and 1 First Aid Centres.

In addition to these, two Ayurvedic Dispensaries, one Homeopathic Dispensary and four Dental Units are also functioning in the Islands of Lakshadweep. But ironical fact is that these health care centres are concentrated in few islands where as the people living in the rest of the islands are deprived of immediate medical treatment as they have to reach these islands for getting immediate treatment at these hospitals and other health care centres. Due to the lack of availability of medical facilities, people depend on local medicines; some believes in superstitious method of treatment and causes death due to improper treatment. In the past, epidemics like cholera, Leprosy, Filariasis and smallpox used to take a heavy toll of lives.

Hospitals in the main island of Kavarathi are not self sufficient to provide health care facility in emergency cases

The Kavarathi Island is the capital of the Lakshadweep islands which is important for it administrative, economic, education and medical functions. There are two hospitals and one dental dispensary. Lakshadweep administration has got an ambulance helicopter to evacuate serious patients from peripheral islands to capital island Kavarathi and also to mainland in case of emergency treatment. But in case of bad weather the transportation is not possible. The another major problem concerned with the health care facility in Kavarathi island is unavailability of specialist doctors and better medical facilities in the Hospital in Kavarathi island. The data pertaining to the patients evacuated from other island to Kavarathi and to mainland, the number of patients evacuating to mainland is more compared to patients transported to mainland. In case of

evacuating patients to mainland, in majority of the cases the movement is due to lack of advance facility, unavailability of specialized doctors, unavailability of required medicines on time and lack of proper infrastructure facilities for availing better medicinal facility in case of any emergency. The data shows that the number of patients evacuated increases year by year indicating slow rate of technological improvement. In case of patients availing treatments from the existing hospitals in Kavarathi Island, the data collected for the year 2006 to 2011, collected from the hospitals in Kavarathi Island, reveals the fact that the numbers of inpatients recorded are less compare to the number of outpatients. The numbers of inpatients were very less before 2006 as there where much dependency on mainland for better treatment. This indicates that the health related infrastructure facilities where less before 2006 and the situation still continuous with increasing rate of growing population in Lakshadweep island. Hence the present study states that the hospitals in the main island are not self sufficient to provide health care facility for emergency cases.

Availability and quality of medicines is not at satisfactory level in all islands

The availability of medicines for all diseases is not at a satisfactory level as some medicines are shipped from the mainland or Kavarathi after every 3 months, hence once stock is over there will be shortage of such medicines and people have to move either to the Kavarathi Island or to move to the main land for purchasing medicines. In case of the quality of medicine, the medicines available in the health centres are less satisfactory as these are purchased under government norms and budget. Hence the low cost medicines which may have high risk of side effects are available for treatment in many of the health centres. Even in some centres these medicines will not be available in cases of emergency and people have to purchase them from either Kavarathi island or from the mainland.

Unavailability of specialist doctors, nurses and helpers causes obstacles in providing treatment on time in many islands

Only in Kavarathi Island there are specialized doctors with 20 nurses and 10 helpers. There are only 2 gynecologist doctors employed for overall Lakshadweep islands. There is only one lady doctor is appointed and that to in Kavarathi islands. Some other islands have doctors and supporting staff, but in case of emergency cases, due to unavailability of doctors or their supporting staff, provision of medical treatment in case of any emergency becomes very difficult. Sometimes doctors will be on long leave or there will be no doctors appointed for a vacant post. The unavailability of doctors or supporting staff, lack of modern high tech facility for emergency treatment, lack of trained staff for operating available instruments in health care centres, lack of basic infrastructure facilities in hospitals and bad weathers are the common causes of death of several patients reported during a span of 10 years.

The existing hospitals in all 10 islands lack basic infrastructure facility for treatment

The health care centres available in these 10 inhabited islands are not uniform. Some islands have 2 or 3 health care centres, where as some islands have one first aid centres and that to for name sake. For example Bitra Island has only one first aid

center, with minimum infrastructure facility. Doctors are rarely available in the First Aid Center. Only limited medicines will be available, and due to unavailability of the duty doctors or helping staff, proper health care facility is not available in Bitra Island. Similar cases are found in many other islands such as Chetlat, Kalpeni Minicoy etc. In case of Kavarathi Island there are 2 hospitals which are comparatively well equipped with modern technology and trained staff. But when the data of inpatients and outpatients in hospitals in Kavarathi Island are considered, the numbers of inpatients are less than the number of outpatients registered in the hospitals in Kavarathi Island.

In case of epidemic breakouts, rapid treatment at large scale is not possible

Epidemics such as Leptospirosis, yellow fever, smallpox, chickenpox, hepatitis B, Hepatitis D, measles etc are the common epidemic diseases found in Lakshadweep islands. In situation of such emergency the existing health care facilities are inefficient to provide rapid treatment at a large scale.

Level of health awareness camps and programmes among the Lakshadweep islands is not satisfactory

The health awareness camps and programmes in Lakshadweep are not conducted in every island. Only in few islands especially in Kavarathi, Minicoy and Agathi islands health awareness camp is conducted either by the existing hospitals or by the hospitals and health care organizations working at the mainland. This inequality makes the provision of better health care facility among the island in Lakshadweep. There is a need to conduct health awareness camp in all islands especially in Bitra, Chetlat, Kalpani etc regularly to make people aware about good health, to provide health care service free of cost and educate native people about the epidemic diseases and ways to prevent it. The present study highlights the fact that the present level of health awareness camps and programmes are not satisfactory.

The level of health care facility is not satisfactory when compared to the level of growth of population in Lashadweep Island

From the present study it is understood that the level of health care facility in its entire manner is not satisfactory when compared to the level of growth of population in Lakshadweep Island. In Lakshadweep the distribution of population is uneven. Major share of Lakshadweep population is concentrated in Kavarathi, followed by Agathi, Minicoy Island etc, whereas in other inhabited islands population is comparatively less. The health care facility is basic amenities to be available for every human being, but in case of Lakshadweep islands, due to the isolated nature of islands, lack of good transportation network, lack of technological development, and improper utilization of government fund the implementation of good health care facility in Lakshadweep is not at a satisfactory level.

Inequality in the provision of health care facilities for the natives still exist among the Lakshadweep islands

A regional disparity in the health care facilities is clearly analyzed in this study. Health is important part of any educated healthy society, hence health care is one among the major issue of any society.

Table 2. Types of diseases in various islands of Lakshadweep Islands

S.No		Kavarathi	Other 9 inhabited islands
1	Population	11210	53219
2	Health Care Centres		
	Hospital	1	9
	Bed	35	132
	Doctor	19	33
	Nurses	20	41
	Helpers	10	42
3	Samples	54	261
4	Communicable diseases	25 %	60 %
5	Emergency situation in hospital	10% of total health care Centres in Lakshadweep islands	90% of health care Centres depend upon the 10 % of health care Centres in Kavarathi island. In case of higher medical treatment patients are shifted to main land.
6	Health awareness programmes conducted	Conducted frequently by the health care Centres individually or with the aid of hospitals from the main land.	Conducted rarely by the health care Centres
7	Visiting health care Centres	More	Less
8	Availability of medicines	More availability	Less availability
9	Availability of modern technology	10 % available	90 % not available
10	Type of treatment	Alopathy – 10.71% Ayurveda – 41.07% Homeo – 48.21%	Alopathy – 85.33 % Ayurveda – 11.33 % Homeo – 3.33 %
11	Type of diseases	Mostly Dietary and respiratory diseases	Mostly others
12	Level of satisfactory services	Satisfactory	unsatisfactory

In case of Lakshadweep, the natural hindrances of being isolated, low population, the low technological development increase the regional disparity among Lakshadweep islands. Only in few islands such as Kavarathi, Minicoy and Agathi have satisfactory level of health care facility where as in other islands the health care facility is very poor. Here the regional disparity indicates the difference in health care facilities in each island of Lakshadweep. The lack of proper transportation facility, lack of frequent health awareness camp, lack of enough infrastructural facility, lack of quality and quantity of medicines available in health care centres etc had created a vast regional disparity among the Lakshadweep Islands.

Comparison of Health Care Facilities in Kavarathi and Other Lakshadweep islands

The following Table 2 shows the vital statistics regarding the Health Care Status in Kavarathi Island and all other 9 inhabited islands. Based on both primary and secondary data, the level of health care facilities in Kavarathi is compared with other 9 inhabited islands. The Table 2 clearly illustrates various parameters adopted in order to analyze the health care facility in Kavarathi Island in compare with other Lakshadweep islands. In case of Kavarathi Island, it inhabits the major share of population. It includes 1 Allopathy hospital, 1 Ayurvedic hospital and 1 Homeopathic hospital. There are 35 beds in the hospitals of Kavarathi Island, with 19 doctors, 20 nurses and 10 health persons. At an emergency situation, the patient is handled with all the facilities available in these hospitals. It is to be noted that in all other islands there are all together 9 health care centres. But in case of emergency, all these health care centres become helpless and patients are transported either to the Kavarathi or main land. This indicates that in case of emergencies like heart attacks, delivery cases, acute fever, or other sever illness, all those 6 hospitals, with 132 beds, served by 33 doctors, 41 nurses and 42 helpers becomes useless and patients depend on the limited health care facilities provided in hospital at Kavarathi islands or are forced to move towards mainland. In case of hospitals in Kavarathi Island, there are various limitations of health care facilities.

The existing hospitals are inefficient to accommodate the large number of patients as indicated by the number of outpatients which are much more than the inpatients. The existing bed facility is less in other islands as it is indicated by the number of inpatients which is much less than the number of outpatients. The availability of medicines in Kavarathi Island is comparatively good and the medicine stocks are taken in an interval of 3 months. In case of availability of medicines in health care centres in other islands, the medicines of low quality purchased and stocked based on the government norms are available where as several costly and high quality medicines are to be either purchased from the Kavarathi Island or main land. The modern technologies available in Kavarathi Island are Intensive Care Unit (ICU), Operation Theatre and blood banks. In case of other islands, the facilities are limited as per the standard of first aid or primary health care centres. Even in several cases of emergencies, due to unavailability of doctors or helping staff or damaged equipments or lack of training for operating the equipments, patients are not able to have proper medical treatment. They are forced to shift as early as possible to the Kavarathi Island or to the main land, but in case of bad weather, the transportation becomes impossible and the existing health care facilities become helpless to save a life.

The common diseases reported in Kavarathi Island are dietary, respiratory, occupational diseases and others, but in case of other islands, cases of communicable diseases are reported more, due to lack of proper health care awareness, lack of proper immunization and proper medical treatment. The health care centres either individually or clubbed with hospitals from the main land, conduct frequent health care awareness camps, free eye checkup, dental care services, free and regular camp for immunization of children of people in Kavarathi island. On the other hand in all other islands the health awareness camps are rarely conducted and as islands are isolated and located far away, people are less intended to move towards the Kavarathi Island for attending such health awareness camps. As a result people in all other islands are comparatively less aware about healthy life, need for environmental cleanliness, proper immunization and regular health checkup. Hence people in

these islands are more prone to epidemic diseases, malnutrition and other diseases. People rarely visit hospitals as most of them depend on local medicines and it leads to poor health status of people dwelling in these 9 other Lakshadweep islands. The present analysis highlights the fact that there exists regional disparity in the spatial distribution of health care facilities in the Lakshadweep Islands. Among the existing health care centres in Lakshadweep Islands, majority of it exists in 9 inhabited islands but in case of the efficient health care centres, only hospital in Kavarathi Island is to a certain level efficient to provide high level medical treatment, high quality medicines, and in case of emergencies holds most possibility of efficient and safe transportation of patients to main land. In case of health care centres in other islands, these are not well equipped to provide high level medical treatment. This indicates that mere existence of health care Centres doesn't complete the task of providing health care facilities to everyone, without regional disparity. Hence there is a need of conducting scientific research and application of proper health care management plan to solve the problems of health care facilities in the Lakshadweep islands.

Conclusion

The spatial distribution of existing health care facility, transportation facility and affordability of medical treatment, in Lakshadweep islands indicates a regional disparity among islands, since major health care facilities are concentrated in Kavarathi Island where as all other islands lacks in efficient health care facilities. On comparing Kavarathi Island with other islands, it has well developed health care facilities. At the same time, the health care facilities are very low in Bitra Island.

A regionalised approach for the spatial development, planning and management of the existing health care facilities will reduce the regional imbalance in the distribution and accessibility of health care facilities in Lakshadweep islands. The present study is a true geographical appraisal of the existing health care facilities, related problems and probable solutions to be implemented in Lakshadweep islands.

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