

Supply of Medical and Welfare Facilities for the Elderly in Islands of the Seto Inland Sea

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Abstract

This paper aims to clarify the supply and location characteristics of medical and welfare facilities for the elderly in the Seto inland sea, which has the most islands in Japan, and consider the facility establishment method in the islands. The results are as follows.1) The islands are classified into five types: non-supply, visiting medical treatment, clinic, medical and welfare facility, and many facility. The index used for analysis is the supply condition of medical and welfare facilities. Some medical, day care, short stay, and residential facilities are established in the islands with more than 1,000 people. Various kinds of medical and welfare facilities are established in the islands with more than 6,000 people. There are many non-supply-type islands (30%) and few many-facility-type islands (less than 10%) in the Seto inland sea.2) Atata island, a clinic-supply-type island, is small in area and population, and one clinic is established. Inhabitants must take a ferry to use the facilities on the mainland, because there are no hospitals where inhabitants can be admitted or welfare facilities. The facility is located along the coast of the central village.3) Yashiro island, a many-facility-type island, is large in area and population. There are 4 hospitals and 13 clinics, as well as 67 welfare services for the elderly. Medical and welfare facilities are complete on the island. The facilities tend to be located near the center of each old village. Medical and welfare facilities tend to be located along the coast of central villages in the Seto inland sea, but few islands have complete facilities. It is necessary to consider the method to allow the mainland and islands where many facilities are established to cooperate, because it is difficult to establish new facilities in areas with small populations.

Keywords: Islands; Welfare facility for the elderly; Medical facility; Location characteristics

1. Introduction

In many islands in Japan, depopulation by the outflow of mainly young people becomes serious, and aging society with child birth rate falling is predicted to advance in the future. Ministry of Health, Labor and Welfare is promoting the construction of “community general support system” by 2025. This system is housing, medical care, welfare, preventing and living support are provided integrally, so that the elderly can continue to live in a familiar area until they will die. However, this system depends on local situation and social resources. Therefore, it is an important issue to tackle solution of regional disparity in islands where social resource is short, such as health and

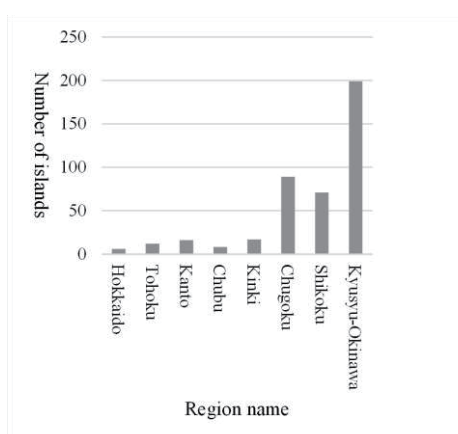
welfare services. There are 418

Fig.1.

The number of manned remote islands

manned

remote islands in Japan (fig.1), and the Kyusyu-Okinawa region has the most islands with 199 islands and the Chugoku and Shikoku regions have 160 islands. So, these islands occupy about



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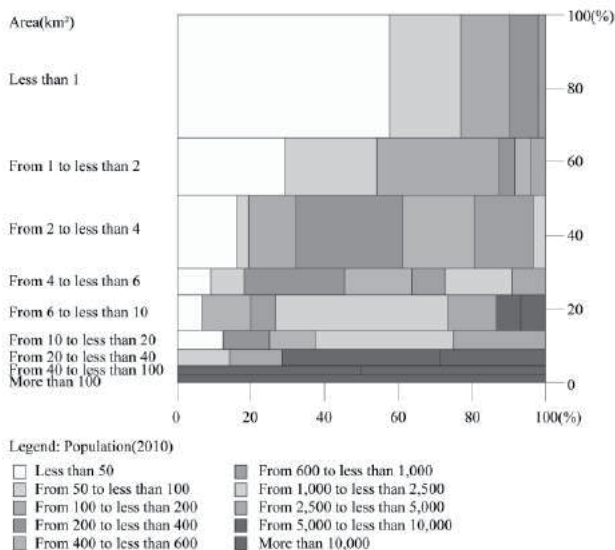


Fig.2. The relationship between area and population

80% in three regions.

In previous studies of the field of building and city planning, there are the research grasping the facility establishment, evaluation of supply level and consideration of optimal location plan⁽¹⁻⁴⁾, and clarifying the demand characteristics⁽⁵⁾. However, there are few studies considering supply level of welfare facilities for the elderly in the islands.

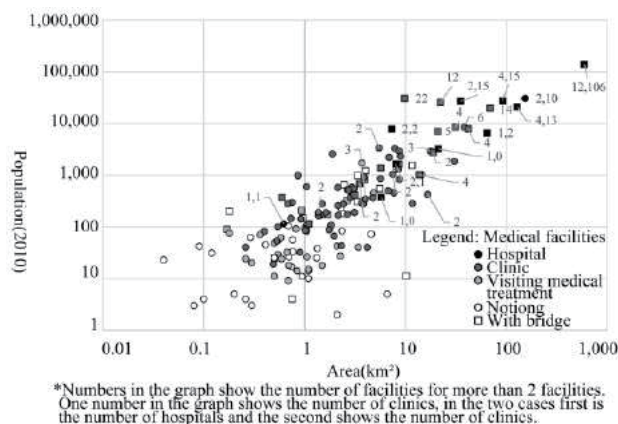
This paper aims to clarify the supply and location characteristics of medical and welfare facilities for the elderly in the Seto inland sea, which has the most islands in Japan, and consider the facility establishment method in the islands.

2. Methods

Firstly, we created the database about the area of manned remote islands in Japan, such as population, existence of a bridge, etc. the based on result of national census and remote island economic newspaper. And we analyzed the relationship between the population and the area. In addition, we collected the facility information in islands of the Seto inland sea, such as community general support centers, medical facilities and welfare facilities for the elderly the based on care service information publication system and the supply condition of medical and welfare facilities.

Secondly, we grasped the supply condition of the facilities in the typical example island by creating the maps of the area and location map of medical and welfare facilities for the elderly.

Thirdly, we classified the islands by the supply condition of medical and welfare facilities. And, we chose typical example islands and took a photo of the facilities because of clarifying the use situation of the medical and welfare facilities.



*Numbers in the graph show the number of facilities for more than 2 facilities. One number in the graph shows the number of clinics, in the two cases first is the number of hospitals and the second shows the number of clinics.

Fig.3. Distribution of medical facilities

3. The outline of the islands in the Seto inland sea

3.1. The distribution of manned remote islands

There are 155 manned remote islands in the Seto inland and these islands belong to Hyogo, Okayama, Hiroshima, Yamaguchi, Tokushima, Kagawa, Ehime, Fukuoka and Oita prefecture (fig.7). There are many islands belonging to Hiroshima and Ehime prefecture. The size of the island is various, but the number of small islands are many. There are Setouchi-shimanami sea expressway, Seto-ohashi bridge, Onaruto bridge and Akashi Kaikyo-ohashi bridge connecting Honshu and Shikoku. And the bridges pass through relatively large islands. Small islands tend to distribute around the large islands. Therefore, most of the large islands have a bridge between the mainland and the island, and many small islands don't have bridge.

3.2. Relationship between area and population

Figure 2 shows the relationship between the area and population. The islands with an area of less than 1 km² are the most with about 30%, and the islands with an area of less than 10 km² occupy about 80%. On the other hand, the islands with the area of more than 100 km² occupy only 2%. The islands with a population of less than 50 people are the most, and there are few islands having a large population. The islands with an area of less than 1 km² and a population of less than 50 people are the most. When the area of islands is more than 6 km², there are also the islands with a population of more than 10,000 people. The area of the islands is from less than 1 km² to more than 100 km², the population is from less than 50 people to more than 10,000 people, and the area and the population of the island are various. As the area becomes larger, the population is also increasing, so they have a correlation.

4. The supply condition of medical and welfare

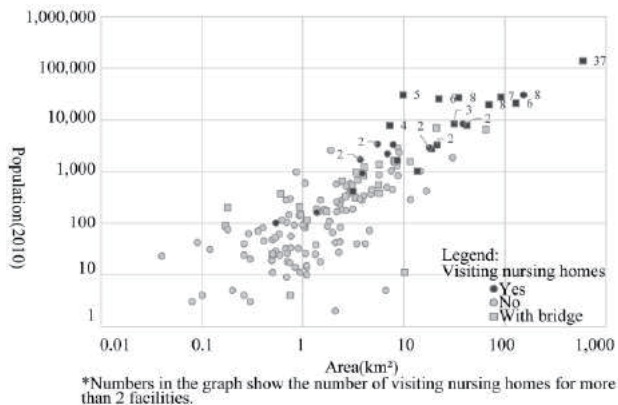


Fig.4. Distribution of visiting nursing homes

facilities

4.1. The supply condition of medical facilities

The distribution figure of the relationship between the area and population in islands of the Seto inland sea is used in order to analyze the relationship between the area, population and supply condition of the facility in islands. Figure 3 shows distribution of medical facilities. Hospitals are established in all 4 islands with an area of more than 100 km². On the other hand, hospitals are established in 7 islands, where the area is small with less than 100 km² but the population is the relatively large with about 10,000 people.

And, clinics are established in many islands with the population of more than 100 people. However, there are also some islands where clinics are not established in the islands with the population of more than 100 people and a bridge, because they can use the mainland medical facilities. On the other hand, clinics are established in also the islands with the population of less than 100 people and no bridge. Mobile medical ship is the ship going to the island and giving medical treatment. And, it goes to the islands with the population of more than 10 people and mainly goes to the islands where there is no medical facility and the population is small. In addition, it goes to the islands where there are no bridge and the residents can't go to the mainland medical facilities.

Almost islands have only one clinic, but more than 10 clinics are established in the island with the population of more than 10,000 people, and Awazi island where the population is more than 100,000 people has more than 100 clinics. Therefore, the establishment of hospitals is related to the area, and the clinic and mobile medical ship are related to the population and existence of a bridge.

4.2. The supply of welfare facilities for the elderly

Figure 4, 5 and 6 show distribution of visiting

nursing homes, day care facilities and special

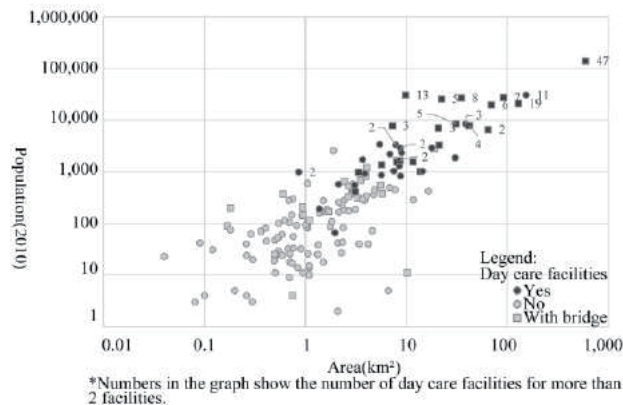


Fig.5. Distribution of day care facilities

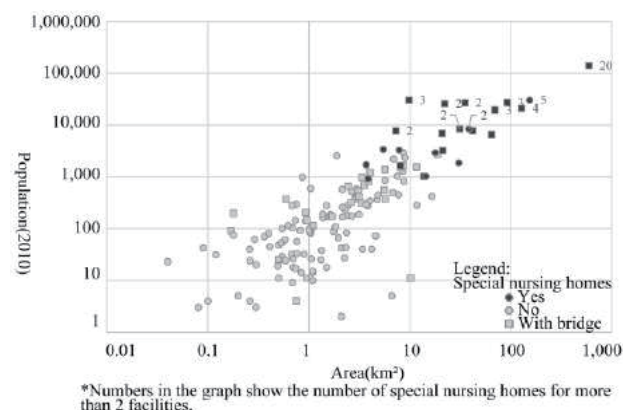


Fig.6. Distribution of special nursing homes

nursing homes. Most of these three kind of the facilities are established in the islands with the population of more than 1,000 people. The number of day care facilities is the most in the islands. Visiting nursing homes and special nursing homes are established more than two facilities in the islands with the population of more than 100,000 people, and day care facilities are established more than five facilities there. The number of the facilities in Awazi island is the most with more than 20 facilities. On the other hand, some islands with a bridge don't have the facilities, even if the population is more than 1,000 people. Therefore, welfare facilities for the elderly are mainly established in the islands with the population of more than 1,000 people, and it is related to existence of a bridge.

4.3. Types of facilities supply level

The islands are classified into five types by cluster analysis in order to grasp the supply condition of the medical and welfare facilities in each island. The data used for analysis is existence of each kind of medical and welfare facilities. Table 1 shows result of classification, and figure 7 shows distribution of the islands by type.

Non- supply-type is a type having no medical and welfare facilities and corresponds to 40 islands

clinic only and clinic + day care service type by supply condition of the facilities except for clinics.



Fig.7. Distribution of the islands by type

The area and population of the islands are relatively

Table 1. The facility supply level type result

Type name	Total number of islands	Visiting service	Day care service	Short stay service	Living service	Residential service	Community general support center	Community treatment	Visiting medical treatment	Clinic	Hospital	Average number of facilities	Average Area(km ²)	Population average	With bridge
Non-supply	40											0.03	1.8	150	10
Visiting medical treatment	27							●				1.0	1.2	93	4
Clinic	Clinic+visiting medical treatment	27						●	●			2.1	2.3	220	1
	Clinic only	19							●			1.3	2.9	484	5
Clinic +day care service	18	●	▲	▲	▲		▲		●			3.1	6.9	1,158	5
Medical and welfare facility	Welfare facility	11	▲	●	●	●	●	▲	▲	▲	▲	7.5	19.3	2,968	5
	Welfare facility +clinic	3	●	●	●	●	●	▲	▲	▲	▲	12.0	16.4	5,951	2
Many facility	Welfare facility +clinic	8	●	●	●	●	●	●	▲	▲	▲	15.1	56.4	21,826	6
	Welfare facility +clinic+hospital	2	●	●	●	●	●	●	●	●	●	20.0	360.4	78,515	2
The entire Seto inland sea	155											2.9	11.5	2,752	40

Legend: Facilities are established in the islands ●More than 80%, ▲From 20% to less than 80%

*Visiting medical treatment: Of the 9 prefectures, Okayama prefecture, Hiroshima prefecture, Yamaguchi prefecture Iwakuni city, Kagawa prefecture, Ehime prefecture only 5 prefectures, Population: 2010

(25%). The average area of the islands is 1.8 km², and the average population is small with about 150 people. And the islands without a bridge are the most with 75%. Mobile medical ship type is a type that a doctor is only temporarily stay using a mobile medical ship and corresponds to 27 islands. However, this collected data is incomplete, and we continue collecting this data still. The area and population of islands are the smallest, and almost islands of this type has no bridge (85%). So, it seems that the islands of this type have to depend on the mobile medical ship. And, many islands of this type distribute near the large islands with a bride.

Clinic-supply-type is a type that clinics are established and corresponds to 64 islands. And, this type is classified into clinic + mobile medical ship,

Table 2. The supply condition of the facilities in typical islands

Type name	Island name	Visiting service	Day care service	Short stay service	Living service	Residential service	Community general support center	Community treatment	Visiting medical treatment	Clinic	Hospital	The number of facilities	Area(km ²)	Population	With bridge
Non-supply	Kanawa island											0	1.1	107	No
Visiting medical treatment	I island								1			1	0.8	91	No
Clinic	Clinic+visiting medical treatment								1	1		2	2.7	174	No
	Clinic only									1		1	2.4	276	No
Clinic +day care service	Clinic									1		3	8.5	1,279	No
	+day care service														
Medical and welfare facility	Nao island	1	3	1	2	1	1	1	1	1	1	10	7.8	3,277	No
Many facility	Welfare facility	1	5	2	2	4	1	1	5			21	20.8	6,936	Yes
	Welfare facility +clinic	13	10	3	6	5	1	1	14			53	69.5	19,565	Yes
Many facility +clinic+hospital	Welfare facility +clinic	16	24	7	9	6	1		13	4	80	128.3	18,589	Yes	
	+clinic+hospital														

*Visiting medical treatment: Of the 9 prefectures, Okayama prefecture, Hiroshima prefecture, Yamaguchi prefecture Iwakuni city, Kagawa prefecture, Ehime prefecture only 5 prefectures, Population: 2010

small, and islands without a bridge are the most. However, it is a characteristic that the islands of clinic + day care service have a large population. And, many islands of this type distribute near the mainland of Okayama and Kagawa prefecture. Medical-and-welfare-facility-type is a type that more than one medical facilities, day care service, short stay service and residential service are established and corresponds to 11 islands. The area of the islands is relatively large, and the population of the islands is more than about 1,000 people, and many islands have a bridge. Many islands of this type distribute near the Shimanami Kaido bridge of Hiroshima and Ehime prefecture.

Many- facility-type is a type that the most medical and welfare facilities are established and

corresponds to 13 islands. The type is classified into welfare facility, welfare facility + clinic, welfare facility + clinic + hospital type by supply condition

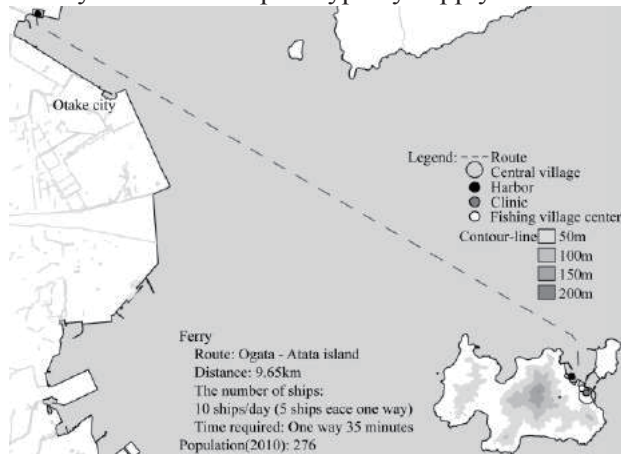


Fig.8. The location map of facilities in Atata island

of the medical facilities. The population of the islands is large with more than 6,000 people. Many islands of this type have a bridge, and the average number of the facilities is the largest with more than 10 facilities. As the area and population of the islands are larger, the number of facilities tends to increase. The islands of the type are located in the concentrate near the Setouchi-shimanami-kaido, Seto-ohashi, Onaruto-kyo and Akashi-kaikyo-ohashi bridge.

Therefore, small islands with less than 1,000 people are the most in Seto inland sea, and Non-supply-type corresponds to 40 islands out of 155 islands. And the islands having many medical and welfare facilities occupy less than 10%. In addition, the islands that clinics are established are the most in other facilities, but there are few islands that welfare facilities for the elderly are established.

5. Case analysis

We have chosen one island which is the nearest average number of the facilities, the area and the population as a typical case in each type. Table 2 shows supply condition of the facilities in typical islands. And, we chose Atata and Yashiro island for case analysis. Atata island is Clinic-supply-type with the largest number of the islands, and Yashiro island of many-facility-type is the island having a large number of facilities.

5.1. Atata island (Clinic-supply-type Clinic only)

Atata island is the island where the area is small with 2.4 km² and the population is small with 276 people (fig.8). And, about medical and welfare facilities, only clinic is established. In addition, there are a children's center, post office, fishing village center, gas station, store, and they located in

the concentrate near the port. The island doesn't have a bridge, and a method of transportation between this island and the mainland is only 10 liners in a day, and it takes 35 minutes.

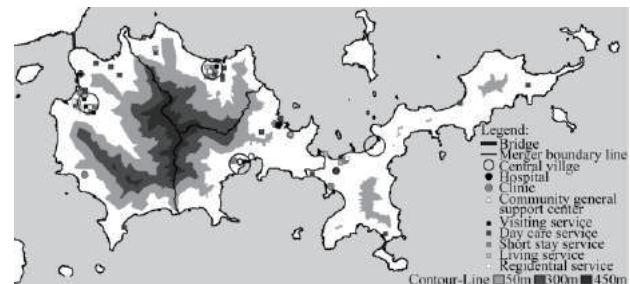


Fig.9. The location map of facilities in Yashiro island

The medical specialty of the clinic is internal medical and surgery only, and the patient can't be hospitalized in this clinic. Many residents go to the mainland hospital, because doctor's specialty is only orthopedic. In case of emergency, they can call a doctor helicopter, but they basically use an ocean taxi. Moreover, they cooperate so that it is possible to transport a sudden ill person by fishing ships of the residents. There are not welfare facilities for the elderly in the island, but they can use visiting nursing care services from the mainland. And, the residents can use a day care facility in the mainland, if transportation by their family is possible. Moreover, the elderly support activities are provided by the residents who are a former self-governing president and commissioned welfare volunteers. They are performed in the fishing village center instead of the public hall on weekends, and participants enjoy communication and tea time after physical exercise.

Therefore, the transportation time to the mainland is long, and residents can't be hospitalized and use welfare facilities for the elderly in the island. However, they make efforts such as cooperation in the case of emergency and the elderly support activities under the limited resources.

5.2. Yashiro island (Many-facility-type Welfare facility + clinic + hospital)

Yashiro island is located in Suo Oshima town, where the municipality is completed with only six islands. The area of the island is 128.31 km² and population is 18,589 people, and it is the largest island in Yamaguchi Prefecture (fig.10). The island has a bridge, so it is possible to go to and return from the mainland freely. Four hospitals and 13 clinics are established in Yashiro island and have many kind of medical specialty and a lot of beds. And, these facilities are located near the center village of the old 4 towns, and it is characteristics that many clinics are located near the hospitals.

67 services are provided in welfare facilities for the elderly. Many private sector corporations entered, and all services of visiting service, day care service, short stay service and residential service are provided. So, residents can choose the service freely. And, the residents can use services in each old town, because the special nursing homes and day care facilities are established in each district. In addition, community general support center that there are few in the island are established, and the welfare facilities for the elderly are full in Yashiro island.

Therefore, there are all kind of medical and welfare facilities in the coastal area and near the center village of each old town where the population concentrates, so the residents can use in each old town. And, the residents can use the day care facility near their house, because many facilities are established in throughout the island.

6. Results

1) The population has a big influence for facility supply. Some medical, day care, short stay, and residential facilities are established in the islands with more than 1,000 people. Various kinds of medical and welfare facilities are established in the islands with more than 6,000 people. And, the islands are classified into six types: non-supply, visiting medical treatment, visiting medical treatment and clinic, clinic, medical and welfare facility, and many facility. The index used for analysis is the supply condition of medical and welfare facilities for the elderly. There are many non-supply-type islands (30%) and few many-facility-type islands (less than 10%) in the Seto inland sea.

2) Atada island, a clinic-supply-type island, is small in area and population, and one clinic is established. Inhabitants must take a ferry to use the facilities on the mainland, because there are no hospitals where inhabitants can be admitted or welfare facilities. However, they make efforts such as cooperation in the case of emergency and the elderly support activities under the limited resources.

3) Yashiro island, a many-facility-type island, is large in area and population. There are 4 hospitals and 13 clinics, as well as 67 welfare services for the elderly. Medical and welfare facilities are complete on the island. The facilities tend to be located near the center of each old village.

Therefore, medical and welfare facilities tend to be located along the coast of central villages in the Seto inland sea, but few islands have complete facilities. There were also some islands that are supporting elderly support projects utilizing other public facilities in islands in which facilities are established. It is necessary to consider the method to support the elderly including corporation with the

mainland and islands where many facilities are established to cooperate from now on, because it is difficult to establish new facilities in areas with small populations. There is this issue in the islands of not only the Seto inland sea but also whole of Japan, so it is necessary to consider the method of support for the elderly according to the condition of each region.

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