



Posyandu Services with Service Area Method in Sukaramé District

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Abstract

Posyandu serves as a promotive and preventive health facility with initial health screening to detect disease risks and prevent certain diseases in the community, as well as to strengthen health monitoring in the local area. This research is based on the absence of analyses of posyandu services using Geographic Information Systems (GIS) with a service area method in Sukaramé District. The aim of this study is to assess posyandu services using the service area method and geographic information systems in Sukaramé District. The method used in this research is descriptive quantitative with a spatial approach and data analysis techniques in the form of overlay. The research results concerning the location and distribution of posyandu in Sukaramé District are spread across 6 sub-districts, with a total of 35 posyandu units; the posyandu in Sukaramé District are generally categorized as not meeting the posyandu criteria standards based on the threshold according to the SNI 03-1773-2004 regulation, with 17 posyandu categorized as undersupply in 4 sub districts and 2 posyandu categorized as oversupply in 2 sub districts. The service area of posyandu in Sukaramé District shows that the area served by posyandu is 5.81 km² (54.35%) of the total area, with 2.69 km² (25.16%) categorized as very accessible and 3.12 km² (29.19%) categorized as accessible. Meanwhile, the area that is not yet served by posyandu services covers 5.17 km² (45.65%).

Keywords: *Posyandu; Population; Service Area; Mapping; GIS*

Introduction

Health is one of the most important aspects of human life. Health is a state of well-being, physically, mentally, spiritually, and socially, that enables everyone to live more productively, both socially and economically (Ministry of Health of the Republic of Indonesia, 2009). All aspects of health are integrated into the Sustainable Development Goals (SDGs). The SDGs are global goals to develop all potential of the world's resources. The health sector is crucial for improvement because failing to implement point 3 of the SDGs could turn the demographic bonus into a demographic burden, and this condition can disrupt the achievement of sustainable development as outlined in the SDGs (Sipido and Nagyoya, 2020).

Successful health development includes quality health services, ensuring ease of access, and improving the quality of affordable health services. Access to health services is indicated by the increase in the number, network, and quality of health facilities (Chisillia & Muazansyah, 2018; Hutabalian, 2025). The

Indonesian Ministry of Health has taken steps to achieve this access, focusing on a 2025 health budget of IDR 187.5 trillion to transform the Indonesian health system. Health facilities are closely related to the provision of public health services, from primary to tertiary levels (Osiya, et al., 2017).

The transformation of primary services is one of the six pillars of the healthcare system transformation program, which focuses on achieving equitable healthcare (Bitton, et al., 2017; Vi'aqila El Tsana, et al., 2025). Services are inherent in our daily lives. The term "service" is often described as a situation in which others provide something for an action or deed. There are two actors involved: the service provider and the service recipient. According to the Dictionary of the Indonesian Language, service is defined as the way or effort made to meet the needs of others in exchange (for money). Essentially, service is a series of activities called a process. As a process, service occurs routinely and continuously, encompassing all aspects of human life at every level of society (Ostrom, et al., 2015). In its implementation, service can be measured so that standards can be established, both in terms of time and results (Moenir, 2001). The role of service is as a catalyst, accelerating the process according to what should be provided, thus becoming a crucial role of service in a work system or organizational activity.

This program will provide primary health services through community health centers (10,374 units) scattered across 7,277 sub districts throughout Indonesia. However, access to health services is still very limited to reach the communities spread over 75,265 villages and 8,498 sub districts (Ministry of Health, 2023). To expand the network of primary health services, integrated health services are needed at the village/sub district level that serve more actively not only infants and pregnant mothers but will also serve the entire life cycle of adolescents, adults, and the elderly in providing basic social health services to the community. The expansion of this primary health service facility network is carried out through Integrated Service Posts (Posyandu) (Endrawati et al., 2025).

Integrated Service Posts, hereinafter referred to as Posyandu, are a form of Community-Based Health Efforts managed and organized by, for, and with the community in the implementation of health development to empower the community in obtaining basic health service facilities to accelerate the reduction of maternal and infant mortality rates and to provide health services for the elderly (Martono et al., 2020). Posyandu, as one of the primary health service facilities in villages/sub districts, is very important as it serves as an extension of the community health center to facilitate access to health services down to the village/sub district level (Sudandi et al., 2023; Ministry of Health, 2023).

Posyandu serves as a promotional and preventive health facility with initial health screening to detect disease risks and prevent certain diseases present in the community, as well as strengthen health monitoring in local areas (Indriyati et al., 2023). The target of posyandu health services is intended for pregnant women, postpartum mothers, breastfeeding mothers, preschool children (0-6 years), school age children, adolescents (>6-18 years), adults (>18-59 years), and the elderly (≥60 years). Monitoring community health services based on the life cycle through posyandu has proven to help the government achieve a better level of community health located in villages/sub districts (Ministry of Health, 2023).

Location is one of the aspects that needs to be considered because it is closely related to the accessibility of posyandu in providing basic services to the community (Permata & Darubekti, 2023). The importance of determining the location of posyandu aligns with Christaller's central place theory, where in determining the location of facilities there are two basic concepts that need to be taken into account, namely (Utami, 2022): 1. Range of goods or services, the maximum average distance that residents travel to obtain certain goods or services, and 2. Threshold, the minimum population (number of residents) required to establish the provision of a certain product or service. Two concepts for determining the location of healthcare facilities to provide access to basic healthcare services in the form of posyandu for areas with a high population and density, one of which is the city of Bandar Lampung.

Bandar Lampung city, which is the capital of Lampung Province, has a population of 1,209,937 people in 2023 (BPS Bandar Lampung City, 2023). One of the sub districts in Bandar Lampung with a high population is Sukarama District. In 2023, according to BPS (2023), the population of Sukarama District is 67,138 people, with a density of 6,280 people/km². The location of Sukarama District, which is on the outskirts of Bandar Lampung (sub urban), along with its high population density, increases the demand for basic health services. Efforts to meet health needs can be made by adjusting the number of posyandu (integrated health posts) to the population and service area.

The determination of the location of posyandu described in Christaller's central place theory states that threshold and range are two basic concepts that must be taken into account (Utami, 2022). Regarding the determination of the locations of supporting facilities, the Indonesian government has regulations that govern the planning of the locations of supporting facilities such as posyandu in the environment according to these two concepts. The regulation governing the planning of public service facility locations, including posyandu, is the Indonesian National Standard (SNI) 03-1733-2004 concerning urban environmental planning procedures.

SNI Regulation 03-1733-2004 is a guideline that serves as a reference framework for planning, designing, cost estimation, and spatial needs in urban residential areas. Based on SNI 03-1733-2004, the required population (threshold) to build a posyandu in a village/city environment is 1,250 people, or in other words, one posyandu is capable of meeting the health needs of 1,250 members of the community. Meanwhile, the service area radius of one posyandu in a village/city environment is 500 m² (range). To achieve equitable posyandu services, two basic concepts of location theory need to be implemented in the determination of posyandu locations.

These two basic concepts are not easy to implement. The issue of the location of the posyandu that does not consider these two concepts results in problems such as the absence of information on the location points and distribution of posyandu. The problems related to the location of the posyandu affect the frequency of visits of toddlers and the elderly to the posyandu because of the long distance from the mothers' and elderly people's homes to the posyandu location, and the lack of transportation available to take them to the location, which becomes a reason for mothers to be less active in bringing their toddlers to the posyandu (Khrisna and Amalia, 2020). The lack of location information related to posyandu in Sukarama District will create uncertainties, such as how many posyandu should be present and distributed in each sub district of Sukarama based on the population and also concerning the service coverage area of each posyandu.

Mapping in a spatial format based on Geographic Information Systems (GIS) is necessary to provide information related to the location of posyandu (integrated health posts) in the Sukarama District. Geographic Information Systems (GIS) is an information system based on spatial data that can represent objects on the earth's surface (Budiman and Cahyono, 2017). In this research, the appropriate type of spatial analysis to be used is geoprocessing analysis in the form of overlay and network analyst. Overlay can be used to present data and information related to the point locations of posyandu, which can then be used as a basis for determining the number of posyandu that should exist if adjusted according to the population. Furthermore, network analysis is a spatial analytical method based on networks, including route analysis, travel directions, nearest facilities, and service areas, as well as identifying areas that have not been reached by posyandu (Adilang et al., 2022).

Based on the background above, to determine the location of posyandu and the issues regarding the number of posyandu that should exist, it is necessary to look at the population and the service area of posyandu in Sukarama District, referring to SNI 03-1733-2004 regulations on the procedures for urban environmental planning. Therefore, research related to this matter needs to be conducted. The goal of this research is to present information on the distribution of posyandu locations and the number of posyandu as well as the service area (service area analyst) of the posyandu that exist in Sukarama District.

Research Method

The research method used is descriptive quantitative method. Quantitative research method is a research method used to study a certain population or sample, collect data using research instruments, and analyze data quantitatively (Sugiyono, 2013). Meanwhile, descriptive research is research conducted to describe the values of each variable, whether one variable or more in its independent nature without making relationships or comparisons with other variables (Sujarweni, 2019). The descriptive quantitative research method is conducted to analyze the coverage of services from posyandu in Sukaramé District using overlay and network analyst methods, which will eventually result in the service area with reference to the threshold and range that should exist in Sukaramé District in 2025.

Research Variables and Operational Definitions of Variables

Research variables are attributes, characteristics, or values of individuals, objects, or activities that exhibit certain variations determined by the researcher to be studied, in order to obtain information about those aspects, and subsequently draw conclusions (Sugiyono, 2019). This research consists of one variable, namely the services of posyandu (integrated health services) located in Sukaramé District, totaling 35 posyandu units. Furthermore, the reference criteria used as indicators in this study are the locations of posyandu and the concept of reference criteria from Central Place Theory, namely population (threshold) and distance (range). Based on the existing background, two concepts have been mentioned as references in determining the location of the posyandu, namely threshold and range as indicators. The operational definitions of the variables in this research will be presented as follows.

Table 1. Operational Definitions of Variables

Variable	Definition of Operational	Indicators
Posyandu Service	Community based posyandu health services are analyzed using the criteria of location, threshold, and range.	Location and distribution of posyandu will be analyzed spatially through plotting. Threshold standard population criteria required for one posyandu in the sub district of Sukaramé according to SNI 03-1733-2004 regulations, which is 1.250 population. The service range of each posyandu in Sukaramé Sub district is in accordance with the SNI 03-1733-2004 regulations, which is 500 m ²

Source: Processed Data Results of Research Variables, 2025.

The following is the classification of posyandu analysis based on threshold and range criteria.

Table 2. Standard Criteria for Posyandu Based on Threshold

Number of Posyandu	Category	Description
$\geq$ Standard Amount	Oversupply	The standard number of posyandu is said to meet the criteria if the existing posyandu matches the population and the other way around.
According to the Standard Quantity	Ideal	
$\leq$ Standard Amount	Undersupply	

Source: Utami, 2022.

Table 3. Standard Criteria for Posyandu Based on Range

Number of Posyandu	Category	Description
0 – 300 m ²	Very Affordable	The closer the distance to posyandu, the higher the affordability of the posyandu.
300 – 500 m ²	Affordable	
> 500 m ²	Unaffordable	

Source: SNI 03-1733-2004.

Data Collection Techniques

The data collection technique is the most important step in research, as the main goal of research is to obtain data. Without knowing the data collection techniques, researchers will not obtain data that meets the established data standards (Sugiyono, 2019). The data collection techniques used in this research are as follows:

1. Field Survey

A survey is a data collection technique through direct measurement in the field to gather information for the research. In this study, a survey was conducted to find and verify the data on the survey location in this research by plotting the locations of each posyandu in the Sukaramé District using GPS Essentials to create a map of the distribution of posyandu locations.

2. Documentation

Documentation is a way of collecting data by recording existing data (Sugiono, 2019). Additionally, the data collection technique using documentation can be interpreted as a process of obtaining data through documents. The documents used in this research come from several publications/documents from relevant agencies such as: a. Ina geoportal; b. The Department of Housing and Settlements of Bandar Lampung City; and c. Sukaramé Sub district and Bandar Lampung City in Numbers 2022.

3. Interviews

An interview is a question and answer activity to obtain information. Interviews can be conducted in a structured or unstructured manner (Nurbaiti and Napitupulu, 2020). In this research, interviews are used to determine the impact of the service area of posyandu in Sukaramé Sub district.

Data Analysis

Data analysis techniques are a process of searching and organizing data systematically obtained from observation and documentation. This process is carried out with the aim of making the characteristics of the data easier to understand and useful as a solution to a problem, especially those related to research. This study uses descriptive data analysis with simple statistical analysis techniques. The method of descriptive analysis in this study is conducted to analyze the research object through explanations, both for measurable and non measurable analyses. In this study, there is a type of data that will be described, namely spatial analysis data using service area technique.

Result and Discussion

Research Results

The research results of Bandar Lampung City show that it has 20 sub districts, one of which is Sukarame Sub district. Initially, Sukarame Sub district was part of the Kedaton Sub district area in South Lampung Regency. Due to the large area and rapid population growth, Sukarame Sub district was established with 5 urban villages through Regional Regulation Number 4 of 2001, consisting of 3 old villages and 2 new villages. Sukarame Sub district underwent another territorial expansion in accordance with Bandar Lampung City Regional Regulation Number 04 of 2012 concerning the Arrangement and Formation of Urban Villages and Sub districts, and Bandar Lampung City Regional Regulation Number 12 of 2012 concerning Amendments to Regional Regulation Number 4 of 2012 concerning the Arrangement and Formation of Urban Villages and Sub districts issued by the Mayor.

In accordance with the local regulations, Sukarame District is composed of 6 urban villages consisting of 3 former urban villages that have been expanded, namely: a. Sukarame Urban Village; b. Sukarame Baru Urban Village; c. Way Dadi Urban Village; d. Way Dadi Baru Urban Village; e. Korpri Jaya Urban Village; and f. Korpri Raya Urban Village. Sukarame District is located in the East of Bandar Lampung City. In the spatial planning division of Bandar Lampung City, Sukarame District is included in planning area along with 3 other districts, namely Tanjung Seneng District, Labuhan Ratu District, and Sukarame District.

Sukarame Sub district, based on the Regional Regulation of Bandar Lampung City Number 04 of 2012, concerning the Arrangement and Formation of Villages and Sub districts, has the following geographical location and administrative boundaries: to the North: South Lampung Regency to the South: Sukabumi Sub district to the East: South Lampung Regency to the West: Way Halim Sub district and Kedamaian Sub district. Administratively, Sukarame Sub district consists of 6 villages. In total, Sukarame Sub district consists of 12 neighborhoods and 122 neighborhood units. The following is the number of Villages, Neighborhoods and Neighborhood Units according to the Villages in Sukarame Sub district.

Table 4. Number of villages, Neighborhoods, and Community units in Sukarame Sub District 2025

No	Sub District	Neighborhood	Neighborhood Association
1	Sukarame	2	34
2	Way Dadi	2	15
3	Korpri Jaya	2	14
4	Way Dadi Baru	2	23
5	Korpri Raya	2	19
6	Sukarame Baru	2	17
Total		12	122

Source: Sukarame Sub district BPS Bandar Lampung City, 2025

Table 4 shows that the total area of Sukarame District is 10.49 km² or 5.94% of the area of Bandar Lampung City. Sukarame Village has the largest area of 2.66 km², representing approximately 24.92% of the total area. Meanwhile, the smallest area is Way Dadi Village with an area of 1.44 km² or 9.77% of the total area of Sukarame District (Sukarame District in Numbers, 2025). For a more detailed view, the area of Sukarame District can be seen in the following table.

Table 5. Area of Villages in Sukaramé Sub District 2025

No	Sub District	Total Area (km ²)
1	Sukaramé	2,96
2	Way Dadi	1,96
3	Korpri Jaya	1,04
4	Way Dadi Baru	1,53
5	Korpri Raya	1,23
6	Sukaramé Baru	2,24
Total		10,96

Source: Sukaramé Sub district in Figures 2025, BPS Bandar Lampung City.

Table 5 shows that the population in Sukaramé District in 2025 is recorded at 67,138 people, which is 6.10 percent of the total population in Bandar Lampung City. From the total population spread across 6 urban villages, the number of male residents is 33,928, while the number of female residents is 33,210. The following is the population in Sukaramé District as shown in the table below.

Table 6. Population of Sukaramé District 2025

No	Kelurahan	Number of Population		
		Man	Female	Total
1	Sukaramé	11.316	11.143	22.459
2	Way Dadi	6.321	6.056	12.377
3	Korpri Jaya	2.971	2.852	5.823
4	Way Dadi Baru	4.668	4.627	9.295
5	Korpri Raya	4.510	4.521	9.031
6	Sukaramé Baru	4.142	4.011	8.153
Total		33.928	33.210	67.138

Source: Sukaramé Sub district in Figures 2025, BPS Bandar Lampung City.

Table 6 shows that Sukaramé village has the largest population in Sukaramé district, which is 22,459 people. Meanwhile, the village with the smallest population in Sukaramé district is Korpri Jaya village, with a population of 5,823 people. Then, the composition of the population based on gender is recorded as 50.53 percent male and 49.47 percent female, with a sex ratio of 102.16, which means that the number of males is higher than the number of females.

In addition to the aspect of population size, another aspect considered in demographic conditions is population density. Population density is a measure of the distribution of the population that shows the number of people per square kilometer of land area (BPS, 2023). The population density in Sukaramé Sub district, based on the calculation of the population divided by the area, is 6,280 people per km², which means there are 6,280 people in every 1 km². The highest population density in Sukaramé Sub district is in Way Dadi Village, at 11,848 people per km². Meanwhile, the lowest population density in Sukaramé Sub district is in Sukaramé Baru Village, at 3,114 people per km². Below is a table of population density in Sukaramé Sub district.

Table 7. Population Density of Sukaramé District Year 2025

No	Sub District	Population Density	Total (km ²)
1	Sukaramé	8.434	2,66
2	Way Dadi	11.848	1,04
3	Korpri Jaya	4.254	1,37
4	Way Dadi Baru	5.640	1,65
5	Korpri Raya	6.717	1,34
6	Sukaramé Baru	3.114	2,62
Total		6.282	10,69

Source: Sukaramé Sub district in Figures 2025, BPS Bandar Lampung City.

Table 7 shows that the population density in Sukaramé District can be classified into several classes through the following class calculations: Determination of Population Density Range

$$R = \frac{\text{maximum} - \text{minimum}}{3}$$

$$R = \frac{\text{highest population density} - \text{lowest population density}}{3}$$

$$R = \frac{11.848 - 3.114}{3}$$

$$R = 2.911 \text{ people/km}^2$$

The calculation results show that the population density range in Sukaramé District is 2,911 people/km². The classification details are as follows: a. Population of 3,114-6,025 people/km² is classified as sparse; b. Population of 6,025-8,936 people/km² is classified as moderate; and c. Population of 8,936-11,848 people/km² is classified as dense. The sub districts categorized as having sparse population density are Korpri Jaya, Sukaramé Baru, and Way Dadi Baru. The sub districts categorized as having moderate population density are Sukaramé and Korpri Raya, while the sub district with high population density is Way Dadi. Way Dadi is the narrowest area but has the highest population density. This is because Way Dadi is closer to the city center and near the Way Halim District, which also has high population density, making it easier for residents to enter and exit the area.

The population condition in Sukaramé District directly affects the number of settlements in Sukaramé District. Settlements can be seen as a representation of the demand for accessing public facilities. This is related to the population as a demand component in public facilities and public facilities as a supply component. If we look at its distribution, settlements in Sukaramé District are often established close to activity centers and public facilities. Therefore, settlements in Sukaramé District have a clustered pattern.

1. Location and Distribution of Posyandu in Sukaramé District, Bandar Lampung City

The location and distribution points of posyandu in Sukaramé District are identified using the GPS Essential application accessed via a smartphone. The steps to determine the coordinates of the posyandu are as follows: 1. Open the GPS Essential application until the home menu is displayed; 2. Next, select the waypoints option to display the location coordinates; 3. If waypoints have been clicked, click the plus sign in the bottom right corner; 4. After the add elements appear, select way points by adding a name, symbol, and description of the place. Wait until the satellite reaches maximum, then click create; and 5. After that, the coordinates of the location will be displayed in the waypoints option. (the projection system can be adjusted).

Table 8. UTM Coordinate Points of Posyandu in Sukaramé District year 2025

No	Posyandu Name	X	Y	Sub District
1	Posyandu Aster	531472	9405742	Way Dadi Baru
2	Posyandu Dahlia	532083	9405647	
3	Posyandu Sidomuncul	532120	9405928	
4	Posyandu Kenanga	531198	9406112	Sukaramé
5	Posyandu Mawar 1	533072	9403943	
6	Posyandu Mawar Merah	532370	9404096	
7	Posyandu Nusa Indah	533020	9404256	
8	Posyandu Anggrek Griya	534061	9404209	
9	Posyandu Bougenville	533764	9404351	
10	Posyandu Mawar Merah 2	533580	9404306	
11	Posyandu Cempaka	533579	9404158	
12	Posyandu Mawar 3	533639	9404208	

No	Posyandu Name	X	Y	Sub District
13	Posyandu Mekar Sari	534096	9403764	Way Dadi
14	Posyandu Melati Sukarame	532019	9404811	
15	Posyandu Kenanga	532861	9404514	
16	Posyandu Melati Waydadi	532950	9404859	
17	Posyandu Melur 2	532777	9405277	
18	Posyandu Kemuning	532215	9405126	Korpri Raya
19	Posyandu Melur 1	532574	9405382	
20	Posyandu Delima 1	533643	9406688	
21	Posyandu Delima 2	532994	9406778	
22	Posyandu Delima 3	533697	9406765	
23	Posyandu Delima 4	533180	9407053	Korpri Jaya
24	Posyandu Sakura 1	534040	9406369	
25	Posyandu Sakura 2	533791	9405888	
26	Posyandu Manggis	533852	9406286	
27	Posyandu Matahari	533235	9405547	
28	Posyandu Nusa Indah	533873	9406986	Sukarame Baru
29	Posyandu Kasih Ibu	534711	9404427	
30	Posyandu Teratai	534205	9404344	
31	Posyandu Aster Kuning	533605	9404449	
32	Posyandu Betik Hati	534856	9404865	
33	Posyandu Bahtera Indah	534833	9404216	
34	Posyandu Permata Hati	534532	9404565	
35	Posyandu Mekar Sari	535101	9404025	

Source: Research Results, 2025.

Table 8 shows that Sukarame District has a total of 35 posyandu (integrated health posts) spread across 6 villages. Way Dadi village has the highest number of posyandu in Sukarame District with a total of 11 posyandu, while the remaining 24 posyandu are distributed across 5 other villages: Way Dadi with a total of 4 posyandu, Korpri Jaya with a total of 5 posyandu, Way Dadi Baru with a total of posyandu, Korpri Raya with a total of 4 posyandu, and Sukarame Baru with a total of 7 posyandu. Information about the location points and distribution of posyandu will be easier to read if presented in the form of a map. The distribution map can depict the posyandu locations in more detail in spatial aspects, providing better visual readability compared to the table. Additionally, it allows for the determination of the distance between posyandu and other posyandu, whether they are close together or far apart.

The creation of a mapping distribution of posyandu was done by entering the coordinates of posyandu into Microsoft Excel with a table containing the name of the posyandu along with X and Y coordinates saved in (.xls) format. The purpose of entering data into Excel is so that the data can be processed using ArcGIS software. The process using ArcGIS software is carried out by overlaying (superimposing) the administrative map of Sukarame District and the posyandu coordinate points to determine the distribution locations of posyandu per village in Sukarame District. Below is the map of the locations and distribution of posyandu in Sukarame District, Bandar Lampung City.

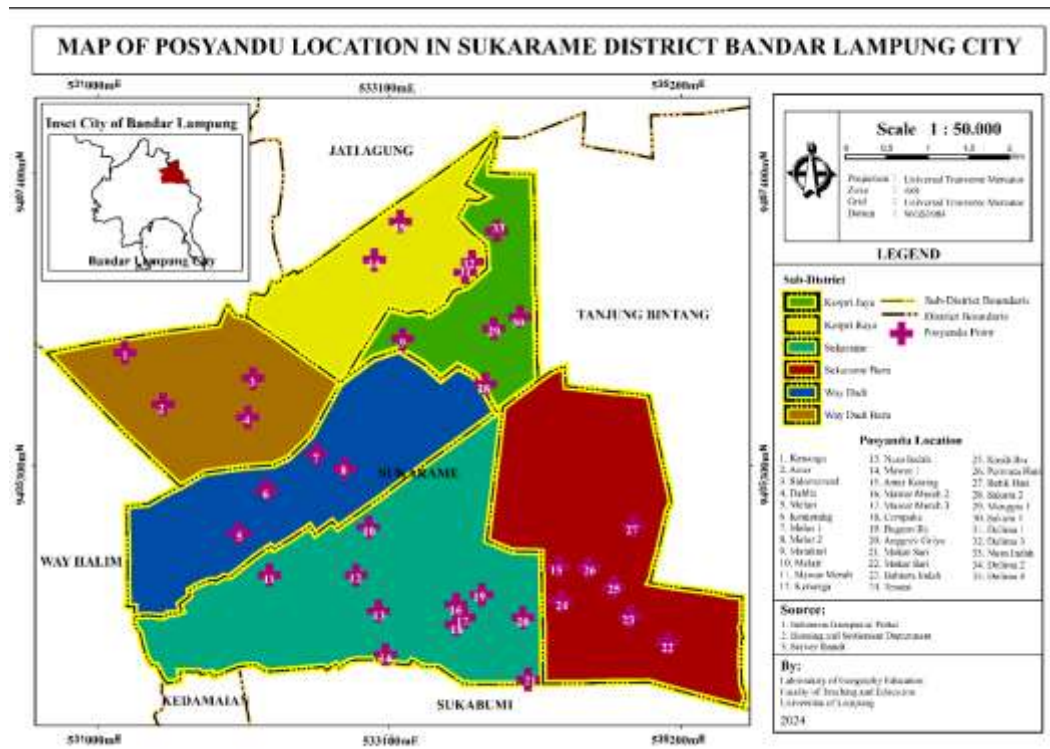


Figure 1. Map of Posyandu Points in Sukaramé District Year 2025

2. Suitability of the Standard Criteria for the Number of Posyandu Based on Threshold in Sukaramé District, Bandar Lampung City

The determination of the standard criteria for the appropriate number of posyandu in Sukaramé District is carried out using the threshold indicator (population). The number of available posyandu should be accessible to all residents in Sukaramé District. Therefore, according to Christaller's criteria (Utami, 2022) in central place theory, there is a minimum threshold which is the supportive population for the establishment of a facility. The threshold standard according to the SNI 03-1733-2004 regulation on urban environmental planning procedures for one posyandu unit is 1,250 residents. This supportive population is the minimum requirement for establishing one posyandu. If the population exceeds this threshold, a new posyandu should be established to make health services more effective.

The population in Sukaramé District, which totals 67,138 residents, can calculate the standard criteria for the number of posyandu using the following formula:

$$JP = JP/JPP$$

Explanation:

JP = number of posyandu

JP = population

JPP = supporting population

The results of this calculation will serve as the basis for determining the standard criteria for the number of posyandu that should exist in Sukaramé District based on the threshold. By determining the standard needs for the number of posyandu, it will be known whether the population needs in Sukaramé

District for posyandu facilities are met or not. The standard number of posyandu from this calculation is then classified as follows: 1. Oversupply, which is a condition where the need for posyandu exceeds the standard number required, resulting in posyandu that are not maximally utilized; 2. Undersupply, which is a condition where the need for posyandu is less than the required standard number, resulting in residents who are not reached by posyandu; and 3. Balanced, which is a condition where the number of posyandu matches the required standard number, ensuring that the existing facilities are utilized and all communities can access these facilities.

The standard number of posyandu from this calculation is then classified as follows: 1. Oversupply, which is a condition where the need for posyandu exceeds the standard number required, resulting in posyandu that are not fully utilized; 2. Undersupply, which is a condition where the need for posyandu is less than the standard number required, resulting in a portion of the population not being served by posyandu; and 3. Balanced, which is a condition where the number of posyandu corresponds to the standard number required, so that the existing facilities are utilized and all communities can be reached by these facilities.

The Posyandu in Sukarama District, if viewed from the threshold standard criteria, has 2 sub districts, namely Korpri Jaya Village and Sukarama Baru Village, which are classified as oversupply with 1 posyandu each. Meanwhile, the areas classified as undersupply based on the threshold standard criteria have 4 villages: Sukarama Village, Way Dadi Village, Way Dadi Baru Village, and Korpri Raya Village, totaling 17 posyandu. In conclusion, the posyandu in Sukarama District does not meet the standard criteria based on the threshold, with 17 posyandu undersupply in Sukarama Village, Way Dadi Village, Way Dadi Baru Village, and Korpri Raya Village, and 2 posyandu oversupply in 2 villages namely Korpri Jaya Village and Sukarama Baru Village.

3. Service Area (Service Area Analyst) of Posyandu in Sukarama District

The concept of range (service area) proposed by Christaller (1955; Utami, 2022) is defined as the range of goods or services, which is the maximum distance residents travel to access certain public facilities. The distance in this study uses network analysis, namely service area, which analyzes the closest and maximum distance according to road networks, thus calculating the distance residents must travel to reach the posyandu service facilities. The service standards for posyandu based on range are explained in the SNI 03-1733-2004 regulation regarding urban environmental planning procedures, stating that the maximum service area distance of each posyandu is 500 m² from the posyandu to the residents or residential settlements around it. However, in practice, the implementation of regulations regarding distance based posyandu services has not been fully applied in posyandu in Sukarama District.

Table 9. Coverage Area of Posyandu in Sukarama District Year 2025.

No	Sub-District	Total Area (km ²)	Service Area Posyandu					
			Very Affordable		Affordable		Unaffordable	
			(0-300 m ²)		(300-500 m ²)		(> 1500 m ²)	
			Area (km ²)	(%)	Area (km ²)	(%)	Area (km ²)	(%)
1	Sukarama	2,96	0,78	26,35	0,93	31,41	1,25	42,24
2	Way Dadi	1,96	0,45	22,95	0,36	18,36	1,15	58,69
3	Korpri Jaya	1,04	0,34	32,69	0,31	29,8	0,39	37,51
4	Way Dadi Baru	1,53	0,45	29,41	0,21	13,72	0,87	56,87
5	Korpri Raya	1,23	0,24	19,51	0,4	32,52	0,59	47,97
6	Sukarama Baru	2,24	0,43	19,19	0,89	39,73	0,92	41,08
Total		10,69	2,69	25,16	3,12	29,19	5,17	45,65

Source: Research Results, 2025.

Table 9 show that the service area of the integrated health post (posyandu) based on the SNI 03-1733- 2004 regulation is categorized as follows: a. An area of 0-300 m², a posyandu location that is categorized as very accessible to residents and residential settlements; b. An area of 300-500 m², a posyandu location that is categorized as accessible to residents and residential settlements; and c. An area of > 500 m², a posyandu location that is categorized as not accessible to residents and residential settlements.

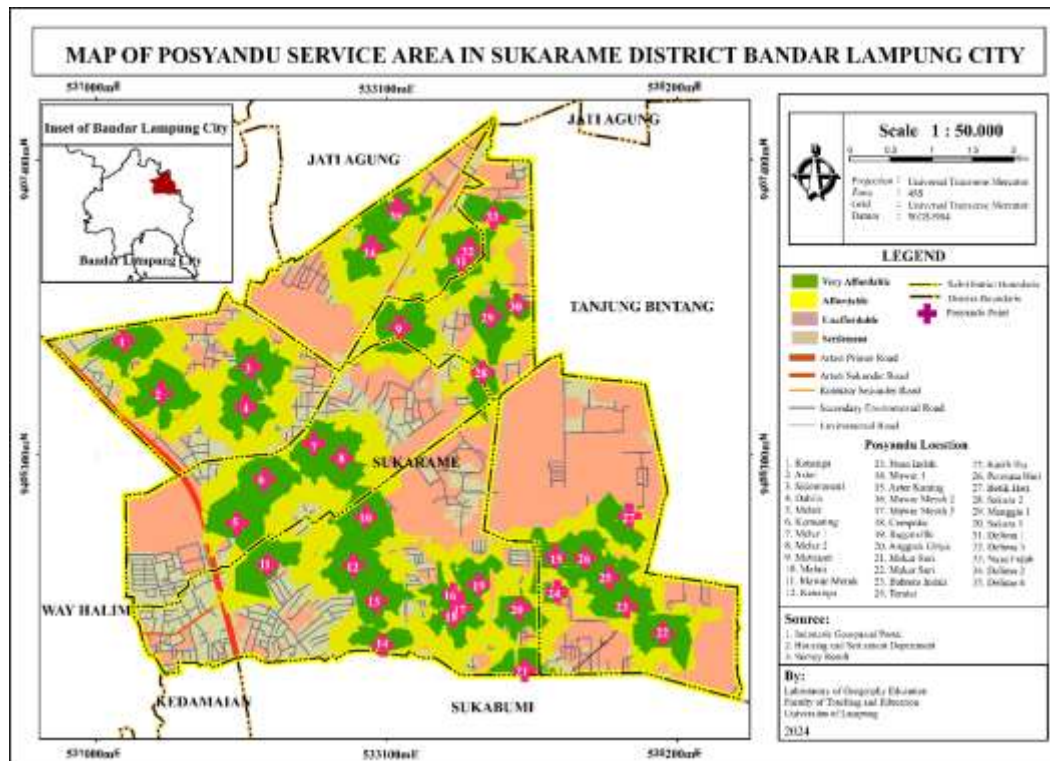


Figure 2. Service Area Map of Posyandu in Sukaramé District Year 2025

Based on the map and table, the sub districts in Sukaramé District do not all have coverage areas for posyandu (integrated health service posts). The sub district with the highest posyandu service coverage area is Korpri Raya Sub district, which has 5 posyandu scattered throughout its residential area. Meanwhile, the sub district with the lowest posyandu service coverage area is Sukaramé Sub district, which has the largest area in Sukaramé District. The following explains the posyandu service area for each sub district in Sukaramé District:

1. Sukaramé Sub district has a total area of 2.96 km². According to the table, 0.78 km² (26.35%) of the area in Sukaramé Sub district falls within the very accessible area (0-300 m²) for posyandu services. Then, 0.93 km² (31.41%) of the area in Sukaramé Sub district falls within the accessible area (300-500 m²) for posyandu services. The remaining area, 1.25 km² (42.24%) in Sukaramé Sub district, falls within the inaccessible area (>500 m²) for posyandu services;
2. Way Dadi Village has a total area of 1.96 km². Based on the table, 0.45 km² (22.95%) of the area in Way Dadi Village is classified as very accessible area (0-300 m²) for posyandu services. Subsequently, 0.36 km² (18.36%) of the area in Way Dadi Village falls into the accessible area (300-500 m²) for posyandu services. The remaining 1.15 km² (58.69%) of the area in Way Dadi Village is classified as inaccessible (>500 m²) for posyandu services;
3. Korpri Jaya Village has a total area of 1.04 km². Based on the table, 0.34 km² (32.69%) of the area in Korpri Jaya Village is classified as very accessible area (0-300 m²) for posyandu services. Subsequently, 0.31 km² (29.80%) of the area in Korpri Jaya Village falls into the accessible area

- (300-500 m²) for posyandu services. The remaining 0.39 km² (37.51%) of the area in Sukarame Village is classified as inaccessible (>500 m²) for posyandu services;
4. The Way Dadi Baru sub district has a total area of 1.53 km². According to the table, 0.45 km² (22.95%) of the area in Way Dadi Baru sub district falls into the very accessible area (0-300 m²) for posyandu services. Then, 0.21 km² (13.72%) of the area in Way Dadi Baru sub district falls into the accessible area (300-500 m²) for posyandu services. The remaining 0.87 km² (56.87%) of the area in Sukarame sub district falls into the inaccessible area (>500 m²) for posyandu services;
 5. The Korpri Raya sub district has a total area of 1.23 km². According to the table, 0.24 km² (19.51%) of the area in Sukarame sub district falls into the very accessible area (0-300 m²) for posyandu services. Then, 0.40 km² (32.52%) of the area in Korpri Raya sub district falls into the accessible area (300-500 m²) for posyandu services. The remaining 0.59 km² (47.97%) of the area in Korpri Raya sub district falls into the inaccessible area (>500 m²) for posyandu services;
 6. Sukarame Baru village has a total area of 2.24 km². Based on the table, 0.43 km² (19.19%) of the area in Sukarame Baru village is classified as very accessible (0-300 m²) for posyandu services. Then, 0.89 km² (39.73%) of the area in Sukarame Baru village is classified as accessible (300-500 m²) for posyandu services. The remaining 0.92 km² (41.08%) of the area in Sukarame Baru village is classified as inaccessible (>500 m²) for posyandu services.

The area of Sukarame sub district that is not covered by posyandu services according to the SNI 03-1733-2004 regulation is 5.17 km² (45.65%) of the total area of Sukarame sub district. Meanwhile, 5.29 km² (54.35%) of the total area of Sukarame sub district is within the reach of posyandu services, with details of 2.69 km² (25.16%) of the area or settlement categorized as very accessible, and 3.12 km² (29.19%) of the area or settlement categorized as accessible.

Discussion

1. Location and Distribution of Posyandu in Sukarame District, Bandar Lampung City

Posyandu (Integrated Health Service Post) plays an important role in ensuring accessibility to basic health services for the community, especially pregnant women, infants, and the elderly. Mapping the location of Posyandu using Geographic Information Systems (GIS) can identify the distribution of Posyandu and provide spatial information. From the research findings, it is known that there are 35 Posyandu located in Sukarame District, which are spread across 6 sub districts. The locations of these Posyandu are situated in the midst of the community, mostly located near the residences of Posyandu cadres. In terms of the location of Posyandu, it is also noted that 34 Posyandu are located on neighborhood roads, making it easier for residents to access Posyandu on foot.

However, one of the Posyandu, namely Posyandu Mawar Merah, is located too close to the secondary collector road, posing a challenge for residents living across from the Posyandu, as they have to cross the road whenever they want to access the Posyandu facilities. The location of the Posyandu near the main road does not comply with SNI 03-1733-2004 regarding planning procedures for residential environments in urban areas. One of the criteria for Posyandu locations is that they should be situated in the midst of residential areas and should not cross the main road. This aims to ensure that the location facilitates access for residents, particularly children and the elderly, as the research by Ilham (2025) shows that the accessibility of the location is a factor that affects the attendance of the elderly due to mobility limitations.

The Posyandu in Sukarame District, if viewed from the threshold standard criteria, has 2 sub districts, namely Korpri Jaya Village and Sukarame Baru Village, which are classified as oversupply with 1 posyandu each. Meanwhile, the areas classified as undersupply based on the threshold standard criteria have 4 villages: Sukarame Village, Way Dadi Village, Way Dadi Baru Village, and Korpi Raya Village, totaling 17 posyandu. In conclusion, the posyandu in Sukarame District does not meet the standard criteria based on

the threshold, with 17 posyandu undersupply in Sukaram Village, Way Dadi Village, Way Dadi Baru Village, and Korpi Raya Village, and 2 posyandu oversupply in 2 villages namely Korpi Jaya Village and Sukaram Baru Village. However, unlike some areas in the southwest that have densely populated settlements, the locations of the Posyandu are rare or even nonexistent, with the Posyandu located near residential settlements even though the serviced area is relatively wide (Putri et al., 2025). This indicates a potential inequality in access for residents in the area to the Posyandu.

The factors influencing the location of adequate integrated health posts (Posyandu) in the northern and central regions are due to the presence of adequate public facilities such as schools, housing with easily accessible roads, and village halls, especially those integrated with community health centers (Puskesmas) to facilitate coordination and oversight of services. This is supported by research by Suri et al. (2025) that health facilities tend to be located near collector roads, residential areas, and urban land use, and close to other facilities. However, it should be noted that this factor can also lead to problems, as seen in the southwestern region which has a high population but is not matched by a sufficient number of Posyandu due to being far from the integration of Puskesmas. This situation is also influenced by the area being widely used for trade or service activities, resulting in insufficient space to establish Posyandu, as many Posyandu are built in the midst of neighboring communities. Thus, even though the population living in this residential area is dense, the number of Posyandu in this area is fewer than in other areas.

2. Compliance of the Standard Criteria for the Number of Posyandu Based on the Threshold in Sukaram District, Bandar Lampung City

Posyandu is a facility provided by the government designed to reduce maternal and infant mortality rates, provide guidance for adolescents, and monitor the health of the elderly. The Posyandu program utilizes a community participatory approach as the frontline in facing health conditions in the community (Aditya, 2018). Therefore, in its development planning, Posyandu must consider the number of supporting population to measure the demand (in this case, the number of people) for the existing Posyandu facilities (supply) (Prasetyo, 2016). The number of supporting population for Posyandu must be considered to ensure a balance between health service providers (Posyandu) and the number of residents as users of Posyandu (Saputra et al., 2023). The higher the population in a location, the greater the number of standard Posyandus required. Conversely, the lower the population, the fewer standard Posyandus are needed (Ariyanto et al., 2021). The size of a facility is greatly influenced by the population size. The larger the population, the greater the need for such facilities (Antara, & Suryana, 2020).

The results of the threshold calculation for the number of Posyandu in this study indicate that the existing Posyandu do not meet the standard criteria and are categorized as having a supply shortage. As a result, each Posyandu has to serve more residents than its ideal capacity. This is supported by research from Sadali, et al., (2022) which shows that areas with high population density experience a concentration of health services in certain Posyandu. Therefore, the lack of adequate distribution of health facilities necessitates the establishment of new Posyandu, taking into account the supporting population size.

The posyandu facility with a capacity that exceeds standard criteria can affect satisfaction with posyandu services. One example is the significant increase in waiting times during routine posyandu operations (Integrated Service Post). The increased burden on participants leads to long queues and longer waiting times. Furthermore, congestion in posyandu services indicates a lack of effective use of posyandu equipment. Increased use of equipment such as scales, measuring tools, and other examination tools leads to accelerated wear and reduced accuracy. This condition not only degrades healthcare services by reducing the reliability of examinations but also poses a risk of increasing operational and management costs for equipment that should be used to enhance service quality. Administratively, the number of residents exceeding the criteria places a burden on Posyandu cadres to maintain records, resulting in a decrease in reporting, which impacts the overall performance analysis of Posyandu. This is supported by research by

Setiatin and Susanto (2019), which states that inadequate infrastructure and resources can reduce the quality of services and increase the risk of errors in recording.

3. Service Area (Service Area Analyst) of Posyandu in Sukarame District

The scope of service relates to the distance limitation of a facility's services as initially presented in the central place theory by Walter Christaller (Utami, 2022). There is a range of goods or services or an average maximum distance that residents travel to obtain certain goods or services. If an area has a service coverage that is inadequate, then unserved residents are found. Conversely, if an area has adequate service coverage, then served residents are found (Utami, 2022).

The access distance to posyandu refers to the distance traveled from the residents' homes to the nearest posyandu facility. A closer distance to posyandu increases the likelihood that residents will utilize health services. The standard criteria for posyandu distance in this study are based on the National Standardization Agency's reference in the Indonesian National Standard (SNI) 03-1733-2004 regarding the planning procedures for residential environments in urban areas, which states that the service coverage distance from each posyandu is 500 m². This standard criterion is also supported by research conducted, which states that the ideal location for health facilities is within a distance of 500 m² (for plains) or 1.5 km² for hilly or desert areas, connected via all weather roads.

The determination of the accessible range distance for residents needs to be considered in the services of posyandu (integrated health posts). One of the factors is that the farther the distance between posyandu service facilities and residential areas, the more it becomes a barrier for residents to visit posyandu regularly. This is also supported by a study conducted by Fitriyah and Purbowati, (2019) which explains that mothers who have a closer distance to posyandu are more active in visiting posyandu compared to those who live farther away. The lack of transportation or the distance of residence becomes a reason for non-compliance in visiting posyandu, which can lead to the absence of regular monitoring of children's growth and development and the health services that toddlers should receive (Khrisna et al., 2020).

It is known that mothers' participation is low due to the long distance, and mothers experience fatigue from having to walk, which requires a long travel time, making them lazy and irregular in weighing their babies according to the posyandu schedule (Asanab et al., 2019). The condition of the posyandu being accessible and close to housing facilitates residents' access to visit the posyandu regularly, in line with the interview conducted with Mrs. Tika, a resident of the Korpri Jaya Housing complex on October 16, 2025. According to her, having a posyandu close to home makes it easier to visit for weekly routine check ups to monitor the growth and development of toddlers by walking without needing a vehicle. The reason these areas are close to the posyandu is that they are integrated with other health facilities such as community health centers. This aligns with the results of the interview with the head of the Public Health Efforts sector. that the determination of the location of the posyandu is largely based on the readiness of the posyandu cadres for their residence to be used as the location of the posyandu, which on average is located near the community health center.

Meanwhile, areas that are not reached by posyandu services are identified due to the limited number of posyandu cadres and the lack of space to establish posyandu in those areas. However, from the interviews with residents in the areas not reached by posyandu, it was mentioned that although the distance to posyandu is quite far, residents can still go to posyandu by vehicle given that the road conditions are good. Therefore, it is important to focus on the fact that the accessibility of posyandu can be improved with good road conditions, thereby facilitating access for residents who are not reached to go to posyandu. In addition, physical factors contributing to the lack of posyandu facilities in the region have also been identified as it is an area that frequently experiences flooding during intense rainfall, which can disrupt service delivery as residents find it more difficult to access posyandu. This is consistent with the research by Mishra et al. (2019) that locations well connected to all-weather road networks are considered better suited for the placement of health facilities, as it increases the likelihood of utilizing those facilities.

The condition of areas that are not accessible has led residents to switch to accessing other healthcare services that are closer. Interviews with residents show that when the posyandu is too far away, they turn to closer healthcare facilities such as midwives and clinics. Thus, although residents who are not served by the posyandu move to other healthcare facilities, the existence of posyandu must remain a priority so that comprehensive healthcare services are available for all layers of society. In addition, the lack of resident participation makes routine health monitoring for the elderly difficult and increases the risk of undetected diseases such as hypertension, diabetes, and cardiovascular issues that reduce the quality of life for seniors (Luo and Wang, 2003; Guagliardo, 2004).

Overall, the advantage of this research is to describe the areas that are not yet covered by posyandu through field surveys regarding the terrestrial location of posyandu due to the lack of detailed information on posyandu location data from relevant government agencies. Additionally, spatial considerations of posyandu are very important to support government programs related to nutrition in order to reach every region. Meanwhile, the limitation of this research is that it has not considered other health facilities such as community health centers, which have a wider coverage area compared to posyandu.

Conclusions

Conclusion Based on the research on posyandu in Sukarama District that has been conducted, the following conclusions can be drawn: 1. The location and distribution of posyandu in Sukarama District are spread across 6 urban villages with a total number of posyandu units amounting to 35 posyandu; 2. Posyandu in Sukarama District are generally categorized as not meeting the standard criteria for posyandu based on the threshold according to SNI 03-1773-2004, with 17 posyandu categorized as undersupply in 4 urban villages and 2 posyandu classified as oversupply in 2 urban villages; and 3. The service area of posyandu in Sukarama District indicates that the area served by posyandu covers 5.81 km² (54.35%) of the total area, with 2.69 km² (25.16%) categorized as very accessible and 3.12 km² (29.19%) categorized as accessible. Meanwhile, the area not served by posyandu covers 5.17 km² (45.65%).

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