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MAKING OF DISEASE SPREAD IN BOGOR CITY USING GEOGRAPHICAL INFORMATION SYSTEM (GIS)

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The success of health development in the future will include factors such as ease of access to health and continuous improvement in the quality of health services. The city of Bogor is located between 106' 48' east longitude and 6' 26' south latitude, Administratively, the city of Bogor consists of 6 districts. With a fairly densely populated city, of course, the level of health is quite low, where Bogor is a city with high rainfall. where there are many types of diseases that appear in the rainy season, for example: Acute Nashoparyngitis, Essential Primary, Acute Respiratory Tract, and others. Therefore, it is necessary to make a map of the distribution of diseases in Bogor City using the Geographic Information System method. The use of a geographic information system (GIS) involves presenting data and information in the form of a map which can be used as an attractive and varied presentation tool according to needs. The main function in using GIS in this modern era is that maps are no longer the end result in an activity because GIS can facilitate the output of the resulting maps. The results obtained in this study are the distribution of the top five types of diseases in Bogor City from January to June 2020, namely Acute nasopharyngitis [common cold], Essential (primary) hypertension, Upper respiratory tract infections, Dyspepsia, and Myalgia, The total number of infected The top 5 diseases are as many as 210,626 people from 6 sub-districts in Bogor City.

Keywords: GIS, Disease, Map, Bogor City

1. Introduction

To achieve the highest public health. The success of health development in the future will include factors such as ease of access to health and continuous improvement in the quality of health services [1] [2]. Health is a healthy state, both physically, mentally, spiritually and socially which enables everyone to live a more productive life socially and economically (Law No. 36 of 2009 Chapter 1 Article 1 concerning Health) [3]. The City of Bogor is located between 106' 48' East Longitude and 6' 26' South Latitude, the geographical position of the City of Bogor is in the middle of the Bogor Regency area and its location is very close to the State Capital The area of Bogor City is 11,850 Ha. sub-district area With a fairly densely populated city, of course, the level of health is quite low, where Bogor is a city that has a high level of rainfall, where in the rainy season many types of diseases occur, for example: Acute Nashoparyngitis, Essential Primary, Acute Respiratory Tract, and others. other than that it is necessary to make a map of the spread of disease in the city of Bogor using the Geographic Information System method.

Technological advances in the current era of globalization are developing very rapidly. This certainly has a positive impact on life regarding the need for information in all fields [4] [5]. The Department of Health as a public sector organization engaged in health services does

not escape the importance of information in supporting all activities in it, the information produced must be relevant so that decisions taken based on the information are right on target, the appropriate form of presentation is a factor that affects quality information that is conveyed. The use of a geographic information system (GIS) involves presenting data and information in the form of a map which can be used as an attractive and varied presentation tool according to needs. Health development is one of the national efforts in all areas of life which is essentially pursued by all components of the nation [6].

The main function in using GIS in this modern era is that maps are no longer the end result in an activity because GIS can facilitate the output of the resulting maps [7] [8]. In fact, the resulting maps can be used as input to find solutions to various problems that occur. Therefore, in the absence of information regarding the spread of disease in Bogor City, it is necessary to have GIS-based spatial information in the form of thematic maps so that the community and the government through the Health Office can deal effectively and the public can know and be aware of the top 5 types of disease in Bogor City.

2. Method

This research was conducted in Bogor City in May – April 2021. Geographically, Bogor City is located between 106' 48' East Longitude and 6' 26' South Latitude, the geographical position of Bogor City is in the middle of Bogor Regency and its location is very close to the National Capital. , is a strategic potential for developing and growing the economy and services, a national activity center for industry, trade, transportation, communication, and tourism.

Figure 1. Study Area

Retrieval of disease data in Bogor City from the Bogor City Health Office. The data obtained are data on the top five types of disease in the city of Bogor, the number of sufferers, the location of the sub-districts most affected, the sex of the infected, the average age of the infected. The data obtained is data for 2020, starting from January to June 2020.

The data obtained will be processed through ArcGIS software using a geographic information system approach. The stages of the processing method are as follows:

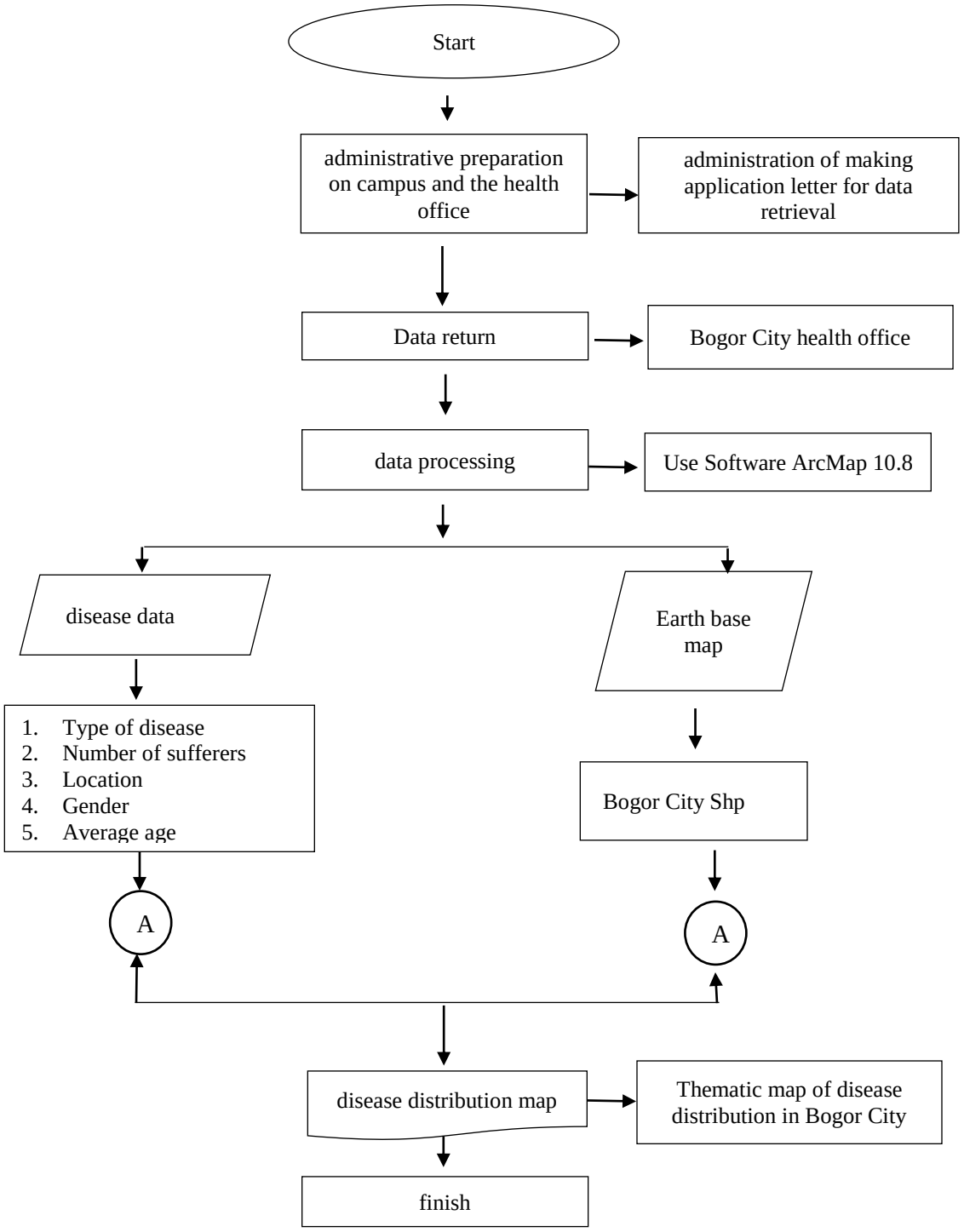

Figure 2. Flowchart of Process

3. Results And Discussion

The total number affected by Acute nasopharyngitis [common cold] is 58840, People and Essential (primary) hypertension 57274 people, Upper respiratory tract infections 42125 people, Dyspepsia 31296 people, and Myalgia 2109. Figure 3. below shows the map of disease distribution in Bogor city.

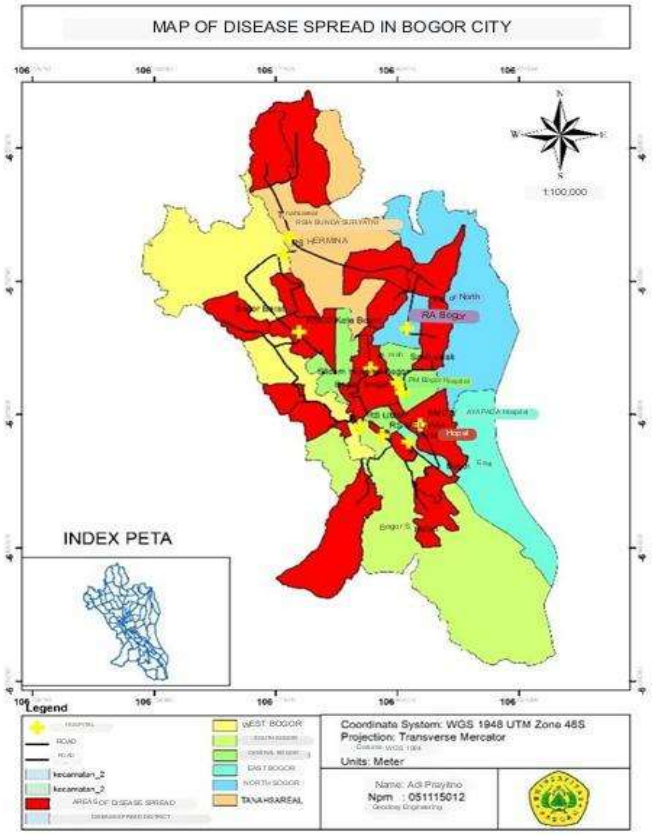

Figure 3. Map of disease distribution in Bogor City

The red color in the image above shows the sub-districts or villages most affected by the Top 5 diseases in Bogor City from January to June 2020. Meanwhile, those not marked in red are villages or sub-districts that have not or little affected by the top 5 diseases. While the yellow plus (+) sign is a hospital in Bogor City, while the black line is the closest route to the hospital.There are 19 sub-districts or villages in the red zone, the data was taken from the puskesmas in each respective sub-district and the data was repeated by the Bogor City Health Office.

For the number of sufferers, gender, and average age for more information and attribute data can be seen in the appendix that has been presented. And the following is a data table for the 5 major diseases per district in Bogor City :

Tabel 1 Sareal Land District Data

No	Type of Disease	Number Of Sufferers	Gender		Average Age
			M	F	
1	Acute nasopharyngitis [common cold]	5217	2703	2514	9 s/d 45
2	Essential (primary) hypertension	1324	809	434	8 s/d 45
3	upper respiratory infection	9779	3913	5866	7 s/d 45
4	Dispepsia	1412	1003	409	7 s/d 50
5	Mialgia	3443	2077	1366	7 s/d 45

Table 2 North Bogor Sub-District Data

No	Type of Disease	Number Of Sufferers	Gender		Average Age
			M	F	
1	Acute nasopharyngitis [common cold]	9179	5999	3180	6 s/d 55
2	Essential (primary) hypertension	4220	1497	2723	9 s/d 45
3	upper respiratory infection	4530	2624	1906	10 s/d 45
4	Dispepsia	5897	2922	2975	8 s/d 45
5	Mialgia	4129	2269	1860	30 s/d 60

Table 3 Central Bogor District Data

No	Type of Disease	Number Of Sufferers	Gender		Average Age
			M	F	
1	Acute nasopharyngitis [common cold]	11482	6292	4890	7 s/d 45
2	Essential (primary) hypertension	1135	765	370	7 s/d 45
3	upper respiratory infection	1274	786	488	7 s/d 45
4	Dispepsia	5138	4017	1121	10 s/d 50
5	Mialgia	2386	1825	561	20 s/d 55

Table 4 West Bogor District Data

No	Type of Disease	Number Of Sufferers	Gender		Average Age
			M	F	
1	Acute nasopharyngitis [common cold]	9446	4789	4657	6 s/d 45
2	Essential (primary) hypertension	1958	1355	603	9 s/d 45
3	upper respiratory infection	0	0	0	-
4	Dispepsia	2447	1402	1045	6 s/d 60
5	Mialgia	2466	944	1522	20 s/d 60

Table 5 East Bogor District Data

No	Type of Disease	Number Of Sufferers	Gender		Average Age
			M	F	
1	Acute nasopharyngitis [common cold]	3639	2128	1511	7 s/d 45
2	Essential (primary) hypertension	2672	1699	973	9 s/d 45
3	upper respiratory infection	0	0	0	-
4	Dispepsia	3947	2564	1383	7 s/d 45
5	Mialgia	936	687	249	30 /d 55

Table 6 South Bogor District Data

No	Type of Disease	Number Of Sufferers	Gender		Average Age
			M	F	
1	Acute nasopharyngitis [common cold]	11665	6517	5148	7 s/d 45
2	Essential (primary) hypertension	6253	3593	2260	9 s/d 45
3	upper respiratory infection	225	129	96	10 s/d 45
4	Dispepsia	3386	2080	1246	10 s/d 45
5	Mialgia	2081	1261	820	30 s/d 55

4. Conclusions

From the results of research that has been conducted, the following conclusions are obtained: The top 5 types of diseases in Bogor City as of January-June 2020 are Acute nasopharyngitis [common cold], Essential (primary) hypertension, Upper respiratory tract infection, Dyspepsia, and Myalgia The total number of those infected with the top 5 diseases is 210.626 people from 6 sub-districts in Bogor City The use of GIS-based applications is very helpful in making it easier to make maps of the distribution of diseases in Bogor City, the community will know where the red zones are affected by the top 5 diseases, and can find out the closest route to the hospital. We would like to thank those who have supported our research, especially the data providers in our research project and do not forget to thank the UPN Veteran Yogyakarta student writers who have helped turn research into writing. The author hereby declares that the published data in this manuscript does not have a conflict of interest against any party. If at a later date this is found, the full responsibility for this matter lies with the author.

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