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A Market Feasibility Of An Upcoming Hospital – Asahan District

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Abstract. *The Regional Government of Asahan Regency has a Healthy Asahan Program committed to creating conditions in Asahan Regency that are clean, comfortable, safe and healthy for residents to live in, which is achieved through the existence of hospitals that are able to provide services according to standards. The ratio of beds to population in Asahan Regency in 2022 is 1.03. The aim of the research is to see future hospital market opportunities in an effort to help the Asahan Sehat Regional Government's Healthy Program of Asahan Regency. We used a convergent parallel mixed methods design, in which qualitative and quantitative data were collected simultaneously. This research was conducted from April 2023 to July 2023. Research data was collected from 5 hospitals in Asahan Regency (H.Abdul Manan Simatupang Hospital, Ibu Kartini Hospital, Bunda Mulia Hospital, Permata Hati Hospital, and Seger Waras Hospital), Central Bureau of Statistics and the Asahan District Health Service. Data was analyzed using SWOT and the hospital's position was determined using SWOT scoring. The SWOT analysis shows that the existence of the new hospital in Asahan Regency is in Quadrant II, meaning that the future hospital has the opportunity to develop in Asahan Regency by minimizing weaknesses. Aspects of hospital location, service/market needs, infrastructure and competitive aspects must be the main focus.*

Keywords: *Asahan; Feasibilty; Hospital; Market; SWOT*

INTRODUCTION

The Regional Government of Asahan Regency has ten superior programs which are targeted for achievement in 2021-2026 and are stated in the Regional Medium Term Development Plan (RMTDP) of Asahan Regency, one of which is Asahan Sehat. The Asahan Sehat Program is committed to creating conditions in Asahan Regency that are clean, comfortable, safe and healthy for residents to live in, which is achieved through the implementation of several integrated arrangements and activities agreed upon by the community and local government, such as the existence of hospitals that are able to provide services according to standards. Existing hospitals are required to continue to be proactive in managing and describing their main tasks and functions with various efforts to improve the quality of their services, especially in supporting the vision, mission and policies of the Regional Government of Asahan Regency (Pemerintah Kabupaten Asahan, 2021).

WHO standards state that whether or not the community's needs for referral and individual health services in an area are met can be seen from the ratio of beds to 1,000 residents. The WHO standard is 1 bed for 1,000 residents. The ratio of hospital beds in Indonesia from 2015 to 2020 is more than 1 per 1,000 population (the ratio of hospital beds in

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Indonesia in 2020 is 1.4). The bed ratio in North Sumatra Province in 2020 is 1.7. So that the number of beds in Indonesia and North Sumatra Province is sufficient (Kementerian Kesehatan, 2021). Asahan Regency has 11 general hospitals spread across 5 sub-districts. Most hospitals are located in West Kisaran District (Pemerintah Kabupaten Asahan, 2022). If we refer to the population of Asahan Regency in 2022 which is 777,626 people and the number of hospital beds currently available is 803, then the ratio of beds to population in Asahan Regency in 2022 is 1.03. This means that Asahan Regency only has 1 hospital bed per 1,000 population. This figure is still very small when compared to the regions of DKI Jakarta (bed ratio 3.1), North Sulawesi (bed ratio 2.7), West Papua (bed ratio 2.3), and East Kalimantan (bed ratio 2,0) (Kementerian Kesehatan, 2021).

This study was carried out to support the Asahan Sehat Program launched by the Regional Government of Asahan Regency by providing superior and reliable health services through health service facilities that provide services according to standards. The study of future hospital market opportunities can help the Regional Government of Asahan Regency realize a high level of health for the community by providing adequate service facilities, establishing integration in the health sector from various scientific disciplines, as well as fulfilling economic aspects like other business fields.

RESEARCH METHOD

Design

To obtain an in-depth understanding of the feasibility, we used a convergent parallel mixed-methods design, in which qualitative and quantitative data were collected simultaneously. This study was conducted from April 2023 until July 2023.

Population and Sample

Research data was collected from 5 hospitals in Asahan Regency (H.Abdul Manan Simatupang Hospital, Ibu Kartini Hospital, Bunda Mulia Hospital, Permata Hati Hospital, and Seger Waras Hospital), the Central Statistics Agency and the Asahan District Health Service.

SWOT Analysys

SWOT analysis is used to evaluate strengths, weaknesses, opportunities and threats in hospital strategic planning. In carrying out a SWOT analysis the data collected is:

Strength 1. The advantages that hospitals have 2. What makes the hospital better than other hospitals 3. The uniqueness of the hospital 4. What causes people to want to visit the hospital? 5. What do patients see as advantages of the hospital?	Opportunity 1. What opportunities can be seen. 2. What trend developments are in line with hospital services.
Weakness 1. What is improved about the hospital 2. What hospitals should avoid 3. What factors cause low visits 4. What the patient sees as the hospital's weaknesses 5. What competitors are doing.	Threat 1. Obstacles currently facing hospitals 2. What the hospital does 3. Technological developments that pose a threat to hospitals 4. Are there any changes to government regulations that threaten the development of the hospital?

SWOT analysis calculations were developed by Pearce and Robinson (1998) to know with certainty the true position of the organization. The calculations are carried out in three stages (Bajri and Sulistiadi, 2019), that is:

a. Calculate the score (a) and weight (b) of factor points as well as the total number of multiplications of scores and weights (c = a×b) for each S-W-O-T factor.
b. Subtract the total number of factors S with W (d) and factors O with T (e); The resulting number (d=x) then becomes a value or point on the X axis, while the resulting number (e = y) then becomes a value or point on the Y axis.
c. Find the position of the organization indicated by the point (x,y) in the quadrant.

SWOT Matrix	Opportunity	Treaths
Strength	A=Comparative Advantages	B=Mobilization
Weakness	C=Divestment/Investment	D=Damage Control

RESULT AND DISCUSSION

he research aims to look at future hospital market opportunities in an effort to help the Asahan Sehat Regional Government's Asahan Regency Government Program. Data from 6 hospitals in Asahan Regency was collected and then grouped into strengths and weaknesses in developing a hospital in Asahan Regency. The next stage will be a SWOT analysis and scoring to see the position of the hospital if a new hospital is to be developed in Asahan Regency.

Building a new healthcare facility (hospital) is more than just a construction project. Hospital businesses must consider changes in epidemiology and advances in medical practice to determine the types of facilities and services to be built. In addition, the health care sector is influenced by the local environment, so a strong understanding of the local health care environment where the hospital will operate is important in operations. (Nah and Osifo-dawodu, 2007). This is in accordance with the mandate of the Minister of Health of the Republic of Indonesia Regulation Number 4 of 2018 that hospitals must provide safe, quality, anti-discriminatory and effective health services by prioritizing the interests of patients in accordance with hospital service standards (Presiden Republik Indonesia, 2009b; Kementerian Kesehatan, 2018).

Table 1. Names of Hospitals and Beds in Asahan Regency

No	Name	Number of Beds
1	H. Abd. Manan Simatupang Hospital	187
2	Setio Husodo Hospital	88
3	Wira Husada Hospital	70
4	Ibu Kartini Hospital	100
5	Methodist Bintang Kasih Hospital	57
6	Bunda Mulia Hospital	60
7	Permata Hati Hospital	25
8	Lina Hospital	34
9	Sripamel Sei Dadap Hospital	40
10	Seger Waras Hospital	74
11	Utama Hospital	68
TOTAL		**803**

The number of beds currently available in Asahan Regency is recorded at 803 beds, while the 2022 population census shows the population of Asahan Regency is 777,626 people (equivalent to 777 beds), so the ratio of beds to 1,000 population in Asahan Regency is 1.03. This figure shows that the ratio of the number of beds to 1,000 residents in Asahan Regency in 2022 has reached the minimum standard from WHO (Presiden Republik Indonesia, 2009a). However, another thing that must be considered is fulfilling accessibility by considering a wide coverage area, geographical conditions and remote locations that contribute to the time and distance to reach health service facilities (Direktorat Jendral Pelayanan Kesehatan, 2020).

Table 2. Performance Indicators for Several Hospitals in Asahan Regency

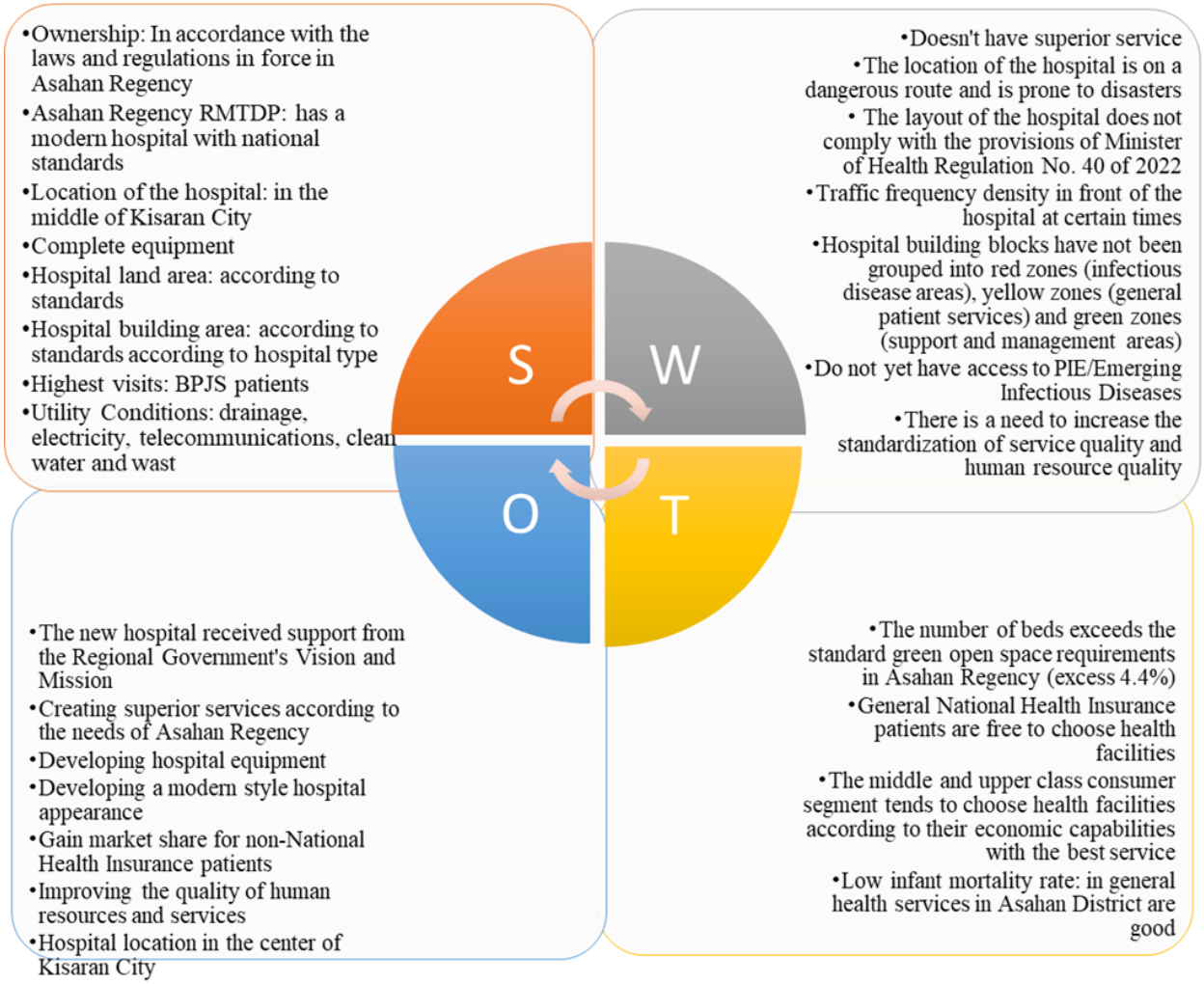
Indicator	H Abdul Manan Simatupang Hospital (2021)	Ibu Kartini Hospital (2019)	Bunda Mulia Hospital (2020)	Permata Hati Hospital (2019)	Seger Waras Hospital (2018)
CHI	78,00	-	-	-	-
BOR	80%	46%	64%	54%	38,6%
LOS	5 hari	3 hari	5 hari	4 hari	2 hari
BTO	42 Kali	38 Kali	45 kali	29 Kali	59,7 kali
TOI	2 hari	5 hari	4 hari	2 hari	3 hari
NDR	14%				0,009
GDR	41%				1%

CHI: Community Health Index; BOR: Bed Occupancy Ratio; LOS: Length of Stay; BTO: Bed Turn Over; TOI: Turn Over Interval; NDR: Net Death Rate; GDR: Gross Daeth Rate

A hospital is a health service institution that provides complete individual health services, providing inpatient, outpatient and emergency services. (Kementrian Sekretariat Negara, 2021). Hospitals have an obligation to provide safe, quality, anti-discriminatory and effective health services by prioritizing the interests of patients in accordance with hospital service standards (Kementerian Kesehatan, 2018). Quality indicators will provide an overview of the level of health services for individuals and communities that can promote optimal health, provided in accordance with service standards and the latest scientific developments and to fulfill the rights and obligations of patients (Kementerian Kesehatan, 2022).

The Bed Occupancy Ratio of several hospitals in Asahan Regency was recorded at >50%, meaning that the utilization rate for hospital beds is above 50%. However, this figure is still small when compared with the ideal BOR parameters according to national health service measurement standards (Depkes RI, 2005) namely 60% - 85%. This condition equates to acute bed occupancy rates in Slovakia's hospitals being well below the average of certain European countries. This low efficiency is mainly caused by inappropriate hospital design, low asset

utilization, and inappropriate functional models (Restricted, 2014). Length of Stay shows the level of efficiency and quality of service. The LOS of several hospitals in Asahan Regency has reached the ideal value based on national health service measurement standards, namely 6-9 days. Turn Over Interval (TOI) describes the average number of days a bed is occupied, from being occupied to the next time it is occupied. The TOI of several hospitals in Asahan Regency has also reached the ideal figure referring to the national health service measurement standard, namely 1-3 days. Bed Turn Over is the use of a bed in one period, several times a bed is used in a certain unit of time. Ideally, in one year the average bed is used 40-50 times. This indicator value is used to plan future hospital development (Rahmadiliyani, Nugroho and Estiyana, 2020).



Quadrant position in the axis as shown in Figure 1

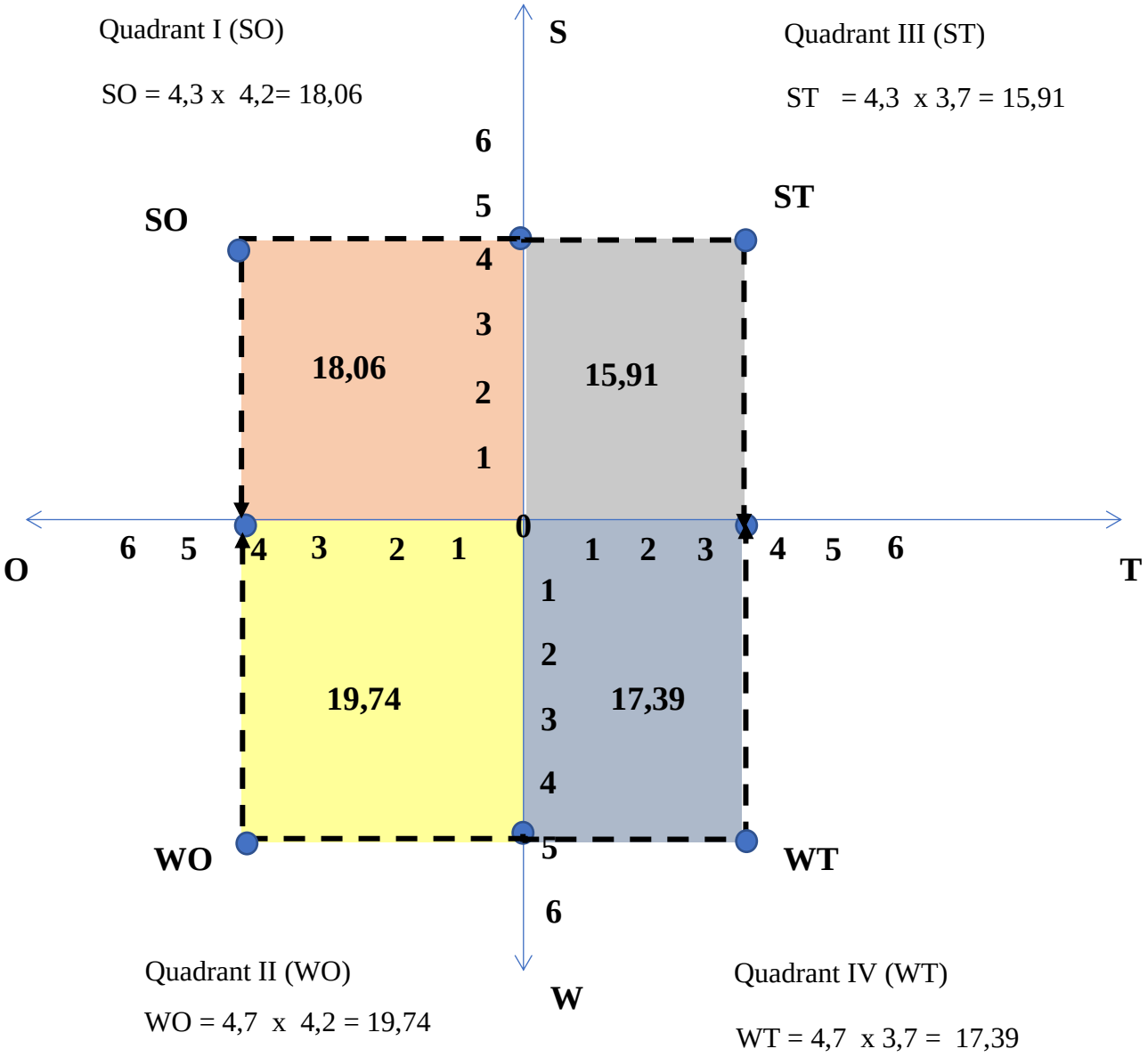


Figure 1. SWOT Analysis Quadrant Position of Future Hospitals in Asahan Regency

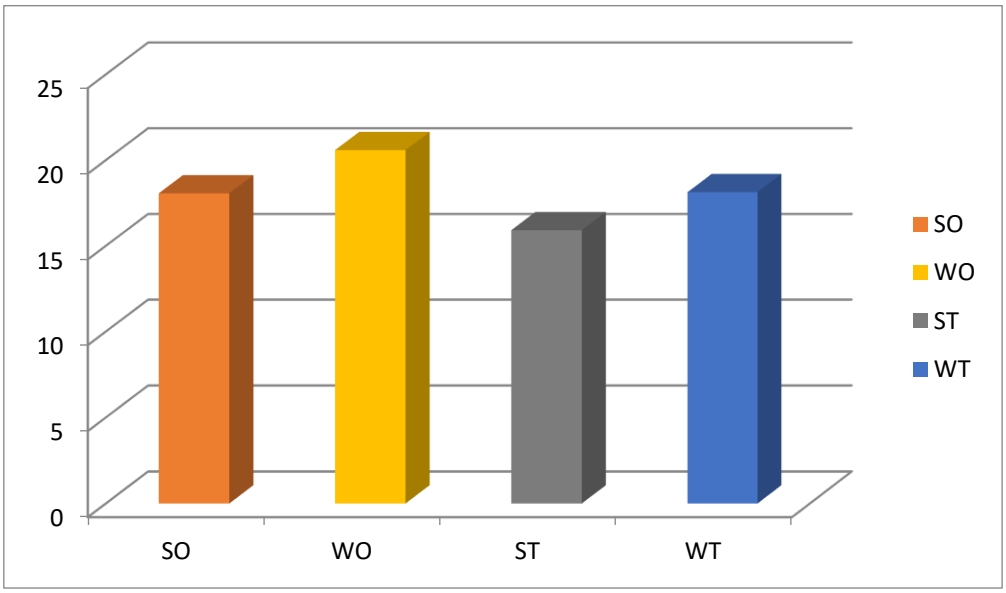


Figure 2. Quadrant Position in the Chart of Future Hospitals in Asahan Regency

The SWOT analysis shows the fact that the existence of the new hospital in Asahan Regency is in Quadrant II, this means that the future hospital in Asahan Regency has weaknesses which can be minimized with several efforts to select a strategic hospital location and in accordance with Government Regulation of the Republic of Indonesia Number 47 of 2021(Kementrian Sekretariat Negara, 2021). Efforts are made to reduce the density and congestion of the traffic lane in front of the hospital with traffic engineering (Old Colony Planning Council (OCPC), 2015). Hospital building blocks are adapted to the functions of emergency rooms, intensive care and environmental safety. Building blocks are grouped into 3 zones according to the provisions of Minister of Health Regulation No. 40 of 2022 (Kemenkes RI, 2021; Kemenkes, 2022). Creating access to PIE/Emerging Infectious Diseases, increasing standardization of service quality (accreditation, ISO Improvement of quality indicators) and improving the quality of human resources (skilled nurse training) (Kementerian Kesehatan, 2020).

The future hospital in Asahan Regency can make several efforts to obtain opportunities with several conditions, including the Vision and Mission of the Regional Government of Asahan Regency (2021-2026) to have a modern style hospital with national standards. Creating superior services according to the needs of Asahan Regency by paying attention to the tendencies of the 10 biggest diseases. Developing advanced and modern equipment. Developing a modern concept hospital according to the needs of Asahan Regency. Maximizing non-JKN patients by providing hospital facilities and infrastructure in accordance with demand and people's purchasing power (Kemenkes RI, 2021). The location of the hospital is in the city

center so that its presence can be maximized by improving the appearance of the hospital and accessibility. Site assessments are also important to assess possible service delivery programs that will advance healthcare facilities, obtain planning permission, overcome site-specific constraints, possibly build infrastructure and build facilities. This points to a broader hospital masterplan that has the potential to help deliver alternative and more valuable land uses (Kementerian Kesehatan, 2012; Robinson *et al.*, 2020). Maximizing improvements in the quality of human resources and services to support improvements in hospital quality and patient satisfaction which ultimately has the power to increase visits.

Internal aspect to see the strength and ability to survive so that it does not become an obstacle in future hospital operations. One of the Regional Government's missions in the health sector through one of its programs "Asahan Sehat" is to have a modern hospital of national standard (Regulation No. 3 of 2021). So the existence of the future hospital is expected to be able to support the vision and mission of the regional government, supported by equipment, human resources and buildings according to hospital standards. In general, the utility network in Asahan Regency is complete, such as the rainwater runoff drainage network, the PLN electricity network, the telecommunications network, clean water, and the household garbage/waste network in solid form that is transported regularly/scheduled. However, hospital building blocks must prioritize the function of emergency rooms, intensive care and environmental safety. Building blocks or areas in hospitals must be grouped into 3 zones, namely the red zone (patient service area for emerging infectious diseases), the yellow zone (general patient service area), and the green zone (support and management area) (Permenkes No. 40 of 2022 concerning Technical Requirements for Hospital Health Buildings, Infrastructure and Equipment) (Kemenkes, 2022). Hospitals must also have access to PIE/emerging infectious diseases in accordance with standardization of service quality and improving the quality of human resources. The excessive size of the building, technical deficiencies and inappropriate internal functional arrangement of the hospital, limit the possibility of modernization and increasing efficiency and productivity (Restricted, 2014). In the future, hospitals must also consider providing superior services that are needed in Asahan Regency, developing sophisticated and modern equipment, developing modern concept hospitals by developing architectural designs and interior designs that can have a positive effect on patient psychology. A beautiful, functional, efficient and clean building gives a positive impression to all hospital users. So that community groups who are not registered with JKN, especially those from the upper middle class, have various choices of places for treatment.

Middle and upper class community groups have alternative choices of service locations. The group will consider hospitals with good service appeal and attractive buildings as places of service. Aspects of hospital location, service/market needs, infrastructure, competitive aspects, economic aspects also need to be considered in future hospital development (Kementerian Kesehatan RI, 2012; Ginting and Fentiana, 2020).

CONCLUSION

The ratio of beds to 1,000 residents in Asahan Regency is 1.03. The Bed Occupancy Ratio for several hospitals in Asahan Regency was recorded at >50%. LOS for several hospitals in Asahan Regency is 3-5 days. TOI for several hospitals in Asahan Regency is 1-3 days. Bed Turn Over in several hospitals in Asahan Regency is 40-50 times. The SWOT analysis shows the fact that the existence of the new hospital in Asahan Regency is in Quadrant II, meaning that the future hospital has the opportunity to develop in Asahan Regency by minimizing weaknesses. Aspects of hospital location, service/market needs, infrastructure and competitive aspects must be the main focus.

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Thank you very much for H.Abdul Manan Simatupang Hospital, Ibu Kartini Hospital, Bunda Mulia Hospital, Permata Hati Hospital, and Seger Waras Hospital which has helped a lot in data collection.

APPENDIX

QUESTIONNAIRE FOR INSTITUTIONAL SURVEY (HOSPITALS)

- Type of hospital?
- Number of hospital beds?
- Average OPD/ per day
- Average patients referred to other hospitals every month
- Reasons for Reference?
- Total number of surgeries per day
- Total manpower of the hospital

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The Relationship Between Environmental Sanitation and Nutritional Status with Soil-Transmitted Helminths Infection in Elementary School Children

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Abstract: *Poor environmental sanitation and malnutrition are the leading causes of STH infection. This studyaims to determine the relationship between ecological sanitation, nutritional status, and STH infection incidence in elementary school children. This type of research is descriptive research. The research location is UPT SDN 060831, Medan City. The sample was 32 respondent, Medan City students, obtained using the total sampling technique. Data was collected using questionnaire instruments, Body Mass Index (BMI) examinations, and fecal examinations. The data were further analyzed univariately.The results showed that most environmental sanitation conditions did not qualify, such as latrine conditions (68.8%), SPAL conditions (75.0%), trash can conditions (87.5%), and clean water facilities (68.8%). Nutritional status (BMI/U) was most in the normal category (65.6%), and no helminth eggs were found in respondents (negative STH), so a relationship analysis could not be carried out. It is suggested that the school and parents support government programs related to providing mass worm-prevention drugs.*

Keywords: *STH, Environmental Sanitation, Nutritional Status*

INTRODUCTION

Health problems are complex problems in all countries and even the world that cannot beavoided and arise due to several factors. Many health problems appear almost every year. Oneof the health problems, such as Soil-Transmitted Helminths (STH), is a problem that often occurs in society and is considered normal by society. STH infection is an intestinal infection transmitted through soil media, in which worm larvae originating from the soil are then swallowed and hatched in the intestine, causing symptoms such as nausea, diarrhea, and abdominal pain. Four types of worms are usually transmitted to humans, namely roundworms (Ascaris lumbricoides), whipworms (Trichuris trichi-ura), hookworms (Ancylostoma duodenale and Necator americanus), and threadworms (Strong-yloides stercoralis). The main factor for STH infection is poor environmental sanitation (house sanitation, clean water sources, and trash bins that do not meet the requirements).

STH infection rarely causes death but can cause long-term health problems for sufferers, including declining health conditions, nutrition, intelligence, and productivity of sufferers, and economically causing many losses, thus reducing the quality of human resources, and can interfere with the absorption of food intake. Food in the digestive system can cause complications such as damage to the intestinal wall and anemia (Agustianingsih

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et al., 2020).

Based on data from the World Health Organization/UNICEF's Joint Monitoring Programfor Water Supply and Sanitation in 2023, Indonesia is ranked third globally with poor environmental sanitation. This is because around 109 million Indonesians need environmental sanitation that meets the requirements. Many Indonesians still defecate openly, so they are easily infected with STH (UNICEF, 2023).

Based on data from the World Health Organization (WHO) in 2023 states that there are more than 1.5 billion world population, or 24%, affected by STH infection where the infectionis the most widespread with a very high incidence rate, namely in tropical and subtropical regions such as sub-Saharan Africa, America, China, and East Asia. Most STH infections are at preschool age, with 267 million children and around 568 children living in STH-endemic areas requiring rare treatment and prevention (Silva et al., 2022).

Based on data from the Permenkes Number 15 0f 2023 Concerning Deworming. It statesthat the worm prevalence rate in Indonesia is still very high and varies between 2.5% - 62%— low economy and environmental sanitation factors that do not meet the requirements. The government made several efforts to prevent STH infection in 2023 by breaking the chain, including health promotion, giving mass drugs to elementary school children, handling sufferers, helminthiasis surveillance, and controlling risk factors. However, many Indonesiansstill suffer STH infections (Mascarini-Serra, 2011).

Based on data obtained from the North Sumatra Provincial Health Service in 2023, it is stated that North Sumatra Province has received worm medicine given to preschool and school children. Based on the results of interviews at UPT SDN 060831 on Thursday 27 January 2024, according to an officer survey, the majority of residents in the UPT SDN 060831 work area have the highest educational status, high school, with the most occupations being farmers and housewives. Then the environmental sanitation conditions in the UPT SDN 060831 work area are still inadequate, such as clean water facilities that do not meet the requirements, there are no trash bins available at home, and there is no waste water disposal channel (SPAL) that meets the requirements. condition. Then, it was discovered that environmental sanitation in schools still did not meet the requirements and students' personal hygiene was still poor; This makes it possible for these children to contract STH infections. In connection with research conducted by Ginting, 2019, regarding analysis of the determinants of worms in elementary school children in Janur Village, Karo Regency, it was stated that house sanitation and family income were related to the incidence of worms in elementary school children..

METHODS

The research location is UPT SDN 060831, Medan City. The time of the research was carried out from Thursday 27 January 2024. This type of research is an analytic observational study using a cross-sectional study design. The cross-sectional researchdesign is a study that studies the correlation between exposure or risk factors (independent) andeffects or effects (dependent) by collecting data simultaneously at one time between risk factors and their effects, meaning that all variables, both independent and dependent variables, are observed at the same time (Irwan, 2021). The dependent variable in this study was the incidenceof Soil-Transmitted Helminths (STH) infection. The independent variables in this study were environmental sanitation (latrine conditions, SPAL, trash can conditions, and clean water sources) and nutritional status.

The population in this study were 32 students of UPT SDN 060831 Medan City, spread across 15 students in each class V. people, and class VI totaled 17 people. The sampling technique uses total sampling so that the number of samples is the same as the population, namely 32 people. The data in this study was collected using a questionnaire, and laboratory examinations were carried out to collect data related to worm infection status by looking for the presence or absence of worm eggs in the respondent's stool samples. Then the data was analyzed using univariate analysis using a frequency distribution table.

RESULTS AND DISCUSSION

Soil-transmitted helminth (*STH) INCIDENT*

Based on the results of research that has been done, the obtained distribution of studentsbased on STH events is as follows.

Table 1. Distribution Student Based on STH incident

STH incident	Total	
	N	%
Negative	32	100.0
Total	32	100.0

Source: Primary Data, 2024

Based on Table 1, got is known that of 32 students Where all student negative STH infectionie as many as 32 people (100.0%).

SANITATION ENVIRONMENT

Distribution Respondents Based on Condition Toilet

Based on the results of research that has been done, then obtained distribution respondentsbased on condition toilet as following.

Table 2. Distribution Respondents Based on Condition Toilet

Condition Toilet	Total	
	n	%
Not Qualified	22	68.8
Qualified	10	31.3
Total	32	100.0

Source: Primary Data, 2024

Based on Table 2, got is known that of the 32 respondents at most own condition latrines that do not fulfill the condition that is as many as 22 respondents (68.8%), and the least that is respondents with condition-fulfilling latrines condition as many as ten respondents (31.3%).

Distribution Respondents Based on Condition Channel Waste Water Disposal (SPAL)

Based on the results of research that has been done, then obtained distribution Respondentsbased on SPAL conditions as follows.

Table 3.*Distribution Respondents Based on SPAL condition*

SPAL condition	Total	
	n	%
Not Qualified	24	75.0
Qualified	8	25.0
Total	32	100.0

Source: Primary Data, 2024

Based on Table 3, got is known that of the 32 respondents, most have SPAL conditions which do not fulfill the condition that is as many as 24 respondents (75.0%), and the least that is respondents own SPAL conditions that meet conditions as many as eight respondents (25.0%).

Distribution Respondents Based on Condition Place Rubbish

Based on the results of research that has been done, then obtained distribution Respondentsbased on the condition placed rubbish as follows.

Table 4. ***Distribution Respondents Based on Condition Place Garbage***

Condition Place Rubbish	Total	
	N	%
Not Qualified	28	87.5
Qualified	4	12.5
Total	32	100.0

Source: Primary Data, 2024

Based on Table 4, get is known that of the 32 respondents, the most conditioned Place trash that does not fulfill the condition that is as many as 28 respondents (87.5%) and the least that is respondents own condition place overflowing trash condition as many as four respondents (12.5%).

DISCUSSION

INCIDENCE OF STH INFECTION

Based on the research results, it is known that of the 32 students, all of them were negative for STH infection, there were 32 people (100.0%). Based on this data, the results of laboratory examinations carried out at the UPTD Public Health Laboratory of North Sumatra Province using the Easel method in microscope observations of 32 students in grades I-III of UPT SDN 060831 Medan City showed that they were not infected with STH worms. This could happen because based on the results of interviews with Telaga Biru Community Health Center officers, the students received deworming medication in the form of albendazole in February 2023. Deworming is a government program that is routinely implemented by the North Sumatra Provincial Health Service and UPT SDN. 060831 to prevent STH transmission in children, especially elementary school age.

This is in line with research by Rehgita (2023) based on USU Faculty of Medicine Parasitology laboratory tests with a sample size of 50 students in grades I-VI of SD Negeri 068005 Medan Tuntungan District; None of them were infected with STH worms (0.00%), this was because the school had received worm medicine from the local health center. This is also in line with Juliana's (2021) research, namely that based on the results of research in Gumantar Kwanyar Village on toddlers aged 2-5 years using microscopic examination with a sample of 20 respondents, 100% negative results were found, meaning that no STH eggs, larvae and worms were found.

ENVIRONMENT SANITATION

LATRINE CONDITION

Based on the results, it was found that out of the 32 respondents the most had latrineconditions that did not meet the requirements, namely 22 respondents (68.8%), and the least, namely respondents who had latrine conditions that met the requirements, were ten respondents(31.3%). Based on the results of direct observation at the research location, it was found that mostof the respondents did not have private latrines, so they had to defecate in the river or a neighboring toilet, but this did not allow the child to get STH infection, as well as latrines at schools which were no longer used and had been it was so dirty that students had to defecate inpeople's homes close to the school.

SPAL CONDITION

Disposal of waste as a component of environmental sanitation can affect the incidence of helminthiasis because it can spread worm eggs into the environment. According to Sumanto (2010), Soil moisture is an essential factor in maintaining the development of worm eggs in thesoil. The SPAL requirements are to have a channel and flow smoothly, have a particular shelter,and be sanitary (the distance between the SPAL and the water source is at least 10 meters).

Based on the results, it was found that out of the 32 respondents, most had SPAL conditions that did not meet the requirements, namely 24 respondents (75.0%), and the least, namely respondents who had SPAL conditions that met the requirements, were eight respondents (25.0%). Based on these results, most respondents did not meet the requirements for SPAL conditions. This is by the results of direct observation at the research location that most people or respondents needed latrines that met the requirements, such as not having SPALand causing odor due to the disposal of residual wastewater indiscriminately placed.

This is supported by research by Sumanto (2010), who found exposure to hookworm eggsin the soil of as much as 77.8% of respondents who disposed of household liquid waste anywhere. At the same time, those flowing into the ditch should have only found 22.2% exposure. The same thing was also found in research by Nurhaedah (2006), which shows that there is a significant relationship between the provision of SPAL and the incidence of helminthiasis in Al-Akhyar elementary school students at Pondok Madinah Islamic Boarding School Sudiang Makassar. Improper waste disposal will have effects, such as becoming a disease carrier and damaging the plants around it. Therefore, wastewater must be appropriatelymanaged.

TRASH CONDITION

The effect of waste on the environment and health is no different from other pollutants. However, waste is not the cause (agent) of disease. However, it is a condition or medium for illness because waste is a medium for the growth and development of bacteria and parasites, and vectors for several diseases. Based on the results, it was found that out of the 32 respondents, most had trash bin conditions that did not meet the requirements, namely 28 respondents (87.5%), and the least, namely respondents who had trash bins that met the requirements, were four respondents (12.5%).

The results of observations in the field were that respondents generally disposed of garbage behind the house and even disposed of it in the garden and the river, while observations of the condition of the trash cans at SD 22 Tapaluluo did not meet the health requirements where garbage was still scattered everywhere. According to the local community, the waste thatis usually disposed of in the house's backyard is treated by burning the waste. This is in line with research by Fitri et al (2012) showed no relationship between the conditions of the trash can and the incidence of helminthiasis.

CONDITION OF CLEAN WATER FACILITIES

Based on the results, it was found that out of the 32 respondents, most had clean water facilitiesthat did not meet the requirements, namely 22 respondents (68.8%), and the least, namely respondents who had clean water conditions that met the requirements, were ten respondents (31.3%). The results of interviews and observations in the field show that the water source usedby the community for their daily needs is a spring that has been tested for water quality by health workers later. However, many conditions for clean water still need to meet the requirements, such as no cover in a water storage container.

This is in line with research from Yusriati (2023), shows that the variables that do not affect worm infection are the use of cleanwater, use of latrines, availability of clean water, waste disposal facilities, and availability of latrines.

NUTRITIONAL STATUS (BMI/U)

Based on the results, it was found that out of the 32 respondents, most of them had normal nutritional status, namely 21 people (65.6%), then seven people (21.9%) had more nutritional status, and the least were obese, four people (12.5%). Based on these results, it can be concludedthat most respondents have overweight status so that the child is not infected with STH; other factors include socioeconomic level, the mother's nutritional behavior, the

mother's knowledgeabout nutrition, and the child's eating pattern. This is in line with the research of Azizaturridhaet al., 2016 that the results of Fischer's Exact statistical test showed that there was no significanteffect of worm infection on nutritional status based on BMI/U in children at SDN 2 Barabai Darat with a value of p = 1.000 (> 0.05).

CONCLUSION

The incidence of STH infection at UPT SDN 060831 Medan City based on laboratory results from 32 samples was declared negative or no positive cases of STH infection were found. Environmental sanitation conditions that do not meet the requirements can be seen from several indicators such as the condition of the toilet, namely 22 respondents (68.8%), the condition of the SPAL, namely 24 respondents (75.0%), the condition of the trash can, namely 28 respondents (87.5%). %) and clean water facilities for 22 respondents (68.8%). Most nutritional status (BMI/U). The category itself of normal nutrition was 21 people (65.6%). So it is necessary to maintain environmental sanitation at home and children's personal hygiene. Apart from that, schools must also support government programs related to providing mass deworming medicine and providing sanitation facilities such as providing hand washing facilities, rubbish dumps and proper toilets in schools.

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Distribution Of Dengue Hemorrhagic Fever (DBD) Incidence In Jambi City

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Abstract:*Dengue Hemorrhagic Fever (DHF) is an infectious disease that is influenced by the environment and people's behavior. In Jambi City, Dengue Fever is still a public health problem. This research aims to distribute dengue hemorrhagic fever (DBD) incidence in Jambi City. This research uses Global Moran's analysis and Local Indicator of Spatial Association (LISA) to determine the Hot Spot and Cold Spot areas for dengue cases in Jambi City in 2018 -2022 with a sub-district analysis unit of 62 sub-districts. During 5 years of observation, the results showed that the distribution pattern of dengue fever cases was in the form of a clustered pattern (I>E[I]) in 2018-2022. The research results on the distribution of dengue fever cases from 2018-2022 showed that the lowest cases were in 2021, namely 132 cases, while the highest cases were in 2019, 698 cases. The results of this study are expected to provide an overview of the distribution of dengue fever incidence in Jambi City in 2018 - 2022 so that it becomes a recommendation material for the Jambi City Health Office or the Jambi City Government in an overview of environmental factors related to dengue fever incidence in Jambi City to prevent various diseases due to poor environmental sanitation in Jambi City. Knowing the distribution pattern of dengue fever can determine regional priorities in implementing dengue fever prevention and control intervention programs in Jambi City.*

Keywords: *Dengue fever, Mapping, Jambi City*

INTRODUCTION

Dengue fever (DHF) is an infection caused by the dengue virus through the bite of the mosquito vector Aedes aegypti and several other mosquito species such as Aedes albopictus, and Aedes polynesiensis. This disease can affect anyone and cause death, especially in children because the immune system against infectious viruses owned by children is still not formed (Astuti, Rejeki and Nurhayati, 2022).

Dengue is a global health problem because dengue virus infection can lead to endemicity. Dengue cases in the world have increased in various countries 30-fold in 50 years. These cases are not only found in urban areas but have spread to rural areas. An estimated 50 million dengue infections occur each year and 2.5 billion people worldwide live in dengue-endemic countries (Lubis, Sinaga and Mutiara, 2021). According to the World Health Organization (WHO), Indonesia is classified as one of the high dengue-endemic countries (Sadukh and Suluh, 2021).

The first outbreaks of DHF in Indonesia were in Surabaya and Jakarta in 1968. The number of DHF cases tends to increase and spread to various regions every year. Currently, DHF is one of the endemic diseases in almost all provinces and is one of the health problems that often increases the number of sufferers and the wider its spread in line with the increasing

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mobility and population density (Depkes RI, 2010), (Syukri *et al.*, 2022). This is due to the extraordinary events (KLB) of dengue that occur periodically within 3-5 years and dengue deaths occur mostly in children (Yusron, 2021).

In Indonesia alone, dengue cases in 2019 increased from the previous year, with an incidence rate of 24.75 to 51.53 per 100,000 population and a Case Fatality Rate (CFR) of 0.67% (Alfiyanti and Siwiendrayanti, 2021). DHF cases spread in all districts/cities in Jambi Province, one of which was in Jambi City. In 2020, Jambi Province had a DHF IR of 58.2 per 100,000 population, almost 20 points higher than the national DHF IR with a Case Fatality Rate of 0.7%. DHF cases have spread in all districts or cities in Jambi Province with the highest cases being in Jambi City with 724 cases which increased in 2021 where there were 131 cases of DHF with a death rate of 3 (three) people and in 2022 it increased to 249 cases of DHF in Jambi City, 5 (five) of whom died (Dinkes Jambi, 2022).

The increase in the distribution of DHF cases in Indonesia is not only influenced by human factors, but environmental factors can also cause DHF cases to differ from one region to another, such as population density, rainfall, proportion of urban areas, road density, and vegetation cover. The distribution of DHF cases based on area and environmental factors can be monitored through spatial analysis. Spatial analysis is an analysis that uses mathematical calculations to produce new data that has various meanings through the process of processing previous data (Wiwik Setyaningsih, 2019).

This spatial analysis activity can be carried out using Geographic Information Systems (GIS). Geographic information system is a system that can analyze spatial and non-spatial problems and provide solutions to these problems based on a spatial perspective. Spatial analysis with geographic information systems is useful in knowing the geographical location of infectious disease cases.

RESEARCH METHOD

This research is a descriptive study using DHF incidence data reported by the Jambi City Health Office from 2018-2022. The data used in the study are secondary data including data on the number of positive dengue cases in Jambi City in 2018-2022. In addition, administrative maps of Jambi City and demographic data were also used, namely population, and gender obtained from Bapeda and the Jambi City Statistics Center Agency.

The design of this research is time series, which is research by observing data at a certain time series. The data includes data on positive DHF patients who have been registered at the Jambi City Health Office. This research uses a quantitative method that is presented

descriptively which aims to describe the incidence of DHF in Jambi City with the help of supporting tools, namely using the Geoda 1.18 program.

RESULT AND DISCUSSION

Geographically, Jambi City is located at $1^{0}30'2.98"$- $1^{0}40'1.07"$ South latitude and $103^{0}40'1.67"$-$103^{0}40'0.22"$ East longitude and an average altitude of 10 to 60 meters above sea level. Jambi City is bordered on the north, west, south and east by Muaro Jambi Regency, in other words, Jambi City is surrounded by Muaro Jambi Regency.

Jambi City administratively has 11 sub-districts consisting of Telanaipura Sub-district, Jambi Selatan Sub-district, Jambi Timur Sub-district, Pasar Jambi Sub-district, Pelayangan Sub-district, Danau Teluk Sub-district, Sub-district Kota Baru, Sub-district Jelutung, Sub-district Alam Barajo, Sub-district Danau Sipin, Sub-district Paal Merah and has 62 sub-district.

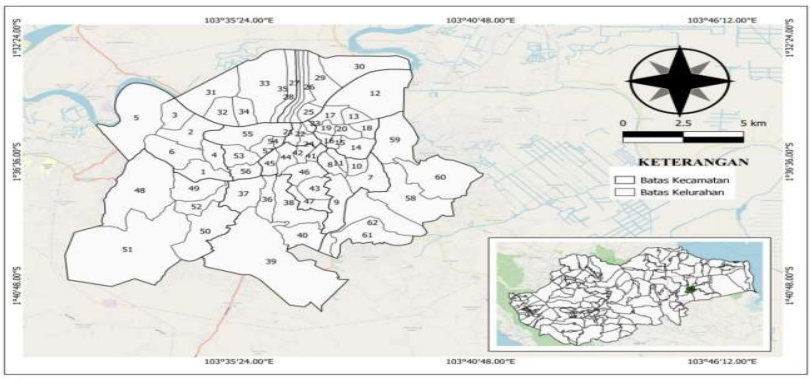
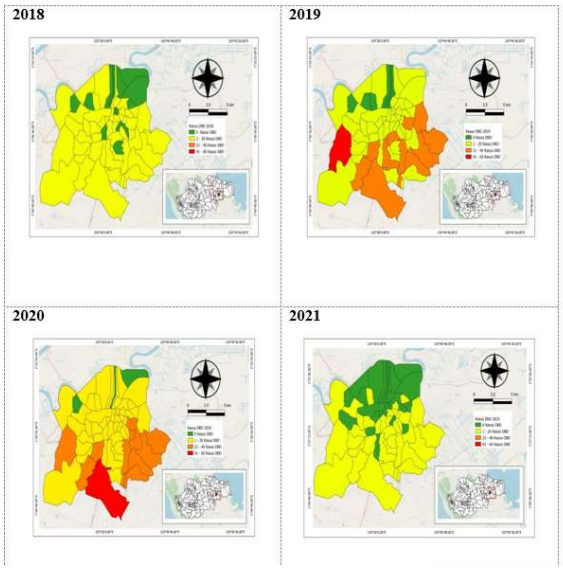


Image 1. Administrative Map of Jambi City



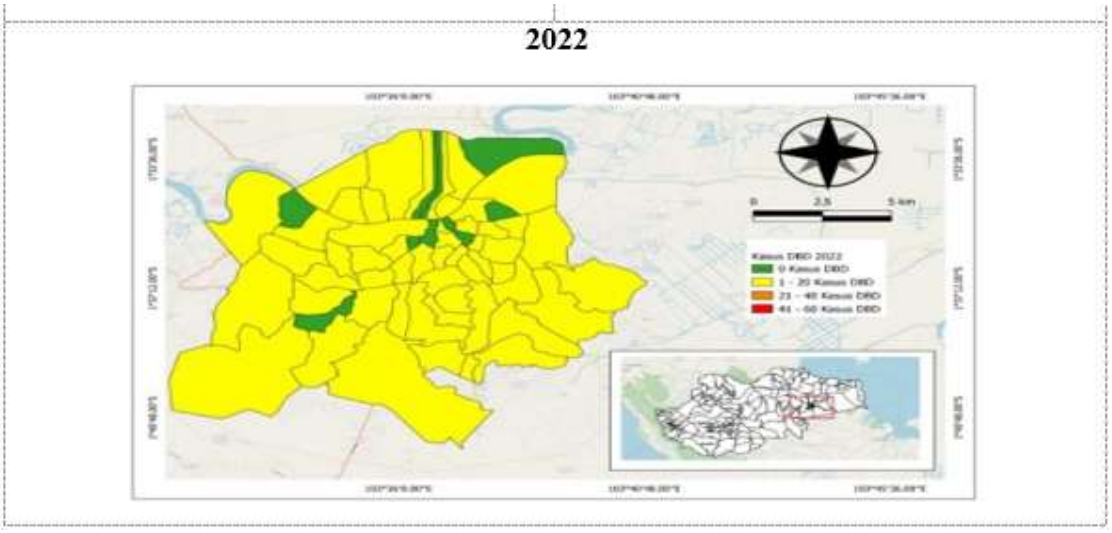


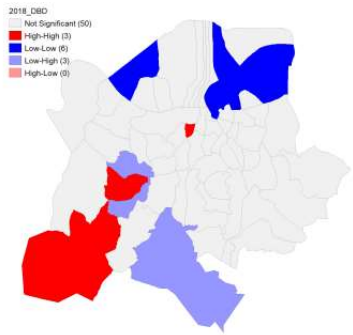
Image 2. Map of the distribution of dengue cases in 2018-2022

Based on the results of the distribution map of DHF cases above, it can be seen that from 2018-2022 the lowest cases were in 2021, namely 132 cases, while the highest cases were in 2019, totaling 698 DHF cases.

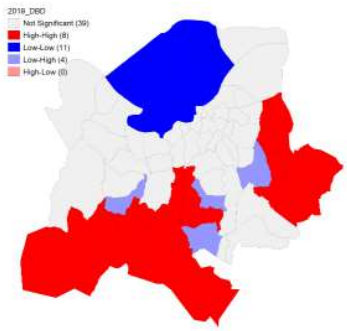
Autocorrelation of Local DHF Cases

The results of the local spatial autocorrelation analysis of DHF cases are as follows:

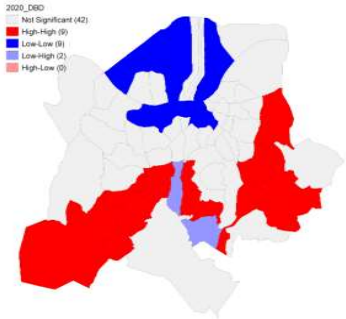
2018



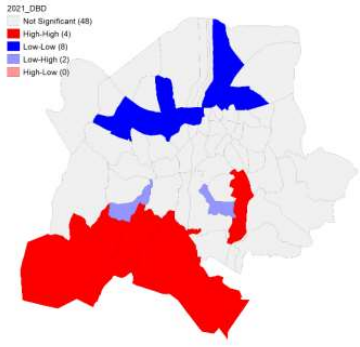
2019



2020



2021



2022

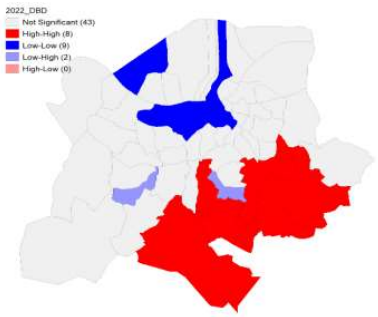


Image 3. LISA autocorrelation results

Based on the LISA autocorrelation results above, it can be seen that urban villages with the HH (High-High) category or referred to as DHF Hot Spot areas, where urban villages that have high dengue cases are surrounded by high dengue cases, were found in 2018, namely Bagan Pete Village, Rawasari and Murni Village. In 2019, namely Suka Karya Village, Paal Lima, Kenali Asam Bawah, Mayang Mangurai, Bagan Pete, Talang Bakung, Payo Selincah and Eka Jaya Village. In 2020, the villages are Pasir Putih, Simpang III Sipin, Paal Lima, Mayang Mangurai, Bagan Pete, Beliung, Talang Bakung, Payo Selincah and Paal Merah. In 2021, the villages are Thehok, Kenali Asam Bawah, Mayang Mangurai, Bagan Pete. In 2022, the villages are Pasir Putih, Thehok, Paal Lima, Kenali Asam Bawah, Kenali Asam Atas, Talang Bakung, Lingkar Selatan and Paal Merah.

In the observation results, some villages have consistently been in quadrant I (High-High) for several years, namely Bagan Pete Village, Mayang Mangurai, Paal Lima, and Kenali Asam Bawah. In Hot Spot areas or Quadrant I (High-High), the Jambi City Health Office can design intervention programs in vector prevention and control efforts, in addition to the Jambi City Health Office, the community can also play an active role in dengue prevention efforts to prevent the spread of the dengue virus to other villages.

CONCLUSIONS AND RECOMMENDATIONS

The results of this study are expected to provide an overview of the distribution of dengue fever incidence in Jambi City in 2018 - 2022 so that it becomes a recommendation material for the Jambi City Health Office or the Jambi City Government in an overview of environmental factors related to dengue fever incidence in Jambi City to prevent various

diseases due to poor environmental sanitation in Jambi City. Knowing the distribution pattern of dengue fever, it can determine regional priorities in implementing dengue fever prevention and control intervention programs in Jambi City.

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INTRODUCTION

Dengue fever (DHF) is an infection caused by the dengue virus through the bite of the mosquito vector Aedes aegypti and several other mosquito species such as Aedes albopictus, and Aedes polynesiensis. This disease can affect anyone and cause death, especially in children because the immune system against infectious viruses owned by children is still not formed (Astuti, Rejeki and Nurhayati, 2022).

Dengue is a global health problem because dengue virus infection can lead to endemicity. Dengue cases in the world have increased in various countries 30-fold in 50 years. These cases are not only found in urban areas but have spread to rural areas. An estimated 50 million dengue infections occur each year and 2.5 billion people worldwide live in dengue-endemic countries (Lubis, Sinaga and Mutiara, 2021). According to the World Health Organization (WHO), Indonesia is classified as one of the high dengue-endemic countries (Sadukh and Suluh, 2021).

The first outbreaks of DHF in Indonesia were in Surabaya and Jakarta in 1968. The number of DHF cases tends to increase and spread to various regions every year. Currently, DHF is one of the endemic diseases in almost all provinces and is one of the health problems that often increases the number of sufferers and the wider its spread in line with the increasing

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mobility and population density (Depkes RI, 2010), (Syukri *et al.*, 2022). This is due to the extraordinary events (KLB) of dengue that occur periodically within 3-5 years and dengue deaths occur mostly in children (Yusron, 2021).

In Indonesia alone, dengue cases in 2019 increased from the previous year, with an incidence rate of 24.75 to 51.53 per 100,000 population and a Case Fatality Rate (CFR) of 0.67% (Alfiyanti and Siwiendrayanti, 2021). DHF cases spread in all districts/cities in Jambi Province, one of which was in Jambi City. In 2020, Jambi Province had a DHF IR of 58.2 per 100,000 population, almost 20 points higher than the national DHF IR with a Case Fatality Rate of 0.7%. DHF cases have spread in all districts or cities in Jambi Province with the highest cases being in Jambi City with 724 cases which increased in 2021 where there were 131 cases of DHF with a death rate of 3 (three) people and in 2022 it increased to 249 cases of DHF in Jambi City, 5 (five) of whom died (Dinkes Jambi, 2022).

The increase in the distribution of DHF cases in Indonesia is not only influenced by human factors, but environmental factors can also cause DHF cases to differ from one region to another, such as population density, rainfall, proportion of urban areas, road density, and vegetation cover. The distribution of DHF cases based on area and environmental factors can be monitored through spatial analysis. Spatial analysis is an analysis that uses mathematical calculations to produce new data that has various meanings through the process of processing previous data (Wiwik Setyaningsih, 2019).

This spatial analysis activity can be carried out using Geographic Information Systems (GIS). Geographic information system is a system that can analyze spatial and non-spatial problems and provide solutions to these problems based on a spatial perspective. Spatial analysis with geographic information systems is useful in knowing the geographical location of infectious disease cases.

RESEARCH METHOD

This research is a descriptive study using DHF incidence data reported by the Jambi City Health Office from 2018-2022. The data used in the study are secondary data including data on the number of positive dengue cases in Jambi City in 2018-2022. In addition, administrative maps of Jambi City and demographic data were also used, namely population, and gender obtained from Bapeda and the Jambi City Statistics Center Agency.

The design of this research is time series, which is research by observing data at a certain time series. The data includes data on positive DHF patients who have been registered at the Jambi City Health Office. This research uses a quantitative method that is presented

descriptively which aims to describe the incidence of DHF in Jambi City with the help of supporting tools, namely using the Geoda 1.18 program.

RESULT AND DISCUSSION

Geographically, Jambi City is located at $1^{0}30'2.98"$- $1^{0}40'1.07"$ South latitude and $103^{0}40'1.67"$-$103^{0}40'0.22"$ East longitude and an average altitude of 10 to 60 meters above sea level. Jambi City is bordered on the north, west, south and east by Muaro Jambi Regency, in other words, Jambi City is surrounded by Muaro Jambi Regency.

Jambi City administratively has 11 sub-districts consisting of Telanaipura Sub-district, Jambi Selatan Sub-district, Jambi Timur Sub-district, Pasar Jambi Sub-district, Pelayangan Sub-district, Danau Teluk Sub-district, Sub-district Kota Baru, Sub-district Jelutung, Sub-district Alam Barajo, Sub-district Danau Sipin, Sub-district Paal Merah and has 62 sub-district.

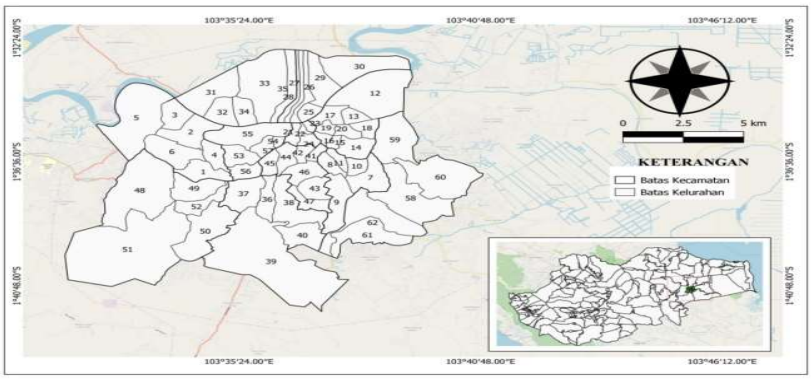
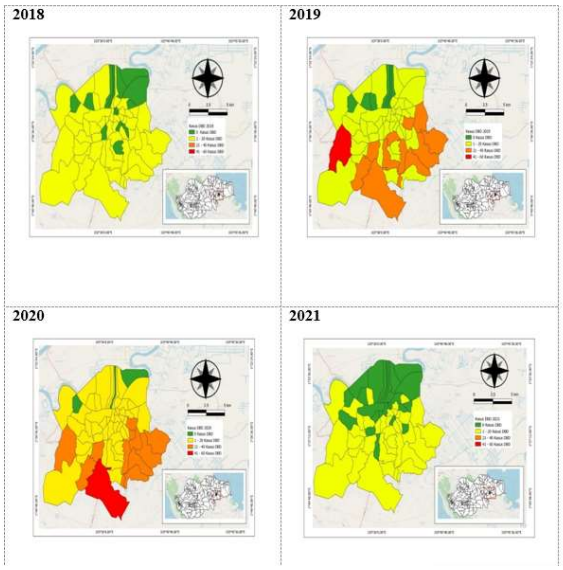


Image 1. Administrative Map of Jambi City



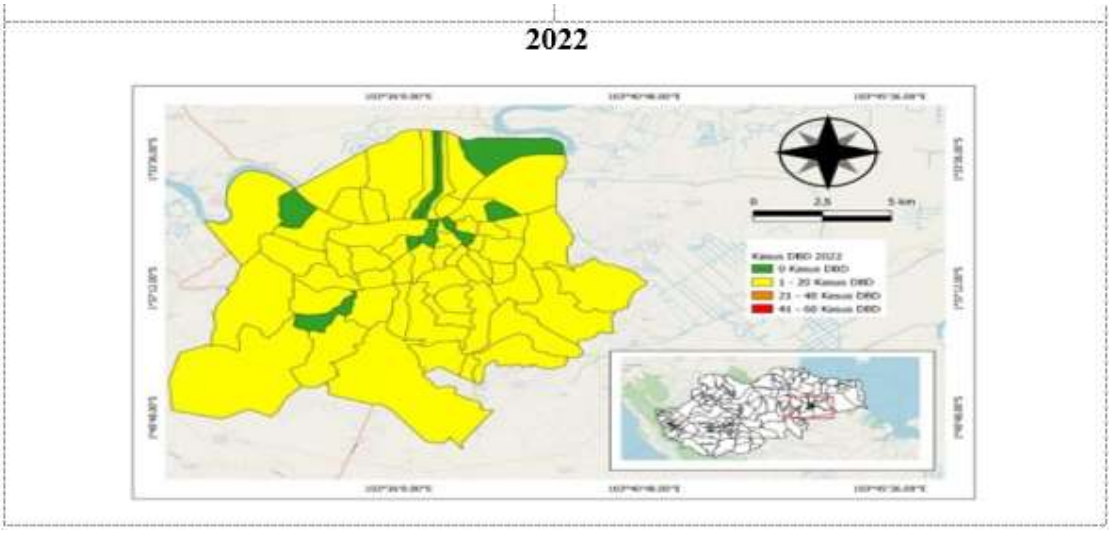


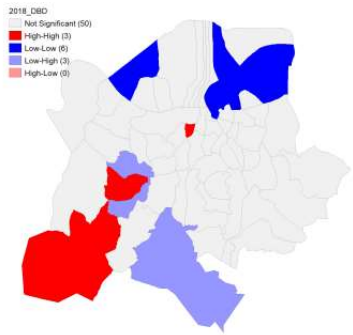
Image 2. Map of the distribution of dengue cases in 2018-2022

Based on the results of the distribution map of DHF cases above, it can be seen that from 2018-2022 the lowest cases were in 2021, namely 132 cases, while the highest cases were in 2019, totaling 698 DHF cases.

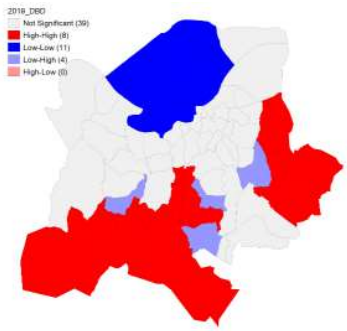
Autocorrelation of Local DHF Cases

The results of the local spatial autocorrelation analysis of DHF cases are as follows:

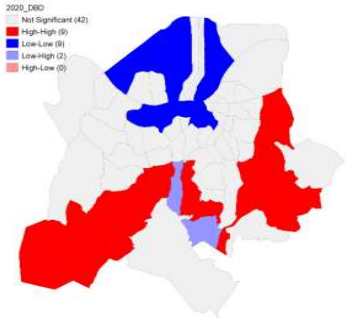
2018



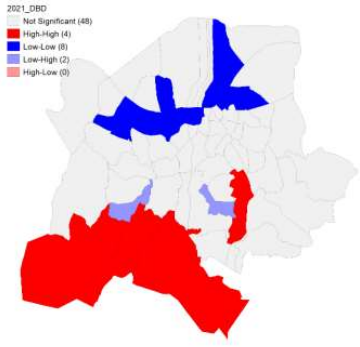
2019



2020



2021



2022

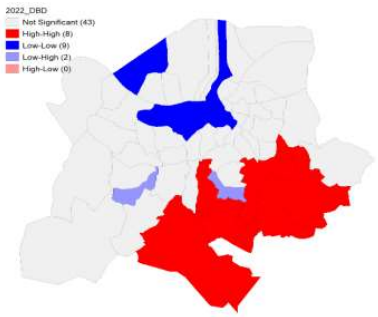


Image 3. LISA autocorrelation results

Based on the LISA autocorrelation results above, it can be seen that urban villages with the HH (High-High) category or referred to as DHF Hot Spot areas, where urban villages that have high dengue cases are surrounded by high dengue cases, were found in 2018, namely Bagan Pete Village, Rawasari and Murni Village. In 2019, namely Suka Karya Village, Paal Lima, Kenali Asam Bawah, Mayang Mangurai, Bagan Pete, Talang Bakung, Payo Selincah and Eka Jaya Village. In 2020, the villages are Pasir Putih, Simpang III Sipin, Paal Lima, Mayang Mangurai, Bagan Pete, Beliung, Talang Bakung, Payo Selincah and Paal Merah. In 2021, the villages are Thehok, Kenali Asam Bawah, Mayang Mangurai, Bagan Pete. In 2022, the villages are Pasir Putih, Thehok, Paal Lima, Kenali Asam Bawah, Kenali Asam Atas, Talang Bakung, Lingkar Selatan and Paal Merah.

In the observation results, some villages have consistently been in quadrant I (High-High) for several years, namely Bagan Pete Village, Mayang Mangurai, Paal Lima, and Kenali Asam Bawah. In Hot Spot areas or Quadrant I (High-High), the Jambi City Health Office can design intervention programs in vector prevention and control efforts, in addition to the Jambi City Health Office, the community can also play an active role in dengue prevention efforts to prevent the spread of the dengue virus to other villages.

CONCLUSIONS AND RECOMMENDATIONS

The results of this study are expected to provide an overview of the distribution of dengue fever incidence in Jambi City in 2018 - 2022 so that it becomes a recommendation material for the Jambi City Health Office or the Jambi City Government in an overview of environmental factors related to dengue fever incidence in Jambi City to prevent various

diseases due to poor environmental sanitation in Jambi City. Knowing the distribution pattern of dengue fever, it can determine regional priorities in implementing dengue fever prevention and control intervention programs in Jambi City.

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Exploring The Relationship Between Physical Activity and Mental Health in College Students

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Abstract. *This study explores how physical activity impacts mental health outcomes in college students. By examining data on exercise frequency, stress levels, and academic performance, the research identifies a positive correlation between regular physical activity and improved mental health, including reductions in stress and anxiety. The findings suggest that promoting physical activity could enhance mental well-being among students and improve academic performance.*

Keywords: *Physical activity, Mental health, College students, Stress, Anxiety, Academic performance, Well-being*

1. INTRODUCTION

The transition to college life can be a challenging time for many students, often marked by increased academic demands, social pressures, and the need to adapt to a new environment. These factors can contribute to elevated levels of stress and anxiety, adversely affecting students' mental health and academic performance. Physical activity has been widely recognized as a potential buffer against these challenges, with numerous studies indicating that regular exercise can lead to improvements in mental health outcomes.

This article aims to explore the relationship between physical activity and mental health in college students, focusing on how exercise can influence stress levels, anxiety, and overall well-being. Understanding this relationship is crucial for developing effective interventions that promote physical activity as a means to enhance mental health among college students.

2. LITERATURE REVIEW

The Importance of Physical Activity for Mental Health

Research has consistently demonstrated that physical activity plays a significant role in mental health. Regular exercise has been associated with decreased symptoms of depression and anxiety, improved mood, and enhanced overall psychological well-being (Craft & Perna, 2004). The physiological mechanisms underlying these effects include the release of endorphins, improved sleep patterns, and reductions in inflammatory markers (Meeusen & De Meirleir, 1995).

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Stress and Academic Performance

The college environment often subjects students to high levels of stress, which can detrimentally impact their academic performance. A study by Misra and McKean (2000) found that college students reported higher stress levels compared to the general population, with academic pressures being a significant contributing factor. As stress levels rise, students may experience difficulties in concentration, motivation, and retention of information, leading to a decline in academic achievement (Robotham & Julian, 2006).

Correlation Between Exercise and Reduced Stress

Numerous studies have indicated a positive correlation between physical activity and reduced stress levels among college students. For instance, a meta-analysis by Rebar et al. (2015) revealed that engaging in regular physical activity significantly decreases stress and improves mental well-being. These findings suggest that incorporating exercise into daily routines may be an effective strategy for managing stress during the college years.

3. METHODOLOGY

Participants

The study surveyed 500 college students from various universities in Iraq, including the University of Baghdad, Al-Nahrain University, and the University of Basra. Participants were selected through random sampling to ensure a representative demographic, including diversity in age, gender, and field of study.

Data Collection

Data were collected using a structured questionnaire that assessed participants' physical activity levels, mental health outcomes (including stress and anxiety), and academic performance. The International Physical Activity Questionnaire (IPAQ) was utilized to measure exercise frequency and duration, while the Perceived Stress Scale (PSS) and the Generalized Anxiety Disorder 7-item scale (GAD-7) were used to evaluate mental health.

Data Analysis

Statistical analyses were conducted using SPSS software to identify correlations between physical activity levels and mental health outcomes. Descriptive statistics were calculated, and Pearson correlation coefficients were used to assess the strength of associations.

4. RESULTS

Physical Activity Levels

The results indicated that 45% of participants engaged in moderate to vigorous physical activity at least three times a week. Those who participated in regular exercise reported significantly lower levels of stress and anxiety compared to their sedentary peers.

Stress and Anxiety Correlation

A Pearson correlation analysis revealed a strong negative correlation between physical activity levels and perceived stress ($r = -0.65$, $p < 0.01$) and anxiety scores ($r = -0.58$, $p < 0.01$). This indicates that higher physical activity is associated with lower stress and anxiety levels among college students.

Impact on Academic Performance

Students who reported regular physical activity also indicated higher levels of academic performance. Approximately 60% of active participants stated that exercise positively affected their concentration and motivation to study, in contrast to only 30% of sedentary students.

5. DISCUSSION

Implications of Findings

The findings of this study underscore the importance of physical activity in promoting mental health and academic success among college students. The significant correlations between exercise, reduced stress, and anxiety highlight the need for initiatives that encourage physical activity within academic settings.

Promoting Physical Activity

Colleges and universities should consider implementing programs and resources that facilitate access to physical activity opportunities, such as fitness classes, sports teams, and outdoor activities. Additionally, incorporating physical activity into the academic curriculum, such as mandatory physical education courses or wellness workshops, could further enhance students' well-being.

Limitations and Future Research

While this study provides valuable insights, it is essential to recognize its limitations. The cross-sectional design prevents causal inferences from being drawn, and self-reported measures may introduce biases. Future research should employ longitudinal designs to establish causal relationships and explore the mechanisms through which physical activity impacts mental health.

6. CONCLUSION

This study highlights the significant relationship between physical activity and mental health outcomes among college students in Iraq. Regular exercise is associated with lower levels of stress and anxiety and improved academic performance, emphasizing the need for institutions to promote physical activity as a vital component of student well-being. By fostering environments that encourage physical activity, colleges can support their students' mental health and enhance their academic experiences.

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