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Original Article

Mapping of Important HIV/AIDS Hotspots in Palu City Following Natural Disaster

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ABSTRACT

This study aims to obtain a map of the distribution of HIV and AIDS Key Population Hotspots based on the criteria for MSM, Waria and FSW after the natural disaster in 2018. The remapping method uses a Geographic Information System (GIS) application. The data processing technique uses the waterfall model scheme, namely, completing the application in a structured or sequential manner, where a stage must be completed first before going to the next stage. No Ethical consideration is needed. The shift in key population hotspot data from 2017and to 2022 data and then Natural Disasters (Earthquake, Liquefaction and Tsunami) in 2018 had an impact on geographical location shifts with conditions in 2017, 4 Districts became key population hotspot locations with 29 hotspots while in 2022 14 key population hotspots were found consisting of 5 sub-districts, so there was an additional 1 sub-district which became a geographically shifting hotspot. Features of activity hubs centered on major population centers, such as hotels, boarding houses, salons, cafés, clubs, city parks, and malls in 2017; in 2022, other amenities like laundry will be included. Male Fellow (MSM), Female Sex Workers (FSW), and Transgender are the features of the major population hotspots since 2017, however in 2022 Natural Disasters (Earthquake, Liquefaction, and Tsunami) in 2018 did not suffer a shift.

Keywords: *Key Population Hotspots, HIV and AIDS, Post-Disaster*

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INTRODUCTION

Initiation of antiretroviral therapy (ART) at or soon after HIV diagnosis and sustained viral suppression substantially reduces HIV transmission [1,2,3] and HIV-related morbidity and mortality [4]. In 2014, the Joint United Nations Programme on HIV/AIDS (UNAIDS) set ambitious global targets to achieve HIV epidemic control, recommending programs aimed at 90% of people living with HIV (PLHIV) knowing their HIV status, 90% of people diagnosed with HIV infection receiving sustained ART, and 90% of people receiving ART to achieve viral suppression [5].

Key populations are groups at risk of contracting or transmitting HIV caused by unsafe sex or the use of unsterile injecting drugs. In HIV and AIDS prevention and control programs, key populations are defined as people or groups whose social situations or behaviors make them vulnerable or at risk of being exposed to or exposing HIV to people in the group or outside. the group. HIV and AIDS

risk behavior can carry a high risk of contracting HIV infection to oneself or others. These behaviors include sexual intercourse with multiple partners without a condom, using needles and syringes (insul), or non-sterile medical equipment, which may be contaminated with other people's blood, both on oneself and others, and receiving blood transfusions from the infected [6].

The risk of HIV infection varies depending on the type of sexual activity. Anal and vaginal sex without a condom are the highest-risk modes of sexual transmission of HIV. For unprotected anal sex with an HIV-positive partner, the estimated risk of infection per act ranges from 0.06 to 0.82%, depending on the role in the sexual relationship (giver or receiver), insertive/giver or receptive/receiver [7].

A meta-analysis study of heterosexual HIV transmission found that in high-income countries, before combination ARV therapy was introduced, the risk of transmission with any sexual intercourse was 0.04% if the female partner was HIV-positive and 0.08% when the male partner was HIV-positive. positive. This rate is much higher in low-income countries if the HIV-positive partner is in the early or late stages of HIV infection, or if one partner has an STI. In vaginal sex, the risk of infection is greater for women with HIV-positive male partners than men with HIV-positive female partners [8,9,10].

Sexually transmitted infections also increase the risk of HIV infection by more than two-fold for someone who has sex with an HIV-positive heterosexual person [11,12], and more than double the likelihood of HIV-positive transmission to their sexual partner [13,14]. Condom use consistently reduced the risk of contracting STIs and HIV. Condom protection in HIV infection through insertive anal sex with an HIV-positive partner is 63%, receptive anal sex with an HIV-positive partner is up to 72%, and vaginal sex is up to 80% [13,15].

Indonesia's high Disaster Risk Index (IRB) encourages the government to pay extra attention to disaster management efforts. According to the 2015-2019 National Medium-Term Development Plan, the BNPB targeted a 30% reduction in IRB by the end of 2019. Various efforts have been made by the BNPB to achieve this target, starting from increasing disaster management capacity in priority areas, in collaboration with ministries and other institutions, to formulate guidelines for implementing new disaster management. However, in the midst of disaster management efforts carried out by the government and related institutions, one central issue generally escapes discussion. The issue is related to reproductive health services during emergencies. Disasters have a significant impact on the reproductive health of affected residents, particularly women, children, and youth. Damage to health infrastructure hampers comprehensive reproductive health services. Limited access to contraception in a disaster situation can increase the number of unwanted pregnancies and the incidence of STIs and HIV. Additionally, unstable post-disaster social conditions can increase the risk of sexual violence.

Indonesia's geographical, demographic, sociological, meteorological, and climatological dynamics not only make it rich in natural resources, but also make it prone to disasters (natural, non-natural, and social). This condition can be used as a laboratory to produce disaster experts, knowledge, and technology in Indonesia [16]. The history of disasters in Indonesia shows that the number of incidents and victims is increasing and complex [17,18], which requires a reliable disaster management and disaster risk management system [19]. The Palu City Health Office report, February 2, 2018, stated that 98 residents of Palu City died as a result of contracting HIV and AIDS.

The Palu City Health Office noted that there were 1,114 cases of HIV and 662 AIDS cases. The highest number of cases was found to be dominated by youth aged 19-35 years, with an increasing trend occurring in housewives. He emphasized that efforts to strengthen preventive socialization activities, diagnosis systems, treatment systems, and patient rehabilitation, both within the family and in the community, are steps to be taken, and these activities are expected to have no new HIV and AIDS infections and no more discrimination against HIV and AIDS sufferers [6].

This study aims to analyze the geographical and social mapping of HIV and AIDS Key Population Hotspots in Palu City and then create a Key Population Hopspot map to control and prevent HIV and AIDS in Palu City.

METHOD

The research was conducted in Palu City for six months from April 2022. The population and research samples of 29 HIV and AIDS Key Population Hotspots were obtained from the 2017 Palu City Health Office report before the Natural Disaster (2018 Earthquake, Liquefaction and Tsunami in Palu City). Determination of the sample size by selecting the entire population (total sample).

The research method to obtain precise and accurate data for completeness in creating a Geographic Information System (GIS) is carried out in several steps. The research method is carried out, namely determining the type of research data, determining the data collection method, and determining the data processing techniques used; there are some data needed to making geographic information systems: primary data, obtained directly at the target of the research object. The data included information on the location of Key Population Hotspots, description of hotspot characteristics, the location of the latitude and longitude lines, and the location of activities (addresses) around the location using a cell phone GPS tool. Secondary data are obtained by the Health Service profile, which accommodates HIV and AIDS data in Palu City, which supports research. In completing the research obtained from the media library on the theory of application systems used in making regional geographic information system application programs in Palu City based on the web.

Data collection methods were as follows:1) Observation, by carrying out field visits to Key Population Hotspots obtained from initial information from the Health Office, HIV and AIDS Community Liaison Officers, and partner reports (community observers of HIV and AIDS in Palu City including Community Reports, Police Reports, and NGO Reports. Searching for data by means of coming directly to the hotspot location, which is the target of the research object, data will be obtained regarding the images that will be included in the application and also the location points of the research object; 2) Interview: Collecting data by interviewing several people who become contact persons who understand the object of research. In this way, the writer can choose the best route to the location and find the location without losing much time while collecting data. 3) Library Studies: collection of data and information, as well as knowledge obtained from books and websites on the Internet regarding the theory concerned in making applications.

Data processing techniques use the waterfall model scheme, namely, making applications complete in a structured or sequential manner, where a stage must be completed first before moving on to the next stage. If the first step is not completed, the second step cannot be performed. If the second step has not been completed, then the third step cannot be completed, and so on.

RESULTS

The HIV and AIDS epidemic in Indonesia is concentrated. This means that transmission occurs mostly in key population groups who are vulnerable to infection because they are involved in risky behavior and have more than one sexual partner, such as female sex workers (WPS) and injecting drug users (IDUs/IDUs). Transmission in key populations can 'cross over' to the general population with the existence of bridge groups such as customers of sex workers who can infect their partners. Ultimately, the HIV and AIDS epidemic could spread to the general population if prevention was not implemented.

In the HIV and AIDS prevention and prevention program, data regarding the number and location of key HIV-affected populations (hereinafter abbreviated as “key populations”) in Palu City so that treatment activities can be carried out on the target. To obtain this data, it is necessary to carry out mapping, which is one way to determine the number and location of key HIV and AIDS hotspots in Palu City. The mapping of key populations in Palu City in 2022 is an update of previous mapping. This needs to be done because the number of key populations is always dynamically fluctuating, bearing in mind that the mobility factor or overtour of key populations both between regions in Palu City and from and out of Palu City is quite high. In addition, the update also aims to identify existing conditions with the possibility of new hotspots emerging, targeting four key populations namely Men-Male (MSM), transgender Waria, and Female Sex Workers (FSW).

Concentrated epidemic control efforts include providing access to testing, prevention, and treatment services when key populations

require them. HIV and AIDS must be dealt with quickly and prevent from spreading to the general population through bridge populations. Identification and estimation of the size of key populations is important to provide an overview of the epidemic situation, and then be used as a reference in the preparation of coping strategies, planning, and budgeting of activities. Key population mapping is the first step in calculating estimates. The estimated number of key populations will be used as input to calculate the projected growth of the key populations. Projections need to be calculated because the life expectancy of people infected with HIV is improving with antiretroviral treatment. Thus, it will have an impact on financing prevention programs and health services for people infected with HIV.

Based on the Regulation of the Minister of Health Number 43 of 2016 concerning MSS in the Health Sector, which contains 12 types of basic services that must be carried out by the Regency/City Governments, point 12 states the target of Health Services for People at Risk of HIV Infection. The achievement of SPM is directed more to the authority of the Regional Government. The concept of SPM becomes Regional Government Performance; therefore, in this case, the Bandung City Government must ensure the availability of sufficient resources (facilities, infrastructure, tools, labor, and money/costs) so that the process of implementing SPM runs adequately. SPM is a provision regarding the type and quality of basic services, which are mandatory government affairs that every citizen is entitled to receive. The SPM is the minimum that must be carried out by the Regional Government for its people, so the SPM target must be 100% every year.

Mapping data collection was implemented for six months, starting from March 2022 to August 2022. The mapping data collection was carried out in Palu City. Mapping was carried out in collaboration with the Palu City Health Office and the Research Team from the Faculty of Public Health under the control of the Tadulako University Research and Community Service Institute. After conducting research on Social Mapping of Key Population Hotspots, the following data is obtained.

Table 1. Data on Hotspot Distribution of HIV and AIDS Key Populations Prior to Natural Disasters (Earthquake, Liquefaction and Tsunami) in 2017

NO	District	Hotspot	Location
1	Palu Timur	W Café	Jl. Tadulako
2	Palu Timur	C Salon	Jl. R.E Martadinata
3	Palu Timur	Hotel PI	Jl. M. Thamrin
4	Palu Timur	D Karaoke	Jl. Sigma
5	Palu Timur	F Karaoke	Jl. Thamrin Atas
6	Palu Timur	A Salon	Jl. Tombolotutu
7	Palu Timur	A Salon	Jl. Terkukur
8	Palu Timur	GYM D	Jl. Kotamso
10	Palu Timur	J Salon	Jl. Haji Hayun
11	Palu Selatan	S Salon	Jl. Tg. Karang
12	Palu Selatan	Kompleks Masomba	Jl. Tg. Pangimpuan
13	Palu Selatan	Cendrawasih	Jl. Cendrawasih
14	Palu Selatan	GYM M	Jl. Emi Saelan
15	Palu Selatan	Kompleks Purnawirawan	Jl. Purnawirawan
16	Palu Selatan	Taman Kota	Jl. W. Monginsidi
17	Palu Selatan	Gang Doly	Samping Mall Tatura
18	Palu Barat	Salon Mega	Jl. Nangka
19	Palu Barat	Salon Mimi	Jl. Sis. Al-Jufrie
20	Palu Barat	Salon Mega	Jl. Nangka
21	Mantikulore	Kompleks Pemancar	Jl. R.E Martadinata
22	Mantikolore	T Kafe	Jl. Cut Mutia
23	Mantikolore	Pantai Talise	Jl. Cut Mutia
24	Mantikolore	T Café	Jl. Balai Kota Selatan
25	Mantikolore	HT Salon	Jl. Hangtua
26	Mantilkolore	Vatulemo	Walkot
27	Mantilkolore	K Café	Jl. Prof Moh Yamin
28	Mantikulore	Eks Lokalilasasi Tondo	Jl. Dayoh Dara
29	Mantikulore	F Salon	Jl. Veteran

Table 1 shows an overview of HIV and AIDS Key Population Hotspots in Palu City in 2017 of the 29 Main Hotspots, consisting of nine Key Population Hotspots in the East Palu District area, seven Key Population Hotspots in the South Palu District area, three Key Population Hotspots in the West Palu District, and ten Key Population Hotspots in the Mantikolore District area. After the post-disaster re-mapping of Natural Disasters (Earthquake, Liquefaction and Tsunami) in 2022, the following data were found for HIV and AIDS Key Population Hotspots in Palu City:

Table 2. Data on Hotspot Distribution of Key Populations of HIV and AIDS after Natural Disasters (Earthquake, Liquefaction and Tsunami) were based on the category of men who have sex with men (MSM).

NO	District	Hotspot	Location
1	Palu Timur	Mr. D	Jl. Katamso
2	Palu Timur	Kampung Nelayan	Jl. Kaombona
3	Palu Timur	Swalayan B	Jl. S Parman
4	Palu Timur	D" Prem	Jl. Hangtua
5	Palu Timur	Café BC	Jl. Jabal Nur
6	Palu Timur	Hutan Kota	Jl. Jabal Nur
7	Palu Timur	Perdos	Jl.Tugu Perdamaian
8	Palu Timur	Citraland	Jl. RE Martadinata
10	Palu Timur	Gym T	Jl. Roviga
11	Palu Timur	Café 1xx	Jl. Setia Budi
12	Palu Barat	Mall PGM	Jl. Diponrgoro
13	Palu Barat	Kost Ed	Jl. Asam Dua
14	Palu Selatan	Gym M	Jl. Emi Saelan

Table 2 provides an overview of HIV and AIDS Key Population Hotspots in the category of men having sex with men in Palu City in 2022. There are as many as 14 hotspots, with 11 Main Hotspots in East Palu District, at least one Main Hotspot is in the South Palu Subdistrict, and two Hotspots are in West Palu District.

Table 3. Data on Hotspot Distribution of Key Populations of HIV and AIDS After Natural Disasters (Earthquake, Liquefaction andTsunami) Based on Waria Category

NO	District	Hotspot	Location
1	Palu Timur	A Salon	Jl. Tombolotutu
2	Palu Timur	C Salon	Jl. R. E Martadinata
3	Palu Timur	Lorong Tekukur	Jl. Tekukur
4	Palu Timur	Jl. Pramuka	Jl. Pramuka
5	Palu Timur	E Club	Jl. Thamrin Bawah
6	Mantikulore	F Salon	Jl. Veteran
7	Mantikulore	CH Salon	Jl. Merpati
8	Mantikulore	Taman Vatulemo	Jl. Balai Kota
10	Mantikulore	F Karaoke	Jl. Thamrin Atas
11	Palu Selatan	Gang Doly	Samping Mall Tatura
12	Palu Selatan	Kompleks Masomba	Jl. Tg Pangimpuan
13	Palu Selatan	L Loundry	Jl. Cendrawasih
14	Palu Barat	Kompleks Impres	Jl. Labu

Table 3 shows information on the Key Population Hotspots for HIV and AIDS with the transgender category in Palu City in 2022 as many as 14 of the most Hotspots with 5 Main Hotspots in East Palu District, 4 Main Hotspots are in the working area of Mantikolore Sub-District, 3 Main Hotspots are in the working area of Palu Sub-District South and at least 1 Main Hotspot is in the working area of West Palu District.

Table 4. Data on Hotspot Distribution of Key Populations of HIV and AIDS after Natural Disasters (Earthquakes, Liquefaction and Tsunami) Based on the category of Female Sex Workers

NO	District	Hotspot	Location
1	Palu Timur	PI Hotel	Jl. M. Thamrin
2	Palu Timur	D Karaoke	Jl. Sigma
3	Palu Timur	F Karaoke	Jl. Thamrin Atas
4	Palu Timur	E Club	Jl. Thamrin Bawah
5	Palu Timur	PL Café	Jl. Hangtua
6	Palu Timur	XX Club	Jl. Setia Budi
7	Palu Selatan	Komp. Purnawirawan	Jl. Purnawirawan
8	Palu Selatan	B Hotel	Jl. Basuki Rachmat
10	Palu Selatan	Hapy Pupy	Jl. Emisaelan
11	Palu Selatan	G Kost	Jl. Garuda
12	Mantikulore	Eks Lokalilasasi Tondo	Jl. Dayoh Dara
13	Mantikulore	Kompleks Pemancar	Jl. R.E Martadinata
14	Ulujadi	DM Club and lounge	Jl. Manonda

Table 4 shows the distribution of HIV and AIDS Key Population Hotspots in Palu City in 2022, as many as 14 Main Hotspots, consisting of six Key Population Hotspots in the East Palu District area, which is the largest District Area, four Key Population Hotspots in the South Palu District area, two Key

Population Hotspots in the Mantikolore District area, and one key population hotspot in the Ulujadi district area.

DISCUSSIONS

Distribution of HIV and AIDS Key Population Hotspots in Palu City Before the Disaster

Geographical mapping of key population hotspots in Palu City was obtained through a Geographic Information System application for all key population hotspots. The number of key population hotspots in Palu City before the liquefaction earthquake and tsunami occurred was 29 points, the most mapped of which were in the Mantikolore District 10 hotspots and the second order were 9 hotspots in the East Palu sub-district, generally spread over five sub-districts in the City Palu, namely seven hotspots in the South Palu District and three hotspots in the West Palu District area, which consists of 13 sub-districts in Palu City in 2022.

Key population hotspots were spread across the four sub-districts in Palu City. Many hotspots are located in the city center, especially in men. The figure below shows how key populations were distributed in Palu City before the natural disaster (the Earthquake, Luckifaksi and Stunami).

The Mantikulore sub-district was divided into eight sub-districts: Kawatuna, Lasoani, Layana Indah, Poboya, Talise, Talise Valangguni, Tanamodindi, and Tondo. The key population hotspot distribution map in Figure 2 shows that there are 15 key population hotspots. Mantikolore mortality ranks the highest in the distribution of key population hotspots, where there are three main hotspot criteria: MSM, FSW, and waria, who are active in karaoke places, salons, gyms, and cafes, as well as city parks.

Based on its geographical position, East Palu is bordered by the North of Palu Bay and Mantikulore District; South - South Palu; West – Kec. West Palu, East Kec. Manticulore. East Palu District consists of five villages: West Besusu, Central Besusu, East Beusu, North Lolu, and South Lolu. The East Palu District is one of the oldest sub-districts in Palu City, with a land area of 7.71 km^2. The East Palu District is located in the middle of Palu City, with the capital being the West Besusu sub-district. If one observes from Figure 2 the key population hotspot distribution map, there are ten key population hotspots. The East Palu neighborhood ranks second in the distribution of key population hotspots, where there are three main hotspot criteria, namely MSM, FSW, and waria, who are active in karaoke, salons, gyms, and cafés, as well as the City Forest.

The South Palu District consists of five sub-districts: South Birobuli Sub-District, Petobo Sub-District, North Birobuli Sub-District, North Tatura Sub-District, and South Tatura Sub-District. South Palu District, which is part of Palu City, has administrative boundaries as follows: North side, East side, South side West side, Borders with East Palu District, Borders with Mantikulore District, Borders with Sigi Biromaru District, Sigi Regency: Borders with Tatanga District, If Observed in Figure 2, there are 7 key population hotspot distribution maps

West Palu District consists of 6 sub-districts, namely: Ujuna Sub-District, Baru Sub-District, Siranindi Sub-District, Kamonji Sub-District, Balaroa Sub-District, Lere Sub-District. West Palu District is part of Palu City and has the following administrative boundaries: north-side east side south-west side, Borders with Ulujadi District, Borders with East Palu District, Borders with Tatanga District, Borders with Donggala Regency and Sigi Regency.

The land area of West Palu District is 8.28 km^2 consisting of six sub-districts that extend from east to west, all of which can be accessed using four-wheeled or two-wheeled vehicles. The characteristics of the West Palu District area according to elevation (height above sea level (DPL), which is between 0 and 15 m) are measured based on the location of the sub-district office. The entire area is land and its morphology is relatively flat. Areas directly adjacent to the sea or coastal areas, namely Kelurahan Lere, whereas the other areas are not coastal areas. As shown in the distribution map of key population hotspots in Figure 2, there are three key population hotspots. Kematan Palu Barat ranks fourth in the distribution of key population hotspots, with 3 main hotspot criteria, namely FSW and waria , whose activities were in salons, gyms and boarding houses and malls Map of Distribution of HIV and AIDS Key Population Hotspots before the disaster (Earthquake, Liquefaction and

Tsunami) as follows:

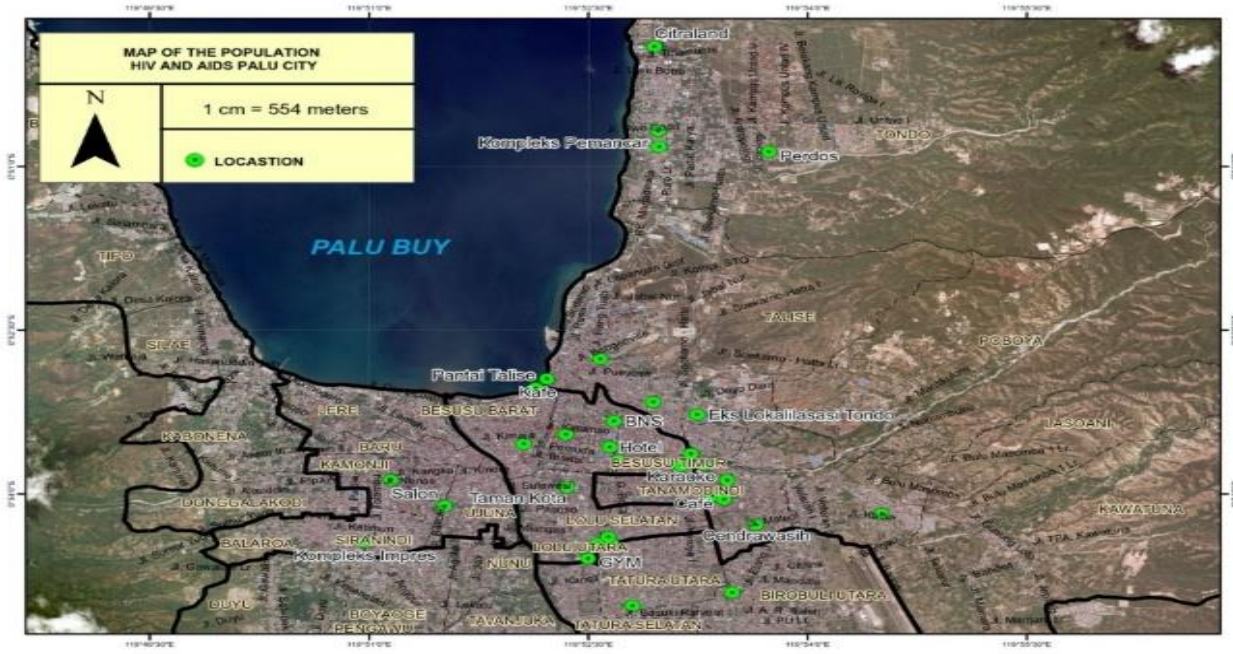

Figure 1. Distribution of Key Population Hotspots by District in Palu City Before Natural Disasters (Earthquake, Liquefaction and Tsunami)

After the 2022 post-natural disaster (earthquake, liquefaction, and tsunami) remapping was carried out, an overview of key population HIV and AIDS hotspots in Palu City was obtained, then continued by comparing the 2017 data to the 2022 data, and a shift in the number of key population hotspots that could be identified was found. Judging from the distribution of hotspot data in 2017, there were 29 hotspots spread across the four districts in Palu City. In 2022, the distribution of hotspot data totaling 14 can be seen in Figure 2: Map of the distribution of Key Population HIV and AIDS Hotspots after the 2022 disaster (Earthquake, Liquefaction and Tsunami) based on MSM, Transgender and WPS criteria in Palu City, as follows:

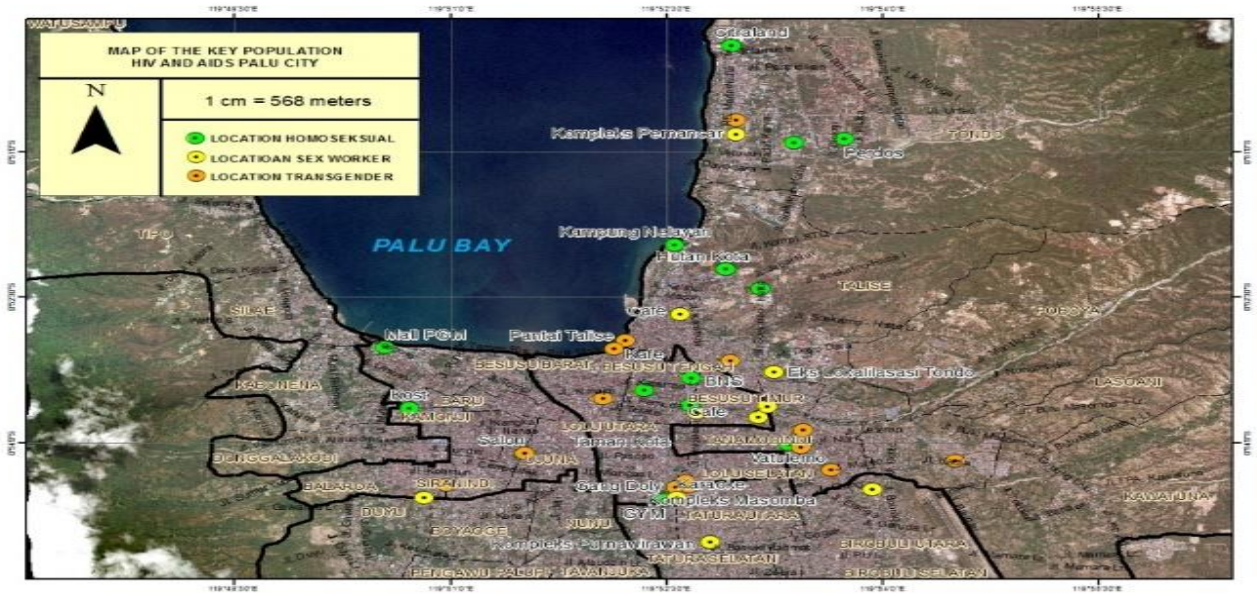

Figure 2. Distribution of Key Population Hotspots in Palu City After Natural Disasters (2018 Earthquake, Liquefaction and Tsunami) Based on MSM, Waria and FSW Criteria in 2022

The distribution of key population hotspot data is 14 points in 2022 compared with the 2017 key population hotspot data, shifting both geographically and demographically based on hotspot characteristics and types of activity places. As a result of natural disasters (earthquakes, liquefaction, and tsunamis that occurred in 2018), the location and place of activity for key population hostpots have changed because of natural disaster situations that have had an impact on the economic, social, and environmental fields. Damage to infrastructure can disrupt social activities, casualties, ecosystem damage, and loss of shelter.The Central Sulawesi area is one of the earthquake-prone areas in Indonesia [20,21], especially Palu City which is passed by the Palu Koro Fault, which is the main fault on Sulawesi Island and classified as an active fault [22,23].

The earthquake disaster that occurred in Palu City on September 28 2018 at 15.00, with a magnitude of 6.1 Mw which rocked Palu City, resulted in the destruction of facilities and infrastructure on the Palu City Coast. The Lere coast is one of the areas that suffered considerable damage because it is located south of Palu Bay, which allowed the tsunami to focus on that area. Communities living in coastal areas are vulnerable to various types of disasters, such as hurricanes, storms, tsunamis, and heavy rains.

The disaster claimed 2,045 lives and suffered a loss of 18.4 trillion, which was explained by the BNPB. The impact of the earthquake and tsunami disaster on the Lere coast of Palu City in the form of economic, social, and environmental factors. Disasters that occur in urban coastal areas, such as tsunamis, cause damage to roads, parking lots, construction sites, and buildings [24,25]. Disasters such as earthquakes also have an impact on asset damage, death and injury, loss of supplies, loss of communication, loss of power, loss of water services, loss of social services, loss of business, loss of social structures and functions [26,27,28,29], and put forward the impact of disasters resulting in social damage that causes physical damage, loss or damage to property and infrastructure, psychosocial, socio-demographic, socio-economic, and socio-political disturbances.

Distribution of HIV and AIDS Key Population Hotspots in Palu City after the Disaster (Earthquake, Liquefaction and Tsunami) based on MSM, Transgender and WPS criteria in 2022

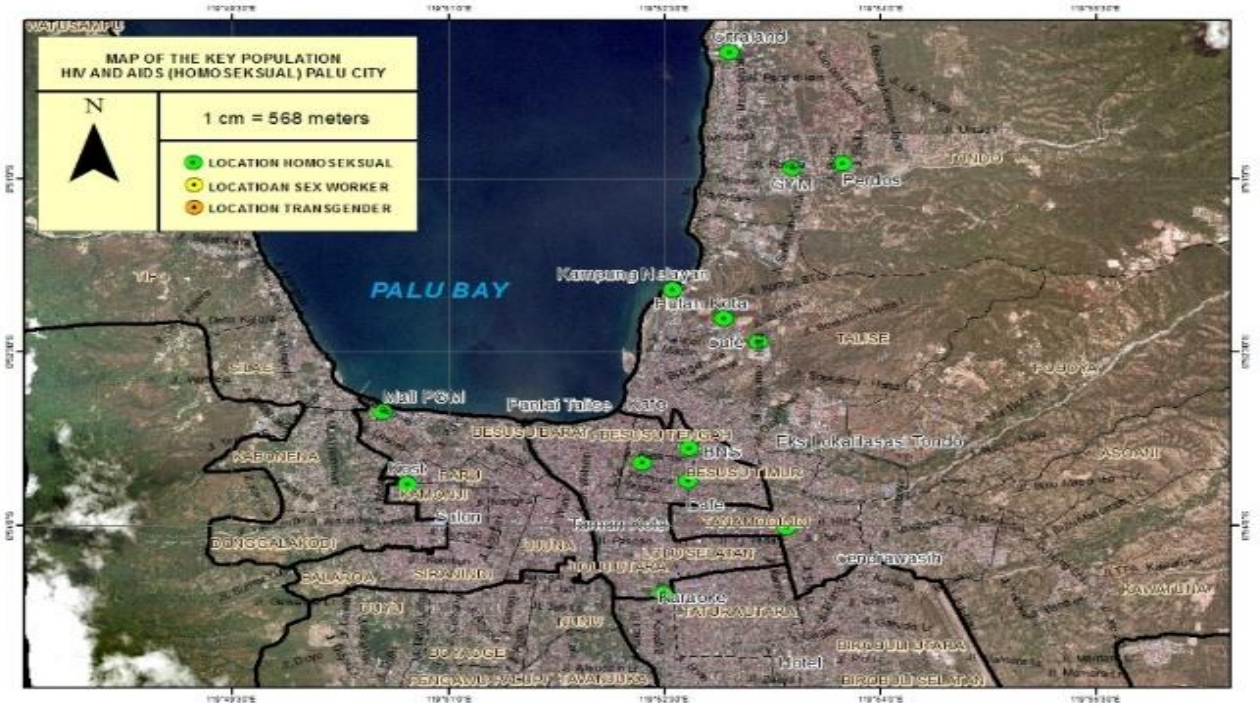

Figure 3. Distribution of Population Hotspots based on Male-Male (MSM) criteria after Natural Disasters (Earthquake, Liquefaction and Tsunami) data for 2022

The risks of communicable diseases and post-disaster deaths are generally due to several unavoidable conditions. First, the sudden occurrence of large-scale evacuations in a short time causes grouping of people at a certain point, with conditions as they are. Refugees usually have dense populations but do not have basic sanitation facilities and adequate drinking water. The BNBP released the number of refugees reaching 73 thousand people in 109 points, with inadequate services and facilities. Second, the damage to various health facilities, both hospitals and Puskesmas, as well as the limited supplies of medicines and health logistics, as well as personnel in the field, limited health services for disaster victims. In a disaster situation, health workers at the disaster site experience trauma and dilemmas. They are victims, but they also have to help others because of their competence and expertise. The risk of refugees being infected with communicable diseases increases with a weakening of their physical condition. Decreased resistance of the human body increases the ability of germs to transmit diseases in a bad environment. Third, in an emergency, it is difficult to predict the end of this condition. It depends on the type and extent of the disaster, the affected population, and the severity of the impact caused by the disaster, both on humans and life support infrastructure, as well as how quickly relief efforts are taking place. Map of the distribution of HIV and AIDS Key Population Hotspots post-disaster (Earthquake, Liquefaction, and Stunami 2018) in 2022 based on MSM criteria in Palu City as follows:

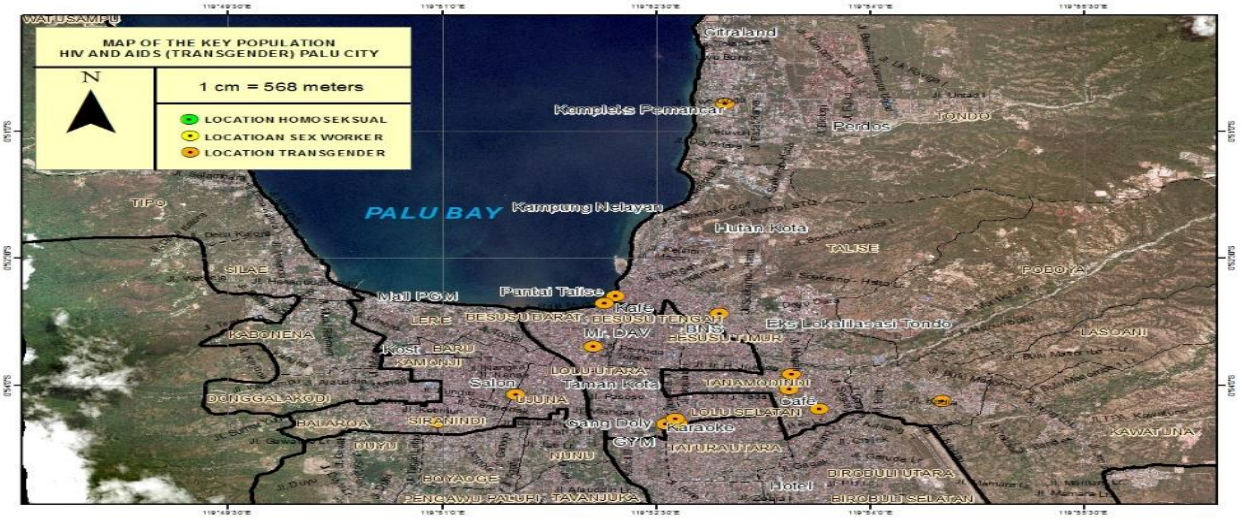

Figure 4. Distribution of Population Hotspots based on Transgender criteria after Natural Disasters (Earthquake, Liquefaction and Tsunami) in 2022

Figure 5. Distribution of Population Hotspots based on the criteria of Female Sex Workers (WPS) After Natural Disasters (Earthquake, Liquefaction and Tsunami) in 2022

People living with HIV who are affected by disasters are also afraid of stigma and discrimination. Even in normal situations, stigma remains, particularly during disasters. It is impossible for many to admit “I am HIV” in a disaster evacuation tent. ARV drugs that are friends with PLWHA must be available in any situation, including during a disaster. There should not be a PLHIV who stops ARV because their psychological and physical conditions are very different. Therefore, the health protection for PLHIV must be completed. Disasters make people living with HIV more at risk of getting sick because their immune system decreases and they get sick and die. Natural disasters were confirmed as the main cause of the shift in key population hotspots. In addition to the problem of damage to infrastructure facilities, hotspots for key populations have also died, but this condition cannot be described in the results of this study because of the absence of tracing data on victims of natural disasters. related to HIV and AIDS key population hotspots in Palu City.

Based on the distribution of key population hotspots in Figure 3 and the mapping results using the Geographic Information System (GIS) application, information is obtained that the distribution of locations and conditions of hotspots is based on location characteristics, namely, GYM, Café, Salon, Karaoke Place, Boarding House, and Housing Complex and Mall. Using the criteria of Male to Male (MSM), Female Sex Workers (FSW), and Waria from the 14 main population hotspots in 2022.

The existence of key populations in the community as individuals or groups is dynamic and continuously changing, so the population size and social characteristics at each location or hotspot will also always change. Regarding the need for data for the implementation of HIV and AIDS prevention and control programs for key population groups, it is urgently necessary to update the location/hotspot mapping data, along with the number of key populations in each of these locations.

Mapping is a basic technique for gathering the information needed to plan interventions for MARPs. Program mapping is conducted to collect information on the magnitude of health problems and program coverage of existing services. The mapping that will be carried out is not only to obtain geographic information but also to obtain social data from each key population and the services needed. Mapping is useful for describing the distribution and magnitude of a situation and problem in a particular area by utilizing the understanding of members of the population in that area (insider's perspective) in order to recommend a program that is appropriate and in accordance with the characteristics and needs of the region. Thus, mapping of key populations is a way to describe a characteristic social situation and risky behavior of key populations in an area.

HIV and AIDS risk behavior can carry a high risk of contracting HIV infection to oneself or others. These behaviors include sexual intercourse with multiple partners without a condom, using needles and syringes (insul), or non-sterile medical equipment, which may be contaminated with other people's blood, both on oneself and others, and receiving blood transfusions from the infected. Periodically, the Ministry of Health, through the Directorate General of Disease Control and Environmental Health, conducts Integrated Biological and Behavioral Surveillance (IBBS) to obtain an overview of the problem, risk factors, knowledge, and coverage of the HIV program in Indonesia. The 2011 IBBS aims to determine the prevalence of HIV and STIs (syphilis, gonorrhea, and chlamydia), knowledge related to HIV and AIDS, behavior at risk of contracting or transmitting HIV, and the scope of intervention programs for the most at-risk and vulnerable populations.

The characteristics found in the geographical mapping of key population hotspots in the city were as follows:1) men who have sex with men (MSM) and men who have sex with their male partners. This group includes people who identify themselves as gay, bisexual, or straight. This category includes those who sell and/or buy sex with other men (male sex workers). 2) Female Direct Sex Workers (FSW): Women selling sex for money or goods as their main source of income. The main source means that there is certainty in obtaining income, not the size of the income. These women include those who work in brothels, streets, or public places where customers come to buy sex. These women may or may not work with brokers or pimps. 3) Waria: (male becoming female) or biologically male who identifies himself as female and/or behaves and dresses like female.

Demographic Profile. The largest key population group based on the characteristics of

men-to-male (MSM) female sex workers (FSW) and waria are evenly distributed in five sub-districts in Palu City. When compared to data on the distribution of key population hotspots in 2017 from four sub-districts, namely Mantikolore, Palu Timur, Palu Selatan, and West Palu for 2022 will add one subdistrict, namely Ulujadi District, with locations for activities such as salons, gyms, city parks, boarding houses, hotel cafes and malls, and laundry.

CONCLUSION

Features of activity hubs centered on major population centers, such as hotels, boarding houses, salons, cafés, clubs, city parks, and malls in 2017. in 2022, other amenities like laundry will be included. Male Fellow, Female Sex Worker, and Transgender are the features of the major population hotspots since 2017, however in 2022 Natural Disaster (Earthquake, Liquefaction, and Tsunami) in 2018 did not suffer a shift. Natural disasters (tsunami, earthquake, and liquefaction) affect the changing HIV and AIDS key population hotspot data; following a post-disaster re-mapping, 29 key population hotspots were discovered, while 14 key population hotspots were detected overall. The year data's primary population hotspot data had a transition later on. The year's natural disasters—the earthquake, liquefaction, and tsunami—had an effect on a shift in geographic conditions. Four districts saw conditions that led to the creation of 29 key population hotspot locations; in contrast, one sub-district was added to the 14 population key hotspots, which are made up of five sub-districts. In 2010, there were other places of activity, such as laundry rooms, although the majority of the activity took place in areas near major population hotspots, such as salons, cafés, clubs, hotels, boarding houses, city parks, and malls. Men-male, Women's Sesk Workers, and Waria have been the main demographic hotspots since 2011, but the year of natural disasters (earthquake, liquefaction, and tsunami) did not see any changes in these characteristics.

It is hoped that all parties will take a role in bringing back order between Male Fellows, Female Sex Workers, and Transgenders as hosts who carry HIV AIDS. The limitation of this research is that there is some previous data that is incomplete, but this can be overcome by researchers by carrying out direct surveys at precise locations on the map. It is hoped that the impact of this research will be a source of knowledge for the government and officials regarding the distribution of people with HIV AIDS in the city of Palu in order to anticipate its spread.

REFERENCES

1. UNAIDS. Unaids Data 2018. UNAIDS. 2018.
2. Rayment M. Prevention of HIV-1 infection with early antiretroviral therapy. Journal of Family Planning and Reproductive Health Care. 2012 Jul 1;38(3):193.
3. Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, Hakim JG, Kumwenda J, Grinsztejn B, Pilotto JH, Godbole SV. Antiretroviral therapy for the prevention of HIV-1 transmission. New England Journal of Medicine. 2016 Sep 1;375(9):830-9.
4. Group TISS. Early Treatment In Asymptomatic HIV Infection," *Physiol. Behav.*, 2017: 176(1); 139–148.
5. UNAIDS. HIV Treatment: Critical To Ending The AIDS Epidemic And Making Hiv Transmission Rare HIV. UNAIDS. 2014.
6. Manopo GM, Kunoli FJ, Baculu EP. Faktor-faktor yang berhubungan dengan kejadian hipertensi di Puskesmas Birobuli Kota Palu. Jurnal Kolaboratif Sains. 2019 Sep 15;2(1), 106-18.
7. Vittinghoff E, Scheer S, O'Malley P, Colfax G, Holmberg SD, Buchbinder SP. Combination antiretroviral therapy and recent declines in AIDS incidence and mortality. The Journal of infectious diseases. 1999 Mar 1;179(3):717-20.
8. Sillman B, Woldstad C, Mcmillan J, Gendelman HE. Neuropathogenesis of human immunodeficiency virus infection. Handbook of clinical neurology. 2018 Jan 1;152:21-40.
9. Pomerantz RJ, de la Monte SM, Donegan SP, Rota TR, Vogt MW, Craven DE, Hirsch MS. Human immunodeficiency virus (HIV) infection of the uterine cervix. Annals

of internal medicine. 1988 Mar 1;108(3):321-7.
10. Boily MC, Baggaley RF, Wang L, Masse B, White RG, Hayes RJ, Alary M. Heterosexual risk of HIV-1 infection per sexual act: systematic review and meta-analysis of observational studies. Lancet Infect Dis. 2009 Feb;9(2):118-29. doi: 10.1016/S1473-3099(09)70021-0. PMID: 19179227; PMCID: PMC4467783.
11. Cohen MS, Council OD, Chen JS. Sexually transmitted infections and HIV in the era of antiretroviral treatment and prevention: the biologic basis for epidemiologic synergy. Journal of the International AIDS Society. 2019 Aug;22:e25355.
12. Kalichman SC, Rompa D, Cage M. Sexually transmitted infections among HIV seropositive men and women. Sexually transmitted infections. 2000 Oct 1;76(5):350-4.
13. Yoo M, Seong J, Yoon JG, Cha JO, Chung YS, Kim K, Kee MK. Characteristics of adolescents and young adults with HIV in the Republic of Korea from 2010 through 2015. Scientific reports. 2020 Jun 10;10(1):9384.
14. Lazebnik R, Hermida T, Szubski R, Dieterich-Colon S, Grey SF. The proportion and characteristics of adolescents who return for anonymous HIV test results. Sexually Transmitted Diseases. 2001 Jul 1:401-4.
15. Zutushi S, Shukla S, Acharya S, Bhawane A, Mishra P, Singh S. Bacterial Meningitis as the First Presentation of Multiple Myeloma. Journal of the Scientific Society. 2022 May 1;49(2).
16. Rusilowati A, Binadja A, Mulyani SE. Mitigasi bencana alam berbasis pembelajaran bervisi science environment technology and society. Jurnal pendidikan fisika indonesia. 2012;8(1).
17. Jati WR. Bonus demografi sebagai mesin pertumbuhan ekonomi: Jendela peluang atau jendela bencana di Indonesia. Populasi. 2015;23(1):1-9.
18. Adi S. Karakterisasi bencana banjir bandang di Indonesia. Jurnal Sains dan Teknologi Indonesia. 2013;15(1).
19. Ahdi D. Perencanaan penanggulangan bencana melalui pendekatan manajemen risiko. Reformasi. 2015 Feb 16;5(1):13-30.
20. Maulana AD, Prasetyo DA. Analisa Matematis pada Koreksi Bouguer dan Koreksi Medan Data Gravitasi Satelit Topex dan Penerapan dalam Geohazard Studi Kasus Sesar Palu Koro, Sulawesi Tengah. Jurnal Geosaintek. 2019 Dec 30;5(3):91-100.
21. Efendi R, Kadir WG, Santoso D, Abdullah CI, Alawiyah S. Gravity gradient technique to identify fracture zones in Palu Koro strike-slip fault. Procedia Environmental Sciences. 2013 Jan 1;17:248-55.
22. Bellier O, Sébrier M, Beaudouin T, Villeneuve M, Braucher R, Bourles D, Siame L, Putranto E, Pratomo I. High slip rate for a low seismicity along the Palu-Koro active fault in central Sulawesi (Indonesia). Terra Nova. 2001 Dec;13(6):463-70.
23. Rudiarto I, Pamungkas D. Spatial exposure and livelihood vulnerability to climate-related disasters in the North Coast of Tegal City, Indonesia. International Review for Spatial Planning and Sustainable Development. 2020 Jul 15;8(3):34-53.
24. Han L, Zhou W, Li W, Li L. Impact of urbanization level on urban air quality: A case of fine particles (PM2. 5) in Chinese cities. Environmental Pollution. 2014 Nov 1;194:163-70.
25. Han L, Zhou W, Li W. Increasing impact of urban fine particles ($PM_{2.5}$) on areas surrounding Chinese cities. Scientific reports. 2015 Jul 29;5(1):12467.
26. Watts N, Amann M, Arnell N, Ayeb-Karlsson S, Belesova K, Berry H, Bouley T, Boykoff M, Byass P, Cai W, Campbell-Lendrum D. The 2018 report of the Lancet Countdown on health and climate change: shaping the health of nations for centuries to come. The Lancet. 2018 Dec 8;392(10163):2479-514.
27. Di Napoli C, McGushin A, Romanello M, Ayeb-Karlsson S, Cai W, Chambers J, Dasgupta S, Escobar LE, Kelman I, Kjellstrom T, Kniveton D. Tracking the

impacts of climate change on human health via indicators: lessons from the Lancet Countdown. BMC public health. 2022 Dec;22(1):1-8.
28. Chong NO, Kamarudin KH. Disaster risk management in Malaysia: Issues and challenges from the persepctive of agencies. Planning Malaysia. 2018 Jul 25;16.
29. Thaha R, Drajat UZ. The Analysis of Post-Flood Disaster Management at North Luwu Regency. International Journal Papier Public Review. 2023 Apr 17;4(1):51-9.