

Eradication of frambusia of Kedungjati Health Center in 2023

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ABSTRACT

Frambusia is a tropical disease that affects children. Frambusia diagnosis is based on clinical and serologic examination. The purpose of this service is to find out that there are no cases of frambusia in Kedungjati District. The method of service carried out was education, screening of all elementary school students, and RDT Frambusia examination. Before the screening, students were educated on the definition of frambusia, causes and risk factors, and how to prevent frambusia. Screening, body examination was conducted on all students present. Students were examined from head to toe, to look for scabs or frambusia lesions. If scabs or frambusia lesions are found, a Frambusia Rapid Diagnostic Test will be conducted. If a positive case is found, treatment will be given at the health center. The conclusion of this activity is that no frambusia cases were found in Kedungjati Sub-district. Advice to the community is to know the factors that play a role in maintaining zero cases of frambusi. Background: Frambusia is a tropical disease that primarily affects children in developing countries. It is characterized by skin lesions and can lead to disfigurement if left untreated. Early detection and treatment are crucial for preventing the spread of frambusia and maintaining public health in endemic areas. Methods: The method involved three main components: education, screening, and diagnostic testing. Students were first educated about frambusia, including its definition, causes, risk factors, and prevention. This was followed by a comprehensive physical examination of all present elementary school students, checking for frambusia lesions or scabs. If suspicious lesions were found, a Rapid Diagnostic Test (RDT) for frambusia was conducted, with positive cases to be treated at the local health center. Results: The result of this service activity was that no cases of frambusia were found in Kedungjati District. The screening and examination of all present elementary school students did not reveal any frambusia lesions or positive Rapid Diagnostic Test results. Conclusion: No frambusia cases were found in Kedungjati Sub-district. It is recommended that the community be informed about the factors that contribute to maintaining zero cases of frambusia in the area.

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INTRODUCTION

Frambusia is an infectious disease caused by the bacterium *Treponema pallidum* subspecies *pertenue*, and belongs to the group of neglected tropical diseases. The disease mainly affects children in tropical areas who have limited access to adequate sanitation and health services. About 75% of those infected are children aged 15 years (peak incidence occurs at 6-10 years). Frambusia is distributed in several endemic countries with tropical climates and high rainfall and humidity, including North Africa, South America, Central America, the Caribbean Islands and Southeast Asia. 1-3 Indonesia is still one of the largest contributors of frambusia cases in Southeast Asia. In 2014, the World Health Organization (WHO) still reported 1,512 cases in Indonesia and increased to 3,379 cases in 2015. Frambusia cases are still found in Sumatra, Banten, East Nusa Tenggara (NTT), Southeast Sulawesi, Maluku, Papua, and West Papua.

To control and eradicate frambusia, also known as yaws, the World Health Organization (WHO) launched the Morges Strategy in 2012 (World Health Organization [WHO], 2012). This strategy emphasizes mass treatment using a single dose of azithromycin, which has been shown to effectively cure the disease (Mitjà et al., 2012). The efficacy of azithromycin has been further confirmed in subsequent studies, demonstrating its potential as a key tool in yaws eradication efforts (Marks et al., 2015).

Other components of the strategy include active surveillance, early detection, and antibiotic resistance monitoring (WHO, 2012, 2018). These elements are crucial, as the resurgence of yaws in previously endemic areas has been documented, highlighting the need for continued vigilance (Asiedu et al., 2014). WHO aims for global eradication of frambusia by 2030 (WHO, 2020), a goal that aligns with broader efforts to eliminate neglected tropical diseases (Mitjà et al., 2012).

In recent years, WHO has continued to update guidelines and technical support for endemic countries through community-based surveillance and community-based treatment programs (WHO, 2021). These approaches have shown promise in various settings, with community engagement playing a vital role in successful implementation (Marks et al., 2018). Innovative strategies, such as the use of spatial epidemiology and molecular techniques, are being explored to enhance surveillance and treatment efforts (McGough et al., 2017)(Mitjà et al., 2018).

Successful eradication of frambusia will largely depend on adherence to mass treatment programs and ongoing surveillance to prevent new cases from emerging (WHO, 2018, 2021). However, challenges remain, including the potential for non-human reservoirs of the disease and the need for sustained political and financial commitment (Knauf et al., 2013). Integration of yaws eradication efforts with other public health initiatives may provide synergies and improve overall outcomes (Mitjà et al., 2017).

In 2020, the Indonesian government established a target for frambusia eradication, as outlined in the Minister of Health regulation no. 8 of 2017 and Minister of Health Decree No. 496 of 2017 (Ministry of Health Indonesia, 2017a; 2017b). Despite these efforts, the target for Frambusia Eradication in Grobogan District was not achieved by 2020. This shortfall could be attributed to a lack of public awareness about the importance of self-examination, resulting in limited case detection in the area (Imani, 2020)(Purba & Umar, 2021)(Smith et al., 2022)(Rini et al., 2024).

Puskesmas (Community Health Centers) serve as the frontline in implementing case-finding efforts for frambusia. A key activity in preventing human-to-human transmission of the disease is early detection through screening (WHO, 2021). Skin patches that are not caused by injury can be indicative of suspected frambusia cases, requiring confirmation through serological testing (Tan & Machrumnizar, 2023).

Given these challenges, there is a compelling need to organize targeted efforts for frambusia case discovery. Of particular interest is the implementation of Early Detection (screening) activities for Frambusia Disease among school children. School-based screening programs have shown promise as an effective strategy for frambusia case finding in endemic areas

(Patel et al., 2023). By focusing on this demographic, health authorities may be able to improve case detection rates and make significant progress towards the eradication goals set by the government.

RESEARCH METHOD

This activity was attended by school children aged <15 years and the public in Kedungjati District. The method used was education in the form of counseling followed by early detection of frambusia disease. The process of implementing this activity is divided into 3 stages, namely: Conducting a meeting about the plan for early detection testing in elementary/middle schools in Kedungjati Sub-district. In addition, they also prepared the necessary equipment such as Frambusia RDT, documentation, and examination attendance list. Prior to the RDT examination, the officer conducted an examination through the frambusia early detection sheet.

This service activity was carried out from January 11, 2023 to August 23, 2023 in 34 SD / MI in the Kedungjati District area. The first activity carried out was education in the form of counseling to students. The education covered several important aspects related to frambusia disease. First, students were given an understanding of the definition and causes of frambusia.

Next, they were informed about the risk factors that can increase the likelihood of developing the disease, such as the habit of changing clothes with other people, rarely bathing, living in a slum and humid environment, and the presence of repeated infectious wounds. Finally, the education also emphasized the importance of preventing frambusia through the implementation of Clean and Healthy Living Behavior (PHBS) in daily life.

Prevention of frambusia can be done through several important steps. Maintaining personal hygiene by regularly washing hands and bathing with soap every day is an effective first step (Hasanah & Mahardika, 2021)(Rosidin et al., 2021)(Hidayaturrahmi et al., 2023)(Iman, 2024). It is also important to wash your clothes after each use and avoid wearing clothes used by people with frambusia, as contaminated clothes can be a source of infection. Avoiding direct contact with the patient's wounds is also highly recommended, as frambusia can spread through such contact. If wounds are present, it is important to keep them clean by cleaning them regularly and protecting them with sterile bandages or dressings. All people who have been in contact with a person with frambusia should receive treatment, even if they are asymptomatic, as the infection can progress gradually. Finally, improving access to quality healthcare facilities is essential for the prevention and early detection of frambusia.

After counseling, an examination of the body from head to toe is then carried out to look for scabs or frambusia lesions. If scabs or frambusia lesions are found, then further examination will be carried out, namely the Frambusia Rapid Diagnostic Test. If the RDT result is positive, treatment will be carried out at the health centre.

RESULTS AND DISCUSSIONS

This This activity was carried out in 34 elementary/middle schools in Kedungjati sub-district. All students in the school were examined head to toe for scabs or frambusia lesions. The results of the frambusia early detection screening are as follows:

Table 1. The results of the frambusia early detection

No.	Implementation Date	Place of Performance	Number of Students Screened	Total
1	26 January 2023	SD N 1. Ngombak	100	3
2	27 January 2023	SD N 2 Ngombak	117	3
3	07 February 2023	SD N 1 Padas	101	3
4	07 February 2023	SD N 2 Padas	115	4
5	09 February 2023	MI Miftahul Ulum Kentengsari	151	7
6	11 February 2023	SD N 1 Kedungjati	151	2
7	11 February 2023	SD N 2 Kedungjati	195	3
8	16 February 2023	SD N 3 Kedungjati	61	3

No.	Implementation Date	Place of Performance	Number of Students Screened	Total
9	16 February 2023	SD N 5 Kedungjati	77	2
10	27 February 2023	SD N 2 Kalimaro	43	2
11	27 February 2023	MI Miftahul Huda 2 Kalimaro	104	2
12	06 March 2023	SD N Klitikan	60	5
13	06 March 2023	MI Tarbiyatus Sibyan Klitikan	69	5
14	09 March 2023	SD N 1 Deras	133	6
15	09 March 2023	SD N 2 Deras	163	5
16	11 March 2023	SD N 1 Karanglangu	127	5
17	11 March 2023	SD N 2 Karanglangu	77	3
18	19 April 2023	SD N 3 Karanglangu	93	5
19	19 April 2023	MI Manbaul Ulum Karanglangu	187	6
20	26 April 2023	SD N 1 Jumo	158	5
21	26 April 2023	SD N 2 Jumo	115	4
22	27 April 2023	SD N 3 Jumo	82	6
23	4 May 2023	SD N 1 Kentengsari	78	7
24	6 May 2023	SD N 3 Kentengsari	63	8
25	11 May 2023	SD N Panimbo	158	6
26	13 May 2023	SD N 2 Panimbo	84	9
27	20 May 2023	MI Miftahul Huda 1 Kalimaro	160	6
28	23 May 2023	SD N 3 Kalimaro	103	4
29	14 June 2023	SD N 4 Padas	78	3
30	20 July 2023	SD N 1 Prigi	119	7
31	22 July 2023	SD N 3 Prigi	45	1
32	14 Agust 2023	SD N 1 Kalimaro	7	3
33	23 Agust 2023	SD N 1 Wates	134	1
34	25 Agust 2023	SD N 2 Wates	166	3

Students with scabs or frambusia lesions were included in the frambusia suspect group. Then the Frambusia RDT examination was conducted. Of the 147 students who underwent Frambusia RDT, all results were negative, so no Frambusia cases were found in the Kedungjati sub-district.

Frambusia, also known as pian, framnboesia, bouba, patek, puru, sampar, is a chronic infection that affects the skin, bones, and joints. Frambusia is a chronic, relapsing treponematosi disease with three stages: skin ulcers or granulomas (mother yaws), early non-destructive lesions, and advanced destructive lesions of the skin, bones, and joints.

Frambusia is caused by *Treponema pallidum* subspecies *pertenue* (*T. pertenue*). The Gram-negative bacteria measure 10-15 μm in length and 0.2 μm in diameter and are spiral-shaped. The bacteria are only visible with a dark field microscope. The small size makes it easier for the bacteria to decrease metabolic activity in causing persistent infections.

Humans are known to be the only reservoir, although some studies have reported the disease can also affect other primates. Frambusia is transmitted through person to person contact. The bacteria are slow to multiply (every 30-33 hours) and are easily eliminated by drying, oxygen exposure and increased temperature. Frambusia is reported to not involve the cardiovascular system, central nervous system, and is not transmitted from mother to fetus.

Risk Factors

Yaws is known to affect populations living in warm, humid and wet climates providing a favorable environment for the spread of infection. Yaws thrives in countries with an average annual isotherm of 27°C and above. The disease does not thrive in colder climates or in climates with temperature extremes. Although there are many opportunities for the disease to move from the tropics to temperate regions, the infection has not yet caused transmission.

The disease mainly affects rural communities, especially those in poor economic conditions and low hygiene standards, with incidence decreasing as social and economic status improves. In addition, in such rural environments, there are usually large areas of vegetation (scrub), which increases the likelihood of injury to the feet and legs and, therefore, the risk of infection.

Clinical manifestations

The criteria for frambusia cases are divided into 1) people with ≥ 1 clinical symptom (papules/papillomas, ulcers, macules, hyperkeratosis of palms or feet, bone and joint changes) for more than 2 weeks (suspected cases); 2) suspected cases who had close contact with frambusia cases for more than 20 hours per week and contact time between 9-90 days before the onset of lesions (probable cases); 3) suspected/probable cases with positive rapid diagnostic test (RDT) results (confirmed cases) and can be followed by rapid plasma reagin (RPR) if doubtful.

Clinical manifestations of frambusia are divided into several stages, namely:

- a. Primary Stage, initial lesions appear at the site of the first entry of bacteria after 21 days (duration of time 9–90 days) without pain. Primary “mother yaw” lesions in the form of papules will develop into exudative papillomas measuring 2–5 cm or plaques (papules and papillomas that join). The lesion may rupture into a single, odorous ulcer with yellowish crusts. The base of the ulcer is prominent, lumpy (granulated) resembling the surface of a raspberry usually concentrated in the center of the ulcer, wet (exudate) with raised and hard ulcer edges. Exudate drying over the papilloma will form a crust covering the papilloma (crusta papilomata). Primary lesions may heal spontaneously in 3-6 months, then enter the early latent stage. The early latent stage may progress to the secondary stage.
- b. Secondary stage, secondary stage lesions are known as “daughter yaws” in the form of smaller, scattered papillomas. The lesions can be macules, papules, nodes, hyperkeratotic, or pustules with crusts that can occur near the primary lesion or spread symmetrically in other parts of the body. Secondary lesions are frambusia lesions that reappear due to autoinoculation and systemic spread of bacteria after a latent period of 10-16 weeks (can reach 2–5 years). In addition to the skin, frambusia also involves generalized lymph nodes, bones, and cartilage. Early secondary stage lesions generally persist for more than 6 months, although they may spontaneously resolve within 3-6 months. Bone involvement is one of the cardinal signs of the secondary stage in the form of osteoperiostitis with pain and thickening of the periosteum. It is reported that 76.2% of secondary frambusia cases in children are only joint pain which generally involves the large joints of the knee, ankle, elbow, wrist. If left untreated, the skin abnormalities may resolve spontaneously and then the infection enters an advanced latent stage.
- c. Latent stage, infection in the latent stage can relapse at any time. This can occur up to five years after the initial infection. The initial latent stage can develop into a secondary stage that becomes a source of transmission in approximately two years, while the advanced latent stage develops into a tertiary (non-infectious) stage within 5–10 years. The latent stage can only be detected through serologic examination but generally does not show clinical manifestations.
- d. Tertiary stage, only 10% of cases can enter the tertiary stage. This stage is caused by relapses that occur within 5–10 years and is characterized by the formation of gumma, gangosa, gondou, advanced ulcers, polydactylitis, and sabre tibia. Gumma is a chronic lump (node), which can be found in any tissue or organ. A gumma consists of a necrotic area surrounded by lymphocytes and mononuclear cells. The lesion softens, ulcerates and is destructive to the underlying tissue. Gangosa is a rare form of complication, characterized by ulceration of the nose and palate. The destructive process usually starts from the mucocutaneous septum of rice with ulceration spreading to the nose, palate, pharynx, but rarely to the maxilla, upper lip and larynx. Swelling of the bilateral and surrounding nasal area with pain (paranasal to maxillary bone) in the form of a lump that is not attached to the skin surface, round or oval is known as Gondou. Gondou is a subperiosteal bone deposit. Lesions in the tertiary stage will leave scars, deformities and contractures resulting in disability. Lesions in the tertiary stage are non-infectious as they contain little or no treponema and are a reaction to granuloma formation.

- e. Management, the management of frambusia is with antibiotics. First-line antibiotics are oral Azithromycin at a dose of 30mg/kgBB, maximum 2g single dose. For children under 6 years old, syrup is recommended. If this is not available, the tablets can be crushed and mixed with water. Other antibiotics that can be used are Benzathine benzylpenicilin with an adult dose (over 10 years) of 0.6 million units of a single dose, given intramuscularly. In pediatric patients with penicillin allergy, oral erythromycin 8-10 mg/kgBB can be given every 6 hours for 15 days. Although effective, the use of penicillin has many problems including the potential for anaphylaxis. Other alternatives that can be given are oral dicycline 2x100 mg for 15 days, or oral tetracycline 4x500mg for 15 days.
- f. Prognosis, left untreated, frambusia can become chronic, recurring after 5-15 years with skin, bone and joint involvement. In most patients, frambusia is limited to the skin, but early bone and joint involvement can occur. Although frambusia lesions disappear spontaneously, bacterial secondary infection and scar tissue formation are common complications. In 10% of frambusia cases, patients enter a latent stage where there are cutaneous destructive lesions and severe deformities of the bones and joints.
- g. Complications, non-treatment can lead to complications in about 10% of individuals which can cause severe damage to the skin and bones resulting in disability of the feet, nose, mouth, and upper jaw. If management is done at an early stage, the cure rate is high and there is no disability. All initial skin lesions are infectious and will persist for several months, with skin relapse usually occurring within 5 years of onset.

CONCLUSION

This service activity aims to detect frambusia cases in Kedungjati District through a series of steps including education, screening, and RDT Frambusia examination in elementary school students. Education is given to students about the definition, causes, risk factors, and ways to prevent frambusia. Screening is done with a thorough physical examination of all students present, looking for signs such as scabs or frambusia lesions. If such signs were found, a Frambusia Rapid Diagnostic Test (RDT) was conducted. The results of this activity showed that no cases of frambusia were found in Kedungjati Sub-district. The community is encouraged to continue to understand the factors that play a role in maintaining this frambusia-free condition. The author states that there is no potential conflict of interest about the authorship and publication of this article.

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