Descriptive Epidemiology of Tuberculosis during 2019-2022 in the Working Area of Arjasa Primary Healthcare, Jember Regency

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Abstract

A person can be infected with tuberculosis (TB) simply by inhaling the bacteria that are spread in the air. Tuberculosis can be fatal for someone if it is not treated immediately, but TB can be cured if you take the medicine properly and correctly. The purpose of this study was to determine the distribution of TB disease based on person, place and time at Arjasa Subdistrict, Jember Regency. The type of research used was descriptive quantitative. This research was conducted at Arjasa Primary Healthcare from January to February 2023. The population and sample in this study were all TB patients at Arjasa Primary Healthcare from 2019 to 2022. The variables in this study were person variables (age, gender, type of TB, treatment status), place (village), time (year), achievement success rate (SR), and achievement case detection rate (CDR). Data analysis is in the form of descriptive analysis and is presented in the form of tables and graphs. Based on the results of the analysis, there is no difference between women and men, the most age is adults, the most type of TB is pulmonary TB, and the most treatment status is cured, based on most places, namely Arjasa Village and Kemuninglor, based on the most time, namely in 2022 as many as 60 people, based on the SR the achievements have decreased and have not reached the target, while the CDR has increased but has not reached the target. It is hoped that the Arjasa Primary Healthcare will improve SR and CDR achievements by involving NGOs related to TB, community leaders, religious leaders, the sub-district government, or the local village government.

Keyword: Descriptive Epidemiology, Person, Place, Time, Tuberculosis

INTRODUCTION

Tuberculosis (TB) is an infectious disease that occurs in society. This disease is caused by *Mycobacterium tuberculosis*. This bacteria can usually attack the lungs, but can also attack other organs such as the kidneys, spine, brain and can even attack almost all parts of the body (CDC, 2016). Tuberculosis can be transmitted from one person to another through the air. When someone with TB coughs, sneezes or spits, they can spread TB bacteria into the air. A person can be infected with TB just by inhaling some of the bacteria that are spread in the air (WHO, 2022b). Tuberculosis can be fatal for someone if it is not treated immediately, but TB can be cured if the patient take drugs properly and correctly according to the recommendations (American Lung Association, 2022).

A person can be infected with TB if they accidentally inhale splashes of saliva or droplets from someone who already has TB. Thus, this increases the risk of transmission to individuals who live at home with someone who already has TB (Sulistiawati, 2022). Patients with TB in the lungs will usually experience several symptoms such as coughing for a long time or more than a week accompanied by phlegm or blood. Other symptoms that are also experienced by TB patients can include fever, loss of appetite, pain in the chest and frequent sweating at night. Symptoms of TB will usually be similar to other lung conditions or diseases, so a doctor's diagnosis and checking through laboratory tests are needed (Kemenkes RI, 2019).

The occurrence of TB can be assessed based on person, place and time. Factors based on people in the form of characteristics possessed by individuals that affect a disease such as gender, age, occupation or social status. Other people's factors can also be in the form of health conditions owned by individuals such as the presence of HIV complications which can increase the risk of death (Irwan, 2017). TB can be studied based on place, namely by looking at its distribution in various regions or areas. TB can be assessed based on time, namely by looking at the length of treatment or its spread by months or years (Talarim et al., 2021). Respiratory diseases such as influenza, ARI and tuberculosis can be easily transmitted due to inadequate ventilation (Sabri et al., 2019).

Globally, TB is the second most deadly infectious disease after Covid-19 and is the thirteenth leading cause of death worldwide. According to WHO data in the Global Tuberculosis Report (2022) the number of TB cases in the world has reached 10.6 million cases. This incident rate has increased from 2020, namely as many as 600,000 cases. Of the 10.6 million cases, 6.4 million and/or 60.3% were reported to have undergone treatment and as many as 4.2 million and/or 39.7% had not been found/diagnosed and reported (WHO, 2022a). Indonesia itself ranks third in the country with the highest TB incidence rates in the world after India and China. According to the Ministry of Health, the incidence of tuberculosis in 2021 is 969,000 TB cases, this figure has increased by 17% compared to 2020 (Kementrian Kesehatan RI, 2020). The incidence of TB in Indonesia in 2020 is 354 per 100,000 people, which means that every 100,000 residents have TB (Yayasan KNCV Indonesia, 2022). East Java Province is one of the provinces with the highest TB cases in Indonesia. The TB prevalence rate in East Java Province is 0.29% (Megatsari et al., 2021). According to BPS data, the incidence of TB in Jember Regency in 2020 is 2,762 cases (BPS, 2021).

Based on the number of TB cases in Jember Regency, cooperation is needed in efforts to reduce TB disease, especially collaboration with the puskesmas as a primary health service that plays a role in the process of finding and treating TB patients. Jember Regency has 50

health centers and one of them is Arjasa Primary Healthcare . TB disease is the highest disease in Arjasa Primary Healthcare . So it is necessary to have a study related to the distribution of TB disease based on person, place and time at Arjasa Primary Healthcare so that you can see an overview of the disease and know what actions can be taken to reduce the incidence of TB, especially in the working area of Arjasa Primary Healthcare.

METHODS

This type of research in this study is descriptive. Descriptive research aims to provide an overview of a problem or disease in a systematic, factual and accurate manner related to the facts and characteristics of certain populations or to describe phenomena in detail (Yusuf, 2014). The research location is at the working area of Arjasa Primary Healthcare, Jember Regency. Data collection began on 9 January 2023 to 17 February 2023. The research instrument used secondary data derived from medical records and routine tuberculosis reports from 2019 to 2022. The variables in this study were person (age, gender, type of TB, status treatment), place (village), time (year), achievement of success rate (SR), and achievement of case detection rate (CDR). Data were analyzed using the SPSS statistical application. The analysis used is univariate analysis, which is a data processing process using only one variable which produces a summary or frequency distribution. Univariate analysis was carried out by examining each variable (Jaya, 2020). Univariate analysis in this study identified the frequency distribution of tuberculosis based on person, place and time. The data presentation techniques used are tables and graphs and are explained in narration in order to facilitate the interpretation process.

RESULTS

The Distribution of Tuberculosis Based on Person

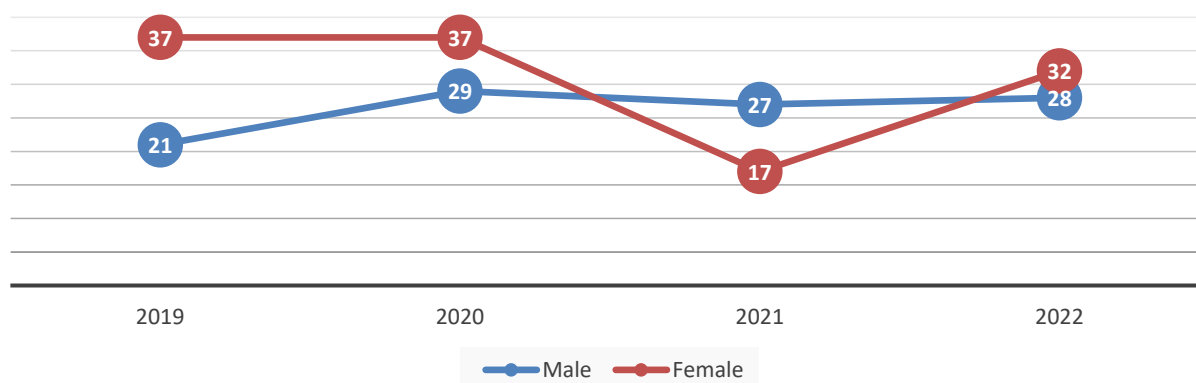The Distribution of TB Based on Gender in Arjasa Primary Healthcare during 2019-2022

Figure 1. The Distribution of TB Based on Gender

Figure 1 shows that tuberculosis disease based on gender in the working area of Arjasa Primary Healthcare in 2019-2022 is categorized into two, namely women and men. Based on the graph, tuberculosis cumulatively occurs in women, namely as many as 107 people and/or 50.47%, while for male patients there are as many as 86 people and/or 49.53%. If you look at the yearly tuberculosis patients by gender, it varies from 2019-2022. In 2019 and 2022 the highest number of tuberculosis patients will be women, namely 37 (63.79%) and 32 people (53.33%). In 2020 and 2021 the highest number of patients will be men, namely 29 (58%) and 27 people (61.36%).
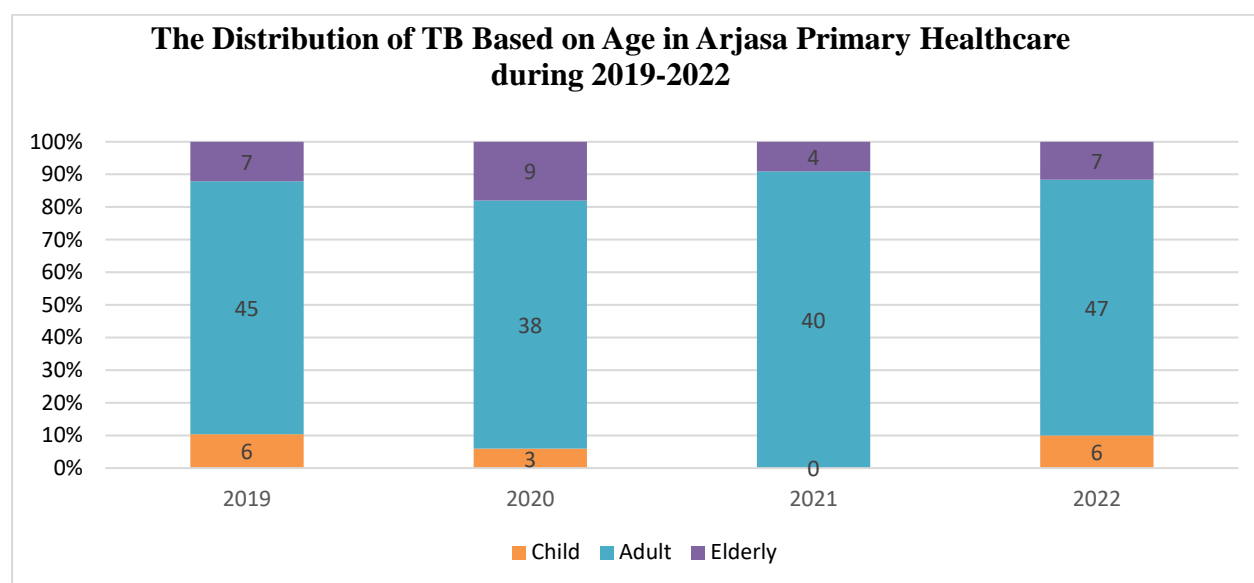

Figure 2. The Distribution of TB Based on Age in Arjasa Primary Healthcare during 2019-2022

Figure 2 shows tuberculosis patients based on age characteristics in the working area of Arjasa Primary Healthcare in 2019-2022 categorized into four groups, namely children (0-15 years), adults (16-60 years), and the elderly (> 60 years). Based on the graph, the cumulative results show that the most tuberculosis patients occur in the adult age group, namely 162 people or 76.42%. Meanwhile, the lowest occurred in the child group, namely as many as 15 children. When viewed annually, from 2019 to 2022 most tuberculosis patients occur in the adult age group. In addition, in the working area of Arjasa Primary Healthcare in 2019-2022 based on the type it is categorized into two, namely pulmonary TB and extra pulmonary TB. Cumulatively, from 2019 to 2022, the most common type of TB was found, namely pulmonary TB, namely 148 people and/or 86.32% compared to patients with extrapulmonary TB of only 29 people and/or 13.68%.
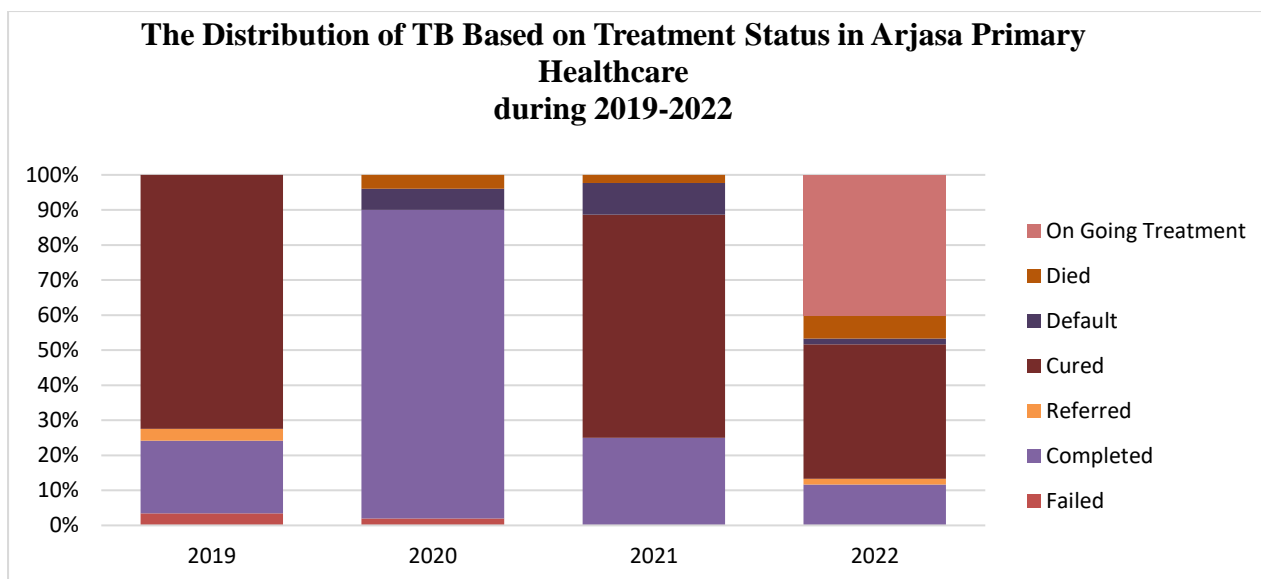
The Distribution of TB Based on Treatment Status in Arjasa Primary Healthcare during 2019-2022

Figure 3. The Distribution of TB Based on Treatment Status in Arjasa Primary Healthcare

Figure 3 shows that tuberculosis that occurs in the working area of Arjasa Primary Healthcare in 2019-2022 based on treatment results is categorized into seven of them in treatment, default, failure, complete, death, transfer and recovery. Based on the graph, the results obtained in 2019 and 2021 are mostly patients with the final result, which is recovery. Meanwhile, in 2020 the highest were patients with complete treatment results. Whereas in 2022 the highest results are patients who are currently on treatment.
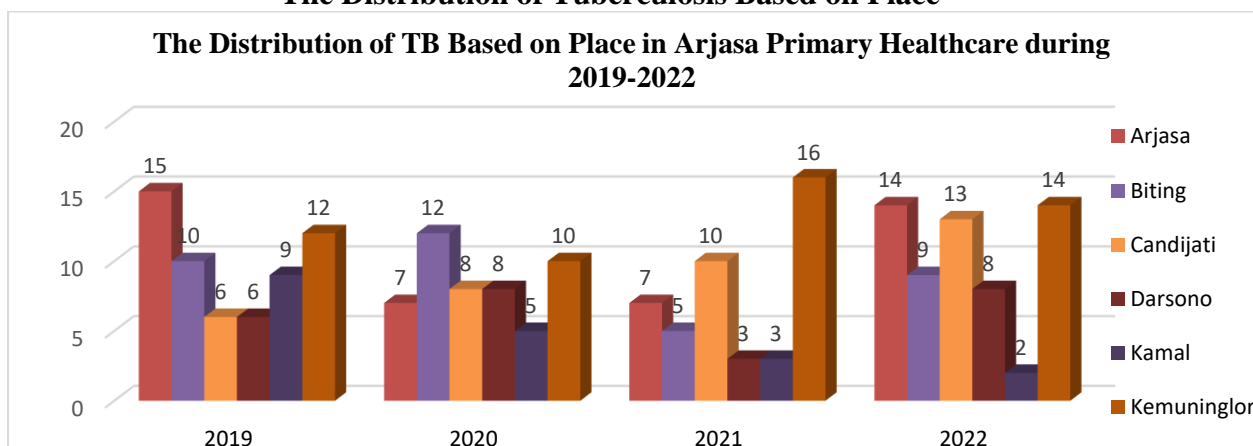
The Distribution of Tuberculosis Based on Place

The Distribution of TB Based on Place in Arjasa Primary Healthcare during 2019-2022

Figure Error! No text of specified style in document.**4. The Distribution of TB Based on Place**

Figure 4 shows that tuberculosis occurs in the working area of Arjasa Primary Healthcare in 2019-2022 based on the characteristics of the place categorized 6, namely the villages of Arjasa, Biting, Candijati, Darsono, Kamal and Kemuninglor. Based on the graph, it was found that cumulatively the most tuberculosis patients occurred in Kemuninglor Village with a total of 52 people and/or 24.53%. If you look at the number of TB patients annually, it varies from village to village. In 2019 the highest number of TB patients occurred in Arjasa

Village, namely 15 people and/or 25.86%. In 2020 the highest number of TB patients is in Biting Village with 12 people and/or 24%. In 2021 the highest number of patients will be in Kemuninglor Village with 16 people and/or 36.36%. In 2022 the highest number of TB patients will occur in Arjasa Village and Kemuninglor Village with the same number of patients, namely 14 people and/or 23.33%.

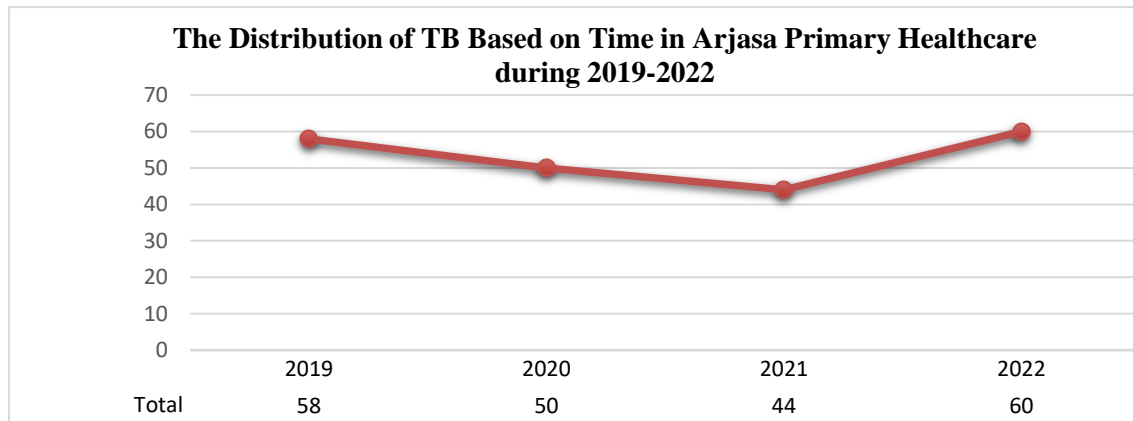**The Distribution of Tuberculosis Based on Time**

Figure 5. The Distribution of TB Based on Time

Figure 5 shows that tuberculosis that occurred in the working area of Arjasa Primary Healthcare in 2019-2022 based on time characteristics was categorized into four, namely 2019, 2020, 2021, 2022. Based on the cumulative graph, the results showed that the most tuberculosis patients occurred in 2022, namely as many as 60 people and/or 28.30%, and the lowest will occur in 2021 as many as 44 people and/or 20.75%.

The Distribution of Tuberculosis Based on Success Rate (SR) and Case Detection Rate (CDR)
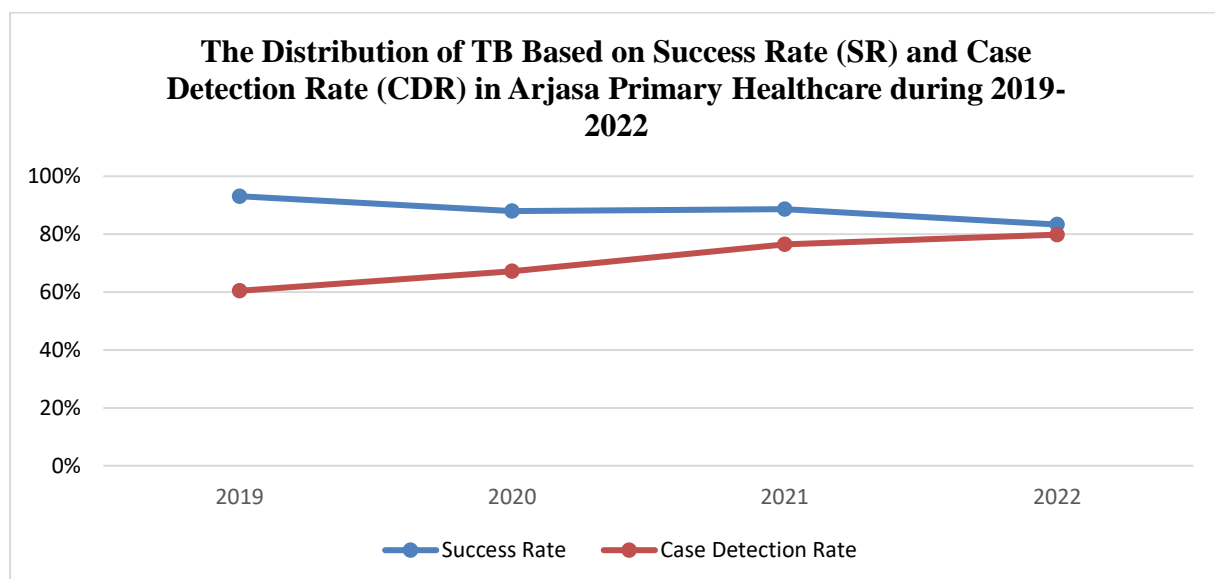
Gambar 6. The Distribution of TB Based on Success Rate (SR) and Case Detection Rate (CDR)

Figure 6 shows an overview of the TB success rate in the working area of Arjasa Primary Healthcare in 2019-2022. Based on the graph, the success rate that occurs every year is fluctuating. The highest percentage occurred in 2019, namely 93.10%, while the lowest occurred in 2022, namely 83.33%. Based on the graph, the case detection rate has increased every year. The highest percentage occurred in 2022, namely 79.83%, while the lowest occurred in 2019, namely 60.45%.

DISCUSSION

Based on person, the most TB patients were women. These results are in line with research conducted by Tsani (2012) on TB patients at Dr. Kariadi Semarang found that there were 55% more TB patients in women compared to men, only 45% (Tsani, 2012). There are more TB patients in women because women have more time to carry out health checks compared to men. In addition, women also have a higher sense of concern for health compared to men and women will immediately take treatment if they experience some symptoms of the disease (Ama et al., 2020). It was also found that the number of TB patients in men in 2020 and 2021 has a higher number compared to women. Men are vulnerable to contracting TB because they have unhealthy behaviors and lifestyles such as consuming alcohol and smoking. Where this behavior can affect a person's immune system so that he is vulnerable to contracting TB (Korua et al., 2015). In addition, men have a higher level of mobility outside the home than women. This of course can increase the risk of contracting TB disease (Amran et al., 2021). The difference in the number of TB patients in women and men was not too significant so that it did not show a difference between male and female patients. This is in line with research conducted by Anisah dkk. (2021) that there is no relationship between gender and the incidence of tuberculosis (Anisah et al., 2021). In addition, there are also some differences regarding the relationship between gender and the incidence of TB, there are several studies which state that there is a relationship and there are several studies which say there is no relationship between gender and the incidence of TB. So that further research is needed to find out or prove a relationship between gender and the incidence of TB in each sex.

The highest number of TB patients every year occurred in the adult or productive age group (18-65 years). This can be caused because at productive age they have a solid level of activity and an unhealthy work environment so that these individuals have a low immune system and are easy to contract various diseases, one of which is tuberculosis (Kemenkes RI, 2018). The Ministry of Health of the Republic of Indonesia (2011) in Damayanti (2018) states that there are around 75% of tuberculosis patients occurring at a productive age due to the high

mobility in that age group, thereby increasing the possibility of meeting many unknown people which increases the possibility of contracting tuberculosis (Damayati et al., 2018). Research of Andayani (2017) also states that productive age is susceptible to TB disease 5-6 times greater than other ages. This is because at that age a person tends to have high activity outside the home, so the possibility of being exposed to Mycobacterium tuberculosis is greater (Andayani & Astuti, 2017). If many people of productive age experience TB, of course it will have an impact on the level of productivity they have and can reduce income or income in fulfilling daily life (Widiati & Majdi, 2021).

Morover, in 2019, 2020 and 2022 there were pediatric TB patients. The discovery of TB cases in children shows that TB surveillance activities in children at Arjasa Primary Healthcare have increased. This is supported by the results of the case detection rate from 2019 to 2022 which has increased. In addition, it is said that TB surveillance has increased because it is more difficult to detect TB cases in children compared to adults. The symptoms of TB in children are not typical and are similar to the symptoms of other infectious diseases, so if there are cases of TB in children it indicates that the number of cases has increased (Marlinae et al., 2019).

Pulmonary TB was the most common TB patients each year. These results are in line with a study conducted by Azizi (2015) that there were more types of pulmonary TB patients than extrapulmonary TB with respective percentages of 89.2% and 10.8%. This is because this type of pulmonary TB is contagious compared to extrapulmonary TB, so that it spreads more easily in this type of pulmonary TB (Azizi et al., 2015). Pulmonary TB can be transmitted through droplets that are spread in the air. If the droplet hits another person, especially someone who has a weak immune system, it can cause pulmonary TB. In contrast to extrapulmonary TB which cannot be transmitted, except for a person or patient who experiences certain conditions such as also experiencing pulmonary TB (Yayasan KNCV Indonesia, 2021).

From treatment status, the highest number is cured patients catagory. These results are in line with research conducted by Sihotang (2013) that the treatment outcome for most TB patients was recovery by 91.38%. This can be caused because the level of adherence to treatment in the community in Arjasa District tends to be high so that the recovery rate in the community is also high. In addition, the high recovery rate in the community can also be caused by high supervision of taking medication from both families and health workers, so that patients are able to complete treatment at the puskesmas (Sihotang et al., 2013). However, in 2020 no treatment results were found in the cured category due to an error in inputting and there was a

changing of TB officer. So that in 2020 the highest is only complete treatment without any data related to patient recovery.

Based on place, the characteristics of the place show fluctuating numbers. The data shows that the highest number of TB patients in 2019 occurred in Arjasa Village. The high incidence of TB in Arjasa Village can be due to the higher population and density levels compared to other villages. According to BPS data for 2019, the population of Arjasa village is 8,445 people (BPS Kab. Jember, 2019). This can pose a risk of tuberculosis transmission because it increases the possibility of contact with TB patients (Sasmita et al., 2017). High population density has a tendency to live in close proximity and slums, poor hygiene and sanitation, and poor nutrition so that if one resident suffers from TB it will accelerate its spread from one person to another (Suryani & Ibad, 2022). However, in 2020 and 2021 the highest number of TB patients was in Kemuning lor Village. This could happen because most of the Kemuning lor area is located in the highlands which has air temperatures that tend to be low and humidity high (BPS Kab. Jember, 2019). High humidity can cause pathogenic bacteria such as Mycobacterium tuberculosis to develop properly because they make up more than 80% of the volume of bacterial cells and are essential for the growth and survival of bacteria. According to Gould and Brooker from previous research of Rezky (2017) high humidity results in dry nasal mucous membranes thereby reducing the protective level in blocking microorganisms (Rezky, 2017).

Based on time, the characteristics of time show fluctuating number of cases. The data states that the highest TB patients will occur in 2022. Meanwhile, from 2019 to 2021 there will be a decrease in the number of TB patients. This decrease was partly due to the small number of visits and the existence of Large-Scale Social Restrictions (PSBB) during the COVID-19 pandemic. This has resulted in a decrease and disruption of TB case-finding activities in the community due to the impact of the COVID-19 pandemic. This is also because there is stigma and fear in the community to seek treatment, for fear of contracting the COVID-19 virus. So that the existence of the COVID-19 pandemic prevented TB patients from carrying out treatment and direct examinations at health services. This of course can have a bad impact on TB patients because for TB patients treatment needs to be continued and must not be interrupted because it can worsen the patient's condition and increase the risk of death by up to 13%. The decrease in cases also occurred because the community did not report to the puskesmas if they had and/or experienced symptoms of tuberculosis, for fear of being considered COVID-19. This is because the symptoms of tuberculosis and those with COVID-19 are almost the same (Handayani & Sumarni, 2021). In 2022 there will be an increase in TB

cases, this is because there has been relaxation and the PSBB policy has ended. So that health service activities for the community and especially services for TB have started to run. Community fear and stigma have begun to decrease, so that reporting of TB cases by the community has also begun to increase. Active screening in the community carried out by the puskesmas has also started to run again. Therefore the detection of positive cases of TB will increase in 2022.

Based on the success rate achievement and the case detection rate achievement, the percentage of success rate from 2019 to 2022 has decreased. Where in 2019, the success rate has met or exceeded the national target of 90%. However, from 2020 to 2021 it has decreased and is below the national target. The success rates in 2020 and 2021 are below the target due to the pandemic which has limited monitoring and treatment visits for TB patients. According to Muflihah (2022) states that due to the pandemic, there has been a reduction in human resources in handling TB patients, as well as concerns for health workers not having much contact with TB patients, who are a vulnerable group to the COVID-19 virus. Reduced contact with these patients leads to decreased medication adherence. According to Harfiani (2020) staff service is also one of the factors that can affect the low level of treatment for tuberculosis patients. Meanwhile, the success rate in 2022 is the lowest compared to the previous year. This could be since there were several patients who were still in the treatment process and were still being provided with assistance until this research was conducted. This is because the treatment process for TB patients lasts for 6-9 months and can only be categorized as complete if they have gone through these 6-9 months regularly and can be categorized as cured if the laboratory test results are negative (Kemenkes RI, 2017). Moreover, the percentage of TB case detection rates had increased from 2019 to 2022. This indicates that case finding and TB surveillance activities at Arjasa Primary Healthcare have started to increase and have started running well. In addition, the CDR figures in 2021 and 2022 are in accordance with the standards set by the Ministry of Health, namely above 70%, namely 76.50% and 79.83% respectively. This figure needs to be maintained and increased so that TB case detection increases and more TB patients are treated and cured (Kepmenkes, 2009).

CONCLUSION

The description of TB patients based on the characteristics of people, namely gender, showed that there was no significant difference in numbers between male and female TB patients. Based on age showed that most TB patients are in the productive age group. Based on the type of TB, the majority of TB patients were pulmonary TB. Based on the results of the

treatment, it was found that the majority of patients was in the cured category. The description of TB patients based on the characteristics of the place showed that the most TB patients occurred in Arjasa Village with its population density and Kemuninglor Village due to high air humidity. A description of TB patients based on time characteristics shows that there has been a decrease in the number of patients from 2019 to 2021 due to the impact of the COVID-19 pandemic and an increase again in 2022. Based on the TB Success Rate in the working area of Arjasa Primary Healthcare obtained fluctuating results but tended to decrease and the Success rate the TB rate at Arjasa Primary Healthcare has not met the target of the national TB program. Based on the case detection rate in Arjasa Primary Healthcare work area shows that there has been an increase from 2019 to 2022 and this case detection rate has met the national target.

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