

Article

What are the determining factors for TB disease? cross-sectional study

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ABSTRACT

Pulmonary TB is caused by the bacterium Mycobacterium tuberculosis. This disease is a contagious disease and spreads faster in men 1,4 times greater than women. The aim is to reveal the problem of risk factors that influence pulmonary TB disease, namely smokers and alcoholics. The method is that this article was written by reading a number of literature discussing pulmonary TB in relation to smoking and drinking behavior. Smokers have a 40-60 percent higher chance of developing pulmonary TB than non-smokers. An unhealthy environment can trigger a wider spread of TB, especially from TB patients who smoke. Alcohol dependence of pulmonary TB patients with smear + in the pre-alcoholic stage can climb to the next stage. At an emergency stage alcoholism can cause the body's resistance to decrease because all control is lost, even alcohol drinkers will continue until they pass out so that the social interaction of the person concerned becomes bad due to dependence on alcohol. The conclusion is that smoking and drinking alcohol are risk factors for pulmonary TB patients. There needs to be a strong motivation so that we all reduce the habit of smoking and drinking alcohol.

I. INTRODUCTION

Tuberculosis is an infectious disease that is a priority for treatment (Ministry of Health, 2019). This disease is caused by the bacterium *Mycobacterium tuberculosis* and is a contagious infectious disease. According to the 2018 Global TB Report, in Indonesia in 2023 there will be 842,000 new TB cases (319 per 100,000 population) and 116,400 deaths due to TB (44 per 100,000 population), including TB-HIV positive. The case notification rate (CNR) of all cases was reported as 171 per 100,000 population. Nationally, the estimated incidence of TB and HIV is 36,000 cases (14 per 100,000 population). The number of TB-RO cases is estimated at 12,000 cases

In 2023 in Indonesia the number of new TB cases will be 420,994 cases. And based on gender, the number of new TB cases in 2023 will be 1.4 times greater in men than in women. Survey The prevalence of TB in men is 3 times higher than in women. This may occur because men are more exposed to TB risk factors such as smoking and alcohol consumption. This survey found that 68.5% of all male participants smoked (InfoDATIN, 2018).

Pulmonary TB disease can occur when the body's immune system decreases. There are three components to the occurrence of TB disease, namely the result of interactions between the three components. These three components are host, cause/agent, and environment. The host part is susceptible to *Mycobacterium tuberculosis* infection and this is greatly influenced by a person's immune system at that time. (InfoDATIN, 2018)

Prevention and control of TB risk factors is carried out by: cultivating clean and healthy living behavior, cultivating coughing ethical behavior, maintaining and improving the quality of housing and its environment in accordance with healthy home standards, increasing body immunity, handling TB comorbidities, implementing prevention and control TB infection in Health Service Facilities, and outside Health Service Facilities (Indonesian Ministry of Health, 2016)

A smoker is someone with a smoking habit which is divided into heavy smokers, moderate smokers and light smokers. One of the risk factors for people with TB is smoking. One type of respiratory disease that is often threatening is tuberculosis. The cause of puffs of cigarette smoke will make the lungs dirty, this condition can indicate that the lungs are starting to be damaged.

Alcohol is often used as an outlet for people who have burdens, for example by drinking alcohol they can become drunk and forget about the problems they are currently experiencing.

Alcoholic is a heavy drinker. In fact, alcohol is often used as an outlet because for people who have burdens, for example by drinking alcohol they can become drunk and forget about the problems they are currently experiencing. Signs of an alcoholic are breath that is identical to alcohol, restlessness, frequent problems, constant desire to consume alcohol, hallucinations and so on. Total per capita consumption by adults (over 15 years) in liters of pure alcohol is 0.6. (WHO, 2011). Research conducted by Lonnroth (2008) and Jorgen (2009) stated that people who consume alcohol have a significant risk factor for TB disease.

Therefore, the author wants to reveal the problem of risk factors that influence TB disease, namely smoking and alcoholism.

II. METHOD

This article was written by reading a number of literature, and then a summary of the literature was taken and then reviewed. This type of research is descriptive with a survey method. Sampling was carried out randomly *Cross Sectional* (Suhron, 2024). This literature is research reports or articles relating to smoking risk factors and alcoholic risk factors for the incidence of TB.

III. RESULTS AND DISCUSSION

TB disease

This disease is an infectious disease and occurs most often in men.

According to Setiarni et al, 2020 there are several risk factors for TB, including:

1. Age
Age greatly influences the incidence of TB disease. It is estimated that around 75% of TB patients are in the most economically productive age group (15-50 years). An adult TB patient will lose an average of 3 to 4 months of work time. This results in a loss of annual household income of around 20-30%. But if you die from TB, you will lose your income for around 15 years. Age is closely related to the level of maturity or martunity. Maturity consists of technical maturity in carrying out tasks as well as psychological maturity. Personnel performance will increase as age increases
2. Education level Some TB sufferers are of productive age with a low level of education, so knowledge about TB and awareness of undergoing regular treatment is low. Education is a factor in the risk of transmitting TB disease. A low level of education will affect a person's knowledge about healthy homes and clean and healthy living behavior. The education a person has will reflect that person's way of thinking, and the higher a society's level of education, the better the society's patterns will be
3. Family income (Income) The main cause of the development of Mycobacterium tuberculosis bacteria in Indonesia is due to the low income of the community. In general, those affected by TB disease are low-income groups of people. A person with a low income level makes less use of health services, perhaps because they do not have enough money to buy medicine. Low family income triggers an increase in malnutrition rates among the poor, which will have an impact on the body's resistance to TB disease. The biggest cause of the decline in TB disease is the increase in family socioeconomic status. The higher the level of education, the better the monthly income they receive.
4. Home environmental sanitation Environmental sanitation is the health status of an environment which includes housing, sewage disposal, provision of clean water and so on. The home environment consists of the physical environment, namely: ventilation, temperature, humidity, floors, walls and the social environment, namely: occupant density. Transmission of respiratory diseases such as tuberculosis will easily occur among house residents Notoatmodjo (2003). A poor home environment is a good place to transmit diseases such as TB. Home environmental factors are closely related to disease transmission, such as the physical, biological, economic, social and cultural environment.
5. Behavior is one of the factors that can cause problems with the spread of Mycobacterium tuberculosis bacteria. On average, a sufferer can infect 2-3 family members. If behavior is not positive, it is very influential in transmitting infectious diseases, so that the environment can change in such a way that it becomes an ideal

place for disease transmission. This behavior can include 2 things, namely smoking behavior and alcohol consumption behavior.

Smoker Risk Factors for TB Disease

One of the factors that influences TB disease is smoking. Smoking is a form of activity that is detrimental to oneself, the family and other people around the smoker. This smoking activity also feels futile, even as if it is burning money and damaging the body. Cigarettes are cylindrical pieces of paper measuring between 70 and 120 mm long with a diameter of around 10 mm containing chopped tobacco leaves. The cigarette is burned at one end and left to smolder so that the smoke can be inhaled through the mouth at the other end.

According to Sugeng (2007) the chemicals contained in cigarettes are:

1. Nicotine, an ingredient that causes smokers to feel relaxed. Nicotine is toxic and can affect the performance of the brain or central nervous system
2. Tar, which consists of more than 4,000 chemicals, of which 60 are carcinogenic. Tar is a polynuclear aromatic hydrocarbon compound which is very dangerous for the body
3. Cyanide, a chemical compound containing the cyano group.
4. Benzene, also known as benzene, a flammable and colorless organic chemical compound.
5. Cadmium, a highly toxic and radioactive metal.
6. Methyl Alcohol or also known as Methanol, which is the simplest alcohol because it has 1 carbon atom
7. Acetylene, is an unsaturated chemical compound which is also the simplest alkyne hydrocarbon.
8. Ammonia, can be found everywhere, but is very toxic in combination with certain elements.
9. Formaldehyde, a highly toxic liquid used to preserve corpses.
10. Hydrogen cyanide, a poison used as a fumigant to kill ants. This substance is also used as a plasticizer and pesticide.
11. Arsenic, a substance found in rat poison.
12. Carbon monoxide, a toxic chemical found in car and motorbike exhaust fumes.

It is generally found that people who smoke have a 73 percent higher risk of being infected with TB and have more than twice the potential to develop active TB than those who do not smoke. Smokers have a 40–60 percent higher chance of developing TB disease than non-smokers. The mechanism involved to explain the relationship between smoking and tuberculosis is that smoking can reduce the immune response or damage the function of cilia in the airways, thereby increasing the risk of TB. Therefore, to reduce the number of TB cases in the future, tobacco control needs to be carried out (Setiarini et al, 2020)

Reporting from the Mayo Clinic, TB itself is divided into two, namely latent TB and active TB, where latent TB is a condition where the body already has the *Mycobacterium tuberculosis* bacteria but is in an inactive state, does not cause symptoms, and is not contagious. This latent TB can turn into active TB, which is a condition that makes this disease contagious and makes a person sick with symptoms such as coughing for more than three weeks or more, chest pain, weight loss, fatigue, fever, chills and coughing up blood. According to a published study, smoking can be a factor in the development of diseases such as lung cancer, chronic lung disease and respiratory infections, especially tuberculosis. This is also related to other risk factors, such as smoking for more than 10 years, a family history of TB and smoking, and the use of non-parenteral drugs rather

than carrying out health checks on TB patients. It was also stated in the journal that an unhealthy environment can trigger a wider spread of TB, especially from TB patients who smoke.

Research in South Korea from 1992 to 2006 also showed that smoking can increase TB cases and death in TB patients. This risk is adjusted to research in Mumbai, India, which found that deaths from TB among smokers were higher than those who had never smoked. Research quoted from WHO also states that smoking can worsen the treatment of TB patients 70 percent more than patients who do not smoke. From this research, data was also obtained which stated that more than 50 percent of TB patients were smokers, this may be because smoking causes the same symptoms as TB such as coughing. So there is often a delay in diagnosing TB among smokers compared to non-smokers.

Research conducted by Hsien-Ho Lin in Taiwan (2009) on smokers, found that around 18,000 people representing the general population over the last three years found a twofold increase in the risk of active TB in smokers compared to those who did not smoke. This made the Taiwanese government take a policy of making stricter laws regarding smoking in the country.

Alcoholic Risk Factors for the Incidence of TB

Alcohol is a psychoactive substance that is addictive. Alcohol is a psychoactive substance because alcohol works selectively on parts of the brain. As a result, it can cause changes in a person's behavior, emotions, cognition, perception and awareness. Meanwhile, the addictive nature of alcohol is a person's dependence on alcohol. An alcohol user has a range of responses that fluctuates from mild to severe.

Alcohol abuse is often carried out by those who have a habit of drinking alcohol or are alcoholics which is very dangerous for themselves. Usually they get drunk every day and make trouble. And they also drink alcohol in large quantities and in high concentration all the time. The effects that arise after consuming alcohol will be felt in a short time if the alcohol level consumed is above 20%. Alcohol use in society has negative impacts that not only harm oneself but also harm others. If this deviation continues, the impact will be addiction or dependence on alcohol. People who are dependent on alcohol are called alcoholics. Alcoholic also means a person with a chronic illness characterized by a tendency to drink more than intended, failure of attempts to stop drinking and continued drinking despite adverse social and occupational consequences. The disease is called alcoholism.

Alcohol addiction can cause significant stress on the body and lead to serious health problems. This addiction makes a person's life become bored and they feel there is no purpose in life, they want to change and stop consuming alcohol by getting closer to Allah and looking for a good environment. (Princess, 2020)

Characteristics of Alcoholism

Usually alcoholics can be detected by the characteristics of alcoholics being unable to regulate their behavior, tending to drive while drunk, and suffering physical injuries due to falls, fights or motor vehicle accidents. Some alcoholics can also be violent/violent. Social relations with the environment and between families are not very good. Alcoholics tend to feel isolated, alone, embarrassed, depressed or hostile. They commonly exhibit self-destructive behavior, and may be sexually immature. Nevertheless, alcohol abuse and dependence are so common that addicts are easily recognized among people with various personalities.

In the body, alcohol is quickly absorbed from the small intestine into the bloodstream. Absorption of alcohol occurs faster than metabolism and elimination from the body, so blood alcohol levels increase rapidly. Small amounts of alcohol in the blood are excreted in urine, sweat and respiratory air. Most alcohol is metabolized in the liver and produces about 210 calories/100 grams (7 calories per milliliter) of pure alcohol drunk. Alcohol immediately depresses brain function; how heavy it is depends on the level in the blood; the higher the level, the more severe the disorder that occurs. Long-term use of excessive amounts of alcohol can damage various organs in the body, especially the liver, brain and heart (Putri, 2020)

Alcohol tends to cause tolerance, so that someone who regularly drinks more than 2 glasses of alcohol/day can consume more alcohol than a non-alcoholic, without experiencing intoxication. Alcoholics may also develop a tolerance to other anti-depressants. For example, addicts taking barbiturates/benzodiazepines usually require larger doses to achieve the effects of treatment. Tolerance does not appear to change the way alcohol is metabolized or excreted. Alcohol even causes the brain and other tissues to adapt to the presence of alcohol. If an addict suddenly stops drinking, withdrawal symptoms will occur. Alcohol withdrawal syndrome usually begins within 12-48 hours after a person stops drinking alcohol. Symptoms include shaking, weakness, sweating and nausea. Some addicts experience seizures (Private, 2023).

Stages of Alcoholism

Alcoholism sufferers generally go through four stages which include: (Putri, 2020).

1. Former Alcoholic

At this stage the individual drinks with his peers and sometimes drinks quite a lot to relieve tension and forget the problems he is experiencing.

2. Prodromal

At this stage the individual drinks in secret. He remained conscious and relatively coherent but was no longer able to remember the events he had experienced.

3. Dire

At this stage all control is lost. Sufferers will drink and continue until they pass out or become sick. Social interactions become worse and he openly drinks in front of family, friends or the office. Sufferers at this stage start drinking in the morning, then drink continuously for days without paying attention to their eating rules.

4. Chronic

At this stage the sufferer's life consists only of drinking, drinking continuously without stopping. His body condition is used to alcohol, so he experiences withdrawal symptoms without alcohol and symptoms of physiological disorders.

According to research results from Makalew in 2010, it was stated that pre-alcoholic stage alcoholism was based on his interpretation that pre-alcoholic stage alcoholism was only a predictive factor for BTA+ TB sufferers. Alcoholism in the pre-alcoholic stage in the current case does not pose a risk to TB sufferers, but it cannot be denied that the alcohol dependence of TB patients with BTA + in the pre-alcoholic stage can increase to the next stage. In the critical stage, alcoholism can cause the body's resistance to decrease because at this stage all control is lost and the drinker will even continue until he passes out so that the person's social interactions become bad due to dependence on alcohol.

III. CONCLUSIONS AND RECOMMENDATIONS

The behavioral factors of smoking and drinking alcohol are risk factors for TB sufferers. Therefore, an intensive approach is needed with TB sufferers who still smoke and drink alcohol until there is a change in behavior, namely they stop these two habits.

REFERENCES

1. Central Statistics Agency, 2023. People's Welfare Statistics 2023, Jakarta. Indonesian Ministry of Health, 2016.
2. Decree of the Minister of Health of the Republic of Indonesia Number HK.01.07/MENKES/755/2019 concerning National Guidelines for Tuberculosis Treatment Medical Services
3. <https://www.halodoc.com/artikel/inilah-alasan-rokok-bisa-tingkatkan-risiko-tuberkulosis>
4. Indonesian Ministry of Health, 2015. Tuberculosis Prevalence Survey 2013-2014, Jakarta.
5. Indonesian Ministry of Health. 2016. National Strategic Plan of Tuberculosis Control 2016-2020, Jakarta.
6. InfoDATIN Data and Information Center Ministry of Health of the Republic of Indonesia, 2018
7. Minister of Health Regulation Number 67 of 2016 concerning Tuberculosis Management, Jakarta.
8. Personal Firm Eco. 2023. Alcohol Abuse in Indonesia: Determinant, SWOT, and CARAT Analysis. Journal of Health Science and Prevention, Vol.1(1), April, 2023 ISSN 2549-919X
9. Presidential Regulation Number 59 of 2023 concerning Sustainability Development Goals. WHO, 2023. Global Tuberculosis Report 2023, Geneva. www.who.int/gho/mortality_burden_disease/cause_death/top10/en/
10. Putri, Yusmi Dwi 2020, Meaning of Life for Former Alcoholics. muhammadiyah Surakarta university
11. Science Daily. Diakses pada 2020. Smoking May Be A Risk Factor For Tuberculosis.
12. Setiarni, Sri Marisya. Adi Heru Sutomo, Widodo Hariyono. 2020. The Relationship Between Knowledge Level, Economic Status and Smoking Habits and the Incidence of Pulmonary Tuberculosis in Adults in the Working Area of the Tuan-Tuan Community Health Center, Ketapang Regency, West Kalimantan KES MAS ISSN: 1978 - 0575
13. Suhron, M. 2024. *Public Health Epidemiology Research Book*. SABDA EDU PRESS.
14. WHO, Global Status Report on Alcohol and Health. Switzerland: 2011