



Risk Factors of Pulmonary Tuberculosis  
Incidence in DOTS Polyclinics of Prof. R. D.  
Kandou Manado Hospital

---

Rivaldo Misa and Metty Wuisang

EasyChair preprints are intended for rapid dissemination of research results and are integrated with the rest of EasyChair.

July 30, 2020

---

## RISK FACTORS OF PULMONARY TUBERCULOSIS INCIDENCE IN DOTS POLYCLINIC OF PROF DR. R. D. KANDOU MANADO HOSPITAL

Rivaldo Dave Misa<sup>1</sup>, Metty Wuisang<sup>2</sup>

1. Departement of Nursing Fundamental, Faculty of Nursing, Klabat University, JL Arnold Mononutu, Airmadidi, 95371, Indonesia

2. Lecture in the Faculty of Nursing, Klabat University JL Arnold Mononutu, Airmadidi, 95371, Indonesia

E-mail: [rivaldomisa98@gmail.com](mailto:rivaldomisa98@gmail.com)<sup>1</sup>, [wuisangmetty@yahoo.com](mailto:wuisangmetty@yahoo.com)<sup>2</sup>

---

### Abstract

Tuberculosis is an infectious disease caused by the bacteria *Mycobacterium Tuberculosis*. These germs infect the lungs more often but can also attack other organs of the body. The purpose of the study was to determine the description of risk factors for pulmonary TB patients in the DOTS Polyclinic Prof. R. D. Kandou Manado. This type of research is quantitative descriptive through a cross sectional approach with 32 respondents. The results obtained are pulmonary TB sufferers who have a contact history of 6 respondents (18.8%) and pulmonary TB sufferers who do not have a contact history of 26 respondents (81.3%), who have completed elementary school totaling 2 respondents (6.3%), graduated junior high numbered 5 respondents (15.6%), graduated high school totaling 22 respondents (68.8%), and those who graduated from college totaled 3 respondents (9.4%), male totaled 21 respondents (65%) and female totaling 11 respondents (34%), those who have enough knowledge amounted to 16 respondents (50%) and good knowledge amounted to 16 respondents (50%), who were smoking amounted to 17 respondents (53.1%), did not smoke amounted to 13 respondents (40.6%), and who ever smoked amounted to 2 respondents (6.3%). Recommendations to the community based on the results of this study are that the community can further enhance their knowledge about TB, pay more attention to personal hygiene and the environment and improve healthy lifestyles, and avoid smoking or exposure to cigarette smoke so as to minimize the risk of contracting pulmonary tuberculosis.

**Keywords:** contact history, education, gender, knowledge, pulmonary tuberculosis, smoking status.

### Abstrak

Tuberkulosis adalah penyakit menular yang disebabkan oleh kuman *Mycobacterium Tuberculosis*. Kuman ini lebih sering menginfeksi area paru-paru tetapi dapat juga menyerang organ tubuh yang lain. Tujuan penelitian untuk mengetahui gambaran faktor risiko penderita TB paru di Poliklinik DOTS RSUP Prof. R. D. Kandou Manado. Jenis penelitian yaitu deskriptif kuantitatif melalui pendekatan *cross sectional* dengan 32 responden. Didapatkan hasil yaitu penderita TB paru yang memiliki riwayat kontak berjumlah 6 responden (18.8%) dan penderita TB paru yang tidak memiliki riwayat kontak berjumlah 26 responden (81.3%), yang memiliki pendidikan terakhir tamat SD berjumlah 2 responden (6.3%), tamat SMP berjumlah 5 responden (15.6%), tamat SMA berjumlah 22 responden (68.8%), dan yang tamat PT berjumlah 3 responden (9.4%), yang berjenis kelamin laki-laki berjumlah 21 responden (65%) dan berjenis kelamin perempuan berjumlah 11 responden (34%), yang memiliki pengetahuan cukup berjumlah 16 responden (50%) dan pengetahuan baik berjumlah 16 responden (50%), yang sedang merokok berjumlah 17 responden (53.1%), tidak merokok berjumlah 13 responden (40.6%), dan yang pernah merokok berjumlah 2 responden (6.3%). Rekomendasi kepada masyarakat berdasarkan hasil penelitian ini yaitu masyarakat dapat lebih meningkatkan pengetahuan yang dimiliki tentang penyakit TB, jaga jarak aman dengan orang yang memiliki gejala TB, serta hindari merokok atau terpapar asap rokok sehingga dapat meminimalkan risiko terjangkitnya penyakit tuberkulosis paru.

**Kata Kunci:** jenis kelamin, pengetahuan, pendidikan, riwayat kontak, status merokok, tuberkulosis paru

---

## Introduction

Tuberculosis (TB) is a chronic infectious disease caused by the bacteria *Mycobacterium Tuberculosis*. In most cases, these germs infect the lung area more often but can also attack other organs of the body (Robbins & Cotran, 2015). According to the World Health Organization (WHO) in 2018 the highest number of pulmonary TB incidents was found in India with 2.69 million cases (Global Tuberculosis Report, 2019). The prevalence of pulmonary TB patients in Indonesia based on research in 2018 is at 0.4% which remains the same as the results of Riskesdas in 2013 which amounted to 0.4%. Furthermore, for the province of North Sulawesi, the prevalence of pulmonary TB was 0.4% or 400 per 100,000 population, which increased compared to the results of Riskesdas in 2013 with a prevalence of 0.3% (Riskesdas, 2018). Data states that the Manado area ranks first in the pulmonary TB New Case Discovery Rate (CNR) in 2016 with 386 cases per 100,000 population (North Sulawesi Provincial Health Service, 2017).

Risk factors that can be related to this disease according to research conducted by Muaz (2014) include sex, smoking, education, and knowledge. Research by Fitriani (2012), adding a history of contact with patients with pulmonary tuberculosis can be a factor associated with the incidence of pulmonary TB. As one factor, smoking is a behavior that is very detrimental to health. The country with the highest number of smokers in the world is occupied by China with 390 million smokers (29%), India with 144 million smokers (12.5%), and Indonesia with 65 million inhabitants (28%) (RI Ministry of Health, 2013). While in the ASEAN zone itself, based on the Southeast Asia Tobacco Control Atlas report, Indonesia ranks first with the most sufferers with a total of 65.19 million smokers, followed by the Philippines with 16.5 million smokers and Vietnam with 15.6 million smokers (Southeast Asia Tobacco Control Alliance, 2016). Besides smoking, the next factor that can be related to pulmonary TB disease is education. The prevalence of pulmonary TB sufferers is increasing at low levels of education, the prevalence shows for those who do not go to school were 0.6%, not completing elementary school 0.4%, graduating elementary school were 0.4 %, graduated from junior high school were 0.3%, graduated from senior high school were 0.3%, and graduated from college were 0.2% (Riskesdas, 2018). A person's level of education is continuous with the knowledge he has. According to Notoadmojo (2014), education can influence someone's knowledge in health behavior, especially in motivating someone to participate in improving health status. Pulmonary TB disease is more common in men than women. In 2018 the number of pulmonary TB patients in Indonesia amounted to 511,873 people, of which 57% were male, and 42% were female (Ministry of Health, Republic of Indonesia, 2018). This

can be caused by the fact that most men smoke and consume alcohol which can decrease the body's immune system, making it easier to contracting this disease (Dotulong, Sapulete, & Kandou, 2015). When the body's immune system goes down, a person is susceptible to contracting any disease, including pulmonary TB. Based on the perspective of the epidemiological triangle explained on one factor namely the host or host side, a person's susceptibility to contracting depends on the person's immune condition at that time (Ministry of Health Republic of Indonesia, 2018).

Based on several factors that have been described, to support this study, researchers used a theory put forward by Gordon, namely the epidemiological triangle. This theory explains that infectious diseases are caused by a complex relationship between the three components namely agent, host, and environment. Changes between any of this three components can result in a disease, in this case the pulmonary TB disease.

Preliminary observations made by researchers at Prof. RSUP R. D. Kandou Manado Hospital, especially in the DOTS (Directly Observed Treatment Shortcourse) polyclinic room, there were 85 pulmonary TB patients coming for treatment from February to April. Based on the background description, the researcher is interested in conducting a study entitled "Risk Factors of Pulmonary Tuberculosis Incidence in DOTS Polyclinics of Prof. R. D. Kandou Manado Hospital".

This research is intended to increase knowledge and insight for researchers specifically about how to make a scientific paper, especially in the field of infectious diseases. This research is expected to be useful to increase knowledge for patients and families in order to better maintain personal and family health. Specifically avoiding the factors that can cause pulmonary TB outbreaks. Besides that, it can be a reference material for nursing students at Klabat University in taking communicable disease courses or as reading in a library to add to the reader's insight, especially risk factors that can cause pulmonary TB disease. This research can also be used as input for hospital institutions to increase patient awareness to better understand and practice ways to avoid the risks that can increase pulmonary TB morbidity and improve public health, especially in North Sulawesi.

## Methods

The research method of this study is descriptive quantitative with cross sectional approach. Data were collected through an interview process through a questionnaire given and then the data were analyzed using the frequency formula to find a description of the

factors that have been attached to the incidence of pulmonary TB in DOTS Polyclinic Prof. Dr. R. D. Kandou Manado Hospital. The population in this study amounted to 85 respondents who came to the DOTS polyclinic from February to March 2020. The sampling method used was consecutive sampling which 32 respondents was found. The scope of this study was pulmonary TB patients who came for treatment at the DOTS polyclinic, while the limitation in this study was that patients could be contacted based on the contact listed on the treatment card for the period of February to April.

The instrument in this study used the interview method through a questionnaire, where respondents filled in data consisting of data on gender, smoking status, contact history, and education. In the last part, there are 20 items of knowledge about pulmonary TB, in which the respondent fills in the yes or no answer by checking (√) in the column provided. The first statement, namely sex, is available for male and female choices which are checked by respondents. In the second statement, smoking status consists of three choices, namely smoking, not smoking, and having smoked. In the third statement, contact history consists of yes, having experienced contact, and never having contact. For the fourth statement is education, consists of the choice of no school, graduated from elementary school, graduated from junior high school, graduated from senior high school, and graduated from college. Interpretation of education level according to Law No. 20 of 2003, namely low education (elementary school to junior high school), middle education (high school), and higher education (college). For the fifth statement, knowledge is adopted from research conducted by Widianingrum (2017). The scale used to measure TB knowledge level uses the Guttman scale, where this scale contains yes or no answers. Scoring on this scale for the type of positive questions given the number 1 if the answer is yes and given a number 0 if the answer is no, while for the type of negative question given the number 0 if the answer is yes and given a number 1 if the answer is no (Sujarweni, 2014). Then scoring is based on the theories that have been discussed which consist of several levels. The respondent's knowledge is good if the score is in the range of 76-100%, the knowledge is sufficient if the respondent's score is in the range of 56-75%, and the respondent's knowledge is lacking if the score is in the range of 0-55%. The knowledge questionnaire that was adopted based on research conducted by Widianingrum (2017) has tested the validity and reliability. The validity test results for 20 statements about the knowledge of pulmonary TB were declared valid with the r value of 20 statements of more than 0.361, followed by a reliability test obtained a Cronbach alpha value of 0.989.

In the process of collecting data the steps taken are the researcher accommodating the material that has been prepared, then the researcher tells the faculty that research will be carried out, then a request letter from the Dean of the Faculty of Nursing is obtained. After that, researcher shows a letter of request from the Dean of the Faculty of Nursing to the hospital to obtain permission to conduct research, after obtaining permission from the hospital to conduct research. After that, the researchers introduced themselves to the participants who were used as respondents in the room and told the intentions and objectives of the researchers, then asked for and obtained consent from the patients that began with giving informed consent, then respondents would then fill out a questionnaire that would be given according to the instructions given by researchers. But based on policies that have been issued by hospitals and faculty because of the coronavirus outbreak, the data collection process was carried out by telephone, where researchers contacted respondents to conduct interviews based on a questionnaire then the researchers filled out the questionnaire based on answers from respondents.

Then after the data collected the data processing is divided into four stages which are editing, coding, processing, and cleaning. Editing, the researcher checks the questionnaire that has been filled out by the respondent whether it is in accordance with the instructions given. Coding, the researcher classifies the answers of the respondents into the form of numbers or numbers. Processing, which is a process where after all the questionnaires have been filled out correctly then the researcher processes the data so that it can be analyzed by computer. Cleaning, that is, the researcher checks the data that has been entered, whether there is an error or not. The data that has been prepared is then analyzed using Microsoft Office Excel 2013 and SPSS (Statistical Package for The Social Sciences) 23<sup>rd</sup> version.

## Results

Descriptive analysis of contact history based on table 1, the results were 6 respondents (18.8%) who had a contact history of pulmonary TB and 26 respondents who had no contact history (81.3%). This shows that more TB patients do not have a contact history than patients who have a contact history.

Table 1. Distribution of respondent frequencies based on contact history

Contact history	N	Percentage (%)
Yes	6	18.8
No	26	81.3
Total	32	100.00

Based on table 2, the results show that Pulmonary TB responden who have completed their elementary school education completed 2 respondents (6.3%), completed junior high school totaling 5 respondents (15.6%), graduated senior high school totaling 22 respondents (68.8%), and those who graduated PT totaled 3 respondents (9.4%). This shows that the majority of pulmonary TB respondents have middle education which is senior high school.

Table 2. Distribution of respondent frequencies based on education

Education	N	Percentage (%)
Graduated from elementary school	2	6.3
Graduated from junior high school	5	15.6
Graduated from senior high school	22	68.8
Graduated from college	3	9.4
Total	32	100.0

Based on Table 3, the results show that male gender are 21 respondents (65%) and 11 respondents (34%) are female. This shows that TB is more common in male gender compared to female gender.

Table 3. Frequency distribution of respondents by gender

Gender	N	Percentage (%)
Male	21	65
Female	11	34
Total	32	100

Based on Table 4, the results show that pulmonary TB respondents with enough knowledge totaled 16 respondents (50%) and good knowledge amounted to 16 respondents (50%). This shows that the knowledge possessed by respondents is balanced between enough knowledge and good knowledge.

Table 4. Frequency distribution of respondents based on knowledge

Knowledge	N	Percentage (%)
Lack of knowledge	0	0
Enough knowledge	16	50
Good knowledge	16	50
Total	32	100

Based on Table 5, the results shows who were smoking amounted to 17 respondents (53.1%), did not smoke

amounted to 13 respondents (40.6%), and who ever smoked amounted to 2 respondents (6.3%). This shows that most respondents have smoking status.

Table 5. Distribution of respondent frequencies based on smoking status

Smoking status	N	Percentage (%)
Smoking	17	53.1
Not smoking	13	40.6
Ever smoking	2	6.3
Total	32	100

## Discussion

Table 1 shows that respondents who came for treatment at the DOTS Polyclinic in RSUP Kandou Manado did not have more contact history (81.3%) than patients who had contact history (18.8%). According to the World Health Organization (WHO), TB contacts are those who have close contact with people who are known to suffer from pulmonary TB, which increases their risk of contracting TB. It depends on one's endurance at that time. When the body's immune system goes down, a person is very susceptible to contracting pulmonary TB disease. Based on the perspective of the epidemiological triangle explained on one factor namely the host or host side, a person's susceptibility to contracting depends on the person's immune condition at that time (Ministry of Health Republic of Indonesia, 2018). But about 90% of infected people will experience latent TB, where the TB germ is dormant. Whereas 10% of infected people will experience active TB, this can be caused by repeated contact with pulmonary TB sufferers (Ignatavicius & Workman, 2016). When researchers conducted interviews, some respondents said that they did not know why they had contracted pulmonary TB, they also said that they felt they did not make contact with other pulmonary TB sufferers.

Table 2 shows that most respondents who came for treatment at the DOTS Polyclinic in RSUP Kandou Manado had middle education, which they who completing high school are 22 respondents (68.8%). The theory explains that the lower education a person has, the less knowledge he has so that it can affect one's health. Higher education can also improve someone's intellectual abilities, which will increase their ability to receive and understand the information obtained. According to Notoadmojo (2014), changes in health behavior by providing information about healthy living, maintaining health, avoiding illness and so on can improve someone's knowledge. Through the knowledge gained can increase their awareness, and finally a person can behave according to the knowledge he has, especially in improving health and preventing disease.

Table 3 shows that respondents who came for treatment at the DOTS Polyclinic in RSUP Kandou Manado were more male (65%) compared to female (34%). This is consistent with the results according to the CDC in Stanhope and Lancaster (2016) where pulmonary TB sufferers are more male, out of a total of 9,945 cases in the United States, 6,028 are male and 3,914 are female. Based on data and information on Indonesia's health profile, in 2018 the number of pulmonary TB patients in Indonesia amounted to 511,873 people, of which 57% were male, and 42% were female (Ministry of Health of the Republic of Indonesia, 2018). This can be caused by the habit of men who smoke more frequently and consume alcohol which can cause a decrease in the body's immune system making it easier to contract pulmonary TB (Dotulong, Sapulete, & Kandou, 2015).

Table 4 shows that respondents who came for treatment at the DOTS Polyclinic of RSUP Kandou Manado who had enough knowledge totaled 16 (50%) respondents and good knowledge amounted to 16 (50%) respondents. This shows that the knowledge possessed by respondents is balanced between enough knowledge and good knowledge. According to Notoadmojo (2014), knowledge is something that is known by someone after sensing (eyes, nose, ears, etc.) on a particular object. This sensing process naturally produces knowledge, which is influenced by intense time and perception of objects, which can be related to health, illness or health. According to research conducted by Manullang (2011), explains that the lower the sufferer's knowledge about the dangers of pulmonary TB disease for themselves, their families and the community around him, the greater the danger of the sufferer as a source of disease transmission, both at home and at work and also a lack of protection for himself.

Table 5 shows that respondents who came for treatment at the DOTS Polyclinic of RSUP Kandou Manado who had been smoking for pulmonary TB were 17 (53.1%) respondents, not smoking were 13 (40.6%) respondents, and those who had smoked were 2 (6.3%) respondents. Smoking is the act of inhaling and exhaling smoke from burning plant material. Various plant materials are smoked, including marijuana and marijuana, but this action is most often associated with tobacco, such as those smoked in cigarettes, cigars, or pipes (Henningfield, Sweanor, Rose, & Hilton, 2019). Various studies have shown that there are many dangers to smoking for health, not only for those who smokers (active smokers) but people around smokers (passive smokers) are also at high risk of being affected by smoking, one of which is an infection of the lungs (Swari, 2018). According to Nurrahmah (2014), explains that smoking can affect one's health in increasing the risk of interference with the lungs by damaging the cilia along the respiratory tract that function as a defense when bacteria enter the body through breathing.

There are limitations in research conducted by researchers, where during the data collection process is done via telephone because the situation makes it impossible to meet directly with respondents. Then the use of research methods that previously used which is analytics was changed to descriptive because the data obtained from the study site were not in accordance with the initial research method.

## Conclusions

Most respondents of pulmonary TB patients who came for treatment at the DOTS Polyclinic in RSUP Kandou Manado had no contact history with a total of 26 respondents (81.3%). Respondents who suffer from pulmonary TB mostly have middle education which graduated from high school are 22 respondents (68.8%). More than half of respondents who suffer from pulmonary TB are male (65%). The knowledge possessed by respondents is balanced, that is enough knowledge amounting to 16 respondents (50%) and good knowledge totaling 16 respondents (50%). Smoking status of respondents who suffer from pulmonary TB shows that most of them are smoking amounting to 17 respondents (53.1%).

## Recommendation

Recommendations to the community based on the results of this study are that the community can further enhance their knowledge, especially understanding of pulmonary TB, pay more attention to personal hygiene and the environment and improve healthy lifestyles, and avoid smoking or exposure to cigarette smoke so as to minimize the risk of contracting pulmonary tuberculosis.

And also to further researchers to be able to develop this research using different research methods such as using case control or cohort study designs and the number of respondents is further enhanced.

## References

- Dinas Kesehatan Daerah Provinsi Sulut. (2017). *Profil Kesehatan Provinsi Sulawesi Utara*. Manado: Balitbangkes Manado.
- Dotulong, J. F., Sapulete, M., & Kandou, G. D. (2015). hubungan faktor risiko jenis umur, jenis kelamin, dan kepadatan hunian dengan kejadian penyakit tb paru di desa wori kecamatan wori. *Jurnal Kedokteran Tropik dan Komunitas*, 57-65.
- Fitriani, E. (2012). Faktor risiko yang berhubungan dengan kejadian tuberkulosis paru. *Unnes*

- Journal of Public Health*, 1-7; ISSN 2252-6781.
- Henningfield, J., Sweanor, D. T., Rose, C. A., & Hilton, M. J. (2019, July). *smoking | Definition, Types, Effect, History & Facts | Britannica.com*. Retrieved from Smoking Tobacco: [britannica.com/topic/smoking-tobacco](http://britannica.com/topic/smoking-tobacco)
- Kementerian Kesehatan Badan Penelitian dan Pengembangan Kesehatan. (2018). *Hasil Utama Riskedas 2018*. Jakarta: Balitbangkes Depkes RI.
- Kementerian Kesehatan Republik Indonesia. (2018). *Data dan informasi profil kesehatan indonesia*. Jakarta: Kemenkes RI.
- Kementerian Kesehatan RI. (2013). *Perilaku merokok masyarakat indonesia*. Jakarta: InfoDATIN .
- Manullang, S. (2011). Hubungan Pengetahuan, Sikap dan Tindakan Masyarakat Tentang Faktor Lingkungan Fisik Rumah Terhadap Kejadian Tuberkulosis Paru di Wilayah Kerja Puskesmas Sukarame Kecamatan Kualuh Hulu Kabupaten Labuhanbatu Utara. *Jurnal Kesehatan Masyarakat*, 53-64.
- Muaz, F. (2014). *Faktor-faktor yang mempengaruhi kejadian tuberkulosis paru basil tahan asam positif di puskesmas wilayah kecamatan serang kota serang tahun 2014*. Jakarta.
- Notoatmodjo, S. (2014). *Ilmu Perilaku Kesehatan*. Jakarta: Rineka Cipta.
- Nurrahmah. (2014). Pengaruh Rokok Terhadap Kesehatan Dan Pembentukan Karakter Manusia. *Prosiding Seminar Nasional*, Volume 01, Nomor 1; hal. 78-84.
- Riset Kesehatan Dasar*. (2013). Jakarta: Badan Penelitian dan Pengembangan Kesehatan Kementrian Kesehatan Republik Indonesia.
- Riset Kesehatan Dasar*. (2018). Jakarta: Badan Penelitian dan Pengembangan Kesehatan Kementrian Kesehatan Republik Indonesia.
- Robbins, & Cotran. (2015). *PATHOLOGIC BASIS OF DISEASE Ninth Edition*. Canada: ELSEIVER.
- Southeast Asia Tobacco Control Alliance. (2016). *The tobacco control atlas: ASEAN region 3rd ed*. Bangkok: Southeast Asia Tobacco Control Alliance.
- Stanhope, M., & Lancaster, J. (2016). *Public Health Nursing: Population-Centered Health Care in the Community*. United States: Elseiver.
- Swari, R. C. (2018, November 29). *helloSEHAT*. Retrieved from <https://hellosehat.com/pusat-kesehatan/berhenti-merokok/bahaya-merokok-pada-daya-tahan-tubuh/>
- WHO. (2018). *Global Tuberculosis Report 2018*. France: Geneva.
- WHO. (2019). *Global Tuberculosis Report 2019*. France: Geneva.
- Widianingrum, T. R. (2017). *Hubungan pengetahuan motivasi dengan kepatuhan minum obat anti tuberkulosis pada pasien TB di wilayah kerja puskesmas perak timur surabaya (skripsi)*. Surabaya: Fakultas Keperawatan Universitas Airlangga.
- World Health Organization. (2018). *Tuberculosis (TB) Contact Investigation*. Retrieved from WHO | Contact Investigation: <https://www.who.int/tb/areas-of-work/laboratory/contact-investigation/en/>