SOCIOECONOMIC PROFILE OF LYMPHADENITIS TUBERCULOSIS PATIENTS IN THE OUTPATIENT DEPARTMENT OF DR. SOETOMO HOSPITAL, SURABAYA, INDONESIA

Adiarsya Ghifari[1], Sahudi[2], Linda Dewanti [3]

[1]Medical Student, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia
[2]Department of Surgery Universitas Airlangga-Dr. Soetomo General Hospital, Surabaya, Indonesia,
[3]Department of Public Health and Preventive Medicine, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

ABSTRACT

Tuberculosis (TB) remains one of the most lethal infectious diseases worldwide, with a rising incidence of lymphadenitis TB, the most common form of extrapulmonary TB (EPTB) in recent years. Lymphadenitis TB can be transmitted through primary infection via the oropharyngeal mucosa, and various socioeconomic factors may influence the risk of infection. Understanding the socioeconomic profile and risk factors associated with lymphadenitis TB is crucial for effective control and prevention strategies. This descriptive cross-sectional study aims to investigate the socioeconomic profile of lymphadenitis TB patients and analyze potential risk factors. Sampling was conducted using a total sampling method, including medical records and interviews via Google Forms or WhatsApp. The sample comprised all lymphadenitis TB outpatients at the General Hospital dr. Soetomo, Surabaya, from January to December 2022, resulting in 180 eligible patients, 103 of whom agreed to the interview. Among the 180 patients, the majority were female (56%), aged 11-20 years (24%), and high school graduates (41%). Among 103 interview participants, most had a monthly income below the minimum wage (55%). Most respondents preferred to cook their meals (62%), with a significant proportion having an income below the average salary (62%). Most respondents (76%) showed good awareness of lymphadenitis TB signs, but nonspecific and mild symptoms led to delayed treatment-seeking in 39% of patients. These findings suggest a potential association between various socioeconomic profiles and lymphadenitis TB infection, although further research is needed to strengthen this association.

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Corresponding author
Sahudi
✉ sahudi4566@gmail.com
Department of Surgery Universitas Airlangga-Dr. Soetomo General Hospital, Surabaya, Indonesia

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Highlights:

1. The majority of Lymphadenitis TB patients were female, 11-20 years old, and high school graduates, with a monthly income below the minimum wage

2. Most patients already showed good awareness of lymphadenitis TB symptoms, but nonspecific and mild symptoms led to delayed treatment-seeking

INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis. TB infection itself can be classified into several spectrums, such as: uninfected individual, TB infection, incipient TB, subclinical TB without signs/symptoms, subclinical TB with unrecognised signs/symptoms, and TB disease with signs/symptoms[1,2]. Currently, Tuberculosis is the second-deadliest infectious disease in the world, second only to Covid-19. It is estimated that around 10.6 million people fell ill with TB in 2021, with 1.6 million estimated deaths from TB. Indonesia ranks as the second highest country in terms of TB cases, accounting for 9.2% of the global TB cases[3]. In the province of East Java, 42.193 new TB cases were reported in 2019, making it the third highest among all provinces in Indonesia. However, this number is still below the estimated cases by the Ministry of Health of the Republic of Indonesia, which predicted that 2021, there would be 95,925 TB cases in East Java[4]. Therefore, it is estimated that 56% of TB cases remain undetected. This highlights the importance of increasing TB diagnosis rates so that the progress in TB eradication can be accelerated again and aligned with the WHO targets.

Tuberculosis can affect various organs in the body. Based on the organs involved, TB can be classified into pulmonary TB and extrapulmonary TB (EPTB). EPTB affects explicitly organs outside the lungs, such as the lymph nodes, pleura, bones, joints, central nervous system, larynx, and kidneys[5,6]. Although pulmonary TB still accounts for the majority of TB cases, there has been a relative increase in EPTB cases in recent years[7]. World Health Organisation (WHO) data shows that EPTB comprised 16% of the 7.1 million TB cases worldwide in 2019. Approximately 10-19% of TB cases in Indonesia are estimated to be EPTB[8]. Among all cases of extrapulmonary TB (EPTB), lymphadenitis TB and Pleural TB are the most common types, with cervical tuberculous lymphadenitis (CTL) as the most common type of lymphadenitis TB[7,9].

The pathogenesis of lymphadenitis TB, especially in CTL, is still not fully understood, and ongoing debates exist on this matter. Generally, the pathogenesis of CTL can be divided into two theories. The first theory suggests that lumphadenitis TB is a complication of pulmonary TB that occurs due to the ingestion of tubercle bacilli by macrophages in the alveoli. These macrophages are transported to the lymph nodes via the lymphatic drainage system. On the other hand, the second theory involves direct infection through the oropharyngeal mucosa, tonsils, or adenoids. The pathogen directly enters the cervical lymph nodes without passing through the lung parenchyma. This theory can also explain the pathogenesis of CTL in patients without pulmonary TB[9].

Several risk factors for the spread of lymphadenitis TB include sex, low socioeconomic status, and a history of HIV infection[10]. Low socioeconomic status is often associated with unhealthy living environments and poor food hygiene, which can also serve as risk factors for the direct transmission of extrapulmonary TB through the oropharyngeal mucosa. History of contact with TB-infected patients can also be a risk factor for TB spread[11]. This

study aims to examine the socioeconomic profile of lymphadenitis TB patients, assess its distribution, and analyze the potential relationship between socioeconomic conditions and the risk of lymphadenitis TB infection. The outpatient department of Dr. Soetomo Hospital Surabaya was chosen as the location for the research because Dr. Soetomo Hospital Surabaya is the main referral hospital in the eastern part of Indonesia, in the hope of getting as much data as possible.

MATERIALS AND METHODS

This study utilized a descriptive method involving data collection from medical records and interviews of all lymphadenitis TB patients in the Outpatient Installation (IRJ) of Dr. Soetomo General Hospital, Surabaya, between January and December 2022. Ethical clearance was obtained from the Ethics Committee of Health Research (KEPK) dr. Soetomo General Hospital, Surabaya, Indonesia, with reference number 0538/KEPK/ XII/2022 on December 19, 2022. Three hundred eighty medical records were obtained from the Technology, Communication, and Information Installation (ITKI), providing general demographic information such as age, sex, and education. Additionally, phone numbers of patients or relatives were collected to facilitate further interviews conducted via WhatsApp.

A data cleaning was then conducted to filter duplicate data from the same patient and remove incomplete data, including patients without contact information, leaving 180 unique patients with complete medical records. Subsequently, all 180 patients were contacted via WhatsApp to inquire about their willingness to participate in the interviews. The parents or relatives were contacted for underage patients to ask about their desires. Among the contacted patients, 103 agreed to participate, and interviews were conducted using phone calls, WhatsApp messages, or Google Forms. The interview consisted of 12 questions related to socioeconomic profile. All interview data were subsequently categorised into groups based on study variables using Microsoft Excel to create a frequency distribution table.

RESULTS

This study collected data on age, sex, and completion from 180 medical records. Additionally, data on monthly income (above or below the regional minimum wage), awareness of neck lymph node enlargement, time interval from recognition of neck lymph node enlargement to the first medical examination, and eating habits were collected through interviews with 103 patients or their relatives who agreed to be interviewed. To address potential bias from a large number of underage patients, data on the educational completion of the parents of underage respondents were also collected.

Table 1. Distribution of Patient Ages

Age (years old)	n (%)
≤10	30 (17)
11-20	43 (24)
21-30	36 (20)
31-40	31 (17)
41-50	20 (11)
>50	20 (11)
Total	**180 (100)**

Based on Table 1, out of 180 patients, the largest age group is patients aged 11-20 (43 individuals, 24%), followed

by patients aged 21-30 (36 individuals, 20%).

Table 2. Distribution of Patient Sex

Sex	n (%)
Male	74 (44)
Female	101 (56)
Total	**180 (100)**

Based on Table 2, out of 180 patients, females slightly outnumber males, with 101 females (56%) compared to 74 males (44%).

Table 3. Distribution of Patient Education Completion

Education Completion	n (%)
No education*	42 (23)
Primary school	19 (11)
Middle school	19 (11)
High school	73 (40)
College/university	27 (15)
Total	**180 (100)**

*Includes primary school students and kids under school age

According to Table 3, out of 180 patients, most have completed high school (73 individuals, 40%), followed by patients with no education completion (42 individuals, 23%). However, it should be noted that all 42 patients with no education completion are underage patients below the age of 14.

Table 4. Distribution of Respondent* Education Completion

Education Completion	n (%)
Primary school	8 (8)
Middle school	8 (8)
High school	52 (50)
College/university	35 (34)
Total	**103 (100)**

*Parents' education completion is used for underage patients

For this study, all 103 respondents who agreed to the interviews were asked about their parents' education completion for underage patients (under 18). From Table 4, out of 103 respondents, most patients or their parents have completed high school (52 individuals, 50%), followed by college/university (35 individuals, 34%).

Among the total of 103 respondents, a slight majority of the patients (or their parents for underage patients) have a monthly income below Surabaya's Regional Minimum Wage (UMK) for the year 2022 (57 individuals, 55%). Only 46 individuals (45%) have a monthly income above the UMK.

Table 5. Monthly Income of Respondent*

Monthly Income	n (%)
Below minimum wage**	57 (55)
Above minimum wage**	46 (45)
Total	**103 (100)**

*Parents' income is used for underage patients
**Minimum wage based on Regional Minimum Wage (UMK) of Surabaya 2022, based on Keputusan Gubernur Jawa Timur Nomor 188/803/KPTS/013/2021, which amounts to 4.375 million rupiah per month

Table 6. Neck Lymph Node Enlargement Awareness* of Respondent

Aware of the Enlargement	n (%)
Yes	78 (76)
No	25 (24)
Total	**103 (100)**

*The respondents were asked if they realised there was an abnormal lump in their neck

This study reveals that most respondents (78 individuals, 76%) were aware of the abnormal lump in their neck. In contrast, 25 individuals (24%) became aware of this abnormality after undergoing medical examination for different symptoms.

Table 7. Time Interval from Recognition of Neck Lymph Node Enlargement to the First Medical Examination

Time Interval (Days)	n (%)
1-2	16 (21)
3-7	19 (24)
8-30	10 (13)
>30	33 (42)
Total	**78 (100)**

Meanwhile, among the 78 individuals aware of abnormal lumps, the majority (33 individuals, 42%) still waited for more than one month before seeking medical examinations at healthcare facilities.

Table 8. Eating Habits of Respondent

Eating Habits	n (%)
Cook at home	64 (62)
Buy at the restaurant	9 (9)
Buy at a roadside food stall	30 (29)
Total	**103 (100)**

Out of 103 respondents, the majority (64 individuals, 62%) reported primarily cooking their meals for daily consumption.

Table 9. Monthly Income of Respondents with Eating Habits of Cooking at Home

Monthly Income	n (%)
Below minimum wage*	40 (62)
Above minimum wage*	24 (38)
Total	**64 (100)**

*Minimum wage based on the Regional Minimum Wage (UMK) of Surabaya 2022, based on Keputusan Gubernur Jawa Timur Nomor 188/803/KPTS/013/2021, which amounts to 4.375 million rupiah per month

Meanwhile, out of the 64 respondents who typically cook their meals for daily consumption, most (40 individuals, 62%) have a monthly income below Surabaya's Regional Minimum Wage (UMK) for 2022. Conversely, only 24 individuals (38%) have an income above the UMK.

DISCUSSION

Most patients in this study are female, totalling 101 individuals (56%). These findings align with previous studies, which also indicated that women are at a higher risk of developing lymphadenitis TB than men[12,13,14]. This trend contrasts with pulmonary TB, where males are more prevalent than females[3,4,8]. The reasons behind this difference are still not fully understood, although several theories have been proposed. Some studies suggest that the difference in tumour necrosis factor, IL-10, CD4+, endocrine, and lymphocyte counts might influence this difference[15,16]. Another study suggests that socioeconomic and cultural differences play a significant role, such as the general awareness of young females toward their appearances[9,15].

Most of the patients in this study are relatively young, with 140 individuals (78%) being 40 years old or younger. However, this study also demonstrates that lymphadenitis TB can affect individuals of all ages. These findings align with previous studies[13,14,17]. In contrast, pulmonary TB follows a different pattern, with older age groups being more affected than younger ones in Indonesia. Specifically, in 2021, the majority of TB cases in Indonesia were reported in the age range of 45-54 years old (17.52%). Additionally, individuals aged 35 and above accounted for 56.31% of all TB cases in Indonesia[4]. Pulmonary TB, in general, tends to affect older individuals due to the decline in the immune system[14]. The relatively younger age range in lymphadenitis TB, especially CTL, supports the theory of direct pathogen infection via the oropharyngeal mucosa in patients without pulmonary TB rather than a relapse of latent TB.

Most patients or their parents in this study have completed either high school (51%) or college/university (34%). Their parents' educational attainment is used for patients below 18 to represent the general education level more accurately, as most still live with their parents, who are responsible for their health. These findings

show that most of the patients are relatively well-educated.

A slight majority of the respondents come from lower socioeconomic backgrounds. These findings, although aligned with previous studies, are not statistically significant[10,18]. These results are somewhat unexpected, considering Surabaya's relatively higher minimum wage. Possible bias may arise from the methods employed in this study, where interviews were conducted via WhatsApp or phone calls, thereby excluding patients without cell phones. Additionally, when contacted to seek their permission, some patients refused to participate due to a lack of understanding. These factors might contribute to the slightly lower rates of patients from low-income backgrounds than initially anticipated.

Based on the interviews, most respondents (76%) already know the signs of lymphadenitis TB. Considering the nonspecific symptoms of lymphadenitis TB, the public must be aware of any abnormal lumps in their bodies to increase the diagnosis rate and expedite the diagnosis and treatment process. The lack of tenderness in the lump in most cases might be the reason why some respondents (24%) failed to notice the abnormality[10]. Although most respondents already have a good awareness of abnormal lumps in their bodies, a significant portion (42%) did not seek medical examination until more than a month later. This finding aligns with the previous study, which shows an average delay of more than one month before patients seek medical help[19]. These findings show that the public still lacks general awareness about the importance of seeking medical help upon discovering abnormal lumps on their necks. This may be explained by the absence of symptoms such as pain, which could make patients unaware of the need to seek medical attention. Further education is needed to increase public awareness regarding lymphadenitis TB, so diagnosis and treatment can be initiated more promptly.

The relatively unhygienic food conditions at roadside stalls pose a risk for the growth of bacteria, including Mycobacterium tuberculosis. Previous studies have highlighted the significant influence of low environmental sanitation on the proliferation of Mycobacterium tuberculosis[20]. Despite restaurants generally having cleaner environments, food hygiene in these establishments is still uncertain, although it is expected to be relatively cleaner compared to roadside stalls. However, the data obtained from this research indicates a low percentage of lymphadenitis TB patients who regularly purchase food from roadside stalls (29%), compared to respondents who prefer to cook their food (62%).

Despite that, out of the 64 respondents who cook their meals, 40 respondents (62%) have monthly incomes below the regional minimum wage (UMK). This indicates that the majority of respondents who prefer to cook their meals belong to low-income groups. Low economic conditions can impact the level of sanitation, which may become a risk factor for lymphadenitis TB.

Strengths and limitations

This study provides valuable insights into the socioeconomic profile of patients with lymphadenitis TB at Dr. Soetomo General Hospital in Surabaya. Given the increasing number of cases and the very limited existing data, both at Dr. Soetomo Hospital and in Indonesia in general, this research helps fill an important knowledge gap. This study also reveals an

interesting behavioral trend, highlighting a lack of initiative among patients to seek early medical treatment despite being aware of the symptoms. This finding may serve as a valuable clue to improve public education strategies on lymphadenitis TB. However, certain limitations should be considered. The single-center focus of the study at Dr.Soetomo General Academic Hospital, Surabaya, might limit the generalizability of findings to broader populations. Furthermore, this study lacks a more in-depth qualitative analysis of the behavior. Future research endeavors may benefit from addressing these limitations to further enrich the knowledge in this field.

CONCLUSION

Most lymphadenitis TB patients in the Outpatient Department of Dr. Soetomo General Hospital, Surabaya, had the following socioeconomic profiles: predominantly female, of younger ages, high school graduates, and from low-income groups. Most respondents demonstrated good awareness of lymphadenitis TB signs, although the nonspecific and relatively mild symptoms often delayed their seeking immediate treatment. These data could support the theory of an association between various socioeconomic conditions and lymphadenitis TB infection. However, further research with analytical methods is needed to see if there's an actual association. This study suggests that other medical students conduct an analytical research on this topic.

This study aimed to provide additional data on lymphadenitis TB in Surabaya to aid in disease prevention efforts. Given the importance of early diagnosis for tuberculosis eradication, further public education from healthcare workers is also necessary to improve the general knowledge of TB among the public.

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CONFLICT OF INTEREST

All Authors involved in this research have no conflict of interest.

ETHIC CONSIDERATION

This research has obtained ethical approval from the Ethics Committee of Health Research (KEPK) dr. Soetomo General Hospital, Surabaya, with reference number 0538/KEPK/XII/2022 on 19 December 2022.

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AUTHOR CONTRIBUTION

All authors have contributed to some process in this research, including preparation, data gathering, drafting, and approval of this manuscript for publication.

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