

Socio-Economic Position as Risk Factor of Childhood Tuberculosis

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Abstract. Childhood tuberculosis cases in the year 2020 increased compared to cases in 2013. Meanwhile, childhood tuberculosis has received less attention in the current tuberculosis epidemic. Researches show that tuberculosis closely related to socio-economic position, but only few researches studied in childhood tuberculosis. This research aims to study socio-economic positions as risk factor of childhood tuberculosis. This research is a case control study carried out in six primary health centres which have the highest cases of childhood tuberculosis in Bandar Lampung, Indonesia. Samples of this research consisted of case sample and control sample. The case samples were all children with tuberculosis in the research study, which were 73 children and the control samples were 73 children who did not suffer from tuberculosis. Data collection was carried out by interview based on questionnaires, which then analysed using chi square. The results show that low socio-economic positions increase the risk of childhood tuberculosis in children. Furthermore, the mechanism included the presence of household contacts as well as low knowledge of tuberculosis transmission and prevention. In conclusion, childhood tuberculosis control program should be elaborated with socio-economic position intervention.

1 Introduction

The impact of tuberculosis (TB) as a global emergency has been established by the World Health Organization (WHO) since 1993. However, in general, this disease is only evaluated in the adult population. Childhood tuberculosis has received less attention in the current TB epidemic. It is estimated that one million children suffered from TB, and 233,000 children died from TB in 2017. However, the actual burden of childhood TB is likely to be higher since the complex challenges of diagnosing childhood TB. Furthermore, children can develop TB disease at any age, but most commonly, between 1 - 4 years (1). In Indonesia, the proportion of TB cases in children in 2017 increased, 8.5% (52,929 children), compared to 2011, which was only 0.7% [1].

Children who are infected with *Mycobacterium tuberculosis* have a greater risk of developing active TB. This indicates that TB tends to threaten the growth and development

of children compared to adolescents and adults who generally have a better immune system [2].

Tuberculosis is a disease that is closely related to socio-economic positions. Furthermore, socio-economic positions directly or through TB risk factors are associated with TB incidence. With different socio-economic positions, one group of people will have better or worse TB risk factors than others. This will make people more susceptible or more immune to TB [3–5]. Socio-economic positions include education, occupation, income, social class, race/ethnicity, and gender [5–7]. The risk factors for TB include access to health services, food safety, housing conditions, and behavior regarding HIV, smoking, malnutrition, Diabetes Mellitus (DM), and alcohol [3].

In childhood TB, socio-economic positions refer to the parents' socio-economic positions since children are still responsible for their parents. Meanwhile, the most critical risk factors of childhood TB include the presence of inhouse contact and parents' knowledge of TB transmission and TB prevention since children are still under the nourishing of parents [8,9].

Several studies have also shown a relationship between socio-economic positions and TB incidence in the national, community, or individual studies, especially in adult TB. Surveys conducted at the national level in the Philippines, Viet Nam, Bangladesh, and Kenya showed that groups with lower socio-economic positions had a greater risk of becoming infected with TB rather than groups with higher socio-economic positions [10]. Surveys conducted in Recife, Brazil, and South Africa also showed a relationship between individual and community-level socioeconomic positions of TB [11,12]. Researches in Bandar Lampung also found that socioeconomic position related to TB is TB transmission, sputum conversion delay, and health access [13–18]. On the other hand, there are still minor study concerns on the effect of socio-economic position on childhood TB.

Bandar Lampung City is one of the highest regencies/ cities in TB case detection in Lampung Province in 2018. Based on data from the Bandar Lampung City Health Office in 2018, 3,759 TB patients were found with 1,646 smear-positive TB patients. A large number of smear-positive TB cases indicate many sources of infection that are pretty dangerous, especially for children. Furthermore, there were 359 cases of childhood TB in Bandar Lampung City recorded in 2018, which has increased compared to 2017, with only 225 childhood TB cases [19].

This study aims to analyze socio-economic position as a risk factor of childhood TB incidence based on this background. This knowledge is beneficial for childhood TB control programs, especially in supporting policies and interventions to reduce the incidence of childhood TB.

2 Methods

This study is a case-control study that aims to measure the risk of socio-economic position to childhood TB incidence. This research was conducted at public health centers (PHC) in Bandar Lampung City, where childhood TB patients were Kedaton, Way Halim, Simpung, Gedong Air, and Way Kandis PHC.

The study population includes the case group population and control group population. The case group population was all childhood TB patients registered at Kedaton, Way Halim, Simpung, Gedong Air, and Way Kandis PHC with complete addresses from October 2018 to February 2019. Meanwhile, the control group population was patients who visited the pediatric clinic at the study site who did not suffer from TB. The number of samples for the case group and control group was 73 children each. The sampling technique was proportional random sampling.

The research variables in this study consisted of independent and dependent variables. The dependent variable consisted of the incidence of childhood TB (yes, no). Meanwhile, the independent variables consisted of: education: number of years of completed education (low: less than 12 years and high: more than 12 years); occupation (no: have no occupation and yes: have part-time or full-time occupation); income: monthly family income per capita (low: less than Bandar Lampung City minimum payment US\$ 170 and high: more than Bandar Lampung City minimum payment) [20].

Data collection in this research consisted of primary and secondary data. Secondary data included childhood TB and children without TB obtained from Kedaton, Way Halim, Simpur, Gedong Air, and Way Kandis PHC. Meanwhile, primary data included socioeconomic position (education, occupation, and family income) obtained through interviews with respondents (mother). Chi-Square then analyzed data to identify the odds ratio of socio-economic position to childhood TB. This research has also received ethical approval from the Faculty of Medicine, University of Lampung No. 783/UN26.18/PP.05.02.00/2019.

3 Results

The result showed that most respondents (67.8%) had high education or more than 12 years of education completed. Moreover, most respondents (59.6%) also had no occupation and had low family income (70.5%). Refer to Table 1, respondents with low education and low-income family per capita are more found in respondents with childhood TB than respondents without childhood TB. Meanwhile, respondents with no occupation or part-time occupation are more found in respondents without childhood TB than respondents with childhood TB.

Table 1. Bivariate analysis of socio-economic position and childhood TB.

Socio-Economic Position	Childhood TB f (%)	Without TB f (%)	p value	OR (95% CI)
Education				
Low	33 (70.2%)	14 (29.8%)	0.001	3.477 (1.654 – 7.308)
High	40 (40.4%)	59 (59.6%)		
Occupation				
No or part time jobs	39 (44.8%)	48 (55.2%)	0.177	
Full time jobs	34 (57.6%)	25 (42.4%)		
Income				
Low	59 (57.3%)	44 (42.7%)	0.011	2.778 (1.315 – 5.868)
High	14 (32.6%)	29 (67.4%)		

Results of chi-square analysis show a relationship between education and childhood TB (p-value = 0.001). In addition, the result of chi-square also shows that low education is a risk factor of childhood TB with OR = 3.477 (95% CI 1.654 – 7.308), which means that mothers with low education have 3.477 greater risks to have childhood TB compared to mothers with high education. The chi-square test result also obtained p-value = 0.011, which means there is a relationship between income and childhood TB. Result analysis also showed the OR = 2.778 (95% CI 1.315 – 5.868), which means that respondents with low income will risk childhood TB incidence 2.778 greater than respondents with high income.

Meanwhile, results showed that there is no relationship between occupation and childhood TB incidence (p-value = 0.177).

4 Discussion

This research showed that related to socio-economic positions, respondents with childhood TB have less education. Meanwhile, respondents without childhood TB are more have high education. Education is often used as an indicator in epidemiology. Knowledge and skills acquired through education can affect a person's cognitive function, making a person more receptive to health messages or better able to communicate appropriately and access appropriate health services [6, 21]. Education can relate to knowledge about health and healthy choices and the ability to control a person's life [22]. Results of this research also support this review and show that respondents with high education also have good knowledge about childhood TB transmission and childhood TB prevention (BCG immunization).

Moreover, respondents with high education also found more in respondents without in-house contact, so that children also have no intensity contact with adult TB patients. This result is also concurrent with research conducted in South Africa which showed that one additional year of primary education reduced the risk of TB by an OR = 0.90 (95% CI 0.86–0.94) [12]. Similar results were also shown by research conducted in Recife, Brazil, which found that being unable to read and write increased the risk of TB disease by 1.5 times greater than those who could read and write [11].

This research also showed that respondents with low income also tend to have inhouse contact with high-intensity relations. Moreover, respondents with low income also have insufficient knowledge of TB transmission and prevention. Income is an indicator of socio-economic position that directly measures the component of material resources. Income is not a single variable but a component consisting of salary, bonuses, hobbies, childcare, payments, and other income [5,6]. Higher incomes and accumulated welfare make a person better able to pay for insurance and medicine, buy more nutritious food, get better quality child care and live in an environment with resources that support good schools and recreational facilities. Conversely, a limited economy means making everyday life full of struggles, leaving little time for a healthy lifestyle, and reducing motivation [22]. This review was also supported by research in rural China, which showed that high income reduces the risk of getting sick with TB by OR = 0.44 (95% CI 0.22-0.87) [23].

In this research, results showed that there is no relationship between occupation and childhood TB. The result differs from reviews that stated that occupation is closely related to health, including TB. Reviews state that fundamental employment indicators in socio-economic positions are widely used, one of which is health. This measure is relevant because it determines where a person is in the social hierarchy and does not merely indicate exposure to occupational risks [6, 21,24]. Some researchers also showed that there was a relationship between occupation and childhood TB incidence. A South African study showed that working within the previous 12 months reduced TB risk by OR = 0.69 (95% CI 0.51-0.87) [12]. Research in Recife, Brazil, showed an association between unemployment for the previous seven days and the incidence of TB [11]. Research in Addis Ababa, South Africa, also showed an association between unemployment and TB incidence [25].

On the other hand, the results of this study are consistent with research conducted in Hong Kong, which showed there was no relationship between occupation and TB disease [26]. This research is an ecological study in Hong Kong, a metropolitan city with good social welfare. The condition caused there to be no occupation status differences between districts. In this study, no differences in occupation status between the group with

childhood TB and the group without childhood TB are caused mainly by mothers who do not have childhood TB and are more housewives or have no occupation. Meanwhile, mothers with childhood TB were more have an occupation as a full-time laborer.

5 Conclusion

This research showed that low socioeconomic position increases the risk of childhood TB incidence through inhouse contact and shared knowledge of TB transmission and prevention. Therefore, a childhood TB control program should be elaborated with socio-economic position intervention, especially in countries with high childhood TB incidence and low socio-economic position.

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