

## CHILDHOOD TUBERCULOSIS: A NEGLECTED PARADIGM IN DEVELOPING COUNTRIES

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Impact of pulmonary TB as a global emergency has been established by the World Health Organization (WHO) since 1993. However, in general, the disease is only be evaluated in the adult population. Pulmonary tuberculosis in children becomes a neglected aspect of the TB epidemic today. In fact, children pulmonary tuberculosis occurs in over 20% in all cases in many countries having high incidents of TB.<sup>1</sup> The global burden of pulmonary tuberculosis in children is also very vague due to the lack of data reporting and recording of TB patients for this population through the National control program of TB. It is also complicated by the difficulty of diagnosis in children with bacteriological examination.<sup>2</sup>

The number of children with pulmonary TB is still an obstacle to predict. and difficult to diagnose. In addition, pulmonary TB control in children also meets challenges especially in circumstances of limited resources,

accompanied by a high burden of this disease.<sup>3</sup> In fact, if the disease is undetected and untreated, the children would be at high risk for death.<sup>4</sup> This is likely to explain why UNICEF did not include TB as a cause of death in children under five years old (toddlers) in their reports.<sup>5</sup> On the other hand, the history from studies clearly said that children who are infected by *Mycobacterium tuberculosis* (MTB) have higher risks to be active tuberculosis, compared to adults who have immune competence (Vanden Driessche et al. 2013). This indicates that pulmonary TB tends to threaten the growth and development of children than adolescents and adults with pulmonary TB who generally have a better immune system.

In Indonesia, the Ministry of Health through the Directorate General of Disease Control and Environmental Health (P2PL) together with the Indonesian Paediatric Association (IDAI) has drafted a guideline for TB control in children in Indonesia. Through this guideline, it is confirmed that

Indonesia still has limited resources, led to the diagnosis of pulmonary tuberculosis in children through a scoring system.<sup>6</sup> However, this way only effected when children delivered to health facilities. For children whom un-well delivered, it made pulmonary TB in Indonesia children still unrecognized to determine.

Pulmonary tuberculosis in children is a global health problem that is neglected. The proportion of all TB cases in Indonesia reached 7.32%.<sup>7</sup> It is often caused by TB infection of the population in their environment, especially with the adults who have TB at home. However, this transmission does not always occur from adult to children at home.

Based on the risk factor, the development of pulmonary TB progressed through two processes those are: firstly, person who vulnerable exposed by infectious pulmonary TB sufferer should be acquired pulmonary TB infection or it also called latent TB infection (LTBI); secondly, this person circumtanced by several factors then they would be sick that diagnosed by clinical examination, namely pulmonary TB sufferer. Otherwise, the risk between infection (LTBI) varied with pulmonary TB sufferer.<sup>8,9</sup> There are three points of current paradigm of tuberculosis in children today:

#### *Children as Victims*

Pulmonary TB infection in children is generally the impact of the contact from adult with pulmonary TB, in other words, the children with TB are not the cause of the transmission of the disease to the population. Otherwise, pulmonary TB in adult is the main source of transmission to the children.<sup>1</sup> The adults at home who have acid fast bacteria gram positive are vulnerably infect the children, especially when the contact occurs intensively.

In prevention efforts globally, chemoprophylaxis is performed on

children who have history of TB in the family to prevent the danger of infection, particularly to prevent the children who have been infected in order not to be pulmonary TB.<sup>10</sup>

Enterprises in the global TB control have been declared by WHO as early detection and treatment. TB treatments who are in health facilities through the success rate tend to increase through the treatment strategy that is directly, or called as Directly Observed Treatments (DOTS) program.<sup>11</sup> It can be said, children with TB have been recorded in primary care facilities, so there is no doubt to get treatment services that have been set. But, this program does not cover the process of early detection of children at risk. As a result, the DOTS strategy has only limited success, which is only slowing the increase of the incidence but failed to make significant progress in achieving the goal of TB elimination. On the other hand, the increase of pulmonary TB cases that are resistant to anti-TB drugs (MDR / XDR-TB) is one indicator of the difficulty of disease control, followed by the concerns towards further development of this disease globally.

The risk factors of infection of pulmonary TB include children who are exposed to adults with active pulmonary tuberculosis, endemic areas, poverty, unhealthy environment (bad hygiene and sanitation), and a communal shelter (orphanage, prison, or other nursing homes).<sup>9</sup> Another factor is the number of people at home (population density), the length of stay at home with the patient, had been ill with pulmonary tuberculosis, and one bedroom with pulmonary tuberculosis patients at night, especially in one bed.<sup>8</sup>

#### *Not Always Sick*

Children infected with pulmonary TB is not always going to be sick. The risk factors of children became ill with

pulmonary TB is the child's age, malnutrition, immunocompromised state (eg, in HIV infection, malignancy, organ transplantation and immunosuppression treatment), diabetes mellitus, and chronic renal failure. Factor that is important in the epidemiology of pulmonary tuberculosis is low socioeconomic status, less income, population density, unemployment, poor education, and lack of funding for public services. In developed countries, the migration has been the risk factor, whereas in Indonesia it has not become a significant problem. Another factor that has the risk of pulmonary TB disease is the virulence of mycobacterium tuberculosis and infectious dose, but clinically it is difficult to prove.<sup>8,9</sup>

Mechanisms of pulmonary TB are through various phases, which are generally one year-symptomatic after being infected. However it is much faster in children. Until today, there are no existing studies further explored about the ecological level of exposure, what and how the transmission took place at this level since it is known that children are sick with pulmonary TB as a result of adult pulmonary TB contacts.

#### *Contact Investigation*

Contact tracing has become the guidelines recommended by the WHO as active case finding efforts. This effort needs to be done especially in the poor and developing countries that do not have such a proactive capability TB control in developed countries. One of the populations that is most recommended for investigation is children, especially under five years old.<sup>12</sup> The discovery of the active by case screening tests is intended to provide recommendations on a case-finding at-risk populations especially in children who are difficult to be diagnosed. The discovery of suspected pulmonary TB in children who live with active pulmonary TB cases is very important. Otherwise, the discovery

of undiagnosed adult who have children who have been sick with pulmonary TB is also vital to cut the transmission of this disease. The contact investigation is really needed and continuously implemented.

Thus, it can be concluded that this three-stage paradigm suggests plausible answer of neglected children with tuberculosis and become the priority paradigm of health care today.

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