ANALYSIS OF NUTRITIONAL STATUS, IMMUNIZATION AND CHARACTERISTICS OF CHILDHOOD TUBERCULOSIS PATIENTS IN REGIONAL HEALTH CENTER

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Abstrak
Tujuan dari penelitian ini adalah untuk mengidentifikasi keadaan gizi, riwayat imunisasi, dan gambaran pasien tuberkulosis anak. Penelitian deskriptif dengan menggunakan cross-sectional design adalah metodologi yang digunakan. Semua pengunjung rumah sakit termasuk dalam populasi penelitian. Seratus orang menjadi sampel penelitian. Berdasarkan jumlah sampel keseluruhan, data dikumpulkan dari pasien anak yang mengunjungi rumah sakit tertentu. Program aplikasi untuk pengolahan data digunakan untuk memproses data. Format tabel, teks, dan narasi digunakan untuk menampilkan data. Setelah itu, analisis univariat dilakukan untuk menganalisisnya. Mayoritas distribusi usia anak (30%) ditemukan pada usia antara 5 dan 15 tahun. Kesimpulan ini didukung oleh temuan penelitian. Sebanyak 50% dari populasi adalah perempuan dan 50% laki-laki. Berdasarkan status gizi anak, terdapat empat kategori: status gizi buruk (48%), cukup (43%), kurang (8%), dan baik (1%). Terdapat dua kelompok anak: mereka yang menerima imunisasi BCG (56%) dan mereka yang tidak menerima imunisasi BCG (44%).
Kata kunci: Status Gizi, Imunisasi, Tuberkulosis, Anak, Rumah Sakit

Abstract
The purpose of this study is to identify the nutritional state, immunization history, and features of pediatric tuberculosis patients. Descriptive study using a cross-sectional design is the methodology employed. All hospital visitors were included in the study population. One hundred persons made up the research sample. Based on the overall sample size, the data were gathered from pediatric patients who visited particular hospitals. Application programs for data processing are used to process data. Table, text, and narrative formats are used to display the data. After that, univariate analysis was performed to analyze it. The majority of children's age distribution (30%) is found in those between the ages of 5 and 15. This conclusion is supported by the research findings. 50% of the population is female and 50% is male. According to the nutritional status of children, there are four categories: poor (48%), good (43%), poor (8%), and good (1%) nutritional status. There were two groups of children: those who received the BCG immunization (56%) and those who did not (44%).
Keywords: Nutritional Status, Immunization, Tuberculosis, Children, Hospital

INTRODUCTION

Mycobacterium tuberculosis2, an aerobic bacteria that mostly lives in the lungs and other organs with a high partial pressure of oxygen, is the cause of pulmonary tuberculosis (TB). Additionally, the germ's cell membrane has a lot of fat, which makes the bacteria resistant to acid and slows down the germ's growth. Since this bacteria cannot withstand UV light, nighttime is when it spreads most often. In 1989, every year, 1 million new cases of TB emerged, resulting in the deaths of 450,000 children under 15 years of age (Husein et al., 2017). The risk of TB transmission in Indonesia is measured by ARTI (Annual Risk of Tuberculosis Infection), meaning the number varies around 2%, which means 20 people in 1000 residents are at risk of contracting TB. An adult TB sufferer with positive BTA (Acid-Fast Bacillus) will infect 10 people in their environment, especially children. If the prevalence of adult TB is high, of course the prevalence of TB in children will also be high; therefore, it is very important to detect adult TB so that every child who is at risk of infection can be given prevention (Fabiani & Tan, 2021).

Apart from the risk of infection from adult TB patients, other risk factors that can cause TB disease in children are nutritional status, BCG (Bacillus Calmette-Guerin) immunization, genetics, and the home environment. Conditions of poor nutritional status or malnutrition will reduce the body's resistance; therefore, a decrease in body resistance will make it easier for children to contract infectious diseases, including tuberculosis. Immunization that aims to prevent TB disease is BCG

immunization (Kartasasmita, 2019). Providing BCG immunization will increase the body's resistance to infection by virulent tuberculosis bacilli, so if a child does not receive BCG immunization, the child is likely to be infected with TB germs. The total number of pediatric TB cases from seven central teaching hospitals in Indonesia for five years was more than 1000, with mortality rates varying from 0% to 13%. The largest age group was 12–60 months (43%), while for babies less than 12 months, it was 17%. The proportion of pediatric TB patients among all TB cases in 2020 per province ranged between 2% and 18%, with the lowest province being Central Sulawesi and the highest being West Java (Tannady et al., 2019). According to Riskesdas data from 2020, there were over 12,000 instances of pulmonary tuberculosis, out of which over 8,000 had positive BTA tests. For pulmonary tuberculosis, the case detection rate (CDR) is 72%. In 2020, 10% of suspects (5–15%) tested positive for BTA; in the first quarter, that percentage was 11% (Nastiti et al., 2018).

When a person with pulmonary tuberculosis coughs or sneezes, microorganisms are discharged into nearby droplet nuclei, which leads to the spread of the disease. These contagious particles can linger outside for one to two hours, depending on humidity, inadequate ventilation, and the presence or absence of UV radiation. Germs can live for days or even months in a moist, dark environment (Ndraha et al., 2010). These particles will attach themselves to the airways or lung tissue if inhaled by healthy individuals. Primary nests, which are tiny tuberculosis nests made of germs lodged in lung tissue. These nests can form in any part of the lung tissue and often attack the apex area of the lung. Local lymphangitis (inflammation of the lymph channels leading to the hilus) and regional lymphadenitis (enlargement of the hilar KBG) will both develop from the primary nest. Intensive tissue reactions in the lung parenchyma and lymph nodes over the next 2 to 12 weeks occur due to tissue hypersensitivity (Tabrani, 2020). Parts of the primary complex parenchyma often heal completely with fibrosis or calcification after undergoing necrosis and capsule formation. Sometimes this part continues to enlarge, causing local pneumonitis and pleurisy (Tan et al., 2013). If the lesion is large, the center of the lesion liquefies and empties the associated bronchial area, leaving a residual cavity (caverna). Years after first appearing as an endogenous infection, dormant germs from primary tuberculosis will reappear as adult tuberculosis (secondary TB). 90% of reinfections are most common. Secondary tuberculosis arises from compromised immunity, including but not limited to malnourishment, alcohol consumption, neoplasms, AIDS, and renal failure. The earliest nest of this secondary tuberculosis is seen in the upper part of the lungs. Rather than the lower pulmonary nodes, the invasion is into the lung parenchymal area (Wahyuni, 2022).

To determine a child's growth, weight and height are measured regularly. How to assess nutritional status in children under five years of age (toddlers) can be done directly and indirectly. Direct nutritional status assessment consists of four assessments: anthropometric assessment, clinical assessment, biochemical assessment, and biophysical assessment, while indirect assessment includes food consumption surveys, vital statistics, and ecological factors (Dharmawan et al., 2021). The indices used in anthropometry are weight for age, height for age, and weight for height. BCG is a live vaccine made from M. bovis that is cultured repeatedly for 1-3 years so that bacteria are obtained that are not virulent but still have immunogenicity. BCG should be given in the right-upper arm region in the right M. deltoid insertion area, so that if lymphadenitis occurs, BCG will be more easily detected. Vaccination does not need to be repeated as a booster, nor does it need to form scars. There is no evidence that the BCG booster vaccination provides additional protection. The IDAI Immunization Task Force (Indonesian Pediatrician Association) recommends giving BCG to babies ≤ 2 months old. Giving BCG after one month of age is better. The immune response the body receives from the immunization will protect the primary TB tubercles, which will cause the infection to calm down and stop spreading. Immunity occurs 5–7 weeks after BCG administration. The immunity that occurs is not complete, so it is still possible for superinfection to occur, even though it is usually not progressive and causes serious complications (Windy et al., 2018).

The majority of cases of pulmonary tuberculosis (TB) occur in young, productive adults. The current demographic shift is increasing the life expectancy of the elderly. Over the age of 55, the biological system deteriorates and becomes more susceptible to a variety of illnesses, including pulmonary tuberculosis (Nastiti et al., 2018). Men are more likely than women to develop pulmonary tuberculosis. Over a year, pulmonary tuberculosis claims the lives of almost one million women. It can be established that pulmonary tuberculosis causes more deaths in women than pregnancy and childbirth do. Because drinking alcohol and smoking tobacco can weaken the body's defenses,

increasing the likelihood of being exposed to substances that cause pulmonary tuberculosis, the disease is more common among men (Tabrani, 2020). The working diagnosis of pediatric TB is made based on contact, especially with active or new adult TB patients, a collection of clinical and symptomatic tests, tuberculin tests, and suggestive features on a chest x-ray. A definite diagnosis can be made by finding TB germs in a direct smear and/or culture, which is the gold standard examination, a PA (anatomical pathology) picture of TB (Wahyuni, 2022).

A definite diagnosis in children is difficult to obtain because the number of germs in children's TB (paucibacillary) is small and the location of the germs is in the parenchymal area, which is far from the bronchi, so that only 10-2% of pediatric TB patients have positive microbiological examination results or TB germs are found. The diagnosis of TB cannot be made based on anamnesis and physical examination alone or a single supporting examination, for example, only a radiological examination (Tan et al., 2013). Therefore, critical analysis needs to be carried out on as many facts as possible to establish a diagnosis. Diagnosis of TB in children is difficult, so misdiagnosis often occurs, both overdiagnosis and underdiagnosis. In children, coughing is not the main symptom. Sputum collection in children is usually difficult, so the diagnosis of childhood tuberculosis requires other criteria using a scoring system (Windy et al., 2018). Following the creation of criteria for pediatric TB diagnosis by WHO and a pathway for pediatric TB diagnosis by UKK Respirology PP IDAI in the National Tuberculosis Management Guidebook by the Indonesian Ministry of Health, this scoring system is the result of a revision of the pediatric TB diagnosis scoring system.

METHOD

Descriptive study using a cross-sectional design is the methodology employed. All hospital visits made up the research population. Meanwhile, the research sample consisted of children aged 0–15 who visited the hospital. The sample for this study was 100 people. The inclusion criteria are pediatric patients aged 0–15 who visit the pediatric polyclinic. Children diagnosed with pulmonary TB based on medical record data. Exclusion criteria are data on pediatric patients with extra-pulmonary TB. Data on pediatric patients that do not include age and weight information. How research works is as follows: Preparing for research. Arrange permits with the Health Service for permission to collect data. Collecting data from pediatric patients at the children's polyclinic. Taking medical records of pediatric TB patients. Selection is based on inclusion and exclusion criteria. Carry out data processing and analysis. Drawing conclusions and reporting research. The data taken was from pediatric patients who visited hospitals selected by total sampling. Data processing is carried out using data processing application programs. Data is presented in the form of narrative, text, and tables. Then it was analyzed by carrying out a univariate analysis.

RESULTS AND DISCUSSION

The number of pediatric TB patients who came to the pulmonary clinic during the study period was 100. This number is relatively small compared to previous research, which amounted to 110 children. It is estimated that this small number is influenced by the treatment habits of pediatric patients who go for treatment outside the health center, such as with pediatricians or other health services, the number of which cannot be known at the time of data collection. Of the 100 children, they were spread across several health centers. Among them, in hospital A, there are 50 children, and in hospital B, there are 50 children. Most children aged 5–15 have a total of 50 people with an average age of 117 months. Meanwhile, there are 20 children aged 3-5 years with an average age of 55 months, and the average age of children aged 0-3 years is 21.4 months. This study is different from previous research in that the incidence of TB occurred more frequently in the age group < 5 years. According to this research, which is consistent with previous studies, the majority of participants are older than five, with an average age of six.

One measure that gives a general idea of bodily mass is body weight. Body mass is highly susceptible to abrupt changes, such as those brought on by an infection, a decrease in appetite, or dietary intake. Body weight is a highly erratic measurement. Under normal conditions, body weight rises with age when nutritional demands and consumption are balanced and health is good. On the other hand, weight development under abnormal circumstances might occur more quickly or more slowly than under normal circumstances. Nutritional status is assessed using the BW/U index, which is based on certain body weight factors. Anthropometrically speaking, height indicates the stage of

skeletal growth. Age-related increases in height are typical. In contrast to body weight, height growth is comparatively less susceptible to nutritional issues over a brief period of time. Based on the explanation above, this study uses the anthropometric index BB/U because in the medical record data there is only weight and age, while there is none for height.

In impoverished nations like Indonesia, tuberculosis remains a highly prevalent illness that can spread to both adults and children and serve as a vector for infection. According to previous research in the Yogyakarta area in 2000, it was found that 0.5% of the population suffered from tuberculosis with positive tuberculosis bacilli in their sputum, with differences in prevalence between cities and villages of 0.6% and 0.2, respectively. The tuberculin test (Mantoux test) on 50% of the population showed positive results, with the most results being those aged 15 years and over. Deaths due to TB are higher than deaths due to malaria and AIDS (Acquired Immuno Deficiency Syndrome). In women, deaths due to TB are higher than deaths due to pregnancy, childbirth, or postpartum. In 2000–2020, deaths due to TB increased to more than 30 million people. Every day 20,000 cases of active TB are found, and TB causes almost 5,000 deaths. The total incidence of TB for 10 years, from 1990 to 1999, was estimated at more than 80 million, and 8 million of them were related to HIV (Human Immunodeficiency Virus) infection. In 2020, there were almost 2 million deaths due to TB, more than 200,000 of which were related to HIV. The rapid increase in TB cases is not only due to the increase in HIV/AIDS cases but also to the increase in cases of multidrug-resistant TB (MDR-TB). Research results in Jakarta found > 5% of new cases. In adults, two-thirds of cases occur in males, but there is a slight predominance of tuberculosis in females in childhood. The frequency of tuberculosis is highest in the elderly white population of the United States who were infected several decades ago. On the other hand, in the colored population, tuberculosis is most common in young adults and children aged less than five years.

CONCLUSION

Based on the research results, it can be concluded that the largest age distribution of children is children aged 5–15 years (30%). The gender ratio of men and women is 50% men and 50% women. The nutritional status of children shows undernutrition status (48%), good nutrition status (43%), poor nutrition status (8%), and overnutrition status (1%). Children who have received BCG immunization (56%) and children who have not received BCG immunization (44%). Researchers suggest that medical records of TB patients be recorded completely and accurately both at the health service level and at the regional hospital level. Give children food that contains sufficient and balanced nutrition every day. Provide BCG immunization. This research has several limitations, including: This research uses a cross-sectional design, which examines the dependent variable and independent variables at the same time, so it cannot provide a definite explanation regarding the existence of a cause-and-effect relationship. This research was not carried out in all hospitals. So, it cannot be analyzed looking for relationships but can only be carried out descriptive research because it does not represent the number of each existing hospital. And the sample cannot represent existing hospitals due to the imbalance in the number of cases from each hospital. The procedural difficulty of applying for a research permit, which requires quite a long time and incomplete hospital records, makes it difficult for researchers to determine data collection.

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