

Strategies for Preventing Disease Transmission at Early Childhood Education Institutions

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Abstract

Early childhood education institutions with a lack of health standards can be a medium for disease transmission. This transmission leads to a decline in health status and the level of children's development. Preschool children often suffer from several infectious diseases such as chickenpox, diphtheria, measles, mumps, hepatitis B, influenza, pulmonary tuberculosis, impetigo, and diarrhea. These diseases can be transmitted through direct or indirect contact such as respiratory tract, digestion, and skin. Disease transmission can occur during interactions between children and children, children and teachers, and children and the environment around the school. The risk of disease transmission can be reduced by implementing prevention strategies for disease transmission, that is, by creating a healthy environment of the educational institution, keeping hands clean, providing handwashing facilities, implementing cough ethics, and increasing the role of teachers and parents to establish children's clean and healthy living behavior. These strategies can work well if they are supported and carried out by the manager, teachers, children, educational personnel, and parents. The strategies are expected to improve the health status of children, so they can achieve growth and development by their stages.

Keywords:

early childhood education, prevention of disease transmission, strategies



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INTRODUCTION

Health development is an integral part of national development, which has a large role in determining success in achieving national development goals. Health development can improve the quality of human resources, characterized by an increase in the level of public health (Purwandari, 2015). People can be categorized as healthy if their condition is good either physically, mentally, spiritually, or socially, so that they can live productively in terms of social and economical matters as stipulated in Law of the Republic of Indonesia Number 36 of 2009 concerning Health. This condition will help improve the quality of human resources in Indonesia.

The quality of human resources has become a major indicator in measuring and describing the progress of a nation. The state, including Indonesia, places human resource development as the main development issue, program, and strategy. Various studies related to early childhood show that the preparation of quality human resources must begin at an early age, even from the time of conception in the womb. The need fulfillment of holistic, integrative development and growth of children determines the quality of health, intelligence, and social maturity in the next stage (Kemendikbud, 2015). Health promotion programs in early childhood education institutions are one solution to achieve this.

Early Childhood Education (ECE) is a coaching effort aimed at children from birth until the age of 6. Coaching is performed by providing educational stimuli to help physical and spiritual growth and development so that children have the readiness to enter further education (Kemendikbud, 2015). This education is a very effective investment (human investment for health development) in building the healthy behavior of the nation's generation. The school is an organized community, so it is easy to set public health efforts, and school children are a group that very easily accept changes or updates, so it is easy to guide, direct and instill good habits in children, including in preventing transmission of infectious disease (Notoatmodjo, 2010).

Children in early childhood institutions are at risk of infectious disease transmission. Based on research conducted by Takaeb et al (2019) at early childhood education institutions, every academic year the majority of children of ECE were ever absent from school for several days or weeks due to illnesses. Symptoms that are often felt include abdominal pain, runny nose, fever, and cough. Based on data from the United States Center for Disease Control (CDC), there are 10,080 deaths with more than 80% of deaths due to diarrhea. In southern Asia, in this case, in India, there are 0.4 million children die in one year because of diarrhea (Journal of Harvard School of Public Health). Based on Riskesdas (Research on Basic Health) in 2013, the incidence of diarrhea in toddlers was 6.7% (range by province 3.3%-10.2%), and the incidence of diarrhea (≤ 2 weeks before the interview) with

symptoms in all age groups was 3.5% (range by province 1.6%-6.3%). Meanwhile, the period of diarrhea prevalence in toddlers was 10.2% and in all age groups (> 2 weeks-1 months before the interview) based on symptoms was 7%. There were health signs that were most frequently experienced by toddlers in 2014 both urban and rural areas, namely cold (66.62%), cough (63.76%) and fever (62.52%) (Ministry of Health of the Republic of Indonesia, 2014)

Promotion and prevention to improve the health status of the nation and society need to be done, especially in the application of clean and healthy living behavior in the school environment (Purwandari, 2015). They must be done at an early age systematically and sustainably. The health efforts aim to ensure the survival of children, especially those to reduce illnesses of children at an early age and to ensure optimal growth and development of children by their potential (Kemenkes, 2011).

Good collaboration between educators and parents is required to optimize growth and development, one of which is through healthy behavior carried out by children of early childhood. The benefit of developing healthy behavior at an early age is that children will have a healthy lifestyle later on. This means that children's' healthy living behaviors at an early age will not easily disappear at later stages of development. Besides, as they already have a healthy lifestyle, they will be free from attacks of various diseases that often occur in early childhood, such as cough/runny nose, tuberculosis,

diarrhea, fever, measles, ear infections, and skin diseases. Children are also protected from potential accidents that are always available around their environment, such as poisoning, falling, drowning, being pierced by sharp objects or thorns. Various abilities possessed by early childhood will be explored and developed properly so that children in early childhood can grow and develop optimally (Astuti, A.K, 2016)...

THEORETICAL PERSPECTIVES

Types of Infectious Disease in Early Childhood

Infectious diseases that often occur in early childhood can be controlled by healthy behaviors (Behrman, 2014). Some infectious diseases that may occur in early childhood are: chickenpox (Varicella), diphtheria, measles (Rubeola), mumps, hepatitis B, and influenza (Marni, 2016). In addition to tuberculosis, impetigo and diarrhea can also be transmitted in early childhood. Chickenpox (Varicella) is an infectious disease caused by Varicella Virus (VZV). This disease can strike in children after 3-6 years. It is spread by direct contact with children who suffer from Varicella. It can also be transmitted through saliva or saliva splashes (droplet infection) as well as snot when coughing or sneezing. Symptoms that appear in children suffering from varicella disease are fever, headache, and abdominal pain decreased appetite, and limp. After a few days, red spots will appear on the skin, itching that starts from the face, chest, or scalp. Then blisters will exist and become scab (Wong. D, 2014).

Diphtheria is an infectious disease caused by infectious *Corynebacterium diphtheriae*. The transmission of this disease can be direct or indirect. Direct transmission goes through droplet infection and direct contact with children suffering from diphtheria. Meanwhile, the indirect transmission is run through objects that are contaminated with *Corynebacterium diphtheriae*, for example, children's toys, eating utensils, drinking equipment, towels, etc. Symptoms that appear in children suffering from diphtheria are fever, cough, cold, nasal discharge mixed with blood, lethargy, pale, headache, anorexia, nausea, vomiting, pain when swallowing, and swelling in the throat (Marni, 2016).

Measles (Rubeola), also called morbilli, is an infectious disease caused by Morbili Virus. Transmission of this disease can occur when sneezing, coughing, breathing as well as direct contact with the children's urine, feces, blood or sweat of children suffering from morbilli disease. Symptoms that appear in children who suffer from this disease are fever, cough, sore throat, muscle aches, itching, reddish spots on the skin starting from the face, and then throughout the body and ending with skin peeling in brown color (Marni, 2016).

Mumps is a disease caused by Paramikavirus which can be transmitted from the saliva of infected children. The mode of transmission is through direct contact or droplet infection of an infected child. Symptoms that appear in children who suffer from this disease are fever, headache, malaise, anorexia, and enlargement of parotid glands and ear pain.

Pain in the ear will be more severe if used for swallowing (Wong, 2014).

Hepatitis B is an inflammatory disease of the liver caused by the hepatitis B virus (HBV). Transmission of this disease is through the body fluids of infected children including feces, urine, saliva, and sweat. Symptoms that appear in children infected with this disease are fever, malaise, fatigue, nausea, vomiting, upper right abdominal pain, yellowish appearance on eyes, yellow urine, and the yellowish look on the skin (Marni, 2016).

Influenza is a respiratory tract disease (ARI) caused by *Haemophilus influenzae*. Transmission can occur through the air when a person sneezes or coughs. The symptoms that appear are cough, runny nose, nasal congestion, frequent sneezing, discharge from the nose, fever, muscle aches, dizziness, and anorexia (Ngastiyah, 2014).

Pulmonary tuberculosis (TB) is a disease caused by *Mycobacterium tuberculosis*. The transmission of this disease is through the air (airborne disease). TB can spread through the air if people suffering from pulmonary or throat TB are coughing, sneezing, or talking and sending it into the air. Signs and symptoms of this disease are coughing for more than 2 weeks, weakness, fatigue, slow growth, fever for more than 2 weeks/recurring, for no apparent reason, no appetite and decreased or stagnant weight within 1 month even after nutrition management and a history of close contact with adults affected by TB (Ngastiyah, 2014).

Impetigo is a skin infection caused by bacteria, which can be transmitted through direct contact

between skin or between the skin and intermediate items, such as towels, clothes, or tableware that have been contaminated with bacteria. Impetigo is more common in children than adults because children are more likely to physically interact with their peers at school or playground. Symptoms of this disease are blister filled with fluid measuring 1-2 centimeters, pain, and itching on the blister. Afterward, blisters will spread and rupture within a few days, and broken blisters will leave a yellow crust.

The Process of Disease Transmission in Children

Disease transmission can be caused by 6 components of the chain of infection. If one chain is broken or removed, transmission can be prevented or stopped. The six components of the chain of infection are the infectious agent, the reservoir, the portal of exit, the transmission method, the portal of entry, and the susceptible host (vulnerable host). The infectious agent is an infectious microorganism. In children with infectious diseases, infectious agents can be in the form of bacteria, viruses, fungi, and parasites. Reservoir or container sites or sources of infectious agents can live, grow, reproduce, and are ready to be transmitted to other hosts or children. Based on research, most reservoirs are in humans, children's toys, animals, plants, soil, water, environment, and other organic materials. They also can be found in healthy people, the surface of the skin, oral mucous membranes, and upper respiratory tract. Portal of exit (exit) is the location where infectious agents (microorganisms) leave the reservoir through the respiratory tract, digestive

tract, and urinary tract. The transmission method is by transporting microorganisms from a container or reservoir to other vulnerable children. There are several methods of transmission, namely direct and indirect contact, droplets, airborne, food, water or drinks, and through vectors (usually insects and rodents). Portal of entry is the location of infectious agents entering vulnerable children. It can infect through the airway, gastrointestinal tract, or the non-intact skin. The susceptible host is a child with decreased immunity, causing an inability to fight infectious agents. The factors that can affect immunity are age, nutritional status, immunization status, and chronic illnesses. Other factors that influence are gender, particular race or ethnicity, economic status, lifestyle and heredity (Kemenkes, 2017; Anderson & Mcfarlane, 2014)

FINDINGS AND DISCUSSION

Creating A Healthy Educational Environment

The educational institution is an institution that is intentionally established to foster and improve the quality of human resources, either physically, mentally, morally, or intellectually. The educational environment is an environment that has been well organized so that it is easily accessible in the context of implementing public health efforts in children. Children at an educational institution are a sensitive group to change because they are in a period of growth and development. At this stage, a child finds it easy to accept guidance and implant for healthy habits. Health management at an educational institution is a way in which education

and health programs are combined to foster healthy behavior as a major factor in life. To achieve this, it is necessary to establish an educational institution environment that can support both physical and non-physical health (Notoatmodjo, 2010).

The physical environment that can support children's health at an early childhood education institution is comfortable by the standard building of educational institutions. The building should meet the physical requirements such as the location of building not close to public places or crowds (for example markets, terminals, malls and so on), capacity and construction of educational institution buildings by the number of students accommodated, availability of school grounds and gardens, adequate ventilation to ensure air circulation in every classroom, adequate lighting, especially for sunlight access to enter every classroom, sewage and smooth rainwater systems with no inundation, adequate clean water, healthy toilets and available landfills in each class (Notoatmodjo, 2010). Meanwhile, the non-physical environment, or referred to as the mental-social environment, is related to the relationship between the school community (teachers, children, education staff, and parents). A healthy mental-social environment exists when there is a good relationship between the components of the school community. This good relationship will guarantee the growth and development of students, including the growth of healthy living behavior.

Developing the Role of Teachers and Parents of Students

An educational institution is an extended arm of the family in laying the foundations of behavior for future children's lives, including healthy behavior. School health management is needed to improve students' health status. The school community consisting of teachers, students, school employees is the target of health promotion within the educational institution. Therefore, to improve health in the educational institution, active cooperation is needed between teachers, students, education personnel and parents of children by providing health education to instill healthy habits of daily living, monitoring children's health and recognizing abnormalities as early as possible, giving the first assistance for accidents, improving children immunity by immunization, setting dental treatment, improving nutrition, and striving for a healthy educational institution life (Notoatmodjo, 2010).

Teachers are a very important element in the implementation of health efforts at school. Teachers can carry out health education to children through structured subjects in the curriculum specifically designed for health education. Also, teachers can monitor the growth and development of children and the abnormalities that exist in children. Efforts that teachers can do in improving children's health care instilling healthy habits in children (for example washing hands before eating, brushing teeth after eating, wearing footwear, etc.), providing health guidance and observation (for example, checking nail hygiene, inspection on skin hygiene, hair

hygiene, ear hygiene, dental hygiene), conducting early detection of diseases that may occur in children and making referrals to Community Health Center if necessary, making records and reporting on activities or health efforts that have been made, coordinating and mobilizing the community around the school to maintain and improve the cleanliness of the environment around the school. Furthermore, teachers must also be able to become an example for children in clean and healthy living behavior (Notoatmodjo, 2010).

Parents have a role in maintaining children's health (Jauhari, 2020). Students are available in the school environment for a maximum of 8 hours a day, and the rest will return to the family and community (Notoatmodjo, 2010). This means that most of the time spent by children every day is at home. Therefore, parents have an important role in the growth and development of children (Kurniawati. D and Jauhari, 2009). The role of parents in the health efforts of students in schools is to participate in planning and organizing health programs at school. Moreover, parents adjust to health programs at schools and try to find out or learn what their children get at school and encourage them to practice clean and healthy behavior (Notoatmodjo, 2010).

To ensure good cooperation between teachers and parents, a partnership is needed on the principles of equality, openness, and mutual benefit (Notoatmojo, 2014). Equality is a commitment to having the same position, not feeling higher and dominating among others. Openness is related to

the teacher and parent's recognition of their strengths or weaknesses. Mutual benefit is a synergy in achieving common goals. By practicing the principles of this partnership and establishing good cooperation between teachers and parents, a harmonious relationship in improving clean and healthy life behavior in children will be established.

Maintaining Hand Hygiene Habits

The act of maintaining hand hygiene must be done by all teachers, education personnel, and children in an educational institution. Hand washing is a small activity but has a large impact. This activity can prevent several diseases including coughing, colds, diarrhea, food poisoning, hepatitis A, E. coli infection, and impetigo (Kemenkes, 2017). It also can prevent the transmission of chickenpox (Varicella), diphtheria, measles (Rubeola), mumps, hepatitis B (Marni 2016). One way to prevent influenza is by diligently washing hands as it can minimize the transfer of viruses and bacteria through hands. If rarely washing hands, the transfer of viruses or bacteria will trigger the ease to get colds. Besides, another health problem that goes through a similar process is diarrhea. One disorder of the digestive tract is caused by the transfer of viruses or bacteria from and through our hands to enter the digestive tract by the food we hold. Food poisoning can also be prevented by washing hands. Hands contaminated with bacteria, germs, and viruses will make food poisoning and then end up with acute abdominal pain, vomiting, or diarrhea. Prevention of hepatitis A can be prevented by

washing hands. Hepatitis is a disease caused by a viral infection that is very contagious to the liver. One of the processes that trigger hepatitis A is that viruses and bacteria enter and infect our body if we rarely wash hands. Besides, hand washing can also prevent E. coli bacterial infection. Escherichia Coli is a bacterium that spreads from one person's feces to another. The absence of washing hands after using a public toilet will make it easier to get infected by this bacterium. Impetigo is a contagious infection that usually occurs in children who rarely wash hands. This disease is characterized by reddish skin which then develops into small blisters.

Washing hands is a very simple activity to do. However, if we are lazy to do so, there are many risks of illness and health problems which will certainly be very harmful to us. To avoid health problems due to the transmission of viruses and bacteria, frequent hand washing is absolute, and it is better to wash hands with soap. Although it is simple, handwashing habit is very effective to ward off various kinds of health problems.

Hand hygiene in children is a small step that will have a very big effect in preventing disease transmission. Hand hygiene is done by washing hands using soap and running water when hands are dirty or exposed to bodily fluids or using alcohol (alcohol-based hand rubs) if hands do not look dirty. Nails should always be clean and cut short. This can reduce the risk of developing germs on the hands. Hand washing has been considered as one of the most important measures to reduce the transmission of microorganisms and prevent infection for more

than 150 years. Semmelweis' studies (1861), and many other studies, show that transmission of infectious diseases from one person to another may occur through the hands. Maintaining good hand hygiene can prevent the transmission of microorganisms and reduce the frequency of infections (Kemenkes, 2016).

Handwashing with soap and water must be done as follows: Wet your hands with clean running water, pour 3-5 cc of liquid soap to lather the entire surface of the hands, flatten with both palms, rub the back and between the fingers of the left hand with the right hand and vice versa, rub the palms and between the fingers—the inner fingers of the two hands lock together—, rub the left thumb spinning in the grip of the right hand and do the opposite, rub by turning the tips of the fingers on the left palm and vice versa, rinse both hands with running water, dry with a disposable towel or tissue towel until it is completely dry and use a disposable towel or tissue towel to close the faucet (this procedure is carried out 40-60 seconds) according to Figure 1 (Kemenkes, 2017).



Figure 1. Ways clean hands with soap and water, adapted from WHO Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge, World Health Organization, 2009.

Providing Hand Hygiene Facilities

Activities to maintain hand hygiene will be successful if the facilities for washing hands are available. The main means for washing hands is running water with an adequate drain or sink. With the splash of flowing water, microorganisms that are released due to mechanical or chemical friction when washing hands will be dispelled and no longer exist on the surface of the skin. The flowing water can be from a tap or by flushing with a dipper, but the way to flush with a dipper has a substantial risk of pollution, either through the dipper handle or splash of used washing water back into the reservoirs of clean water. Tap water does not have to be costly

but can be made simple with a tank top using a bucket given a faucet placed in an easily accessible position to teachers and students who need it. In addition to running water, there are two types of handwashing materials needed: soap or detergent.

Soap is a material that does not kill microorganisms but inhibits and reduces the number of microorganisms by reducing surface tension so that microorganisms are separated from the skin surface and easily carried by water. The number of microorganisms decreases along with the increasing frequency of washing hands, but on the other hand, by using soap or detergent frequently, the skin fat layer will disappear and make the skin dry and cracked. This can be overcome by using soap that does not contain softener on the skin.

Practicing Cough Ethics

Cough ethics and respiratory hygiene must be practiced in all parts of the education institution, community, and even at home. This important action must always be taken to control potential sources of infection to prevent transmission of respiratory infection in early childhood education institutions. Cleanliness of the respiratory tract and cough ethics must be a fundamental part of healthy behavior. If possible, it is recommended for people who cough to sit at a distance of 1 meter from the others (Kemenkes, 2017).

Respiratory hygiene and cough ethics are two important ways to control the spread of infection at the source. All children, teachers, and employees in educational institutions should be encouraged to

always adhere to cough ethics and respiratory hygiene to prevent respiratory secretions. Prevention and control of the spread of pathogens from infected students (prevention and control of sources) are the keys to avoiding transmission due to unprotected contact. For diseases that are transmitted through saliva splashing (large droplets and/or nucleic droplets), respiratory hygiene or cough ethics should be applied by everyone who indicates symptoms of respiratory infection. All people (teachers, students, and employees) who have signs and symptoms of respiratory infection must adopt a cough ethic. One cough ethic is that when coughing or sneezing, cover the nose and mouth with a tissue or handkerchief or upper arm then throw the tissue into place and then wash hands. If in a state of continuous coughing, teachers, students, and employees use masks to prevent transmission to others (Kemenkes, 2017).

Practicing Clean and Healthy Life Behavior

Clean and healthy living behavior is a set of health behaviors that are based on one's self-awareness, so he can help himself and his family in the health sector and has a role in the surrounding community. Clean healthy living behavior is an activity to convey experiences about undergoing a healthy life through individuals, groups, and the surrounding community environment through communication media to convey health information. The information about health education is provided to improve knowledge, attitudes, and ways of living a clean and healthy living behavior (Kemenkes, 2016).

The clean and healthy life behavior movement aims to improve the quality of health through awareness process as the beginning of the contribution of individuals in living clean and healthy daily life behaviors. This movement is useful to create a community that is health-conscious and has the knowledge and awareness to live behaviors that maintain hygiene and meet health standards (Kemenkes, 2011). The clean and healthy lifestyle behavior at school is an activity that empowers children in schools, teachers and the community of school partners to be willing to adopt a healthy lifestyle so that a healthy school can be created. This clean and healthy life behavior has benefits to make schools able to create a clean and healthy environment, increase teaching and learning activities and make children, teachers, and the community around the school healthy (Kemenkes, 2011). Healthy schools can prevent the transmission of various diseases. The healthy and clean life behavior indicators at school are: washing hands with soap before and after eating, eating healthy snacks, using clean and healthy latrines, doing regular exercise, eradicating mosquito larvae, disposing the trash in its place and doing community service with residents of the school environment to create a healthy environment (Kemenkes, 2011).

Clean and healthy life behaviors in schools require sustainable efforts to improve health and play an active role in creating a healthy environment. The indicator of clean and healthy life behavior in school becomes a measurement tool to show a condition or tendency of clean and healthy life

behavior carried out by children at school. Clean and healthy life behaviors carried out by children at school should be practiced optimally. Ideally, the overall eight indicators of clean and healthy life behavior at schools are well implemented. However, factually, that the clean and healthy behavior program is still not optimal indicated by a case of illness that occurs due to unhealthy living behavior.

Indicators of clean and healthy life behavior in an educational institution environment are the optimal growth and development of early childhood depending on the healthy behavior performed. Healthy behaviors observed in this study were eating and drinking behavior, personal hygiene behavior, environmental hygiene behavior, behavior towards illness and disease; balance behavior (regular exercise, adequate rest, and sleep) (Astuti, A.K, 2016).

CONCLUSION

Prevention of disease transmission in early childhood education institutions can work well if there is a harmonious collaboration between teachers, education personnel, and students' parents. This collaboration can establish children's behavior in maintaining hand hygiene, practicing cough ethics, and improving clean and healthy living behaviors. For this reason, support from the management of an educational institution is needed to provide educational facilities and facilities that meet health standards. Besides, support from the community around the school is also needed to create a clean and healthy environment. The

implementation of this disease prevention strategy is expected to minimize the risk of disease transmission between children and children, children and teachers, children, and the surrounding environment. The purpose of this strategy is to improve the health status of children and the community around the school, one of which is indicated by success in minimized absence from school due to illnesses.

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