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RISK FACTORS OF TRANSMISSION OF CORONAVIRUS DISEASE 2019 (COVID-19) IN CHILDREN: A REVIEW

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ABSTRACT

Introduction: The transmission of Coronavirus Disease 2019 (COVID-19) in children in the world is still high, especially from the environment where children live and play. The purpose of this review was to analyze host and environmental factors for the risk of transmission of COVID-19 in children, based on empirical studies in the last 2 years. **Methods:** Search for journals or articles were used databases including Scopus, Science Direct, Proquest and Pubmed. Journal search was conducted from April to October 2020. The PRISMA checklist was used to assess study feasibility. The framework used to review is PICOS and the inclusion criteria used are English-language journals published in 2019 to 2020, discussions related to transmission to children, and the population is children. The data collection was carried out by examining the title, abstract, full text and assessed methodology to determine the eligibility of the journal. **Results:** Thirty hundred journals have been identified, there are twelve journals that match the research criteria, the study explains the risk factors for the transmission of coronavirus disease 2019 (COVID-19) in children (n = 12). Research designs that are widely used to discuss factors associated with the transmission of COVID-19 in children are the Cohort studies, Case-report studies, Case Control, Survey studies, Observes Studies dan Mix method **Discussion:** Host factors that influence the incidence of COVID-19 in children are immunity, comorbidities, personal hygiene behavior and nutritional status. Children with low immunity and comorbid susceptibility to contracting the virus and will become severe when the child's nutritional status is poor. **Conclusion:** The environmental factor of the child tends to be transmitted in the child's home and play environment. It is necessary to implement health protocols and increase nutritional intake especially for children.

Keywords: Risk Factors; Infection; COVID-19; Transmission; Children

INTRODUCTION

The transmission of Coronavirus Disease 2019 (COVID-19) in children in the world is still high with a number of 179,990 (De Luca *et al.*, 2020). Transmission that occurs to children comes from adults who are career or virus carriers or parents who are positive without symptoms so they do not realize that they have the potential to infect their family and other people who live in the same house (Kobayashi *et al.*, 2020). This happens because of the interaction between parents and children while at home (Wang *et al.*, 2020). The spread of the virus, which is basically through droplets, will occur very quickly with the presence of hugs, kissing children and the habits of parents who ignore the correct cough etiquette (Duff, 2020). Child immunity factors influence the incidence of transmission in children. The impact felt by a child infected with COVID-19 will be seen after a few days of exposure, starting from no symptoms to death. From a child's perspective, there are also many factors that cause transmission or cross infection to occur very quickly from adult to child or

from one child to another. So that in general, the factor of COVID-19 transmission in children cannot be known.

Reporting from April to October 2020 the number of positive cases of COVID-19 in the world reached 3,139,690 cases, with a monthly average of 381 thousand cases (Manderson & Levine, 2020). According to (Wu *et al.*, 2020) the incidence of COVID-19 in children aged 10-19 years was 549 / 72,314 or 1% of all cases, while the age group <10 years was 416 / 72,314 or 0.9% of cases. According to data from the Task Force for the Acceleration of Handling of COVID-19, more than 2712 children infected with COVID-19 and 51 of them (who were under 18 years old) died from the corona virus, and most of them were toddlers. This is equivalent to 1.7% of total deaths due to COVID-19 with comorbidity of asthma, leukemia, congenital heart defects, and meningitis, which according to the Indonesian Pediatric Association, was one of the highest in Asia and the world.

The number of COVID-19 cases in children is influenced by outside environment where they stayed. Transmission that occurs due to parental negligence in supervising children and parental awareness in taking care of themselves is still lacking (Zar *et al.*, 2020). The rapid and radical transmission of this virus is influenced by environmental factors, immunity conditions and the nature of the virus itself (Ying *et al.*, 2020). In general, the factors that influence the transmission of COVID-19 are environmental conditions, the host, namely the human, and the agent, namely the virus. So that serious attention is needed related to transmission to prevent sustainable transmission because the impact is very large, such as insufficient health facilities and health workers to accommodate and provide care for patients who are positive for COVID-19 (Ying *et al.*, 2020).

The impact of the infection process on the development of children have longer effect. Children under six years can interfere with basic growth and development, namely motor skills, language speaking skills, and the ability of independent personnel. Meanwhile, in children aged six years, the infection process at an early age can interfere with their growth and development in terms of behavior and intelligence. John Gordon's theory states that the emergence of a disease is strongly influenced by three factors, namely germs Agent), host (Host), and environment (Alligood, & Tomey, (2014)). The agent factor that is of course clear is the COVID-19 virus, then the host factor is the child which is influenced by the child's habits with the child's health protocol and the child's immune system and environmental factors are the home where the child gathers with other adults including parents who may be sufferers of COVID-19. Therefore it is necessary to conduct a study that summarizes the transmission of COVID-19 to determine the factors that affect transmission in children.

METHODOLOGY

Search Strategy

The authors have performed a systematic primary search of the literature that resulted in a used keywords in this "literature review" are adjusted to "Medical Subject Heading (MeSH)." The keywords in this literature search are "Factor" OR "Risk Factore" OR "Causes" AND "Infection" OR "Transmission" OR "Contact (Behavior)" AND "Covid-19" OR "SARS COV-2" OR "Coronavirus" AND "Pediatric" OR "Children" OR "Child". The authors have searched for articles using an electronic literature search of Scopus, Science Direct, Proquest and Pubmed databases published during the period from 2019 to 2020. We have used the Ten articles which met the inclusion criteria were selected from the search as shown in (Figure 1). The studies have been summarized as shown in (Table 1).

Review Process

Two of the investigators initially reviewed article titles for relevance to include in this review paper. These studies were screened to remove duplicate studies by entering them into a computer-based referred management system. The abstracts were screened for the inclusion criteria by the two investigators. Inclusion criteria were (1) limited to english language studies; (2) 0-18 years participants; (3) one of the main outcome variables measured was risk factors or predictors of transmission of covid-19 to children; (4) original primary research article published in a peer-reviewed journal; and (5) article published between the years 2019 to 2020. On the basis of screening, the full text article was obtained for the second stage screening. Researcher performed the second stage screening and downloaded 330 references. The title and abstracts were screened for relevance and identified 136 articles. Using the inclusion criteria, 12 articles were identified from these 330 articles. The process, of handling the retrieved articles are outlined as in Figure 1.

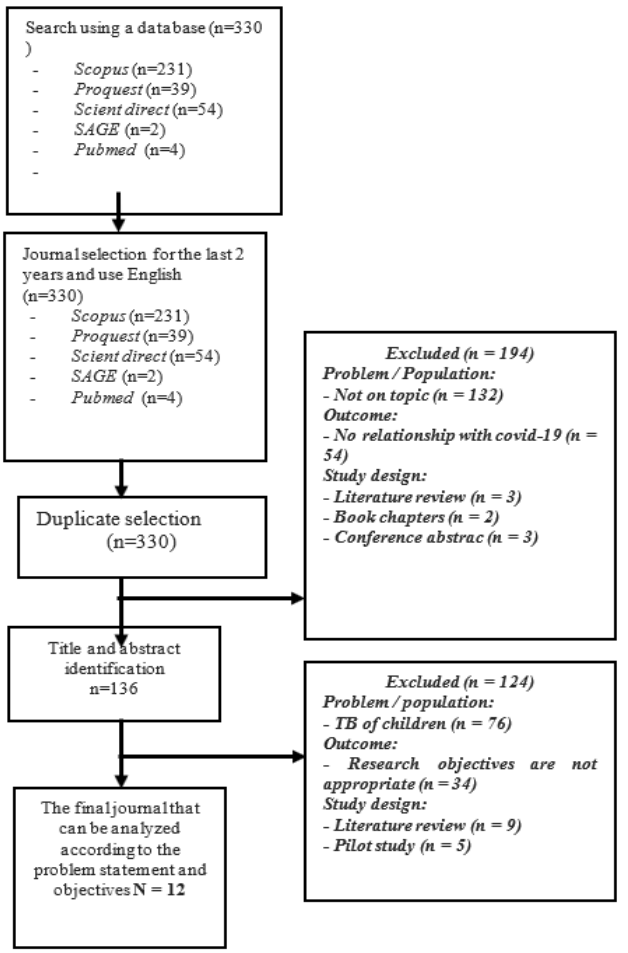

Figure 1: Diagram Flow for Relevant Articles Finding

Analysis and assessment of study quality

The findings were presented in a narrative format; the 12 articles that met the inclusion criteria used different methodology and instruments (method heterogeneity) to measure the outcome variables risk factors or predictors of covid-19 transmission. For this reason, it was not possible to use meta-analysis process to generate a sound quantifiable conclusion. The results were presented in a tabular format (Table 1). We assessed the following aspects of the study quality: (1) study design and variable (2) sampling (3) data collection instruments.

RESULTS

This literature review study uses twelve international journals that have passed screening according to inclusion and exclusion criteria. Overall, the twelve journals describe the risk factors for the transmission of coronavirus disease 2019 (COVID-19) in children, the twelve journals can be seen in (Table 1). The studies that the authors found that fit the topic were conducted in China, namely three studies (Liu *et al.*, 2020; Dong *et al.*, 2020; Zhou *et al.*, 2020), two studies in Italy (Götzinger *et al.*, 2020: Bellino *et al.*, 2020), and one study each in America (Wilke *et al.*, 2020), in Vietnam Le *et al.*, 2020), in Bangladesh (Hamadani *et al.*, 2020), in India (Saha & Chouhan, 2020), in Taiwan (Cao *et al.*, 2020), in France (Hubiche *et al.*, 2020), in Australia (Ibrahim *et al.*, 2020). The results of the study search found by the author can be seen in table 1.

Table 1: The Results of the Study Search Found by the Author

No	Author, year, vol, and country	Publisher	Title	Method	Rsults of Research
1	Bellino *et al* 2020, Vol:146 Issue:4 ISSN: 10984275 Italy	*America Academic of Pediatrics*	*COVID-19 Disease Severity Risk Factors for Pediatric Patients in Italy*	Design: Case Report Sample: 3,836 children in Italy Variables: age, comorbid, social contact, COVID-19 Instruments: Secondary data, PCR swab test Analysis: Regression	The risk factors for transmitting COVID-19 to children are age, comorbidities and close contact with positive people and the environment.
2	Ibrahim *et al.,* 2020, Vol: 32 Issue:5 Pages:801-808 ISSN:17426723 Australia	*EMA - Emergency Medicine Australasia*	*SARS-CoV-2 testing and outcomes in the first 30 days after the first case of COVID-19 at an Australian children's hospital*	Design: Cohort study Sample: 433 patients Variable: Comor bid, COVID-19 Instrument: Secondary data from PCR lab results Statistic analysis	The risk factors for transmission to children are comorbids, asthma

3	Le *et al* 2020, Vol:4 Issue:5 Pages: 405 - 406 ISSN: 2352-4642 Vietnam	*The Lancet Child & Adolescent Health*	*The first infant case of COVID-19 acquired from a secondary transmission in Vietnam*	Design: Case report Sample: 1 baby case who tested positive for COVID-19 in Vietnam. Variables: Close contact, family, pregnant women, COVID-19 Instruments: Secondary data Analysis: Distribution analysis	Risk factors for transmission of COVID-19 to children include pregnant women to their babies, contact with family members who are positive for COVID-19, close contact
4	Hamadani *et al,* 2020, Vol: 8 Issue:11 Pages:e1380-e1389 ISSN: 20937997 Bangladesh	*The Lancet Child & Adolescent Health*	*Immediate impact of stay-at-home orders to control COVID -19 transmission on socioeconomic conditions, food insecurity, mental health, and intimate partner vio lence in Bangladeshi women and their families: an interrupted time series*	Design: Case Control Sample: 2424 mothers of children in Bangladesh Variables: social and economic status, nutrition, COVID-19 Instruments: Questionnaires and secondary data Analysis: Regression	The risk factors for transmitting COVID-19 to children are low socioeconomic status and nutritional status.
5	Wilke, Hiles, & Goldman 2020, Vol: 110 Issue:P2 Pages: 104712 ISSN:187377 57 America	*Child Abuse & Neglect*	*Rapid return of children in residential care to family as a result of COVID -19: Scope, challenges, and recommendations*	Design: Mix method Sample: 75,483 children in 14 countries in America Variables: income, Comorbid, cleanliness, PPE Instrument: Online survey Analysis: Regression	Risk factors for transmission of COVID-19 to children with low or middle income families, unable to maintain distance and hand hygiene, lack of PPE and comorbidities.
6	Götzinger *et al*., 2020, Vol:4642 Issue:20 Pages:1-9 ISSN:153765 91 Italy	*Lancet Child Adolesc Health 2020*	*COVID-19 in children and adolescents in Europe:a multinational, multicentre cohort study*	Design: Multicenter Cohort Study Sample: 582 children who tested positive for COVID-19. Variables: age under 5 years, comorbid, immunity, COVID-19. Instrument: Online questionnaire Analysis: Mann-Whitney and Fisher	The risk factors for transmission are children under 5 years of age, comorbid or pre-existing medical conditions and the child's immunity.
7	Saha & Chouhan, 2020, Vol: 266 Pages:115250 ISSN: 0269-7491 India	*Environmental pollution*	*Indoor air pollution (IAP) and pre -existing morbidities among under-5 children in India: are risk factors of coronavirus disease (COVID-19)?*	Design: Study / Prevalance Survey Sample: 247,743 children under five in India Variable: Air pollution, comorbid, environment / red zone, COVID-19. Instrument: Survey Analysis: Spearman Statistics	Risk factors for transmission of COVID-19 are caused by air pollution or air contaminated with the COVOD -19 virus, the environment or being in the red zone.

8	T. Liu *et al.,* 2020, Vol: 9 Issue: 1 China	*Emerging Microbes & Infections*	*Risk factors associated with COVID-19 infection: a retrospective cohort study based on contacts tracing*	Design: Retrospective Cohort Study Sample: 515 positive children for COVID-19 in Guandhong. Variables: family, close family, close contact, COVID-19 Instruments: Secondary data Analysis: Logistic regression and Chi square test	The risk factors for transmission to children are non -compliance with health protocols and the presence of a family member who has close contact with a family member who is positive for COVID-19.
9	Dong *et al.,* 2020, Vol: 22 Issue: 2 China	*American Academy of Pediatrics*	*Epidemiological Characteristics of 2143 Pediatric Patients With 2019 Coronavirus Disease in China*	Design: Case Report Sample: 2,143 children who tested positive for COVID-19 Variables: Age, close contact, Infection Sars Cov-2 Instruments: Secondary data Analysis: Chi-square test, Fisher exact test and the Mann-Whitney test	Transmission that occurs in children under 7 years of age, male sex, interaction between parents and children at close range and touching the child's face area
10	Cao *et al.,* 2020, Vol:119 Issue:3 Pages:670-673 ISSN:18760821 Taiwan	*pediatric perspective*	*SARS-CoV-2 infection in children: Transmission dynamics and clinical characteristics*	Design: Cohort study / Perspective study Sample: 398 children with COVID-19 Variables: Family cluster, toys / objects, Infection Sars Cov-2. Instrument: Checklist sheet Statistic analysis	Transmission to children occurs in the school environment, contact with family members and contaminated toys / objects.
11	Zhou *et al.,* 2020, Vol:96 Pages: 710 - 714 ISSN: 1201-9712 China	*Pediatric infection journal*	*From SARS to COVID-19: What we have learned about children infected with COVID-19*	Design: Cohort study Sample: 3 newborns in China who tested positive for COVID-19 Variables: newborn, family member, close contact, COVID-19 Instrument: Checklist sheet Statistic analysis	The risk factor for transmitting COVID-19 to a child is a newborn of a positive mother with COVID -19, close contact with positive family members. and are infected by children outside the home, such as schools and playgrounds
12	T Hubiche *et al*, 2020, Vol:16 Pages:1-22 ISSN: 0151-9638 France	*Annales de dermatologie et de venereologie*	*Acute acral eruptions in children during the COVID-19 pandemic: characteristics of 103 children and their family cluster*	Design: Multicentre observational study Sample: 103 children in France Variable: family member, close contact, COVID-19 Instruments: Secondary data Analysis: Wilcoxon	The risk factor for a child contracting COVID -19 is close contact with a family member who is positive for COVID-19.

The articles or journals to be reviewed include the database used, the year of publication, and the research design. Overall, the twelve journals describe the risk factors for transmitting COVID-19 to children. The research design that is widely used to discuss factors associated with the transmission of COVID-19 to children is the Cohort Study. namely as many as 5 articles or 42%. Characteristics of children who are respondents in this literature review are based on age, illustrating that seen from the entire sample, the dominant age of the respondents is that of children under 5 years of age, namely 247,743 respondents or 74.24%. The rest of the respondents were children under 18 years old and babies less than 1 year old. The factors of transmission of COVID-19 in children are divided into 2 (two) major themes, namely host factors and environmental factors. The environmental factor found by the authors based on the study results is the factor of close contact with family members or adults, or playmates who are positive for COVID-19 who without realizing they have been infected with COVID-19 (Bellino *et al.*, 2020; Liu *et al.*, 2020; Dong *et al.*, 2021; Hubiche *et al*., 2020). Another environmental factor is that children can be infected with COVID-19 from a school environment, play environment or toys contaminated with the virus (Cao, *et al.*, 2020; Hamadani *et al.*, 2020). Host factors or factors from children, namely immunity and the presence of comorbids such as asthma and other chronic diseases according to the study (Ibrahim *et al.*, 2020; Götzinger *et al.*, 2020; Wilke *et al.*, 2020) besides hygiene factors or not adhering to health protocols such as not being able to maintain hand hygiene (Wilke *et al.*, 2020; Liu *et al*., 2020) Socio-economic factors and income of household heads that affect the ability to provide resources such as limited nutritional food intake, availability of masks, availability of tools for hand hygiene, space for independent isolation / keeping a distance, houses are narrow and there is no air ventilation (Hamadani *et al.*, 2020; Wilke *et al.,* 2020; Saha & Chouhan, 2020). Factors for babies infected with COVID-19 who were acquired while in the womb, were born to mothers who were positive for COVID-19, or transmission could occur during the interaction between breastfeeding and kissing the baby (Le *et al.*, 2020; Dong *et al.*, 2021; Zhou *et al.*, 2020).

DISCUSSION

Host Factor of Children

Imunity Factor

Based on the results of the review of the articles conducted by the researcher, it was found in the study (Götzinger *et al.*, 2020) shows a relationship between transmission and immunity status of children. The body's immune system has a function, namely to help repair human DNA, prevent infections caused by fungi, bacteria, viruses, and other organisms, and produce antibodies (a type of protein called immunoglobulin) to combat invasion of foreign bacteria and viruses into the body. The job of the immune system is to find and destroy invaders that harm the human body.

Children with low immunity will easily catch COVID-19 because the body's defenses are not good. Infection that occurs in children will often cause symptoms that vary from mild to severe according to the child's body response (Sun, Chen, & Viboud, 2020). Children become susceptible to infection due to the absence of antibodies or immunity to SARS-Cov2 and changes in the susceptibility of the host response to the agent, and / or factors that increase exposure (Adhikari *et al.*, 2020). Children can be taught to exercise regularly and maintain body fitness to increase endurance and maintain it so that the body is not susceptible to disease. Resistance to disease depends on the quality of the immune system if it is in optimal condition it will avoid disease whereas if it decreases it will be susceptible to disease (Yuliarto, 2013). Based on the results of the study, the authors state that immunity in children, especially toddlers, has not been well developed so that younger children have weak immunity status, this can be a risk factor for children who are very susceptible to contracting COVID-19 from adults.

Factors of Non-Compliance with Health Protocols

Based on the results of the review of the article, it was stated that the host factors stated in the study were mostly related to non-compliance with health protocols such as poor hand hygiene. The results of these studies are shown by (Götzinger *et al.*, 2020; Wilke *et al.*, 2020). Hands are part of the body that is susceptible to dirt and germs attached. When holding something, touching, cleaning vital organs after or before defecating or urinating and shaking hands, such activities can cause germs to stick to the skin of the hands and enter orally by mouth because of the lack of cleanliness in washing hands with germs that are infected. still attached to the hand (Dong *et al.*, 2021). Apart from hand hygiene, parents are also not obedient to using masks, not wearing masks at home even if they

are coughing or sick (Wilke *et al.*, 2020). The behavior of covering the nose and mouth must also be accustomed to children, such as using masks according to standards. Children often touch anything then rub their nose and eat without washing their hands or other facial areas, allowing the virus to enter the body through these areas (Dong *et al.*, 2020) From the results of the study, it can be stated that children have a tendency not to wash their hands after holding objects or toys around them and then do activities to eat or touch their playmates and toys around them. This results in transmission between friends.

Comorbid Factor

Several articles reviewed stated that, comorbids also have an effect on the transmission of COVID-19, in research by (Ibrahim *et al.,* 2020; Wilke *et al.*, 2020; Götzinger *et al.*, 2020) shows that comorbid is one of the causes of high transmission in children. This is confirmed by the research of (Ludvigsson, 2020) which shows that comorbids are a factor affecting the transmission of COVID-19 in children. The health problems in question include allergies and asthma, which are congenital diseases of children. Children with allergies or asthma will have a decreased immune defense response. Asthma in children results in a decrease in surfactants so that viruses that enter the lungs can easily infect and even cause other symptoms such as pneumonia in children (Ibrahim *et al.*, 2020) In COVID-19, like other respiratory viruses, they can make their asthma symptoms worse and even have the potential to experience life-threatening asthma attacks. WHO also lists asthma as a condition that makes a person more susceptible to becoming more seriously ill due to the corona virus (Oreskovic *et al.*,2020). Based on the results of the review of the article, it can be stated that children who suffer from congenital diseases such as asthma and other chronic diseases are more at risk of being infected with COVID-19 but more specific examinations need to be carried out to ascertain whether the child is purely sick with the respiratory tract or is already infected with COVID-19.

Nutrition Factor

In the case of children with COVID-19 nutritional status was obtained in the research conducted (Hamadani *et al.*, 2020) shows that nutritional status affects the transmission of COVID-19 in children. Poor nutritional status will result in decreased immunity of children so that the defense in the body decreases. This is in accordance with research by (Moradi *et al.*, 2019) which states that children with good nutritional status have a lower risk of contracting viruses or bacteria than children with poor nutritional status. Adequacy of nutrition, especially vitamins and minerals, is essential in maintaining an optimal immune system. Vegetables and fruits are the best sources of various vitamins, minerals and fiber. Vitamins and minerals contained in vegetables and fruits act as antidotes to bad compounds or antioxidants in the body and help increase immunity. With increased immunity, it will prevent transmission of COVID-19. Nutrition is an important concern in maintaining the immune system. Fulfilled and good nutrition is needed for cells to function optimally. The activated immune system, in this case the higher the energy intake during the infection period, with the greater the basal energy expenditure (Moradi *et al.*, 2019). Critically ill conditions in patients treated with COVID-19, require comprehensive management including nutritional therapy. Critically ill COVID-19 patients are under extreme stress, which places them at a high risk of malnutrition. Children have a low nutritional status because children have a tendency to consume only foods they like and prefer to eat only one type of food, so it is necessary to arrange food for children to meet the nutritional needs of children. The nutritional status of children is also determined by the socioeconomic status or income of the person, which results in the family's inability to provide nutritious food intake for their children In addition to the above factors, another host factor that is a risk factor for the transmission of COVID-19 in children is age, where the age of children under 5 years is more at risk of infection (Götzinger *et al.*, 2020; Dong *et al.*, 2020).

Environment Factor

House Close Contact

Indicates that the home is the most infectious site. Parents with no symptoms feel safe and ignore health protocols carrying the virus and interacting with the child. This interaction causes droplets that are scattered in the home environment and even directly on children, especially when not wearing masks. This is supported by the condition of the house that does not meet the criteria for a healthy home, so the virus will easily spread to all family members, not only children.

Close contact creates a direct relationship between

children and parents. Parents who do not realize that they are carriers of the virus directly spread it through coughing or sneezing, the patient spreads the virus into the air in the form of droplet nuclei. One cough can produce about 3000 sparks. Generally transmission occurs in a room where sputum sparks last for a long time. Ventilation can reduce the number of splashes, while direct sunlight can kill viruses. Splashes can last for several hours in dark, humid conditions (Zhu *et al.*, 2020). Family members including children who are close to sufferers of COVID-19 are the groups most vulnerable to contracting the COVID-19 disease because it is difficult to avoid contact with sufferers (Bellino *et al.*, 2020). In fact, children are very difficult to separate from their parents. The interaction of children with parents is something that cannot be avoided. Children who miss their parents who work outside the home all day, and vice versa. This interaction includes holding the child, hugging and kissing the child. Some parents do not realize that they are a career that carries the virus everywhere, even in the home. We recommend that after work parents before meeting children clean themselves with a new shower and shampoo after changing to clean clothes to gather with children and other family members who are at home. So that it can reduce the cluster of transmission in the family.

Children's Playground and School

Lu *et al*., (2020) mentioned that the children's play environment and school are the most common places of transmission. Children who are carriers or carriers of the virus or confirmed with or without symptoms can leave the virus on inanimate objects in the environment around the child so that it is easily spread by the touch of other children or transmitted directly by sharing food or drinks in one container (Kannan *et al.*, 2020). Not only that in research by Kursumovic *et al*., (2020) Viruses are often found in places that have been touched by sufferers such as door handles, chairs and tables so that children who often touch them can be infected indirectly from previous sufferers. The study in Singapore said there was widespread environmental pollution in rooms and toilets of patients experiencing mild symptoms of COVID-19. Virus can be detected on door handles, toilet seats, light switches, windows, cupboards and objects or devices that the patient may have touched but not found in air samples (Kannan *et al.*, 2020). Based on the results of the study, it can be stated that often the children's play area has been contaminated from children who are positive for COVID-19 and / or parents who are positive for COVID-19 who accompany children who play. Based on the findings of the data, that children often share food in one container needs to be the attention of every parent. This often occurs in a child's play environment such as sharing drinking water and snacks with friends.

Limitation

A related limitation in this review is the potential for publication bias, because the included studies were those that the researcher could find, so that the minimal number of factors reviewed was limited to host and environmental factors, because there may be other factors that were not discovered and not examined by researchers and not found in the review, besides that the study was not conducted in all countries affected by COVID-19. More specific aspects related to policies to prevent transmission of COVID-19 in children need to be considered for implementing interventions in health facilities in each place.

CONCLUSION

Based on a review of the literature that was reviewed, it was found that the host factors that influence the incidence of COVID-19 in children are immunity, comorbidities, hygiene behavior or disobedience to health protocols and nutritional status. Children with low immunity and comorbid susceptibility to contracting the virus and will become severe when the child's nutritional status is poor. Meanwhile, the environmental factors of children tend to be transmitted at home and in the children's play environment. The existence of direct interaction between parents and children can make a cross-infection medium for children or interactions between children and playmates who are positive for COVID-19. To break the chain of the spread of COVID-19, it is hoped that every individual and society level implements the applicable health protocol, including for children. In addition, to adopt a healthy life, one should improve and maintain the immune system by improving balanced nutritional intake. So that you don't get infected with COVID-19 easily. Increase the intake of healthy and nutritious foods in the family, especially children, to increase immunity or immunity against viruses. The child's environment is an important thing to pay attention to because it is a medium for transmission of the COVID-19 disease that often occurs, so health education and personal hygiene behavior for children starting from parents, family, school, play

environment, home environment, and especially social media educating children about health programs is necessary. The main type of education for school-age children who already understand can be taught about health protocols such as the correct use of masks, keeping a distance from fellow friends, learning how to wash hands properly, playing by avoiding crowds and reducing mobilization by studying and playing at home, now Many various kinds of children's toys teach children to be quiet in the house such as paper folding games, counting with various games, learning to sew with harmless materials and various interesting children's videos for children.

Conflict of Interest

The authors declare no conflict of interest.

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