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DEVELOPMENT OF CHILDREN UNDER 5 YEARS OF AGE LIVING ON LANDFILL SITES AND THEIR ENVIRONMENTAL SANITATION CONDITIONS

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ABSTRACT

Less than optimal development of children under 5 years of age can be caused by one factor inadequate environmental sanitation, especially in landfill sites. Objective to determine the development of children under 5 years of age and the environmental sanitation of those living in landfill sites. Method: This research uses descriptive analytics with a purposive sampling technique. The number of samples in this study was 91 parents with children under 5 years of age in landfill sites. Assessment of development using the Developmental Pre-Screening Questionnaire and environmental sanitation through interviews and observations. Data were presented in frequency distributions of demographic characteristics, development of children under 5 years of age, environmental sanitation, and cross-tabulations. This study showed the interpretation of the development of children under 5 years of age who were in landfill sites was development according to age (90.3%) at pre-school age, doubtful (38.1%) and there was a possibility of deviation (57.1%) at infant age. Environmental sanitation conditions in the landfill sites consisted of drinking water sources from boreholes/pumps (27.5%); available, watertight, and uncovered waste bins (51.6%); use of septic tank (100%); and no sewerage available (49.5%). The parents who use borehole/pump water sources, trash bins that are not watertight and uncovered, and no sewerage in the landfill sites where parents live, have the results of the interpretation that children under 5 years of age develop doubtful and there is a possibility of deviation. Therefore, the important role of nurses in providing education and early stimulation of children under 5 years of age development by involving parents, optimizing the uses of the Developmental Pre-Screening Questionnaire at public health centers, education and management of a conducive physical environment to support the development and handling of children under 5 years of age who experience delays.

Keywords: children under 5 years of age; development; environmental sanitation; landfill sites

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INTRODUCTION

The number of children under 5 years of age in Indonesian reached around 31.8 million in 2022 (Indonesian Ministry of Health, 2023), this makes the growth and development of children under 5 years of age very important to pay attention to because it concerns the quality of life of the nation's next generation. The period of children under 5 years of age is an important period in the process of human growth and development because it takes place quickly and will never be repeated, also called the golden age (Diyah, 2020). Therefore, growth and development at this time deserve attention and every child has the right to achieve optimal cognitive, social and emotional behavioral development (Harahap, 2019) One of the factors that contribute to the development of children under 5 years of age is environmental sanitation. An inadequate environment, especially in landfills sites, can cause children under 5 years of age to experience development delays.

According to (World Health Organization, 2018) Indonesia is the third largest country with the highest prevalence in the Southeast Asia Regional (SEAR) of children under 5 years of age experienced growth and development disorders with 28.7%. In the aspect of development, the results of the National Socio-Economic Survey (2017) show that children under 5 years of age who experience development delays are 4.81% and this has increased from the National Socio-Economic Survey (2022) by 13.5% (Central Statistics Agency, 2023). The population of South Sulawesi in 2023 at the age of 0-4 years has increased by 8.417 people and the age of 5-9 years by 11.206 people (Central Statistics Agency South Sulawesi, 2022). According to (Ministry of Home Affairs Net Consolidated Data, 2018) the population of South Sulawesi, namely children aged 0-9 years, continues to increase. The situation of increasing population from the previous year shows that child development delays will also increase (Central Statistics Agency South Sulawesi, 2022). This is in line with the South East Asian Nutrition Surveys (SEANUTS) study that the development delay of children aged 0.5-5.9 years is 21.6% consisting of gross motor skills (11.5%), fine motor skills (11.8%), language (15.8%) and social personal (14.5%) %) (Nurturing Care for Early Childhood Development, 2019). According to the (Indonesian Ministry of Health, 2020), shows that 56.4% of children under 5 years of age suffer from growth and development disorders (Biomedika, 2020). According (Makassar City Health Office, 2022) shows that 350 children under 5 years of age in the Tamangapa Community Health Center had development disorders of 0.38%.

In South Sulawesi, growth and development disorders of children under 5 years of age are categorized as serious at >40%% (Indonesian Ministry of Health, 2018). Common disorders include physical growth, motoric development, language, and behavioral disorders. Every child will go through a growth and development process by their age stages, including children under 5 years of age (aged 12-59 months) (Indonesian Ministry of Health, 2023). Optimal child development is influenced by exclusive breastfeeding, consumption of nutrient-rich foods, regular feeding, lack of infectious diseases, and mental stimulation including good parenting (Black, 2018) while (Indonesian Ministry of Health, 2022) is influenced by internal factors including race/ethnicity, family, age, gender, and genetics. External factors include prenatal, childbirth, and postnatal phases (physical and chemical environment and nurturing environment). Children under 5 years of age growing up in landfill sites face various health risks such as respiratory infections, skin diseases, and gastrointestinal disorders. In addition, the cognitive, behavioral, emotional, and productivity development of children under 5 years of age can also be affected by exposure to unhealthy environments (Harahap, 2019); (Jeong, 2019), in addition, according to (Larson, 2017) suggests the impacts that can be caused include speech delays, sleep disorders, malnutrition, damage to the nervous system that causes mental retardation, learning difficulties, blindness and deafness in children. Air pollution and bad smells from landfill sites can affect children's brain and nervous system development, while poor sanitation conditions can cause stress and psychological disorders in children.

Ideally, a family lives with access to sanitation, a house, and clean water at a distance from landfill sites of more than 100 meters, in a place where rainwater and dirty water are not stagnant, and close to cleaning facilities (McGovern, 2017); (Ningrum, 2018). However, there are still families who live in inappropriate environments, one of which in landfill sites. Antang landfills is the only landfill in Makassar City and is included at the Tamangapa Community Health Center. These landfills produce gases that are harmful to the surrounding population. Poor sanitation conditions and inadequate waste management are a medium for spreading infectious diseases such as tuberculosis, pneumonia, and diarrhea (Rahmailina, 2018). The majority of scavengers are male, female, and children (boys and girls). This of course increases the risk of health problems in parents and children (Manurung, 2020). The

results of interviews with 10 parents at Landfills Sites on 7 October 2023 that four mothers with 18-month-old children said their children were not able to stand alone without holding their hands, two mothers with 24-month-old children said their children could not walk and four mothers with 10-month-old children said their children could not sit by themselves and also could not crawl. In line with this, research (Syahda, 2020) on children under 5 years of age at the Tambusai landfills sites showed 12 children under 5 years of age with 2 children under 5 years of age experiencing developmental delays and 10 in development according to age and research by (Widaningsih & Putri, 2020) on 35 children aged 4−24 months who had a risk of growth and development disorders showed that there was an effect of early detection of growth and development on reducing the risk of growth and development disorders for 23 children (65.7%). Based on this description, this study aims to determine the development of children under 5 years of age and the environmental sanitation of those who live in the landfill sites. This research aims to determine the development of children under 5 years of age and environmental sanitation of those living in landfill sites.

METHOD

This research method used an analytical descriptive quantitative study with a purposive sampling technique. This study was conducted in the Antang Landfill Sites of Makassar City in 2024 with a total sample in this study of 91 parents who have children under 5 years of age who live in the landfill sites. The inclusion criteria in this study were parents who agreed to become respondents, residing ≤ 500 meters from the landfill sites. Meanwhile, the exclusion criteria were children under 5 years of age who have congenital abnormalities. Before conducting research, researchers provide informed consent to respect, protect, and maintain the confidentiality of information and privacy of respondents. Primary data collection of development interpretation children under 5 years of age was carried out using the Developmental Pre-Screening Questionnaire (Indonesian Ministry of Health, 2022) and environmental sanitation through interviews and observation sheets of Special Research on Environmental Pollution (Indonesian Health Research and Development Agency, 2019) which refers to ten indicators of Clean and Healthy Living Behavior (Indonesian Ministry of Health, 2019). Data were presented in frequency distributions of demographic characteristics, development of children under 5 years of age, environmental sanitation, and cross-tabulations between variables.

RESULTS

Table 1.
Distribution Characteristics of Parents and Children Under 5 Years of Age (n=91)

Respondent Characteristics	f	%	*Mean*±(SD)	Min-Max
Parents				
Age (years old)			30.64(6.427)	18−42
Gender				
Male	1	1.1		
Female	90	98.9		
Occupation				
Housewife	34	37.4		
Scavenger	40	44.0		
Daily worker	17	18.7		
Last Education				
Elementary School	65	71.4		
Junior High School	25	26.4		
Associate's Degree	1	1.1		

Respondent Characteristics	f	%	*Mean*±(SD)	Min-Max
Children				
Age (month)			28.40 (16.247)	3−58
Infant (0-12 month)	21	23.1		
Toddler (13-36 month)	39	42.9		
Pre-school (37-72 month)	31	34.1		
Gender				
Boys	43	47.3		
Girls	48	52.7		

Table 1 shows the majority of parents gender were female (98.9%). The most common age was an average of 30.64 years. Less than half of the parent's occupation was scavenger (44.0%). In addition, most parents education was elementary school (71.4%). For children under 5 years old, the gender was mostly girls (52.7%). The highest age was a toddler (13-36 months) (42.9%).

Table 2.
Distribution of Children Under 5 Years of Age Development Interpretation (n=91)

Interpretation of Development	Child Under 5 Years Old					
	Infants (0-12 month)		Toddler (13-36 month)		Pre-School (37-72 month)	
	f	%	f	%	f	%
Development according to age	1	4.8	24	61.5	28	90.3
Doubtful	8	38.1	11	28.2	3	9.7
There was a possibility of deviation	12	57.1	4	10.3	0	0.0

Table 2 shows that the development interpretation of children under 5 years of age in landfill sites was developed according to age (90.3%) at pre-school, doubtful (38.1%), and there was a possibility of deviation (57.1%) at infants.

Table 3.
Distribution of Environmental Sanitation in Landfill Sites (n=91)

Variable	Number of respondents	
	f	%
Source of drinking water		
Borehole/pumps	25	27.5
Protected well	5	5.5
Mineral/packaged water	11	12.1
Regional water company	50	54.9
Waste disposal facilities (waste bins)		
Not available	2	2.2
Available, not watertight and not covered	4	4.4
Available, watertight and uncovered	47	51.6
Available, watertight and covered	38	41.8
Means of disposing of human excreta		
Septic tank	91	100.0
Sewerage facilities		
Not available, so it stagnates irregularly in the yard	45	49.5
Available, drained into open sewers	24	26.4
Available, infiltrated and does not pollute water sources (distance to well water >10m)	22	24.2

Table 3 shows that the environmental sanitation conditions in the landfill sites consisted of drinking water sources from boreholes/pumps (27.5%), available, watertight, and uncovered waste bins (51.6%), use of septic tank (100%); and no sewerage available (49.5%).

Tabel 4.
Cross-tabulation of Children Under 5 Years of Age Development Interpretation with Environmental Sanitation (n= 91)

Variable	Children Under 5 Years of Age Development Interpretation					
	Development according to age		Doubtful		There was a possibility of deviation	
	f	%	f	%	f	%
Sources of drinking water						
Borehole/pumps	15	60.0	8	32.0	2	8.0
Protected well	2	40.0	1	20.0	2	40.0
Mineral/packaged water	6	54.5	3	27.3	2	18.2
Regional water company	30	60.0	10	20.0	10	20.0
Waste disposal facilities (waste bins)						
Not available	2	3.8	0	0.0	0	0.0
Available, not watertight and not covered	1	1.9	3	13.6	0	0.0
Available, watertight and uncovered	30	56.6	7	31.8	10	62.5
Available, watertight and covered	20	37.7	12	54.5	6	37.5
Means of disposing of human feces						
Septic tank	53	58.2	22	24.2	16	17.6
Sewerage facilities						
Not available, so it stagnates irregularly in the yard	28	52.8	13	59.1	4	25.0
Available, drained into open sewers	13	24.5	6	27.3	5	31.3
Available, infiltrated and does not pollute water sources (distance to well water >10m)	12	22.6	3	13.6	7	31.8

Table 4 shows that the development interpretation of children under 5 years of age was favorable towards regional water company drinking water source (60.0%), doubtful towards unavailability of sewerage facilities (59.1%), there was a possibility of deviation towards available, watertight and uncovered waste bins (62.5%) and use of septic tank (24.2%).

DISCUSSION

This study shows that most children were under 5 years of age with the interpretation of development there was a possibility of deviation at infant age (0−12 months). Based on the (Indonesian Ministry of Health, 2022) infants age often have developmental problems, namely gross motor skills that can be detected early, by referring to red flags such as children not being able to hold their heads stably at the age of 3−5 months, not being able to roll over, crawl, stand at the age of 6−8 months, not being able to sit and walk alone at the age of 9−11 months. In addition, children who are found to be at risk of motor development disorders should be referred before 6 months for physiotherapy as soon as the motor skills disorder is confirmed, this is due to research (Rambe et al., 2020) that motor skills very interesting to note because the changes are visible, namely this process starts from newborns who cannot do anything to become perfect adult humans. So that development problems that have the potential to arise must be anticipated immediately by paying attention to internal factors including race /ethnicity, family, age, gender, and genetics as well, the external factors include prenatal, childbirth, and postnatal phases included physical, chemical environment, care, especially in the landfill sites.

Environment factors were one of the factors of development deviations in children under 5 years of age, motivated by public ignorance about the process of growth and development in children. The results of interviews with parents of children under 5 years of age said that they did not get enough information from health workers and working parents did not have much time to take care of children under 5 years of age such as bringing them to the integrated

service post and providing stimulation according to the child's age. This is in line with research conducted by (Dhas et al., 2022) which states that parents' beliefs, experiences, occupations, and socio-economics have a role in children's play opportunities so that they have an impact on child development. This is in line with a longitudinal study of 900 European American children from the (National Institute of Child Health And Human Development (NICHD), 2020), which showed that the quality of care for children decreased in mothers who worked 30 hours or more per week. In addition, this study found that fine motor skills were the highest sector that experienced development deviations (55%), one of which was due to lack of stimulation, this is in line with research conducted (Ginting, 2022) that of children under 5 years of age who lack stimulation can experienced development deviations and even persistent disorders and also in line with a study from the (National Longitudinal Survey of Youth (NLSY), 2019) that negative results on cognitive and behavioral aspects of children aged 3−8 years were obtained by children whose mothers worked full-time during the first year after birth compared to children whose mothers worked part-time or did not work at all during the first year. Therefore, stimulation should be done in four sectors namely gross motor skills, fine motor skills, speech, and language, as well as socialization and independence.

This study also showed development according to age interpretation of children under 5 years of age in families with regional water company drinking water sources, available, watertight, and uncovered waste bins, the use of septic tanks, and the unavailability of sewerage. Regional water company drinking water sources are engaged in providing clean water to the distribution process to the general public for daily needs because regional water company has neutral water with water acidity of 6.5 to 8 (Indonesian Legal Subdivision of Audit Board, 2019). The regional water company has gone through a standardization test so that the water is suitable for consumption, this refers to Minister of Health regulations No.2 of 2023 (Yudha, 2020). (WHO, 2021) and (UNICEF, 2021) has released data related to clean water and child health which shows that more than 150 thousand children die each year due to diarrhea and poor sanitation. This is in line with research conducted by (Darvesh et al., 2017) that the provision of good quality water sources, sanitation, and adequate hygiene practices are essential for child survival and development. So parents need to pay attention to the provision of water to be consumed to prevent children from developing disorders.

In addition, houses in the landfill sites used plastic bins or sacks. However, some respondents use basket bins with open conditions. This is not by the requirements of Minister of Health regulations No. 2 of 2023 that waste management facilities must be watertight and closed. Uncovered trash cans have the potential to breed vectors such as flies, rats, and cockroaches and emit gas emissions, one of which is lead metal, which has health effects such as causing the following disorders neurological disorders (nervous system), disorders of the reproductive system in the form of miscarriages, causing disability in infants, disorders of the nervous system, especially in children, which can reduce intelligence in children (Indonesian Ministry of Health, 2022). Water, sanitation, and hygiene (WASH) interventions can impact early childhood education through several interrelated pathways: poor sanitation has been linked to lower child cognition and school performance, WASH can modulate gut microbiota composition and function, thereby influencing brain development through the gut-brain-microbiota axis (Mellisa et al., 2019). EED is a disorder of the small intestine that is virtually ubiquitous among people living in conditions of poor sanitation and hygiene. EED disorders arising from ineffective WASH implementation are accompanied by systemic inflammation, which can directly impair neurodevelopment in children (Butta et al., 2017).

Another finding was that all parents and children under 5 years of age were using septic tanks. Research by (Atmore et al., 2018) showed that communities without septic tank toilets have a negative impact on child development and the spread of infectious diseases in Africa. This study of a septic tank that has been equipped with feces and water collection units to prevent rodents from entering. Pit latrines or direct feces disposal sites have a seven times greater risk of intestinal parasite infection compared to septic tanks. Repeated intestinal parasite infections limit the absorption of nutrients and calories, resulting in malnutrition (Shrestha et al., 2020). Children living in households with healthy and clean septic tanks are less likely to experience health problems. Therefore, every family needs to have a toilet to maintain the health of their family. In addition, the presence of sewerage is a form of wastewater management. Wastewater can be a vector of disease, a place where disease seeds live, and can pollute groundwater (Yudha, 2018); (Indonesian Ministry of Health, 2022). The process of poor wastewater management has a relationship with the problem in children which has an impact on development disorders. This is in line with research conducted by (Shields et al., 2015) shows that poor sewerage systems influence children's development to achieve their well-being. A poor environment allows the occurrence of various types of diseases such as diarrhea, worms, and digestive tract infections. One of the causes of diarrhea diseases is improper management both at home and in health facilities. Waste disposal, solid waste and liquid wastes, from households must be properly processed so as not to pollute the soil surface and water sources (Indonesian Minister of Health Regulations, 2023). This is supported by research conducted by (Dhas et al., 2022) that there is a relationship between the presence of Sewerage facilities and impaired motor skills development in children.

CONCLUSION

The parents who use borehole/pump water sources, trash bins that are not watertight and uncovered, and no sewerage in the landfill sites where parents live, have the results of the interpretation of children under 5 years of age development is doubtful and there is a possibility of deviation. Therefore, the importance of the role of nurses in providing education and early stimulation of children under 5 years of age development by involving parents, optimizing the uses of the Developmental Pre-Screening Questionnaire at health centers, and integrated service post, education, and management of a conducive physical environment to support the development and handling of children under 5 years of age who experience delays.

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