

Systematic Literature Review: Analysis Implementation of Water, Sanitation, and Hygiene (WASH) Programs in Elementary Schools

Indes Maharani Handayani^{✉1}, and Nana Supriatna².

^{1,2,3} Sekolah Pascasarjana, Universitas Pendidikan Indonesia, Bandung, Indonesia

✉ indes.maharani@upi.edu

Abstract. The problem of human concern for the environment is a problem in life. To support the goals of the Sustainable Development Goals SDGs launched by the UN at points 4 and 6 regarding quality education to ensure equality and quality of inclusive education to increase sustainable learning opportunities for all humans, as well as at goal point 6, namely regarding adequate water and sanitation. Worthy, through education, it is hoped that it can improve the quality of human life, including human knowledge regarding the environment. Development programs for the SDGs goals implemented in elementary school level education units are Water, Sanitation, and Hygiene (WASH). The importance of monitoring and evaluating Water, Sanitation, and Hygiene (WASH) implementation activities in elementary schools to achieve the goals of the SDGs. This article aims to determine the extent of Water, Sanitation, and Hygiene (WASH) implementation in elementary schools. The research method uses literature studies from researchers through several related research journals. According to several research sources, the Water, Sanitation, and Hygiene (WASH) program in elementary schools has played an essential role in dealing with hygiene problems and health behavior among students. Still, monitoring and ongoing evaluation from program stakeholders are needed to optimize the Water, Sanitation, and Hygiene (WASH) program in schools to achieve the SDGs goals.

Keywords: Water, Sanitation, and Hygiene (WASH), Elementary School, student, health,

How to Cite: Handayani, M,I., & Supriatna, N. (2024). Systematic Literature Review: Analysis Implementation of Water, Sanitation, and Hygiene (WASH) Programs in Elementary Schools. *Proceeding The 6th International Conference on Elementary Education, 6(1)*, 206-214.

INTRODUCTION

The article's topic comes from several scientific findings regarding implementing programs launched by the United Nations (UN) to end poverty, protect Earth's planet, and ensure humans live decently by 2030. Countries that are members of the UN launched a program, namely Sustainable Development Goals (SDGs), which has 17 goals and 169 achievement indicators that influence each other (Kementerian PPN/ Bappenas, 2017). The goals of the SDGs program are related to points 4 and 6, including goal 4, namely regarding quality education to ensure equality and quality of inclusive education to increase sustainable learning opportunities for all humans, and goal point 6, regarding adequate water and sanitation. Implementation in the scope of education as the goal of the SDGs in Indonesia is being developed through the Water, Sanitation, and Hygiene (WASH) program supported by the government, Non-Governmental Organizations (NGOs), and other institutions.

Educational institutions, especially schools, are targets of the Water, Sanitation, and Hygiene (WASH) program targets. Access to the Water, Sanitation, and Hygiene (WASH) program in educational units, including schools, can be divided into three levels: (1) No Access, (2) Limited Service, and (3) Basic Service (Kremere et al., 2019).

Globally, in 2018, the fulfillment of SDGs indicators regarding the Water, Sanitation, and Hygiene (WASH) program at the school level nationally is gradually improving. However, acceleration still needs to be achieved by 2030. Countries with access to water in schools nationally experienced an increase from primary water access of 92 to 133. Not all countries include an increase in data on water access separately between rural areas or urban areas but can estimate that water access data in rural areas increased three times from primary water access from 9 to 30 and in urban areas increased two times multiplied by the fact that access to essential

water was originally 12 to 22. Access to basic sanitation has also increased from 101 countries to 123 countries, representing 60% of the global school-age population. In rural areas, access to basic sanitation was initially 37% to 54%, while in urban areas, it experienced a decline. Between 2018 and 2022, the number of countries with access to basic sanitation will triple from 5 to 16, but this data only represents 7% of the relevant school-age population. From 2018 to 2020, the number of countries that have access to basic hygiene has increased from 81 to 121, which explains that population coverage has experienced a slight increase, namely 50% to 50%, from several countries that have reported data on access to hygiene in their countries stating that in rural areas there has been an increase which is faster, namely from 13 to 29 compared to urban areas where initially it was only 16 to 21 (WHO/UNICEF, 2022).

Through the Directorate General of Early Childhood Education, Primary and Secondary Education in the Indonesian government at the Ministry of Education and Culture and the Center for Data and Information Technology, the School Sanitation Profile was designed, which UNICEF Indonesia, GIZ FIT for School, and SNV Indonesia. The latest national data regarding access to Water, Sanitation, and Hygiene (WASH) in Indonesia at the Primary Education level in 2020 shows that one in five Primary School Education units do not have adequate water facilities, access to facilities for Primary School education in rural areas (74%) lower than in urban areas (91%), Yogyakarta Special Region province has the highest primary access data for drinking water facilities while Papua province has the most insufficient direct access to drinking water facilities. Furthermore, the data regarding access to sanitation at the elementary school level in Indonesia, six out of ten elementary school education units do not have access to proper sanitation, the same as access to water sanitation, access to sanitation at the elementary school level in rural areas is lower (34%) than in urban areas. (56%), Yogyakarta Special Region province still has the highest access to basic sanitation facilities, while the lowest access to basic sanitation facilities is in West Sulawesi province. Regarding the fact of access to hygiene at the elementary school level in Indonesia, it is a fact that one in two elementary schools does not have access to ideal hand washing facilities such as running water and soap, elementary schools in urban areas have access to basic hygiene facilities that are higher (70%) than in rural areas (49%), the province of Yogyakarta Special Region has the most elevated primary access to hygiene facilities, and Papua province has the lowest direct access to hygiene facilities. Access to adequate water facilities in West Java province at the elementary school education level has access to basic water facilities (86%), which still needs to be higher than in Yogyakarta Special Region province, which has access to basic water facilities (92%). In comparison, access to sanitation in West Java province is low (42%) compared to Yogyakarta Special Region province, which has access to basic facilities (74%). Hygiene facilities in Primary School Education units in West Java province have basic access (52%), which is also still low compared to Special Region province Yogyakarta with access to basic hygiene sanitation (88%) (Direktorat Jenderal Pendidikan Anak Usia Dini, Pendidikan Dasar dan Pendidikan Menengah et al., 2020). From the data presented, it is essential to continue monitoring the process and evaluate the program's progress in achieving the SDGs targets regarding access to water sanitation, sanitation, and hygiene in schools.

METHOD

The research method used in this research is qualitative with an SLR Systematic literature research design. Researchers study various sources or library materials to gain comprehensive general knowledge (insight) related to problems through library research library materials, which aim to solve problems based on in-depth critical studies of relevant library sources (Ahyar et al., 2020). The aim of using this method is to examine the findings based on relevant authorities, Google Scholar scientific journals published in the period 2013 to 2023, to then be analyzed as a whole and in-depth regarding the topic of discussion of the implementation of the Water, Sanitation, and Hygiene (WASH) program in Elementary School. The steps for collecting data analysis sources are as follows:

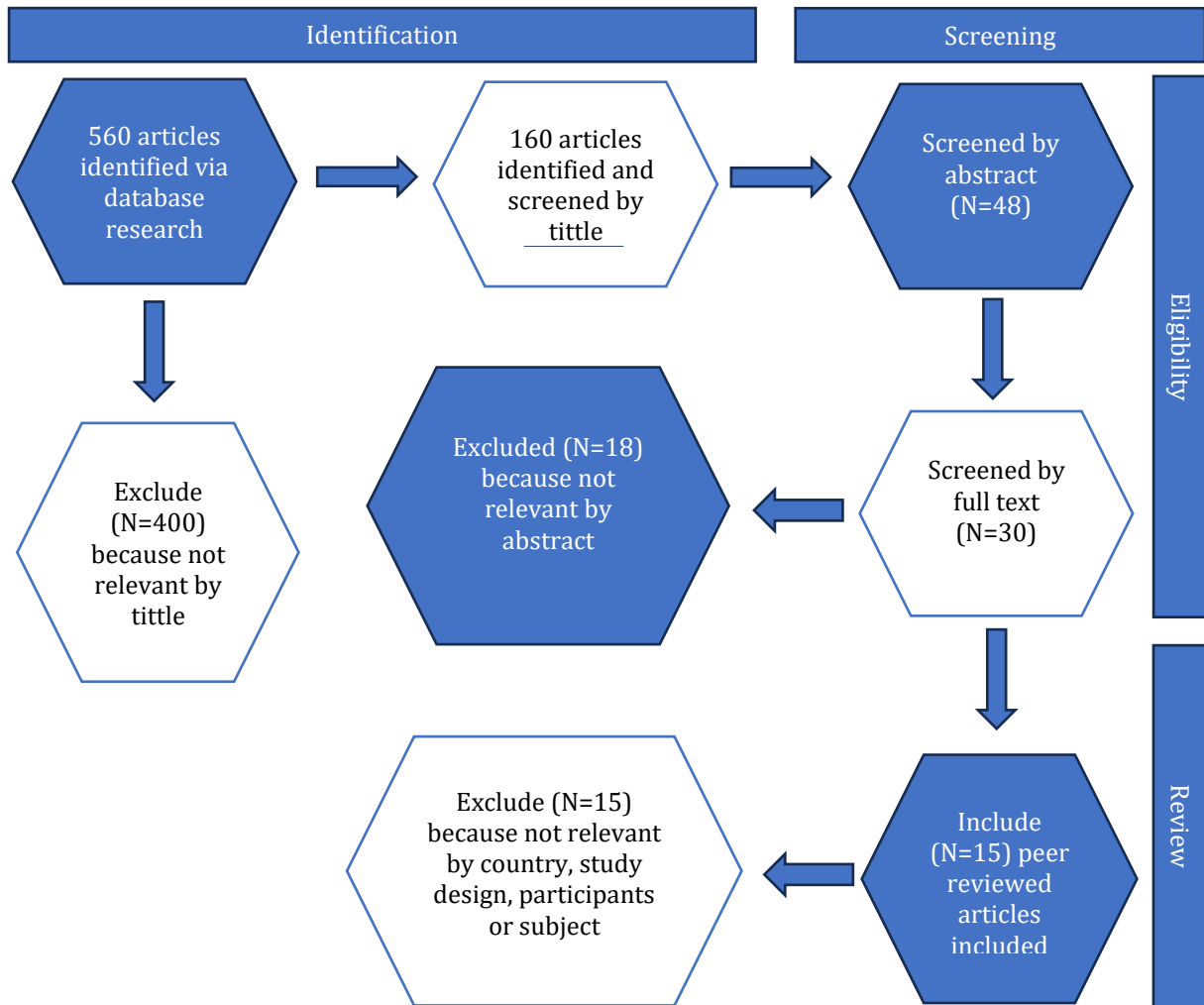


Figure 1. PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Diagram

RESULTS

The problem of low awareness of the environment arises in various aspects of life. Humans in the ecosystem have an essential role in life. The essence of humans as caliphs on earth is assigned to manage nature well in the context of the welfare of humanity because the world was created by God for humans themselves (Chairul, 2014). Somebody must address the fundamental problems faced today regarding environmental and natural issues through positive things for human survival. A program designed by the UN regarding the achievement of sustainable development or Sustainable Development Goals (SDGs) contains the expected goals of the program, including goal 4, namely regarding quality education to ensure equality and quality of inclusive education to increase sustainable learning opportunities for all. Humans, as well as goal point 6, regarding adequate water and sanitation.

The initial history of the emergence of the term Water, Sanitation, and Hygiene (WASH) began with a significant concern in the International Development agenda in the 1980s. Relevant institutions understanding water, sanitation, and hygiene use this to frame the relationship between water access, sanitation, and hygiene in one scope. In the early 2000s, the terms Water, Sanitation, and Hygiene began to be abbreviated (WASH). In WASH, water is defined as availability for personal and domestic needs. The term sanitation refers to services or facilities for the disposal of human waste, and the term hygiene relates to concerns regarding access to washing hands using soap (Kremere et al., 2019).

The Indonesian government is committed to achieving Sustainable Development Goal (SDGs) 4, including involving students in schools by providing access to essential water, sanitation, and hygiene (WASH) facilities and practices in schools. It had to reduce the risk of transmission of STH infections, COVID-19, and diarrhea. Additionally, WASH in Schools increases school participation and promotes gender equality. It also provides opportunities for students to participate actively as agents of change in their environment (Direktorat Jenderal Pendidikan Anak Usia Dini, Pendidikan Dasar dan Pendidikan Menengah et al., 2020). Supporting factors for the goals of the SDGs program emphasize equality and make the WASH program an integral part of ensuring all students in schools have access to a safe learning environment.

The two SDGs program objectives intersect and are implemented as a Water, Sanitation, and Hygiene (WASH) program held in educational institutions. It is essential to continue to monitor the process and evaluate program progress in achieving SDG targets regarding access to water sanitation, access to sanitation, and access to hygiene in schools. Good WASH facilities and implementation will trigger clean living behavior in students. For example, using good toilets, washing hands with soap, and good water collection are small actions that can influence students' survival. Guidelines for the ideal design of WASH facilities in schools for elementary school children aged 8-11 years include schools must provide practical facilities between theory and practice of hygiene that are easy for students to understand, available facilities must integrate the provision of adequate water, hand washing facilities, and soap, as well as cleaning tools for vital organs and disposal as well as privacy services according to the student's gender (UNICEF, 2012).

Before implementing Water, Sanitation, and Hygiene (WASH) practices in schools, we must prepare several supporting aspects in achieving the determined indicators. One is the financing aspect to fulfill WASH facilities in ideal schools. (McGinnis et al., 2017) have special attention regarding how funding for WASH programs in schools is determined. His research needed more information regarding choosing WASH financing and other supporting programs such as hygiene education, monitoring, evaluation, training, and learning curriculum development. The three financing mechanisms identified include government and public funding, private and donor financing, and user fees. However, this mechanism still needs improvement because it adapted to each country's WASH provision needs, including considerations when designing budgets for WASH in schools. This consideration is based on overcoming gaps, community involvement in hygiene education, effective monitoring and evaluation, integrating program management strategies, and appropriate financing planning. There is a need for extensive technical information regarding implementing WASH programs in the future, especially in the school environment.

Without support from parties in school institutions in managing the Water, Sanitation and Hygiene (WASH) program, the goals of WASH will not be optimal. Research from (Budiono & Purba, 2020) raised research regarding the importance of teachers as a driving factor for WASH access in schools. Budiono researched the quality of elementary school teachers in 501 districts/cities throughout Indonesia. The research results show that the role of teachers in elementary schools in access to clean water has a significant effect on regional gross domestic product as support for local economic prosperity in every district/city in Indonesia. Elementary school teachers are human resources who can directly drive environmental learning by being role models for their students. The vital role of elementary school teachers is the key to improving the economy and eradicating poverty in Indonesia. Therefore, the government's focus is to improve the quality of elementary school teachers to improve the education system in Indonesia.

Through observations, researchers identified one piece of research relevant to how the Water, Sanitation, and Hygiene (WASH) program intervenes in students' health. According to the results of research (Duijster et al., 2017) which evaluated the impact of the Fit for School program on the health of students, there were 1,847 children (average age 6.7 years, between 6.0-8.0 years) who participated in the baseline survey. Of this number, 1,499 children were willing to continue participating in the research. Research conducted over two years in Cambodia with 478 children, Indonesia with 486 children, and Laos with 535 children found that the contribution of tooth brushing interventions to students was significant in preventing dental caries in children. This research describes real-life implementation to evaluate the combination of WASH programs intervening in students' health. Duijster can interpret that this has experienced many challenges

due to obstacles regarding the quality of program implementation and field conditions beyond the control of researchers, for example, interference from other related parties. The study results show that health interventions can be carried out with simple activities such as brushing teeth with toothpaste, washing hands with soap, and regularly taking deworming medicine. Full school support is needed through quality implementation so that students get the full benefits. Apart from school institutions, consent from other institutions concerned with WASH programs in schools is required to increase school numbers and school quality, governance, and funding for health in the school environment through WASH programs to achieve safe education for students. There is a need for regular evaluation of the implementation of WASH programs in schools through education management and information systems or other evaluation tools. School education unit institutions are considered adequate for implementing clean living behavior toward students. With the existence of a WASH program implementation program in schools for students' health, it's hoped that schools will be able to manage, monitor, and finance the program consistently per the government's issues and technical instructions to achieve SDG targets.

According to a research study conducted by (Joshi & Amadi, 2013), which examined the health impact of implementing the Water, Sanitation, and Hygiene (WASH) program in schools in reducing student absenteeism and the prevalence of diarrheal infections in the short-term, was explained that among WASH practices in schools and the health of students have not found empirically corroborating research. However, it is essential to have access to clean water, proper hand washing facilities with soap, and clean living education because this will significantly impact the quality of life and continuity of students' learning. Therefore, an in-depth study of how WASH programs affect students' health.

Next is another research source that raises similar issues (Karon et al., 2017), carried out in schools in three districts that implement Water, Sanitation, and Hygiene (WASH) in schools, one of which is an area in eastern Indonesia with more challenges in the process of implementing the WASH program in schools in Takalar Regency, South Sulawesi province, South Central Timor in East Nusa Tenggara province, and Jayapura, Papua province. The results of this research show that the implementation of the WASH program in schools in the three areas has yet to implement the WASH program in schools. Of the selected schools, three schools in the Jayapura district implement the WASH program, 12 in the Takalar District, and eight in the South Central Timor district. How can schools implementing WASH have greater access to WASH infrastructure than schools that have or have never implemented WASH programs? The profile of students who have implemented the WASH program in schools also shows better hygiene behavior compared to schools that have not implemented the WASH program; they do not defecate in the open, and the level of concern for hand washing is higher.

Sanitation at home and school has relevance for personal hygiene regarding Soil Transmissible Helminths (STH) infections in children in elementary schools. Based on research conducted by (Damanik & Husodo, 2014) on Palue Island, Sikka Regency, East Nusa Tenggara Province, with a sample of 100 elementary school students from grades I to VI from 8 elementary schools. The findings of the research results show that there is a relationship between environmental sanitation at home and school and the practice of clean living habits towards STH because, in this district, Damanik found that the prevalence of STH students was 78%, which is relatively high due to low access to environmental sanitation at home, namely 84%, in the school environment 79% and poor healthy living habits 96%.

Infection with Soil Transmissible Helminths (STH) or worms is one of the health problems in Indonesia and is included in the group of neglected diseases. In 2018 (Konstantin et al., 2021) conducted research on the correlation analysis between WASH and the transmission of Soil Transmissible Helminths (STH) or worm disease in elementary school students in Aru Islands Regency, including Karangguli State Elementary School with 55 children and SD Wakam State numbered 79 children. The study found that the prevalence of STH infection in students at Karangguli State Elementary School and Wakam State Elementary School was 68.9% because students' intervention towards WASH was lower than students who washed their hands after playing in the dirt and students who did not wash their hands. Hand-washing habits have a lower prevalence of STH infection. Shows that WASH has a significant relationship to STH infection. A

program of taking worm medicine regularly twice a year is implemented, even though STH infections still have a high rate. Therefore, it is hoped that more in-depth guidance regarding WASH interventions in the two schools is expected.

The prevalence of Soil Transmissible Helminths (STH) infection in 138 elementary school students aged 6-13 years or an average of 9 years in Ngis Village, Karangasem, Bali resulted in a prevalence of 10.1% of students infected with STH, 78.6% infected with *Trichuris trichiura*, and 21%.4% experienced mixed infections, this data obtained from finding sources (Arta Suryantari, 2019). The findings regarding the prevalence of STH infection are closely related or significant to factors such as the habit of living a healthy and clean life, for example, not washing hands after defecating, not washing hands after playing on the ground, not wearing footwear, not cutting nails and taking medication. The importance of knowledge and education on healthy and clean living behavior for students to prevent infection, monitoring, and evaluation of the use of WASH programs from related parties is also needed to maximize efforts to prevent STH infections in elementary schools.

In connection with STH or worm disease in children, research conducted in Western Indonesia, namely in North Johar Karo Regency, North Sumatra province, in 2019 by (Agustaria et al., 2019) with a population of students in elementary schools in grade IV, V, and VI found that the prevalence of worms in boys was 51%, poor access to basic sanitation was 38.6%. Poor personal hygiene was 67.5%. Researchers hope that WASH interventions in schools will prevent the transmission of STH disease. The prevalence of STH sufferers in elementary schools in this area is 50%. Students' hygiene has proven to have a relationship with most STH. It was found in this study that students who have low personal hygiene are at risk of contracting worms 6,052 times greater than participants in students who practice good personal hygiene.

(Wanti et al., 2021) researched students at elementary schools in West Amanuban, East Nusa Tenggara, Indonesia, with a random sample of 160 students, and the dependent variable was worm infection on WASH access and the presence of animals and animal drums. Research shows that the risk of worms in elementary school students will increase due to poor access to WASH. At the same time, the company of animals and presence of cages does not significantly impact worms.

The relationship between personal hygiene and the prevalence of STH students in elementary schools is related. (Krismahardi & Metriana, 2023) their research found that hand-washing behavior, use of footwear, and clean nails can increase the risk of worms. Therefore, other prevention efforts are needed by routinely giving worm medicine every six months and providing in-depth education to students and parents regarding personal hygiene education.

Urban from slum areas, one of which is the city of Bandung. (Otsuka et al., 2019). Conducted research on the factors that influence children's health from WASH habits interventions in elementary schools with a sample of 169 students in densely populated areas in Bandung City, Indonesia, which resulted in the majority of children (98.7%) experiencing fecal contamination and girls have a higher prevalence of *Escherichia Coli* than boys. The ability to wash hands correctly, knowledge, and awareness of WASH still need to improve. Correct hand washing technique using soap is the right thing to reduce fecal contamination, so it requires attention from educators and support from the surrounding area to implement education regarding the importance of washing hands with soap based on gender in elementary schools.

Regarding the implementation of clean and healthy living behavior in elementary school students, research (Dyah Safitri, 2020) at SDN Gunungpati District in 34 elementary schools with a sample of 100 class V students showed the results that in schools in this district, there was no specific learning regarding Life Habits. Clean and Healthy (PHBS) is demonstrated by low access to sanitation, knowledge, attitudes, and good deeds. This research suggests that schools can improve environmental learning related to PHBS as a habit.

The world experienced a pandemic during the previous two years; COVID-19 infected almost every human. Education requires efforts to prevent or treat diseases that can infect students through clean and healthy living habits. (Yudhana & Siwiendrayanti, 2022) Observed how WASH facilities were prepared to prevent the transmission of COVID-19 in all elementary schools in Ngaliyan District, Semarang City. Observations were carried out on 36 elementary schools in the Ngaliyan subdistrict, where 100% of elementary schools in the subdistrict had

WASH facilities with 97% clean water requirements, 64% access to sanitation, and 14% met waste disposal requirements, 100% met waste disposal requirements, and 67% met the criteria for waste disposal—requirements for hand washing facilities. The research results show that WASH facilities at the elementary school level in Ngaliyan District are ready to prevent COVID-19. However, improvements are still needed, especially access to waste disposal, toilets, and hand washing facilities.

During the transition period of the COVID-19 pandemic, there is now a general picture of the condition of WASH facilities in elementary schools. Research in Surakarta City conducted by (Ajeng et al., 2023), carried out from February to March 2023 in 10 elementary schools in Surakarta City, shows that 80% of elementary schools facilitate hand washing using soap and are equipped with good drainage. Access to toilet sanitation in most schools is in good condition and meets the requirements, and access to water in schools with clean water sources is 80%. Ajeng can be conclude that ten elementary schools in Surakarta City have met the requirements for good sanitation. However, as in Semarang, optimization is needed in using WASH facilities in schools to increase students' awareness, which will affect the student's health.

The latest research in 2022 was conducted (Unggul et al., 2023) on public and private elementary schools in Indonesia with population data from 514 districts/cities regarding WASH access divided into 2 clusters, 1 cluster covering 418 neighborhoods/cities and cluster 2 surrounding 96 city district. This cluster is divided based on areas with high availability of WASH facilities in Cluster 1 and Cluster 2, which qualify for low availability of WASH facilities. Cluster 2 consists of 66 districts/cities in the eastern province of Indonesia. The research findings show 11 regencies/cities, including Bangka Belitung Islands, Riau, Riau Islands, Lampung, West Sumatra, DI Yogyakarta, and West Java. Central Java, Banten, East Kalimantan, and North Kalimantan are classified as Cluster 1. In contrast, the four provinces that control cluster 2 include West Sulawesi (67% of the site), Central Sulawesi (62% of the site), Papua (83% of the site), and West Papua (67% of the region). There will be different conditions in public and private schools. For example, in Bali and DKI Jakarta, where 100% of districts/cities are included in cluster 1, private schools still need full access to WASH facilities compared to state schools. However, in four provinces, West Sumatra, Riau, West Kalimantan, and East Kalimantan, 100% of private schools have WASH facilities in schools compared to private schools. Meanwhile, cluster 2, which is still dominated by districts/cities in the Eastern Indonesia region, shows that there is still a need for serious attention to the availability of WASH access in elementary schools and to pay attention to this regardless of the type of school, private or public.

DISCUSSION

In the analysis that has been reviewed in depth by researchers of 15 articles that are related to the implementation of the Water, Sanitation, and Hygiene (WASH) program in elementary schools, overall research has been carried out both quantitatively and qualitatively with research methods that support the hypothesis or objectives of the study—supported by an appropriate sample or population, namely elementary schools and students. The researchers examined the effectiveness of implementing WASH programs in elementary schools on students' health. However, there are still many research gaps found in the learning aspects of Clean and Healthy Living Habits (PHBS) through the WASH program, especially regarding the learning process in elementary schools, explicitly in classroom learning plans, which include indicators of student learning achievement harmonized through the curriculum.

CONCLUSION

To achieve the objectives of the Sustainable Development Programs SDGs 4 and 6, the Indonesian government provides full support by organizing and collaborating with institutions interested in developing Water, Sanitation, and Hygiene (WASH) programs, especially in elementary school education units. In implementing this program in schools, the government designed a School Sanitation Profile, which UNICEF Indonesia, GIZ FIT for School, and SNV Indonesia supported. It is essential to continue to monitor the process and evaluate program progress in achieving SDG targets regarding access to water sanitation, access to sanitation, and

access to hygiene, especially in elementary schools. Based on the 15 articles discussed previously, WASH programs held in schools must fulfill aspects that foster Clean and Healthy Living Habits (PHBS) supported by practical facilities and practices, including cleanliness theory and practice that are easy to understand and have meaning for students' lives.

On the other hand, knowledge also needed regarding financing procedures, implementation, and significant contributions from related parties such as teachers/schools to support the optimal performance of WASH programs in schools. According to several studies, the impact of the implementation of WASH programs in schools on health interventions for students in elementary schools has a relatively significant significance compared to schools that have not or did not implement WASH programs in schools at all. During the COVID-19 pandemic that we went through several years ago, the WASH program had a positive impact on reducing and preventing transmission of the COVID-19 virus to students. In implementing the WASH program in schools, ongoing development, monitoring, and evaluation are still needed to distribute the program in elementary school education units in Indonesia.

REFERENCES

- Agustaria, G., Fazidah, A. S., & Nurmaini, N. (2019). *The Relationship of Gender , School Sanitation and Personal Hygiene with Helminthiasis at Juhar Karo Regency in North Sumatera Province , Indonesia*. 7(20), 3497–3500.
- Ahyar, H., Maret, U. S., Andriani, H., Sukmana, D. J., Mada, U. G., Hardani, S.Pd., M. S., Nur Hikmatul Auliya, G. C. B., Helmina Andriani, M. S., Fardani, R. A., Ustiaty, J., Utami, E. F., Sukmana, D. J., & Istiqomah, R. R. (2020). *Buku Metode Penelitian Kualitatif & Kuantitatif* (Issue March).
- Ajeng, B., Istichomah, Y., Astuti, D., & Surakarta, U. M. (2023). *Overview of Environment Sanitation Conditions of Elementary Schools in Surakarta City During the Covid-19 Transition Period*.
- Arta Suryantari, S. A. (2019). Prevalence, Intensity and Risk Factors of Soil Transmitted Helminths Infections Among Elementary School Students in Ngis Village, Karangasem District, Bali. *Indonesian Journal of Tropical and Infectious Disease*, 7(6), 137. <https://doi.org/10.20473/ijtid.v7i6.9952>
- Budiono, S., & Purba, J. T. (2020). *Measurement Availability of Clean Water and Elementary Teachers towards Income of all Districts and Cities in Indonesia*. 1552–1559.
- Chairul, A. (2014). *Chairul Anwar Hakikat Manusia.Pdf* (p. 280).
- Damanik, D. M., & Husodo, A. H. (2014). *Sanitation of House and School , Personal Hygiene and Infection of Soil Transmitted Helminths (STH) among Elementary School Students*. 3(1).
- Direktorat Jenderal Pendidikan Anak Usia Dini, Pendidikan Dasar dan Pendidikan Menengah, K. P. dan K., Pusat Data dan Teknologi Informasi, K. P. dan K., & UNICEF Indonesia, G. dan S. I. (2020). *Profil Sanitasi Sekolah 2020*. In *Profil Sanitasi Sekolah*.
- Duijster, D., Monse, B., Dimaisip-Nabuab, J., Djuharnoko, P., Heinrich-Weltzien, R., Hobdell, M., Kromeyer-Hauschild, K., Kunthearith, Y., Mijares-Majini, M. C., Siegmund, N., Soukhanouvong, P., & Benzian, H. (2017). 'Fit for school' - a school-based water, sanitation and hygiene programme to improve child health: Results from a longitudinal study in Cambodia, Indonesia and Lao PDR. *BMC Public Health*, 17(1), 1–15. <https://doi.org/10.1186/s12889-017-4203-1>
- Dyah Safitri, A. (2020). Analysis of Environmental Sanitation Conditions and Clean and Healthy Living Behavior (Phbs) in Gunungpati Subdistrict Elementary School. *Jurnal EduHealth*, 11(1), 15–25. <https://doi.org/10.54209/jurnaleduhealth.v11i1.77>
- Joshi, A., & Amadi, C. (2013). Impact of water, sanitation, and hygiene interventions on improving health outcomes among school children. *Journal of Environmental and Public Health*, 2013. <https://doi.org/10.1155/2013/984626>
- Karon, A. J., Cronin, A. A., Cronk, R., & Hendrawan, R. (2017). Improving water, sanitation, and hygiene in schools in Indonesia: A cross-sectional assessment on sustaining infrastructural and behavioral interventions. *International Journal of Hygiene and Environmental Health*, 220(3), 539–550. <https://doi.org/10.1016/j.ijheh.2017.02.001>
- Kementerian PPN/ Bappenas. (2017). *Terjemahan Tujuan dan Target Global Tujuan Pembangunan Berkelanjutan (TPB)/Sustainable Development Goals (SDGs)*.

- http://sdgs.bappenas.go.id/wp-content/uploads/2017/09/Buku_Terjemahan_Baku_Tujuan_dan_Target_Global_TPB.pdf
- Konstantin, T., Tantular, I. S., Athiyah, A. F., & Rosyanti, L. (2021). the Correlation Between Water, Sanitation, and Hygiene With Soil-Transmitted Helminths Infection Among Elementary School Children of Aru Islands District, Maluku. *Indonesian Journal of Public Health, 16*(2), 273–284. <https://doi.org/10.20473/ijph.v16i2.2021.273-284>
- Kremere, E., Morgan, E., & Obani, P. (2019). SDG6 - Clean water and sanitation: Balancing the water cycle for sustainable life on earth. *SDG6 - Clean Water and Sanitation: Balancing the Water Cycle for Sustainable Life on Earth*, 1–161. <https://doi.org/10.1108/9781789731033>
- Krismahardi, A., & Metriana. (2023). *THE RELATIONSHIP BETWEEN PERSONAL HYGIENE AND THE INCIDENCE OF HELMINTHIASIS IN ELEMENTARY SCHOOL STUDENTS IN INDONESIA. 9*, 89–100.
- McGinnis, S. M., McKeon, T., Desai, R., Ejelonu, A., Laskowski, S., & Murphy, H. M. (2017). A systematic review: Costing and financing of water, sanitation, and hygiene (WASH) in schools. *International Journal of Environmental Research and Public Health, 14*(4). <https://doi.org/10.3390/ijerph14040442>
- Otsuka, Y., Agestika, L., Harada, H., Sriwuryandari, L., Sintawardani, N., & Yamauchi, T. (2019). Comprehensive assessment of handwashing and faecal contamination among elementary school children in an urban slum of Indonesia. *Tropical Medicine and International Health, 24*(8), 954–961. <https://doi.org/10.1111/tmi.13279>
- Unggul, D. B., Ainy, K. N., & Jannah, R. (2023). Profiling the Inequality of School Water, Sanitation, and Hygiene Facilities Among Indonesian Regions Using Cluster Analysis. *Jurnal Kesehatan Lingkungan, 15*(1), 27–36. <https://doi.org/10.20473/jkl.v15i1.2023.27-36>
- UNICEF. (2012). Water, Sanitation and Hygiene (WASH) in Schools. A companion to the Child Friendly Schools Manual. *Unicef*, 1–51.
- Wanti, W., Paun, R., Irfan, I., Kusmiyati, K., Cahyani, S. L., Shagti, I., & Gunawan, Y. (2021). Environmental Sanitation And Its Correlation With Intestinal Worm Infection In Elementary School Students In West Amanuban District, East Nusa Tenggara, Indonesia. *The 8th International Conference on Public Health, 378–385*.
- WHO/UNICEF. (2022). *Progress on drinkingwater, sanitation and hygiene in schools*. https://data.unicef.org/wp-content/uploads/2022/08/JMP-WASH-in-schools_2022.pdf
- Yudhana, E. F., & Siwiendrayanti, A. (2022). Readiness of Water Sanitation and Hygiene Facilities (WASH) as an Effort to Prevent COVID-19 Transmission in Elementary Schools at Ngaliyan District, Semarang City. *Journal of Public Health for Tropical and Coastal Region, 5*(1), 42–50. <https://doi.org/10.14710/jphtcr.v5i1.13688>