

12-31-2022

Improving Handwashing Behavior of School-Age Children Through a Game-Based Educational Program

Ikbal Fradianto

University of Tanjungpura, Indonesia, ikbal.fradianto@ners.untan.ac.id

Arief Andriyanto

University of Bina Sehat PPNI Mojokerto, Indonesia

See next page for additional authors

Follow this and additional works at: <https://scholarhub.ui.ac.id/ajce>



Part of the [Public Health and Community Nursing Commons](#)

Recommended Citation

Fradianto, Ikbal; Andriyanto, Arief; Akbar, Nur; Yulanda, Nita Arisanti; and Bahtiar, Bahtiar (2022). Improving Handwashing Behavior of School-Age Children Through a Game-Based Educational Program. *ASEAN Journal of Community Engagement*, 6(2), 324-334. Available at: <https://doi.org/10.7454/ajce.v6i2.1138>

Creative Commons License



This work is licensed under a [Creative Commons Attribution-Share Alike 4.0 License](#).

This Case-Based Article is brought to you for free and open access by the Universitas Indonesia at ASEAN Journal of Community Engagement. It has been accepted for inclusion in ASEAN Journal of Community Engagement.

Improving Handwashing Behavior of School-Age Children Through a Game-Based Educational Program

Ikkal Fradianto,^{1*} Arief Andriyanto,² Nur Akbar,³ Nita Arisanti Yulanda,¹ Bahtiar⁴

¹Nursing Department, Medical Faculty, University of Tanjungpura, Pontianak, Indonesia

²Nursing Department, University of Bina Sehat PPNI Mojokerto, Jawa Timur, Indonesia

³Nursing Department, Universitas Indonesia Hospital, Depok, Indonesia

⁴Nursing Department, Medical Faculty, University of Mulawarman, Kalimantan Timur, Indonesia

*Correspondence email: ikkal.fradianto@ners.untan.ac.id

Received: November 27, 2019, Accepted: November 17, 2022

Abstract

Handwashing plays an essential role in overcoming health problems. Washing hands is a straightforward exercise but will not be done if not adequately informed and drilled on it. School-age children are a vulnerable group relative to health problems, but at the same time, is an excellent group to be given appropriate education. Educating school-age children on the importance of washing their hands is critical to improving health behavior. This community-based research aims to increase school-age children's handwashing knowledge, attitudes, and practices using a game-based educational program. As a result, there are improvements in the handwashing behavior of around a hundred children in Curug Village, Cimanggis Depok, Indonesia, after a twelve-month-long program. This suggests that through appropriate approaches for promoting healthy living behavior to the children, such as a game board, the project can be successful and sustainable.

Keywords:

handwashing; school-age children; improving health behavior; game-based education

1. Introduction

School-age children, ranging in age from six to twelve years, in particular elementary school, are a golden age for instilling the values of clean and healthy living behavior (*Perilaku Hidup Bersih dan Sehat* or PHBS). During school age, many changes occur in children, including physical, cognitive, and psychosocial changes (Guo et al., 2018). School-age children have relatively stable soul growth and strong memory, obey all their teacher's commands, and memorize more easily but also forget more easily. They are also less stubborn and accept suggestions and input more easily (Stanhope & Lancaster, 2016). In 2019, there were 25,238,923 elementary school-age children in Indonesia (Pusat Data dan Teknologi Informasi, n.d.). Thus, they are the potential agents of change in promoting PHBS in schools, families, and communities (Arip et al., 2018).

However, health-wise, school-age children often face problems of diarrhea, fever, sinusitis, tonsillitis, dengue, heart failure, and acute respiratory infections (Bieri et al., 2017). They may also face issues concerning injuries, cleanliness, and healthy living behavior, aside from bullying (Stanhope & Lancaster, 2016). In particular, diarrhea has a reasonably high prevalence in Indonesia, having increased from 7% in 2013

to 8% in 2018 (Badan Penelitian dan Pengembangan Kesehatan, 2019). The disease is prevalent in all cities and provinces in Indonesia. In Depok City, one of the cities in West Java Province, diarrhea is one of the top ten diseases leading to outpatient hospital and community health center visits by children in the 5–14 years age group. In 2019, outpatient visits by this age group comprised 3.97% and 3.96% of all hospital and public health center visits, respectively (Dinas Kesehatan Kota Depok, 2019).

To prevent diarrhea, good handwashing is required as a basis of personal hygiene. One of the important aspects of healthy living is correct and adequate handwashing, which is undoubtedly the basis of personal hygiene. Understanding and assessing handwashing habits are basic to improving sanitation, hand hygiene, and water quality (Pati et al., 2018). Previous research related to handwashing with soap, which was evaluated for three months, increased in skills from bad to good (Solehati et al., 2017). Previous studies have shown that educational games—e.g., Snakes and Ladders—were effective in increasing knowledge, attitudes, and handwashing practices in elementary school students in the third, fourth, and fifth grades (Hartati et al., 2021). A similar study found that handwashing practices showed increased knowledge and the best benefits (Yamgai et al., 2022). Handwashing activities will be successful if health workers give full motivation to school-age children.

Health behavior needs to be maintained to be able to protect children from disease. Perceptions, beliefs, and practices related to handwashing behavior need to be considered by health workers to prevent disease (Parveen et al., 2018). The prevention of disease in the community is one of the roles of nurses and imparting a basic understanding of this to individuals, families, groups, or communities, both healthy and sick, becomes a form of professional nursing service that is an integral part of health services (Noor, 2015).

As an integral part of health services, nurses are expected to overcome the existing problems in society. Such problems can be dealt with not only with the technicality of the recovery process or prevention of further complications but most importantly by perceiving and examining the root of the problem. Nurses are expected to approach the community's issues and serve the community by looking at the various sectors and seeing what needs to be done as part of their practice (Alligood, 2017). The current community nursing practice uses a scientific approach consisting of four stages which include assessment, planning, implementation, and evaluation. Nursing interventions must be carried out by nurses, and practiced both independently and in collaboration with other health teams, through cross-program and cross-sectoral means (Nies & McEwen, 2019).

One of the problem-solving processes carried out by nurses is to adopt existing theoretical approaches, such as the community as a partner (Anderson, 2007). The idea positions the understanding of a community as an important aspect to promote health. It refers to the assessment of the community's state and condition in full regarding their specific needs responding to diverse stages of life within the community. The assessment should be conducted based on data, which means the nurses plan the action only after the data of the community is acquired. One of the activities that can be done is to take steps to prevent illness (Anderson & McFarlane, 2007).

This paper believes that the idea of positioning the community as a partner in promoting health can be a relevant basis for the current nursing practice. The researcher employs

this theory to develop community engagement for increasing the knowledge, attitudes, and practices of handwashing, including positioning school-age children as important partners. As the incidence of disease caused by low clean and healthy living behavior in children is relatively high, precautions must be taken. A study shows the effectiveness of age-appropriate educational programs as part of promoting health in a community by improving the knowledge and practice of proper handwashing of children (Suen & Cheung, 2020). The participation and engagement of school-age children are crucial because handwashing behavior is a simple activity, but it requires a process of habituation. Thus, this program strives to enhance children's engagement in implementing clean and healthy behavior within a community.

This program plans preventive steps that allow school-age children to improve their self-confidence so that they can carry out the desired behavior patterns. In this regard, the Health Promotion Model (HPM) can be employed (Alligood, 2017). The self-efficacy aspect of HPM focuses on making children do an activity regularly to promote confidence. There are various methods to develop health promotion among children and one of the best techniques to be used are playing. Playing with children can increase children's motivation to learn and avoid boredom during the learning process. One of the playing media is board games—games that utilize board and cards, such as crossword puzzles, Snakes and Ladders, and Monopoly (Taspinar et al., 2016). The use of a board game is a creative health education strategy to make children understand science and technology material in a fun and attractive way. The game is designed so that the children can easily understand and have the right attitude toward the practice of handwashing. In this way, the children contribute to and are the key persons in the assessment and implementation of the health education program, and evaluation of the board game on handwashing. Arguably, the program runs successfully because of the active participation of the children; hopefully, it will improve the knowledge, attitudes, and handwashing practices among school-age children.

This paper illustrates the community engagement program with school-age children in a village conducted by a group of nurses and analyses the program's success through game board activity. The program seizes the opportunity in promoting health by introducing healthy living behavior to the children within a community. It provides health promotion for school-age children at the elementary level introduced through playing activities. The health aspects include basic personal hygiene information, such as excellent and proper handwashing conduct. The program is conducted by fall within the role of community nurses to improve the health of the community.

2. Methods

The health activity program was conducted from January to March 2020 on school-age children in Curug Village, Cimanggis Depok, Indonesia. This activity program involves 100 children at the elementary school level who join a religious study group after their school time. The children's activities at the religious study group are from Monday to Saturday and take up quite a big part of the children's days. The program aims to improve the knowledge and handwashing practice skills of school-age children, using structured playing with game media. Figure 1 outlines the implementation process.

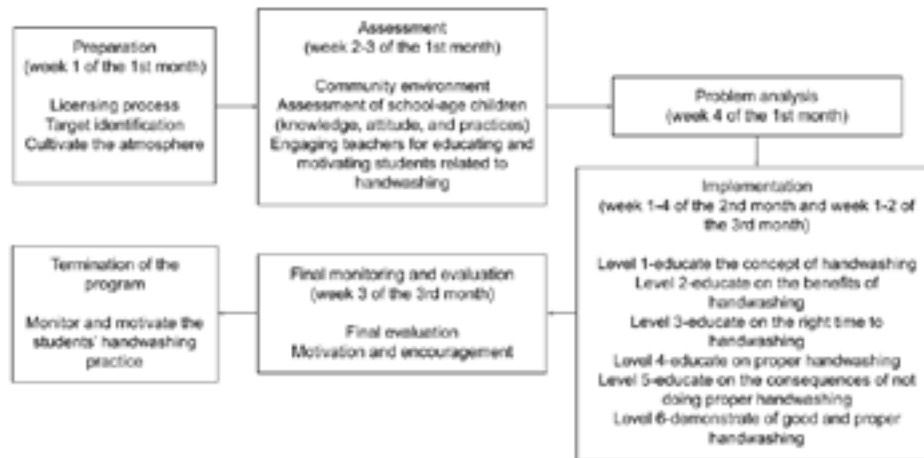


Figure 1. The process of the community engagement program activities in Curug Village, Depok

This program comprises a series of steps, namely (1) preparation, (2) assessment, (3) problem analysis, (4) implementation, (5) monitoring and evaluation, and (6) termination of activities. This whole community engagement program is designed for approximately three months and conducted collaboratively by Universitas Indonesia Hospital in Depok, Bina Sehat PPNI University in Mojokerto, University of Tanjungpura in West Kalimantan, and University of Mulawarman in East Kalimantan. The team is then comprised of nurses from those institutions. The team works closely with the school principals, class teachers, and persons in charge of the school's health unit. The first step is conducted in week one of the first month, the team made the necessary preparations to make the agenda clear and the program ready to run. This step had three parts: 1) acquiring the licensing process from the ethics commission of University of Tanjungpura and approval from the school as an essential part before all the activities could be legally run; 2) identifying a target based on the program's inclusion criteria to select the qualified participant children; 3) cultivating the atmosphere by approaching the community for the social acceptance of the program that will be conducted in their community.

The second step of the activity is an assessment that is held in weeks two and three in the first month. Three things are examined in this stage, namely the community's condition in the location where the program will be run; the children's knowledge, attitudes, and practices on handwashing; the support of the local stakeholders, which in this case the teachers in the study group. The support of the local stakeholders is crucial, as the program expects a similar understanding of the teachers regarding healthy living behavior. The teacher is provided with basic education regarding the program so that they can strengthen the education program and help motivate the students to practice handwashing in the future. After that, the third step occurs in the fourth week to analyze the existing problem within the community so that the team can be prepared with an excellent management strategy.

The fourth step is the part where the program was implemented. This lasted for six weeks for completing six levels of the education process. The six levels of the education process comprise the concept of washing hands, the benefits of washing hands, the right time to wash hands, how to wash hands properly, the impact of not washing hands, and the demonstration of good and proper handwashing. For the fifth step in the program, the conduct of the health education program afterwards is further monitored and evaluated.

The evaluation is conducted during the children's demonstration of doing handwashing program and, at the same time, it becomes a chance to provide motivation and encouragement to the children as the participants. Finally, there comes the termination of the program, where the community engagement team advises the teachers and religious leaders of the community to monitor the students' handwashing practice and continuously keep them motivated.

3. Results and Discussion

To analyze the success of the program, an initial assessment is conducted and set as a basis for the later evaluation. The initial assessment was performed to find out the children's knowledge, attitudes, and practices of handwashing (Figure 2). Based on the initial assessment, 45% of the participant children had good knowledge of handwashing, while 55% had poor knowledge; 23% had a good attitude regarding handwashing, while 77% had a poor attitude; 21% had good handwashing practices, while 79% had poor practices. This suggests a relatively low rate of knowledge, attitude, and skill in handwashing.

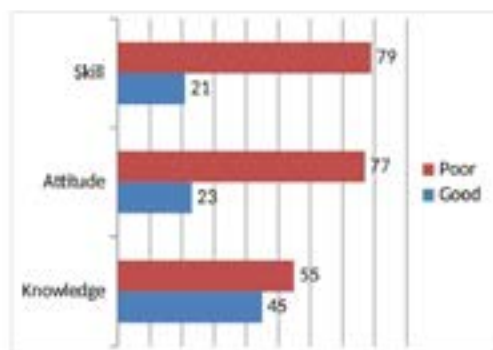


Figure 2. Initial assessment results of handwashing knowledge, attitudes, and practices

In the implementation process, the process of motivational activities ran smoothly by playing. At the beginning of the program, a hundred twenty children were recorded. During the program implementation, it was observable that the children were very happy and enthusiastic about participating from the beginning to the end of the activities. However, twenty participants were excluded for not having completely participated in the play activities, for different reasons, and not because they were bored. Three participants had to go out of town, fifteen had family events, and two got sick.

After observing the children for twelve weeks, the changes in handwashing knowledge, attitudes, and practices were assessed. From Figure 2, it can be seen that after the health education activities, 90% of the children can be considered to have good knowledge of handwashing, while 10% had poor knowledge. Regarding attitude toward handwashing, 88% of the children had a good attitude toward handwashing, while 12% had a poor attitude. Meanwhile, a good handwashing practice can be demonstrated by 85% of the children, while the rest suggest otherwise.

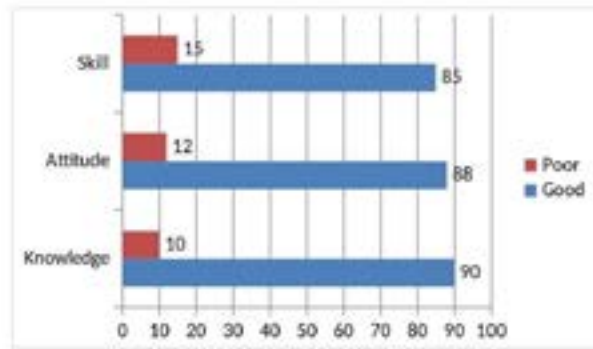


Figure 3. Final assessment results of handwashing knowledge, attitudes, and practices after the program

The program, which lasted for three months, had outstanding results. The results showed an increase in handwashing knowledge, attitudes, and practices among the participant elementary school-age children. This increase is perfect for the community groups' health, starting from the smallest group, namely elementary school-age children who apply good and proper handwashing. Intensive educational intervention on hand hygiene is effective in improving the personal hygiene of children and parents, as was seen from the results of previous studies (Almas et al., 2020; Guo et al., 2018).

Proper handwashing is the basis of personal hygiene for individuals—one of the benefits of handwashing is preventing diarrhea. Washing hands is an important clean and healthy lifestyle behavior. Clean running water will remove the dirt from the hands while cleaning with soap can also kill the bacteria. Such handwashing can also prevent the transmission of diseases and health issues, such as diarrhea, dysentery, cholera, typhoid, worms, skin diseases, acute respiratory infections, and bird flu (UNICEF, n.d). Thus, it is crucial to emphasize the use of clean running water for the children.

On the other hand, if children do not wash their hands with soap and water, it will certainly cause health problems, such as diarrhea and disruption of growth and development. If a clean and healthy lifestyle behavior is not encouraged in school-age children, this could have an impact on the community by way of an increased health burden on the government. Thus, the resolution of issues that occur in school-age children aims at solving not only individual problems but comprehensively solving the problems of families and society (Nies & McEwen, 2019).

Increases in handwashing knowledge, attitudes, and practices after the activities were observed in three aspects—knowledge, attitude, and practices. There is a 45% increase in knowledge aspect (from 45% to 90%), suggesting more children understand proper handwashing behavior than before joining the program. There is also an increase of 65% in the second aspect, showing more children have a better attitude toward handwashing behavior (from 23% to 88%). A 64% increase in the number of children who practice handwashing well is shown as well. This increase occurred because of the game-based approach as part of the educational activities, which is suitable to the nature of elementary school-age children—who like to play games.

The approach of using games in educational programs for school-age children is effective in changing behavior. The games used in these activities were board games. This was

shown in previous research results on changing the knowledge, attitudes, and practices of school-age children in preventing diarrhea problems—with a significance value of <0.05 (Ichwan et al., 2016). Board games have proven to be an excellent approach to modifying attitudes and cognition. Such games can create a passion for curiosity and channel children emotionally and intellectually through a safe place. Board games can also facilitate communication between players, in which the players are required to communicate with each other. The players have to work together to set strategies during the game and follow the game instructions. Games have been used in Indonesia as educational material in health-related topics, with satisfying results in attaining the objectives (Khazaal et al., 2006). Children can learn effectively through creative activities that take into account the child's developmental stage (Suen & Cheung, 2020).



Figure 4. Fun Game Board is played by the children

The approach of using games in educational programs for school-age children is effective in changing behavior. The games used in these activities were board games. This was shown in previous research results on changing the knowledge, attitudes, and practices of school-age children in preventing diarrhea problems—with a significance value of <0.05 (Ichwan et al., 2016). Board games have proven to be an excellent approach to modifying attitudes and cognition. Such games can create a passion for curiosity and channel children emotionally and intellectually through a safe place. Board games can also facilitate communication between players, in which the players are required to communicate with each other. The players have to work together to set strategies during the game and follow the game instructions. Games have been used in Indonesia as educational material in health-related topics, with satisfying results in attaining the objectives (Khazaal et al., 2006). Children can learn effectively through creative activities that take into account the child's developmental stage (Suen & Cheung, 2020).

In this program, board games called Fun Board Games were used. Based on the observation and conversation with the children, the board games have been proven to be good teaching and learning strategies as shown by the increase in knowledge, attitude, and practices of handwashing. Such approaches stimulate school students' interest in the subject matter, enable the acquisition of knowledge and skills and content review,

increase attention, promote interaction between students, and encourage a more intense involvement in the learning process (DeYoung, 2009; Kennedy, 2006). Specifically, dental health trials have been tested for effectiveness by getting worthiness of 86% and 87% in efforts as a medium for health promotion (Himmami et al., 2019). In another study, there was an increase in the practice of washing hands with soap (CTPS) after groups of students were taught the Teams Games Tournament method (Sari et al., 2019).

Furthermore, the program engaged the religious leaders in the community so that they can promote and encourage people to practice healthy behavior. This is aligned with the idea of including influential or distinctive people or groups as an essential tool for the success of health promotion activities (Mason et al., 2011). The specific way of explaining becomes an influential means for promoting health, particularly for underserved populations in low-resource countries (Leurer & Petrucka, 2018). Thus, such approaches support our contention that our program could be effective for behavior change in handwashing in the community.

4. Conclusion

This community engagement project aims to promote healthy living behavior through handwashing practice. This project believes that school-age children are potential agents of change in promoting healthy living behavior in society. To create success in introducing such a lifestyle, the game board are used so that they can still learn while they play. The learning experience becomes effective as shown by the changes shown by the children, comparing before and after the program.

The program takes around twelve weeks and is measured to know the improvement of the children's handwashing behavior. There are three aspects measured before and after the program—knowledge, attitude, and skill or in the demonstrated practice. As a result, there are significant changes in the aspects, namely improvement in knowledge, attitude regarding handwashing, and good practice of handwashing.

Some important aspects of the success of this engagement program can be learned. First is the implementation of a gameboard as part of the educational activities of school-age children. The play approach has proven to be a beneficial factor, not only to introduce the idea of a healthy living behavior but also to reinforce the practice of handwashing. The second aspect would be the involvement of the local religious leaders as influential actors in the community. The involvement would be crucial for the sustainability of the healthy living behavior of the community. These allow further research or similar project of community engagement to study the effectiveness of embedding play or games, including local or traditional games, with children as the intended part of the community. These show that through appropriate approaches for promoting healthy living behavior in the children, such as a game board, the project can be successful and sustainable.

Acknowledgment

The authors would like to thank all institutions University of Tanjungpura, Universitas Indonesia Hospital, University of Bina Sehat PPNI Mojokerto, University of Mulawarman, elementary school, and all participants.

Declaration of Conflicts of Interest

I declare unpublished materials disclosed in the manuscript. These materials must not be used in an editor's research without the express written consent of the author. This manuscript has not been published, accepted for publication, or is under editorial review for publication elsewhere; and my institution representative is fully aware of this submission. All participants of the study gave informed consent for the research, and their anonymity was preserved. I certify that there is no actual or potential conflict of interest concerning this article.

Author Contributions

Ikbal Fradianto contributed in conceptualization and idea, methodology, formal analysis, and original draft preparation. Nur Akbar contributed in conceptualization and idea, investigation, original draft preparation, and project administration. Nita Arisanti Yulanda contributed in conceptualization and idea and original draft preparation. Arief Andriyanto contributed in methodology, review, and editing while Bahtiar contributed in formal analysis, review, and editing.

References

- Alligood, M. R. (2017). *Nursing theory experts and their work*. Elsevier Ltd.
- Almas, S., Kawish, A. B., Butt, T. M., & Akber, S. (2020). Knowledge and practices regarding hand-washing among mothers of children less than five years of age in rural areas of District Sialkot. *Journal of the Pakistan Medical Association*, 71(1-A), 105–109. <https://doi.org/10.47391/JPMA.456>
- Anderson, E. T., & McFarlane, J. (2007). *Buku ajar keperawatan komunitas teori dan praktik* (3rd ed.). EGC.
- Arip, M., Cembun, & Emilyani, D. (2018). Strategy to improve knowledge, attitude, and skill toward clean and healthy life behaviour. *International Journal of Social Sciences and Humanities*, 2(3), 125–135. <https://doi.org/10.29332/ijssh.v2n3.222>
- Badan Penelitian dan Pengembangan Kesehatan. (2019). *Hasil utama riset kesehatan dasar 2018*. Kementerian Kesehatan RI.
- Bieri, F. A., Gray, D. J., Williams, G. M., Raso, G., Li, Y.-S., Yuan, L., He, Y., Li, R. S., Guo, F.-Y., Li, S.-M., & McManus, D. P. (2013). Health-education package to prevent worm infections in Chinese schoolchildren. *New England Journal of Medicine*, 368(17), 1603–1612. <https://doi.org/10.1056/nejmoa1204885>
- DeYoung, S. (2009). *Teaching strategies for nurse educator* (3rd ed.). Prentice Hall.
- Dinas Kesehatan Kota Depok. (2019). *Profil Kesehatan Kota Depok tahun 2018*. <https://diskes.jabarprov.go.id/informasipublik/unduh/UHZBaVc0YkRWcVIDUmhUUz11NFFNQT09>
- Guo, N., Ma, H., Deng, J., Ma, Y., Huang, L., Guo, R., & Zhang, L. (2018). Effect of hand washing and personal hygiene on hand food mouth disease: A community intervention study. *Medicine*, 97(51). <https://doi.org/10.1097/MD.00000000000013144>
- Hartati, Dewi, N. P., Sumarni, Fadlilah, S., Lestiawati, E., Harmili, & Praman, C. (2021). Education games effective to improve knowledge, attitudes, and handwashing practices in school-age children. *Annals of Tropical Medicine & Public Health*, 25(4), 12029–12038.
- Himmami, Y., Adi, S., & Ratih, S. P. (2019). Pengembangan permainan papan (board game) edukatif sebagai media promosi kesehatan gigi dan mulut pada anak

- usia sekolah. *Sport Science and Health*, 1(2), 164–175. <http://journal2.um.ac.id/index.php/jfik/article/view/10638/4811>
- Ichwan, M., Yuniar, N., & Erawan, P. E. (2016). Efektifitas metode permainan edukatif Papeda terhadap peningkatan pengetahuan, sikap, dan tindakan untuk pencegahan kejadian diare pada murid Kelas V SDN 14 Poasia di Kecamatan Poasia Kota Kendari Tahun 2016. *Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat Unsyiah*, 1(3), 183746.
- Kennedy, L. (2006). PD trivia: Making learning fun. *CANNT Journal*, 16(3), 46–48. <https://pubmed.ncbi.nlm.nih.gov/17061697/>
- Khazaal, Y., Favrod, J., Libbrecht, J., Finot, S. C., Azoulay, S., Benzakin, L., Oury-Delamotte, M., Follack, C., & Pomini, V. (2006). A card game for the treatment of delusional ideas: A naturalistic pilot trial. *BMC Psychiatry*, 6(48). <https://doi.org/10.1186/1471-244X-6-48>
- Leurer, M. D., & Petrucka, P. (2018). Perspectives on issues, challenges, and preferred futures for maternal, newborn, and child health in Arusha and Ngorongoro, Tanzania. *Community Development*, 49(2), 231–246. <https://doi.org/10.1080/15575330.2018.1434553>
- Mason, M., Welch, S. B., Becker, A., Block, D. R., Gomez, L., Hernandez, A., & Suarez-Balcazar, Y. (2011). Ciclovià in Chicago: A strategy for community development to improve public health. *Community Development*, 42(2), 221–239. <https://doi.org/10.1080/15575330.2011.558203>
- Nies, M. A., & McEwen, M. (2019). *Keperawatan kesehatan komunitas dan keluarga*. (J. Sahar, A. Setiawan, & N. M. Riasmini, Eds.). Elsevier.
- Noor, N. B. (2015). Effect of professional nursing practice model application to nurses work performance at inpatient unit of Jenepono Hospital, Indonesia. *International Journal of Sciences: Basic and Applied Research*, 24(4), 53–64.
- Parveen, S., Nasreen, S., Allen, J. V., Kamm, K. B., Khan, S., Akter, S., Lopa, T. M., Zaman, K., El Arifeen, S., Luby, S. P., & Ram, P. K. (2018). Barriers to and motivators of handwashing behavior among mothers of neonates in rural Bangladesh. *BMC Public Health*, 18(1). <https://doi.org/10.1186/s12889-018-5365-1>
- Pati, S., Kadam, S. S., & Chauhan, A. S. (2018). Hand hygiene behavior among urban slum children and their care takers in Odisha, India. *Journal of Preventive Medicine and Hygiene*, 55(2), 65–68. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4718329/>
- Pusat Data dan Teknologi Informasi. (n.d.). Statistik pendidikan. <https://statistik.data.kemdikbud.go.id/>
- Sari, D. M., Baddrah, S., & Satriana, M. (2019). Teams games tournament method in improving knowledge, attitude, and handwashing with soap practice on 3Th grade elementary school students. *Proceedings of the Educational Sciences International Conference (ESIC 2018)*, 224, 20–27. <https://doi.org/10.2991/esic-18.2019.6>
- Solehati, T., Eli Kosasih, C., Susilawati, S., Lukman, M., & Paryati, S. P. Y. (2017). Effect of school community empowerment model towards handwashing implementation among elementary school students in Dayeuhkolot subdistrict. *Kesmas: National Public Health Journal*, 11(3), 111–116. <https://doi.org/10.21109/kesmas.v11i3.1171>
- Stanhope, M., & Lancaster, J. (2016). *Foundations of nursing in the community: Community-oriented practice*. Mosby.

- Suen, L. K. P., & Cheung, J. P. L. (2020). Effectiveness of “Hand Hygiene Fun Month” for kindergarten children: A pilot quasi-experimental study. *International Journal of Environmental Research and Public Health*, 17(19), 1–15. <https://doi.org/10.3390/ijerph17197264>
- Taspinar, B., Schmidt, W., & Schuhbauer, H. (2016). Gamification in education: A board game approach to knowledge acquisition. *Procedia Computer Science*, 99, 101–116. <https://doi.org/10.1016/j.procs.2016.09.104>
- UNICEF. (n.d.) *Key practice: Hand washing with soap and water*. UNICEF Uganda. <https://www.unicef.org/uganda/key-practice-hand-washing-soap-and-water>
- Yamgai, P. F., Pouokam, G. B., Foudjo, B. U. S., Mazzanti, F., Sando, J. T., Samuel, C., Silapeux, A. G. K., Fokou, E., & Frazzoli, C. (2022). Combined education course on nutrition, hand-washing and dental care in primary schools in Yaoundé, Cameroon. *Journal of Global Health Reports*, 6(e), 1–16. <https://doi.org/10.29392/001c.33812>

Author Biography

Ikbal Fradianto is a lecturer, researcher at the Nursing Department, University of Tanjungpura, Pontianak, Indonesia. He received a master degree in Community health nursing, Universitas Indonesia and is currently assigned in the Department of Community Health Nursing. His interests are in the field of health promotion, disease prevention, empowerment health community, and child health.

Arief Andriyanto is a lecturer, researcher at the Nursing Department, University of Bina Sehat PPNI Mojokerto, Jawa Timur, Indonesia. He received a master degree in Community health nursing, Universitas Indonesia. He works at the Department of Community Health Nursing and he is interested in health in the community, disease prevention, diabetic prevention and control.

Nur Akbar is a nurse at the Universitas Indonesia Hospital. He received a master degree in Community Health Nursing, Universitas Indonesia. His current field placement is manager in health service and he is interested in health in the community, disease prevention and communicable disease.

Bahtiar is a lecturer and a researcher at the Nursing Department, University of Mulawarman, Kalimantan Timur, Indonesia. He received a master degree in Community health nursing, Universitas Indonesia. His current field placement is at the Department of Community Health Nursing and he is interested in health in the community, disease prevention, geriatric in nursing.