



Effectiveness of storytelling and roleplay in improving oral hygiene knowledge and supporting nutritional health among elementary school students: A quasy experimental study

Efektivitas metode storytelling dan roleplay dalam meningkatkan pengetahuan kebersihan gigi serta mendukung kesehatan gizi pada siswa sekolah dasar: Studi kuasi eksperimen

Anses Warman^{1*}, Arnetty², Ika ifitri³, Fadila Rahmat Dinanti⁴, Amiruddin⁵, Renita Eka Zuriant⁶

¹ Department of Dental Nursing, Poltekkes Kemenkes Padang, Indonesia.

E-mail: drg.anseswarman@yahoo.com

² Department of Dental Nursing, Poltekkes Kemenkes Padang, Indonesia.

E-mail: arnetty0724@gmail.com

³ Department of Dental Nursing, Poltekkes Kemenkes Padang, Indonesia.

E-mail: ika_ifitri@yahoo.com

⁴ Department of Dental Nursing, Poltekkes Kemenkes Padang, Indonesia.

E-mail: frahmatdinanti@gmail.com

⁵ Department of Dental Nursing, Poltekkes Kemenkes Aceh, Indonesia.

E-mail: amir_molar@yahoo.co.id

⁶ Members of PDGI Bengkalis Branch, Riau.

E-mail: renitaekazurianti22@gmail.com

*Correspondence Author:

Department of Dental Nursing,
Poltekkes Kemenkes Padang,
Indonesia.

E-mail: drg.anseswarman@yahoo.com

Article History:

Received: June 25, 2025; Revised: July 10,

2025; Accepted: August 13, 2025;

Published: September 8, 2025.

Publisher:



Politeknik Kesehatan Aceh
Kementerian Kesehatan RI

© The Author(s). 2025 **Open Access**

This article has been distributed under the terms of the *License Internasional Creative Commons Attribution 4.0*



Abstract

Poor oral hygiene among school-aged children can compromise food intake and contribute to nutritional problems including stunting, wasting, and underweight. However, few studies have explored active learning methods that integrate oral health education with its nutritional implications. This study evaluated the effectiveness of storytelling and roleplay in improving oral hygiene knowledge and their potential relevance to nutritional health promotion. A true experimental study with a pretest-posttest design on two intervention groups was conducted in December 2024 at State Elementary School 23, Kubang Putih, Agam Regency, West Sumatra. Thirty-six students in grades III and IV were randomly assigned to either the storytelling or roleplay groups. Both groups received one week of structured counseling. Instrument validity and reliability were confirmed through expert review and Cronbach's alpha testing ($\alpha > 0,80$). Paired and independent t-tests were used at the 95% confidence level. Results indicated significant post-intervention knowledge gains in both groups ($p < 0,001$), with the roleplay group achieving a greater mean improvement ($27,8 \pm 1,77$) than the storytelling group ($19,5 \pm 2,60$; $p < 0,001$). Roleplay demonstrated superior effectiveness in enhancing children's oral health literacy, which is essential for supporting school-based malnutrition prevention initiatives such as the School Health Unit (SHU) program and curriculum integration. Longitudinal studies are recommended to examine behavioral changes and their measurable impact on nutritional status.

Keywords: Knowledge, oral hygiene, nutritional health, roleplay, storytelling

Abstrak

Kebersihan gigi yang buruk pada anak usia sekolah dapat mengganggu asupan makanan dan berkontribusi terhadap masalah gizi, termasuk stunting, wasting, dan underweight. Namun, penelitian yang mengintegrasikan edukasi kesehatan gigi dengan implikasi kesehatan gizi melalui metode pembelajaran aktif masih terbatas. Penelitian ini bertujuan mengevaluasi efektivitas metode bercerita (*storytelling*) dan bermain peran (*roleplay*) dalam meningkatkan pengetahuan kebersihan gigi serta relevansinya bagi promosi kesehatan gizi. Penelitian eksperimental murni dengan desain *pretest-posttest* pada dua kelompok intervensi dilakukan pada Desember 2024 di SDN 23 Kubang Putih, Kabupaten Agam, Sumatera Barat. Sebanyak 36 siswa kelas III dan IV dibagi secara acak ke dalam kelompok *storytelling* atau *roleplay*. Kedua kelompok menerima intervensi konseling terstruktur selama satu minggu. Validitas instrumen diuji melalui penilaian pakar dan reliabilitas diuji dengan Cronbach's alpha ($\alpha > 0,80$). Analisis data menggunakan uji *paired t-test* dan *independent t-test* dengan taraf

kepercayaan 95%. Hasil menunjukkan peningkatan signifikan skor pengetahuan pada kedua kelompok setelah intervensi ($p < 0,001$), dengan peningkatan rata-rata lebih tinggi pada kelompok *roleplay* ($27,8 \pm 1,77$) dibandingkan kelompok *storytelling* ($19,5 \pm 2,60$; $p < 0,001$). Metode *roleplay* terbukti lebih efektif dalam meningkatkan literasi kesehatan gigi anak, yang berpotensi mendukung program pencegahan malnutrisi berbasis sekolah, seperti Usaha Kesehatan Sekolah (UKS) dan integrasi ke dalam kurikulum. Penelitian longitudinal disarankan untuk mengkaji perubahan perilaku dan dampaknya terhadap status gizi secara terukur.

Kata Kunci: Kebersihan gigi, kesehatan gizi, pengetahuan, *roleplay*, *storytelling*

Introduction

The nutritional status of school-aged children (6–12 years) is a key determinant of the future quality of human resources. During this phase, children experience rapid growth and therefore require a balanced and high-quality intake of proteins, vitamins, and minerals (Saavedra & Prentice, 2023). However, nutritional issues among school-aged children in Indonesia and other countries remain a serious challenge (Ernawati et al., 2023). A report by UNICEF (2021) shows that more than 95% of school-aged children in Indonesia do not consume enough vegetables and fruits, while approximately 20% are overweight. According to Mosses et al. (2025), this phenomenon reflects the "triple burden of malnutrition," which encompasses undernutrition, overnutrition, and micronutrient deficiencies in children.

Malnutrition in children not only affects physical growth but also affects cognitive development and academic performance and increases the risk of non-communicable diseases in adulthood (WHO, 2021; FAO, 2021). In Indonesia, the 2023 Indonesian Health Survey (IHS) reported a 19.7% prevalence of overweight children aged 5-12 years and 16.2% among those aged 13-15 years. Additionally, 16.3% of children aged 5-14 years suffer from anemia. This situation is compounded by oral health problems, as more than 63.8% of children experience dental caries (BKPK, 2023). Anemia and weight loss are often closely related to poor oral health, as pain and chewing difficulties can reduce the intake of nutritious foods (Haznedaroglu & Polat, 2023; Özel et al., 2024).

Several studies have found a significant relationship between oral health and nutritional status of children. Dental health issues such as toothaches or infections can cause children to avoid fiber-rich nutritious foods such as fruits

and vegetables, further worsening their nutritional status (Mazengia & Biks, 2018; Thwin et al., 2018). This leads to an increased risk of malnutrition owing to reduced appetite, pain while eating, and a decline in quality of life (Yang et al., 2020). Therefore, innovative approaches to health education that simultaneously target both aspects are needed.

Storytelling and roleplay are two promising educational strategies. Storytelling has been shown to improve children's understanding of health by delivering narratives that touch on emotions and stimulate imagination (Mayangsari & Rasmiati, 2020). Meanwhile, roleplay allows children to practice healthy behaviors in simulated situations, enhancing their skills, self-confidence, and positive health attitudes (Putriningtyas et al., 2023). Oral hygiene knowledge should be introduced early as it forms the foundation for clean and healthy living habits (Sihombing & Syafriani, 2023). Children who understand the importance of maintaining oral health are more likely to maintain regular tooth brushing routines, avoid excessive sugary foods, and be aware of the long-term impact of poor habits on their health (Abigayl & Putri, 2024; Siddaiah et al., 2021). When storytelling and roleplay are combined in structured educational activities, children not only cognitively understand the information, but also internalize health values through emotional experiences and active behavior (Abdi et al., 2025; Pulimeno et al., 2020). Although the effectiveness of each method has been extensively researched, no study in Indonesia has directly compared its effectiveness in enhancing oral hygiene knowledge and relevance to children's nutritional health promotion.

Research integrating both approaches is limited in the context of nutritional and oral health education, making it crucial to conduct a more in-depth study. Therefore, the aim of this

study was to compare the effectiveness of storytelling and roleplay methods in improving elementary school students' knowledge of oral hygiene and their implications for promoting nutritional health. The hypothesis of this study is that roleplay will lead to greater knowledge improvement than storytelling.

Methods

Design

This study used a true experimental design with a pre-test–post-test two-intervention group approach. Two intervention groups were compared: Group A (Storytelling Group) received counseling based on picture stories and educational narratives, whereas Group B (Roleplay Group) received counseling based on roleplaying activities related to oral hygiene habits and healthy eating. Both groups underwent pre-test and post-test assessments to evaluate changes in their knowledge about oral hygiene and its relationship to nutritional health.

The study did not involve a control group with no intervention or conventional education, as the primary focus was to compare the effectiveness of two active learning approaches relevant to the implementation of school-based UKS programs. This approach was also chosen to avoid unfair learning conditions for participants who did not receive the intervention, as suggested by educational research ethics (Cohen et al., 2017).

Location, Time, and Procedure

The study was conducted at the State Elementary School 23 Kubang Putiah, Agam District, West Sumatra, in December 2024. The intervention sessions lasted for one week, consisting of three main sessions (each approximately 40 minutes) held on different days.

Before the intervention, a 3-day training was conducted for enumerators to ensure consistency in the delivery of storytelling and roleplay methods, questionnaire completion, and bias mitigation procedures. Four trained enumerators participated in the intervention to ensure uniform treatment.

Population and Sample

The population consisted of all third- and fourth-grade students at State Elementary School 23

Kubang Putiah, who met the following inclusion criteria: (1) active students attending the intervention, (2) no speech or hearing impairments, and (3) written consent from parents/guardians. Thirty-six participants were included in 36 participants. The participants were randomly assigned using a random number generator to ensure even distribution (18 students per group).

Instruments and Validity-Reliability Testing

The instrument used in this study was a closed-ended questionnaire consisting of 20 items measuring knowledge of oral hygiene and its implications on nutritional health. Content validity was assessed through expert judgment, and construct validity was tested using Pearson's product-moment correlation ($r \geq 0,30$, considered valid). Reliability was tested using Cronbach's alpha, which yielded a value of 0,87, indicating high reliability.

Data Collection and Intervention

Data were collected using a specially designed closed-ended questionnaire to measure students' knowledge of oral hygiene and its implications for their nutritional health. Before the intervention, all participants completed a pre-test to assess their initial knowledge level. Group A received counseling using a storytelling method with picture stories and narratives that conveyed messages about the importance of oral health and its connection to nutritious foods. Meanwhile, Group B received counseling using the roleplay method, where students performed scenarios related to maintaining oral hygiene and consuming healthy food.

After all intervention sessions were completed, both groups completed the post-test using the same questionnaire to evaluate knowledge improvements. To ensure consistency and quality, the intervention was supported by four trained enumerators. Training and alignment sessions were conducted for three days before the study began, covering the technical execution of storytelling and roleplay, as well as how to fill out and supervise the questionnaires. The enumerators were also instructed to ensure that all questionnaires were fully completed without any missing sections.

To minimize bias, the interventions for both groups were conducted in separate rooms, with materials delivered at the same duration

and intensity, and enumerators were blinded to the study hypothesis. The data analysis was also blinded to group identity.

Analysis and Statistical Tests

Data analysis was performed to assess the differences in pre- and post-test scores within each group (storytelling and roleplay). To compare the effectiveness of the two intervention methods, paired and independent t-tests were used. The analysis was performed at a 95% confidence level ($\alpha = 0,05$). The results were analyzed for changes in the mean knowledge scores, standard deviations, and p-values to assess statistical significance.

Ethics of Research

This study was approved by the Ethics Committee of Dr. M. Hatta Brain Hospital,

Bukittinggi (number: 002142/KEP). RSOMH BUKITTINGGI/2024) before intervention. All the participants received full information and signed an informed consent form. The study was conducted in accordance with the principles of the Declaration of Helsinki, maintaining data confidentiality and respecting participants' right to withdraw without consequences.

Result and Discussion

Respondent Characteristics

This study involved 36 students from grades III and IV at State Elementary School 23 Kubang Putiah, randomly divided into two intervention groups: the storytelling group (n=18) and the roleplay group (n=18). Participants' characteristics are presented in Table 1.

Table 1. Respondent characteristics by grade, age, and gender

Characteristic	Category	Storytelling Group (n= 18)		Roleplay Group (n= 18)		p-value
		n	%	n	%	
Grade	Grade III	9	50,0	9	50,0	1,000
	Grade IV	9	50,0	9	50,0	
Age	8 years old	1	33,3	2	66,7	0,750
	9 years old	8	57,1	6	42,9	
	10 years old	8	50,0	8	50,0	
	11 years old	1	33,3	2	66,7	
Gender	Male	10	50,0	10	50,0	1,000
	Female	8	50,0	8	50,0	

Chi-Square analysis showed no significant differences between the two groups regarding grade ($p = 1,000$), age ($p = 0,750$), and gender ($p = 0,750$), indicating that the groups were homogeneous at baseline. This homogeneity ensures that the observed differences in post-intervention outcomes are more likely to be due to the educational methods used rather than demographic factors. This is consistent with the findings of Özdemir and Tuna (2023), who emphasized the importance of baseline homogeneity for internal validity in educational intervention studies.

To minimize bias, an equal gender and grade distribution was used to control for social variables that could affect student engagement (Pakpahan et al., 2025; Kenefick & June, 2020). The homogeneous characteristics of the respondents support the use of creative educational methods, such as storytelling and

roleplay, in teaching. This approach creates an ideal context for evaluating the effectiveness of each method, as the findings suggest that factors such as grade, age, and gender did not significantly affect learning outcomes (Cronin-Gilmore & Hammond, 2024). Therefore, innovative teaching approaches can be applied to engage students and improve educational outcomes

Impact and Effectiveness of Storytelling and Roleplay Counseling on Knowledge

A paired T-test analysis (Table 2) of pre- and post-intervention knowledge assessments revealed significant improvements in both intervention groups. The storytelling group's average knowledge score increased from 58.3 to 77,8, with a mean difference of $19,5 \pm 2,60$, and a 95% confidence interval (CI) ranging from 13,4 to 25,6. The p-value obtained was

0,001, indicating that the improvement was statistically significant ($p < 0,05$). The roleplay group showed a larger improvement, with an increase from an average score of

61,1 to 88,9, yielding a mean difference of $27,8 \pm 1,77$ and a 95% CI of 21,0 to 31,6. A p-value $<0,001$ indicated strong statistical significance.

Table 2. Effect of storytelling and roleplay interventions on oral hygiene knowledge and its impact on nutritional health

Intervention Group	Mean	Standard Deviation (SD)	Difference (Mean \pm SD)	CI 95% (Lower - Upper)	p-value
Storytelling					
Before	58,3	5,42	$19,5 \pm 2,60$	13,4 - 25,6	0,001
After	77,8	8,02			
Roleplay					
Before	61,1	5,74	$27,8 \pm 1,77$	21,0 - 31,6	$<0,001$
After	88,9	7,51			

Table 3. Effectiveness of storytelling and roleplay interventions on knowledge score improvement

Intervention Group	n	Difference of Intervention Score (Mean \pm SD)	Difference (Mean \pm SD)	CI 95% (Lower - Upper)	p-value
Storytelling	18	$19,5 \pm 2,60$	$8,3 \pm 0,83$	6,67 - 9,93	$<0,001$
Roleplay	18	$27,8 \pm 1,77$			

Furthermore, based on Table 3, an Independent T-test comparing the effectiveness of storytelling and roleplay showed significant differences between groups. Participants in the roleplay group showed a higher knowledge score improvement ($27,8 \pm 1,77$) compared to the storytelling group ($19,5 \pm 2,60$), with a mean difference of $8,3 \pm 0,83$ (95% CI: 6,67-9,93; $p < 0,001$). This result suggests that roleplay is significantly more effective in improving the participants' knowledge. Narrow confidence intervals indicate that this estimate is precise and reliable.

This finding is consistent with that of Heaton et al. (2018), who demonstrated that active learning methods, such as roleplay, enhance knowledge retention in the context of oral health. Kim et al. (2023) and Jun et al. (2022) also highlighted that interactive educational methods can improve children's motivation and understanding of health in the short to medium term.

Therefore, this study suggests that both storytelling and roleplay are effective in improving students' oral hygiene knowledge. This is in line with research that indicates that roleplay can create significant improvements in student comprehension, as the technique encourages an interactive and enjoyable learning experience (Kusumo, 2021). Although the roleplay group

showed higher average improvements, both methods have substantial potential to be implemented in promoting oral health in elementary schools, which is crucial given the cognitive developmental characteristics of children aged 8-11 years who require engaging learning approaches (Rahayu et al. 2022).

From a learning theory perspective, storytelling utilizes affective and imaginative elements based on constructivism, in which stories containing emotional elements play a role in internalizing the importance of maintaining oral health and nutrition (Shofiyyah et al., 2024). However, roleplay provides practical experiences that support kinesthetic learning, which is crucial for children aged 8-11 years who are more responsive to hands-on experiences (Moradi & He-fang, 2019). Additionally, from a public health perspective, significant improvements in oral hygiene knowledge can positively affect the nutritional health of children. Aboalshamat et al. (2023) noted that dental caries and oral infections reduce appetite and cause chewing difficulties, which in turn can decrease calorie intake and vital micronutrients, such as protein and iron. A meta-analysis by Santoso et al. (2023) revealed a significant relationship between untreated dental caries and children's nutritional status, particularly in developing countries.

Long-term nutritional issues such as stunting, wasting, and underweight result from insufficient intake. WHO notes that these indicators reflect both acute and chronic nutritional conditions that affect children's physical and cognitive development (Ayten & Polater, 2021). Empowering children with knowledge of oral hygiene can serve as an initial step in preventing malnutrition (Puteri & Emini, 2023).

Practical implementation of this intervention is recommended for integration into School Health Unit (SHU) programs and nutrition education communication (NEAC), particularly in areas vulnerable to stunting. Storytelling and roleplay offer engaging and developmentally appropriate methods for schools and health educators to raise awareness and improve oral health literacy (Cuffee et al., 2022).

This study had several limitations. The small sample size and single-site setting limited the generalizability of the findings. A short intervention period restricts the ability to assess the sustainability of behavioral changes (Supady et al., 2023). External factors such as dietary habits, sanitation, and parental involvement, which are important determinants of a child's nutritional status, could not be fully controlled. In addition, reliance on self-administered questionnaires may have introduced recall or social desirability biases. Future research should consider a longitudinal randomized controlled trial (RCT) with a larger sample size and intervention duration of 6–12 months to generate more robust and applicable evidence (Staley & Freeman, 2017).

Conclusion

This study showed that both storytelling and roleplay counseling are effective in improving children's knowledge of oral hygiene, with roleplay providing a more significant improvement. Both methods proved effective, but roleplay resulted in a statistically and practically significant improvement.

It is recommended that activity-based learning methods, especially roleplay, be integrated into the policy and implementation of School Health Unit (SHU) programs and health promotion activities in elementary schools. Implementation can be achieved through

teacher training, provision of interactive learning modules, and strengthening partnerships between health centers and schools. Furthermore, to ensure the sustainability of the program, local governments and schools should establish a regular schedule for roleplay-based education sessions at least once per semester and include them in UKS evaluation indicators.

Further research should be conducted using a longitudinal design to evaluate the long-term impact of this intervention on children's oral hygiene behavior and nutritional status, for example, through follow-up at six months post-intervention. Such studies will provide strong evidence to support the adoption of activity-based health education policies at the national level.

Acknowledgments

The authors would like to express their gratitude to the Director of Politeknik Kesehatan Kemenkes Padang and the Head of the Health Department of Agam District for their support during the implementation of this study. We also extend our thanks to the teachers and staff of State Elementary School 23 Kubang Putih, and particularly to the third- and fourth-grade students who participated in this study. The contributions and cooperation of all parties were instrumental in ensuring smooth and successful implementation of this research.

References

- Abdi, F., Karamoozian, A., Lotfilou, M., Gholami, F., Shaterian, N., Niasar, A. A., Aghapour, E., & Jandaghian-Bidgoli, M. (2025). Effect of play therapy and storytelling on the anxiety level of hospitalized children: a randomized controlled trial. *BMC Complementary Medicine and Therapies*, 25(1), 23. <https://doi.org/10.1186/s12906-025-04767-4>
- Abigayl, I., & Putri, A. N. (2024). Assessing dental health knowledge and care behavior among school children in Banjar City, Indonesia. *Journal of Syiah Kuala Dentistry Society*, 9(2), 186–194. <https://doi.org/10.24815/jds.v9i2.39258>

- Aboalshamat, K., Alsharif, F. S., Alsanei, B. S., Aljohani, A., Aljabri, S., Salawati, R., & Nassar, A. A. (2023). Storytelling as innovative method to improve the recognition of teledentistry among adults: A randomized controlled trial. *International Journal of Dentistry*, 2023, 1–7. <https://doi.org/10.1155/2023/8814905>
- Ayten, B. K., & Polater, C. (2021). Values education using the digital storytelling method in fourth grade primary school students. *International Journal of Education and Literacy Studies*, 9(2), 66. <https://doi.org/10.7575/aiac.ijels.v.9n.2p.66>
- Belda-Medina, J., & Goddard, M. B. (2024). The effect of digital storytelling on english vocabulary learning in inclusive and diverse education. *International Journal of English Language Studies*, 6(1), 110–118. <https://doi.org/10.32996/ijels.2024.6.1.11>
- BKPK. (2023). *Survei Kesehatan Indonesia (SKI) 2023*. <https://www.badankebijakan.kemkes.go.id/ski-2023-dalam-angka/>
- Cohen, L., Manion, L., & Morrison, K. (2017). The ethics of educational and social research. In *Research Methods in Education* (8th editio, p. 33). Routledge. <https://doi.org/10.4324/9781315456539>
- Cronin-Gilmore, J., & Hammond, H. G. (2024). Storytelling in videos: A novel way to teach qualitative research. *Advances in Online Education: A Peer-Reviewed Journal*, 3(1), 85–98. <https://doi.org/10.69554/LAIY8682>
- Cuffee, Y., Burse, N. R., Jaffe, R., & Hargraves, J. L. (2022). Developing a storytelling study for African Americans with hypertension: A study protocol. *Delaware Journal of Public Health*, 8(4), 48–53. <https://doi.org/10.32481/djph.2022.10.010>
- Ernawati, F., Efriwati, Nurjanah, N., Aji, G. K., Hapsari Tjandrarini, D., Widodo, Y., Retiaty, F., Prihatini, M., Arifin, A. Y., Sundari, D., Rachmalina, R., Salimar, Julianti, E. D., Aidi, M. N., & Syauqy, A. (2023). Micronutrients and Nutrition Status of School-Aged Children in Indonesia. *Journal of Nutrition and Metabolism*, 2023(1), 4610038. <https://doi.org/https://doi.org/10.1155/2023/4610038>
- Fadhilah, N. (2025). Efektivitas penyuluh kesehatan gigi dengan metode storytelling dan ceramah terhadap pengetahuan kesehatan gigi pada siswa SDN. 101921 Beringin. *Future Academia: The Journal of Multidisciplinary Research on Scientific and Advanced*, 3(1), 486–495. <https://doi.org/10.61579/future.v3i1.440>
- FAO. (2021). *The State of Food Security and Nutrition in the World 2021*. <https://openknowledge.fao.org/server/api/core/bitstreams/1c38676f-f5f7-47cf-81b3-f4c9794eba8a/content>
- Haznedaroglu, E., & Polat, E. (2023). Dental Caries, Dental Erosion and Periodontal Disease in Children with Inflammatory Bowel Disease. *International Journal of Medical Sciences*, 20(5), 682–688. <https://doi.org/10.7150/ijms.83075>
- Heaton, B., Gebel, C., Crawford, A. J., Barker, J. C., Henshaw, M., García, R. I., Riedy, C. A., & Wimsatt, M. A. (2018). Using storytelling to address oral health knowledge in American Indian and Alaska native communities. *Preventing Chronic Disease*, 15(E63), 170305. <https://doi.org/10.5888/pcd15.170305>
- Jun, J., Siegrist, K., & Weinschenker, D. (2022). Evaluation of nurses' experiences with digital storytelling workshop: new way to engage, connect, and empower. *Journal of Nursing Management*, 30(5), 1317–1323. <https://doi.org/10.1111/jonm.13619>
- Kenefick, M. A., & June, M. R. (2020). Video storytelling in the classroom: The role of narrative transportation. *Journal of Nursing Education*, 59(8), 470–474. <https://doi.org/10.3928/01484834-20200723-10>
- Kim, S. W., Chen, A. C.-C., Ou, L., Larkey, L., Todd, M., & Han, Y. (2023). Developing a culturally and linguistically congruent digital storytelling intervention in Vietnamese and Korean American mothers of human papillomavirus-vaccinated children: Feasibility and acceptability study. *JMIR Rormative Research*, 7, e45696. <https://doi.org/10.2196/45696>
- Kusumo, M. P. (2021). Health Behavior Education to Prevent Coronavirus Disease-

- 19 in Orphanages: Roleplay Strategies. *Open Access Macedonian Journal of Medical Sciences*, 9(E), 1480–1484. <https://doi.org/10.3889/oamjms.2021.6870>
- Mayangsari, R., & Rasmiati, K. (2020). Effect of supplementation of F100 biscuits modified with moringa oleifera flour substitution on nutritional status of under-five children with malnutrition in Kendari City Indonesia. *Public Health of Indonesia*, 6(1), 28–34. <https://doi.org/10.36685/phi.v6i1.318>
- Mazengia, A. L., & Biks, G. A. (2018). Predictors of stunting among school-age children in northwestern Ethiopia. *Journal of Nutrition and Metabolism*, 2018(1), 752175. <https://doi.org/10.1155/2018/7521751>
- Merbawani, G. W., Setiawan, S., & Anam, S. (2023). “In Storytelling, we see the performance more from the personality”: The goals and self-regulation on storytellers of other-language. *EDUKASIA Jurnal Pendidikan Dan Pembelajaran*, 4(2), 2109–2120. <https://doi.org/10.62775/edukasia.v4i2.555>
- Moradi, H., & He-fang, C. (2019). Digital storytelling in language education. *Behavioral Sciences*, 9(12), 147. <https://doi.org/10.3390/bs9120147>
- Mosses, A., Ngadaya, E., Leyna, G., Solomon, D., Msola, H., Said, F. A., Masanja, H., Kagaruki, G., Mwiru, R. S., Salmin, A., Isangula, K., Kiyungai, M., Kombo, K. M., Mchau, G., Ngegba, J., & Codjia, P. (2025). Prevalence and Determinants of Double and Triple Burden of Malnutrition Among School Going Children and Adolescents in Zanzibar, 2022. *MedRxiv*, 12(3), 1–24. <https://doi.org/10.1101/2025.02.28.25323109>
- Özdemir, K., & Tuna, Y. E. (2023). A history lesson designed with the digital storytelling method: Kara Fatma example. *International Journal of Education and Literacy Studies*, 11(4), 362–371. <https://doi.org/10.7575/aiac.ijels.v.11n.4.p.362>
- Özel, İ. Ç., Erbaş Ünverdi, G., Serdar Eymirli, P., & Yabancı Ayhan, N. (2024). The relationship between dental caries, dietary intake and body composition in school-age children. *Egyptian Pediatric Association Gazette*, 72(1), 14. <https://doi.org/10.1186/s43054-024-00255-5>
- Pakpahan, F., Sadira, L., Syifah, N., Jodi, S., Panjaitan, E., & Meisuri, W. (2025). The effectiveness of storytelling in improving speaking skills of junior high school students. *KIRANA: Social Science Journal*, 2(2), 48–55. <https://doi.org/10.61579/kirana.v2i2.474>
- Pulimeno, M., Piscitelli, P., & Colazzo, S. (2020). Children’s literature to promote students’ global development and wellbeing. *Health Promotion Perspectives*, 10(1), 13–23. <https://doi.org/10.15171/hpp.2020.05>
- Puteri, A. D., & Emini, E. (2023). Storytelling as increasing knowledge of dental health in kindergarten. *Journal Center of Excellent: Health Assistive Technology*, 1(2), 71–75. <https://doi.org/10.36082/jchat.v1i2.1257>
- Putriningtyas, I. F., Sulasri, N. A., & Mnsen, R. E. (2023). Support for the comprehensive school health model to increase reproductive health knowledge of elementary school children as a primary prevention effort. *Journal of Health Sciences*, 16(03), 258–266. <https://doi.org/10.33086/jhs.v16i03.5110>
- Rahayu, A. S., Eryansyah, E., & Sitinjak, M. D. (2022). Four Strategies in Teaching Speaking During Covid -19 Pandemic at SMA N 04 Palembang. *English Review Journal of English Education*, 10(3), 843–854. <https://doi.org/10.25134/erjee.v10i3.6342>
- Saavedra, J. M., & Prentice, A. M. (2023). Nutrition in school-age children: a rationale for revisiting priorities. *Nutrition Reviews*, 81(7), 823–843. <https://doi.org/10.1093/nutrit/nuac089>
- Santoso, M., Agrawal, R., Tiwari, K., Manjanatha, D., Austin, S. B., McAdams-Mahmoud, A., Craddock, N., & Raffoul, A. (2023). Tackling Colourism Through Storytelling in an Online Course for Public Health Professionals. *Health Education Journal*, 82(4), 430–443. <https://doi.org/10.1177/00178969231164039>

- Shofiyyah, N. A., Muharam, A., Susanti, I., & Nurdiana, A. (2024). Exploring the power of storytelling: Enhancing engagement and learning outcomes among adolescents. *Indo-Mathedu Intellectuals Journal*, 5(1), 990–1006. <https://doi.org/10.54373/imeij.v5i1.847>
- Siddaiah, S. B., Ramachandra, J. A., Mehta, D. V., & Gopinath, G. (2021). Assessment of oral health awareness among residential and day school-going children in south bengaluru: A questionnaire-based survey. *World Journal of Dentistry*, 12(3), 234–240. <https://doi.org/10.5005/jp-journals-10015-1815>
- Sihombing, K. P., & Syafriani, I. (2023). Effectiveness of interactive audiovisual media on the level of knowledge, attitude of children and dental oral health. *Proceeding International Conference on Health Research and Science*, 1(1), 133–138.
- Staley, B., & Freeman, L. (2017). Digital storytelling as student-centred pedagogy: empowering high school students to frame their futures. *Research and Practice in Technology Enhanced Learning*, 12(1), 21. <https://doi.org/10.1186/s41039-017-0061-9>
- Supady, A., Nguyen, K., Aziz, M., Überreiter, C., Bärnighausen, T., & Adam, M. (2023). A short, animated storytelling video about sodium intake as a major cardiovascular risk factor and recommendations for a healthy diet: an online, randomized, controlled trial. *Trials*, 24(1), 390. <https://doi.org/10.1186/s13063-023-07418-6>
- Thwin, K. M., Zaitsu, T., Ueno, M., & Kawaguchi, Y. (2018). Effects of oral health education in Myanmar preschool children and guardians. *Journal of Investigative and Clinical Dentistry*, 9(3), e12346. <https://doi.org/10.1111/jicd.12346>
- UNICEF. (2021). The State of the World's Children 2021: On My Mind – Promoting, Protecting, and Caring for Children's Mental Health. In <https://www.unicef.org/reports>. <https://www.unicef.org/reports/state-worlds-children-2021>
- WHO. (2021). *Levels and trends in child malnutrition: Key findings of the 2021 edition of the joint child malnutrition estimates*. <https://www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb>
- Yang, H., Gao, X.-B., Li, M., Ye, Q., Sun, Y., & Huang, Y. (2020). The use of mind mapping in health education in extended care for children with caries. *Journal of International Medical Research*, 48(5), 0300060519898053. <https://doi.org/10.1177/0300060519898053>