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Management of Oral Hygiene Health Education with Animated Video Media on Improving Knowledge of Families and Pediatric Patients

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Abstract:
School-age children are susceptible to disease and need health supervision. Children who are sick have a high dependence on others in terms of self-care. Children who are sick and unable to fulfill their self-care will experience self-care deficit problems. One component of personal hygiene often forgotten when self-care during illness oral hygiene is. This study aims to determine how health education using animated video media on oral hygiene can improve family and patient knowledge of self-care, especially oral hygiene. This research is a descriptive, quantitative study that uses a case study approach. The research design was a one-group pre-test-post-test design, in which a knowledge questionnaire was administered before and after health education. There are differences in knowledge scores before and after health education is provided to both families and patients, with increased knowledge of oral hygiene. Evaluation of oral hygiene using the OHI-S score shows a decrease in score, indicating improvement from poor to moderate, and is performed 4 times every 24 hours until discharge. Providing oral hygiene education can increase parents' and patients' knowledge and interest in self-care.

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INTRODUCTION

School-age children, typically defined as those aged 6 to 12, represent a vulnerable population in healthcare settings due to ongoing physical and cognitive development (Mohammed et al., 2025; Akhiat et al., 2024). During periods of illness or hospitalization, these children frequently experience disruptions in growth trajectories, diminished functional capacity, and heightened dependence on caregivers for activities of daily living (Mastorci et al., 2024). This dependency extends to essential self-care practices, including oral hygiene, a critical yet frequently overlooked component of holistic pediatric care (Alshammari et al., 2025). When children cannot independently maintain oral cleanliness during illness, they become susceptible to secondary complications that may impede recovery and compromise long-term health outcomes (Han et al., 2025). Consequently, ensuring consistent oral hygiene practices among hospitalized school-age children requires active involvement and adequate knowledge on the part of family caregivers, who serve as primary support systems during hospitalization (Seni et al., 2025).

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Self-care deficit theory posits that individuals require nursing or caregiver assistance when they lack the capacity to perform necessary self-maintenance activities (Teng et al., 2025). In pediatric contexts, illness-induced fatigue, pain, medical interventions, or developmental limitations often precipitate such deficits, particularly concerning personal hygiene routines. Among these neglected domains, oral care consistently ranks as a low priority compared to more immediately visible needs such as feeding or mobility assistance (Erwin et al., 2022). This oversight is especially problematic given that the oral cavity serves as a gateway to both the digestive and respiratory systems; its neglect during vulnerable health states creates a permissive environment for pathogenic colonization (Gupta et al., 2024). For school-age children whose primary dentition remains functionally active, compromised oral hygiene during illness may precipitate acute infections that exacerbate existing health challenges and prolong hospital stays (Han et al., 2025).

The clinical implications of inadequate oral hygiene in pediatric patients are substantial. Accumulation of dental plaque and oral bacteria can rapidly progress to dental caries, gingivitis, oral candidiasis, and mucosal ulcerations, conditions that cause significant pain, dysphagia, and nutritional compromise (Chan, 2024). These complications not only diminish the child's quality of life during hospitalization but may also delay medical recovery by introducing secondary infection sources or reducing oral intake of medications and nutrients (Zafer et al., 2024). Furthermore, primary teeth serve crucial developmental functions beyond mastication, including maintaining dental arch integrity, facilitating speech development, and guiding permanent tooth eruption (Chussid et al., 2023). Damage to primary dentition from preventable infections during critical growth periods may therefore precipitate long-term consequences for permanent dentition alignment and oral health trajectory, underscoring the necessity of maintaining rigorous oral hygiene standards even during acute illness (Kramer & Splieth, 2022).

A primary barrier to optimal oral care delivery in hospitalized children stems from knowledge deficits among family caregivers (Al-Mashhadani et al., 2024). Research indicates that parents and guardians frequently lack awareness regarding the importance of oral hygiene during illness, appropriate techniques for pediatric oral care in clinical settings, and recognition of early signs of oral complications (Ludovichetti et al., 2025). This knowledge gap is compounded by healthcare systems that often prioritize acute medical management over preventive hygiene education, leaving families unprepared to assume this responsibility (Barzoki et al., 2025). Traditional health education methods, such as verbal instruction or printed materials, demonstrate limited efficacy in knowledge retention among caregivers experiencing stress and information overload in hospital environments (Mishra et al., 2025). Consequently, innovative, engaging, and developmentally appropriate educational strategies are urgently needed to bridge this knowledge-practice gap and empower families as active participants in their child's comprehensive care (Loredo et al., 2024).

Animated video media present a promising pedagogical solution for enhancing health education delivery in pediatric settings (Lawal et al., 2025; Noviyanti et al., 2023). Leveraging visual storytelling, simplified animations, and child-friendly narratives, animated videos can effectively translate complex health concepts into accessible, memorable content for both children and adults (Hansen et al., 2024). Evidence suggests that multimedia interventions incorporating animation significantly improve knowledge acquisition, retention, and behavioral intention compared to conventional educational approaches, particularly among populations with varying health literacy levels (Feeley et al., 2023). This study examines the efficacy of a purpose-developed animated video intervention designed to improve oral hygiene knowledge among families and pediatric patients in hospital settings. By evaluating knowledge gains following exposure to this innovative medium, we aim to establish evidence for scalable, engaging health education tools that address a critical yet neglected dimension of pediatric self-care during illness.

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METHOD

Participant (Subject) Characteristics

This study was conducted in a hospital in Situbondo from June 16 to 19, 2025. Participants included family members of An. R and R's own child, who was a patient undergoing treatment in the pediatric ward. Participant inclusion criteria included: (1) family members aged 18 years and over and always actively involved in patient care, (2) patients and family members can read and write, and (3) those who are willing to give consent to participate in this study. Exclusion criteria included: (1) family members with serious health problems and (2) family members who could not be present during the health education intervention.

Measures and covariates, and Quality of Measurements

The primary data collection tool in this study is a structured questionnaire administered to both patients and their family members to assess knowledge levels. Oral hygiene status is evaluated using the Oral Hygiene Index-Simplified (OHI-S), a standardized clinical assessment tool. These instruments collectively enable a comprehensive evaluation of both knowledge and oral hygiene practices within the study population.

Data Collection

This study used primary and secondary data. Primary data were obtained directly from respondents through interviews, observations, and questionnaires on knowledge of oral hygiene among patients' families and patients. Meanwhile, secondary data was obtained from reviewing medical records. Interviews were conducted with the patient's family to explore knowledge of self-care, including oral hygiene. In addition, observations were made to document the patient's oral hygiene using the OHI-S instrument. This includes the debris score and dental calculus. The family was then asked to complete an informed consent sheet, and the family and patient completed a pre-test sheet to determine the initial knowledge score, which was measured using the oral hygiene knowledge instrument. Health education on oral hygiene was conducted after the family and patient completed the pre-test sheet, and a demonstration of proper oral hygiene was performed directly on the patient, which the patient then imitated. Furthermore, post-test sheets were completed by families and patients at predetermined time intervals after health education and demonstrations. Oral hygiene was evaluated using the OHI-S instrument for 4 consecutive days until discharge. Oral hygiene improves if the OHI-S score decreases.

Research Design

This research design uses a case study with a one-group pre-test-post-test design, in which a pre-test is taken before the intervention and a post-test is taken after the intervention. To know the changes in knowledge values before and after health education about oral hygiene.

Intervention Duration and Follow-Up

Health education interventions were conducted every day for 4 days. Health education in the form of animated videos is designed based on the provided material, specifically oral hygiene. The subjects contained in the animated video include:

1. Definition of oral hygiene
2. Purpose of oral hygiene
3. Importance of oral hygiene in children
4. The impact of not doing oral hygiene

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5. Teeth brushing techniques to maintain oral hygiene
6. Tips to maintain oral hygiene

The animated video at the beginning of the meeting was watched with the researcher's assistance, and the next day, the family and patient viewed it without the researcher's assistance, for a total of 5 minutes. In addition to the animation video at the beginning of the intervention meeting, a tooth-brushing demonstration was also provided to the patient. The pre-test was conducted before the intervention, and the post-test was conducted on the last day of the intervention (day 4).

Data analysis

Data analysis identified prevailing nursing problems among pediatric patients, with a self-care deficit in oral hygiene emerging as the primary concern requiring intervention. Comparative analysis of pre- and post-intervention knowledge scores demonstrated a statistically significant improvement in oral hygiene understanding among both family caregivers and pediatric patients following exposure to the animated video health education module. Additionally, clinical evaluation of oral hygiene status utilizing standardized assessment tools revealed measurable improvements in oral cleanliness, reduced plaque accumulation, and decreased incidence of oral mucosal abnormalities following the educational intervention.

Ethical Clearance

This study received formal ethical clearance from the Health Research Ethics Committee of the Faculty of Nursing, University of Jember, ensuring adherence to international standards for research involving human participants. The approval encompassed all study procedures, including health education interventions, data collection methods, and informed consent protocols for both pediatric participants and their family caregivers. Written informed consent was obtained from parents or legal guardians prior to participation, while age-appropriate assent was secured from all school-age children involved in the study. Ethical principles of autonomy, beneficence, non-maleficence, and confidentiality were rigorously upheld throughout the research implementation.

RESULT

Case Overview

The managed patient is An. R is 9 years old and female gender. Medical diagnoses are a primary diagnosis of dyspepsia and a secondary diagnosis of hypokalemia and mild to moderate dehydration. With complaints of admission to the hospital, namely continuous nausea and vomiting that has occurred for 5 days with a frequency of more than 5 times a day with liquid and food contents, the child looks weak, with decreased appetite, and heartburn with a pain scale of 7 out of 10 (NRS), the patient's mother said that in the last 1 month the child had lost approximately 3 kg in weight, from the initial weight of 20.5 kg to 17.5 kg, height 128 cm, with an ideal body weight (BBI) of 23.8 kg, so the patient had lost more than 10% of BBI in the last 1 month. In performing daily activities, the patient is assisted by his parents with eating/drinking and toileting, with an ADL score of 2 (assisted by others). Still, the patient can ambulate and mobilize in bed independently, with an ADL score of 4 (independent). The patient's mother reported that during hospitalization, over 7 days of treatment, the patient rarely or did not perform personal hygiene, including bathing and brushing teeth.

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Implementation with Health Education

In this study, knowledge increased after the implementation of oral hygiene education and demonstration for families and patients. This increase in knowledge is depicted in Figure 1.

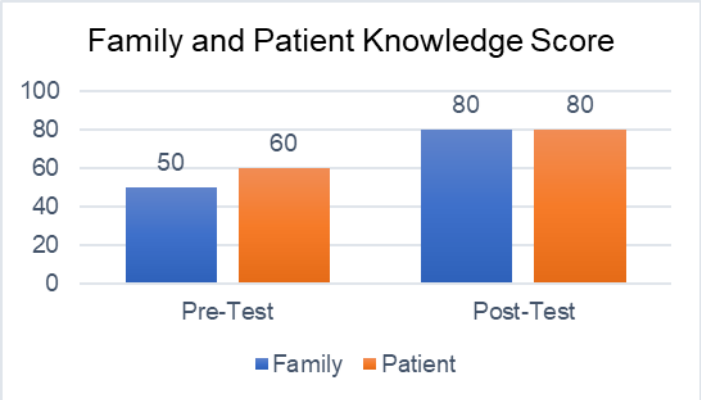

Figure 1. Graph of Change in Knowledge Score Before and After Education

Based on the pre-test results for the family, 5 of 10 answers were incorrect. The incorrect answers were about how to maintain oral hygiene (4 questions) and the factors that cause oral health problems (1 question). While the pre-test results on the patient, An. R, it was found that 4 of 10 answers were incorrect. The wrong answer is in question 3, on oral hygiene, and in question 1, on the factors that cause oral health problems. After implementing oral hygiene education, family and patient knowledge have increased. Knowledge in the family increased by 30 points: pre-test score 50, post-test score 80. Meanwhile, patient knowledge increased by 20 points: in the pre-test, the score was 60, and in the post-test, it was 80.

Evaluation of Health Education with OHI-S

Assessment or evaluation of patients' ability to apply oral hygiene correctly during hospitalization, as measured by the Oral Hygiene Index Simplified (OHI-S) score in pediatric patients. OHI-S is a measure of oral hygiene obtained by summing the Debris Index (DI) and Calculus Index (CI). The following table presents the daily oral hygiene assessments conducted over 4 days.

Table 1. Oral Hygiene Assessment with OHI-S

Indicator	Before Health Education	After Health Education			
		Day-1	Day-2	Day-3	Day-4
DI Score	2.3	1.6	1.3	1.16	1
CI Score	1.6	1.6	1.6	1.6	1.6
OHI-S Score	3.9	3.2	2.9	2.76	2.6
Interpretation	Poor	Poor	Fair	Fair	Fair

Table 1 shows the evaluation of oral hygiene from before education to day 4. The results obtained before the study showed that the DI score was 2.3 and decreased daily until it reached 1 on the last day. The CI score from before education to day 4 remained the same at 1.6 because calculus cannot be removed by brushing; it must be scaled at the dentist. Evaluation of oral hygiene using OHI-S is shown clearly in Figure 2.

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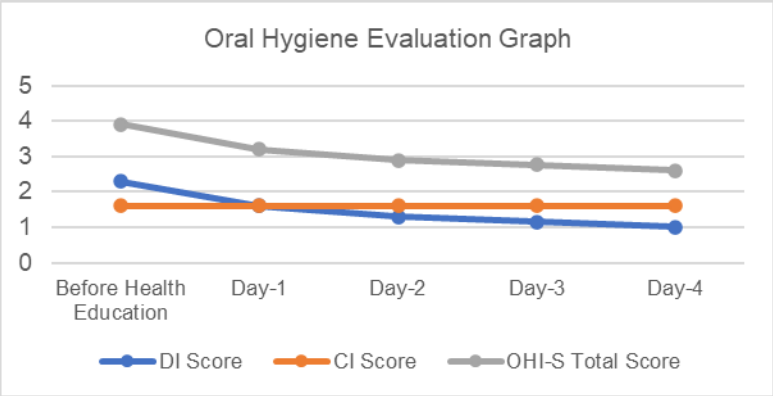

Figure 2. Oral Hygiene Evaluation Graph using OHI-S Score

Evaluation results related to oral hygiene from education on infection risk management, with oral hygiene applied for 4 days, showed a decrease in OHI-S scores from poor to moderate, from a pre-education total score of 3.9 to 2.6 after education on day 4.

DISCUSSION

Nursing Problem Analysis of Self-Care Deficit in An. R

Patients do not perform dental and oral cleaning because they are weak from bed rest treatment, and their condition is not excellent. Pediatric patients are prone to infection, and many portals of entry can serve as entry points for pathogens (such as bacteria, viruses, and fungi), especially in states of illness or unhealth. One of these ports of entry is the mouth, because it is directly related to the respiratory and digestive tracts (Crestez et al., 2024). The oral cavity is a significant source of infection and inflammatory diseases that can contribute as a factor that triggers or aggravates certain diseases (systemic diseases) and can affect the body's overall health if not adequately treated. The spread of oral infection is one of the causes, namely the presence of cavities and dental caries, which can lead to expansion and continued infection that can affect general health with systemic diseases (Murray et al., 2024). Signs of oral infection have now appeared in the patient, including black cavities, bad breath, carious teeth, and dental plaque. So, the nursing diagnosis in this case is a self-care deficit.

Self-care deficit is the inability to perform self-care activities (Isik & Fredland, 2023). If hospitalized patients ignore their hygiene, it will affect their health. Self-care, including oral hygiene, if not done correctly, can lead to ongoing infections, add new problems, extend the recovery period, and slow healing. Thus, oral care intervention is needed as a self-care effort to prevent disease, especially when hospitalized or sick.

Analysis of Interventions Conducted

Nursing diagnosis of self-care deficit is one part of the nurse's duties in charge of care, an independent action that focuses on patient-centered care. With this self-care deficit nursing diagnosis, the outcome is increased self-care, with the outcome criteria being maintained oral hygiene and increased interest in self-care (Kiskac & Oz, 2023). With a nursing action plan based on the Indonesian Nursing Intervention Standards (SIKI), namely oral care education, because patients do not carry out self-care, especially oral care, while undergoing treatment in the hospital. Oral care education is provided to increase the patient's interest in self-care, especially oral care,

which is expected to prevent complications and infections associated with oral disease when self-care is not practiced (Asefa et al., 2025).

In this case, the patient is a pediatric patient who is highly dependent on others in self-care activities. Based on Orem's theory, there are three categories in the nursing system to meet patients' self-care needs: a complete assistance system, a partial assistance system, and a self-care system through education. Nurses as educators, or educators who are nurses, provide information and knowledge to patients and families to promote healthy behavior and improve patient health (Alkuwaisi et al., 2024). Thus, the family's role is vital in supporting children's self-care, especially during hospitalization. Therefore, providing appropriate oral care interventions can reduce complications from oral and dental infections resulting from inadequate self-care, thereby reducing the length of the patient's treatment and lowering the cost of care.

Analysis of Oral Hygiene Education Nursing Implementation Results

Oral hygiene knowledge education is delivered to the family, the patient's caregiver, and the patient to support and assist patients in performing oral hygiene during hospitalization. Patients must be aware and willing to perform oral hygiene during hospitalization. Before education is carried out, researchers identify inhibiting factors such as family and patient education levels, language limitations, and writing limitations. This was done to adjust the health education media and the language used in both the questionnaire and the health education materials. One factor influencing knowledge is the level of education. This is because the higher a person's education, the easier it is for them to receive and respond to information more rationally (Barnes et al., 2022).

In this implementation stage, families and patients are invited to watch the animated videos. Providing this health education is also accompanied by demonstrating the correct way to perform oral hygiene while hospitalized, so that families and patients know how to do oral hygiene in bed. This health education lasted approximately 15 minutes, and the researcher re-clarified misunderstandings and allowed the family and patient to ask questions. The animated video is sent to the family and patient, who can use it as learning material. After that, the patient will be evaluated for 4 days of treatment to assess oral hygiene using the OHI-S instrument, and a knowledge post-test will be administered on the fourth day, the last evaluation day. During the implementation and evaluation over four days, the researcher asked how often the animated video was viewed and how often dental and oral hygiene were performed each day. The evaluation results indicated that the patient and family watched the animated video at least 1 time per day, up to 2-3 times per day. For oral hygiene behavior, patients perform it twice a day, namely in the morning and at bedtime.

After implementing oral hygiene education, family and patient knowledge have increased. Health education is declared successful or not based on the post-test score in the last session after schooling. From the description of the results of the pre-test and post-test scores, it is concluded that there is a significant increase in scores, so it can be said that there has been an increase in family knowledge and also in patients about oral hygiene care as an effort to prevent infections, especially infections related to the oral cavity. There was an increase in knowledge among children who received animated video education.

Animated video is a pictorial medium in which objects appear to move alternately, causing changes in movement, accompanied by interesting, character-like sounds. The educational media chosen for special attention and to attract the target audience must be tailored to the target's background conditions. Video media, especially animated videos, are more effective than traditional media that contain a lot of text and tend to be boring. In addition, demonstrating how to practice something to patients can help convey the information more clearly (Tugtekin & Dursun, 2022; Setioputro et al., 2022). Health education media is highly influential in the success of health

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education, and creative, attractive media can effectively increase knowledge. This study shows differences in pre-test and post-test scores for family and patient knowledge using animated video education on oral hygiene.

Evaluation Analysis of Implementation Results

Evaluation results for oral hygiene following education on self-care management, with oral hygiene applied for 4 days, showed a decrease in OHI-S scores from poor to moderate. Before the intervention, an OHI-S examination was also performed, yielding a total score of 3.9, indicating poor oral hygiene. On the 4th day of evaluation after the intervention, the OHIS-S score decreased to 2.6, indicating moderate oral hygiene. During the initial assessment, other signs and symptoms were also obtained, namely, quite pungent bad breath, a lot of dental caries, food plaque, and many black teeth, and the leukocyte value was relatively high at 13.94x103/µL, which was included in the diagnosis of self-care deficits due to not taking appropriate self-care. Health education and demonstration of personal hygiene can improve the patient's oral hygiene from the first day to the fourth day before the patient goes home. This includes preventive efforts to recognize and prevent the risk of infection. This implementation makes prevention efforts to reduce healthcare-associated infections (HAIs) quick, as HAIs can endanger patients and hospital services and worsen the quality of healthcare.

The patient has many cavities, frequent toothaches, dental plaque, and bad breath. How many early signs of infection in the teeth and mouth are pain in the teeth/frequent toothaches, reddish gums, swollen gums, and bad breath? Infections arise due to various factors, including poor dental hygiene in children and inadequate care. The mouth and teeth are directly related organs; they contact food, crush it, and initiate swallowing, so the digestive process begins in the mouth. So that in the mouth, there is often a buildup of food debris on the tooth surfaces, and if it is not cleaned immediately, it can become plaque and calculus, which can become a source of infection in the teeth and mouth (Nuriddinovna, 2025).

The patient had many dental caries during the examination. Dental caries can have a profound impact on the body because it not only disrupts the function of teeth as a chewing tool but also causes children to become cranky, experience gum swelling, and have difficulty carrying out their daily activities. As a result, children may lose their appetite, leading to malnutrition in more serious conditions. When children are malnourished, this condition can weaken their immune system, making them more susceptible to various diseases (Morales et al., 2023). As a result, there will be further infections from the primary diagnosis due to poor oral hygiene, prolonging recovery, and slowing healing.

Everyone involved in the patient's healing process, especially family members, plays a vital role. In Indonesian culture, the family serves as a companion and an extension of medical personnel in patient care. Therefore, efforts to prevent and control infection through self-care are not only the responsibility of health workers but also involve the family or patient companion. Through health education, there is a process of change that includes five stages: awareness, interest, evaluation, trial, and adoption of changes that bring benefits (Ghahramani et al., 2022).

In evaluating the results of this case using animated videos and oral care demonstrations, it can be concluded that the patient and family have reached a stage of acceptance of changes that bring benefits. This is because the patient and their family have performed self-care effectively during their hospital stay, particularly oral and dental care. As a result, when evaluating the success criteria for nursing interventions, indicators of maintaining oral hygiene and interest in self-care have improved. Therefore, oral hygiene education for the family and patient aligns with the target or desired outcomes.

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CONCLUSION

Oral hygiene health education, delivered through animated videos, significantly impacts knowledge and behavior change, particularly among pediatric patients. This study reinforces the importance of integrating structured educational interventions into nursing care to improve the practice of nurses responsible for care. Therefore, oral hygiene health education using animated videos can be utilized in the current era of digital transformation. However, future researchers must thoroughly master the evaluation tools for oral hygiene to ensure more objective assessments, and if possible, seek guidance from healthcare professionals with expertise in oral health.

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