

Implementation of Card Games as Educational Media for Dental and Oral Health in Elementary School Children: A Literature Review

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Abstract

Based on RISKESDAS data (2018), 67,3% of Indonesian children aged 5—9 years reported suffering from caries. One of the causes of the high number is their low oral health literacy. If this continues, more children in Indonesia will have low Oral Health Literacy and dental disease. Educational intervention is needed to tackle this problem. Seeing that need, children's educational games are used as a breakthrough.

To analyze the implementation of games in increasing awareness about dental and oral health in elementary school children.

The references were taken from the PubMed, ScienceDirect, and Wiley databases last accessed on 4 June 2023. Thirtythree (33) search results were filtered using PRISMA 2009 into four (4) main data in the form of clinical studies that met the inclusion criteria that had been processed using a study tool with the NIH.

From this study, game-based dental and oral health education was reported to increase the knowledge score of elementary school children about dental and oral health. This method was carried out for up to three months and succeeded in increasing the knowledge score of the posttest results. Games also increase the OHI-S and DI-S scores on the subject. Countries like India and China have used this method. The use of games has succeeded in improving children's dental and oral health education to build healthy children of the nation towards the Industrial Revolution 4.0.

Games as a medium of learning can increase the awareness of maintaining oral health in elementary school children.

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Introduction

RISKESDAS (2018) reports that 57.6% of Indonesia's population suffers from caries. Whereas in children aged 5-9 years who suffered from caries was reported as much as 67.3%. The category of children aged 5-9 has the highest score among the other categories.¹

Dental and oral health is an important thing that is often overlooked, as well as caries as one of the most common oral diseases in humans. Caries appear when the microbial balance in the mouth changes its character to become acidogenic, aciduric or cariogenic. Disruption of

this homeostasis will result in an imbalance of remineralization and demineralization of the teeth. Consumption of sugar is the main reason these changes occur. Nevertheless, biological, habitual, psychological, and social factors also influence the incidence of caries.²

Various factors from both the child and those around them allow caries to occur, such as the behavior of parents, which has an impact on children's dental health. Parents who often give sweet, sticky, and milk foods, than parents who pay less attention to the health of their children's teeth and mouth so that dental examinations and care are not routinely carried out.³ The bad habit of breathing through the mouth is a number of reasons for caries in children.⁴

Knowledge and application of dental and oral health care to fight caries is very important for children. The role of parents, teachers, and the surrounding community is needed to educate children.⁵ Various efforts have been made to

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increase children's knowledge, such as by providing education, counseling, and teaching children how to brush their teeth properly.⁶ However, the efforts that have been made are felt to be insufficient and sometimes ineffective due to a lack of obedience and enthusiasm as well as the feeling of boredom that children feel when they receive material. Another reason is that parents, teachers and the surrounding community are not able to explain and teach properly and correctly.

Departing from this perceived deficiency, problem solving is needed to increase children's enthusiasm for learning which will then have an impact on increasing children's knowledge about dental and oral health. The solution to the problem offered is in the form of game-based oral health education. Games are an alternative educational media that are interesting, easy, and proven to be able to increase children's knowledge.⁷ Not only that, in terms of game characters, they can improve children's cognitive abilities and self-confidence.⁸ Dental and oral health by using games can provide a fun experience so that children are more enthusiastic and easily understand the material being taught to them. This option can be a wise choice for teaching so that learning is not monotonous and the child is able to develop himself further. Game-based dental and oral health education can provide a different experience, help children learn better and has been proven to give real results.

Materials and methods

Data collection techniques were performed in the PubMed, Science Direct, and Wiley databases. The last source search was conducted on June 4 2023. The keywords used were "dental health game", "educational health game", and "dental education game". The authors used the inclusion criteria of a systematic review design. The intervention used was in the form of dental and oral health education within the last five (5) years of study publication. Meanwhile, the exclusion criteria were the unavailability of the full version, incomplete study results, clinical studies without a control group, and languages other than Indonesian or English. The next step is data processing using the PRISMA Flow Diagram.

From the PubMed, Science Direct, and

Wiley databases which were last accessed on 4th June 2023, ninety four (94) search results were obtained which had been filtered into 6 sources with 4 (four) main data in the form of clinical studies.

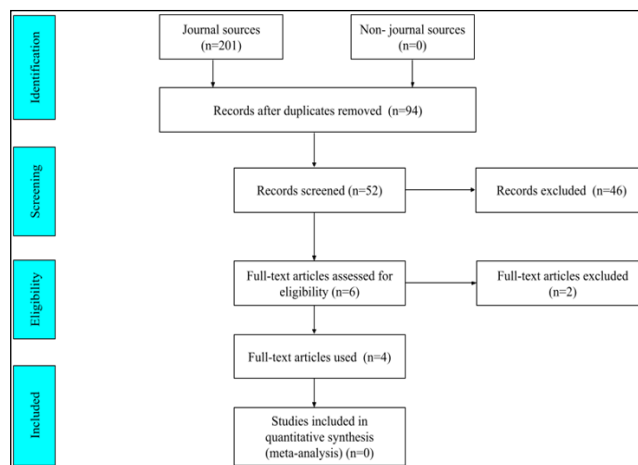


Figure 1. PRISMA 2009 Flow Diagram.

Results

The results of the four main data used are summarized as follows:

No	Author, Year	Subjects	Intervention	Results
1	Harikiran et al., (2017) ⁷	45 children, around 12—13 years old	Using board games as dental and oral health education	a. Improving children's dental and oral health knowledge assessed from quizzes b. Improving children's attitude in maintaining healthy teeth and mouth.
2	Kumar et al., (2017) ⁸	150 children, 8—12 years old	Dental and oral health education in the form of a board game	a. The increase in posttest scores continued to increase from the first meeting, the first month, and the third month. b. Get the average final posttest value of 9.98/10
3	Liu et al., (2021) ⁹	42 elementary school children	Dental and oral health education in the form of board games for 2x60 minutes a week.	a. Increased knowledge assessed by posttest b. Increase in OHI-S score after three months
4	Gupta et al., (2021) ¹⁰	300 children, 7—12 years old	Dental and oral health education in the form of a checkerboard interspersed with flashcards once a week.	a. Improved mean score on the post-test after three (3) months of intervention b. Increase in OHI-S and DI-S values in the third month compared to the first day.

Table 1. Summary of Four Studies.

Discussion

Based on data analysis, the use of games can increase information absorption and can be implemented in dentistry education. In the studies conducted, using the game itself is an easy, cheap, effective, and efficient method.^{7, 11} Collaborative games in providing self-education maximize the visual and auditory abilities of children which will lead to fun and easy-to-understand activities.⁸ There are quite a number of games that can be collaborated on, such as role-playing, snakes and ladders, pairing pictures, singing, and using flash cards.^{9, 12}

Slow to understand and receive information, physically active, wide emotional spectrum, easily bored, forgetful, and a reliable imitator are the basic characteristics of children. Based on research, implementing games in teaching methods for children can overcome these things.^{13,14} Playing games alone can create a stimulus to solve problems and feel emotions so that children will feel familiar and relevant. Research shows that perceived relevance has a direct relationship with memory so that it makes children able to receive more new information.^{10, 15}

Higher absorption of information makes children able to understand the material presented and is evident from the post-test scores and increased knowledge. At the beginning of the visit, the children were given a pretest as an initial measurement and continued with information presentation interventions that were implemented using games.^{8,16} After implementation is carried out within a certain period of time, measurements are again carried out by means of a post-test. It can be seen that the post-test scores are higher when compared to the pre-test, and the intervention using game media has a greater impact and a more significant increase in scores compared to conventional methods with presentations.^{8,9,10}

The success rate of implementing games in dentistry education itself can be proven based on the OHI-S and DI-S levels measured before and after the intervention. In the first data no measurements were taken, however, the results of the questionnaire and feedback from the participants showed an increase in terms of knowledge and attitudes regarding dental and oral hygiene.⁷ Reviewing the second to fourth data, there was a significant increase in OHI-S

and DI-S after the intervention using games. The three data show that the use of games increases knowledge about dental and oral hygiene, followed by a change in attitude and ends with an increase in OHI-S and DI-S.^{9,10, 12}

Children have basic characteristics and attitudes that are different from adults, so a comprehensive method is needed to maximize information absorption and change habits slowly but surely.¹⁵ Implementing games in presentations about dental and oral hygiene and health will give the impression of being interesting, entertaining, and can be enjoyed by children.¹⁰ The presence of games in approaching and providing information will support optimal absorption of information and minimize children's boredom so that it can be carried out regularly until the child gets used to it. Patterns of attitude and knowledge regarding dental and oral hygiene can be adopted optimally when implementing games in the educational plan.^{13, 14}

Game implementation can also help realize the Sustainable Development Goals (SDGs). The targeted SDG is SDG 4, namely the development of quality education. (Sustainable Development Goals., 2016). The presence of games in dentistry education in Indonesia can support the achievement of the vision of the Industrial Revolution 4.0. This happens because games prepare children as healthy, intelligent and competent individuals in the future.^{12, 15}

Conclusions

From this literature review, it can be concluded that the implementation of games has the potential to raise awareness about oral health in elementary school children. The implementation of games has been reported to be influential in increasing post-test scores, children's OHI-S and DI-S, knowledge, and children's attitudes towards children's dental and oral health. However, games are needed that are interesting, fun and educational to get the attention of children. Therefore, more exploration and development is needed regarding games as a media for dental and oral health education.

Declaration of Interest

The authors report no conflict of interest.

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