



Indonesian Dental Association

Journal of Indonesian Dental Association

<http://jurnal.pdgi.or.id/index.php/jida>  
ISSN: 2621-6183 (Print); ISSN: 2621-6175 (Online)



Literature Review

# The Effectiveness of Education and Reminder Messages in Increasing OHI-S, Patient's Behavior, and Oral Health Literacy in Dental Practice: A Systematic Review of Randomized Controlled Trials

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Received date: January 30, 2023. Accepted date: June 2, 2023. Published date: June 24, 2023.

## KEYWORDS

short message;  
health services;  
dental;  
oral

## ABSTRACT

According to Basic Health Research, dental and oral health is still one of the main health problems that occur especially in small cities due to lack of accessibility. Poor oral hygiene scores can lead to complex diseases such as caries and periodontal disease. If this condition persists, it will have an impact on aspects of the patient's life such as disruption of productivity, and declining general health of patients, resulting in disruption of social aspects. Until now, no solution can improve the oral health of the community. Whereas Indonesia needs to prepare a competent and healthy workforce to reach Indonesia Gold 2045. Short messages sent by hospitals containing reminders and education have the potential to increase public awareness of the importance of compliance in maintaining dental and oral hygiene. To analyze the implementation of short messages in support of modification of reminders and education in dental practice. The main references were taken from the PubMed, Science Direct, and Wiley databases last accessed on 16 April 2022. 31 search results that had been filtered using PRISMA 2009 became the source with 5 main data that met the inclusion criteria. In the form of clinical studies in the form of randomized controlled trials that have been processed using the study tool from the NIH. From a systematic study, it was found that short messages can be used as reminders and education in the fields of public dental health, pediatric dentistry, orthodontics, and periodontics. This method is carried out with follow-up and evaluation for up to 6 months. Countries such as France, Italy, India, America, and Japan have used this method. The main outcome of this study was an improvement in the oral hygiene score (OHI-S), behavior, and oral health literacy. The use of reminders in the form of short messages has the potential to increase public awareness of the importance of compliance in maintaining dental and oral hygiene. The short message approach as a dental support service has proven to have many advantages and can be implemented in Indonesia.

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DOI: [10.32793/jida.v6i1.952](https://doi.org/10.32793/jida.v6i1.952)

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## INTRODUCTION

A prosperous society has an element of health in it. Health is meant for both body and oral health. Dental and oral health is essential to pay attention to. However, in Indonesia, especially in remote areas, dental and oral health is classified as poor. Education and treatment of dental and oral problems are not evenly distributed, so only big cities have access.<sup>1</sup>

Dental and oral health is reflected in clean teeth, free from plaque and dirt, and no malodor of mouth.<sup>2</sup> This is influenced by various factors such as; systemic conditions, excessive sugar consumption, alcohol use, poor oral hygiene, limited knowledge of dental and oral health, minimal access to treatment and so on.<sup>3</sup> If the risk factors continue to increase and are not addressed, it will impact oral health. Lack of knowledge and awareness of the importance, causes, and effects of dental and oral hygiene is the basis of dental and oral problems.

Many people are less exposed to dental and oral health for various reasons. The main reason that can explain this is a person's lack of education. Patients with less social economic status often need access to proper education. It is common for someone who needs to learn about oral and dental health to be unaware of the importance of caring for and seeking help to deal with their dental and oral problems.<sup>4</sup>

The Oral Hygiene Index Simplified can indicate whether a person has taken care of their oral hygiene. The way to determine whether a person's oral status is good or bad is to do an intraoral examination. Plaque and debris for each tooth were examined and then added to be classified as bad, moderate, and good.<sup>5</sup> A poor OHI-S score can indicate dental and oral disease.

Various things can happen due to the poor oral health of a person. For example, dental and oral diseases from mild to severe cases. Caries and periodontal disease are two of the most popular diseases experienced by the community. However, this does not rule out the possibility of serious illnesses such as oral cancer occurring.<sup>6</sup> These diseases can have an impact on a person's life. Pain and discomfort can hinder a person's daily activities and activities.

Interventions have been carried out to build awareness and improve the health of people of all ages. Both those carried out by the government and institutions or individuals to realize dental and oral health for the wider community. The government has carried out fluoridation of water intending to prevent dental caries.<sup>7</sup> Health education has been given early on to school

children, counseling and treatment for the wider community, promoting of oral health on various social media and public places, and others.<sup>8</sup> But it is very unfortunate that many people still need to be made aware of the importance of dental and oral health and often forget to have their teeth checked by the dentist every six months and how to care for their teeth and mouth properly.

From this experience, new problem-solving is needed to increase community awareness, health, and dental and oral hygiene scores. The solution offered is sending short messages containing reminders and education aimed at increasing community compliance and each individual's dental and oral hygiene scores. In this digital era, almost everyone has electronic devices to communicate orally and in writing. Taking advantage of the available opportunities, short electronic messages containing information about oral hygiene and reminders to return to dental control are sent to the public by hospitals and clinics.<sup>9</sup> These short messages can recall forgotten information or even add new information to the public. Through the information that provides education, people can be more aware of the importance of their dental and oral health. Apart from that, it is hoped that the community will be able to change their behavior and start implementing the habit of maintaining and caring for the cleanliness of their teeth and mouth. Then the results will appear from a low OHI-S score. This option can be a wise choice and provide a different experience to the community.

The aim of this study was to analyze the implementation of short messages as reminders and education to improve patient's oral health index-simplified, behaviour, and oral health literacy in dental practice.

## MATERIALS AND METHODS

Data collection techniques were performed in the PubMed, ScienceDirect, and Wiley databases. The last source search was conducted on April 16, 2022. The keywords used were “((caries OR oral health) AND (text messaging OR teledentistry OR telehealth))”. The authors used the inclusion criteria of a clinical study design. The intervention is in the form of dental and oral health education through the publication of studies over the last 10 years. 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 PRISMA Flow Diagrams and habit analysis using the NIH Study Tool. In studying this system, the authors use the PICO analysis.

Population: Patients with poor dental and oral health scores.

Intervention: Educational intervention using short messages.

Comparison: Study comparing short message-based education with conventional methods.

Outcome: Short messages excel in educating patients about oral health, are preferred and are easier to understand.

From the PubMed, Science Direct, and Wiley databases which were last accessed on April 16, 2022. By using PRISMA 2009, 31 search results were obtained. (Fig. 1) As 5 main data met the inclusion criteria in the form of randomized controlled trials were processed using a study tool from NIH. The next step, 5 journals were screened using the NIH Study Tool. (Table 1)

**RESULT**

The results of the 5 main sources used can be summarized as follows in Table 2.

**DISCUSSION**

Based on the data analysis, using short messages as reminders and education can improve dental and oral clinical outcomes for patients. This is assessed from three aspects: the oral health score (OHI-S), patient behavior, and oral health literacy. In the studies conducted, short

**Table 1. Risk Bias Assessment**

Studies Criteria	Bowen et al., (2017)	Cozzani et al., (2017)	Eppright et al., (2018)	Guram et al., (2018)	Garyga et al., (2019)
C1	Y	Y	Y	Y	Y
C2	Y	Y	Y	Y	Y
C3	Y	Y	Y	Y	Y
C4	Y	Y	Y	Y	Y
C5	Y	Y	Y	Y	Y
C6	Y	Y	Y	Y	Y
C7	Y	Y	Y	Y	Y
C8	Y	Y	Y	Y	Y
C9	Y	Y	Y	N	Y
C10	Y	Y	Y	N	Y
C11	Y	Y	Y	Y	Y
C12	Y	Y	Y	Y	Y
C13	Y	Y	Y	Y	Y
C14	Y	Y	Y	Y	Y

Note: Y=Yes, N=No, CD = Cannot Determined, NR= Not Reported. Adapted from <https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools>

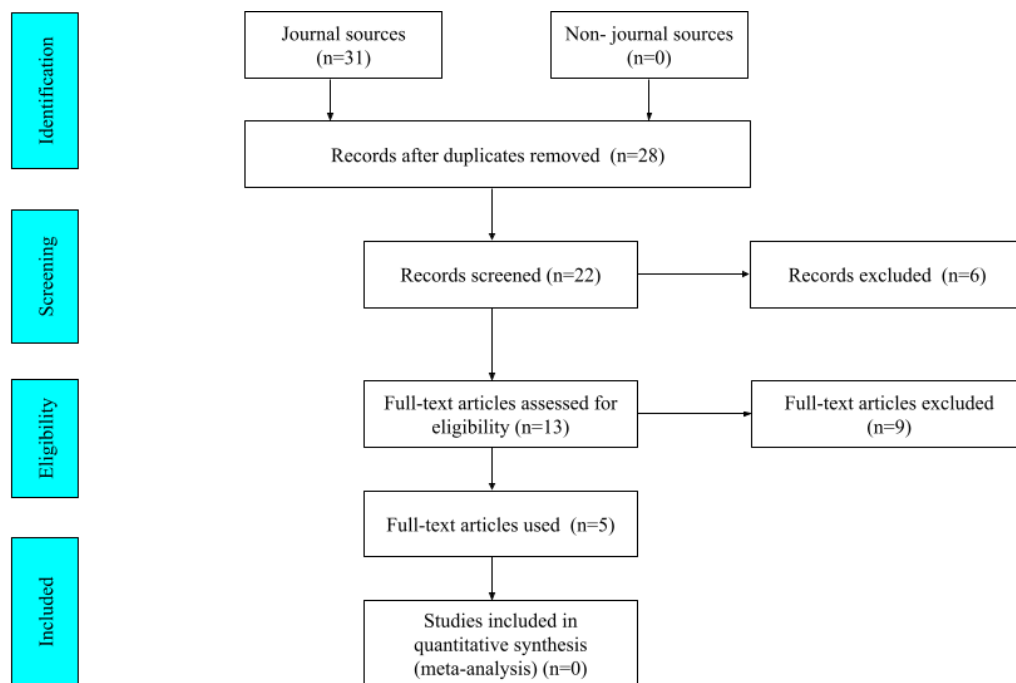


Figure 1. PRISMA 2009 Flow Diagram

**Table 2.** Summarization of 5 Main Sources

No.	Author (Year), Country	Study Type	Total Subject	Intervention	Result		
					OHI-S	Patient Behavior	Patient Knowledge Level
1	Bowen et al., (2017), United States	Randomized Controlled Trial	50 subjects were divided into a control group and an intervention group	The intervention group subjects were given short messages three times a week for three months	The difference in OHI-S scores was much better in the intervention group	Subjects in the intervention group were more obedient in maintaining oral health	Not reported
2	Cozzani et al., (2017), Italy	Randomized Controlled Trial	84 orthodontic subjects were randomly divided into three groups	Educated based on the group placed. I: Education in the clinic. II : Education with short messages twice a week III: Education via short telephone once a week	Subjects in the third group had better OHI-S than group two, and group two had a higher OHI-S than group one	Not reported	Patients understand more about dental and oral health as assessed from the post-test
3	Eppright et al., (2017), Australia	Randomized Controlled Trial	42 orthodontic patients	Provide reminder messages and education once a week	Improved in bleeding index, modified gingival index, and plaque index values	Improved after four offline meetings (with one- month intervals)	Increased in knowledge
4	Guram et al., (2018), India	Randomized Controlled Trial	60 patients with fixed orthodontics were divided into two groups; control and intervention groups	The intervention group was given reminder messages for three months	The intervention group showed improvement in the OHI-S scores	Not reported	Not reported
5	Garyga et al., (2019), France	Randomized Controlled Trial	86 subjects were randomly divided into two groups	Intervention group patients were given access to an application called GoPerio	Improvement in plaque control and bleeding on probing as well as improvement in gingival inflammation	The patient's behavior changes due to the motivation provided by the GoPerio application	Patients understand more about oral health and motivation to maintain it

messages have various advantages and positive responses from subjects. The author reviews short messages from three aspects as follows:

The first aspect is the potential of short messages in increasing the oral health score (OHI-S). The index is scored by debris and calculus index accumulated. The text messages have the purpose of increasing the patient's clinical result. From the data, there is a significant

difference in OHI-S scores between the intervention group than in the control group.<sup>10,11,12</sup> Progression in clinical outcome can be seen in the intervention group. In addition, Garyga et al., (2019) reported improvements in plaque control and bleeding on probing, as well as improvements in gingival inflammation in the intervention patient group.<sup>14</sup> Ultimately, the usage of text messaging has a serious impact in enhancing the treatment for oral diseases.

The second aspect is a change of patients' behavior. The subjects who received the intervention reported having better dental and oral health behaviors. This can be assessed by the habit of taking care of oral health such as tooth brushing, mouth washing, and flossing. In the study of Bowen et al., (2017), the results of research in the form of behavior were found to be very significant, such as paying more attention to tooth brushing schedules and reducing snacking. This was also added by Garyga et al., (2019), due to the motivation patients got in the GoPerio application.<sup>10,14</sup> By increasing the patients' motivation and repairing its behavior, the clinical outcome will adjust indirectly.

The third aspect is the increasing score of oral health literacy. The results assessed by the authors are the level of patient knowledge which can be seen in pre and post-tests. Cozzani et al. (2017) conducted a post-test to measure the education of the subjects after the study and the results showed a qualitative improvement. Several other studies have also added that there is an increase in knowledge in the causes and development of disease, which makes the subject more critical.<sup>11,12</sup> Oral health literacy is the key to improve patients' clinical results and quality of life. By increasing the oral health literacy, patients will have less incident and complications to oral diseases.

On a final note, text messaging for education and reminders was proven to increase oral health index simplified, health behavior, and oral health literacy. Upcoming research need to be done to test the usage in Indonesia.

## CONCLUSIONS

In summary, it can be concluded that reminder messages to perform oral routines have the potential to improve the dental and oral health of the Indonesian people and even reach almost all levels of society. The use of reminder messages is reported to have a positive impact starting from increasing knowledge about oral health, and slowly changing behavior patterns about maintaining oral health, to improve dental and oral health as indicated by the OHI and OHI-S scores. However, some people have yet to keep up with technological developments, such as not owning a device or not understanding how to use a device. Therefore, more studies and development are needed regarding reminder messages supporting the quality improvement and education of dental and oral health in Indonesia.

Conducting scientific studies in Indonesia regarding implementing reminder messages to increase oral health index scroll, behavior in maintaining oral hygiene, and oral health literacy. Developing and perfecting the

implementation of technology is needed so that it can reach layers of society inclusively. For future development, it is needed to adjust the concept of reminder messages with the socio-economic culture in Indonesia.

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