

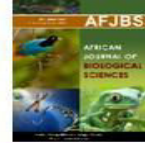
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The Impact of Reminders on Oral Hygiene Status in Patients Undergoing Fixed Orthodontic Treatment: A double-blind analysis

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Abstract

Aim: The objective of this study was to investigate potential disparities in oral hygiene between patients who receive direct text messages and those who do not.

Material and Methods: The study focused on patients between the ages of 12 and 40, as this age range is commonly associated with those seeking orthodontic treatment. The questions were presented in a format that was simple to grasp, concise, and offered multiple options to choose from. A total of 120 patients undergoing fixed orthodontic treatment and meeting the inclusion criteria were randomly assigned to two equal groups: a control group and a study group receiving text messages. Throughout the study period, participants in the study group received a weekly text message reminder about oral hygiene, while those in the control group did not receive any messages. The oral hygiene of both groups was assessed at the beginning, 2 months, and 3 months using the Plaque Index (PI) in addition to evaluating the presence of white spot lesions (WSL).

Results: The average age of the patients in the control group was 14.9 years, whereas in the study group it was 15.7 years. During the baseline and 2nd month, the study group had a higher average PI score compared to the control group ($p > 0.031$). However, after the 3rd month, the PI score decreased in the test group ($p > 0.001$). WSL did not show any notable difference at the beginning, but it significantly decreased in the study group after three months.

Conclusion: Text messages have proven to be effective in promoting oral hygiene among patients, improving compliance, and maximizing treatment success. In

addition, orthodontic patients are encouraged to actively engage in their treatment, fostering a sense of responsibility for their own health.

Key Words: Fixed Orthodontic Treatment, Oral Hygiene Status, Plaque Index, Text messages

Introduction

Orthodontic providers have a limited range of strategies to educate their patients about the significance of maintaining consistent and effective dental hygiene. During the early stages of orthodontic treatment, a significant amount of information about oral hygiene is usually given verbally within a limited timeframe. However, there may be a lack of effective reinforcement during subsequent visits. This approach lacks sufficient time for patients to fully comprehend the material, potentially resulting in limited exposure to the information until their next appointment, if at all.^{1,2}

Consequently, the patient faces difficulties in recalling crucial information since studies have shown that, on average, half of the verbal communication directed towards patients is repetitive. This is made worse by the limited support provided to the patient in between appointments. It appears that repeatedly providing a patient with small amounts of information is more effective than overwhelming them with additional facts and advice.³⁻⁵

Previous research has indicated that oral hygiene can be enhanced through the use of reward systems or active reminder therapy. In recent times, there has been a significant surge in mobile usage. In the late 1980s, the creation of short message service (SMS) revolutionised communication with the advent of digital technology, specifically the global system for mobile communication. In the medical field, mobile phones have been utilised for various services, including appointment reminders and medication alerts through SMS alerts or phone calls.^{6,7}

Prior research has indicated that follow-up text messages from orthodontic clinics have been effective in reducing patients' self-reported pain. Automated text messages also assist in maintaining communication with patients during extended appointment intervals. Thanks to the advent of text messaging, it has become more convenient to stay in touch with patients.^{8,9} The objective of this study was to investigate potential disparities in oral hygiene between patients who receive direct text messages and those who do not.

Material and Methods

This study was conducted on orthodontic patients who presented to the Department of Orthodontics at a dental college. The study focused on patients between the ages of 12 and 40, as this age range is commonly associated with those seeking orthodontic treatment. The questions were presented in a format that was simple to grasp, concise, and offered multiple options to choose from. Prior to proceeding to the main questionnaire, patients were kindly requested to complete the introductory questions for ethical reasons. The questionnaire was distributed fairly among patients from various socioeconomic backgrounds.

Criteria for Inclusion:

1. Ages: 13-21 years
2. Patients who are actively receiving comprehensive orthodontic treatment with fixed appliances.
3. User of a smart phone
4. The patient's dental plaque is clearly visible during the clinical examination.

Exclusion Criteria:

1. Patients with uncontrolled systemic conditions or medications that may affect periodontal health
2. Patients who have a weakened immune system
3. Patients requiring antibiotics for dental treatment
4. Patients with limited hand coordination

A total of 120 patients undergoing fixed orthodontic treatment and meeting the inclusion criteria were randomly assigned to two equal groups: a control group and a study group receiving text messages. All participants provided written informed consent. All participants received standardized oral hygiene instruction prior to the start of the study. A group of text messages was sent to remind participants about oral hygiene, while another group did not receive any messages. Throughout the study period, participants in the study group received a weekly text message reminder about oral hygiene, while those in the control group did not receive any messages. Throughout the study period, participants in the study group received a weekly text message reminder about oral hygiene.

The scoring criteria for plaque index were utilised. The oral hygiene of both groups was assessed at the beginning, 2 months, and 3 months using the Plaque Index (PI) in addition to evaluating the presence of white spot lesions (WSL). The study involved a trained single examiner who provided oral hygiene instruction. The plaque index was measured for the buccal surface of every tooth. The study involved a trained single examiner who provided oral hygiene instruction.

Statistical analysis

The data were analyzed using SPSS statistical software, version 19, USA. The statistical tests used were the chi-square test and t-test. A p-value of less than 0.05 was considered statistically significant.

Results

The objective of this study was to investigate any potential disparities in oral hygiene between patients who receive direct text messages and those who do not. The study included a total of 120 patients. Out of the total of 120 patients, they were evenly divided into 2 groups. There were 60 patients included in the control group, while the study group also consisted of 60 patients. In the control group, there were 24 males and 36 females, while the study group consisted of 32 males and 28 females. The average age of the patients in the control group was 14.9 years, whereas in the study group it was 15.7 years.

A total of 12 SMS alerts were sent to the text message group over a span of 3 months. During the baseline and 2nd month, the study group had a higher average PI score compared to the control group ($p > 0.031$). However, after the 3rd month, the PI score decreased in the test group ($p > 0.001$). WSL did not show any notable difference at the beginning, but it significantly decreased in the study group after three months ($p > 0.003$).

Table 1: PI scoring in the patients in the study

PI	Control group (n = 60)	Study group (n = 60)
Baseline mean \pm SD	0.89 \pm 0.67	1.65 \pm 0.54
2 months mean \pm SD	0.88 \pm 0.59	1.22 \pm 0.92
3 months mean \pm SD	1.06 \pm 0.52	0.54 \pm 0.24

Discussion

The study included participants who were at various stages of orthodontic treatment. The duration of treatment was not controlled, which could have influenced the level of subject interest and their ability to incorporate new oral health information into their oral hygiene routine. For example, individuals who are just starting their treatment may be very focused on oral health instructions in order to adjust to having braces. However, individuals in the later stages of treatment, who are already familiar with braces, may have already developed a consistent oral hygiene routine and may be less inclined to adopt new practices. Considering the subject's length in orthodontic treatment could have enhanced the quality of this study.^{10,11}

In the current study, the text message group had a higher average PI score at baseline and at the 2nd month compared to the control group. As a health educator, it's worth noting that the study group experienced a decrease in white spot lesions (WSL) thanks to the implementation of text message reminders, which led to improved oral hygiene. This study included patients who had undergone fixed orthodontic treatment approximately 2 months ago. A text message was sent to the study group every week for a period of 3 months, totaling 12 messages.

Surveys conducted on orthodontic patients have revealed a concerning lack of knowledge, attitude, and practice when it comes to oral hygiene. It is clear that there is a pressing need for improved education and motivation in this area. Therefore, it is crucial to raise their awareness through the implementation of preventive programs. Research has indicated that practicing good oral hygiene can help prevent periodontal disease, bone loss, and cavities while undergoing orthodontic treatment. Nevertheless, these studies vary significantly in terms of content, design, duration, and methods of oral hygiene motivation. While some have compared different methods for motivation, others have compared techniques involving indicator dyes or showing live bacteria to patients using a phase contrast microscope.

Iqbal et al found that the text message reminder method has been shown to be effective in enhancing the oral hygiene of orthodontic patients. The study observed notable reductions in PI scores, bleeding index, and modified gingival index among the participants who received text messages, as compared to those in the control group.¹²

Regular check-ups are important for maintaining good oral hygiene. During these appointments, patients receive feedback on their oral hygiene routine and learn how to make improvements for better results. Throughout the entire procedure, dentists use different techniques to encourage their patients to follow oral hygiene practices. One way to achieve this is through chair-side education, video demonstrations, and regular reminders. Consistently practicing good oral hygiene is essential for maintaining optimal oral health during orthodontic treatment.

Conclusion

It is clear that text messages have proven to be effective in promoting oral hygiene among patients, improving compliance, and maximising treatment success. In addition, orthodontic patients are encouraged to actively engage in their treatment, fostering a sense of responsibility for their own health. It is important to note that this study had some limitations. One limitation was the short duration of the study, which may have impacted the ability to fully evaluate the long-term effectiveness of text messages. Further investigations would be needed to gain a more comprehensive understanding of this effectiveness.

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