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Original Research Article

Evaluation of audio-visual aids as a medium of periodontal health education for patients with periodontitis

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ABSTRACT

Background: It is of paramount importance that patients be educated of their clinical conditions and the available treatment options. Audio-visual aids can be used as a beneficial modality to help the clinicians in the educational task by presenting the necessary information to the patient in a simpler manner.
Methods: A randomized controlled trial was done to assess the retention of knowledge amongst periodontitis patients after receiving oral health education using audio-visual aids. The effect of audio-visual aids was compared to standard education in the form of verbal narration for periodontal patient education. A total of 60 consented periodontitis patients were recruited for the study and randomly allocated to audio-visual group or control group according to computer generated randomization. All patients received a pre-test questionnaire to assess their baseline knowledge regarding oral health and treatment modalities. A post-test questionnaire was taken immediately after receiving the two sets of education to assess the retention level of knowledge. The questionnaire contained 15 multiple-choice questions.
Results: There was no significant difference in baseline knowledge between the two groups (p value=0.317). Patients receiving the audio-visual aids had significantly higher scores for the post-test (mean±SD=7.56±2.31) when compared with patients receiving standard education (mean±SD=5.73±2.94; p value=0.01*).
Conclusions: Retention of knowledge is significantly higher in the audio-visual group when compared to the control group. Audio-visual aids can be an effective medium for patient education in day-to-day dental practice.

Keywords: Audio-visual aids, Oral health care, Patient education

INTRODUCTION

Patient education is an important aspect of dentistry to motivate individuals for undergoing any procedure.[1] It is the responsibility of a periodontologist to inform and motivate patients to ensure that they understand the aetiology of periodontal diseases, the available treatment options and the consequences of no treatment or non-compliance.[2]

For the patients to make informed treatment decisions, they must be provided with pertinent information presented in a manner that promotes understanding. Typically, this information is imparted through a verbal discussion with the clinician.[3] Since the patients do not understand the complexity of the dental procedure, it is important to have a patient fully informed and engaged in the decision-making process.[2]

Evidence suggests that patients often do not understand what is being said to them when information is given during a dental encounter due to cultural, educational or language barrier between clinicians and patients. This often discourages the patient to undergo the treatment.[3]

The use of audio-visual aids is advocated in order to bridge this gap between the patients and the clinicians to promote understanding of their clinical conditions and treatment

options.[1] Various audio-visual aids such as video-films, computer-based 3D models and animations can be useful in imparting oral health-related knowledge to out-patient department patients.[4]

An audio-visual aid plays a vital role in providing education in a stress-free environment by targeting the direct care of patients and ensures that the delivery of the relevant information reaches the patients.[5] Currently, most clinical settings are still without the use of multimedia tools to assist in the process of informing patients about the diseases and different procedures. A recent study of Clayton et al confirmed the limited use of electronic means in dental patient education.[6] Recent literature shows growing evidence with regards to the benefit of multimedia tools in enhancement of patients' satisfaction and improvement of knowledge retention.[1-4] Moreover, patients who belong to rural areas in developing countries, have little or no knowledge regarding the dental procedure and hence it is advisable that they be provided an audio-visual based explanation of the dental procedure for their better understanding.

Therefore, the aim of the study was to evaluate the role of audio-visual aids on knowledge and retention of information by patients.

METHODS

Study design

This was a randomized controlled trial conducted amongst patients visiting the outpatient, department of periodontics, KAHER KLE VK Institute of Dental Sciences, Belagavi, Karnataka, between March 2023 to May 2023. To participate in the study, following inclusion and exclusion criteria had to be met: consenting adults in the age group of 35-44 years (according to WHO index age group). No previous periodontal treatment. Patients visiting for the first time who were diagnosed with gingival and periodontal disease. No medical conditions where memory loss could occur. Patients meeting these criteria were invited to participate in the study by obtaining informed consent.

The sample size was 60, calculated according to the mean values obtained from the study done by Cleeren et al. A total of 146 patients were evaluated out of which 60 were selected according to the inclusion criteria. The subjects were assigned a patient number and then randomly divided over the two study groups (1:1 ratio) according to computer generated randomization.

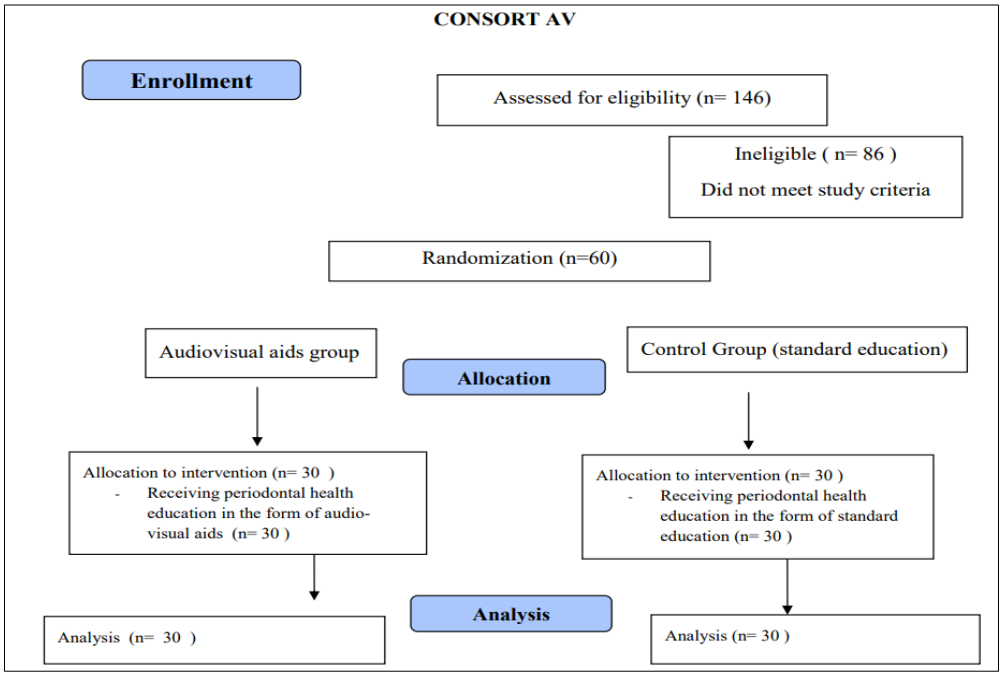

Figure 1: CONSORT flow diagram of the progress through enrolment, intervention allocation, and analysis of a parallel-randomized trial of two groups (AV and CO-group).

Intervention groups

Group I: audio-visual (AV)

The information was provided in the form of videos depicting basic oral hygiene measures, mechanical and chemical plaque control, a general view of periodontitis and treatment options. The duration of the video was 5 mins.

Group II: control (CO)

The information was provided in the form of verbal narration where the patient was explained about the same.

Outcome measures

Periodontal knowledge and retention levels were assessed and comparison was done between both the groups before and after the two modes of education.

Study set-up

The patients were divided into two groups. Both groups went through the following procedures. A questionnaire in the form of multiple-choice questions was used to evaluate the patient regarding their general understanding of periodontal disease and the available treatment options. The patients had to fill in the questionnaire at two different times. The pre-test gives an idea of the basic knowledge of the patients before getting the two modes of information. Patient education was provided by showing videos (AV) or through verbal narration (CO). The post-test was completed immediately after education was provided.

Statistical analysis

Statistical analysis of data was processed using Microsoft excel 2016 and statistical package for the social sciences (SPSS) software (version 21, SPSS Inc., Chicago, IL, USA). Mean and standard deviation of all parameters were calculated. For intra group and inter group comparison, independent t-test was carried out. P≤0.05 was considered as a significant result.

RESULTS

The demographic characteristics of both groups, including age and gender, are presented below. A total of 60 subjects were recruited for the study, out of which 26 were males (43.3%) and 34 were females (56.7%). The percentage of male and female participants was 40% and 60% in the AV group and 46.7% and 53.3% in CO group, respectively. The mean age of the study participants was 35.08±4.56 (Table 1).

The participants were asked to fill a pre-test and a post-test (audio-visual versus standard education) questionnaire related to oral hygiene, periodontal heath, disease and treatment to assess their knowledge. The responses were similar in both the groups, signifying that there was no difference in the baseline knowledge of both the groups. However, the post-test reveals that there was a difference in correct responses in both the groups, wherein, the highest percentage of correct responses for AV group was 93.3% and that of CO group was 86.7%, with respect to the same question. The percentage of participants with correct responses are given in Table 2.

Table 1: Demographic distribution of the patients.

Gender	AV group		CO group		Total	
	N	%	N	%	N	%
Male	12	40	14	46.7	26	43.3
Female	18	60	16	53.3	34	56.7
Total	30	100	30	100	60	100

Table 2: Percentages of patients with the correct response to the questions for the pre-test and post-test in the AV and CO-group. The correct response is highlighted in the following questionnaire.

S. no.	Questions	Audio-visual group		Control group	
		Pre-test	Post-test	Pre-test	Post-test
1	How many times should you brush your teeth? a) Once b) Twice (morning and night) c) Only sometimes d) I don't know	76.7	90.0	70.0	90
2	How should you brush your teeth? a) Fast and horizontal motion b) Vertical motion c) Gentle circular motion, swiping down d) I don't know	76.7	93.3	53.33	86.7
3	Apart from tooth brushing, what other methods are used to improve oral hygiene: a) Mouthwash b) Dental floss c) both a) and b) d) I don't know	43.3	66.7	36.67	43.3
4	If food gets stuck in between your teeth what to use a) Dental floss b) Interdental brush c) both a) and b) d) I don't know	30.0	50.0	33.30	56.7
5	How often should you change your toothbrush? a) Every month c) Every 2 years d) I don't know b) Every 3-4 month when bristled become frayed	16.7	73.3	40.0	73.3
6	Gingivitis means: a) Healthy gums b) Gums are light in colour c) Red, swollen, bleeding gums d) I don't know	15.0	53.3	23.3	43.3

Continued.

S. no.	Questions	Audio-visual group		Control group	
		Pre-test	Post-test	Pre-test	Post-test
7	When gingivitis develops into periodontitis: a) There is bone loss b) Teeth become mobile/loose c) Both a) and b) d) I don't know	3.3	26.7	20.0	26
8	Periodontitis leads eventually to: a) Decay of all teeth b) Loss of teeth c) Yellowing of teeth d) I don't know	6.7	43.3	13.30	23.3
9	How often should you visit your dentist? a) Every 6 months b) Every 5 years c) Every 2 years d) I don't know	10.00	46.7	0.00	20
10	Which specialist should you visit if you have gum disease: a) Periodontist b) Endodontist c) Oral pathologist d) I don't know	12.00	30.00	3.30	13.3
11	Periodontitis is linked to a) It is not linked to any other disease b) Heart disease, premature birth and uncontrolled diabetes c) Heart disease only d) I don't know	5.00	33.3	0.00	10
12	Tartar or calculus is removed by a) Brushing the teeth b) Water c) Scaling d) I don't know	6.7	23.3	6.70	6.7
13	Scaling results in a) Maintenance of healthy gums b) Fracture of teeth c) Weakens the teeth d) I don't know	13.3	63.3	13.30	46.7
14	The most important act in periodontal treatment is: a) Oral hygiene between teeth and gums b) Maintenance of clean tongue c) Teeth whitening d) I don't know	20.0	26.7	23.30	33.3
15	If the periodontal pockets persist even after scaling and root planning is done: a) Gum/flap surgery is advised b) No other treatment required c) Root canal treatment is advised d) I don't know	5.0	36.7	6.70	13.3

Concerning pre-existing knowledge, no statistically significant differences were observed between both groups at baseline level. Although the knowledge scores improved in both groups after the periodontal patient education, the scores for the post-test were significantly higher in the AV-group compared with the CO-group (Table 3).

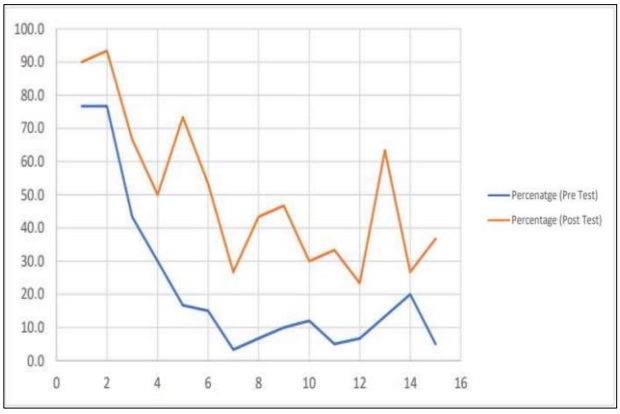

Figure 2: Distribution curves for the AV-group in pre-test and post-test, group I (AV).

X-axis: the scores on 15 points for each test; Y-axis: the percentages for each score

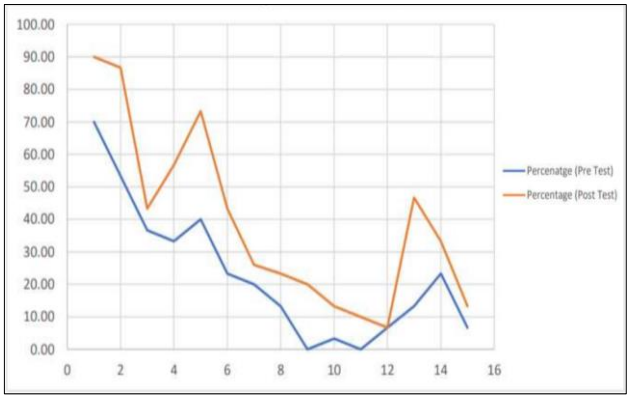

Figure 3: Distribution curves for the CO-group in pre-test and post-test, group II (CO).

Table 3 : Mean and standard deviation for both the groups.

Time point	Mean±SD		P value
	Group I (AV group)	Group II (CO)	
Pre – test	2.93±1.99	3.43±1.83	0.317
Post – test	7.56±2.31	5.73±2.94	0.01*
P value	0.000*	0.001*	

The distribution of patients over the different results on the two tests in the audio-visual group is depicted in Figure 2 and the distribution of patients over the different results on the two tests in the control group is depicted in Figure 3. Pre-test results are similar in both groups.

DISCUSSION

One of the most important tasks of a dental clinician is to provide relevant information to the patients about healthcare and disease. Patient education not only helps in guiding and motivating the patients for any treatment, it also helps reducing their anxiety. In a dental setting, the commonly practiced way of educating patients is through standard education, wherein there is a verbal discussion between the clinician and the patients. The patient should be informed about their condition in a simple and meaningful manner. Audio-visual aids help in better explanation since the information is presented in a pictorial fashion.

The cognitive theory of multimedia learning as described by Mayer and Moreno makes it clear why the different multimedia tools have an advantage above a written leaflet or a verbal explanation.[7] This theory states that deeper learning can occur when information is presented in both text and graphics than by text alone. There are two channels for learning: auditory and visual. Both of these channels are used to process information into working memory.

There is evidence to support this in the dental setting. Renton-Harper et al in their study showed that a watch-and-follow instructional video improved plaque removal by an electric toothbrush compared to the use of the written instructional leaflet.[8] Barkhordar et al undertook a study to compare the effectiveness of an information leaflet with a multimedia program in informing dental implant patients. The results showed that although both methods are effective in informing the patients, the multimedia program had a more positively significant result.[9] In another study done by Mladenovski and Kieser, the effectiveness of an information pamphlet with that of a multimedia programme in informing patients about third molar surgery was evaluated and it was seen that the preference for the multimedia option was significantly higher than the pamphlet group after the intervention.[10]

In accordance to the above studies the results of the present study also demonstrate that the Audio-visual aids improved knowledge levels among the periodontitis patients. That improvement is significantly higher compared with the patients receiving standard education through verbal explanation. A potential reason for the higher scores in the audio-visual group is that the videos make it possible to display the teeth and their surrounding tissues in such a way that the patients can recognize and link with their prior knowledge. Another explanation of the better knowledge scores could be the reduction in the complexity of the knowledge due to pictorial representation.

Similar findings were observed in a study done by Cleeren et al, where a randomized controlled parallel trial was conducted to investigate the effect of 3D animation on the increase and recall of knowledge on periodontitis by patients with periodontitis. Patients receiving the 3D animations education had significantly higher scores for both the post-test and the follow-up test, when compared with patients receiving verbal narration with real-time sketch animation education.[1] Even in the field of medical education a study by Stromberg et al, to evaluate the effects of a single-session, interactive computer-based educational program on knowledge, compliance and quality of life in heart failure patients. The increase in knowledge was significantly higher in the computer-based group after 6 months ($p=0.03$).[11]

Good visualisation with videos could reduce the complexity of understanding and result in more retention of information.[12] The use of audio-visual aids in patient education not only favours the patients understanding during patient–dentist communication, it also contributes to patients' compliance with the treatment of periodontitis. This enhancement of understanding leads to an informed patient who is engaged in positive health behaviour and participating in health decisions.[13]

CONCLUSION

Audio-visual aids can be an excellent tool to retain knowledge about diseases and treatment. The use of audio-visual aids like video-films, case images and 3D animation in a dental setting can enhance knowledge and compliance with treatment and can result in a more active involvement of the patient in dental decision-making. Long term studies should be conducted in order to assess the role of audio-visual aids in recall of the patients over a longer period of time. It should be noted that they cannot be used as a replacement for the interaction between patient and health professional, but used as a powerful medium for assisting in the educational task.

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