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Effectiveness of post-extraction instruction delivery methods on patients' understanding and compliance: a randomized controlled trial

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Abstract

Background Video-based educational tools are becoming more commonly used among medical professionals to deliver instructions to patients. However, no studies have assessed patients' compliance with and understanding of post-operative instructions provided in the form of a video after tooth extraction. Therefore, this study aimed to evaluate the effectiveness of two post-extraction instruction delivery methods (conventional versus video-based instructions) on patients' understanding of and compliance with post-operative care following dental extraction.

Methods This randomized controlled trial assessed patients who had undergone dental extraction at the dental teaching hospital at Umm Al-Qura University, Saudi Arabia. Patients were randomly assigned to two groups: the conventional group ($n=68$) received written instructions, and the interventional video group ($n=58$) was provided with instructions delivered in a video. Patient compliance and understanding of post-operative instructions after extraction were assessed via a questionnaire after two days. The questionnaire comprised three parts: the first part collected demographic data, the second part evaluated the patient's understanding of the post-operative instructions and the third part measured the patient's compliance with the post-operative instructions via close-ended questions. The collected data were analyzed via descriptive statistics and chi-square tests.

Results This study involved 126 patients randomly divided into two groups: the conventional group ($n=68$) and the video group ($n=58$). The analysis of the questionnaires revealed no significant difference between the groups in terms of patient adherence to the post-extraction instructions.

Conclusion Post-operative instruction videos are as effective as the conventional method in helping patients understand post-operative instructions after extraction.

Trial registration This randomized controlled trial was registered at the ISRCTN registry with the study registration number ISRCTN11048490.

Keywords Patient compliance, Patient education, Tooth extraction

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Background

Tooth extraction is one of the top five frightening dental procedures [1]. It is associated with many post-operative complications, including pain, swelling, dry socket, infection, and discomfort [2]. Therefore, good communication with patients and providing them with sufficient information regarding the procedure preoperatively, during surgery and after extraction reduce their anxiety and risk of complications [3, 4]. The information given to patients may include expected post-operative events and consequences, as well as addressing any possible misunderstandings they may have regarding the given instructions. Therefore, successful delivery of instructions is crucial to minimize or prevent complications and improve patients' general health [5].

It is important to provide patients with correct information regarding the extraction prognosis, treatment, and post-operative care. Moreover, effective communication with patients leads to better understanding, remembering, and adhering to the post-operative instructions, as approximately 40–80% of the information given by healthcare professionals is instantly forgotten [6]. This information loss may be due to how the information is delivered or the patient's education and status [7]. Furthermore, many factors, such as age, sociocultural background, and preoperative anxiety, can affect the quality of the information and patient adherence to post-operative instructions [8]. Patients and their families might not remember verbal information, so a home reference is needed that they can refer to, some given instructions should be revised, and important points should be reviewed. The more patients understand and become familiar with post-operative care and instructions, the better their recovery [9]. Many studies have assessed patients' compliance and understanding after the use of different post-operative delivery methods, revealing a statistically significant increase in patient compliance and understanding after receiving instructions in both verbal and written forms, which leads to decreased post-operative complications [10, 11]. Gheisari et al. reported that patients who received instructions verbally experienced the most intense and severe pain and least satisfaction, whereas patients who received verbal and written instructions had the lowest pain intensity and were most satisfied with treatment outcomes [11].

However, one study conducted by Alvira-González, J. and Gay-Escoda, C. (2015) revealed no difference in patients' adherence to instructions, whether they were given verbal or written or additional information one week after surgical extraction of impacted lower third molars [8]. Another study conducted by Shenoi RS et al. (2021) indicated that compliance was significantly greater when patients received visual and verbal instructions than when patients received verbal instructions following the surgical extraction of impacted lower third molars [12].

Educational videos can be easily viewed by many people in different locations, providing consistent messages in an auditory and visual manner [13]. Video recording can also provide real-time feedback that helps people adjust their behavior. In healthcare, remote video auditing has been used to improve hand hygiene, significantly increasing compliance from 7 to 82% [14]; thus, video-based educational tools have become commonly used among medical professionals [9]. Many studies have assessed the conventional methods of delivering post-operative instructions in written and verbal forms [10, 11, 15]. However, to our knowledge, no studies have assessed compliance with and understanding of post-operative instructions after dental extraction delivered in a video. Therefore, this randomized controlled trial aimed to evaluate the effectiveness of different post-extraction instruction delivery methods—conventional (verbal and written) versus video-based instructions—on patients' understanding of and compliance with post-operative care following dental extraction.

Methods

Ethical approval

Institutional Review Board (IRB) approval was obtained from Umm Al-Qura University with approval number HAPO-02-K-012-2022-11-1337.

Subjects and study design

Among the 194 participants, 160 met the inclusion criteria and underwent dental extraction over a two-month period at the Oral and Maxillofacial Surgery Clinic, Faculty of Dental Medicine, Umm Al-Qura University, Makkah, Saudi Arabia. These 160 patients were then invited to participate in the study.

The study included male and female patients aged 18 years and older who had undergone simple dental extractions. Participants needed to understand either Arabic or English, have an electronic device with the WhatsApp application, and possess knowledge about how to complete electronic surveys. Patients with uncontrolled systemic diseases, special needs, those who required surgical extraction, or who lacked access to or knowledge of social media were excluded.

The sample size calculator (calculater.net) estimated a minimum of 112 participants to be recruited with a confidence level of 95% at a 0.05 significance level and 0.90 power. Patients were randomly assigned by simple randomization, flipping coins (head = conventional method, tail = video) into two groups before each clinical session; the conventional group ($n = 68$) was given verbal and written post-extraction instructions (conventional method), whereas the video group ($n = 68$) was given

verbal and educational video containing identical information to the written instructions.

Clinical procedures

Extraction method

Single-tooth simple extraction was performed atraumatically under local anesthesia by senior students in the final two years of their dental training, along with dental interns who worked independently, all under the supervision of oral surgery consultants who were blinded to the study.

Post-operative delivery method

Once the extraction was completed, two investigators from the research team were responsible for delivering the post-operative instructions and collecting the data. Participants in the conventional group received verbal and written instructions typically provided for post-operative care, and they were given a paper copy to take home to access and review the instructions at their convenience. (Written Post-Operative Instructions after Tooth Extraction). In contrast, the interventional video group received verbal and video created by the research team that visually explained all the post-operative care instructions (Video Post-Operative Instructions after Tooth Extraction). The video was sent to participants via the WhatsApp social platform immediately after extraction, allowing them to access and review the instructions at their convenience. This video was recorded at the Faculty of Dental Medicine at Umm Al-Qura University and was designed to clearly illustrate each step of post-operative care following tooth extraction. The video presented the same information as the written instructions included clear visual demonstrations of each step in post-extraction care, with important behaviors marked for easy identification. Correct behaviors were highlighted with a green checkmark (✓) symbol, whereas incorrect behaviors were marked with a red (X) symbol to indicate what should be avoided to enhance understanding. The length of the video was 3 min.

Understanding and compliance questionnaire

Patients' understanding of and compliance with post-operative surgical instructions were evaluated via an online, closed-ended questionnaire sent via WhatsApp two days after extraction. Before beginning the questionnaire, the participants were asked to review and sign an online consent form. Once they provided their consent, they were directed to complete the questionnaire. The expected time for completing the questionnaire was approximately five to seven minutes. The questionnaire consisted of three parts: the first part collected demographic data (age, gender, educational level, and nationality), the second part measured participants' understanding of the post-operative instructions, and the third part assessed their compliance with the post-operative instructions via close-ended questions obtained from previous studies with modifications [16].

A pilot study was performed to ensure the validity of the video and the questions of 25 participants, which resulted in very good validity, with a Cronbach's alpha score of 0.8. Feedback was also gathered from healthcare experts in the field who administered the instructions, providing additional insights into the feasibility and practicality of using the video.

Statistical analysis

The data were analyzed via IBM® SPSS® Statistics version 25 software. Descriptive data were expressed as frequencies and percentages and were analyzed via chi-square tests. The data analysis was performed by a blinded statistician.

Results

Baseline characteristics

Among the 160 participants who underwent tooth extraction, 126 completed the questionnaire: 68 in the conventional method group and 58 in the video group (Fig. 1).

Most participants were non-Saudi (74.6%), with over half of them being females (57.1%). The highest percentage of participants belonged to the 18–25 years age group (34.9%), and 31.0% had a high school education level. In terms of previous extraction experiences, 82.8% of the conventional group and 76.5% of the video group reported having undergone tooth extraction. With respect to their knowledge of post-operative instructions, 62.1% of the conventional group and 70.6% of the video group had received prior education on the topic. There were no statistically significant differences between the groups regarding their demographic data Table 1.

Knowledge of post-extraction instructions

The knowledge of patients regarding post-extraction instructions based on the method of instruction delivery is presented in Table 2.

Overall, more than 98% of the participants in both groups reported that they understood the post-operative instructions and remembered the post-operative instructions given by the dentist after surgery. Additionally, most participants in both groups were aware of the possibility of pain and discomfort, as well as limited mouth opening after surgery. However, slightly more participants in the conventional group than in the video group were aware of bleeding at the time of extraction, but this difference did not reach statistical significance ($P = 0.047$).

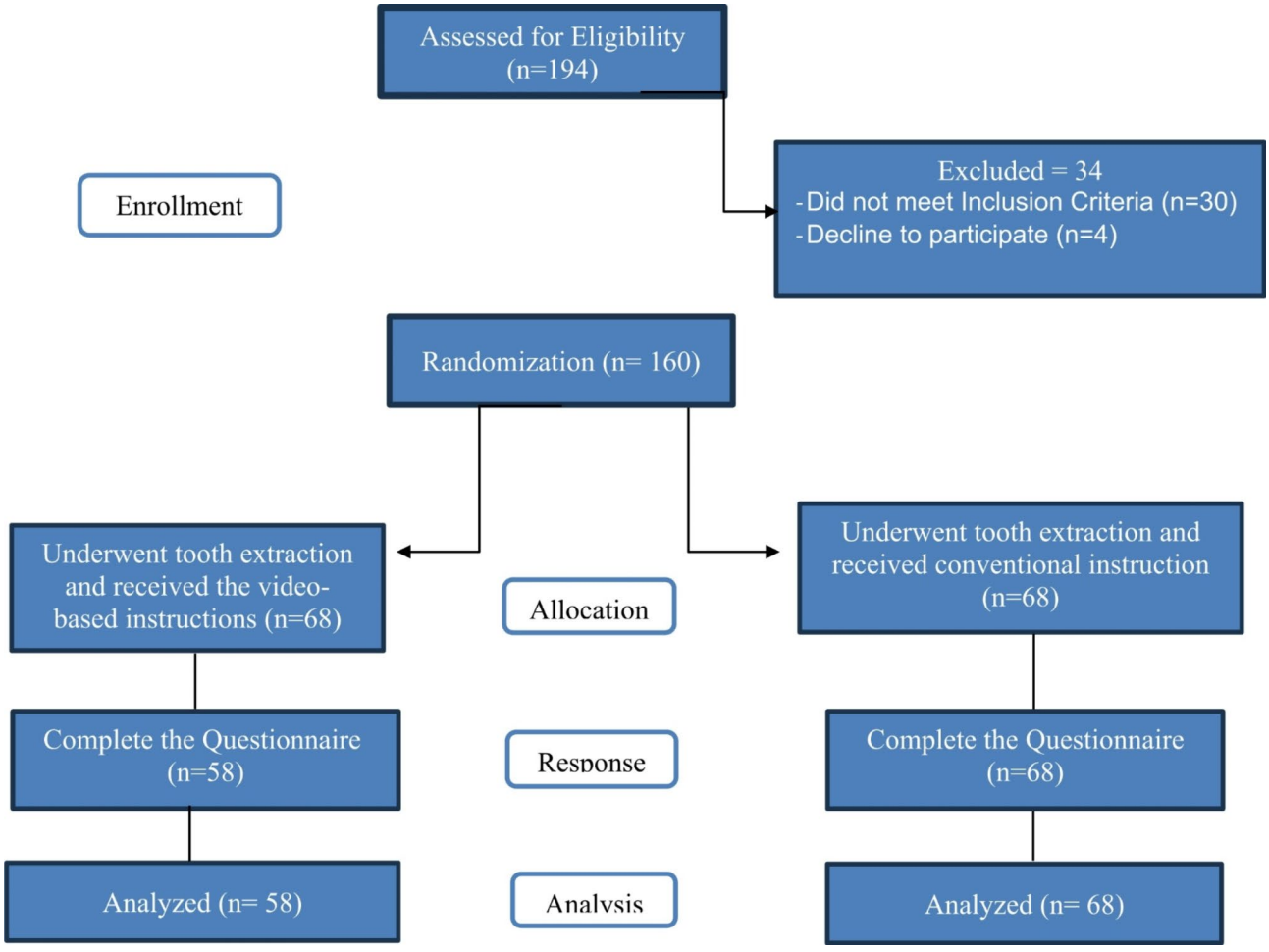

Fig. 1 Participant interaction flowchart

Table 1 Demographic characteristics of the study sample

Demographics		Total cohort *n* = 126	Conventional group *n* = 68	Video group *n* = 58	*P* value
Age	18–25	34.9%	35.3%	34.5%	0.309
	26–35	26.2%	29.4%	22.4%	
	36–45	15.1%	17.6%	12.1%	
	46–56	23.8%	17.6%	31.0%	
Gender	Male	42.9%	47.1%	37.9%	0.302
	Female	57.1%	52.9%	62.1%	
Nationality	Saudi	25.4%	30.9%	19.0%	0.126
	Non- Saudi	74.6%	69.1%	81.0%	
Educational level	Elementary School or Less	27%	32.4%	20.7%	0.444
	Middle School	20.6%	20.6%	20.7%	
	High School	31%	29.4%	32.8%	
	Bachelor's degree or higher	21.4%	17.6%	25.9%	

Table 2 Patients' understaning and knowledge of post-extraction instructions

Questions	Conventional group	Video group	*P* value
	Yes %	Yes %	
I understood the post-operative instructions	98.5%	98.3%	0.910
I remember the post-operative instructions given by the dentist after surgery	98.5%	100%	0.354
Do you agree that pain and discomfort may occur after surgery?	89.7%	89.7%	0.993
Do you agree that limited mouth opening may occur after surgery?	82.4%	82.8%	0.952
Do you agree that bleeding will occur at the extraction site?	97.1%	87.9%	0.047*

Table 3 Compliance with post-extraction instructions

Questions	Conventional group	Video group	*P* value
	Yes %	Yes %	
Did you strictly follow the recommendation of not biting on cheeks or lips?	95.6	93.1	0.544
Did you strictly follow the recommendation to bite on gauze for 30 min, until bleeding stops?	98.5	91.4	0.060
Did you strictly follow the recommendation of not drinking or eating anything until the anesthesia effect wears off?	95.6	93.1	0.120
Did you strictly follow the recommendation of maintaining a cold and soft diet for the first 24 h after the operation?	95.6	91.4	0.334
Did you strictly follow the recommendation of not using the straw for a few days after surgery?	89.7	91.4	0.750
Did you strictly follow the recommendation to bite on gauze for 30 min, until bleeding stops?	98.5	91.4	0.060
Did you strictly follow the recommendation of not spitting and swallowing your saliva even if it is stained with blood?	79.4	82.8	0.633
Did you strictly follow the recommendation of not rinsing and brushing the extraction area within the first 24 h?	79.4	89.7	0.117
Did you apply an ice pack the following 20 min after extraction?	54.4	58.6	0.635
Did you discontinue the painkiller when there was no pain?	61.8	60.3	0.871
Did you strictly follow the recommendation of not brushing the operated area for the first 24 h after surgery?	75	75.9	0.911
Did you resume gentle brushing and rinsing one day after surgery when the bleeding stopped?	95.6	91.4	0.334
If applicable, did you strictly follow the recommendation of not smoking for the first 72 h after the operation?	75	74.1	0.912
Did you use warm water and salt frequently after meals?	79.3	82.8	0.614
Did you avoid strenuous exercises?	63.2	74.1	0.190
Did you follow the medication prescription given by the surgeon strictly?	95.6	89.7	0.197
Did you use the double pillows technique while sleeping to reduce the bleeding?	82.4	72.4	0.181
Are you taking care of dental hygiene and gentle brushing regularly after the extraction day?	79.4	81	0.281
Did you take painkillers before the effect of local anesthesia wears off?	88.2	91.4	0.563

Compliance with post-operative extraction instructions

Table 3 presents the patients' compliance with post-extraction instructions and shows that most patients in both groups adhered to all instructions, except for the application of an ice pack within 20 min after extraction. There were no statistically significant differences between the two groups regarding their compliance with instructions.

Discussion

This study evaluated patients' understanding of and compliance with post-operative instructions following dental extraction via two different methods: written instructions and the video. The results revealed no significant differences in compliance between the two groups.

However, participants who received the video instructions demonstrated better retention of information than did those who received the conventional instructions. These results suggest that using a video to deliver post-operative instructions is a promising method for improving knowledge retention and understanding in the field of dental and health education.

These results support other studies that have investigated the effect of using video and images in health education to improve patients' understanding and knowledge and to improve the retention of this information [12, 17]. For example, Nassar AA et al. (2024) reported similar findings in a randomized control trial comparing animated video with verbal explanations for endodontic treatment. While no significant difference was found in patient compliance, the video group showed improved knowledge retention [18]. Furthermore, Shenoi RS et al. (2021) reported that compliance was significantly greater in patients who received both visual and verbal instructions after surgical extraction of impacted lower third

molars than in those who received verbal instructions alone [12]. A further research study by Akshaya N et al. (2024) revealed that patients who received post-operative instructions via video provided favorable feedback, indicating that their comprehension of the instructions was clearer than that of other study participants 24 h post-extraction [19].

An additional factor influencing the results could be the availability of reference materials. According to Kessels (2003), approximately 40–80% of the information provided by healthcare professionals is immediately forgotten [6]. However, in the present study, both groups received verbal instructions plus take-home material, which could have allowed participants to revisit the instructions after the initial delivery. This could have reduced the observed difference between the two groups, as both groups had access to supplementary information at any time. This could explain why no significant difference was found in actual compliance, even though retention appeared to be better in the video group. The developed instructional video was designed to overcome the language barrier, as most participants were non-Saudi but understood either Arabic or English. As mentioned previously, participants had previous extraction experience, which may also affect the true impact of the video in addition to the language barrier.

Compared with other patient education techniques, video-based health education has been found to be more easily comprehended by patients, particularly when presented in an understandable format [17]. The video form was as effective as the verbal and written forms in delivering the post-operative instructions. Therefore, developing videos as a part of post-operative care might improve the understanding of the required instructions, thus decreasing post-operative complications. Using this method in clinical settings may overcome communication problems. Combining video and conventional methods can enforce knowledge and overcome language barriers or low levels of education. These results are consistent with findings from other studies, which suggest that educational videos can be easily shared with patients, delivering consistent messages in both visual and audio manners [13, 18].

This study is one of the few to investigate the use of a video as a delivery method of post-operative instructions for improving the understanding and compliance of patients who have undergone tooth extraction via a rigorous randomized controlled trial design. However, several limitations must be acknowledged. The relatively small sample size may have limited the ability to detect smaller differences in compliance or understanding between the two groups, particularly if the effect size was small. This limitation may also reduce the generalizability of the findings. Furthermore, compliance was assessed through self-reported, close-ended questions, which are susceptible to social desirability bias or inaccurate reporting. Furthermore, the study did not investigate whether the participants needed to revisit the provided materials, either the written paper or the video, more than once before completing the survey. Future research should explore additional factors, such as pervious history of extraction, patient motivation, health literacy, and psychosocial influences, that may affect patient behavior. Moreover, it would be beneficial to assess not only knowledge and compliance but also other variables that could provide a more comprehensive understanding of patient outcomes. Moreover, to ensure broader applicability, it is recommended that future educational videos incorporate multiple languages or subtitles, especially in heterogeneous cities such as Makkah, to better accommodate patients from diverse linguistic backgrounds. It would also be beneficial to test various video formats—such as animated, voice-over, and interactive videos—to determine which type is most effective for improving patient understanding and compliance.

Conclusion

In conclusion, this study supports the use of video-based methods for delivering post-operative instructions following dental extractions. They are as effective as the conventional method for helping patients achieve a complete understanding of instructions, offer promising tools for improving patient understanding, and may help overcome language and communication barriers in diverse patient populations.

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Author contributions

AD and AN contributed to conceptualization, methodology, supervision, and writing the original draft. In addition, AS contributed to the statistical analysis. AA, GA, SA, FY contributed to data collection and project administration. All authors wrote, revised and edited the manuscript prior to submission.

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Data availability

All data that support the findings are available upon reasonable request.

Declarations

Ethics approval and consent to participate

Institutional Review Board (IRB) approval was obtained from Umm Al-Qura University with approval number HAPO-02-K-012-2022-11-1337. In addition, it was registered at the ISRCTN registry with the study registration number ISRCTN11048490. The study followed the ethical principles outlined in the Helsinki Declaration.

Consent for publication

Not applicable.

Competing interests
The authors declare no competing interests.

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