Research Square

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The Effect of Douyin Short Videos on Alleviating Preoperative Anxiety and Postoperative Pain in Patients Undergoing Laparoscopic Cholecystectomy

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Abstract

Objective

To evaluate the effect of Douyin short videos in patient education and distraction methods on preoperative anxiety and postoperative pain in patients undergoing laparoscopic cholecystectomy (LC).

Methods

This randomized controlled trial enrolled 300 patients scheduled for elective LC surgery from September 2025 to March 2026. Patients were randomly divided into three groups: the patient education group (watching Douyin medical education videos preoperatively and postoperatively), the distraction group (watching Douyin nature/space/ocean videos), and the control group (routine nursing care). The State-Trait Anxiety Inventory (STAI) was used to assess preoperative anxiety levels, and the Visual Analogue Scale (VAS) and McGill Pain Questionnaire (MPQ) were used to evaluate postoperative pain intensity.

Results

A total of 283 patients completed the study. After intervention, the state anxiety scores of the education group and distraction group (31.54 ± 8.33 and 33.65 ± 6.81, respectively) were significantly lower than those of the control group (56.71 ± 16.08) ($p < 0.001$). Regarding postoperative pain, the VAS scores and total MPQ scores of the education group and distraction group (VAS: 6.34 ± 1.66 and 6.19 ± 1.72; MPQ: 21.09 ± 7.25 and 20.12 ± 6.37, respectively) were significantly lower than those of the control group (VAS: 8.26 ± 2.11; MPQ: 33.18 ± 6.78) ($p < 0.001$). Both intervention methods showed significant effects on sensory, affective, and miscellaneous pain dimensions, but there was no statistically significant difference between the two intervention groups ($p > 0.05$).

Conclusion

Douyin short videos used for preoperative patient education and distraction can significantly alleviate preoperative anxiety and postoperative pain in LC patients. It is recommended to promote their application in clinical wards.

Introduction

Approximately 6.1% (95% CI, 5.6–6.5) of adults worldwide suffer from gallstones, and the prevalence has remained stable over the past two decades[1]. Gallstones can cause upper abdominal pain and discomfort, decreased appetite, and increase the risk of gallbladder cancer. LC is currently a safe and appropriate method for treating various gallstones complicated with cholecystitis and has been widely

applied in clinical practice[2]. Pain is one of the most common symptoms in LC patients after surgery. Although postoperative pain has been greatly reduced compared with traditional open cholecystectomy, the effects of commonly used analgesics in clinical practice are still unsatisfactory[3]. In 20%-37% of LC patients, pain is the main reason for prolonged postoperative hospitalization, along with other factors such as dizziness and nausea[4]. Postoperative acute pain in LC is a complex and multifaceted pain, manifested as pain due to muscle traction, peritoneal irritation caused by abdominal exudate and inflammation, and pain at the surgical trocar ports.

Preoperative anxiety is one of the factors affecting preoperative sleep in patients, and fear of postoperative pain is known to be the primary cause of anxiety[5]. Patients' anxiety begins when they learn they have gallstones and peaks when they are informed that surgery is needed upon admission. Before surgery, patients experience different situations (such as privacy protection, size of surgical incision, surgical complications, and impact of surgery on subsequent life), all of which may trigger anxiety[6]. The high incidence and severity of preoperative anxiety vary from person to person; some patients have systolic blood pressure elevated above 200mmHg, increasing the risk of cardiovascular and cerebrovascular accidents[7]. Previous studies have pointed out that patients who receive surgical information before surgery have significantly lower anxiety levels, but the technology for providing information has not been effectively developed[8]. Text is an effective technique for conveying surgical information to patients, but patients have different understandings of information, and a few illiterate patients cannot read and understand this information. There are numerous media for providing information to patients, such as face-to-face communication, watching educational videos, and telephone communication. Distraction can effectively reduce pain. Previously, Douyin videos have been tested in different diseases, such as anxiety and depressive disorders, cancer pain, and neurological rehabilitation[9]. It distracts patients' attention from pain signals by simultaneously flowing a series of multisensory information in the brain. Douyin short video is a common application with a huge user base.

Most previous studies have focused on using Douyin in distraction methods, and few studies have evaluated patient education through Douyin videos[10]. No studies comparing the two methods of distraction and patient education have been found. Given the above issues, this study aims to evaluate the effect of Douyin short videos in patient education and distraction methods on preoperative anxiety and postoperative pain in LC patients. The study protocol was approved by the Ethics Committee of Fuyang People's Hospital (PJ2026-2-1). Written informed consent was obtained from participants before the study. Subjects were allowed to withdraw from the study at any time.

Methods

Enrolled Patients

A three-group pretest-posttest randomized clinical trial was conducted from September 2025 to March 2026. The study subjects were 300 candidate patients who needed to undergo LC surgery and were hospitalized in the Hepatobiliary and Pancreatic Surgery Ward of Fuyang People's Hospital from September 2025 to March 2026. Inclusion criteria included: □ aged 18–60 years, □ simple gallstones with cholecystitis, □ scheduled for elective LC surgery, □ able to complete tests independently. Exclusion criteria included: □ diagnosed psychological problems, □ unable to understand pain scales, □ addiction to opioids or other potent analgesics (such as tramadol), □ pain from other serious diseases, □ history of gastrointestinal surgery in the past month, history of vestibular vertigo or epilepsy.

Douyin Video Preparation

The content for the distraction group was searched from the existing video library. For this purpose, three videos of nature, space, and ocean, each at least five minutes long, were selected. Subsequently, patient education content was prepared by selecting medical science popularization videos already published on the Douyin platform, including animations and intraoperative recordings.

Researchers described the preparations for patients entering the operating room as detailed as possible, the entire LC surgery process, until the final recovery ended, to reduce preoperative anxiety caused by fear of pain. Patients gained a deeper understanding of the following related items of their surgery: they will receive general anesthesia during surgery and have no consciousness during the operation; LC surgery usually takes about 30 minutes; the surgery will be performed through three operating ports, and the trocar port layout was shown with diagrams. Increasing patients' understanding of the surgery, compared with the large incision of open surgery, pain will be significantly reduced.

Educational Video 1 The following scenes were used to reduce anxiety: an adult man being pushed into the operating room accompanied by a doctor. The anesthesiologist takes a medical history, showing the patient the equipment and instruments connected to the patient for monitoring, and the method of general anesthesia. After anesthesia, the process of removing the endotracheal tube and the dressing and drainage tube at the surgical site were shown. Subsequently, the anatomy and function of the gallbladder and the LC steps were displayed.

Educational Video 2 Postoperatively, the semi-sitting position was adopted, with narration explaining that this position makes breathing easier and reduces intra-abdominal pressure, thereby reducing pain. Deep breathing and effective coughing were gradually demonstrated to the patient, emphasizing the importance of promoting faster release of carbon dioxide gas from the abdominal cavity and drainage of exudate. In addition, bed activities were demonstrated to the patient to prevent thrombosis and promote faster discharge of gas from the abdominal cavity. These activities mainly included lower limb exercises. Finally, how to get out of bed and postoperative dietary precautions were gradually demonstrated to the patient.

Sampling

- Using Power Analysis Sample Size (PASS) software, based on detecting a 1-unit difference in pain variables using the Mann-Whitney test (standard deviation 1.5, power 90%, type I error 5%), the estimated sample size for each group was 89 cases. However, considering sample attrition, 100 subjects were allocated to each group. Subjects were selected using the randomized block method, with six block sizes to increase unpredictability. Group names were written on paper and sealed in envelopes. Subsequently, the envelopes were numbered and arranged. After obtaining participants' informed consent, they were given an envelope to determine their group. Patients (n = 300) were assigned to the patient education group watching Douyin videos, the patient distraction group watching Douyin videos, and the control group. Finally, 283 people completed the study protocol. In the distraction group, control group, and education group, 17 subjects were excluded due to dizziness (n = 3), incomplete questionnaires (n = 9), and surgery cancellation (n = 5). Patient education group: final analysis (*n* = 94); distraction group: final analysis (*n* = 95); control group: final analysis (*n* = 94) (Fig. 1).

Research Instruments

Data collection used a demographic and disease questionnaire designed based on similar studies and expert opinions; its content was approved by 10 experts. The State-Trait Anxiety Inventory (STAI) Form Y-1 contains 20 items assessing the intensity of "right now" current feelings to measure state anxiety levels. This scale was developed and validated by Spielberger in 1983[11].

The Visual Analogue Scale (VAS) was also used to determine pain severity. This is a standard scale for assessing pain intensity, widely used in Iran. Its reliability has been confirmed with a correlation coefficient of 0.88[12].

The McGill Pain Questionnaire (MPQ) was also used to assess the quality and intensity of subjective pain. The MPQ is a multidimensional pain assessment tool containing 78 descriptive words divided into 20 subgroups forming four dimensions: sensory (subgroups 1–10) scoring range 0–42, affective (subgroups 11–15) scoring range 0–14, evaluative (subgroup 16) scoring range 0–5, and miscellaneous (subgroups 17–20, including spreading/penetrating, tight/tearing, cold/freezing, annoying/torturing) scoring range 0–16. This tool was first approved by Melzack and used in studies of patients with different pain types[13]. In addition, Dworkin approved the validity of this questionnaire, and the tool's reliability was confirmed with Cronbach's alpha of 0.83–0.87[14].

Intervention

The procedures of this randomized clinical trial were conducted for three groups: the patient education group watching Douyin videos, the patient distraction group watching Douyin videos, and the control

group. The intervention procedures of this study were conducted in two stages: 1) 2 hours before laparoscopic cholecystectomy; 2) 4 hours after receiving the first dose of analgesic after LC (Fig. 1).

Patient Education Method Using Douyin After completing the demographic characteristics form and STAI, subjects watched the first preoperative education simulation animation 2 hours before surgery and listened to the sound through headphones. Subsequently, patients completed the STAI again 30 minutes after watching the animation film before surgery. After postoperative consciousness recovery, 4 hours after receiving the first dose of analgesic (40mg parecoxib), patients' pain levels were measured using VAS and MPQ. Subsequently, patients watched the Douyin pain management education animation and completed VAS and MPQ again 30 minutes and 2 hours after watching the animation, respectively (Fig. 1).

Patient Distraction Method Using Douyin In the patient distraction group, participants were asked to complete the demographic characteristics form and STAI questionnaire, and choose one among three videos of nature, space, and ocean, each at least five minutes long. Patients watched Douyin videos 2 hours before surgery and completed the STAI again half an hour later. After postoperative consciousness recovery, 4 hours after receiving the first dose of analgesic (40mg parecoxib), patients' pain levels were measured using VAS and MPQ. Subsequently, patients watched Douyin videos and completed VAS and MPQ again 30 minutes and 2 hours after watching the videos, respectively (Fig. 1).

Control Group In the control group, routine nursing care in the ward was implemented for participants, including distributing educational manuals to patients and doctors providing face-to-face patient education. They routinely received the first dose of analgesic (40mg parecoxib). Participants filled out the demographic characteristics form, and similar to the other two groups, the STAI was completed at two stages before surgery at 30-minute intervals. After surgery, VAS and MPQ were completed at half-hour and two-hour intervals, respectively (Fig. 1).

Data Analysis

Qualitative data were expressed as frequency and percentage, and quantitative data were expressed as mean ± standard deviation (mean ± SD) when normally distributed. Data analysis was performed using STATA software (version 14), employing chi-square test, one-way ANOVA, Bonferroni post-hoc test, and quantile regression. In all tests, $P < 0.05$ was considered statistically significant.

Results

Comparison of Groups According to Demographic Characteristics

Statistical results showed that the three groups of patients were homogeneous in terms of age ($p = 0.12$), gender ($p = 0.23$), education level ($p = 0.31$), marital status ($p = 0.24$), and underlying diseases ($p =$

0.19; Table 1).

Comparison of Groups According to Preoperative Anxiety

One-way ANOVA results showed significant differences among the three groups in terms of preoperative state anxiety mean scores ($p < 0.001$). After considering the baseline mean state anxiety score as a covariate, comparison of post-intervention patient state anxiety mean scores showed significant differences among the three groups ($p < 0.001$; Table 2). The Bonferroni test also showed significant differences in mean anxiety scores between the patient education group (31.54 ± 8.33) and the control group (56.71 ± 16.08) ($p < 0.001$), and between the patient distraction group (33.65 ± 6.81) and the control group (56.71 ± 16.08). However, this test result showed no difference in state anxiety scores between the patient education group and the distraction group ($p = 0.57$).

Quantile regression model results showed that patients in the education group had significantly reduced anxiety scores compared with the control group (regression coefficient [RC] = -9). The model also showed that the distraction group had significantly reduced anxiety scores compared with the control group (RC = -7) (Table 3).

Comparison of Groups According to Postoperative Pain

One-way ANOVA showed significant differences among the three groups in terms of pre-intervention VAS-reported pain mean scores ($p < 0.001$). After considering the baseline mean pain score as a covariate, comparison of post-intervention patient pain mean scores showed significant differences among the three groups ($p < 0.001$; Table 2). Pairwise comparisons between groups showed significant differences in VAS pain mean scores between the patient education group (6.34 ± 1.66) and the control group (8.26 ± 2.11), and between the patient distraction group (6.19 ± 1.72) and the control group (8.26 ± 2.11) ($p < 0.001$).

The quantile regression model, after considering the effect of baseline VAS pain score as a covariate, showed that the patient education group had significantly reduced VAS pain scores compared with the control group (RC = -1.3). In addition, the model showed that the distraction group had significantly reduced VAS pain scores compared with the control group (RC = -1.1) (Table 3).

The three groups reported significant differences in pre-intervention MPQ total pain mean scores ($p < 0.001$). However, after considering the baseline mean pain score as a covariate, comparison of post-intervention patient MPQ scores showed significant differences among the three groups ($p < 0.001$; Table 2). Pairwise comparison results of the Bonferroni test showed significant differences between the patient education group (21.09 ± 7.25) and the control group (33.18 ± 6.78) ($p < 0.001$). In addition, this test showed significant differences between the patient distraction group (20.12 ± 6.37) and the control group (33.18 ± 6.78) ($p < 0.001$); however, there was no significant difference in MPQ pain scores between the two intervention groups ($p = 0.53$).

Results also showed that compared with the control group, education could significantly reduce patients' mean pain scores in three dimensions, including affective ($p < 0.001$), sensory ($p < 0.001$), and miscellaneous ($p < 0.001$). In addition, pairwise statistical tests showed that compared with the control group, distraction could significantly reduce patients' pain in three dimensions, including affective ($p < 0.004$), sensory ($p < 0.001$), and miscellaneous ($p < 0.004$). Tests also showed that compared with the control group, patient education could significantly reduce patients' pain in three dimensions, including affective ($p < 0.001$), sensory ($p < 0.001$), and miscellaneous ($p < 0.001$). It is worth mentioning that there was no difference between the two interventions in terms of the three dimensions of pain ($p = 0.22$).

The quantile regression model, after considering the baseline effect of MPQ total pain score and underlying diseases as covariates, showed that compared with the control group, patient education and distraction reduced pain by RC = -6.21 and RC = -5.07, respectively ($p < 0.001$; Table 3).

Discussion

The results of this study indicate that both patient education and distraction methods using Douyin videos reduced preoperative anxiety and postoperative pain in LC patients. In addition, the results show that subjects with uncontrolled preoperative anxiety in the control group had higher postoperative pain levels compared with the two intervention groups.

The results indicate the significant effect of Douyin video use in patient education and distraction methods on preoperative anxiety. This finding is consistent with the results of Dehghan et al. on video technology in clinical applications, who reported the effect of video-based education methods (operating room simulation films) on reducing anxiety before abdominal surgery in children[15]. They concluded that video education significantly reduced children's preoperative situational anxiety. According to the study results, reducing preoperative anxiety can significantly reduce postoperative pain. Considering the results of the quantile regression model, it can be concluded that using Douyin videos in the education method is more useful than in the distraction method, because doctors can use one method to simultaneously reduce anxiety and provide preoperative education for patients. In this regard, Pouryousef et al. mentioned the significant effect of distraction methods (using calming images) on reducing anxiety in patients undergoing coronary angiography[16]. Not only that, intraoperative or postoperative video education with distraction has been preliminarily attempted in patients undergoing surgical operations, revealing the significant effect of using distraction methods (immersing in the natural world) on reducing anxiety in patients undergoing outpatient maxillofacial surgery[17, 18]. The results of all the above studies are consistent with the results of this study regarding the significant effect of Douyin videos in controlling anxiety before invasive procedures, outpatient surgery, and general anesthesia surgery.

Literature review shows that there are currently no studies comparing the effects of Douyin video use in patient education and distraction methods on preoperative anxiety and postoperative pain. This study's results regarding comparing the effects of video use in patient education and distraction methods prove

the intervention's ability to reduce pain in various dimensions, including sensory and affective pain, and different types of pain. In addition, the intervention significantly reduced the total pain score obtained based on MPQ. According to the results of this study, MPQ was significantly superior to VAS in explaining pain changes in patients in the three groups. In addition, patients' perception of pain in affective and sensory dimensions was significantly related to their preoperative anxiety. The results of this study point out that after eliminating the influence of confounding variables, the distraction group and education group showed reduced anxiety in patients compared with the control group.

The results of this study indicate that the effect of patient education on pain was higher than distraction techniques; however, this difference was not significant. In addition, the results show that compared with distraction techniques, the use of video education in patient education methods led to more significant reductions in patients' overall and sensory pain. It is worth noting that increasing the time interval may increase the significance of differences between the two groups.

Limitations

Regarding the limitations of this study, the dosage and frequency of anesthetic drug administration for each patient during surgery were not recorded, which may affect patients' pain scores. The second limitation concerns the use of analgesic drugs during the recovery period; various anesthetic and analgesic drugs given throughout the perioperative period affect patients' postoperative pain experience. The inability to analyze anesthetic and analgesic drug data means these confounding factors exist and may affect the study results.

Practical Implications

Given the important role of doctors in patient education, and considering the insufficient time for doctors to provide face-to-face training to patients, it is recommended to replace doctors' education with educational animations in Douyin videos. This method can reduce preoperative anxiety and postoperative pain. Since the study began training 2 hours before surgery to control patients' anxiety levels, the time was slightly insufficient; therefore, if education had started earlier, the results might have been more effective.

Conclusion

According to the results of this study, both methods of preoperative patient education and distraction using Douyin videos significantly alleviated preoperative anxiety and postoperative pain after LC. Based on the results, considering doctors' time constraints, doctors are recommended to use the patient education method with Douyin videos in wards. In addition, participants with uncontrolled preoperative anxiety who did not receive intervention had higher perception of postoperative pain.

Declarations

Acknowledgement

Not applicable

Ethical approval and accordance

This study was conducted in accordance with the principles outlined in the Declaration of Helsinki, and all procedures involving human subjects were approved by the Ethics Committee of Fuyang People's Hospital, Anhui Medical University. (PJ2026-2-1)

Consent to participate

Written informed consent was taken from the participants. (PJ2026-2-1)

Conflict of Interest information

The authors declare that they have no relevant financial interests.

Consent to publish statement

Not applicable as no identifiable data or images are present within the manuscript

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Tables

Tables 1 to 3 are available in the Supplementary Files section.

Figures

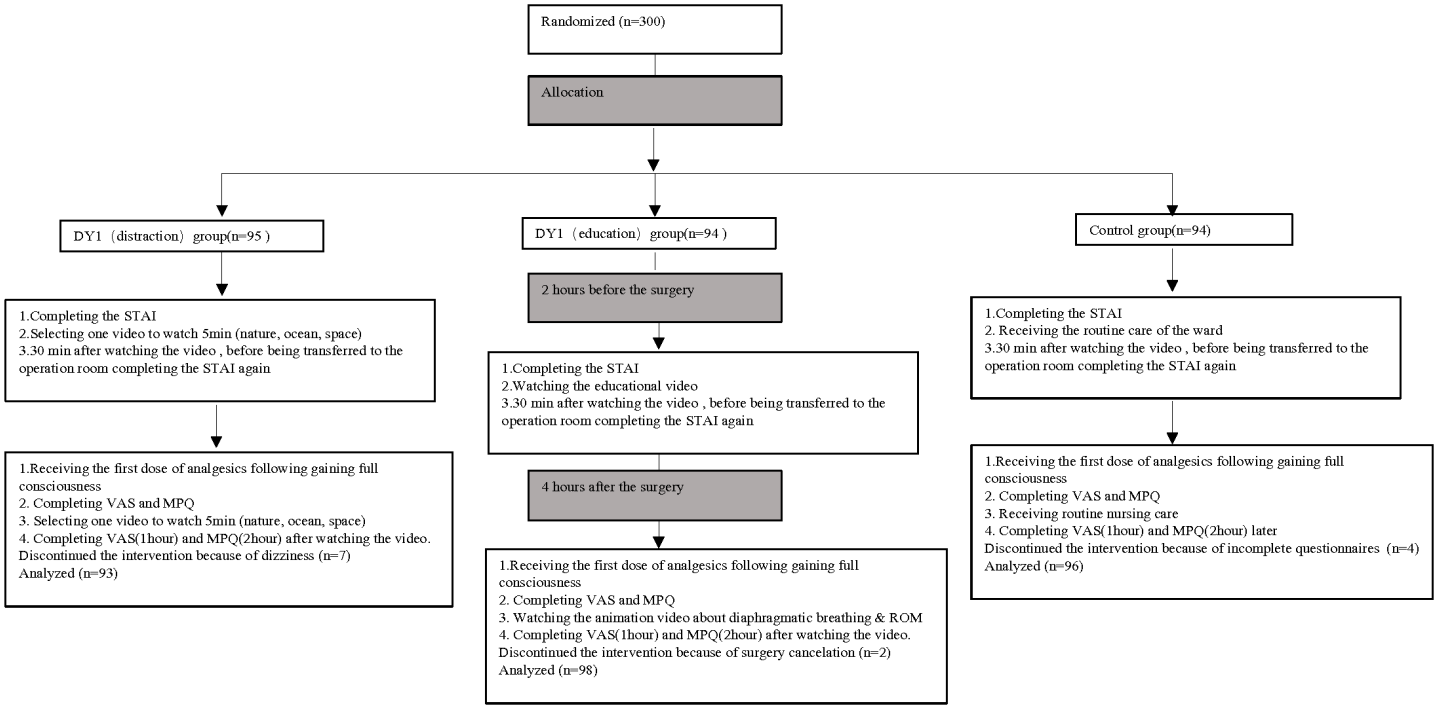


Fig. 1. The flow diagram of the method of the research.

Figure 1

See image above for figure legend

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Table1.xlsx
- Table2.xlsx
- Table3.xlsx
- StudyProtocol.docx
- CONSORT.pdf