Original Article

The Effects on Anesthetic Knowledge after Pre-Anesthetic Visit Comparing between the Use of Face-To-Face Interview Alone with Face-To-Face Interview Plus Animated Video or Brochure in Patients Undergoing Elective General Anesthesia

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Background: Additional media during the pre-anesthetic visit may improve knowledge of anesthetic information, reduce anxiety, and increase patient satisfaction.

Objective: To compare three of the pre-anesthetic visit conducting methods in knowledge score of anesthetic information, anxiety, and satisfaction in patients undergoing elective general anesthesia.

Materials and Methods: The authors randomized 225 patients into three groups, the animated video plus face-to-face interview group, which included 76 patients (group V), the brochure plus face-to-face interview group, which included 73 patients (group B), and the face-to-face interview only group, which included 76 patients (group F). The patients were asked to complete the same self-evaluation questionnaires at three different times, which were before, immediately after, and on the day of surgery after the pre-anesthetic visit, to evaluate for the knowledge of anesthetic information, anxiety, and satisfaction level.

Results: At all times, the knowledge scores of anesthetic information were statistically different among the three groups (p=0.002). V and B group had higher knowledge scores when compared with F group. The mean difference between the V and F groups were 1.36 (95% CI 0.41 to 2.32, p=0.005), and between the B and F groups were 1.99 (95% CI 1.02 to 2.96, p<0.001). However, there was no difference in knowledge score between the V and B group after the visit (p>0.999 and 0.559, respectively). The anxiety scores were never statistically different between the three groups (p=0.365). While the patients had high satisfaction scores on the day of surgery, there were no statistically significant differences between the three groups (p=0.220).

Conclusion: The use of medias either animated video or brochure added to the routine face-to-face interview can improve anesthetic knowledge, but animated video was not more effective than the brochure in elective surgical patients undergoing general anesthesia. The difference in methods did not affect patient anxiety and satisfaction.

Keywords: Knowledge; Pre-anesthetic visit; General anesthesia; Video; Brochure

Received 14 June 2021 | Revised 10 August 2021 | Accepted 10 August 2021

J Med Assoc Thai 2021;104(9):1549-56

Website: http://www.jmatonline.com

Pre-anesthetic visit is the important beginning process to obtain information of the patient, to give knowledge of anesthetic information including anesthesia-related events, risks, and benefits, and to obtain informed consent. Most of surgical patients experience substantial anxiety before operation. Anxiety is associated with pathophysiological responses such as hypertension and dysrhythmias, increasing the requirement of anesthetic drugs to produce unconsciousness, worsen patients' perception of pain, increasing requirements for postoperative analgesia, which may cause patients to refuse planned surgery and reduced patient's satisfaction[1-3]. Getting adequate anesthetic information will improve patient's cooperation and reduce anxiety[2-6].

Various methods have been used to provide anesthetic information during pre-anesthetic visit,

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How to cite this article:

Chanthawong S, Phendee N, Plengpanich P, Chaikree Y, Phoesri N, Paksiri W, et al. The Effects on Anesthetic Knowledge after Pre-Anesthetic Visit Comparing between the Use of Face-To-Face Interview Alone with Face-To-Face Interview Plus Animated Video or Brochure in Patients Undergoing Elective General Anesthesia. J Med Assoc Thai 2021;104:1549-56.

doi.org/10.35755/jmedassocthai.2021.09.13077

including routine verbal interview with a face-to-face interview, brochure, and video either a virtual video or animated video. Previous studies[1,2,4-6] have been conducted to compare the effectiveness method to provide adequate information for patients undergoing elective surgery under general anesthesia. They found that the patients who received additional medias had higher knowledge level comparing with the conventional verbal method, while the results in anxiety and satisfaction were controversial. However, the ideal way to provide anesthesia information remains unclear.

The purpose of the present study was to compare the knowledge scores of anesthetic information, anxiety, and satisfaction level among face-to-face interview only, brochure plus face-to-face interview, and animated video plus face-to-face interview. The authors hypothesized that additional media such as video or brochure to routine face-to-face interview in pre-anesthetic visit would improve anesthetic knowledge, reduce anxiety, and increase satisfaction.

Materials and Methods

Approval of the Ethics Committee in Human Research of Khon Kaen University (HE621477) and written informed consents were obtained from patients enrolled in the present study. The Thai Clinical Trials Registry (TCTR) identification number was TCTR20210402004. The present study was a prospective randomized controlled trial study. Data were collected between December 2019 and January 2021 at Srinagarind Hospital, Faculty of Medicine, Khon Kaen University.

All adult patients, aged over 18 years old, scheduled for elective surgery under general anesthesia admitted to the ward at least one day before surgery, and the American Society of Anesthesia (ASA) physical status I to III were eligible for the present study. Exclusion criteria were patients who had been performed general anesthesia in the previous six months, had cognitive and speech impairment such as intellectual disability, dementia, disorientation to time, place, person, psychiatric disorders, or laryngectomy, had audiovisual impairment, had a language barrier by being unable to understand the Thai language, or were illiterate.

The patients were pre-operatively visited and evaluated on the evening of the day before surgery. After patients decided to participate in the study and informed consents were obtained, the patients were randomly assigned to one of the three study groups according to pre-anesthetic conducting methods, the animated video plus face-to-face interview (V), the brochure plus face-to-face interview (B), and the face-to-face interview only (F). The allocation sequence was generated by a block size of six randomizations and using sealed opaque envelopes. The patients in the V group received anesthetic information by the face-to-face interview plus a five-minute animated video via a 9-inch-screen tablet. The animated video was made by the research team. An animation character playing the role of a female anesthesiologist explained some of the important knowledge of anesthetic procedures in plain Thai language with a female voice. The patients in the B group received anesthetic information by the face-to-face interview plus a brochure. The brochure was the 2-page standard information brochure of the Anesthesiology Department, Faculty of Medicine, Khon Kaen University. The patients in the F group received anesthetic information by the face-to-face interview only as a standard visit. The anesthetic information in each group had the same content about self-preparation for general anesthesia, process, and possible risks of general anesthesia. The information was provided by the anesthesia team. The anesthesia team who provided the information were trained about research protocol and had been in anesthesia training program for at least six months.

The self-evaluation questionnaire consisted of three parts, developed and verified by three anesthesiologists to assess patients' anesthetic knowledge, anxiety, and satisfaction. Part 1, the knowledge questionnaire, was designed to assess anesthetic knowledge. It had 12 multiple-choice questions with three response possibilities, the appropriate one must be marked in a tick box, and 12 true-or-false questions. Each correct answer was scored for 1 point and a total sum score was 24 points.

Part 2, the anxiety questionnaire, was designed to assess anxiety. Anxiety was measured with the Thai version of the Amsterdam Preoperative Anxiety and Information Scale (APAIS)[7], which was translated and validated from APAIS[8] for Thai patients and consistently had a reliable correlation with the gold standard STAI-state[9]. It consisted of two separate parts with a total of six questions including three questions for anxiety about anesthetic procedure, and the other three questions for anxiety about surgical procedure. Each question was scored on a one-to-five rating scale, with a total sum score of 30 points. Part 3, the satisfaction questionnaire, was designed to assess patient satisfaction in pre-anesthetic conducting methods. The degree of patient satisfaction was expressed on a visual analog scale of 0 to 10.

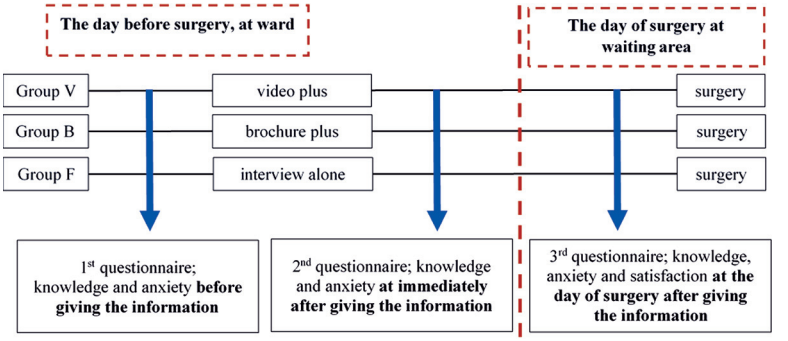

Figure 1. Overview of study flow and time points of data collection.

On the day before surgery, each patient completed the self-evaluation questionnaire part 1 and 2 before the pre-anesthetic interview to assess baseline anesthetic knowledge and anxiety. After the questionnaire was collected, the anesthesia team conducted the pre-anesthetic interview and provided the pre-anesthetic information by different methods according to the group randomization. The anesthesia team providing the information were trained about research protocol and had been in anesthesia training program for at least six months. After completing the interview, each patient was asked to complete the same questionnaire for the second time immediately at ward (part 1 and 2).

On the day of the surgery, the patients were asked again to complete the questionnaire in part 1, 2, and 3 at the waiting area before leaving for the operating room. During this time, the investigator blinded from the patient's study group gave the questionnaire and left the patient to do it freely by themself for 30 minutes (Figure 1).

The scores of anesthetic knowledge, anxiety, and satisfaction of pre-anesthetic conducting methods at three-time points, which were before, immediately after, and the day of surgery after the information were given, were compared among the three groups, which were groups V, B, and F.

The authors determined the sample sizes based on the hypothesis that media such as animated video or brochure in addition to routine face-to-face interview method would increase level of knowledge when compared to only routine face-to-face interview method. Using ANCOVA statistics with $\mu_1$post, $\mu_2$post, σ referenced from the previous study of Snyder-Ramos et al[6], the sample size was 67 participants per group. Applying drop-out rate at 10%, the sample size was 83 participants per group, therefore, the total sample size was 249 participants. The data were analyzed with Stata software for Windows, version 11.0 (StataCorp LP, College Station, TX, USA).

The knowledge scores of anesthetic information and anxiety scores repeatedly measured at three points of time were presented by mean ± standard deviation (SD) and analyzed for possible difference with generalized estimating equation (GEE). Pairwise comparison among groups were analyzed by Bonferroni post-hoc test. The magnitude of difference will be reported with 95% confidence interval (CI) and p-value. A p-value of less than 0.05 was considered statistically significant (β-error=0.2). The satisfaction of pre-anesthetic conducting methods were represented by median (interquartile range, IQR) and analyzed by Kruskall-Wallis test according to non-normal distribution. The magnitude of difference will be reported with rank sum and p-value. A p-value of less than 0.05 was considered statistically significance (β-error=0.2).

Results

Two hundred seventy patients were enrolled during the present study period and 21 patients were excluded, because two patients had general anesthesia in the previous six months, 15 patients had audiovisual impairment, and four patients were illiterate. The remaining 249 patients were enrolled and divided equally. Therefore, the V, B, and F groups received 83 patients each. Seven, ten, and seven in V, B, and F group, respectively, did not complete the trial because of the operation schedule rearrangement, operative cancellation, and less time in the waiting area. Therefore, the number of patients in the V, B, and F group were reduced to 76, 73, and 76 patients, respectively (Figure 2).

There were no significant differences in demographic data among the three groups regarding to gender, age, education level, occupation, and the

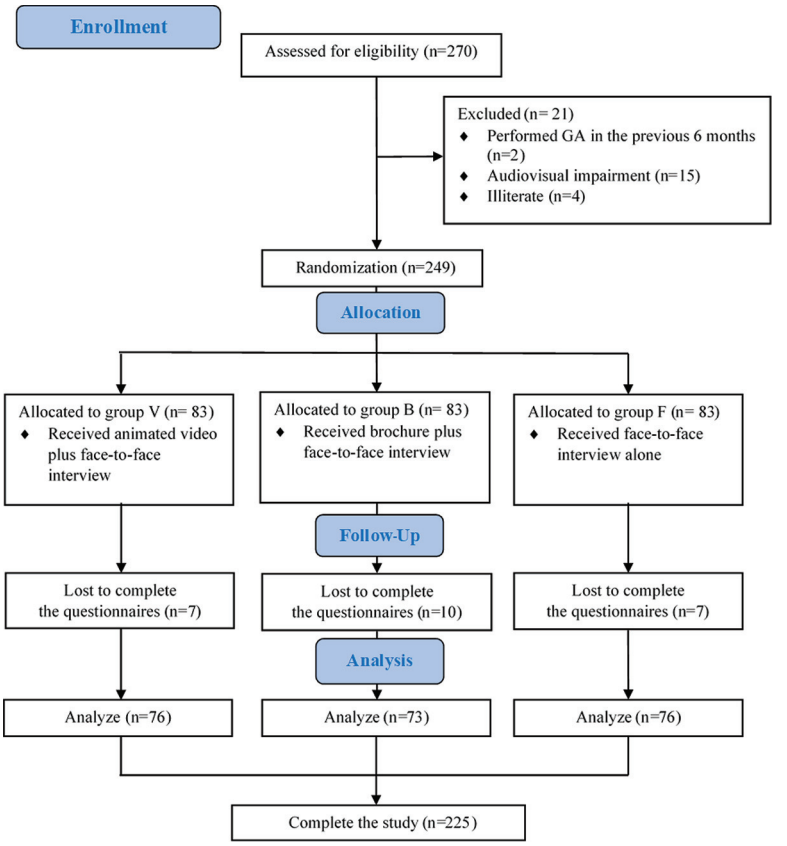

Figure 2. Flow of recruitment of study participants.

Table 1. Baseline characteristics of patients (n 225 patients)

Demographic data	Group V (n=76); n (%)	Group B (n=73); n (%)	Group F (n=76); n (%)	p-value
Sex				0.336
Male	25 (32.89)	23 (31.51)	32 (42.11)	
Female	51 (67.11)	50 (68.49)	44 (57.89)	
Age (years); mean±SD	50.64±14.45	45.82±13.94	45.79±15.14	0.063
Education				0.576
Elementary school	22 (28.95)	13 (17.80)	17 (22.37)	
High school	21 (27.63)	25 (34.25)	22 (28.95)	
Bachelor's degree	33 (43.42)	35 (47.95)	37 (48.68)	
Occupation				0.108
Medical personnel	10 (13.16)	3 (4.11)	5 (6.58)	
Non-medical	66 (86.84)	70 (95.89)	71 (93.42)	
ASA physical status				0.735
I	32 (42.11)	36 (49.32)	38 (50.00)	
II	37 (48.68)	33 (45.20)	31 (40.79)	
III	7 (9.21)	4 (5.48)	7 (9.21)	

ASA=American Society of Anesthesiologists physical status classification system; SD=standard deviation

p<0.05 is statistical significant

ASA physical status. Most patients were female, non-medical personnel with bachelor's degree education level, and the mean age of 50.64±14.45, 45.82±13.94, and 45.79±15.14 years in V, B, and F group, respectively (Table 1).

Table 2 summarizes the knowledge scores of anesthetic information in the three groups. At all times, the knowledge scores of anesthetic information were statistically different between the three groups by GEE analysis (p=0.0002). The V and B group had higher knowledge scores when compare with F group with a mean difference between the V and F group of 1.36 (95% CI 0.41 to 2.32, p=0.005), and the B and F group of 1.99 (95% CI 1.02 to 2.96; p<0.001).

At each point of time, the baseline knowledge scores of anesthetic information did not show statistically significant different among the three groups. Pairwise comparison among groups at immediately and on the day of surgery after gave the interview and anesthetic information by Bonferroni post-hoc test, the authors found that V and B group also had higher knowledge scores when compared with F group, but V and B group were not different

Table 2. Knowledge scores of anesthetic information before and after preanesthetic visit (total sum scores=24)

Knowledge scores	Group V (n=76); mean±SD	Group B (n=73); mean±SD	Group F (n=76); mean±SD	Mean difference (95% CI)	p-value
All time					0.002[a]
		V vs. F		1.36 (0.41 to 2.32)	0.005
		B vs. F		1.99 (1.02 to 2.96)	<0.001
Before preanesthetic visit	16.32±3.35	16.93±3.54		0.62 (–0.80 to 2.03)	0.887[b]
	16.32±3.35		15.70±3.84	0.62 (–0.78 to 2.02)	0.866[b]
		16.93±3.54	15.70±3.84	1.23 (–0.18 to 2.65)	0.110[b]
After preanesthetic visit					
Immediately	20.54±3.27	21.08±3.32		0.54 (–0.83 to 1.92)	>0.999[b]
	20.54±3.27		18.42±3.80	2.12 (0.76 to 3.48)	0.001[b]
		21.08±3.32	18.42±3.80	2.66 (1.29 to 4.03)	<0.001[b]
On the day of surgery	20.04±3.38	20.75±3.16		0.71 (–0.59 to 2.01)	0.559[b]
	20.04±3.38		18.68±3.32	1.36 (0.07 to 2.64)	0.035[b]
		20.75±3.16	18.68±3.32	2.07 (0.77 to 3.37)	<0.001[b]

SD=standard deviation; CI=confidence interval

[a] Difference at all time points was analyzed by generalized estimating equation (GEE), [b] Pairwise comparison between groups was analyzed by Bonferroni post-hoc test, p<0.05 is statistical significant

Table 3. Anxiety scores before and after preanesthetic visit (total sum scores=30)

Anxiety score	Group V (n=76); mean±SD	Group B (n=73); mean±SD	Group F (n=76); mean±SD	Mean difference (95% CI)	p-value
All time					0.365[a]
		V vs. F		0.64 (–0.99 to 2.28)	0.441
		B vs. F		–0.55 (–2.21 to 1.10)	0.512
Before preanesthetic visit	18.28±5.68	16.97±5.85		–1.30 (–3.57 to 0.97)	0.503[b]
	18.28±5.68		17.57±5.71	0.71 (–1.54 to 2.96)	>0.999[b]
		16.97±5.85	17.57±5.71	–0.60 (–2.86 to 1.68)	>0.999[b]
After preanesthetic visit					
Immediately	17.26±6.09	16.08±5.34		–1.18 (–3.39 to 1.03)	0.598[b]
	17.26±6.09		16.30±5.32	0.96 (–1.23 to 3.15)	>0.999[b]
		16.08±5.34	16.30±5.32	–0.22 (–2.43 to 1.99)	0.874[b]
On the day of surgery	16.99±5.82	15.88±5.21		–1.11 (–3.22 to 1.00)	0.618[b]
	16.99±5.82		16.72±4.95	0.26 (–1.83 to 2.35)	>0.999[b]
		15.88±5.21	16.72±4.95	–0.85 (–2.96 to 1.26)	>0.999[b]

SD=standard deviation; CI=confidence interval

[a] Difference at all time points was analyzed by generalized estimating equation (GEE), [b] Pairwise comparison between groups was analyzed by Bonferroni post-hoc test, p<0.05 is statistical significant

in knowledge score. The knowledge scores in each group were peaked at immediately and declined on 1-day after the interview, but there were still higher than baseline before interview (Table 2).

The anxiety scores were not statistically different among the three groups at all times. Pairwise comparison among groups at immediately and on the day of surgery after receiving the interview and anesthetic information by Bonferroni post-hoc test, there was no difference in all pairs. However, the patients in all groups reduced their anxiety after having received the pre-anesthetic visit (Table 3).

The satisfaction of pre-anesthetic conducting methods is shown in Figure 3. The patients in all groups had high satisfaction scores with more than 9 of 10 scores, but there was no statistically significant difference among the three groups at the day of surgery after having received the interview and

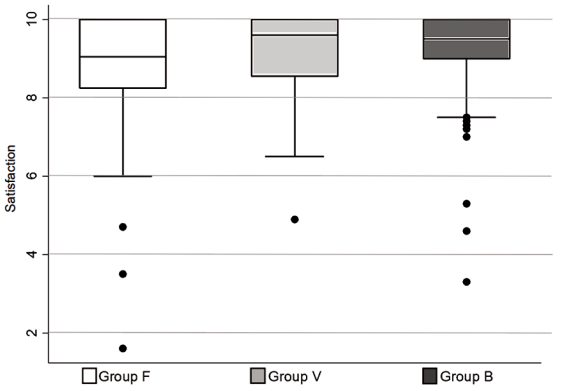

Figure 3. Box plot of patient satisfaction of preanesthetic conducting methods at 1-day after preanesthetic visit (n=225).

anesthetic information. In group F, the median score was 9.05 (IQR 1.75), in group V, the median score was 9.60 (IQR 1.45), and in group B, the median score was 9.50 (IQR 1.00); p=0.220].

Discussion

In the present randomized controlled study, the authors determined the effect of media as animated video or brochure in addition to a routine face-to-face interview in pre-anesthetic visit conducting method to give the anesthetic information to the patients who underwent elective surgery under general anesthesia on the domains of knowledge of anesthetic information, anxiety, and satisfaction. In the authors' institute, the routine face-to-face interview and brochure are the standard method to provide anesthetic information. For the present study, the authors created a video with the content based on the standard information in the brochure of Anesthesiology department, Faculty of Medicine, Khon Kaen University. The authors used animated characters and avoided using medical terminology for an easy-to-understand video. The animated video presentation length was about five minutes to enhance patient engagement. The previous study revealed the length of video that gained maximum engagement was less than six minutes[10].

A recent systematic review and several studies[1,2,4,6,11] concluded that face-to-face interview alone was an insufficient method to provide adequate information during pre-anesthetic visit. The knowledge obtained after additional media was better than after verbal method alone similar to the results of the present study. Because anesthesia is incomprehensible, complex, difficult to imagine, the media, whether video or brochure, should make it easier to understand, resulting in improved knowledge.

Several studies[2,12-15] had reported that video-based education resulted in better patient satisfaction and improved patient's understanding regarding the anesthesia procedure compared to verbal information alone or a combination of verbal information and a brochure. Based on this, the authors of this study expected better understanding, but it had contrary results. The brochure had better knowledge scores than the animated video when compared with face-to-face alone. This could be explained by our patients, which were familiar with text and brochure, proper number of pages, and sufficient time to remember it. However, for the animated video, they watched it only one time. While it provided an overview of the anesthesia process, it had no details. One randomized controlled trial study[6] found that the highest knowledge scores were in the video group and the scores were lower in brochure group. They explained the results that their brochure contained numerous pages as it was a 30-page booklet, and the patients would lose interest in finishing the reading. The amount of content could also be an important factor for any method. The usage of a brochure depends on the patient's active collaboration and cognitive abilities[16].

Regard to anxiety, the present study showed the anxiety scores were not statistically different between the three groups, which is similar to previous studies[2,5]. However, each conducting method of pre-operative visit could reduce anxiety scores from the baseline, which is before the visit. Moreover, the medias informing anesthetic information might not be able to reduce all aspects of anxiety especially surgery and disease prognosis. As being discussed in a study by Badner et al[17], anesthesiologists were poor judges of anxiety levels in patients. There were a number of the studies supporting the use of multimodal approach, including massage[18], aromatherapy[18,19], and musical therapy[20,21], which could reduce anxiety for surgical patients.

Satisfaction level with pre-anesthetic conducting method was not statistically different between the three groups but the satisfaction scores were relatively high in all groups. Sufficient information and increased attention given to the patients were the major factors influencing satisfaction of anesthetic care[22-24].

Limitations of the present study included the process of pre-anesthetic visit could not be done without combination with face-to-face interview

because the patients had to be assessed about physical and airway examination and obtained the informed consent. Therefore, the authors could not conduct the study in a double-blind fashion to investigators and patients and examined the effects of media exclusively. The other limitation was the rush time in transferring patients to the operating room causing inadequate time for the patients to complete the questionnaire.

Conclusion

The use of medias either animated video or brochure in addition to the routine face-to-face interview can improve anesthetic knowledge, but animated video was not more effective than the brochure in elective surgical patients undergoing general anesthesia. The different pre-anesthetic conducting methods did not affect patient anxiety and satisfaction.

What is already known on this topic?

Numerous previous studies agreed that additional medias such as various types of video and printed information could improve the quality of pre-anesthetic visit by increasing knowledge about anesthesia. However, most of the studies compared either a video or a brochure with the interview method, and just a small number of studies compared between the three different methods. As for anxiety and satisfaction domains, the results were not consistent. Lastly, no study had been done in the local population.

What does this study add?

This study made an animated instructive video that had the appropriate language and amount of content to the patients and examined the effects of the three different methods on knowledge, anxiety, and satisfaction in the local population.

Further suggestion

As education level could be a variable that affects cognitive ability. The authors suggest that future study protocol should be on subgroup analysis in according to education level.

Funding disclosure

The authors were all supported by a grant from the Faculty of Medicine, Khon Kaen University, Khon Kaen, Thailand (Grant number: IN63239).

Conflicts of interest

The authors declare no conflict of interest.

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