

The effect of animated video
used to inform patients attending
a fast-track total hip replacement
program

Report

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Summary

The fast-track Total Hip Arthroplasty (THA) program is short and compressed, and health information must be given over a short period of time. This poses high demands for patients' learning capacity, and the preoperative information session is therefore a key component in preparing patients for successfully joining the program. Patients' health literacy may be improved with the use of animated information, as this seems to have beneficial effect on anxiety and learning ability. This study has compared the effect of a standard information session (SIS) and a standard information session supplemented with an animated video (SIS-a) measured on preoperative anxiety. The study included 91 patients in the SIS group and 59 patients in the SIS-a group, and showed that participation in both SIS and SIS-a had effect on the patients' preoperative anxiety. Furthermore, the results indicated that a baseline anxiety score above 30 millimeter measured on a visual analogue scale (VAS-A) score >30 may be a predictor of effect of participation in information sessions in general.



Background

Introduction

The fast-track surgical program is short, compressed and presupposes a high degree of patient health literacy (1) and patient participation in health-care processes (2). Consequently information related to the program is given in a condensed form both before and during hospitalization. This poses high demands on the patients' learning capacity (ibid). The preoperative information session presenting the content and demands of the fast track Total Hip Arthroplasty program (THA-program) is a key component in informing and involving the patient in the process (3,4). A positive effect of animated information has been found on preoperative anxiety and learning ability regardless of the level of health literacy (5,6). The ambition in this study was to examine the effect of animated video integrated in a standard information session on the level of anxiety in patients attending a fast track THA-program.

Fast-track pathways

THA is one of the most commonly used surgical treatments (7), and records from 2013 shows that approximately 9000 THA operations are performed annually in Denmark (8). The implementation of evidence in anesthesia, pain-relieving treatment, reduction of surgical stress, fluid intake, minimal invasive surgery, nutrition and mobility has facilitated the development of an accelerated surgical course (9,10). The fast-track surgical program focuses on improving the restitution and reducing morbidity by optimizing the preoperative information for patients, reducing the surgical stress response, optimizing pain management, supporting the mobilization and adequate nutrition as well as providing optimized postoperative nursing care and rehabilitation (9,11,12).

Preoperative anxiety

There is a high occurrence of preoperative anxiety among surgical patients (9) and recent research has shown that a high anxiety level at the pre-examination may predict high anxiety level throughout the THA-program and 3 months after discharge (13). A high level of anxiety can increase the need for postoperative pain-relieving treatment for up to one year after surgery (14, 15). Preoperative anxiety is associated with an increased risk of postoperative complications (16) and may induce adverse effects on the immune system and the development of infections (11). Preoperative anxiety may furthermore result in an extension of the postoperative hospitalization, a

reduction of patient satisfaction (ibid) and research indicates a high correlation between anxiety levels and reduced learning ability (13).

Preoperative information in a fast track program

The fast-track surgical programs are short and intensive, and require patients' active participation in the treatment-, care- and rehabilitation process. Thorough and extensive information is therefore essential in the fast-track surgical program (16). Evidently, complete and extensive preoperative information may improve patients' knowledge, increase patient satisfaction, reduce preoperative anxiety and improve health-related quality of life (14,17). Knowledge of the surgical procedure and post surgical management may additionally improve the postoperative functional level, reduce hospital length of stay and reduce the need for postoperative pain management (17,18,14). The purpose of the wide-ranging preoperative information is to offer a detailed knowledge about treatment, care and rehabilitation, as well as accommodate the patients' expectations of the operation and its benefits, and potentially to reduce anxiety (10). Adequate patient information is essential for the patients' possibility of active participation in the surgical program; it enables relevant decision making about care and treatment. The preoperative information session is a key component in the efforts made to involve the patient actively in the surgical program (3), and is therefore important in the organization of the fast-track total hip arthroplasty program (4). The preoperative standardized information session covers a wide range of topics, including the surgical procedure, risks and complications, symptom management, organization of discharge and anticipation of the need of support from primary care (4,16).

Health Literacy

The positive effect of the preoperative information session partly depends on the patients' ability to acquire, understand and apply the information and partly on the healthcare system's ability to deliver tailored information matching the recipient. Adequate health literacy is essential to the acquisition of knowledge, and thereby the ability to navigate in the health care system and make informed choices (19). The functional health literacy is related to reading and writing skills (20) and is therefore crucial to whether patients can receive and understand written information. Since 16.1% of adults in Denmark have less good reading and writing skills (4), this alone has great significance for the patients' level of health literacy. Limited health literacy is typically seen among low-educated and elderly patients, but difficulties transcend educational levels, age and ethnicity, and all patients are periodically at risk of experiencing low health literacy (19,21). Research shows that

patients with low health literacy are susceptible to visually based information and that the visual approach can reduce the complexity of the information and thus increases the acquisition of knowledge (5,22,6).

Animated information

Animation has shown to be a powerful didactic tool, as it allows control of how information is presented and timed (22,6) with implications in the mental processing of health information (23). Animated videos have also been documented as an effective method of dissemination of information, partly because animations are typically perceived as harmless, familiar and easy-to-use across age groups, culture and reading skills (5,22). Animated videos use advertising techniques such as light, color, size, and music, which has a beneficial effect on attention towards the displayed animated information and thereby the acquired knowledge (22,24,25). Application of animated videos in the preoperative patient education can potentially contribute to the reduction of the patients' preoperative anxiety and improve prospects for learning (26,5). A pilot project with focus on the significance of animated information on preoperative anxiety in THA-patients indicates a small effect of animated preoperative information, and suggests potential greater impact in patients with high anxiety levels as well as in patients with a low level of education (26).

Aim

The aim of this study is to compare and evaluate the effect of the standard information session (SIS) versus the standard information session supplemented with an animated video describing the THA-program (SIS-a) on level of anxiety in the total study population and on a subpopulation with highest level of anxiety at baseline. Furthermore, this study aims to identify predictive patient characteristics of effect of the information sessions.

Hypotheses

- There is a significant reduction in anxiety score on a visual analogue scale (VAS-A) from before to after the information session in the SIS group and the SIS-a group, both for the total study population as well as for the subpopulation with a baseline VAS-A score >30.
- The reduction of VAS-A score from before to after the information session is significantly greater in the SIS-a group than in the SIS group, both for the total study population as well as for the subpopulation with a baseline VAS-A score >30.

Materials and method

Design

The study has a before and after design, where the inclusion of the SIS group took place consecutively in 2012-2013 and the inclusion of the SIS-a group took place consecutively in 2013. The study is a sub-study of a major research project in which THA-patients' psychosocial behavior is compared before and after a change in the information practice. The research project was conducted in a Danish hospital from 2012 to 2015.

Study population

Recruitment of patients was carried out by a research assistant in an outpatient clinic in elective orthopedic surgery in Denmark. A screening of all hip replacement patients was carried out before the pre examination. A research assistant reviewed all patients based on inclusion and exclusion criteria. Upon acceptance of participation the patients were instructed to fill out questionnaires at home and hand them in just before the start of the information session.

The inclusion criteria were patients referred to a fast-track THA-program. Exclusion criteria were former THA-operation, acquired or congenital cognitive deficit and inability to speak or read Danish.

The THA-program

In the fast track THA-program, the expected hospital stay is one day, which gives the staff a shorter time than in the past to prepare the patient for surgery, discharge and rehabilitation. On average it takes 2-3 weeks from the pre examination in the outpatient clinic until surgery. The patients were informed about the operation by both surgeon and nurse at the pre examination. Patients were then supplied with a pamphlet about the fast-track THA-program and were advised to read it carefully before the information session to which they were invited to participate with relatives. Attending the program, during admission and after discharge, patients were recommended to contact the responsible coordinator (special trained nurse or physiotherapist) if they had questions about their planned THA-program, in order to preserve the linkage in the course of treatment and care. One day post discharge the coordinator called the patients to follow up on how things were going, and during the third postoperative week the patients were seen in the outpatient clinic for a physiotherapeutic control of functional level and health condition (13).

The interventions

The SIS group and their relatives were invited to participate in a 2 hours long standardized information session. At the session they received oral information on the preparations for the operation, the operative procedure and the postoperative rehabilitation. These information sessions were the established practice before the animated videos were introduced, and therefore the condition the control group participated in.

The SIS-a group was offered a standardized information session supplemented with a 15 minute long animated video displaying the whole program comprising information about: arthritis, symptoms, the surgical procedure and the placement of the prosthesis, the rehabilitation process as well as restrictions of mobility.

In Figure 1 the two types of information sessions (SIS and SIS-a) are presented.

Figure 1: Chronology and content of SIS and SIS-a

SIS	SIS-a
The coordinator of the fast-track program initiates with a collective welcome to the information meeting and distributes information material	The coordinator of the fast-track program initiates with a collective welcome to the information meeting and distributes information material
	<i>The animated video is shown (duration approximately 12 minutes)</i>
The coordinator reviews the main points in the fast-track program	The coordinator reviews the main points in the fast-track program
The anesthetist nurse reviews the anesthetic procedure and pain management (duration approximately 20 minutes). Pictures of patients who get anesthetized, etc. are shown as visual support	The anesthetist nurse reviews the anesthesia procedure and pain management. <i>The oral information is significantly shortened, as the animated video includes a 2 minute long chapter of the anesthetic procedure</i>
10 minutes intermission	10 minutes intermission
The physiotherapist goes through the rehabilitation program and instructs the patients in exercises from the program (approximately 30 minutes)	The physiotherapist goes through the rehabilitation program and instructs the patients in exercises from the program (approximately 30 minutes)
The occupational therapist follows up on the patients requests for assistive devices	The occupational therapist follows up on the patients requests for aids

SIS= standard information session, SIS-a= standard information session supplemented with an animated video of the program

The animated video was originally developed for THA-patients as part of a research project on telemedicine performed in 2009. The film was subsequently further developed in 2013 by a cross-professional team in the larger study which this study is a part of (13).

Data collection

The patients filled in the VAS-A forms before and after the information session in both the SIS group and the SIS-a group. The VAS-A scale consists of a line measuring from 0 mm. to 100 mm. The line has no markings, so patients expressed their experienced anxiety by marking with a cross on the line between 0 mm: "not at all nervous" and 100 mm: "worst possible nervousness". The forms were assessed by a project nurse who measured the distance from the start line to the center of the deposited cross. All measurements were made with the same tool.

The VAS-A scale is a validated tool (27) with a known cut-off point at >30 for clinically relevant anxiety (28). The VAS-A score is individual and subjective, and since it is impossible to determine whether a patient specifying an anxiety level of for example 10 mm is more or less anxious than a patient who specifies an anxiety level of 15, 20 or 25 mm., the individual score can not be compared between individuals. Therefore the focus of the analysis was on the difference in VAS-A score from before to after the information session for each patient.

The project nurse subsequently gathered the following information in the patients' electronic hospital records; sex, age, civil status, contact to home care, education¹, length of stay and ASA-level (American Society of Anesthesiologists physical status classification)².

¹ If information concerning education were not registered in the electronic health record, patients were subsequently contacted by phone in order to obtain this information. This contact was covered by the written consent. Level of education was measured with ISCED= International Standard Classification of Education. Low education is classified as levels 0-2, medium as levels 3-5 and high as levels 6-8.

² ASA: I: healthy patient, II: patient with mild systemic disease, III: patient with severe systemic disease

Statistical methods

The effect of SIS and SIS-a measured by anxiety level

In accordance to the study's purpose we tested whether the difference in VAS-A score within the groups from before to after the information sessions were statistically significant. This analysis was performed with a Wilcoxon's signed rank test, because the data were assessed not to be normally distributed. The difference in VAS-A score between groups was compared with a Wilcoxon's rank sum test. A dichotomization was performed on the outcome VAS-A, those who had reduced VAS-A, and those who did not³. A supplementary analysis using Pearson's chi² test was used in order to supplement the result of the non-parametric analyses, as well as to uncover whether there is a difference between the proportion of people with effect in the SIS group and in the SIS-a group respectively.

The effect at a baseline VAS-A score >30

It was decided to perform a subgroup analysis on patients with a baseline VAS-A score of >30 in both the SIS and the SIS-a group. This was performed as the VAS-A score >30 is a well known cut-off point for clinically relevant anxiety, and furthermore recent research proposes VAS-A score >30 as a possible predictor of a high level of anxiety throughout the course of THA (13). Differences in VAS-A in the two intervention groups in this subpopulation with VAS-A >30 were assessed to be normally distributed, and the statistical test between groups was therefore performed as a two-sample t-test. The analysis describing the difference in VAS-A score within the SIS groups from before to after the information sessions were conducted with a paired t-test, since these data were also assessed to be normally distributed.

Demographic characteristics

A descriptive analysis was conducted on the demographic characteristics of patients in both the SIS and the SIS-a group, as well as on the demographic characteristics of patients with a baseline VAS-A score >30.

A predictor analysis was performed in the form of a multiple logistic regression analysis with the effect of the information session as the dichotomous dependent variable, in order to determine

³ The outcome is defined as effect or no effect (reduction in the perceived anxiety from before to after the information session, as measured by VAS-A)

association patterns between the effect of the two types of information sessions and the following patient characteristics: “age”, “ISCED⁴” “SIS group”, as well as “baseline VAS-A score >30”. The variables “age” and “ISCED” were selected for this analysis, since research shows that both are essential factors contributing to level of health literacy and thus the ability to understand and apply the given health information. The variable “VAS-A score >30” was selected for analysis because these patients are at risk of a high anxiety levels throughout the clinical pathway (13), and because there is a tendency for these patients to show an increased effect of animated information (26). The variable “SIS group” was selected for this analysis because of interest in detecting a possible association between effect of the added animation video and the intervention group.

Patients with missing data on the explanatory variables were omitted from this analysis. It was initially determined whether the variables were individually associated with effect and whether some of these variables were internally highly correlated. The final model consisted of “age”, “ISCED”, “baseline VAS-A score >30” and “SIS group” as explanatory variables. These were analyzed as categorical variables except age, which were analyzed as a continuous variable. There were no interactions when the model was tested for possible interactions between the explanatory variables in pairs.

Ethics

This study meets the principles of Good Clinical Practice (GCP) (29). The Danish data protection agency (J. No. 2007-58-0010) has approved the overall study. This project was deemed in exempt of notification to the ethical committee of the central region of Denmark due to its observational character. In accordance with the Helsinki Declaration the patients were supplied with both oral and written information about the project, and they gave written consent preliminary to their participation. All information obtained about patients in this study was anonymized, in order to meet the requirement of proper handling of confidential information and the protection of the participant's right to privacy.

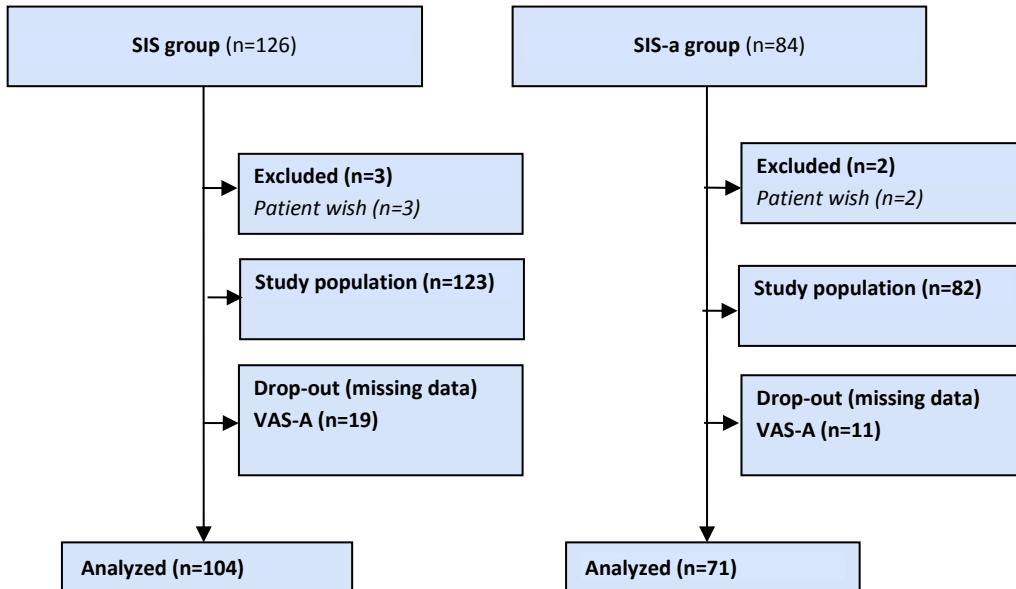
Results

A total of 210 THA-patients agreed to participate in the project. Five patients chose to withdraw from the project. There is no data on these patients, since all data in accordance with the Danish

⁴ ISCED international standard classification of education developed by UNESCO in order to facilitate the comparison of education statistics and indicators between countries on the basis of uniform and internationally agreed definitions (30)

legislation was deleted due to the withdrawal of consent. Analyses on the hypotheses were conducted on 104 patients in the SIS group and 71 patients in the SIS-a group (see Figure 2).

Figure 2: Flowchart over the inclusion



There was found no statistically significant baseline differences in patient characteristics and on the level of anxiety between the SIS and the SIS-a group (see Table 1).

Table 1: Patient characteristics

N	SIS (n=104)	SIS-a (n=71)	p-Value	Test
Age (years), mean (SD)	65 (10)	65 (8)	0.87	Two sample t-test
Gender, n (%)				
Female	51 (49)	37 (52)	0.76	Fisher's exact
Male	53 (51)	34 (48)		
Physical status, n (%)				
ASA I	42 (40)	20 (28)	0.22	Fisher's exact
ASA II	56 (54)	45 (63)		
ASA III	4 (4)	3 (4)		
ASA IV	0 (0)	1 (1)		
Missing	2 (2)	2 (3)		
Education, n (%)				
Low	45 (43)	23 (32)	0.40	Pearson's chi ²
Middle	19 (18)	13 (18)		
High	27 (26)	23 (32)		
Missing	13 (13)	12 (17)		
Postoperative days in hospital, median (IQR)	1 (1, 1)	1 (1, 2)	0.47	Wilcoxon rank-sum
Marital status, n (%)				
Yes	77 (74)	60 (85)	0.13	Fisher's exact
No	27 (26)	11 (16)		
Contact with the primary healthcare, n (%)				
Yes	9 (9)	2 (3)	0.20	Fisher's exact
No	95 (91)	69 (97)		
VAS-A baseline, median (IQR)	14.5 (6-33)	18 (6-36)	0.64	Wilcoxon rank-sum

SIS= standard information session, SIS-a= standard information session supplemented with an animated video of the program, VAS-A= Visual Analogue Scale – Anxiety, ASA= American Society of Anesthesiologists physical status classification, SD: =standard deviation, IQR= Inter-quartile range

A dropout analysis was conducted, comparing the discontinued patients who were excluded in the primary analyses due to missing data on VAS-A (see Table 2) to patients included in the analysis. This study defines a dropout analysis as an analysis of the demographic characteristics of the

patients with missing data on the outcome measure VAS-A, compared to demographic characteristics of the patients with no missing data. This analysis showed that the group of excluded project participants was not significantly different from the included project participants on the following demographic factors: “gender”, “age”, “ASA category”, “SIS group” and “marital status”.

Table 2: Dropout analysis

N	Inclusion (n= 175)	Missing (n=30)	p-value	Test
Age (years), mean (SD)	65 (9)	68 (8)	0.16	Two sample t-test
Gender, n (%)				
Female	88 (50)	16 (53)	0.76	Pearson's chi ²
Male	87 (50)	14 (47)		
Physical status, n (%)				
ASA I	62 (35)	12 (40)	0.32	Fisher's exact
ASA II	101 (58)	14 (47)		
ASA III	7 (4)	3 (10)		
ASA IV	1 (1)	0 (0)		
Missing	4 (2)	1 (3)		
Marital status, n (%)				
Yes	137 (78)	19 (63)	0.08	Pearson's chi ²
No	38 (2)	11 (37)		
SIS group, n (%)				
SIS	104 (59)	19 (63)	0.69	Pearson's chi ²
SIS-a	71 (41)	11 (37)		

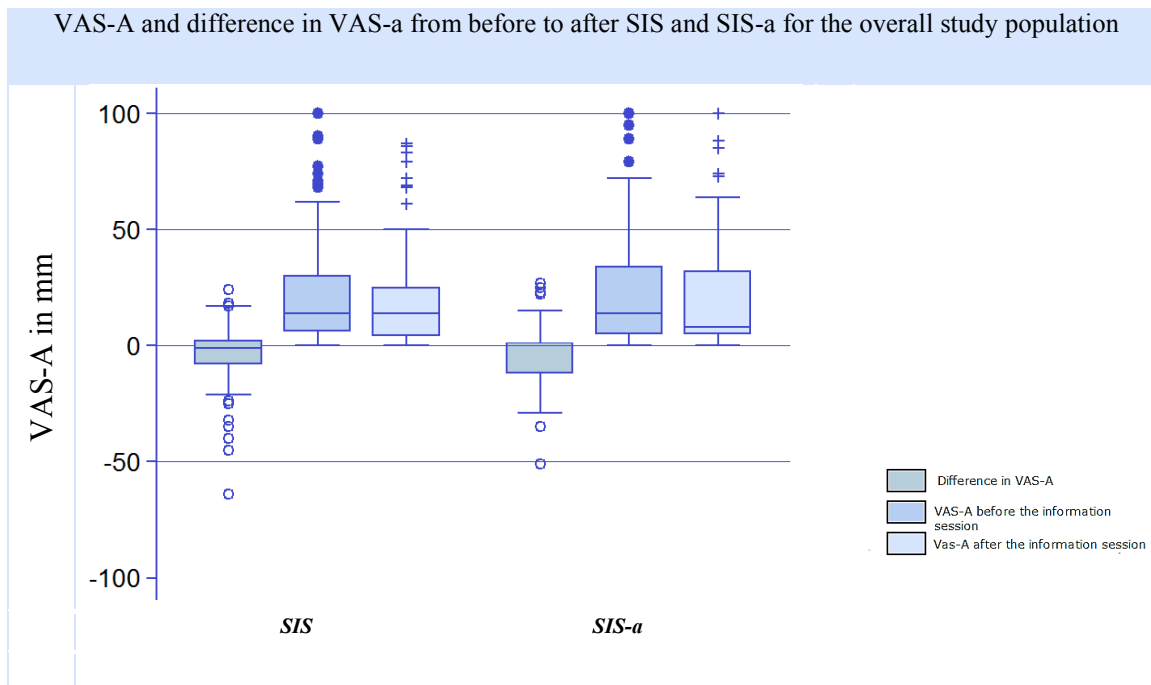
ASA= American Society of Anesthesiologists physical status classification, SIS= standard information session, SIS-a= standard information session supplemented with an animated video of the program, SD: =standard deviation, IQR:= Inter-quartile range

Effect of the different information sessions

The non-parametric analysis of effect within the groups showed a statistically significant effect of the information session in both the SIS group (p-value 0.005) and in the SIS-a group (p-value 0.01). To create an initial overview of the distribution of data for the entire population, Figure 3 shows a graphic representation as classic box plots with 25 'end, 75 'end percentile and median in boxes and whiskers indicating upper and lower adjacent value and outliers (31). The parallel box plots show

the VAS-A scores before and after the information session, as well as the difference from before to after the information session (see Figure 3).

Figure 3: Boxplots of the study population



SIS= standard information session, SIS-a= standard information session supplemented with an animated video of the program, VAS-A= Visual Analogue Scale – Anxiety

The non-parametric analysis between the groups showed no statistically significant difference between the effect in the SIS group and in the SIS-a group (p-value: 0.54).

After a dichotomization of data on the outcome a Pearson's χ^2 test showed no statistically significant difference in the proportion of patients with effect in the SIS and in the SIS-a (p-value: 0,63) (Table 3).

Table 3: Analysis of the effect of SIS and SIS-a

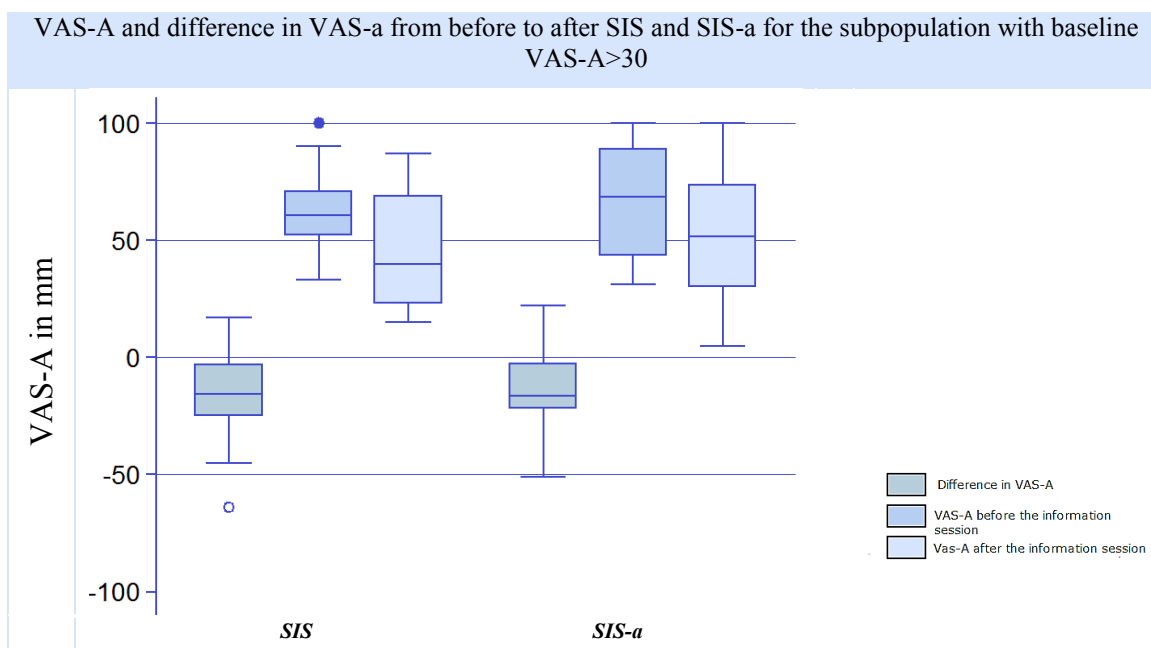
Dichotomized by outcome				
VAS-A difference	SIS (n=104)	SIS-a (n=71)	Total (n=175)	p-value*
Reduction n (%)	58 (56)	37 (52)	95 (54)	0.63
No reduction n (%)	46 (44)	34 (48)	80 (46)	

*Pearson's χ^2 , VAS-A= Visual Analogue Scale – Anxiety, SIS= standard information session, SIS-a= standard information session supplemented with an animated video of the program

Effect of SIS and SIS-a for patients with a baseline VAS-A score >30

The data were divided in two groups viz. baseline VAS-A score \leq and >30 in order to isolate the patients with baseline VAS-A score >30 in the SIS and the SIS-a group. Again a graphic representation is shown of the group with VAS-A score >30 as classic box plots (31). The parallel box plots show the VAS-A score before and after the information session, as well as the difference from before to after the information session (see Figure 4).

Figure 4: Boxplots of the subpopulation with baseline VAS-A >30



SIS= standard information session, SIS-a= standard information session supplemented with an animated video of the program, VAS-A= Visual Analogue Scale – Anxiety, Baseline VAS-A= score on the Visual Analogue Scale – Anxiety before the information session

For this subgroup there was found no statistically significant differences in patient characteristics or in the average level of anxiety before the information session (see Table 4).

Table 4: Patient characteristics for the subgroup with baseline VAS-A > 30

N	SIS (n=35)	SIS-a (n=28)	p-value	Test
Age (years), mean (SD)	62 (9)	64 (8)	0.52	Two-sample t-test
Gender, n (%)				
Female	20 (57)	19 (68)	0.44	Fisher's exact
Male	15 (43)	9 (32)		
Physical status, n (%)				
ASA I	14 (40)	7 (25)	0.50	Fisher's exact
ASA II	18 (51)	17 (61)		
ASA III	1 (3)	1 (4)		
ASA IV	0 (0)	1 (4)		
Missing	2 (6)	2 (7)		
Education, n (%)				
Low	7 (20)	4 (14)	0.90	Pearson's chi ²
Middle	6 (17)	5 (18)		
High	9 (26)	7 (25)		
Missing	13 (37)	12 (43)		
Postoperative days in hospital, median (IQR)	1 (1, 2)	1 (1, 2)	0.63	Wilcoxon rank-sum
Marital status, n (%)				
Yes	22 (63)	23 (82)	0.16	Fisher's exact
No	13 (37)	5 (18)		
Contact with the primary healthcare, n (%)				
Yes	4 (11)	1 (4)	0.37	Fisher's exact
No	31 (89)	27 (96)		
VAS-A baseline, median (IQR)	55 (33, 70)	49 (29, 76)	0.97	Wilcoxon rank-sum

VAS-A= Visual Analogue Scale – Anxiety, ASA= American Society of Anesthesiologists physical status classification, SIS= standard information session, SIS-a= standard information session supplemented with an animated video of the program, SD: =standard deviation, IQR= Inter-quartile range, Baseline VAS-A= score on the Visual Analogue Scale – Anxiety before the information session

The subgroup analysis within the groups showed a statistically significant reduction in anxiety for both the SIS and the SIS-a group. The mean reduction of anxiety was found to be 12 mm for the SIS group and at 14 mm for the SIS-a group (see Table 5). The between groups analysis showed

that this difference between the SIS and the SIS-a group was not statistically significant (see Table 5).

Table 5: Effect in the subgroup with baseline VAS-A score > 30

N=40 VAS-A diff.	SIS (n=35)	p-value* (within the group)	SIS-a (n=28)	p-value* (within the group)	Difference (between groups)	p-value** (between groups)
Mean (95 % CI)	-12 (-18; -6)	0.0002	-14 (-21; -7)	0.0003	2 (-7;10)	0.72

*=one-sample t-test; **=two-sample t-test; VAS-A= Visual Analogue Scale – Anxiety, SIS= standard information session, SIS-a= standard information session supplemented with an animated video of the program, Baseline VAS-A= score on the Visual Analogue Scale – Anxiety before the information session.

Demographic characteristics of patients with effect of information sessions

The following logistic regression was performed to investigate whether or not the following patient characteristics can predict effect of SIS or SIS-a (Table 6).

Table 6: Predictor analysis for effect of SIS and SIS-a

Achieved effect	OR (95 % CI)	P-value
Baseline VAS-A > 30	5.23 (2.01 – 13.65)	0.001
Baseline VAS-A 0-30 (reference)	1.00	
SIS	1.56 (0.76 – 3.23)	0.235
SIS-a (reference)	1.00	
Age	0.97 (0.93 – 1.00)	0.099
High education	2.22 (0.97– 5.05)	0.058
Medium education	0.73 (0.28 – 1.85)	0.499
Low education (reference)	1.00	

Level of education is measured with ISCED=International Standard Classification of Education. Baseline VAS-A= score on the Visual Analogue Scale – Anxiety before the information session, SIS= standard information session, SIS-a= standard information session supplemented with an animated video of the program

According to the regression analysis in the present study, patients with baseline VAS-A score >30 are 5 times more likely to experience effect of the information session as compared to patients with a baseline VAS-A score ≤30 (OR(95%CI) 5.23(2.01-13.65)). This result is adjusted for SIS group,

age and ISCED level. This indicates that whichever information session patients participate in, the likelihood of effect are highest in patients with a high anxiety level before the information session.

Although not significant, the regression analysis indicates that patients with a high ISCED level are 2.2 times more likely to experience effect compared with patients with a low ISCED level (OR (95% CI) 2.22 (0.97-5.05)). This was also adjusted for “SIS group”, “age” and “baseline VAS-A score”.

The rest of the chosen factors did not have statistically significant predictive ability of effect of the information sessions in this study population.

Discussion

In this article we have presented the results from a study of the effect of two types of information sessions with and without an animated video (SIS and SIS-a). We examined the effect of the information sessions and whether there was a greater effect of SIS-a compared to SIS. Finally we wanted to identify predictive patient characteristics of effect of the information sessions.

Both the SIS and the SIS-a group experienced statistically significant effect of the information sessions measured with VAS-A and tested with Wilcoxon’s signed rank test on the overall study population and the paired t-test on the subpopulation with a baseline VAS-A score >30. The logistic regression however showed that the subgroup with a baseline VAS-A score >30 were 5 times more likely to experience effect than the subgroup with a baseline VAS-A score ≤30. This substantiates the conclusion by Farstad et al (26), that there seems to be a greater potential for effect among the subpopulation with a high anxiety level than for the total study population.

Neither the Wilcoxon’s rank sum test nor the two-sample t-test showed a significant difference in the effect between the SIS group and the SIS-a group in respectively the total study population and the subpopulation with a baseline VAS-A score >30. Tou et al. (6) have previously found positive effect of an animated video on preoperative anxiety in gastro intestinal surgical patients, and Kakinuma et al. (5) has found a positive effect of an animated video on the learning ability of cancer patients (5). The results of current study thus vary some from existing studies. According to Sjöling et al. (18) thorough and comprehensive information have a positive effect on preoperative

anxiety. Because the standard THA-program, in the hospital where this study was carried out, is organized with extensive oral and written information through the entire process, this in itself may meet the patients' need for information. This can contribute to the fact that this study did not find an increased positive effect upon implementation of animated video in addition to the already existing offer of patient information.

None of the educational levels were predictors of effect of the information sessions when compared to the lowest level. However, a trend towards an increased probability of experiencing effect of the interventions was detected for patients with high educational levels. Although this result is not statistically significant, it can still be considered clinically relevant. Earlier research has found that a high educational level is associated with high levels of health literacy (19, 20,21), and that the ability to understand and apply health information has shown to reduce patients' preoperative anxiety (14, 17,18). The fact that this study did not find statistical significance for this result may be due to the limited strength of the overall predictor analysis. The logistic regression furthermore showed that patients with a baseline VAS-A score >30 was 5 times more likely to experience effect than patients with a baseline VAS-A score ≤ 30 . However, it can be disputed that the outcome in this case is not rare, thus the estimate calculated as an odds ratio may overestimate the true probability. Previous research has estimated a VAS-A score >30 as the cut-off point for clinically relevant anxiety, and a recent research project has shown that a VAS-A score >30 is a potential predictor for a high anxiety level throughout the clinical pathway (13). This study's findings thus support earlier research findings, and have furthermore shown that a baseline VAS-A score >30 may be predictor of effect of participation in the information sessions. None of the other explanatory variables in the model was shown to be significantly associated with effect.

Limitations

The information on the outcome is found by measuring the distance from 0 to a patient reported cross on the VAS-A scale. The scientific assistant who measured the VAS-A score was not blinded to the SIS groups. It was continuously ensured that the VAS-A line deposited on paper was 100 mm. In the analysis were the VAS-A score is dichotomized on effect, we recognize that this is a very simplistic measure, since the dichotomization only focuses on the reduction of the VAS-A score and not the size of reduction. It might be desirable that research in the future focuses on defining a limit for the minimal clinically relevant reduction.

The other main characterizing variables were collected by obtaining information from the electronic hospital records, as well as by phone interview. There is some uncertainty in patient-reported data, but overall the validity of the information used must be assessed as good. There is a risk that the patients included in this study are not representative of the general population of THA-patients who undergo fast track surgery, since this study only included patients undergoing THA surgery for the first time. Thus it cannot be assumed that second time THA-patients have the same evolvement of preoperative anxiety level as the first time operated.

Only few patients (5) choose to withdraw from the study, and these dropouts are not assessed to be of impact on the validity of the results of the study. Unfortunately it has been impossible to identify the size or characteristics of the actual possible study population, and thus we can not access if the sample in the study is representative of the target population. However, since the patients are included consecutively in two different periods, and the dropout rate is very limited, a possible selection bias from this source is unlikely. It is unclear whether the results can be generalized beyond the hospital where the study is conducted, but it presumably can be generalized to similar settings with similar information settings.

All statistical testing has been performed without trial pre-specified scientific hypotheses, and the results should therefore be seen as hypothesis generating and explorative.

In the overall predictive model, relevant confounders are taken in account. It might have been desirable to have an objective measure of health literacy, but this was unfortunately not an option because these post hoc analyses were performed on data already collected and did not contain data about the patients' health literacy.

Conclusion

Information sessions had good effect on preoperative anxiety in both the SIS and SIS-a group, which is in line with previous research in this field. There was shown no difference in level of anxiety between participation in the regular information sessions (SIS) versus participation in similar information sessions with the addition of an animated video (SIS-a).

This study's findings thus supports earlier research findings , and have also shown that a baseline VAS-A score >30 may be a predictor of effect of participating in information sessions, regardless of whether the patients participates in the SIS or SIS-a.

It is desirable that future research focuses on defining a smallest clinically relevant reduction in VAS-A.

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