

Effectiveness of an online patient education video for transcatheter aortic valve implantation

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Dear Editor,

Anxiety and gaps in medical knowledge have been shown to adversely affect treatment decisions amongst patients and their next-of-kin (NOK).¹⁻³ In a busy clinical setting, physicians may find it time-consuming and challenging to address all aspects of a complex procedure, like transcatheter aortic valve implantation (TAVI) for the treatment of aortic stenosis (AS). We aim to evaluate the effectiveness of an online patient education video in improving patients' and NOKs' knowledge, and reducing their anxiety for TAVI.

Between April 2021 and April 2024, consecutive patients and/or their NOK being considered for TAVI in the National Heart Centre Singapore were recruited. Non-English-speaking participants were excluded. Written informed consent was obtained from the participants and ethical approval was obtained.

In addition to the consult by the heart team, a 5-minute original animated education video, accessible at <https://www.youtube.com/watch?v=F56YUQehj0k>, was shown. This was created using a whiteboard sketching video tool, VideoScribe (Sparkol Limited, Bristol, UK) and narrated in English. The video described the clinical symptoms of AS, the indications, procedural details, risks and benefits of TAVI, and post-procedural care (Supplementary material S1). A self-administered written questionnaire (Supplementary material S2) was conducted prior to and after the intervention. In summary, the questionnaire gathered information regarding baseline demographic data, and both objective and subjective assessment of knowledge and anxiety levels. The knowledge component was objectively graded based on 10 questions with a score of 1 for the right answer without negative marking.

Anxiety was assessed objectively via the State Trait Anxiety Inventory (STAI).⁴ The STAI is a self-reported, validated psychological instrument to assess levels of state anxiety (STAI-S) and trait anxiety (STAI-T). Qualitative feedback on the video was also obtained.

The primary outcomes were objective knowledge scores and STAI scores. Secondary outcomes were participants' own perception of their knowledge and anxiety levels.

All scores were compared pre- and post-intervention using Wilcoxon signed-rank test. A sensitivity analysis was performed separately in the patient and NOK subsets. A *P* value of <0.05 was considered significant. Statistical analysis was performed using Stata version 18 (StataCorp, College Station, Texas).

A total of 32 participants were recruited, with 18 patients and 14 NOKs. Participants were equally represented in sex. Median age was 65.0 (interquartile range [IQR] 46.5–75.5) years, with patients generally older than NOK, at 74.5 (IQR 67–82) and 43.0 (IQR 38–53) years, respectively. Most participants were non-university graduates (78.1%) and lived in public housing (71.9%).

Table 1 summarises the outcomes. For primary outcomes, overall scores on the 10-question questionnaire increased pre-intervention to post-intervention from 5.0 (IQR 4–6.5) to 7.0 (IQR 6–8) (*P*<0.01). In the patient subgroup, scores increased from 4.0 (IQR 3–6) to 7.0 (IQR 7–9) (*P*<0.01). There was a non-significant increase in scores for the NOK group from 5.0 (IQR 5–7) to 6.0 (IQR 6–7) (*P*=0.16).

For assessment of anxiety based on STAI-S and STAI-T scores, there was a decrease from pre-

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Table 1. Knowledge and anxiety levels pre- and post-intervention.

	Median	IQR	P value
Overall			
Knowledge			
Objective (pre)	5.0	(4.0, 6.5)	<0.01
Objective (post)	7.0	(6.0, 8.0)	
Subjective (pre)	6.0	(4.0, 7.0)	<0.01
Subjective (Post)	8.0	(7.0, 8.5)	
Anxiety			
STAI-S scale (pre)	44.5	(35.5, 51.5)	<0.01
STAI-S scale (post)	37.0	(31.0, 47.5)	
STAI-T scale (pre)	39.5	(31.0, 47.5)	<0.01
STAI-T scale (post)	37.0	(31.0, 44.5)	
Subjective (pre)	7.0	(5.0, 8.0)	0.02
Subjective (post)	6.0	(4.0, 7.0)	
Patients			
Knowledge			
Objective (pre)	4.0	(3.0, 6.0)	<0.01
Objective (post)	7.0	(7.0, 9.0)	
Subjective (pre)	5.0	(4.0, 6.0)	<0.01
Subjective (post)	7.5	(6.0, 8.0)	
Anxiety			
STAI-S scale (pre)	47.5	(36.0, 53.0)	0.05
STAI-S scale (post)	42.0	(35.0, 53.0)	
STAI-T scale (pre)	40.5	(30.0, 48.0)	0.23
STAI-T scale (post)	36.5	(30.0, 49.0)	
Subjective (pre)	7.0	(5.0, 9.0)	0.12
Subjective (post)	6.0	(5.0, 8.0)	
NOKs			
Knowledge			
Objective (pre)	5.0	(5.0, 7.0)	0.16
Objective (post)	6.0	(6.0, 7.0)	
Subjective (pre)	6.0	(6.0, 8.0)	<0.01
Subjective (post)	8.0	(8.0, 10.0)	

Table 1. Knowledge and anxiety levels pre- and post-intervention. (Cont'd)

	Median	IQR	P value
Anxiety			
STAI-S scale (pre)	41.0	(35.0, 50.0)	<0.01
STAI-S scale (post)	33.5	(30.0, 41.0)	
STAI-T scale (pre)	39.5	(34.0, 45.0)	0.01
STAI-T scale (post)	37.0	(32.0, 39.0)	
Subjective (pre)	6.0	(5.0, 8.0)	0.09
Subjective (post)	5.5	(4.0, 6.0)	

IQR: interquartile range; NOK: next-of-kin;
STAI-S: State Trait Anxiety Inventory-State;
STAI-T: State Trait Anxiety Inventory-Trait

intervention to post-intervention from 44.5 (IQR 35.5–51.5) to 37.0 (IQR 31–47.5) ($P<0.01$) and 39.5 (IQR 31–47.5) to 37 (IQR 31–44.5) ($P<0.01$), respectively. There was a significant decrease in scores for NOKs for both STAI-S from 41.0 (IQR 35–50) to 33.5 (IQR 30–41) ($P<0.01$) and STAI-T from 39.5 (IQR 34–45) to 37.0 (IQR 32–39) ($P<0.01$); there was a decrease in scores for patients from 47.5 (IQR 36–53) to 42.0 (IQR 35–53) ($P=0.05$) in STAI-S, without significant difference in STAI-T scores ($P>0.05$).

For secondary outcomes, subjective perceptions for understanding the TAVI procedure rated on a scale of 10 increased overall from 6.0 (IQR 4–7) to 8 (IQR 7–8.5) ($P<0.01$). This was seen in both patients (5.0 [IQR 4–6] to 7.5 [IQR 6–8], $P<0.01$) and NOKs (6.0 [IQR 6–8] to 8.0 [IQR 8–10] $P<0.01$). Median subjective anxiety levels rated on a scale of 10 decreased from 7.0 (IQR 5–8) to 6.0 (IQR 4–7) ($P=0.02$) overall. Separately, both patient and NOK median scores did not decrease significantly ($P>0.05$).

Regarding qualitative feedback about the video, all participants reported that they liked the use of videos in patient education. The top reasons are that it was simple to understand (90.1%), and that there were pictures and drawings (81.3%) and clear narration (65.6%).

Our study showed that there was significant increase in knowledge through this simple intervention. Similarly, a prior randomised controlled trial using an animated video with whiteboard sketching tools improved knowledge in patients undergoing coronary angiography and angioplasty.⁵ Beyond cardiology, Moe-Byrne et al.

corroborated in a systematic analysis that video animations were useful patient information tools for improving knowledge.⁶ Notably, the increase in knowledge scores in the patient subgroup, could be attributed to the increased age of this cohort, where the effectiveness of visual aids in delivering information compared with verbal counselling is accentuated.⁷ Additionally, there is significant reduction in anxiety through our intervention. It has been reported that even if patients do agree to a procedure, inadequate understanding in patients with poor health literacy may worsen patient anxiety, increase litigation and confer worse outcomes.^{8,9} The use of a video in reducing anxiety in a clinical setting has also been seen in other medical disciplines. For example, Raz et al. found that a video intervention significantly reduced participants sense of dejection through lung cancer screening and promoted psychological preparedness.¹⁰ Our study adds to the body of evidence in demonstrating the utility of video tools in improving knowledge and reducing anxiety.⁵

There are several benefits to this video identified. First, the duration is short allowing good attention span. Second, the video utilises whiteboard sketching tools with layman language, and simple animations with subtitles that increase understandability. Lastly, our video is readily and publicly available.

Several limitations exist. This is a study from a single tertiary cardiac institution. In addition, due to limited resources for translation, only English-speaking participants were recruited. Thus, this may impact the generalisability of the results. The production of this video in other languages is planned.

In conclusion, this is one of the first studies demonstrating that an online patient education video using simple whiteboard sketching tools was effective in improving knowledge and reducing anxiety in patients/NOKs for TAVI. There may be consideration of incorporating this into clinical practice to improve patient care.

Supplementary Material S1 Figure

Supplementary Material S2 TAVI Questionnaire

Ethics statement

Written informed consent was obtained from the participants and ethical approval for the study was obtained from the SingHealth Centralised Institutional Review Board (Reference 2020/3149).

Declaration

The authors have no affiliations or financial involvement with any commercial organisation with a direct financial interest in the subject or materials discussed in the manuscript.

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REFERENCES

1. Basukala S, Shrestha O, Thapa N, et al. How informed is informed consent?—Evaluating the quality of informed consent among surgical patients in a tertiary care hospital in Nepal. *PLoS One* 2023;18:e0288074.
2. Strøm A, Dreyer A. Next of kin's protracted challenges with access to relevant information and involvement opportunities. *J Multidiscip Healthc* 2018;12:1-8.
3. Col NF, Otero D, Lindman BR, et al. What matters most to patients with severe aortic stenosis when choosing treatment? Framing the conversation for shared decision making *PLoS One* 2022;17:e0270209.
4. Spielberger CD, Gorsuch RL, Lushene RE, et al. Manual for the State-Trait Anxiety Inventory (Form Y1 – Y2). CA: Consulting Psychologists Press;1983.
5. Yap J, Teo TY, Foong P, et al. A randomized controlled trial on the effectiveness of a portable patient education video prior to coronary angiography and angioplasty. *Catheter Cardiovasc Interv* 2020;96:1409-14.
6. Moe-Byrne T, Evans E, Benhebl N, et al. The effectiveness of video animations as information tools for patients and the general public: A systematic review. *Front Digit Health* 2022;4:1010779.
7. Kim SH, Koh WU, Rhim JH, et al. Preconsent video-assisted instruction improves the comprehension and satisfaction in elderly patient visiting pain clinic. *Korean J Pain* 2012;25:254-7.
8. Steven Bailey C, Bailey JA. Claims of alleged medical negligence in refractive surgery: causes and avoidance. *Cont Lens Anterior Eye* 2007;30:144-47.
9. Shahid R, Shoker M, Chu LM, et al. Impact of low health literacy on patients' health outcomes: a multicenter cohort study. *BMC Health Serv Res* 2022;22:1148.
10. Raz DJ, Nelson RA, Kim JY, et al. Pilot study of a video intervention to reduce anxiety and promote preparedness for lung cancer screening. *Cancer Treat Res Commun* 2018;16:1-8.