

RESEARCH

Paired surveys for patients and physiologists in echocardiography: a single-centre experience

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Abstract

The British Society of Echocardiography (BSE) highlights the importance of patient questionnaires as part of the quality improvement process. To this end, we implemented a novel system whereby paired surveys were completed by patients and physiologists for transthoracic echocardiography scans, allowing for parallel comparison of the experiences of service providers and end users. Anonymised questionnaires were completed for each scan by the patient and physiologist for outpatient echocardiographic scans in a teaching hospital. In 26% of the responses, patient found the scans at least slightly painful, and in 24% of scans physiologists were in discomfort. The most common reason given by physiologists for technically difficult or inadequate scans was patient discomfort. In 38% of the scans at least one person (the patient or the physiologist) was in at least some discomfort. Comparative data showed that the scans reported as most painful by patients were also reported by the physiologists as difficult and uncomfortable. In summary, these results demonstrate the feasibility of implementing paired surveys. Patient information leaflets by the BSE and National Health Service (NHS) describe echocardiography as painless but the results here indicate this is not always the case.

Key Words

- ▶ transthoracic echocardiography
- ▶ comparison
- ▶ feasibility

Introduction

Transthoracic echocardiography (TTE) remains the commonest cardiac imaging modality as it is safe, cost-effective and useful in the diagnosis, management and follow-up of most cardiac conditions (1). As with all investigations, patient surveys are important because acting on feedback can improve their experience. The 2016 British Society of Echocardiography's (BSE) Echocardiography Quality Framework recommends patient satisfaction questionnaires in all TTE departments so that we always ask ourselves 'if we are kind to our

patients' and 'what ... our patients say about us' (<https://www.bsecho.org/education/echo-quality-framework/>, accessed 17/11/18). The BSE recognises that in busy TTE departments this can be 'difficult and time consuming', and whilst similar modalities have been studied, there is no literature discussing the feasibility and results of patient satisfaction surveys in TTE (2, 3). Furthermore, whilst the theoretical and hypothetical benefits of implementing the BSE framework have recently been reviewed, there are no published accounts of real-world attempts to

implement the BSE Echocardiography Quality Framework in an echocardiography department (4, 5). The combining of patient feedback and physiologist feedback across successive TTE studies for the purposes of research and quality improvement is also novel. The aim of this study is to design, implement and publish the results of the first survey of patients and physiologists in an outpatient TTE department in order to assess its feasibility, improve the service for both patients and physiologists and explore areas for further research.

Methods

Survey design

Surveys were designed for patients and physiologists, respectively. The patient survey was based on a draft provided by the BSE on request (Daniell G, personal communication). Another example has since been published (5). Questions were qualitative and quantitative with different sections for (i) demographics, (ii) service quality, (iii) patient experience and (iv) overall feedback (Supplementary Fig. 1, see section on [supplementary data](#) given at the end of this article). The physiologist survey was shorter to minimise the impact on service provision and included multiple-choice questions on (i) demographics, (ii) sonographer experience and (iii) image quality (Supplementary Fig. 2). Both were anonymised to encourage honesty and reduce bias, but were numbered and paired to allow the cross-comparison of patient and physiologist data for exploratory purposes.

Survey implementation

The study took place in the echocardiography department at Whipps Cross University Hospital in North-East London. This is a typically busy district general hospital echocardiography department. Each year approximately 5200 outpatient scans and 4100 inpatient scans are performed by five departmental echosonographers using two Vivid 7 GE and two Vivid I GE machines. Ethical approval was provided by the Clinical Effectiveness Unit at Barts Health NHS Trust. Surveys were initially distributed to patients, physiologists and the wider multi-disciplinary team for piloting. Feedback was then used to improve the questionnaires prior to implementation. The final versions of both questionnaires were authorised and agreed by the Departmental Clinical Governance Team.

Data collection and analysis

Patients were prospectively enrolled, and consent for participation was verbal. In line with the BSE Guidelines all patients received an information leaflet prior to their TTE study and all scans were based on the standard BSE TTE protocol criteria (https://www.bsecho.org/media/71250/tte_ds_sept_2012.pdf, accessed 17/11/18). After their outpatient TTE studies, consenting physiologists and patients completed their respective numbered surveys. Data were collected and analysed in Microsoft Excel. To minimise data loss, incomplete surveys remained in the final analysis. Because of this, and that some questions were in a 'select all that apply' format, not all percentages add up to 100%.

Results

During the first 3 weeks of February 2018, paired patient and physiologists surveys were completed for 80 out of a possible 324 outpatient TTE studies (response rate 25%).

Patient survey

Thirty-four patients (43%) were male, 31 (39%) were female and 15 (18%) did not say. The average age was 62 years (range 17–91 years). Forty-three (53%) were white, 14 (18%) were Asian, 3 (4%) were African-Caribbean, 1 (1%) was of mixed race, 2 (3%) selected 'other', and 17 (21%) did not say. A summary of patient experiences of service provision is shown in [Table 1](#). Ten (13%) patients found reading the patient information leaflet useful. Forty-seven (59%) found the scan 'painless', 17 (21%) found it 'slightly painful', 1 (1%) found it 'often painful', 1 (1%) found it 'mostly painful' and 2 (3%) found it 'always painful'. [Figure 1](#) shows a summary of patients' overall reported experiences.

Physiologist survey

Nineteen (24%) of the studies caused the physiologist some discomfort and 57 (71%) did not. Thirty-nine (49%) studies were 'technically adequate', 35 (44%) were 'technically difficult' and 2 (3%) were technically 'inadequate'. The reasons for 'technically difficult' or 'inadequate' TTE scans are shown in [Fig. 2](#). Of the 52 left-handed scans, 5 (10%) caused the physiologist some discomfort (10%). Of the 24 right-handed scans, 14 (58%) caused them discomfort.

Table 1 Responses in the patient questionnaire regarding service provision.

	Patient responses (%)	
	Agree	Disagree
This was the first time I have ever had an echo scan	36	30
I knew exactly what the echo scan was for	63	4
The time I waited for my appointment was reasonable	65	1
The scan today was on time and I didn't have to wait	66	1
I was offered a chaperone for today's scan	20	34
The scanning couch was comfortable to lie on	61	6
I am currently taking pain relieving medications	20	39
The person scanning was friendly towards me	67	1
The person scanning explained the procedure to me	56	8
The person scanning was willing to answer my questions	60	4
I was treated with dignity and respect throughout	67	1
I was told how and when the results would be available	55	10
I wanted to receive more information about my results today	35	19

Comparative data

Because patient and physiologist surveys were linked we could draw comparisons between their experiences of the same study. In 30 of the TTE studies (38%) at least one person (i.e. the patient or the physiologist) was in at least some discomfort, whereas in 39 (49%) scans neither patient nor physiologist was in any discomfort. Comparing pain scores and analgesia use, there is a trend towards higher discomfort levels in patients taking regular analgesia, but the numbers were too small to draw statistically robust conclusions (Fig. 3). Within the comparative data, there were two individual TTE studies that patients found 'always painful'. The first was an 82-year-old male of low BMI who was one of only two patients whose TTE images were 'completely inadequate', and one of only five who rated their experience 'average' (as opposed to 'good' or 'excellent'). The second patient who reported their scan as 'always painful' was a 17-year-old female; it was her first scan and was 'technically difficult'. She was also one of five patients to rate their overall TTE experience as 'average'

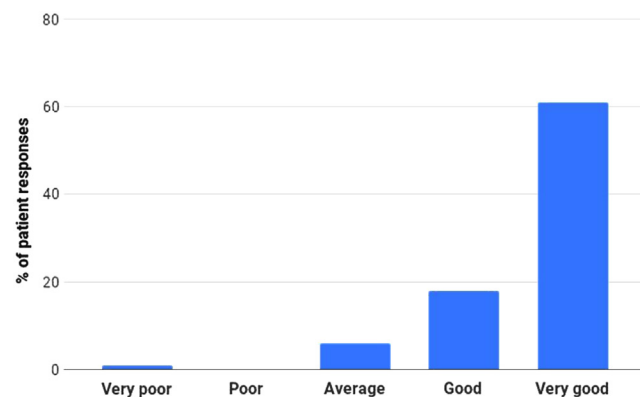


Figure 1 Patient rating of overall experience.

and was one of only eight who said they did not have the procedure explained to them properly beforehand. Interestingly, in both of these two 'always painful' cases, the scan caused some discomfort for the physiologist, as well as the patient.

Discussion

To provide patients an excellent service, it is important to study their experiences and to act on the results. This is especially relevant for an investigation as useful, ubiquitous and important as TTE. Whilst the BSE now recommends patient surveys in all echocardiography departments, in reality this practice is rare, the practicalities of doing so are still being explored, and this is the first publication to discuss the feasibility and results of such a survey (4, 5). We hope that by sharing our experience, we support other centres in implementing the various domains of the BSE Echocardiography Quality Framework locally. Our inclusion of a paired physiologist survey is also novel.

The results of our survey demonstrated that patients were generally satisfied with their TTE experience in our department. They reported that the physiologists were friendly, that they did not have to wait too long for their appointments and that they were largely treated with dignity and respect. Most rated their overall experience as either 'good' or 'very good'.

The main areas for improvement are related to patient expectations, information provision and patient and physiologist comfort levels. For example, whilst the majority did feel that TTE was explained to them, only 13% found reading the leaflet useful, many did not know what the scan was for and many were not told how and when the results would be available (Table 1).

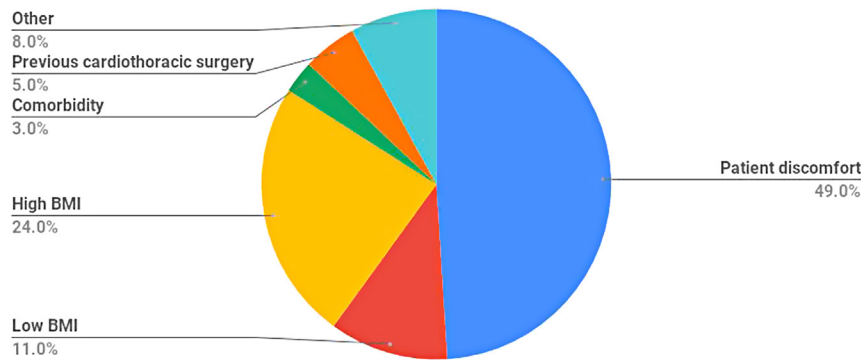


Figure 2
Reasons given by physiologists for technically difficult or inadequate studies.

One patient wanted ‘a general introduction to what it is all about’ and another wanted ‘the (physiologist) to explain the procedure and ask if (they) had any questions’. A considerable proportion of patients in our cohort wanted their results immediately; non-communication of test results can cause anxiety, and fully informed patients have better outcomes (6, 7). Furthermore, many TTE studies are reassuringly normal and some centres are even using dedicated physiologist-led clinics to improve the communication of TTE results to patients (8, 9). Such clinics could also reduce clinic waiting times, increase patient understanding and satisfaction and contribute to their continuity of care. Our results would generally support the early provision of TTE results to patients.

A surprising result was the level of pain that patients experience. This may be exacerbated by the fact that patients are expecting the test to be painless. That is, most information leaflets, including the BSE template and the National Health Service website, describe TTE as a ‘painless’ investigation but 26% of patients in our study found their scan at least slightly painful (<https://www.bsecho.org/education/patient-information/>, accessed 17/11/18, <https://www.nhs.uk/conditions/echocardiogram/>, accessed 17/11/18). The single most important factor for patient satisfaction of a diagnostic test is the degree of discomfort they experience, and patient-related outcome measures are increasingly important in clinical practice and research (10). To ensure

that patient expectations meet reality, it is important that information leaflets discuss TTE as a harmless rather than a painless test; that it is safe, but that it may cause them at least mild discomfort. Pain may also be reduced if patients understand why a TTE may become momentarily less comfortable; for example, physiologists could explain they may need to press harder to obtain better pictures. This is an important area for improvement and a useful example of the information that can be extracted from paired surveys like this.

In our survey, 24% of scans also caused the physiologist some discomfort. Right-handed scanners were more affected than left-handed scanners, contradicting a previous study which found no correlation between musculoskeletal pain and handedness (11). Physiologist discomfort or even musculoskeletal disability is common. Eighty percent of cardiac physiologists are working in pain, and some even experience career-ending injuries through their work (12). The two most painful scans for patients in our study were included as examples of the comparative analysis that is possible with paired surveys such as this. These two scans were not only uncomfortable for physiologists, but were also ‘technically inadequate’. We would have liked to mine the data further to look for more correlations like this, but it became clear that our low response rate made drawing statistically robust conclusions challenging. The reasons for TTEs being ‘technically difficult’ or ‘inadequate’ in our study were

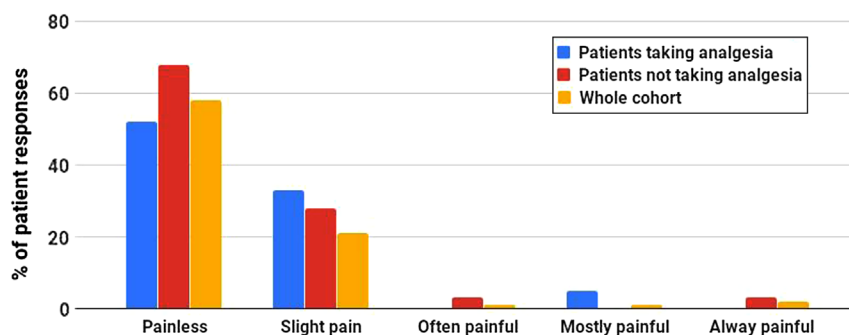


Figure 3
Comparing levels of discomfort reported by patients taking analgesia, patients not taking analgesia and patient from the whole cohort.

patient discomfort (49%), high BMI (24%), low BMI (11%), cardiothoracic surgery (5%), comorbidity (3%) or other (8%). Although exploratory, it is possible that a subset of TTE studies are both technically inadequate and uncomfortable both for patients and physiologists, and further work could highlight the importance of selecting alternative imaging modalities for groups such as this.

The main strength of this study is that it demonstrates the feasibility of the prospective collection of paired, matched, anonymous patient and physiologist surveys in a typically busy echocardiography department. This practical, real-world case study builds on recent discussions of the theoretical and hypothetical advantages of implementing the various domains of the BSE Echocardiography Quality Framework (4, 5). Our study is also in line with these publications as it is holistic, scalable, adaptable and multi-disciplinary in nature (4, 5). The surveys we distributed were well received and largely completed in full. Analysis of the results has yielded some interesting and novel findings, which will pave the way for local quality improvement and possibly further research.

Disappointingly, however, the response rate is low; though the numbers are similar to comparable patient and sonographer surveys (3, 10, 11, 13). This may be because quality assurance exercises like this can be '*difficult ... time consuming ... and sometimes contentious*', as mentioned in the BSE Echocardiography Quality Framework (<https://www.bsecho.org/education/echo-quality-framework/>, accessed 17/11/18). This limited our ability to extract more robust comparative data between the patient and physiologist responses, although some interesting comparisons were still discussed. We hope that further work will provide more robust comparative data.

Given that this is the first published survey of its kind, there are many opportunities for further work. The first step is to begin addressing the local issues we identified. For example, by modifying the information leaflet we send to patients (explaining the test more thoroughly, explaining that it might be uncomfortable and why and discussing how patients can get access to their results afterwards). The next step would be to increase the number of responses we receive by implementing the survey over a longer period of time in multiple centres. Data inferences and more robust comparisons could then be used to drive further research. For example, further studies could consider how we can reduce the discomfort that patients and physiologists experience; how patient discomfort, physiologist discomfort and patient comorbidity affect image adequacy and how we could use that information

to improve modality selection and image adequacy. More broadly, larger surveys could, for example, generate a score that predicts a subset of patients who are likely to have inadequate images and/or significant discomfort, and who may benefit from alternative imaging modalities or even simple analgesia prior to their scan. However, these ideas are still exploratory.

In conclusion, the outpatient TTE service we provide is well received by patients. A patient satisfaction survey based on the BSE Echocardiography Quality Framework is feasible and can be paired anonymously with a brief physiologist questionnaire as well. The anonymous pairing of the two surveys is a novel and useful research tool that, in parallel, could help drive improvements for patients, physiologists and clinicians alike. In accordance with the BSE recommendations, we agree that patient satisfaction surveys should be implemented in all TTE departments.

Supplementary data

This is linked to the online version of the paper at <https://doi.org/10.1530/ERP-18-0064>.

Declaration of interest

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

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