



PHILIPS

Research paper

A fresh perspective from the interventional suite

How focusing on the patient can positively
impact outcomes, cost of care, and the patient
and staff experience

Summary

Feelings of anxiety and apprehension are common among patients who undergo cardiology and radiology interventions. Patients undergoing a cardiac catheterization experience the highest levels of anxiety just before the procedure. These issues can lead to unfavorable physiological changes. Therefore, strategies aiming to minimize anxiety in patients undergoing diagnostic or therapeutic interventions are not only important for the patient but could potentially improve outcomes.¹

A retrospective review of scientific publications, interviews with patients and subject matter experts, and validation of proposed patient-focused design concepts by patients and healthcare professionals, concludes that strategies to improve the patient experience for interventional procedures can be prioritized into three main categories: information, positive distraction, and comfort.

Information: Patients confirm the need/desire to receive personalized pre-procedure information at home, rather than immediately prior to the procedure, and a debrief directly upon procedure completion.

Positive distraction: Patients suggest the opportunity for a less intimidating environment, and a choice of audio and/or visual distraction would be highly appreciated. It would help take their mind off the procedure – settling them down and allowing staff to better concentrate on the task.

Comfort: Patients indicate a more comfortable mattress and room temperature may help them maintain the required position longer, which could result in fewer disruptions.



The research highlighted interesting topics for consideration in the development of patient-centric solutions going forward:

- Actual average patient table time for a typical procedure (i.e. percutaneous coronary intervention or routine PCI) is longer than perceived patient table time – between 30 minutes and 2 hours, although it can take longer.²
- While in many procedures patients might be sedated, this strongly depends on the hospital or procedure protocol and the impact of distraction and reduced sedation use may be underestimated.
- Clear pre- and post-procedural information, in addition to intraprocedural instructions, is critical to patient confidence and has the potential to positively influence workflow.
- Patients and healthcare professionals do differ slightly in opinion on when, in the patient journey, intervention can be most impactful. Patients speak most highly of positive distraction and comfort while entering the room and undergoing the procedure. Healthcare professionals tend to believe pre/post information is most important. Both groups realize that positive distraction, while difficult to quantify, may contribute to a more efficient procedure.
- Strategies targeting anxiety reduction (distraction/comfort) prior to the procedure may also have a positive financial impact. Cost savings and time reduction can be achieved due to potential reduction of sedation, and/or reduction in the need for an anesthesia care team – as research has already shown in (pediatric) magnetic resonance imaging settings.³



Introduction

Improving the care environment and experience, for both patients and staff, has become an increasing focus of the healthcare industry. Adding to that, is the concept of individualized care where the patient has active involvement and is able to choose certain aspects of the care experience.

For the interventional setting, patients frequently wait before entering the lab, and then again while staff prepare for the procedure to start. The environment is perceived as cold, brightly lit, and unwelcoming, which can negatively impact the patient experience.

The research findings covered in this paper help validate the proposition that patient-focused strategies can help to improve the interventional experience and may also positively impact outcomes and provide hospitals with an opportunity to enhance their standard of care.

Research findings

Our desk research of 42 relevant publications, 13 in the context of cardiology, identified the following major pain points for patients waiting for and undergoing a diagnostic or interventional procedure:¹⁻¹⁰

- Patients feel uncertain about their health and if they are being treated in a timely fashion
- Patients feel uncertain about the unknown staff, intimidating environment, and equipment
- Patients feel uncertain about exactly what is going to happen during the procedure
- Patients anticipate possible complications or unfavorable clinical findings
- Patients have a fear of lying flat for long periods of time
- Patients have a fear of potential outcomes and related changes to their health and personal life

Research shows patient anxiety generally peaks in the moments immediately prior to the intervention, with higher anxiety scores for patients <65 years, compared to patients of older age.¹ In the same study, pre-procedural anxiety was also associated with post-procedural anxiety at one week, underlining the importance of attempts to decrease the pre-procedural anxiety of patients.

Research also shows that significant impact is achieved when applying patient experience interventions.¹⁻¹⁰ In summary, we identified three main drivers to positively impact patients and hospital workflow:

- **Better pre-procedural explanation** is associated with lower anxiety levels
- **Distraction by colored lighting, music, and serene imagery** is associated with lower anxiety, reduction in medication/sedation, lower pain perception, and higher staff productivity
- **More emphatic attention** from medical staff is associated with lower anxiety, reduction in medication/sedation, and higher staff productivity

Lastly, we were able to confirm that hospitals with better patient-reported experience scores have higher profitability. A study performed by Deloitte reveals that hospitals with 'excellent' HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems, metric used in United States) patient ratings between 2008 and 2014 posted an average net margin of 4.7%, compared to just 1.8% for hospitals with 'low' ratings. Similarly, on average, hospitals with 'excellent' ratings returned 5.6% on assets invested between 2008 and 2014 compared to 3.4% for hospitals with 'low' ratings.⁴ External players also reward this. In the US, Medicare's Hospital Value-Based Purchasing (VBP) Program provides incentive payments for hospitals that score highly in patient experience.

Hospitals with better patient-reported experience scores have higher profitability.⁴

In conclusion, addressing patient pain points provides hospitals with an opportunity to improve the patient experience in ways that lower anxiety levels, give a greater feeling of control and involvement, and put the patient at ease. It can also improve staff satisfaction/productivity and have a positive financial impact.

Identifying critical points in the patient journey

To support conclusions drawn from literature and to obtain additional inspiration for patient-focused concept designs, we conducted information gathering sessions with key stakeholders including cardiologists, patients and Philips subject matter experts. The intent was to visualize the patient flow, define associated patient pain points, and detail staff interactions.

| At home | | Preparation holding | | Cath lab procedure room | | Recovery holding |
|--|--|---|--|--|---|--|
| At home (elective procedures) | Preparation holding | Cath lab procedure room | | | | Recovery holding |
| Patient waits for the scheduled date, preparations at home | Patient arrives in the holding area, patient is prepared, informed consent is taken and patient waits for undefined length of time | Patient arrives in the lab, preparation of procedure by staff, optional patient sedation or general anesthesia (GA) | Patient and staff wait for the physician | Patient waits while undergoing the actual procedure by physician | Procedure finished, staff helps patient to the holding area | Patient waits to be moved to the nursing department, or to go home, procedure debrief by physician |

Table 1: The steps patients generally go through as part of a cardiology or radiology intervention.

In addition to defining the flow, the sessions also revealed a potential blind spot regarding ‘total patient table time’. We learned that healthcare professionals often confuse the ‘time performing a routine procedure’, which is estimated around 30 minutes for routine percutaneous coronary intervention (PCI), with the actual ‘total patient table time’ which is much longer.

These insights suggest that strategies targeted to calm patients upon entrance in the cath lab and while waiting for the actual procedure to start, may have more impact than initially expected.

Patients spend 30 minutes to 2 hours or more total table time in the cath lab² and insights suggest that strategies to calm patients prior to and during a cath lab procedure, may have more impact than initially expected.

Design concepts

Next, we organized ideation sessions to develop concepts for improving the individual steps of the patient journey. These sessions included multiple stakeholders. Major pain points were identified for which patient-focused concepts have been designed to relieve those pain points. (See Table 2).

| Place | Time | Pain point | Patient-focused concept |
|--------------------------------|---------------------|--|--|
| Home (elective procedures) | Days/month | Uncertain about health, not knowing what will happen | Patient preparation information |
| Preparation holding | Undefined | Waiting for undefined length of time, unknown staff | Engaging infotainment |
| Cath lab - patient preparation | Average 20-30 mins | Waiting for undefined length of time, unknown staff Waiting for undefined length of time, fear of potential outcomes | Individual welcome Pleasant distraction |
| Cath lab - during procedure | Average 30-240 mins | Anxious about complications, discomfort lying flat for long periods Waiting for undefined length of time (patient and loved ones) Relief at procedure end, anxious about the result, disorientation when sedated | Improved comfort Procedure tracker Patient debrief information |
| Recovery holding | Policy dependent | Disorientation from GA when received | Engaging infotainment |

Table 2: These design concepts may help to positively impact sensitive steps during the patient journey.

Design concept validation

To evaluate and validate the patient-focused design concepts, we interviewed three groups of healthcare stakeholders from the United States and Netherlands. 31 healthcare professionals and 43 Philips subject matter experts were interviewed during the 2019 Transcatheter Cardiovascular Therapeutics (TCT) and Radiological Society of North America (RSNA) trade shows. Following that, experiences of 13 former patients and 5 of their family members were discussed during a one-hour face-to-face conversation. The interviews were carried out in February 2020 by an external agency, SKIM in the Netherlands, to avoid any bias toward Philips.

TCT evaluation

- 16 Philips experts
- 21 Healthcare professionals (physicians, nurses, limited decision makers)

RSNA evaluation

- 27 Philips experts
- 10 Healthcare professionals (physicians, nurses, decision makers)

Patient evaluation

- 13 former patients (7 female & 6 male, 53-75 years)
- 5 family members
- PCI or PV intervention (<5 years ago)



The design concepts were then prioritized based on the feedback of the interviewees and their perceived impact on the patient and staff flow. Input and feedback provided at TCT are used to fine-tune the concept presentations at RSNA. An overview of the top prioritizations can be found in Chart 1 and Chart 2.

Preferred top two concepts from TCT evaluation

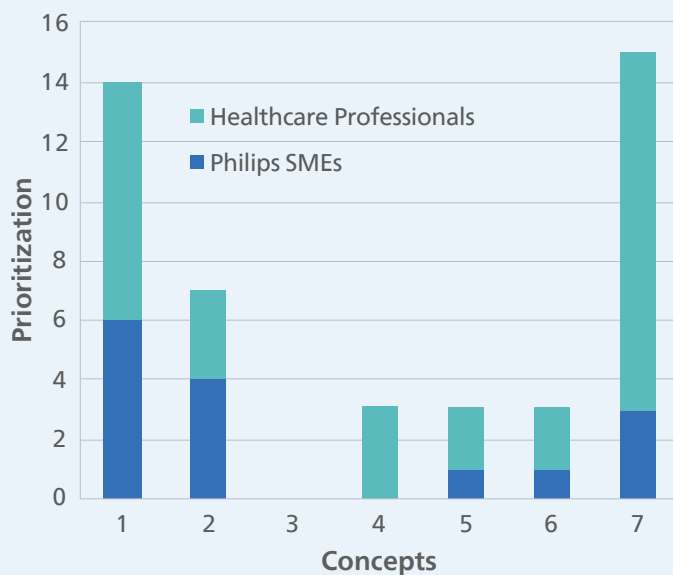


Chart 1.

Concepts

1 = Patient preparation information
 2 = Engaging infotainment
 3 = Individual welcome

4 = Pleasant distraction
 5 = Improved comfort

6 = Procedure tracker
 7 = Patient debrief information

Preferred top two concepts from RSNA evaluation

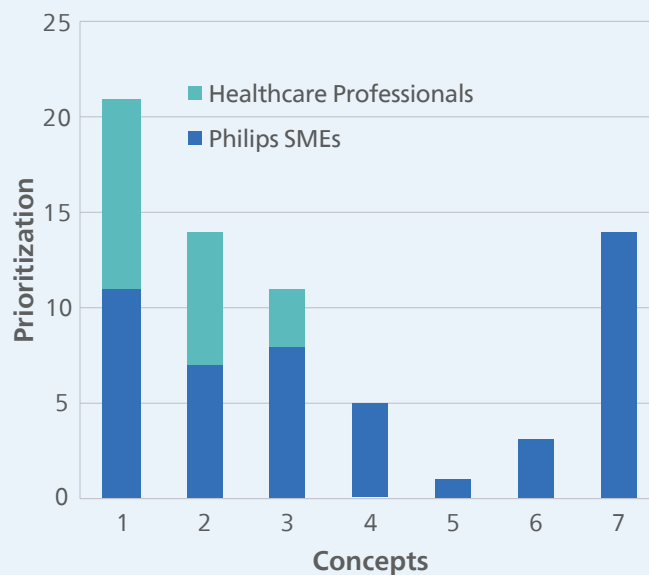


Chart 2.

The highest scoring design concepts for these professionals are:

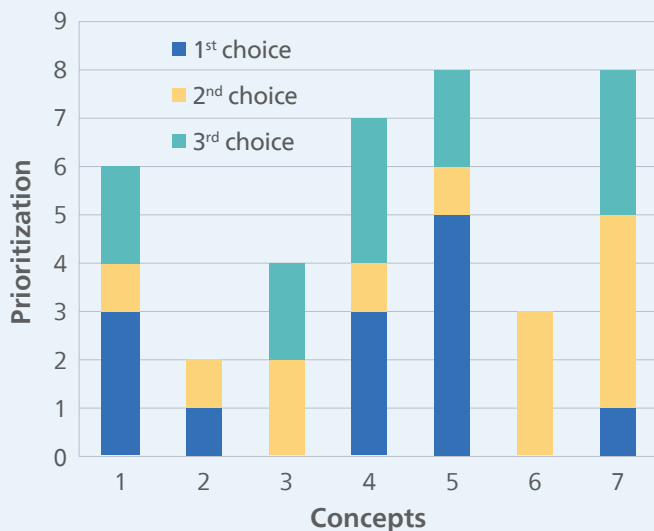
- **Patient preparation information – tailored to offer day-of procedural details**
- **Patient debrief information – meant to describe the results of the procedure**

This varies significantly with the input from the patient group who have indicated that comfort and distraction are also most important, see chart 3.

Interestingly, some professionals share that patients may be aware of what is happening throughout the course of the procedure. There appears to be large regional differences in sedation policy. When sedation is applied, the majority of cardiology and radiology interventions take place with moderate sedation – without general anesthesia. Physicians confirm that when patients are sedated in this manner, they are (semi) conscious and may therefore experience some part of what is happening around them.^{11,12}

In discussion with patients and their family members, rating the top three proposed concept directions shows a difference in what is important to patients compared to the professional groups. It is apparent that patients regard concepts which focus on the experience inside the cath lab to be of higher perceived value than those outside the cath lab.

Preferred top three concepts of the patient group



While healthcare professionals focus on improvements outside of the cath lab, patients are looking for enhancements both outside of and within the cath lab.

Chart 3.

Concepts

- | | | |
|-------------------------------------|--------------------------|---------------------------------|
| 1 = Patient preparation information | 4 = Pleasant distraction | 6 = Procedure tracker |
| 2 = Engaging infotainment | 5 = Improved comfort | 7 = Patient debrief information |
| 3 = Individual welcome | | |

The highest scoring design concepts for patients are:

- **Improved comfort – intended to provide additional comfort**
- **Pleasant distraction – designed to offer a calming environment**
- **Patient debrief information – meant to describe the results of the procedure**

The ‘patient preparation’ concept is also considered highly valuable.

Conclusions and recommendations

Patient experience has been shown to be positively associated with many quality and safety outcomes, such as adherence to clinical guidelines, increased preventative behaviors, and lower inpatient mortality.⁴

Based on our research, design concepts and validations, we conclude that strategies to improve patient experience for interventional procedures, can be prioritized into three main categories: Information, positive distraction, and comfort.

Information

Staff training to provide patients with pre-procedural information positively contributes to lowering anxiety levels among patients.¹⁻⁵ Patients show an interest in receiving this information to help them better understand the upcoming procedure and feel confident of success. This, in turn, may shorten procedure times and reduce medication/sedation use. Once in the interventional suite, they want preparatory information only – no medical opinions. However, immediately following the procedure (before discharge), patients would like to know how it went and what their prognosis is for the future.

Positive distraction

Distraction through music, imagery, or atmospheric lighting can reduce patient anxiety levels, lower their heart rate and blood pressure, and can positively affect their pain perception.⁶⁻¹⁰ Patients often feel overwhelmed by the equipment, bright lights and low temperature in the exam room, all of which feels unwelcoming and even unpleasant. The opportunity to create a less intimidating environment by selecting an audio and/or visual distraction is valued by patients. Staff could have more time to concentrate on their tasks with fewer interruptions if patients are more relaxed and positively distracted.

Comfort

Patients participating in our validation exercise confirm that they experience discomfort lying flat for long periods of time in a cold environment. A more comfortable mattress and room temperature in the interventional suite would allow patients to avoid discomfort and better maintain required positions, which may lead to improved image quality and less interruptions during the procedure.



Next steps

High levels of anxiety are associated with worse clinical outcomes due to unfavorable physiological changes and lowered immune response. Therefore, strategies aiming to minimize anxiety in patients undergoing diagnostic or therapeutic interventions are not only important for patient comfort but could potentially improve outcome and provide hospitals with an opportunity to improve their standard of care.¹

Today, there are companies that support hospitals in implementing patient-focused care environments in the interventional suite as indicated in this paper. For Philips, this study has reconfirmed the relevancy of creating an engaging, welcoming, multi-sensorial interventional environment applying positive distraction for patients through technologies such as Ambient Experience solutions.

This study also provides design direction for future developments to help health systems further improve the patient experience, positively impact outcomes, and lower the cost of care.

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