

# The Virtual Shelf: A pilot study on self-selected imagery displays and the inpatient experience in a cancer treatment setting

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**SUMMARY**

While patient room design standards have resulted in more pleasant surroundings than in the past, the patient still relinquishes control over most choices during the inpatient stay. This study examines how implementing the Virtual Shelf (VS), a digital collection of patient-selected images, affects the patient experience. We assessed whether the VS could positively impact the patient's sense of control, provide social support, and improve communications with healthcare staff. The protocol was tested in a bone marrow transplant unit of a major hospital. Results indicate this approach could be a valid tool—in conjunction with other tools such as music therapy, therapeutic television channels, massage, and spiritual counselling—to improve outcomes for patients, their families, and healthcare providers. The Virtual Shelf could be used in other extended stay healthcare settings.

**Key Words**

Patient control, self-selected imagery, bone marrow transplant setting

## ABSTRACT

### Background

The design of healthcare facilities is shifting from an efficiency-oriented approach to also include a more intentional focus on patient experience. Researchers used an intervention they called the Virtual Shelf (VS)—a digitised collection of personalised images on display in a patient's room—to offer participants a unique element of control over the visual setting of their room environment during their extended inpatient stay on a bone marrow transplant unit (BMTU).

### Aims

This study first explored the feasibility of implementing the VS research protocol—recruiting participants, creating the individualised VS for each participant, training healthcare staff in the protocol, and gathering data. During data analysis, researchers also explored whether the VS could enhance patients' experience during hospitalisation regarding their sense of control over their room environment, social support, and communication with caregivers.

### Method

Potential participants (incoming BMTU patients) were identified by staff from the partnering cancer centre. Researchers met with potential participants to explain the project in detail and discuss informed consent. Once enrolled in the study, participants gave researchers meaningful personal photographs. Researchers created a digital collection of the images, the Virtual Shelf, and worked with healthcare staff to have the VS available for viewing on demand by participants once they were assigned a room in the

BMTU. Participants could view their pictures on their in-room television monitors for as long and as often as they wished. Healthcare staff assisted participants with displaying the Virtual Shelf during the course of each patient's stay. Researchers met with participants and healthcare staff to assess implementation of the protocol and to gather feedback on potential benefits of having the pictures available for viewing during the extended hospital stay (typically 60–90 days).

### Conclusion

Researchers encountered logistical challenges when implementing the VS: some participants lacked access to reliable internet and did not have digital photos; some patient rooms did not have compatible in-room display monitors; healthcare staff were sometimes confused about their roles in the study; and there were unanticipated changes in nursing staff leadership. Researchers were able to address the challenges, and the feedback from patient participants and healthcare staff involved in the study showed promise that the VS could be used alongside other approaches currently available (such as music therapy, art therapy, regular television, relaxation-focused television channels, and massage therapy) to improve the patient experience during the inpatient stay in the BMTU. Furthermore, the VS could provide similar benefits in other long-term inpatient settings, such as rehabilitation hospitals and long-term care nursing homes.

### BACKGROUND

Patient-centred care, a major focus of modern healthcare delivery, requires a strengthening of personal, professional, and organisational relationships to meet each patient's specific needs and health outcomes.<sup>1</sup> Gerteis *et al*<sup>2</sup> identified eight essential dimensions of patient-centred care and measures for each, including access; respect for patients' values and preferences; coordination of care; information, communication, and education; physical comfort; emotional support; involvement of friends and family; and preparation for discharge and transitions in care. Literature reviews and synthesis studies further revealed that patient experience should be enhanced from multiple dimensions, including emotional and physical lived experience, personal interactions, and patient involvement.<sup>3</sup>

Most patients experience stress during health care, and the healthcare physical environment (noise, foot traffic, lighting, other patients, aesthetics) cause much of the stress.<sup>4,5</sup> To achieve his objective of alleviating patient stress through design, Ulrich conceptualised the theory of supportive design for healthcare physical-social environments that would foster three components: (1) sense of control with respect to physical-social surroundings, (2) access to social support, and (3) access to positive distractions.<sup>6</sup>

Sense of control refers to the patient's ability to have some level of impact over their surroundings. Lack of control is a pervasive problem in healthcare environments—it can increase patients' stress and adversely affect wellness.<sup>6</sup> Hospital routines and treatment protocols associated with certain illnesses, such as cancer, effectively render the patient powerless over their own physical situation while in the hospital. In such cases, enriching design opportunities to allow patients to exert some level of control over the physical environment may help combat their sense of helplessness. Common recommendations from the literature and practice include providing for patient control of lighting, adjustment of window blinds, and access to food menu options.<sup>7–9</sup> Sense of control can also be enhanced through the use of familiar artwork.<sup>10,11</sup>

Social support manifests primarily in the form of frequent or prolonged contact with caring family and friends. A recent meta-analysis study revealed that insufficient social support negatively causes physical and psychologic symptoms and responses, depression, role burden, and stress.<sup>12</sup>

Positive distractions are environmental features or situations that elicit positive feelings, hold attention and interest, and eventually foster beneficial changes in physiological systems.<sup>13</sup> Typical positive distractions from the literature include the colour palette of a room, local artwork, art with positive meanings, exposure to nature, music, and ambient scents.<sup>14</sup>

### Research Question

Building upon the art/imagery aspects referenced above, this research focused on creating and implementing a positive distraction-based protocol that would give patients on a bone marrow transplant unit the opportunity to have meaningful, personalised pictures available for display on their in-room video monitors during their stays. The study researchers call this protocol the Virtual Shelf (VS). The question driving the research was whether such an approach could impact the patient experience positively and thereby equip healthcare facilities with another tool to improve the patient experience in the inpatient setting. The cancer centre's protocol review monitoring committee instructed the research team to undertake the research as a feasibility study to assess primarily the mechanics of the protocol, and secondarily to assess the potential for an expanded study that would examine the potential patient benefits in greater detail. The protocol included training the healthcare team on the project goals, collecting and digitising personal pictures from each participant, and gathering feedback from patients, family, and healthcare staff to ascertain the potential benefits of such a project.

### METHOD

The study was conducted in partnership with the Bone Marrow Transplant Unit (BMTU) and the Spiritual Care and Counselling Unit of a major university cancer institute. BMTU patients were selected as the target population because of the extended stay nature of the treatment setting (typically 60–90 days) and because of the loss of control over their actions and environment. BMTU patients are often very sick and have little choice in activity while an inpatient; their days consist of extended periods of medication administration, followed by significant time spent in bed recovering from the medication's various effects on their bodies and psyche. The participant pool was identified and informed of the study by the cancer institute staff, as they were best aware of who would be entering the BMTU over the period of our study. Once a potential participant was identified, a meeting was arranged with the researchers to explain the study further and get informed consent. The meetings were held during a regular pre-admission appointment at the cancer centre, thus allowing time to prepare each participant's VS so that it would be available to them upon admission to the BMTU.

The VS is a digital collection of images chosen by study participants and supplied to the researchers in advance of admission to the BMTU. The participants were asked, "If you could bring anything with you to decorate your hospital room, what would you bring?" They were encouraged to submit photographic representations of those things—pictures that would be available for viewing while in their hospital rooms. The moniker "Virtual Shelf" was chosen because we wanted participants to think broadly about the range of objects they might include in their collection of images. Pictures of loved ones are an obvious choice for inclusion, but patients might also have objects of significant meaning in their home—on a shelf—that

could bring them comfort. As there is typically little room for personal belongings in a hospital room, pictures of those objects would substitute for the actual object. Participants provided researchers with digital copies of photographs via a private and secure online document sharing account. Those participants for whom digital sharing was not an option provided hard copies of images that the researchers then digitised. A participant’s digitised collection was loaded onto both a DVD and a flash drive and delivered to BMTU healthcare staff. Since participants had limited control (on/off, volume, regular channels) over the wall-mounted in-room television monitors, healthcare staff had to assist with the display of the images, either by helping to operate the DVD player or using a flash drive through the monitor’s auxiliary input. Healthcare staff were instructed to activate the VS only if asked to do so by the patient. There was to be no prompting by staff.

Data were collected following the four steps as shown in Table 1. Participants engaged in a post-study interview with the researchers to communicate in their own words their thoughts about the study. To ensure coding validity, both researchers studied the post-study survey replies and observation notes individually, and each one employed an inductive coding approach to arrive at a collection of themes. Researchers then shared their themes, along with the supporting statements from participants; they condensed their findings into seven key themes they agreed adequately represented the essence of the collected data.

**Table 1: Planned data collection strategy**

Data Source	Data Collection Details
1. Researchers’ observations and notes from visits with participants during their stay	These conversations were general in nature and did not rely on a structured set of questions. The goal was to check in with the patient and see how they were doing. Also, these times were used to check with staff to see if there were any unresolved technical difficulties.
2. Patient survey upon discharge	<p>The survey comprised eight open-ended questions that allowed the participant to comment on various aspects of the study:</p> <ol style="list-style-type: none"> <li>1. Please describe your reactions, thoughts, and expectations when you first learned about the study from the cancer centre staff.</li> <li>2. Please describe how your perceptions, ideas, and expectations changed after having more detailed discussions about the study with the researchers.</li> <li>3. Please describe any positive aspects you realised from the study once you had been admitted to the BMTU.</li> <li>4. Please describe any negative aspects you realised from the study once you had been admitted to the BMTU.</li> <li>5. Please describe any pre-admission benefits you may have received from the study.</li> <li>6. Please suggest how we could improve the Virtual Shelf protocol for future patients. You can address any aspect you feel is related.</li> <li>7. Please explain how, if in any way, the Virtual Shelf protocol provided you with a sense of control during your inpatient stay.</li> <li>8. Please comment on any other aspect of the study we have not already addressed.</li> </ol> <p>Researchers followed up with participants to expand upon or clarify information when the situation allowed.</p>
3. Nursing staff observations and notes about patients’ use of the Virtual Shelf	BMTU nursing staff were to record observations on the use of the Virtual Shelf by the participants and/or their families at least once per nursing shift. These data were to be recorded in the electronic health record (EHR) in fields created for this project, and designed in coordination with the EHR manager and the director of Spiritual Care and Counselling. The fields were:


	<ul style="list-style-type: none"> <li>• Patient/family was using the VS at the time of the nursing visit</li> <li>• Interaction with healthcare staff was aided by the VS</li> <li>• Patient/family requested the VS be engaged at the time of visit</li> <li>• Patient/family offered unsolicited POSITIVE feedback about VS</li> <li>• Patient/family offered unsolicited NEGATIVE feedback about VS</li> </ul>
4. Follow-up survey with nursing staff	<p>BMTU nurses were to complete a brief survey on their experiences with the Virtual Shelf and the participants. The survey was available in both print and electronic versions. The questions were:</p> <ol style="list-style-type: none"> <li>1. Overall, do you feel that providing the patient the ability to display their self-selected pictures in their room benefited the patient in any way? Please explain.</li> <li>2. As a healthcare team member, was your role in the study clear to you? If there were any parts of the study in which your role was not clear, please explain.</li> <li>3. If you were asked to assist a participant with displaying the VS on their in-room television screens, did you ever have trouble/challenges in assisting with those requests? Please explain.</li> <li>4. Please describe any positive impacts to the patient or patient's family you witnessed during their participation in the study.</li> <li>5. Please describe any negative impacts to the patient or patient's family you witnessed during their participation in the study.</li> <li>6. From your perspective as a member of the healthcare team, did the patient's participation in the study ever assist you in communicating with the patient or the patient's family? Please explain.</li> <li>7. From your perspective as a member of the healthcare team, did the patient's participation in the study ever hinder your communicating with the patient? Please explain.</li> <li>8. From your perspective as a member of the healthcare team, did having access to their personal pictures provide the patient with a sense of control over their room environment?</li> <li>9. Can you identify any positive or negative impacts to you (as a health team member) that resulted from the patient's participation in the study? Please explain.</li> </ol>

## RESULTS

An initial goal of N=10 was set in conjunction with the staff of the cancer centre and was based upon expected patient load during the anticipated timeframe of our study. We were ultimately introduced to eight potential participants. After learning the details of the study, six chose to participate. Of those six, five completed the study, and one died during the study, resulting in a completion rate of 83 per cent.

Data analysis revealed that participants generally found the concept of the VS beneficial on several themed fronts. Table 2 shows the emergent themes, their frequencies, and representative comments that led researchers to them. Figure 1 shows the emergent themes; the dot size indicates the intensity of the particular theme by patient.

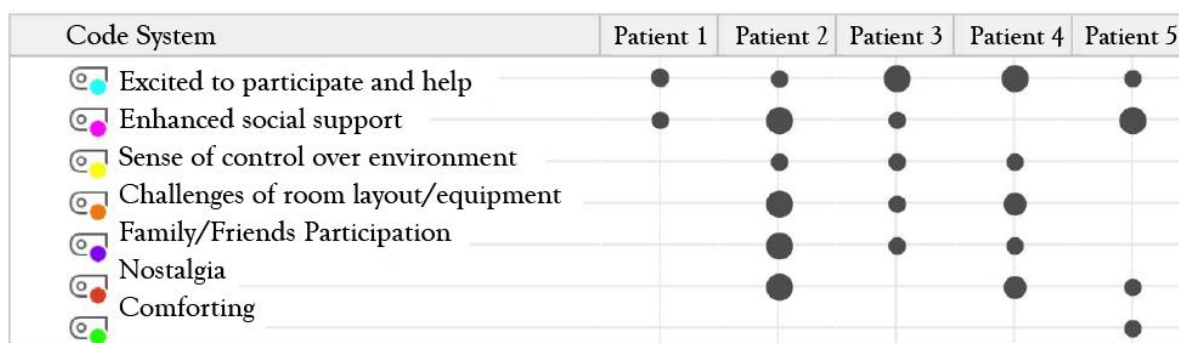
**Table 2: Themes and representative comments from participants**

Code	Theme Title	Representative Quotes
1 	Excited to participate and help	<ul style="list-style-type: none"> <li>• “I thought it was a very good idea to have the pictures on TV screen for everyone to see.” [Patient 1]</li> <li>• “It seemed like a great thing to do. I was excited to participate and had fun putting my pictures together”. [Patient 2]</li> <li>• “Excited to be able to participate.” [Patient 3]</li> </ul>



		<ul style="list-style-type: none"> <li>• “I encourage you to continue. . .to make brighter days for future cancer patients.” [Patient 4]</li> </ul>
2	Enhanced social support	<ul style="list-style-type: none"> <li>• “It was nice to see my family members up on the TV supporting me through the process.” [Patient 2]</li> <li>• “. . .a very positive way to stay in touch with family and friends.” [Patient 3]</li> <li>• “It’s nice to have pictures of loved one and favourite things when you are away from them.” [Patient 5]</li> </ul>
3	Sense of control over environment	<ul style="list-style-type: none"> <li>• “Share with visitor and staff our photos from home. . .yes, some control” [Patient 3]</li> <li>• “. . .did have control over (environment) which was a helpful thing.” [Patient 4]</li> </ul>
4	Challenges of room layout/equipment	<ul style="list-style-type: none"> <li>• “Wonder how we’d pull it off due to lack of computer skills.” [Patient 2]</li> <li>• “Had to have someone for it since it was too high. Tried to watch more but didn’t want to bother staff for just this. . .Make it where patient could do it yourself, more pictures, some staff could not do it. . .” [Patient 4]</li> <li>• “Would like to have control over the TV.” [Patient 3]</li> </ul>
5	Family/Friends Participation	<ul style="list-style-type: none"> <li>• “My friend and caregiver thankfully is very computer savvy and she helped me prepare the images to give to the investigator.” [Patient 2]</li> <li>• “We knew our daughter would be excited and willing to supply the photos.” [Patient 3]</li> <li>• “My family and I were able to put the photos together.” [Patient 4]</li> </ul>
6	Nostalgia	<ul style="list-style-type: none"> <li>• “Looking through my pictures helped me to remember the good times I had with family and friends.” [Patient 5]</li> <li>• “The pictures made me sad at first, it also gave me hope of a bright future.” [Patient 4]</li> <li>• “. . .grieving over the loss of my husband. . .feeling good and wanting to watch—not a depressing.” [Patient 2]</li> </ul>
7	Comforting	<ul style="list-style-type: none"> <li>• “Having pictures to look at was comforting.” [Patient 5]</li> </ul>

Figure 1: Coding theme frequency by participant



The nature of this study necessitated continued interaction between the researchers and participants. Hospital staff were extremely helpful, but understandably they could not address all questions or situations that arose during the study. The BMTU healthcare staff is small and consistent, a factor we deemed important to the study’s research protocol and to avoid confusion. While only one of the BMTU nurses completed a post-study survey, her responses were similar to various comments we received from staff while we were on the floor, and supported the notion that the VS was a conversation starter, it provided a level of comfort to the patients, and the images helped the nursing staff to know the patient’s family better.



Analysis of the researchers' observation notes revealed themes similar to the patient survey. One participant and his wife were excited to share pictures and interact with the researcher. During one observation period he commented, "Let's get the pictures up on the television—I want to show you all my family. My daughter is a nurse back at home as she was so excited to get all these pictures together for my stay." During a visit with a participant on Christmas Day, she revealed her wish that she had brought more pictures with her—she didn't anticipate how much she would enjoy looking at them and reflecting on past moments with her family. She also pointed out some pre-admission benefits to the study, explaining that as she and her adult children thought collectively about the pictures she would bring with her for her stay, they came across photos of their recently deceased father—pictures they had never seen before. The researchers' notes indicate several participants appreciated that efforts were being made to find other ways to improve their inpatient experience during such a trying time. Participants also shared their joy at participating in the development of a protocol that could help future patients.

## DISCUSSION

Initial positive feedback from participants warrants a more systematic and widespread implementation of the VS. The hospital and cancer centre administrators were enthusiastic about the VS concept, and they acknowledged the dearth of such qualitative research into patient experience in the cancer treatment setting. A member of the nursing executive team commented, "Even if we cannot measure the impact of such an approach on patient experience and well-being while in the BMTU, we should be doing everything we can to make that experience as beneficial as possible." The director of Spiritual Care and Counselling and the manager of the BMTU based their support and involvement of their departments in the project on the idea that the display of personalised imagery, via the VS, could facilitate communication between patients and healthcare staff communications. In the BMTU, communication between staff and patients and their families can be challenging because patients suffer from low moods due to being quite sick, and family members are distressed about their loved ones' prognosis.

The hospital has institutionalised regular access to other patient-experience enhancing approaches available in the BMTU (music therapy, massage, and the Care Channel—a service the hospital subscribes to that provides patients with soothing video imagery and music), and participants reported engaging in and enjoying those services during their stays. While it is not easy to measure the value of these offerings in terms of improving the patient experience, the VS could enjoy the same status and provide unique opportunities to enhance the patient experience. The VS could also provide a platform for further academic research on how personalising the inpatient experience can impact health outcomes, patient-staff relations, and staff experiences and outcomes.

A future implementation of the VS ideally would incorporate patient-controlled technology (wall-mounted digital picture monitors), a sample/control type of study, and use of a standardised method to assess how the VS impacts the patient experience. While the long-term stay nature of the BMTU provided an enticing setting for the study, the VS could be applied in other long-term stay settings such as rehabilitation hospitals and elderly care homes.

## Limitations

The following limitations arose during the study, but we believe they could be overcome in a future study:

1. This qualitative study did not conform to the cancer centre's conventional research protocols, resulting in an extended review period (15 months). Consequently, one staff member from Spiritual Care and Counselling who was scheduled to participate in the study was no longer being able to. This person was to record daily observations from the BMTU floor.
2. We began with a small sample size (N=10) based on anticipated admissions to the BMTU. Our actual sample size was smaller.
3. While we attempted to ensure that each BMTU room had appropriate technology for displaying the VS and that BMTU staff knew how to operate the equipment, we encountered several instances to the contrary. We overcame these challenges, but they complicated implementation of the research study.
4. Despite having clear protocols outlining nursing staff roles in the study that the BMTU manager communicated to nursing staff, there was some confusion and non-compliance. Some nurses felt they were supposed to prompt the participants to use the VS. Nursing staff did not record observations in the electronic health record (EHR) system as specified in the agreed-upon protocol, which meant researchers' data set was not as rich as anticipated. Finally, there was a change of leadership in the BMTU supervisory staff and the new manager was not made aware of the ongoing study protocol, which the researchers did not learn about until they noticed that the EHR fields were not being completed.

## CONCLUSION

The BMTU's primary focus is administering complicated drug protocols over a long timeframe (typically 60–90 days) in an inpatient setting followed by care in an outpatient setting. The physical character of the patient room, at least in the setting we studied, was not given any special consideration. Despite our study's limited sample size, our results provide evidence that the Virtual Shelf is a useful tool to improve the inpatient experience, which is often an area of extreme stress, especially in extended stay situations such as the BMTU. Moreover, the physical environment is an important yet understudied part of the patient experience that warrants in-depth study as part of a truly holistic approach to patient care. Our study also demonstrates the importance of qualitative research and the benefits of studies that do not conform to conventional research protocols but nevertheless offer valuable insights.

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#### PEER REVIEW

Not commissioned. Externally peer reviewed.

#### CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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