ORIGINAL RESEARCH

Acuity-adaptable patient room from the patient's perspective

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Received: July 12, 2017 **Accepted:** October 31, 2017 **Online Published:** December 19, 2017
DOI: 10.5430/jnep.v8n5p38 **URL:** https://doi.org/10.5430/jnep.v8n5p38

ABSTRACT

Acuity-Adaptable Patient Room is a single room concept where a patient is cared for in the same room during the entire hospital stay at any level of acuity. This room concept has demonstrated benefits with regards to patient safety, patient experience, and decrease length of stay. A descriptive study on renal transplant patients was done to describe the patient's perspective about this room concept. Content-validated questionnaires were provided to 36 consenting renal transplant patients and 33 were completed and returned. Twenty-five patients claimed that the monitoring device in the room made them feel safe. One patient complained of discomfort because his feet hung off the bed. Another felt that transition from the operating room to the floor was noisy. Although most patients felt that the room temperature was adequately controlled, however the room temperature did fluctuate from hot to cold. Most patients expressed that the care they received was exceptional and the room provided a healing environment.

Key Words: Acuity-adaptable patient room, Renal transplant, Cares safety, Patient satisfaction, Nurse satisfaction

1. INTRODUCTION

The acuity-adaptable patient room is a promising concept that has received a great deal of attention. In this model of care, the patient remains in the same room from admission to discharge, regardless of level of acuity. The current standard care delivery model often requires moving the patient from one unit or room to another to provide the necessary level of care. Such transfers contribute to errors in communication, patient disorientation, dissatisfaction, and falls.[1] In the acuity-adaptable patient room model, the delineated level of care is brought to the patient to eliminate or minimize these adverse outcomes.

Evidence indicates that patients cared for in this room have positive clinical consequences with regard to infection prevention, client preference as well as satisfaction,[1] nurse and physician satisfaction,[2] patient safety,[3] and reduced length of stay[4] compared to care delivered in the standard patient room. The evidence also suggests that acuity-adaptable rooms contribute to a decrease in noise levels.[5] Because all acuity-adaptable patient rooms are single-bed rooms,[6] Ulrich[7] points out the benefits of this model in reducing infection and cross-contamination of patients and their belongings that may occur in multi-bed rooms. Patient and family satisfaction has been noted to increase when care is provided in an acuity-adaptable room[8] and provides the opportunity for confidential discussions between the caregiver, the patient, and the family or other visitors.[7,9–11] The healing atmosphere that the acuity-adaptable room provides lead to shorter length of stay according to McGrath[12] and Mader.[13] Quantitative and descriptive studies conducted by the American Institute of Architects and Facilities Guidelines Institute[14] on the acuity-adaptable room concept indicate

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strong evidence on improvement of patient clinical outcomes.

A magnet-designated institution in a large Southwestern medical center embraced the challenge to innovate by offering kidney transplant patients care using this patient room concept. This forward-thinking approach was consistent with healthcare reform, specifically the Patient Protection and Affordable Care Act of 2010, which incentivized organizations to focus on value of care rather than volume. The acuity-adaptable room concept represents an investment in infrastructure and redesigned care processes with the goal of providing high quality and efficient service delivery. The design supports consumer-centric trends to enhance the patient's experience: privacy and family-centeredness, a healing environment through a focus on caring for the patient as a whole, and convenience by minimizing the patient's and family's in-hospital transfers. The authors did not find any study design that examined the patient's perspective about the acuity-adaptable patient room. The patient's perspective is essential in order to strengthen support for this concept.

Patient experience has become the major driver in construction and facility design decisions. Given the growing market demands for privacy and family-centered care, this pilot study seeks to provide a crucial piece of evidence that will help to determine the feasibility and sustainability of this kind of room concept. More studies of this kind are needed to further investigate this innovative patient room concept and add to the body of knowledge.

1.1 Study purpose

The purpose of this study was to obtain the perspective of the renal transplant patient concerning the acuity-adaptable patient room.

1.2 Review of the literature

Medical management of a renal transplant patient is highly complex. Equally important is the supportive care we provide to the patient and the family.[15] To provide comprehensive quality care to renal transplant patients, we need to be able to provide an ultimate healing environment. Attention to the patient's experience and the physical environmental needs of renal transplant patient needs to be explored, which means a focus on the patient's room where most care activities are performed.

The acuity-adaptable patient room showed promise in reducing transport cost and errors, promote patient safety,[16] abate workflow bottlenecks and improve patient satisfaction.[5,7] This room concept is suited for population of patients that are homogenous with predictable outcomes.[17–20] With this study our study population were renal transplant patients.

The first documented outcomes in favor of the acuity-adaptable patient room was in 1999 where Hendrich et al.[21] conducted a 3-year study utilizing pre and post method to show a remarkable reduction on clinician handoffs and transfer (90%) and reduction on medication errors of 70% and a demonstrated reduction on patient falls that were below the national benchmark of 2 falls per 1,000 days. The study also reported improvements in patient experience; nurses have more time for the patient, effective utilization of nurse's times without value-added cost, and appropriate bed utilization. Similar studies about favorability of this kind of room mentioned that patient safety is safeguarded by decrease intra-hospital handover thus reducing the risk of errors.[2,22–25] Landro and Page mentioned reduction of medication errors[17,24] and Clark et al.[26] noted reduction of mortality rate from 4.2% to 0% as well as a notable reduction of postoperative extubation median from 9.9 to 5.0 hours.

Healing environment comes from the ability of the patient to control her/his environment. Patient would be eager to pay extra if they have an environment that offers privacy so they can be put in the best position to heal.[3,8] The flexibility of a single room is very useful when patient condition changes.[9] It allows for greater privacy and it is easier for family and friends to visit.[11,14,25] Older adults overwhelmingly prefer the private rooms and provided them sense of control over their environment according to Calkins and Cassela.[1] Physician-owned specialty hospital, MedCath with acuity-adaptable patient room designs won a national award for its design in recognition of high rating on patient satisfaction.[17,27] that resulted in broadening their hospital's market base. Swan et al.[28] reported that physicians and nurses positively gauge the appeal of the acuity-adaptable room, while patient favors the service factor. The room offers an atmosphere that strengthens the development of trusting relationships with consistent care staff that reinforce the patient trust in the skill of the nurse. Pease and Finlay's survey of 36 relatives and 41 patients in a 17-bed oncology ward, 20% of patients and 28% of relatives preferred a private room. Same trend was also seen in adolescents, they too preferred a single room.[29]

A study of Clark et al.[26] and Sadler et al.[22] expressed increase in patient satisfaction noted in an acuity-adaptable patient room. In Ulrich study,[7] patients that stay in a private rooms expressed better patient privacy and confidentiality, improved communication between staff and patients, offer superior accommodation of family, and with steady trends on higher satisfaction on the overall quality of care.

Nurses and patients alike were satisfied with the single room concept.[5,24,30–32] Nurses often mentioned autonomous prac-

tice and spacious with more consistent room set-up, while patients mentioned privacy, more family time supporting family-centered care and less exposure to multiple caregivers.

A survey conducted in medical-surgical units in 4 hospitals of seventy-seven nurses' perception of the advantages and disadvantages of the single-room versus multi-occupancy patient rooms was completed by Chaudhury et al.[2] Nurses favorably rated private room as helpful and preferred the private room occupancy to the multi-room occupancy patient rooms. Nurses rated criteria such as ease in accommodating family, appropriateness for patient's assessment by the healthcare team, comfort level of the patient, patient recuperation rate, less chance for drug errors, and less likelihood of meals mixed-up. Clark et al.[26] has a different positive observation who shared that staff resignation decreased from 28% to 1.7%. The findings were attributed to structured staff recruitment efforts and comprehensive staff development education so nurses would be successful in the cardiovascular single-unit stay program.

Patients who stay in a single room experienced lower noise levels and hence it improves patient sleep.[7, 14] Noise level study in a single-room unit was decreased from 63 to 56 decibels after 9 months in the single-room unit.[5] Similar results were obtained in a newly designed neonatal intensive care unit where the noise level decreased from Leq of 42.4 decibels in the nurse's station with a sound burst of 60 decibels. The recommended noise control in the baby intensive care should not exceed an Lmax average of 50 decibels (a weighted scale), with a peak sound not to exceed an Lmax of 70 decibels.

2. METHODS

This descriptive study was approved by the Institutional Review Board. Data collection tool was developed by the author to describe the demographic of the sample population. The author also created a patient satisfaction questionnaire (a survey instrument) with questions specific to the acuity-adaptable unit. The operational definition of patient satisfaction is a "snapshot" of the patient's opinions of their stay in the acuity-adaptable room. The content validity of the survey instrument was established through a panel of experts. Internal consistency was assessed by using coefficient alpha.

The questions presented to the renal transplant patients are listed below. Patients scored their responses as strongly agree, agree, neutral, disagree, or strongly disagree.

- I feel that monitoring devices (ECG leads, BP cuff & pulse oximetry) applied to my body made me feel safe.
- I feel that the TV, call bell button, lights and bed work well in this room.
- I feel that the room temperature was adequately controlled in this room.
- I feel that the noise level in this room was acceptable to me.
- I feel that the room I stayed in provided a healing environment.
- I feel that the staff was available to me when I needed assistance in this room.
- I am satisfied with the care I received in this room.

A transdisciplinary planning team comprising the associate chief of nursing, the nursing director, the author, managers, the clinical leader, the transplant pharmacist, the transplant medical director, and a nurse educator were convened to develop strategy for successful implementation of the acuity-adaptable care delivery. Benchmarking was sought through like-minded academic institutions for evidence-based practices on how to care for a patient in an acuity-adaptable setting. The benchmarking results showed that to our knowledge no one has an acuity-adaptable care setting. With the full support of the hospital leadership, the logistics of creating the acuity-adaptable room was operationalized. Multi-organ transplant nurse-driven admission, discharge, and transfer criteria were developed and approved by the Transplant Care Management Performance Improvement Committee and the institution's Policy and Procedure Committee. A communication strategy was implemented to address patient admission from all entry points, and the coordination of postoperative patient flow from the operating theater to the acuity-adaptable patient room was explained. Nursing competency is paramount to the success of this kind of care delivery and was addressed.

Four acuity-adaptable patient rooms were created as a result of the collaborative initiative. The author and the team who had undergone training about the study administered the survey instruments. The teams made the patients fully understand that they could answer the survey questionnaire during any phase of their stay in the acuity-adaptable patient room at their convenience. The survey was administered for a span of 4 months.

2.1 Setting

The study was conducted in an academic magnet-designated facility with a 30-bed multi-organ transplant unit. The multi-organ transplant unit created 4 acuity-adaptable patient rooms fully furnished with cardiac monitors capable of ECG, pulse oximetry, hemodynamic monitoring, medical gas capacity to support ventilator management, left ventricular assist device and oxygen delivery.

2.2 Population and sample

The population was renal transplant patients

2.3 Inclusion criteria

- End-stage renal disease as primary diagnosis
- Comprehend third-grade level reading and writing
- 18 to 75 years of age
- American Society of Anesthesiologist score of III or IV post-transplant surgery.

2.4 Exclusion criteria

- Intubated kidney transplant patients
- Kidney transplant patients complicated with bleeding problems post-op
- Kidney transplant patients who developed heart problems immediate postoperative period
- Kidney transplant patient with unstable conditions in the immediate postoperative period.

In the span of 4 months, 36 patients were eligible and consented to be part of the study. The baseline characteristics of the study sample are shown in Table 1.

Table 1. Baseline characteristics of the sample

	Mean ± SD or No. (%)
Age (years)	44.5 ± 2.4
Male	17 (47.2)
Race	
White	17 (47.22)
Black or African American	9 (25.0)
Hispanic or Latino	9 (25.0)
Other	1 (2.8)
Body mass index (kg/m^2)	27.8 ± 5.7
ASA score	
2	0 (0)
3	22 (71.0)
4	9 (29.0)
Duration of surgery (min)	38.7 ± 21.2
Length of stay (days)	4.1 ± 1.3
Cost ($)	
Total	61,291 ± 11,508
Labor	10,146 ± 3,477
Direct	21,489 ± 4,755
Medical condition	
Hypertension	31 (86.1)
Diabetes	32 (30.8)
Anemia	22 (61.1)
TB	2 (5.6)
Pulmonary disease	3 (8.3)
Peptic ulcer disease	3 (8.3)
Hepatitis	3 (8.3)

Note. ASA: American Society of Anesthesiologists; TB: tuberculosis.

3. RESULTS

Overall, the patients responded favorably regarding to their stays in the acuity-adaptable patient rooms (see Table 2). Of the 36 patients who consented to the study, 33 survey questionnaires were returned to the author. Twenty-five of 32 patients (78%) responded that the monitoring devices made them feel safe. Seventy-four percent (23 of 32) responded that the TV, call bell button, lights, and bed worked well in the room, although one patient commented on his discomfort with the bed (3%) because his feet were hanging off the end. Twenty-three patients (72%) felt that the room temperature was adequately controlled; however, there were patients (8%) who felt that the thermostat was outdated and the room temperature fluctuated to either hot or cold.

Concerning noise level, one patient commented that during the transition from the operating room to the floor, there was a lot of commotion and the patient perceived that it was "too loud." This is understandable, especially during the handoff process when patients have numerous monitoring lines in the bed. Several staff members accompanied the patient during transport to make sure the patient was safe. Monitoring lines needed to be hooked up and calibrated. The patient comes directly from the operating room to the post-anesthesia care unit for recovery and then to the acuity-adaptable patient room. The patient has to be monitored vigilantly every hour for vital signs and other parameters to watch for impending complications and early signs of organ rejection. Staff come in and out of the room, especially on the postoperative surgery day. One patient commented that because of the proximity to the nurses' station where a lot of activity goes on, closing the door was the best thing to do. The acuity-adaptable patient room was strategically located near the nurses' station so that the patients could be closely observed.

As far as the room providing a healing environment, 72% (23 of 32) of the patients responded that the acuity-adaptable patient room provided a therapeutic healing environment. One patient expressed that the room was great and comfortable and provided a respite for healing. Another patient commented that the quietness of the room made him feel well and restored.

Patients often used superlatives when describing the nursing staff in the acuity-adaptable patient room. A total of 75% (24 of 32) responded satisfactorily and used words like "top to bottom perfect care" and "excellent nurses." One patient shared that she had been sick for almost 3 years and had never obtained such quality care. The highest score obtained was 81% (25 of 31) when patients were asked about the care they received in the acuity-adaptable patient room: 25 of 31 patients expressed that the care they received in the

acuity-adaptable patient room was exceptional. One patient mentioned that the nursing staff was knowledgeable and kind, one mentioned the excellent nursing staff, and one patient mentioned the names of the nursing staff and was extremely grateful to the staff for accelerating his healing process. For patients to describe nurses this way means that the patients truly trusted the nurses' skill and were confident in the nurses' ability to help them heal. One patient remarked that she had a few complaints but did not elaborate and summed up her experience as overall perfect. Another patient also gave kudos to the members of the health care team and noted that they were kind and helpful.

Table 2. Results of the acuity-adaptable patient satisfaction survey instrument

QUESTIONS	RATINGS					COMMENTS
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
1. I feel that monitoring devices (ECG leads, BP cuff & pulse Oximetry) applied to my body made me feel safe.			6%	16%	78%	
2. I feel that the TV, call bell button, lights and bed work well in this room.			3%	23%	74%	
3. I feel that the room temperature was adequately controlled in this room.		3%		25%	72%	
4. I feel that the noise level in this room was acceptable to me.			9%	24%	67%	
5. I feel that the room I stayed in provided a healing environment.			6%	22%	72%	
6. I feel that the staff was available to me when I needed assistance in this room.			3%	22%	75%	
7. I am satisfied with the care I received in this room.			3%	16%	81%	

4. Discussion and conclusion

The patients in this study viewed their stays in the acuity-adaptable patient rooms favorably and were satisfied. The patients expressed that they felt safe because of the added equipment in the room to monitor their care progress. They were highly complementary about the care they received and took notice of the highly competent staff who cared for them. They also viewed the acuity-adaptable room as providing a healing environment that allowed them to focus on their recovery.

Our findings on patient safety from the patient's perspective could add to the current body of knowledge on acuity-adaptable patient rooms, which is more directed to patients' clinical outcomes.[6,21–24] In the present study, the patients' perception of safety was positively correlated to the equipment provided in the acuity-adaptable room. Our findings of patients reporting excellent care provided by the nurses in the acuity-adaptable patient room are supported by the study findings of Bonuel and Cesario.[33] Bonuel and Cesario reported that nurses felt empowered in caring for patients in the acuity-adaptable patient room, which helped to create a healing environment for both patients and family.

Our study was limited by a small sample size; therefore, caution is needed because such findings cannot be generalized to a wider population of patients. The result of this study provided some groundwork for designs of future studies, either qualitative or quantitative. As the increasing demand for a consumer-friendly environment that accommodates both patients and families becomes the baseline, the focus should be on putting patients in the best position to heal, optimizing patient flow through the facility, and ultimately improving the patient's experience. Future studies are needed to reproduce a full study to shed more light and gain evidence to strengthen support for the acuity-adaptable patient room concept.

Acknowledgements

Sandra Cesario, PhD, RN, FAAN, PhD/DNP Program Coordinator, Texas Woman's University; Ann Scanlon-McGinity, PhD, RN, former CNO, Houston Methodist Hospital; Alma Degracia, MBA, MSN, RN, CCRN, NEA-BC former director, Multi-Organ Transplant Unit; Osama Gaber, MD, Medical Director Transplantation Department; and the nursing staff of D4W, Multi-Organ Transplant Unit.

Conflicts of Interest Disclosure

The author declares that there is no conflict of interest.

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