

Evidence-Based Enhancements in the Nuclear Medicine Therapy Wards: Change from the Disease/Treatment-Centric Patient Care to Holistic Care

Problem Statement

When one visits a nuclear medicine therapy ward, a feeling of isolation is quite common. The radiation safety, workflow, and monetary considerations have contributed to architectural designs, with small rooms, thick walls, and often no windows. However, their effect on the psychiatric health of the patients is often overlooked. Visitor restrictions and barrier nursing further aggravate the issue by isolating the patient from the surrounding world and family support structures.

While there is no doubt about the importance of radiation safety principles, they do have an effect on patient care *vis a vis* other wards with lesser restrictions. Consider an example of a patient with thyroid carcinoma, who has been admitted to receive radioiodine therapy. Given the high cost of recombinant thyroid-stimulating hormone (TSH), it is more likely that he/she would receive therapy after raising TSH through cessation of thyroid hormone replacement. Resulting hypothyroid state can lead to gait abnormalities, shortness of breath, mental slowness, muscle weakness, and mood impairment.^[1,2] Therefore, there is a higher likelihood of falls and psychiatric issues such as depression in such patients. Similarly, the risk of fall in cancer patients undergoing treatment can be as high as 50%.^[3]

Therefore, it is not difficult to see that we need to take steps to improve the quality of patient care, while also ensuring the need for radiation safety among caregivers.

Headwinds for Change

During the course of the evolution of modern medicine, the hospital design has been dictated by the “economic” and “work-flow” considerations, rather than “holistic patient care.” Congested hallways, very little natural light and cacophony of all kinds of medical equipment are the quintessential hospital experience. Providing a stress-free environment, with a focus on psychiatric and social needs of the patients has been shown to improve patient outcomes and staff productivity, while reducing in-hospital accidents.^[4,5] Therefore, the medical community itself has been introspecting and calling for reforms in hospital design through different names such as “humanistic,”^[6] “evidence-based,”^[7] and “holistic” designs.^[5] We prefer the nomenclature of “evidence-based design,” as it emphasizes the design as an important component of “evidence-based medicine.”

Evidence Based Design – Current Status

Given the age of much of the hospital infrastructure worldwide and obsolescence of their architecture,

“patch-work” policies and “re-modeling” have been the go-to approaches by most administrations. It is estimated that ~ 40% of the hospitals do not conform to contemporary principles in design and technology.^[7]

Components of “Evidence-Based Design”

Although there are many ways to incorporate patient-centric changes in therapy wards, we prefer to use the approach used by Brambilla *et al.*^[7] We will be adapting our discussion to only those domains, which we feel are relevant to the nuclear medicine therapy wards while adding a few of our own.

1. *Audio-visual environment*: Natural light provides “day/night cues,” in addition to allowing the patient, a connection to the outside world.^[4] Continuous artificial lighting can lead to psychosis in intensive care unit (ICU) patients and low lighting conditions can result in medication errors.^[4] Windows are the simplest way to achieve natural lighting conditions. In addition, landscaping in hospitals and art installation can positively impact the mental health of caregivers and patients alike.^[5,7] The use of equipment with low noise levels should be preferred to reduce patient stress, anxiety, and feeling of alien environment. Finally, it is important to install television sets in individual rooms for entertainment
2. *Safety*: In our opinion, this is the most important aspect of design in the therapy wards. Due to the reasons discussed above, the therapy wards more closely resemble the ICUs than the general medicine wards. Due to a lack of regular visual access to the patients (visitor restriction and barrier nursing); guard rails, way-finding cues and nonslippery flooring should be necessary. In addition, the usage of SOS buttons (both physical buttons by the bed and at ground level; plus, voice-activated systems) and fall detection bracelets should be prioritized. The cameras while intrusive should preferably be installed both in alleys and patient rooms (especially those at higher risk of falls). These technologies have become cheaper and their use in relatively common in elderly care facilities. Therefore, the installation of similar systems in therapy wards should not be a logistical challenge, nor a substantial economic venture
3. *Family support space (physical and virtual)*: Visitor restriction in therapy wards is a necessity, which limits the utilization of physical support space. However, audio-visual streaming technology allows the creation of “virtual support system.” Much can be learned from recent experiences with the role played by video

calling/conferencing” in ensuring family support to those in COVID-19-related quarantines. These systems drastically reduce the impact of isolation on mental health of the therapy ward patients, through ensuring family access and support

4. “Tele-medicine”: Another concept, which has taken off in the present pandemic is “telemedicine.”^[8] Radiation protection for physicians can introduce complications in common medical practices like specialist consultations. While the regular staffs are quite well versed with radiation safety; the apprehensions regarding “radiation exposure” can seriously limit the time that visiting consultants spend with the patient. This is an easily addressable issue, wherein we can use the already available equipment (which is to be used to create a “virtual family support space”) for teleconsultations. Hence, the consulting, as well as the primary physician, may need to enter patients’ room only in case physical examination is needed. This will improve the time spent by the physicians with the patient, reduce patient anxiety (regarding treatments and side effects), and provides access to psychiatric consultations for relatively less severe symptoms (usually deferred till after discharge).

Execution Approaches to Evidence-Based Design in Nuclear Medicine Therapy Wards

Most of the changes listed above can be executed at little cost to any ward. The expenditure is easily offset by the potential benefits in the quality of patient care. In addition, the technological additions as discussed above can be easily installed in older wards, where structural changes are not possible. Other approaches such as exclusion of patients receiving Lu-177-based therapies, from mandatory admission (as was recently recommended by the atomic energy regulatory board [AERB]) are steps in the right direction. Finally, we do want to emphasize that the typical layout as recommended by institutions like AERB and international atomic energy agency (IAEA) are backed by evidence and we are not advocating revisions in the overall layout and designs, especially in areas for dose administration, radioactive waste storage, and discharge. What we are suggesting are enhancements to the design of patients’ rooms, which can address the safety and holistic health domains of their treatment. We the nuclear medicine community is most well-placed (due to our small-sized

wards and already being a technology-intensive field) to execute and benefit from these changes and should spearhead their general adoption.

Conclusion

“Holistic” patient care is much more than the primary treatment itself and upgradation of patients’ rooms in the nuclear medicine therapy wards is needed to achieve the same. Incorporation of advancements in design and technology can effectively minimize patient isolation and mental health detriment while maximizing the ability of staff to provide quality patient care. Therefore, continuing with legacy practices at the cost of patients’ holistic health is unacceptable, and increased cost is justified.

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Conflicts of interest

There are no conflicts of interest.

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