



KEY POINT SUMMARY

OBJECTIVES

The objective of this research was to learn more about the impact of hospital unit layouts on nurses' walking behavior and walking distances through the lens of studying a specific task that is regularly performed by nurses: medication administration.

The Effect of Hospital Unit Layout on Nurse Walking Behavior

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Key Concepts/Context

Over the course of a typical shift, nurses spend a lot of time on their feet, walking back and forth on the unit to take care of patients' needs. The long distances that nurses walk is a topic of concern in the industry. Some believe it may potentially impact the amount of time spent with patients and also because of the physical toll on nurses, day after day. Researchers are attempting to understand whether unit layout and design might be revised to reduce walking distances and create efficiencies that enhance patient care. Particularly in consideration of the expansion of patient rooms in order to provide patient- and family-centered care, there is interest in understanding the impact on walking patterns and behaviors. In this study, the researchers looked to compare two types of nursing units, the nurse's amount of experience, and the number of extra stops, interactions with others, and extra path length while performing a common nursing task (administering medication).

Methods

This study presented a new way of studying the impact of unit layout: The researchers observed nurses' walking behavior during the completion of a specific task that is regularly performed by nurses -- administering medication to patients. This was described as a novel scheme of observation. Twelve ICU nurses participated in the study, which took place within an ICU at a university hospital in Atlanta, Georgia. The ICU consisted of 20 single-patient rooms, with six rooms in the east wing and 14 rooms in the west wing. The east wing had an L-shaped hallway very similar to a radial layout, while the west wing had a double-loaded/racetrack design. Researchers followed participants and recorded their movements on floor plans during the medication administration task. The observation period started when the nurse left the medication substation to distribute medication, and ended when the nurse entered the patient room; thus the focus of the observations was walking distances within the hallways. Researchers also recorded any



stops/interruptions and interactions and their respective locations. They measured the shortest possible distances for each given path as a comparison against actual paths selected. Descriptive statistics and the analysis of variance method were used to analyze the data collected from 20 total observations (10 in each wing). Finally, the researchers controlled for type of task (all nurses completed the same task), as well as culture and policy of the hospital, as the study took place within the same nursing unit.

Findings

The researchers found that, among the three patterns of participant paths – efficient, retracing, and deviated – eight efficient, four retracing, and seven deviated path patterns were observed. The results indicate that new nurses were more efficient than experienced nurses in terms of their path length while administering medication and less likely to deviate from their paths. New nurses interacted less, stopped less, and walked shorter distances (as evidenced by mean descriptive data) than more experienced nurses. On the other hand, experienced nurses were less likely to retrace their path back into the medication substation.

When comparing the east versus the west wings, the researchers surprisingly found that the smaller radial layout of the east wing was associated with longer path lengths or walking distances and more deviations than the west. The west wing, with the double-loaded or racetrack layout, had more efficient route patterns.

While the researchers cited that this went against a number of studies in the research literature, they noted that a possible reason for this is that the shape of the unit may have mattered less than the spatial relationship and proximity of the efficient route (from the medication substation to the patient room) to the central nurses' station. This may have impacted the number of interactions and stops due to higher visibility and higher likelihood of crossing paths with other staff. Therefore, the most important finding may be that nurses had more interruptions and interactions along their route when they passed very closely by the central nursing station along their route.

Design Implications

At this point, it is difficult to outline precise design implications from this study due to the sample size. The study does point to additional factors that may need to be taken into consideration when determining what type of layout impacts nurses' walking distances and other behavior in the nursing unit. Beyond considering radial versus racetrack versus single-corridor layouts, proximity of efficient walking routes to the central nursing station may be one such factor to take into account. While certain benefits of placing walking paths through nursing stations exist – such as enhanced visibility and nurse-to-nurse communication – there are also potentially negative consequences of this type of proximal placement, including a



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potential for increased interruptions while performing tasks, potential for increased medical errors, and increased walking distances.

Limitations

One significant limitation of this study is the very small sample of 12 participants and 20 observations, which makes it difficult to draw any significant conclusions from the data.

Additionally, from an outside perspective, the authors cited at the beginning of the article that few studies had looked at patient- and family-centered units and their impact on nurse walking behavior. While the units under study were in fact patient- and family-centered, the researchers only studied walking behavior in the corridors and not in the patient rooms themselves, which typically might have the biggest difference in square footage. It was never explained how corridors in patient- and family-centered units differ from corridors in traditional units from a spatial standpoint. The reader is left to wonder whether there is any significant difference between the two that might impact walking behavior in hallways of patient- and family-centered units.

Finally, the authors mention that the proximity to the nursing station and degree of visibility of the nurse while walking through the nursing station may have impacted the likelihood of interactions and interruptions, and therefore, this should be a larger take-away from the study than any finding attempting to compare walking behavior in the two wings.