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The Impact of Environmental Factors on Nursing Stress, Job Satisfaction, and Turnover Intention

Dr. Diane Applebaum, DrPH, RN, CIC, Dr. Susan Fowler, PhD, RN, CNRN, Dr. Nancy Fiedler, PhD, MA, Dr. Omowunmi Osinubi, MD, MSc, MBA, FRCA, and Dr. Mark Robson, PhD, MPH

Director (Dr Applebaum), Medical Specialty Unit, Hunterdon Medical Center Flemington, New Jersey; Manager (Dr Fowler), Clinical Nursing Research, Visiting Nurse Association of Central Jersey, Red Bank, New Jersey; Professor (Dr Fiedler), University of Medicine and Dentistry of New Jersey–Robert Wood Johnson Medical School, Piscataway; Occupational & Environmental Physician (Dr Osinubi), Occupational & Environmental Health Associates, Somerset, New Jersey; Dean of Agricultural and Urban Programs (Dr Robson), Professor of Entomology, School of Environmental and Biological Sciences, Rutgers, The State University of New Jersey, New Brunswick

Abstract

Objective—The purpose of this study was to investigate relationships between environmental factors of odor, noise, light, and color and perceived stress, job satisfaction, and turnover intention.

Background—The physical work environment may positively or negatively influence nurses' stress, and stress may negatively impact their job satisfaction and intention to change jobs.

Methods—The research questions were answered using a descriptive, correlational design. The sample ($n = 116$) consisted of medical-surgical nurses working in acute-care settings. A 36-item questionnaire addressed odor, noise, light, color, perceived stress, job satisfaction, and turnover intention.

Results—Significant relationships were found between noise and perceived stress, perceived stress and job satisfaction, job satisfaction and turnover intention, and perceived stress and turnover intention.

Conclusions—Nurses tend to overlook their physical environment and “do their job.” Common environmental stressors in the work environment can be stressful to staff and influence job satisfaction and, ultimately, intention to change jobs. Mitigating or eliminating these environmental factors has the potential to improve staff satisfaction and retention. Stress influences nursing job satisfaction and, ultimately, intention to change jobs.

The United States is in the midst of a nursing shortage that is expected to intensify as baby boomers age and the demand for healthcare grows.¹ Buerhaus and colleagues² found that

more than 75% of RNs believe the nursing shortage presents a major problem for the quality of their work life, the quality of patient care, and the amount of time nurses can spend with their patients. Almost all the surveyed nurses saw the future shortage as a catalyst for increasing stress on nurses (98%), lowering patient care quality (93%), and causing nurses to leave the profession.¹ Nurses across the nation are reporting increased stress and dissatisfaction with nursing,³ with job-related stress being one of the principal reasons that nurses change jobs. The more stress, the lower job satisfaction and the higher turnover intention.³

A multitude of factors affect a nurse's intent to leave their present position. The physical environment may influence a nurse's perceived level of stress and job satisfaction, which ultimately influences intention to turnover. Environmental factors such as noise, air quality, light, toxic exposures, temperature, humidity, and aesthetics have been examined for their effects on both patients and workers. The combination of environmental factors with the growing consumer demand for safety, security, competence, and physical and psychological comfort has engendered the concept of a healing environment. Healthcare designers in 1988 initiated the concept of a healing environment that could facilitate the healing process by identifying factors that improve the access to people and resources, increase employee comfort, expand patient privacy by reducing noise and distractions, and provide flexibility and personalization in the delivery of care. In the past few years, healthcare designers and healthcare facilities have formed partnerships to incorporate healing environmental design aspects into their renovation and new construction projects and to measure the effects of these initiatives on patient outcomes.⁴ There is mounting evidence that the physical work environment affects job performance, job satisfaction, employee injuries, worker behaviors, communication patterns, employee fatigue, employee error rates, and physical and psychological stress.⁵

Environmental Factors

Odor

The perception of odor is dominated by pleasant or unpleasant dimensions. Odor can affect mood because of the overlap of the olfactory and emotional systems in the brain.⁶ Just as pleasant odors contribute to a sense of well-being and health, malodors have the ability to produce an organismic response that can be most unpleasant and even possibly harmful.⁶ Odors are on a continuum and can be viewed as a range or levels, such as “no odor” to “highly odiferous,” but these are not clearly defined.

Noise

Many researchers have examined the effects of noise on patients, but comparatively few studies are available for healthcare staff.⁷ There is evidence that nurses are adversely affected by high noise levels. Such levels have been associated with increased stress and annoyance, fatigue, emotional exhaustion, and burnout.⁸ Increased feelings of noise-related stress and burnout can lead to an increase in turnover intention. A recent study by Blomkvist and colleagues⁹ examined the effects of higher versus lower noise levels on a group of coronary intensive-care nurses over a period of months. Lower noise levels were linked with

a number of positive effects on staff, including reduced perceived work demands, increased workplace social support, improved quality of care for patients, and better speech intelligibility.⁷ These positive outcomes for the staff have the potential to decrease nurses' intention to turnover.

Light

Most healthcare settings are lit by a combination of daylight entering through windows (natural light) and electric light sources (artificial light). There are few empirical studies that have examined the impact of light, artificial or natural, on mood or task performance in healthcare settings. Constant exposure to artificial light, in particular, fluorescent tube light, is commonly mentioned by nurses as one of the most draining aspects of work on a nursing unit.¹⁰ One study of 141 nurses in Turkey found that nurses exposed to natural daylight for at least 3 hours a day experienced less stress and were more satisfied at work.¹¹ Furthermore, looking out at natural light can improve health outcomes, including agitation, sleep, and circadian rest-activity rhythms.¹² This can apply to both patients and nurses.

Researchers from the Center for Health Design confirm from previous research that the most obvious effect of light on humans is that of enabling vision and performance of visual tasks. According to Boyce and colleagues,¹² the nature of the task, as well as the amount, spectrum, and distribution of the light, determines the level of performance that is achieved. Performance on visual tasks improves as light levels increase.

Another factor that affects performance on visual tasks is age. The need for light increases as a function of age because of reduced transmittance of aging eye lenses.¹³ This is significant in that the nursing work-force is aging, and there is a need to critically assess the lighting provisions for different types of tasks performed by nurses. Individuals may feel stressed if they are unable to perform tasks because of inadequate levels of lighting.

Color

Color is an essential element of visual stimulation with well-documented psychological and physiological effects. Reds, yellows, and oranges have longer wavelengths and are considered warm, stimulating colors. Blues, greens, and purples have shorter wavelengths and are considered cool, soft, soothing colors. Warm colors, especially when accompanied by high illumination levels, have been found to encourage activity or movement, whereas cool colors promote more passive behavior.¹⁰ Because greens and blues are calming, these may be highly appropriate in the adult workplace as green has also been found to stimulate growth and balance emotions and is highly preferred by adults.¹⁴

These characteristics can be applied to specific clinical areas. For example, a postoperative unit can promote a feeling of calmness with cool, soft colors such as greens and blues. A more stimulating environment can be created with vibrant warm colors and may be appropriate for a geriatric unit.¹⁰

In summary, odors affect mood, noise affects stress, the type and amount of light affect stress, and certain colors are preferred by adults and affect behavior.

Purpose of the Study

The general purpose of the study was to investigate the following research questions:

- What is the relationship between perceived levels of odor, noise, light, and color with perceived stress levels of inpatient acute-care nurses?
- What is the relationship between perceived levels of light and job satisfaction among in-patient acute-care nurses?
- What is the relationship between perceived stress and job satisfaction among inpatient acute-care nurses?
- What is the relationship between job satisfaction and perceived stress with intention to turnover among inpatient acute-care nurses?

Methods

Design

A descriptive, correlational study design was used to answer the research questions. This design enabled the study of relationships between the study variables. The correlations between these variables were then stated as either positive or negative.

Sample

Data were gathered from full-time RNs who were employed on adult medical-surgical units at 500-bed level I trauma center located in northeastern New Jersey. Inclusion criteria consisted of (a) RNs who were (b) employed full-time (defined as working at least 36 hours per week) in direct patient care and (c) working in 1 of the 6 major inpatient medical/surgical areas (ie, orthopedics, cardiac, oncology, thoracic, geriatric, and neuroscience). Exclusion criteria consisted of (a) part-time or per-diem employees, (b) nursing management personnel, and (c) the following clinical areas: critical care, emergency services, obstetrics, and the operating room. Full-time employees were used because of the potentially different stress experienced by part-time or per-diem employees. Of the 285 surveys distributed, 116 surveys were returned, which yielded an overall response rate of 41%. Of the 116 RNs who participated in the study, 41 (35%) worked on more than 1 unit, 23 (19%) worked on a cardiac-medical unit, 18 (16%) on oncology, 12 (10%) on orthopedics, 10 (9%) on a neurology-respiratory unit, 9 (8%) on a cardiac-surgical unit, and 2 (2%) on a minimally invasive thoracic unit. One RN did not identify the unit that she worked on. Pertinent sociodemographic variables could not be considered because of the removal from the study at the request of the institutional review board (IRB).

Survey Instruments

Standardized survey instruments were pooled to develop 1 survey of 36 questions that assessed environmental factors, perceived stress, job satisfaction, and turnover intention. Survey instruments used in the development of the survey tool included the 10-item Perceived Stress Scale (PSS-10),¹⁵ Nurses' Intent to Stay Questionnaire (NISQ),¹⁶ and the M. D. Anderson Patient Contact Survey. Standardized environmental factors were measured

with selected items from the University of Texas M. D. Anderson Cancer Center Patient Contact Staff Survey. The survey tool has not yet been released into the public realm. Permission to use this tool was obtained from Jason M. Etchegaray, PhD, from the M. D. Anderson Cancer Center and Anjali Joseph, PhD, director of research at the Center for Health Design. The validity and reliability of the M. D. Anderson survey tool were limited in the literature, but the 15 items used for the purpose of this study had yielded acceptable Cronbach α 's (odor, $\alpha = .77$; noise, $\alpha = .70$; and light, $\alpha = .87$).

Perceived stress was measured with the PSS-10.¹⁵ The PSS-10 measures the degree to which situations in one's life are appraised as stressful. All 10 items were used in the study survey tool.

Job satisfaction and turnover intention were measured with 4 and 7 items, respectively, from the 11-item NISQ.¹⁶ The original questionnaire consisted of 5 sets of questions that measured intent to stay, satisfaction at work, satisfaction with administration, organizational commitment, and work cohesion. A Likert scale of 5, 6, or 7 positions was used so that a numerical value could be assigned to each item that could influence an RN's decision to keep his/her job. A global score was determined for each variable. This original job satisfaction questionnaire, when submitted to the IRB, was reduced from 15 to 7 questions.

Validity and reliability of the PSS-10 and the NISQ had been established and in this study also yielded acceptable reliability ranging from 0.76 to 0.87.

Procedures

The research was approved by appropriate IRBs. The principal investigator discussed the research with the management of each participating nursing unit. The clinical nurse researcher at the participating hospital acted as the study facilitator. A script was drafted for the nurse managers to use when presenting the study at their respective staff meetings, enabling presentation of consistent study information. Survey packets with instructions were placed in staff mailboxes including a self-addressed stamped envelope to the principal investigator. A reminder poster and postcard were used 1 and 2 weeks after initial survey distribution in an effort to secure an adequate response rate. The surveys were to be completed at work during uninterrupted downtime or breaks. This decreased the likelihood of recall bias. Return of the survey tool acknowledged consent to participate in the study. As an incentive for participation and to show appreciation, a uniform discount coupon was distributed.

Data Analysis

Data were analyzed using SPSS (student version 11.0; SPSS Inc, Chicago, Illinois). Descriptive statistics, including means, SDs, and ranges, were used to describe the data. Research questions were tested using the Pearson product moment correlation coefficient. Two-tailed tests of significance were used to test directional research questions.

Results

Table 1 outlines relationships between study variables posed in the 4 research questions. Four of the 8 relationships were statistically significant. Only 1 environmental factor, noise, was significantly related to perceived stress ($r = -0.18, P = .05$). Perceived stress was proposed to be linked to job satisfaction and turnover intention, and significant findings confirmed this relationship ($r = 0.55, P = .00; r = 0.34, P = .00$, respectively). Job satisfaction was significantly related, positively, to turnover intention ($r = 0.74, P = .00$).

Variables were entered into a regression model in an effort to explain the variance in turnover intention. Because no one independent variable was a strong predictor of turnover intention, backward regression was used. Fifty-six percent of the variance was explained in this model, with job satisfaction having the strongest influence on turnover intention ($P = .00$).

Discussion

In this study, an inverse relationship was found between the level of noise and perceived stress. One can expect that some noises are a comfort to the nursing staff while caring for their patients. Familiarity with the noises may actually provide a sense of reassurance and decrease stress (ie, bed alarms, intravenous pumps, cardiac monitor alarms).

An inverse relationship was also found between odor and light and perceived stress. A nonsignificant direct relationship has been established between warm stimulating colors and perceived stress. Nurses are focused on providing patient care and overcome many obstacles to care for their patients effectively and safely. The strength of nursing is reflected in the ability to adapt to ever-changing work conditions including the patient care environment that is out of the nurses' control.

A significant direct relationship was found between perceived stress and job satisfaction. Stress is inherent in nursing today. There is a higher level of stress in medical-surgical nursing units because of higher patient acuity. It appears that increasing job satisfaction is absorbing the effects of job stress.

A direct relationship between perceived stress and turnover intention was found. In a study conducted by Gardulf et al,¹⁷ about one-third of nurses who intended to quit their jobs stated that they experienced their work as being psychologically strenuous and stressful. It may not be stress itself that leads a nurse to leave his/her job, but the physical consequences of stress, such as missing lunch, physical symptoms, overtime, that cause nurses to leave their jobs. A significant direct relationship was found between job satisfaction and turnover intention. Turnover intention arises from a variety of complex factors. The level of job satisfaction, career prospects, mobility, and satisfaction with one's personal life all interact in the decision to leave a nursing position. A nurse may decide to move on to another position in the same facility or look for a new career opportunity outside of the facility.

Limitations

In generalizing the results of this study, several limitations should be considered. The current study was conducted in 1 healthcare setting. As a result, a variety of nursing environments could not be sampled. Pertinent sociodemographic variables could not be considered because of the removal from the study at the request of the IRB. It was also impossible to control the conditions under which the surveys were completed. The principal investigator did not personally validate the observations of color, the level of odor, noise, or light on each nursing unit, but depended on each nurse's subjectivity associated with his/her senses. Unequal response rates between units limited post hoc analysis to determine differences between units.

The survey questions addressing the work environment were quite general and could not eliminate subjectivity associated with the human senses. The stress questions measured the degree to which situations in one's life were appraised as stressful as opposed to focusing on job-related stress. The original job satisfaction questionnaire submitted to the IRB was reduced from 15 to 7 questions. A more comprehensive questionnaire should be used in future research. The turnover intention questions did not allow for an explanation of why the nurse was planning to leave the hospital.

Conclusion

A hospital is a bricks-and-mortar framework for the care that is provided.¹⁸ By having a greater understanding of how the physical environment of a health-care facility affects how the staff members perceive their environment, we can begin to translate research into practice and have a greater understanding of how evidence-based design research can be used to optimize the healthcare experience for everyone, including the nursing staff.¹⁹

Findings from this study can be used to inform hospital and nursing administrators about policy development and practices in hospital design and nursing unit renovation. Input from nursing staff is critical in guiding assessment of and changes in the hospital environment. Too often nurses are left out of this process, which ultimately results in an increase in stress and a decrease in job satisfaction. When hospital and nursing administrators listen to nurses, recognize their contribution, and allow them to participate in decision making about the nursing physical work environment, the result can be an increase in job satisfaction and a decrease in staff stress.

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Table 1

Summary of Results

Research Question	Variables	<i>r</i> (Relationship)	<i>P</i>
1	Level of odor Perceived stress	-0.14	.14
1	Level of noise Perceived stress	-0.18	.05 ^a
1	Level of light Perceived stress	-0.11	.24
1	Color Perceived stress	0.08	.40
2	Level of light Job satisfaction	-0.12	.20
3	Perceived stress Job satisfaction	0.55	.00 ^a
4	Job satisfaction Turnover intention	0.74	.00 ^a
4	Perceived stress Turnover intention	0.34	.00 ^a

^a*P* 0.05.