ENVIRONMENTAL EVALUATION OF THREE DIFFERENT WAITING ROOMS IN A MEXICAN HOSPITAL

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Abstract

This study identifies the influence of environmental conditions, temperature and noise (objective and self-reported), and waiting time, on patients' spatial perceptions of three hospital waiting rooms. The sample consisted of two hundred and fifty-three female patients. We used Ortega´s Environmental Evaluation Scale. A multiple regression analysis indicated that the spatial perception of waiting rooms defined by characteristics such as big, pleasant, spacious, among others, is determined by the physical valuation which has to do with qualities such as warm, silent, relaxing and others and by exposure to environmental conditions such as comfortable temperature levels, low levels of noise and short waiting times.

Keywords: Hospital setting, noise, waiting time, physical valuation, women

There is a growing literature today that offers empirical data on psychological and environmental characteristics of hospital settings (Carpman & Grant, 1984, Cohen, Kessler & Underwood, 1997, Evans & Cohen, 1987, Reizenstein, Grant & Simmons, 1986, Shumaker & Pequegnat, 1989, Topf, 2000), stressing the negative effects they might have on patients' well-being and, in some cases, on some physiological indicators of health recovery, such as high blood pressure and a greater necessity for painkillers (Ulrich, 1984) or alterations of sleep patterns associated with environmental noise (Topf, 2000).

Such research emphasizes the importance of reducing adverse environmental conditions, which can contribute to the worsening of illnesses or can constitute threats to the recovery process in hospitals and health centers. Examples of factors in hospital environments that could precipitate new health problems include stress originated by noise (Evans & Lepore, 1997), lack of control over the social interaction of patients and visitors (Conell, Sanford, Megrew & Thesing, 1997), lack of signaling and consequent disorientation (Atef & McCormick, 1995, Boelter & Torgrude, 1997), the symbolic image giving negative messages to visitors or relatives such as not being welcome, or ambiguous messages interpreted as not belonging to a certain part of the hospital or health center (Ortega-Andeane, 1993), as well as the effects of medical attention and socio-environmental factors as stress generators in hospitals (Ortega, 2002).

From this perspective, Mc Laughlin (1976) talks about the role played by patients in hospital waiting rooms, mentioning that waiting can influence or affect expectations regarding the type of treatment they will receive. On the other hand, the waiting time for visitors can be minutes or hours of boredom or intense anxiety, and for this reason, the size of the waiting room should be related to the number of patients and the average time spent in the waiting room.

Reidl, Ortega & Estrada (2002) report a study done in a specialized health center in Mexico City which had the aim of identifying the relationship existing between physical, physiological and socio-environmental variables and their relationship with the stress evaluation of patients and their relatives in the general waiting room.

The results indicated the need to consider the waiting and admission rooms as focal points in the planning, organization and environmental design of health centers and is of special importance for health institutions in Mexico, as they provide service to a great number of users and patients are obliged to spend long hours waiting in an environment that does not provide basic satisfactory conditions.

Also, Ortega, Reidl, Lopez & Estrada (2000) reported the influence that physical and socio-environmental variables have on patients´ companions and their perception of the waiting rooms in hospitals. They found that increased levels of environmental noise were due to increases in social density and the temperature level increased due to natural climatic conditions independent of social density. As a consequence, the authors stressed the importance of taking into consideration objective environmental aspects (indoor climatic conditions and noise) that can affect the spatial perception of hospital facilities and the physical well-being of patients.

Based on this finding, it is very important to take into consideration and determine current environmental conditions such as the range of temperatures that can determine feelings of comfort, which would allow us to establish criteria for creating adequate environments. Rohles (1981) noted that a series of investigations had the objective of defining what would constitute thermal well-being that not only depends on temperature, humidity and air velocity, but also on the type of clothing and physical activity of people, and he states that people report feeling comfortable at 26 degrees Celsius.

The aim of this paper is to report a recent investigation of the influence that some environmental conditions such as temperature, noise, and waiting times, have on patients' spatial perception of different waiting rooms in hospitals.

METHOD

Subjects

Two hundred and fifty-three women with ages ranging from 15 to 79 (x = 32.16). 24% had attended only primary school, 62% high school, 9% had undergraduate college education and 3% had no education whatsoever (2% of the sample did not report their level of education). 68% were housewives, 24% were employees and the remaining 5% were students. It was an opportunity sample because participants were asked to take part in the study while waiting for their medical appointment.

Setting

Three waiting rooms of different size and number of seats of a Mexican public hospital for women:
Waiting room 1. 118 square meters with 80 seats
Waiting room 2. 67 square meters with 48 seats
Waiting room 3. 53 square meters with 13 seats

Instruments and Equipment

We have developed the Environmental Evaluation Scale (Ortega, 2002). It measures the perception and evaluation of physical and socio-environmental factors. It consists of 35 pairs of opposed adjectives, separated by six optional response spaces. We used a principal components factorial analysis with varimax rotation and we obtained four factors explaining 43% of the total variance. The scale's internal validity was checked using the Alpha-Cronbach Coefficient, which was of 0.89. For this study, we only considered the Spatial Perception Factor with seven bipolar scales: big-small, simple-complicated, with sufficient-insufficient seats, decorated - non-decorated, spacious-confined, pleasant-boring, huge-small, which had an eigen value of 2.22, explaining 6.9% of the total variance and a 0.68 reliability; and the Physical Valuation Factor with five bipolar scales: silent-noisy, relaxing-tiring, ventilated-enclosed, warm-cold, fresh-suffocating which had an eigen value of 1.49, explaining 4.6% of the total variance and a 0.57 reliability, of the complete Environmental Evaluation Scale. Positive adjectives from each item were assigned the highest value when coding the data.

The waiting time until receiving medical attention was registered in hours and minutes, as reported by patients.
We used a Realistic Digital sonometer to measure environmental noise and a Brüel & Kjäer interior climate measuring device in order to register environmental temperature.

Procedure

The study was carried out in three different waiting rooms in a public hospital for women. Patients waiting for their medical appointment were approached and asked for their collaboration in the study. Once they accepted, a member of the research team gave them the questionnaire, a pencil and general instructions to complete the questionnaire. Participants could ask for any help from the interviewers when required. It is worth noting that in few cases the interviewers helped participants to fill in the questionnaire. Participants were thanked for their collaboration. While answering the questionnaires, noise and temperature levels in all waiting rooms were measured every 30 minutes.

All measurements were carried out in the out patients area, from 8:00 to 14:30 hrs, Monday to Friday, during three consecutive weeks.

RESULTS

Figure 1 shows environmental noise intensity for the three waiting rooms, as registered by the sonometer (in decibels or dBA) with an average value of 59.5 dB(A), values ranged from 55.17 dB(A) to 67.0 dB(A). It can be noted how there is an increment in noise levels, starting from 55-57 decibels at 8 a.m., which rise to more than 60 decibels from 10:30 to 12 a.m., reaching approximately 67 decibels around 11 a.m., and maintaining levels of more than 60 decibels until the end of the medical working hours.

For room two, the minimum value was 55.17 dB(A), 60.83 dB(A) the maximum, and 58.07 dB(A) as an average. For room three, 56.67 dB(A) was the minimum value, 61.83 dB(A) was the maximum, and the average value was 60.23 dB(A). More specifically the minimum value in room one was 56.83 dB(A), the maximum was 67 dB(A), and the average rate was 60.74 dB(A). It is worth noting that patients in waiting room 1 were exposed to especially high levels of noise, greater than 65 dB(A), during peak hours.

Figure 1. Mean of environmental noise intensity

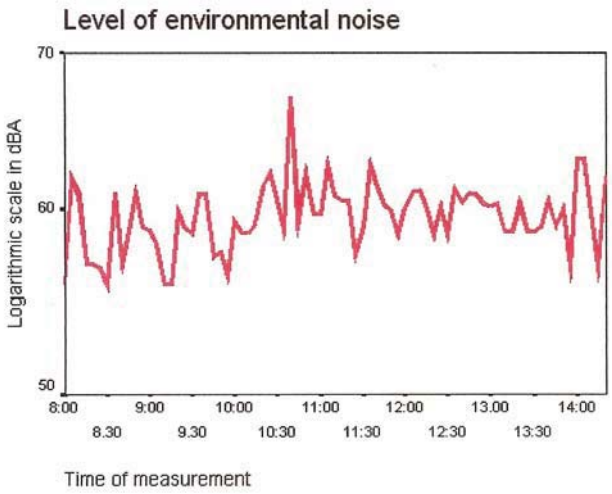
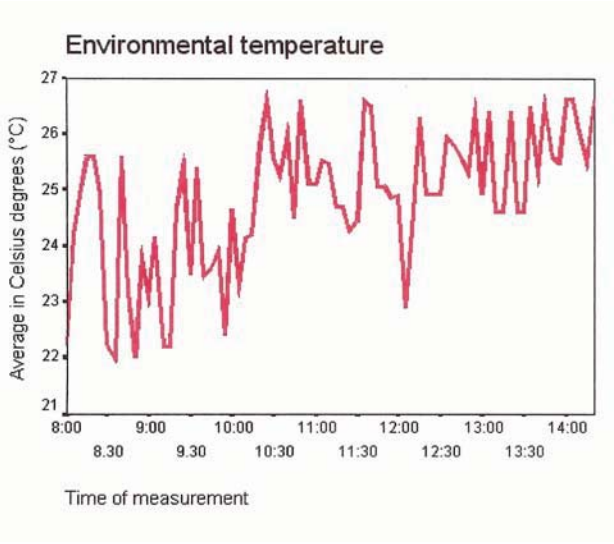


Figure 2 shows the levels of environmental temperature (in Celsius degrees) in the waiting rooms, with an average value of 24.76 degrees Celsius, ranging from 21.4 to 26.6 Celsius. An ascendant tendency can be noted during the day, starting from 22-23 degrees in the morning and increasing to 26-27 degrees by the end of the working day.

Figure 2. Mean of environmental temperature intensity



Waiting time reported by patients before receiving medical attention ranged from 20 minutes to 4 and a half hours (M = 1 hour 28 minutes, SD = 1 hour). It should be mentioned here that the average number of people per room was 38, ranging from 8 to 62, and that waiting rooms are enclosed spaces with no natural or artificial ventilation.

As mentioned earlier, positive adjectives from the spatial perception and physical valuation factors were assigned the highest scores so that high scores in both factors mean that the waiting room was perceived as comfortable (spatial perception), and that the physical environmental conditions of the place were evaluated as optimal (physical valuation).

A multiple simultaneous regression analysis was performed to identify the effects of both physical variables and the patient's physical valuation on spatial perception. The dependent variable was the spatial perception and the independent variables were the physical valuation, waiting times, environmental temperature and noise. Results are shown in table 1.

As can be noted the determination coefficient is 0.25 which indicates that 25 % of the total variance of spatial perception is explained by physical valuation, environmental temperature, environmental noise and waiting time. The relationship between waiting time and noise levels and the dependent variable, physical valuation, is negative.

DISCUSSION

The results indicate that the patients' spatial perception of waiting rooms is explained by the positive physical valuation of the rooms, with moderate temperatures (considering the thermal comfort criteria cited by Rohles, 1981), with shorter waiting times and with low levels of environmental noise. On the basis of these results, we can conclude that, for this particular sample, a spatial perception of waiting rooms defined by characteristics such as big, simple, with sufficient seats, decorated, spacious and pleasant, is determined by the physical valuation which has to do with qualities such as silent, relaxing, ventilated, warm, fresh, and by the exposure to environmental conditions such as comfortable levels of temperature, low levels of noise and short waiting times.

Waiting times can cause cascade effects; that is, Ortega (2002) asserts that as waiting times increase (more than 3 hours and up to 10) a more negative environmental perception appears, specially in terms of space, wayfinding and funcionality, which in turn have a negative effect in people's evaluation of the medical service.

Similarly, Frenk (2003) stresses the importance of taking into consideration clear indicators such as waiting times as part of the provision of medical attention in institutional programs of healthcare, in order to improve the quality of medical services in Mexico.

Table 1. A multiple simultaneous regression analysis performed for variables which predicted Spatial Perception.

Results for the simultaneous regression analysis performed for variables which predicted Spatial Perception (N of subjects = 140)

Variables	B	SE B	Beta
Physical Valuation	.379	.106	.275***
Environmental temperature	1.497	.399	.320***
Waiting time	-1.546	.522	-.232**
Environmental noise	-.500	.231	-.186*

R^2 = .25 (p< .000), *p< .05, **p< .01, ***p<.001

The results of the present investigation are similar to those reported by Ortega, Reidl, Lopez and Estrada (2000) in the sense that environmental conditions influence the spatial perception of hospitals´ waiting rooms. With the present study, we have further increased the validity of previous results, by measuring environmental conditions in an objective manner, by using self-report measures in a different setting with different socio-environmental characteristics, by considering patients´ waiting time, and by observing an increase of the objective environmental indicators (noise and temperature).

The social and physical features of a hospital, like those evaluated in this and other similar studies (Ortega, 2004), can directly and indirectly cause emotional stress, anxiety, fatigue and low activation.

Finally, it is important to emphasize the key role that the study of physical design will play when building the hospital of the 21st Century; as Ulrich and Craig (2004) assert: "this deep and wide base of evidence suggests that, parallel to evidence-based medicine, we can move to evidence-based design. It refers to a process for creating healthcare building, informed by the best available evidence, with the goal of improving outcomes and of continuing to monitor the success of designs for subsequent decision-making" (p.26). Hence, the future challenge for environmental design research, will be to provide tools to design hospitals that support and do not interfere with patients, families and staff activities and that provide a caring, effective, safe and patient-centered environment.

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