Healing Environment’s Variable to Reduce Anxiety in Cardiovascular Patients

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Abstract. Cardiovascular diseases are the number one cause of death globally also in Indonesia. Patients with the cardiovascular disease usually experience anxiety with varying degrees of anxiety when taking medication in the hospital. An uncomfortable physical environment can increase the level of patient anxiety which results in physical and psychological stress with an impact on organs especially the heart. This study aims to determine Healing Environment variables that influence to reduce the anxiety level of cardiovascular patients during treatment at the hospital. This study using a quantitative descriptive study with an online questionnaire survey method with a total of sixty respondents who are cardiovascular patients or people who have had cardiovascular disease treatment at the hospital. The results showed that the comfort variable which is influenced by some variables is very effective in reducing the anxiety level of cardiovascular patients. The result can use as guidelines for the architect or designer in design the cardiovascular hospital.

Keywords: healing environment, cardiovascular patient, level of anxiety

1. Introduction

Patients with the cardiovascular disease usually experience anxiety with varying degrees of anxiety. High levels of anxiety are associated with weak immune responses and changes in heart function such as irregular heartbeat, endothelial dysfunction, and inflammation of blood vessels which may lead to poor results [1]. The highest anxiety occurs when the patient is waiting or before performing a cardiac catheterization procedure. Increased anxiety can lead to physical and psychological stress with an impact on organs especially the heart. In addition, there was an increase in blood pressure and heart rate. All of these can trigger negative effects that affect the patient's heart system which can cause dysrhythmia, heart disease, ischemia, ventricular filtration, re-occurrence of infections, cardiovascular complications, and even lead to death [2].

According to Jones, the biggest factor that plays an important role in the human healing process is the environment by 40%, followed by genetic factors 20%, other factors 30% while medical factors only 10%. Both environmental factors that are natural and artificial which can be applied in rooms, buildings, or the large-scale environment to the city. Related to the large role of the environment in the healing process, then in the design of a health service facility should prioritize environmental quality. The physical environment of a hospital with a certain
atmosphere can increase patient stress, which can hinder or thwart the healing process [3]. Therefore, it’s expected that the presence of certain moods can reduce stress or mental stress experienced by patients undergoing treatment [4].

One of them is with the Healing Environment approach. In the 1990s a design solution to health, based on existing research, or defined as "evidence-based design" (EBD) has become a theoretical concept and is now called a healing environment. It can be said that it is a careful investment because it can save costs, improve worker efficiency, and reduce the duration of patients staying in the hospital by reducing stress [5]. There are six Healing Environment aspects accepted by the patient and family: Reduction of Errors, Increasing Safety and Security, Enhancing Control, Privacy, Comfort, and Family Support. Each aspect has its indicators that are received by patients and their families as shown in Table 1. Essentially, the aim of this study is to present Healing Environment variables that can reduce the anxiety level of heart patients during treatment at the hospital.

Table 1. Healing environment aspects and indicators that are received by patients and their families.

| Aspects accepted by the patient and family | Indicators |
|-------------------------------------------|------------|
| Reduction of Errors                      | Identical room layout |
|                                           | Lighting   |
|                                           | No slippery floors |
|                                           | Appropriate door opening |
|                                           | Correct placement of rail |
| Increasing Safety and Security            | Correct placement of toilet and furniture height |
|                                           | Single-bed rooms |
|                                           | Easy to clean surface |
|                                           | Automatic sink |
|                                           | Smooth edges in rooms |
| Enhancing Control                         | Control over the position of the bed |
|                                           | Control over the temperature |
|                                           | Control over the light |
|                                           | Control over the sound |
|                                           | Control over the natural light |
| Privacy                                   | Single-bed rooms |
|                                           | Curtain wall |
| Comfort                                   | Single-bed rooms |
|                                           | Material without glare |
|                                           | Windows with a view |
|                                           | Natural Light |
|                                           | Wayfinding (signage) |
| Family Support                            | Presence of family and relatives |
|                                           | Family waiting room |
2. The methodology

The methodology used cross-sectional descriptive methods, where the respondent is the people who ever had a cardiovascular treatment in the hospital. The total number of samples was 60 patients (37 males and 23 females). Patients' age ranged between 25 years old until above 65 years old. The majority (66.7%) of the samples had 1-5 years suffer from cardiovascular disease and 73.4% of them had a previous surgical history.

The data were collected by the questioner that was distributed online. The questionnaire consisted of an open and closed question. The open question is used to describe the cause of the cardiovascular patient’s anxiety. Four multiple-choice questions about characteristics including age, gender, surgical frequency, and history of the disease. Two multiple-choice questions about audio and visual comfort. Twelve Likert scale questions about healing environment indicators to reduce the anxiety level. Each response was assigned a score of 1 to 5 where score 1 for being disagreed and score 5 for highly agreeing.

The collected data are analyzed by using multivariate binary logistic regression analysis to find out what variables had the most effect on patient anxiety to be applied in a variety of spaces at the hospital, to reduce cardiovascular patients' anxiety. The validity and its reliability were affirmed by determining Cronbach's alpha are 0.837. It’s meant the reliability of the data was high.

3. Result and Discussion

3.1. The healing environment variables that most affect the anxiety level of cardiovascular patients

Based on the table below, the Sig. in the amount of 0.015. Because this value is smaller than 0.05, it can be concluded that the independent variable (Healing environment) that is used, together affects the anxiety level of heart patients. Or at least one independent variable has an effect.

| Table 2. Omnibus tests of model coefficients |
|---------------------------------------------|
|               | Chi-square | df | Sig. |
| Step 1        | 15.856     | 6  | .015 |
| Block         | 15.856     | 6  | .015 |
| Model         | 15.856     | 6  | .015 |

From the results of the questionnaire, heart patients who experienced anxiety were 37 people and those who did not experience anxiety were 23 people. In the interpretation of logistic regression with SPSS, the overall percentage is 68.3%, which means the prediction has an accuracy rate of 68.3% (cf. table 3). Anxious feelings experienced by patients are caused by several things such as illness, awaiting family, waiting for the results of the examination afraid of the results deteriorating, failure of operations, bills & costs, negligence of medical staff, unsupportive situations, there are other patients who died, the sound produced by medical devices, first experience, being afraid of being alone, noise, recovery time, etc. However, some of the respondents did not feel anxious.
Table 3. Classification Table

| Anxiety in Cardiovascular Patient | Percentage Correct |
|-----------------------------------|--------------------|
| Anxious                           | 31                 | 6                  | 83.8 |
| Not Anxious                       | 13                 | 10                 | 43.5 |
| Overall Percentage                |                    |                    | 68.3 |

The influencing variable is comfort which has a significant p-value < 0.05. The p-value of the significance of the Faculty variable is 0.026 < 0.05, so the comfort variable has a significant effect. If the comfort variable is increased, the tendency will have an impact on reducing anxiety levels by 2,833 times. This means that if the hospital design supports the comfort variable, the patient’s anxiety level will be reduced by 2,833 times.

Table 4. Variables in the equation

| Step 1 | Variable             | B   | S.E. | Wald  | df  | Sig.   | Exp(B) |
|--------|----------------------|-----|------|-------|-----|--------|--------|
| 1      | Comfort              | 1.041 | .469 | 4.930 | 1   | .026   | 2.833  |
|        | Privacy              | .315 | .434 | .529  | 1   | .467   | 1.371  |
|        | Enhancing control    | -1.268 | .654 | 3.755 | 1   | .053   | .281   |
|        | Safety and security  | -.044 | .674 | .004  | 1   | .949   | .957   |
|        | Reduction of error   | .434 | .536 | .656  | 1   | .418   | 1.544  |
|        | Family support       | -.486 | .353 | 1.895 | 1   | .169   | .615   |

More than half percent the number of respondent’s cardiovascular patients choose instrumental/ classical music to reduce their anxiety. Quite is chosen with a percentage of 31.7%, and the lowest is the sound of water with a percentage of 10%. The visual comfort chosen by cardiovascular patients to reduce their anxiety is dominated by views toward the garden. Landscape of painting is chosen with a percentage of 13.3%, and the lowest is flower vase in the room.

Several studies of cardiac patients before cardiac catheterization show that music therapy is efficient in reducing patient anxiety. After music therapy, heart rate and blood pressure reduction. As a non-pharmacological treatment with music aiming to provide comfort, well-being, and relaxation by affective, cognitive, and sensorial stimuli [6]. During music therapy, patient are given music choices for greater efficacy. Usually music with slow tempo, such as relaxation or classical music that is chosen to be an option. They determine the volume of music they listen to. The duration of music therapy for 20 to 40 minutes is the right time, some studies determine this time can provide the best result. Music therapy is very important because it can help spend time, waiting to be in progress. Music therapy can reduce by as much as 15% [6,7].

Previous studies have shown that noise can adversely affect the patient's recovery process and can increase stress [8,9]. The main noise source is located inside the hospital. The noise level affects patient comfort and has an impact on patient recovery [8]. Noise causes poor sleep quality and affects the quantity of sleep [10]. One of study among cardiovascular patients with myocardial infarction and unstable angina. By replacing the ceiling with material that absorbs sound. See the comparison of 31 patients who were in the unit before the ceiling was replaced with 63 patients who were in the unit after the ceiling was replaced. The result shown, 31 of patients showed a higher amplitude pulse than 63 patients during the night [11].
The key component of a healing environment is nature. According to previous research, nature can reduce patient and family anxiety [12]. Research reveals that patients who can see a view of trees during hospitalization require less pain medication and a shorter duration of stay than patients who are in a room facing a wall [13]. One study related to distraction therapy by view from a window is visual stimulation. Showed that patients who can see the view to nature while undergoing painful procedure feel less pain [14]. Besides views of the real garden, image of nature and murals can reduce anxiety and stress [15], but it should be chosen accordingly and should be located in the sightlines of patients. The following elements of art to be appropriate in healthcare environments are calm waterscape, visual depth or open foreground landscapes, trees with broad canopy, savannah landscapes, verdant vegetation or positive cultural artefacts [16]. Using simple natural images can enhance the recovery and reduce the pain of coronary surgical patients. Patients who can see natural images while in the hospital room have lower anxiety [17]. Patients need less post-operative medication in hospital rooms with flowering plants. Seen from a more positive physiological response (heart rate, anxiety and fatigue, lower systolic blood pressure, pain rating) and have more positive emotions and greater satisfaction with their hospital rooms than in the control group [18,19].

One component that leads to patient satisfaction is adequate lighting. To reduce pain and the incidence of depression can be done by presenting daylight through large windows that are not blocked from other building blocks. This will also have an impact on reducing the duration of depression experienced by patients [20]. Sunlight is also important in addition to daylight. Study among 174 patients has shown that patients who suffer from depression if they live in a bright room have a shorter stay in the hospital than patients in dull rooms [21]. Another study among 628 heart attack patients in the intensive care unit revealed that female patients were placed on sunny rooms had a one-day shorter stay on average and the mortality rate was lower than female patients in dull rooms [22].

Table 5. Acoustic comfort to reduce anxiety in cardiovascular patient

| Acoustic Comfort          | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------------------------|-----------|---------|---------------|--------------------|
| Valid Quiet               | 19        | 31,7    | 31,7          | 31,7               |
| The sound of water        | 6         | 10,0    | 10,0          | 41,2               |
| Instrumental/classical music | 35       | 58,3    | 58,3          | 100                |
| Total                     | 60        | 100,0   | 100,0         |                    |

Table 6. Visual comfort to reduce anxiety in cardiovascular patient

| Visual Comfort             | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------------------------|-----------|---------|---------------|--------------------|
| Valid View towards the garden | 49       | 81,7    | 81,7          | 81,7               |
| Flower vase inside the room | 3        | 5,0     | 5,0           | 87                 |
| Landscape painting         | 8         | 13,3    | 13,3          | 10                 |
| Total                      | 60        | 100,0   | 100,0         |                    |
4. Concluding Remarks
Based on binary logistic regression output with SPSS software on 12 Healing Environment indicators. Healing Environment variable which is very affect in reducing the anxiety level of heart patients is Comfort because the statistical data shows that the variable has a significant p-value < 0.05. If the comfort variable is increased, the tendency will have an impact on reducing anxiety levels by 2,833 times. This means that if the hospital design supports the comfort variable, the patient's anxiety level will be reduced by 2,833 times. View towards the garden and listen to instrumental / classical music is the choice of cardiovascular patients to improve their comfort to reduce the anxiety they experience.

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