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The soundscape dimensions of third-class hospital ward in Indonesia

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ABSTRACT

In Indonesia, the categorisation of the hospital ward is determined based on the number of beds. Third class hospital ward (the lowest class) is the ward which consists of more than four beds inside the room. This type of ward is typical in a developing country and might have different acoustic problems compared to the standard ward. This study aims to understand the soundscape dimension in a third-class hospital ward. Two experiments were conducted: the development of semantic scales and the identification of soundscape dimensions. The semantic scales were developed by asking the patient about the feeling in the ward. Most of the terms used to describe the environment are negative terms such as annoying, boring, scary, upset, and uncomfortable.

Interestingly, the perception ratings indicate that the patients feel positive about the sound environment. Principal component analysis is used to analyse the rating resulting in five soundscape dimensions. The dimensions are Privacy, Disturbance, Dynamic, Fear, and Satisfaction. These dimensions indicate the important aspect which needs to be understood in increasing the quality of third-class hospital ward.

Keywords: soundscape dimensions, third-class hospital ward

1. INTRODUCTION

The hospital environment is vital in speeding up the patient's recovery (1). The optimal healing environment must be designed carefully based on several aspects in both in the indoor and outdoor area(2). One of the critical environmental aspects which need to consider is the sound environment.

Many approaches have been made to improve the sonic environment but mainly focus on the noise of the environment since the effect has been determined for both patients and staff (3–5). The improvement for the sound quality is focused on reducing the noise level using several methods (6).

Other studies focus more on the perception aspects using soundscape approach (7–10). This approach focuses more on what people feel and perceive in the environment, not only based on sound level measurement. Previous studies have been conducted in several areas in a hospital such as the Intensive Care Unit (9,11) of hospital ward (7,12). Most of the previous study tries to enhance the acoustic comfort without determined the other important perception in the hospital area. Specifically, in the hospital ward, the soundscape study focusses on the hospital wards which have limited beds.

This study tries to understand the soundscape dimensions of a third-class hospital ward which consist of more than four beds inside. This type of ward is typical in a developing country and might have different problems compared to the normal hospital ward. This type of ward also the cheapest ward and always full of patients. The focus of this study is to develop semantic scales for third-class hospital ward and to determine the soundscape dimensions of the third-class hospital ward.

2. Method

The surveys for this study were conducted in five third-class hospital wards. Third-class ward has a larger room size with a few more beds than the other types. The number of beds is within the range of

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6 – 8 beds with 7.2m^2 for each bed [8] as shown in Figure 1. This type of room is usually full of patients due to the cheapest rate than the other types of room. The beds in this room usually located near to each other and only separated by a curtain. In this room class, the beds are separated by thin curtain to visually closed the view among the patients. The room usually used by patients with the government's insurance or poor people who do not have to pay for the cure. Most of the patients in this room are in the recovery stage of their illness.

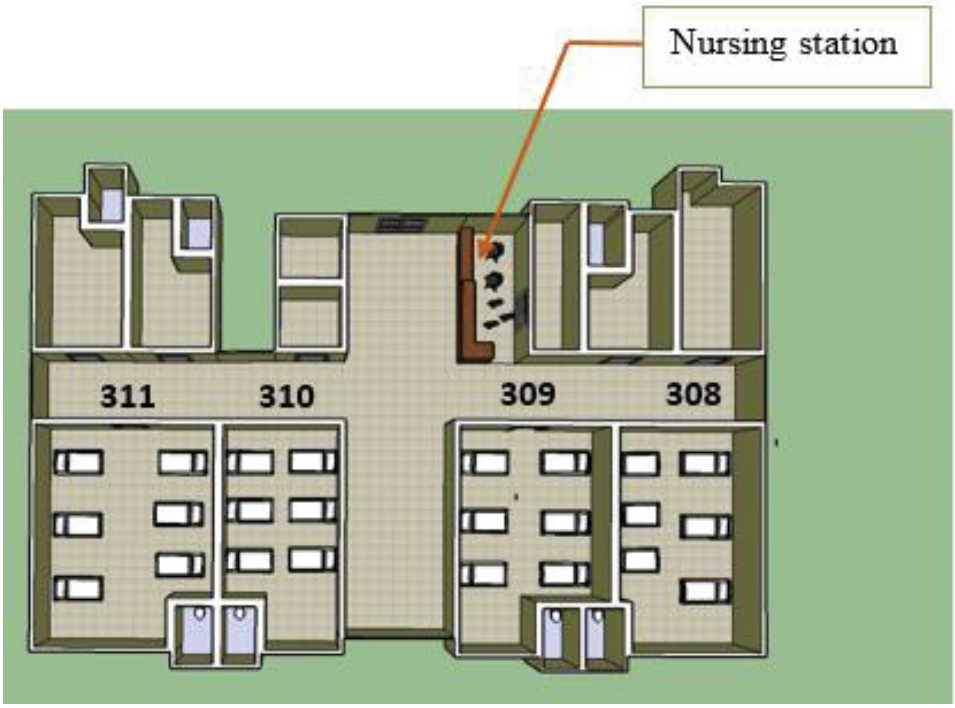

Figure 1 –Third-class hospital ward room Layout

The experiments were conducted at an Islamic Hospital in Bandung, Indonesia. Fifty-nine respondents (28 males and 31 females) voluntarily join the experiment. 36 patients joint the experiment and 23 patient's guard who also stayed in the ward. The average age of the patients was 42.5 with a standard deviation of 15.4. In the first experiment, the patients of third-class hospital ward were asked about what they feel in the ward. The perception appeared in this step then implemented to develop a set of semantic scales. In the second steps, the patients of the ward were requested to filled a questionnaire of semantic scales. The data from semantic scales were analysed using principal component analysis to determine the soundscape dimensions of the third-class hospital ward.

3. Analysis

The first experiment was conducted to developed semantic scales. Several perceptions were gathered in this experiment as shown in Table 1.

Table 1 – Term used to explain the situation in the third-class hospital ward

Indonesian	English Translation	Indonesian	English Translation
Mengganggu	Disturbing	*Tidak nyaman*	Uncomfortable
Membosankan	Boring	*Dinamis*	Dynamic
Menakutkan	Scary	*Sempit*	Cramped
Tertekan	Depressed	*Lambat*	Slow
Puas	Satisfied	*Penuh*	Full
Ribut	Noisy	*Kesal*	Annoyed
Tidak privat	Not Private		

Table 1 shows that most of the term used to described the third-class hospital ward are negative terms. This description might indicate the soundscape of the ward which needs to be improved. Interestingly, there are term satisfied (*puas*) which indicates that the patients satisfied with the ward.

The second experiment was conducted by requesting the participants to rate the acoustic environment based on five-point semantic scales. The scales were developed based on the perception term found on the first experiment. The scale is shown in Table 2.

Table 3 – Semantic scale used for the experiment

Indonesian	English Translation
Mengganggu - Tidak Menganggu	Disturbing-not disturbing
Membosankan – Menarik	Boring-interesting
Menakutkan-Tidak menakutkan	Scary-reassuring
Tertekan – Menenangkan	Depressing-calming
Puas-Tidak Puas	Satisfied-unsatisfied
Ribut-hening	Noisy-silence
Tidak privat-privat	Not private-private
Tidak nyaman-nyaman	Uncomfortable-comfortable
Dinamis-monoton	Dynamic-monotonous
Sempit-luas	Cramped-spacious
Lambat-Cepat	Slow-fast
Penuh-kosong	Full-empty
Kesal-Senang	Annoyed-pleased

Further analysis is conducted by analysing the score of perception rating. The median value of the score is shown in figure 2. Contrary to the term found in the first experiment, the rating shows that in general, the patients feel positive about the environment. They feel not scary, comfortable, monotonous, and full. This finding might indicate the acceptance of the environment. The patients feel that this type of ward is the best option for them and they accept the environment. Most of the patient get free cure there, and it is the better option rather than does not get the cure.

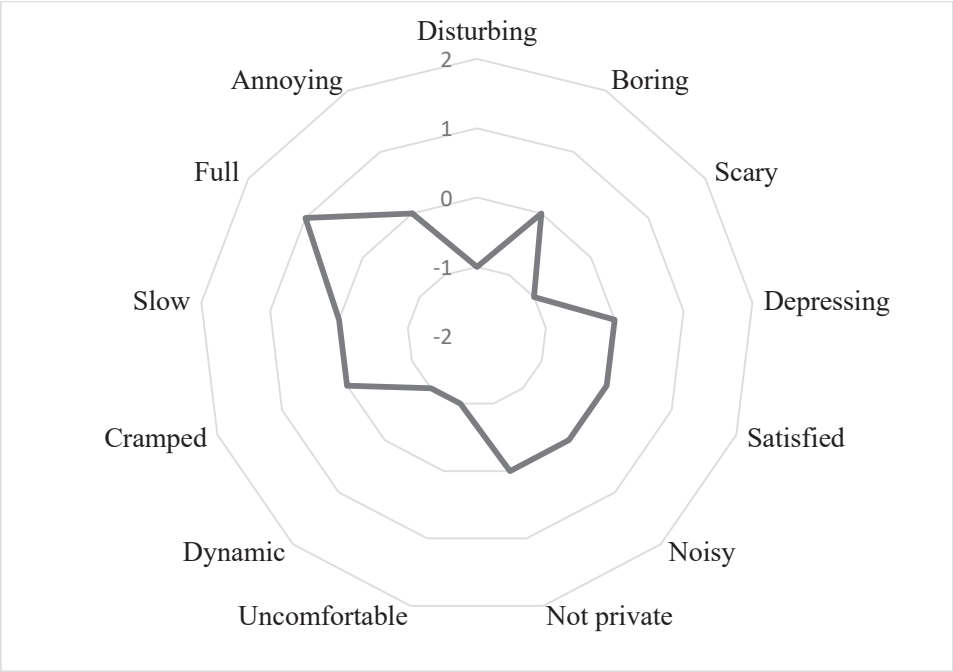

Figure 2 – Median score of perception rating in third-ward hospital

Further analysis is conducted using principal component analysis to determine the soundscape dimensions of the third-class hospital ward. The PCA result is shown in Table 3. The soundscape dimensions are the components which have eigenvalue bigger than one.

Table 3 – Principal Component Analysis Result

Kaiser-Meyer-Olkin Measure of Sampling Adequacy =0.710, sig. 0.000

	Component 1	Component 2	Component 3	Component 4	Component 5
	18%	13%	13%	12%	11%
Disturbing	0.1	0.74	0.21	0.32	0.14
Boring	0.55	0.19	0.19	0.51	-0.19
Scary	-0.04	0.17	0	0.88	0.07
Depressing	0.68	0.11	-0.21	0.4	-0.16
Satisfied	0.13	0.05	0.18	0.13	0.81
Noisy	0.27	0.41	0.5	0.1	-0.07
Not private	0.67	0.07	0.39	0	0.22
Uncomfortable	0.39	0.75	0.03	0.07	0.04
Dynamic	0.06	-0.12	0.68	-0.07	0.25
Cramped	0.04	0.22	0.69	0.09	-0.14
Slow	0.39	-0.48	0.18	0.39	0.33
Full	0.78	0.3	0.14	-0.2	0.03
Annoyed	0.31	-0.07	0.39	0.22	-0.63

There are five soundscape dimensions appear in this experiment:

1. The dimension related to the perception of privacy (18%). The dimension is represented by the semantic scales of boring, depressing, not private, and full.
2. The dimension related to the perception of disturbance (13%). The dimension is represented by the semantic scale of disturbing, and uncomfortable
3. The dimension related to the perception dynamic (13%). The dimension is represented by the semantic scales of dynamic and cramped.
4. The dimension related to the perception of fear (12%). The dimension is represented by the semantic scales of boring and scary.
5. The dimension related to the perception of satisfaction (11%). This dimension is represented by the semantic scales of satisfied and annoyed.

The dimension of privacy become the most dominant soundscape dimension. This privacy of the ward is related to the scale of depressing which mean the privacy can make the patients depressed. This result is interesting since the soundscape dimensions usually dominated by the perception related to the preference of the space. In an urban area, the first dimension is called Pleasantness (13), Calmness(14), or Relaxation (15). In an academic library, two soundscape dimensions (pleasantness and dynamic)(16) indicates similar soundscape dimensions with the urban soundscape.

The difference might happen because, in the urban and library area, people stay in that area for a short period, so the most important aspect is to enjoy the environment. Another similarity between those two studies is that people have the choice to leave the environment if they want to.

There is another case similar to the hospital ward where people need to be in the area for a long period and does not have the opportunity to leave the place. The case happened for the nurse who works in the Intensive Care Unit (ICU)(11) and a student in a class (17). In this environment, the most dominant soundscape dimension is the dimension which not representing the preference of the space. The perception of information is the most important perception for nurses who work in ICU while the perception of space is the most important perception for student in a classroom. The perception related to space preference (Calmness) become the second soundscape dimension.

4. Conclusion

Third-class hospital ward soundscape has been analysed according to the verbal response, overall rating, and soundscape dimensions. The verbal response from the patients indicates a negative acoustic environment. Interestingly, the rating of semantic scales indicates positive perception. This result might indicate the acceptance of the acoustic environment among the patients.

There are five soundscape dimensions gathered from third-class hospital ward: privacy, disturbance, dynamic, fear, and satisfaction. The first dimension is not related to the preference of the space, and this result is consistent with the place where people do not have the opportunity to move.

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