SURVEY OF CHARACTERISTICS OF THE ODOR IN MEDICAL FACILITIES

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ABSTRACT

This research clearly shows unpleasant odors in hospitals, with the goal of obtaining the basic information needed for formulating measures to control such odors. In the study, we conducted a survey of the odor awareness of nursing staff members at 174 medical institutions, and compared the results with past research related to odors in nursing homes for the elderly. 88.5% of the nurses sensed odors in hospitals. 81.0% considered it a problem and 67.2% recognized a need for improvement. The most odorous places included sickrooms, sick wards, sanitary rooms, and lavatories. Among odor types, excrement odors were most frequently remarked. In addition, there was also body odor, chemical odors from medicines, and the odors of food, tobacco smoke odor, moldy odor, etc. The odors from the excrement of bedridden patients, patients with urinary incontinence, patients who use diapers, and patients who use portable toilets were presumed to be factors that affected odor environment. When the odor level of hospital sickrooms and nursing home bedrooms were compared, increased odor intensity and unpleasantness were observed in sickrooms. It was shown that greater measures to control odors are necessary in hospitals than those necessary in nursing homes.

KEYWORDS

Hospital, Characteristics, Questionnaire, Odors from excrement

INTRODUCTION

The aging society progresses quickly and the interest in medical welfare institutions is growing. The environmental improvement in medical institutions are also highly expected. However, medical institutions predominantly have multi-bed rooms in Japan, so that it is difficult to protect a patient's privacy. Especially, an unpleasant odor generated at the time of defecation with the portable toilet, or at the time of diaper exchange disturbs comfortable hospitalization, presenting a problem (Miura et al. 2004). This research deals with unpleasant odors in hospitals with the goal of obtaining the basic information needed for formulating measures to prevent or eliminate such odors. In the study, we conducted a questionnaire survey about awareness concerning odors in the hospitals.

METHOD OF EXPERIEMT

We conducted a questionnaire survey about opinions concerning odors in a hospital among nurses working at 174 medical institutions in June, 2005. Table 1 shows investigation items. We asked the nurses to choose five odorous places in the hospital. We asked them to choose two kinds of odors which they sensed in those places. Moreover, 13 types of patient factors which could be thought to affect odor in the sick ward were specified. Two “odor types” the nurses sensed from those patients were chosen. In addition, we compared the results with Mitsuda’s 1998 research (Mitsuda et al. 2000), which clarified the odor levels of nursing homes, and examined whether the odor levels in the hospital were of an extent that they needed the control of odors.
RESULTS ANALYSIS AND DISCUSSION

Awareness of Odors in the Hospital

461 survey forms had been distributed, but the number we collected was 174 (a collection rate was 37.8%). Table 2 shows the questionnaire results. 88.5% of nursing staff responded that they sense odors and it became clear that most nurses were aware of odors in the hospital. In addition, 81.0% of the nursing staff responded that odor is a problem. Furthermore, 67.2% of the nursing staff responded that improvement for the odor is necessary.

Table 2 The results of awareness concerning odor in hospitals

<table>
<thead>
<tr>
<th>Survey items</th>
<th>Yes (%)</th>
<th>No (%)</th>
<th>No answer (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you feel odors in the Hospital?</td>
<td>154 (88.5)</td>
<td>10 (5.7)</td>
<td>10 (5.7)</td>
</tr>
<tr>
<td>Do you think that the odor is problem?</td>
<td>141 (81.0)</td>
<td>24 (13.8)</td>
<td>9 (5.2)</td>
</tr>
<tr>
<td>Do you think that improvement for the odor is necessary?</td>
<td>117 (67.2)</td>
<td>47 (27.1)</td>
<td>10 (5.7)</td>
</tr>
</tbody>
</table>

Figure 1 The results of totaling the response rates of odorous places from 1st to 5th place

Figure 2 The results of totaling the rates of the odor types from 1st to 5th place

Table 1 Survey items

<table>
<thead>
<tr>
<th>Awareness concerning odor in the hospital</th>
<th>The rate of sensing odors</th>
<th>The rate of considering odor as a problem</th>
<th>The necessity for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>The characteristics of odors in the hospital</td>
<td>Odor control measures and their effect</td>
<td>Odorous places</td>
<td>Unpleasant odor types</td>
</tr>
<tr>
<td></td>
<td>Odor intensity</td>
<td>Unpleasantness</td>
<td>Odor intensity</td>
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</table>
that they recognize the necessity of improving the odor problem in their hospital.

**Odorous Places and Odor Types**

Figure 1 shows the result of totaling the response rates of the odorous places from 1st to 5th place. The most frequently answered was "Sickroom," at 31%. Subsequently, "Lavatory" was 22.0%, and "Sanitary room" was 18.0%. The percentage of "Sick ward" responses after the 2nd level increased. Four places, "Sickrooms", "Sick wards", "Lavatories" and "Sanitary rooms" were found to be typical odorous places. Figure 2 shows the results of totaling the rates of the odor types from 1st to 5th place. Odors from excrement and urine were answered the most, and they were both more than 30%. Subsequently, "Body odor" and "Food odors" were high, and there were "Chemical odors from medicines," "Moldy odor," "Perfume," etc. The odors were classified into four categories: the odor generated from patients, such as odors from excrement and body odor, the odor peculiar to the hospital, such as a chemical odors from medicines, the odor related to the building, such as the odor of building materials, and odor to occur by life, such as moldy odor, dust, and tobacco smoke odor. We were able to surmise that the patients themselves were a contributing factor of the unpleasant odors affecting their hospitalization, among some other factors. Figure 3 shows the mean odor intensity and unpleasantness in the 1st to the 5th odorous places. The odor intensity was 3.1 in the 1st place area, but it descended to 2.6 in the 5th place area. The Unpleasantness was -1.7 in the 1st place area, but it was -1.1 in the 5th place area. The odor intensity became stronger, and the unpleasantness became more unpleasant as the ranking rose. In the T-test, a difference was significant at a level of 1% between the 1st place area and the 3rd place or lower areas. It was shown that the higher-ranked places had stronger unpleasant odors.

**Odor Types Classified by the Patient Factor**

The investigation of the odor in hospitals, which was considered a problem, was conducted, and 867 departments in the 174 medical institutions replied to the questionnaire. Figure 4 shows 13 "odor types" classified by the patient factor which seemed to affect the odor. Since 1% significance was shown by the independent test, a residual analysis of the cross-tabulation table was conducted. In "Bedridden patients", "Patients with urinary incontinence," "Patients who use diapers," "Patients using portable toilets," "Patients with urethral catheters," and "Patients who had problems defecating," the odors from excrement were more odorous than other patients, and the significant level was 1%. In "Bedridden patients," "Patients during sputum aspiration," "Patients with tube feeding," and the "Patients with end-stage cancer," body odor was more odorous than other patients, and the significant level was 1%. In the case that there were not many replies of excrement odor, the response rate of body odor was high. In addition, replies to the questionnaire included treatment-related odors such as blood odor, chemical odors from medicines, body fluid, and vomit. These facts revealed that "odors from
"excrement" and "body odor" were considered problems in the sick ward.

Controls of Odor and Their Effects

Figure 5 and 6 show controls of the odor performed in hospitals and their effects. For countermeasures, 34.5% replied that they "Open a window," 27.0% "Use a fan," and 21.8% "Use a deodorant." These formed 80% of all the responses. In a sickroom with an odor problem, the rate of "Open a window" was 68.5%, which was the most generally performed method. "Use a fan" and "Use a deodorant" were as low as 13.0% and 11.1%, respectively. Although the responses that the "Odor went away" by "Open a window" were 42.6%, the effectiveness of other methods were only about 20%. Sufficient effect using
currently performed measures of odor control have not been obtained. It was suggested that, to provide a comfortable environment in hospitals, it is necessary to control the spread of unpleasant odors.

Comparison with the Odor Levels of the Nursing Homes
The survey form was distributed to 247 nursing homes for the elderly near Aichi. The number of responses collected was 123, and the collection rate was 49.8%. The odor level of the "Sickroom" was compared with that of the "Bedroom" of the special building in which the patients with severe dementia lived. The items compared were the unpleasant odor type and the odor intensity and unpleasantness. Figure 7 shows these results. The odor intensity of the "Sickroom" was 3.4, higher than 1.8 of the "Bedroom". The unpleasantness of the "Sickroom" was -1.9, more unpleasant than -0.8 of the "Bedroom". It was revealed that the odor level of hospital was higher than that of the nursing homes. As for the odor types, 80% or more in the "Sickroom" were "Odors from excrement," while "Body odor" was significant in the "Bedroom", in addition to the "odors from excrement".

The Need for Control of Odor Based on Acceptable Level
According to the academic standard for control and maintenance of indoor odors by the Architectural Institute of Japan, odor concentration when the unacceptable rate is 20% should be an acceptable level. As for the standard odor value of each space in nursing homes, the odor concentration should be 8 in the bedroom and 4 in the sanitary room. For the odor indicated by odor intensity and concentration in the standard odor value, kitchen garbage odor is 1.4, body odor 1.5, and cooking odor 2.1 (Mitsuda 2000) (Architectural Institute of Japan 2005). Putting them all together, an acceptable level of indoor odor intensity is about 1.5. This survey showed that the odor intensity and unpleasantness in a sickroom indicated a higher value relative to nursing homes. It became clear from these observations that the odor level in a sickroom is higher than that in nursing homes, and the need for control of odor
CONCLUSIONS
We conducted a questionnaire survey about odor awareness in hospitals for nurses working at 174 medical institutions. In addition, whether or not the hospital odor level required control of odor was also examined. The findings obtained are summarized as follows.

1. 88.5% of the nurses who work in a given hospital sense odors within the hospital; 81.0% thought it was a problem, and 67.2% felt a need for improvement.

2. Typical odorous places included sickrooms, sick wards, sanitary rooms, and lavatories. The largest number answered that the most unpleasant odor types were the odors from excrement. In addition, body odor, chemical odors from medicines, food odors, tobacco smoke odor, moldy odor, etc. were also present.

3. Especially in bedridden patients, patients with urinary incontinence, patients who use diapers, and patients who use portable toilets, the odors from excrement were considered a problem.

4. To “Open a window”, “Use a fan”, and “Use a deodorant” were the typical measures for odor controls. The deodorization efficiency in sickrooms was 42.6%.

5. The odor intensity of the “Sickroom” was stronger than that of the “Bedroom”. In comparison with the unpleasantness, the unpleasant level was greater in the “Sickroom.” The odor level of hospitals was higher than that of the nursing homes, and an evident need for control of odor was found.

ACKNOWLEDGEMENTS
The authors wish acknowledge the personnel of the facilities who cooperated with our survey. Also, we are deeply thankful to Mr. Yuya Nakajima (undergraduate student at the time), Dept. of Engineering, Daido Inst. of Technology, for his cooperation in the survey count.

REFERENCES