I. Objective

As for elderly people, it is desirable to enhance cerebral activity during drinking and eating, recreation, and so on. I, researcher, considered whether I could use colors as routine stimulation. However, at existing state, there aren’t many studies conducted so far that relates to color in the field of nursing. Therefore, as the study purpose in this study, I decided to perform the basic verification of the relationship between the color preference and the influence which was exerted on the frontal lobe activity and subjective awakening degree by adopted colors in the nursing environment. Considering the colors to be adopted in the nursing-care environment, I performed the verification of different colors using five colors of tablecloths.

II. Methods

1. Subjects

I enrolled 14 young healthy women of 18 to 30 years old (average age 22.1±2.1 years old) whose study consent could be obtained. They were healthy subjects with normal color sense and normal autonomic nervous function.

2. Color stimulation

Using a small table of 150cm×90cm (light gray color, 5Y7/1), I changed only the colors of the tablecloth covering it. For the colors used in the experiment, I used chromatic colors from the Munsell hue circle (Figure 1). I selected red, yellow, blue and green with high chroma. For the achromatic colors, I selected white. I used color tablecloths that were marketed products. The Munsell values were red (5R4/12), yellow (7.5Y8.5/10), blue (5B8/10), green (7G4/8), and white (9N.25).

The colorimetry was selected using visual judgment based upon the colors in the Munsell system devised by the Japan Color Research Institute Foundation and judgmental instrument using the colorimetry of the ColorMunki Design (X-Rite, Incorporated, Figure2).

All subjects participated in five color experiments on the same day, and the tablecloth order was randomly determined for each subject.

III. Results and discussion

The color stimulates people!

1. Changes of brain blood-flow volume

In the comparison during the eye-closed at rest and during the color stimulation, the activation of the frontal lobe could be confirmed with the significant increases of the values for all color in CH4 and CH13. This shows that I was able to measure cerebral activation by the color stimulation in this device.

The analysis points of the blood-flow volume change in the frontal lobe were set in the two points consisting of CH4 (the right frontal lobe) and CH13 (the left frontal lobe) in this study and then calculated average values of the Oxy-Hb changes between during the eye-opening at rest and during the color stimulation. As for the five colors, I compared blood-flow volume changes between during eye-opening at rest (the color of the small table) and during the color stimulation in each color. I also compared them between five colors.

2. Study on subjective awakening degree

As for the TA, a significant score increase for yellow and a significant score decrease for green were found. As for the EA, a significant score increase for red and significant score decrease for white were found. It was demonstrated that yellow and red stimulated the subjective awakening degree, while green and white calmed it.

Table2. Comparison pre- and post-trial of JUMACL scores

<table>
<thead>
<tr>
<th>Color</th>
<th>TA</th>
<th>EA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>±6.1</td>
<td>±1.4</td>
</tr>
<tr>
<td>Yellow</td>
<td>±8.5</td>
<td>±2.6</td>
</tr>
<tr>
<td>Blue</td>
<td>±5.9</td>
<td>±1.7</td>
</tr>
<tr>
<td>Green</td>
<td>±4.0</td>
<td>±1.5</td>
</tr>
<tr>
<td>White</td>
<td>±3.5</td>
<td>±3.0</td>
</tr>
</tbody>
</table>

Note: Δ: amount of change values (mM ・Oxy-Hb). Values in the tables are averages and standard errors. &: Wilcoxon signed-rank sum test.

When looking at the changes in cerebral blood flow caused by color stimulus, a significant increase in value was recognized in red, blue and green and frontal cortex activation was confirmed. Subjective investigation presented that yellow and red are stimulus color and green and white are the color that helps to calm. The result suggested a possibility that color can be used on a daily basis as nursing care in order to stimulate cerebrum.

It is considered to have a high general versatility as the tablecloths method which can be easily used by anyone who was adopted in this study.

I will extend the study subjects to elderly people and will discuss the practical use of it in the nursing-care in the future.

IV. Conclusion

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