THE EFFECTS OF MENSTRUAL ASSOCIATED SYMPTOMS ON THE TASK PERFORMANCE
-The palliation of menstrual associated symptoms using a warmer-

Kasamatsu, K.1, Suzuki, S.2, Karashima, M.3, Kumashiro, M.1, Ninomija, S.P.2

1Department of Ergonomics, University of Occupational and Environmental Health, JAPAN
1-1, Iseigaoka, Yahatanishi, Kitakyusyu, Fukuoka, 807-8555
JAPAN
2Department of Integrated Information Technology, Aoyama Gakuin University
5-10-1, Fuchinobe, Sagamihara, Kanagawa, 229-8558
JAPAN
3Department of Management Systems Engineering, Tokai University
1117, Kitakaname, Hiratsuka, Kanagawa, 259-1292
JAPAN

Abstract

Task performance and a questionnaire survey using the modified MDQ (Menstrual Distress Questionnaire) were examined for phases of the menstrual cycle. The lower abdomen was warmed using a warmer to palliate menstrual associated symptoms. The effect of palliation using this folk remedy on task performance was examined. The experimental task consisted of clicking on randomly displayed targets, which made them disappear. This had to be accomplished within a certain time limit. The task performance, critical flicker frequency and MDQ score were measured as measurement indices. As the results, the precision of task during menstruation was lower than during the follicular phase. There were many complaints regarding menstrual associated symptoms during menstruation. The palliation treatment did not relieve the negative symptoms experienced by the subjects.

Key Words
Menstrual Cycle, Task Performance, Menstrual Distress Questionnaire, Menstrual Associated Symptoms

1. Introduction

The equal employment opportunity law in Japan came into force in 1986 as a basic law to establish a gender-equal society, and was amended in 1999. In addition, regulations designed to protect women, such as prohibitions on overtime and night and shift work, were abolished by the revision of the labour standard law.

The menstrual cycle is a unique biologically rhythmic cycle which can have various side effects on women throughout the cycle, not just during menstruation itself. These side effects are influenced by diverse factors. In addition, there are various side effects which occur when women are in the menstrual cycle itself. These effects not only differ between individuals, but also show intra-individual variations. The menstrual cycle most noticeably accounts for intra-individual variations among individuals.


While responses to menstrual phases will vary from person to person, a large sample size may offset those differences and produce a consistent phase-related pattern. Therefore, it is necessary to examine and compare the effects of the menstrual cycle on different individuals.

The previous studies have investigated the relationship between the menstrual cycle and task performance, and menstrual complaints. In this study, the effect of palliation for menstrual associated symptoms on task performance was examined. The lower abdomen was
warmed using a warmer to palliate the menstrual associated symptoms. Moreover, the MDQ by Moos was modified to be culturally specific to Japan, and menstrual complaints in Japanese women were investigated using this modified MDQ.

2. Methodology

Task performance and a questionnaire survey using the modified MDQ were examined for phases of the menstrual cycle. The lower abdomen was warmed using a warmer to palliate menstrual associated symptoms. The effect of palliation using this folk remedy on task performance was examined.

2.1 Subjects

The inclusion criteria for subjects in this study were as follows: unmarried women with a regular menstrual cycle, who did not take hormones or other drugs, were not pregnant, and had not habit smoking. All subjects were volunteers. To define the menstrual cycle, the basal body temperature was taken and recorded every morning. Subjects who the basal body temperature was divided into low and high temperature periods were selected, and the subjects’ menstrual cycles were confirmed to be fairly regular. The 12 subjects were college students, with a mean age of 21.6.

2.2 Menstrual Cycle

Menstruation, menstruation during which the menstrual associated symptoms were palliated (the palliation phase), and the follicular phase were selected and examined. The experiment on menstruation was carried out within 48 hours after bleeding began. The experimental order of the three phases of the menstrual cycle was arranged as a counterbalance.

2.3 Experimental Task

The experimental task consisted of clicking on randomly displayed targets, which made them disappear. This had to be accomplished within a certain time limit. Ten colored targets such as those shown in Fig. 1(a) were randomly displayed. The subjects were instructed to click on the center of the targets as accurately as possible, and make them disappear, all within a certain time limit. The time limit given was eleven seconds. This task was the first stage, and continued for fifteen minutes. After the time limit was up, all targets disappeared, and the next stage began. The scores for the colored targets were 3 as the core (the inside agenda), 2 (the inside blue), and 1 as the outermost (the inside yellow) (Fig.1(b)). A time limit on each stage was displayed on the screen.

2.4 Measurement Indices

The total number of targets that disappeared (the number of tasks), the total score, the score on a stage, the time which was taken to complete a stage, the time which was taken to click a target (reaction time), and the error rate were measured as the task performance. Critical flicker frequency was measured both before and after the experiment was begun. Flicker value was measured five times. The mean value of three measurements, with the exception of the maximum and minimum, were calculated.

Moreover, the MDQ by Moos was modified to be culturally specific to Japan and one item was added. The modified MDQ with 48 items in Japanese was administered to investigate the physical and mental conditions of the subjects at pre- and post-experiments. The MDQ was estimated on a six-point scale, which ranged from no experience with the symptom, to significant experience.

3. Results

3.1 Task Performance

The differences between phases were examined using ANOVA on the measured task results. As the results, there were significant differences between phases on the total score and the score on the stages (p<0.05).

Moreover, the multiple comparisons between phases were performed on the total score and the score on the stages. The total score (Fig. 2) and the score on the stages of the follicular phase were significantly higher than those on menstruation (p<0.05). There was a significant tendency for the scores on the follicular phase to be higher than those on the palliation phase (p<0.10). The score on the stages was also the same result as the total score.

The error rate (Fig. 3) on menstruation was lower than the palliation phase. There was no significant difference
between the phases on the number of tasks performed, completion time, and reaction time.

3.2 Flicker Test

The flicker value between the pre- and the post-experiment was examined using t-test. As a result, there were significant differences between the pre- and the post-experiment on all phases (p<0.05).

The rate of change in the flicker value each phase was examined using ANOVA. There was no significant difference between phases on the rate of change in the flicker value. However, the change of the flicker value during the palliation phase was the largest (Fig. 4).

3.3 A Modified MDQ

Fig. 5 (pre-experiment) and Fig. 6 (post-experiment) show the results of eight factors scored for each phase. The highest score phase on the mean value of each factor in the pre-experiment was as follows: the palliation phase on pain, menstruation on concentration, menstruation on behavioral changes, the palliation phase on autonomic reactions, menstruation on water retention, menstruation on negative affect, menstruation on arousal, and the palliation phase on control. The highest score phase on the mean value of each factor in post-experiment was as follows: the palliation phase on pain, the palliation phase on concentration, menstruation on behavioral changes, the palliation phase on autonomic reactions, menstruation on water retention, menstruation on negative affect, menstruation on arousal, and menstruation and the palliation phase on control.

The difference between the three phases was examined
using ANOVA on the total score and eight factors score, and each symptom score on the pre- and post-experiments.

First, ANOVA results on the pre-experiment were as follows (Fig.7). For the total score, there was a significant difference between the three phases on the pre-experiment (p<0.01). The results of multiple comparison showed that the total score of the menstruation (p<0.05) and palliation phase (p<0.01) were significantly higher than that of the follicular phase. There was no significant difference between the menstruation and palliation phase.

Significant differences between three phases were found in these factors: pain (p<0.01), behavioral changes (p<0.01), and water retention (p<0.01). Both the menstruation and palliation phase (p<0.01) received a significantly higher score than the follicular phase on pain, behavioral changes, and water retention.

In addition, there was a significant difference between three phases in each of these symptoms: cramps (p<0.01), backache (p<0.05), general aches and pains (p<0.05), lowered judgment (p<0.05), lowered motor coordination (p<0.01), lowered school or work performance (p<0.01), decreased efficiency (p<0.05), weight gain (p<0.05), skin disorders (p<0.01), painful breasts (p<0.05), anxiety (p<0.05), and depression (p<0.05).

Next, ANOVA results on the post-experiment were as follows (Fig.8). There was a significant difference between the three phases on the total score at the post-experiment (p<0.05). The results of multiple comparison showed that the total score of the menstruation (p<0.05) and palliation phase (p<0.05) were significantly higher than that of the follicular phase. There was no significant difference between the menstruation and palliation phase.

Significant differences between three phases were shown for the following factors: pain (p<0.01), autonomic reactions (p<0.05), and water retention (p<0.01). During the menstruation (p<0.05) and palliation phase (p<0.01), there was a significantly higher score on pain and water retention than during the follicular phase. There was a significantly higher score on autonomic reactions during both menstruation and palliation (p<0.05) than during the follicular phase.

In addition, a significant difference was shown for each of the following symptoms: cramps (p<0.01), backache (p<0.05), fatigue (p<0.01), general aches and pains (p<0.05), insomnia (p<0.05), weight gain (p<0.05), restlessness (p<0.05), and irritability (p<0.05).

It was suggested that the subjects experienced a higher degree of menstrual-associated symptoms during menstruation than during the follicular phase, both pre- and post-experiment. In particular, the subjects reported pain, behavioral changes, and water retention factors at pre-experiment, and pain, autonomic reactions, and water retention factors post-experiment. Pain and water retention were common factors reported pre- and post-experiment, and therefore tended to appear to a high degree in menstrual-associated symptoms. Significantly higher scores were reported for pain and water retention factors during menstruation than during the follicular phase.

The pre- and post-experiment differences in menstrual-associated symptoms were examined using t-test. It was found that during the follicular phase, the only symptom for which complaints increased significantly post-experiment was “lowered judgment” (p<0.05). For menstruation, the symptoms for which complaints decreased significantly post-experiment were “cramps” (p<0.05), “take naps” (p<0.05), and “mood swings” (p<0.05). The symptoms for which complaints increased significantly post-experiment were “accidents” (p<0.05) and “blind spots, fuzzy vision” (p<0.05). For the palliation phase, the symptoms for which complaints decreased significantly post-experiment were “cramps” (p<0.01), “lowered school or work performance” (p<0.05), “stay at home” (p<0.05), “weight gain” (p<0.05), and “skin disorders” (p<0.05). “Lowered judgment” (p<0.05), and “blind spots, fuzzy vision” (p<0.05) were symptoms that received significantly higher post-experiment scores than pre-experiment scores. For the symptoms which received significantly lower scores post-experiment, it
was suggested that the task itself relieved the menstrual-associated symptoms. For the symptoms which received significantly higher scores post-experiment, it was indicated that the symptoms appeared due to fatigue from performing the task. For example, “blind spots, fuzzy vision” was considered to have been caused by gazing at the VDT display.

4. Discussion

The effects of the menstrual cycle on task performance, as well as the effect of palliation for menstrual associated symptoms on task performance, were examined. From examining task performance, it was found that the score during the follicular phase was significantly higher than the score during menstruation, and the score during the follicular phase tended to be higher than the score during the palliation phase. That is to say, there was a higher precision of task during the follicular phase. However, there was no significant difference between the menstruation and palliation phases, and it was suggested that there was no effect of palliation on task performance. The error rate during the palliation phase tended to be higher than during menstruation. The concentration factor and lowered judgment received higher scores post-experiment on the palliation phase. Therefore the experiment was performed without the accurate judgment. Moreover, the subjects became especially fatigued during the palliation phase, because the rate of change in the flicker value during this phase was the highest.

The total score during the menstruation and palliation phase was higher than the follicular phase on the pre-experiment MDQ. The scores for pain, behavioral changes, and water retention during the menstruation and palliation phase were significantly higher than for the follicular phase, and there was a strong tendency for the subjects to experience physical complaints during the menstruation and palliation phase. The score for 12 symptoms experienced during menstruation, including cramps and backache, was higher than the scores for the follicular phase.

It was suggested that warming the lower abdomen was connected to relax of mental condition and palliation of pain. While there was condition which can expect an effect during palliation, the condition causing the negative effect that lowered judgment appeared. However, the effect of palliation was not recognized on task performance. It was suggested that palliation did not have an effect on mental tasks, such as the experimental task performed in this study, and that a palliative effect cannot be expected, because there was no significant difference between the menstruation and palliation phase on task performance, and deterioration in judgment was indicated.

It is necessary to develop the complaints palliation remedy without disturbing work. It might be necessary to examine about various kind of tasks. However, it might be suggested that information over series of cycles would be more useful in a quantitative approach for small numbers of subjects.

5. Conclusions

The precision of task during menstruation was lower than during the follicular phase. There were many complaints regarding menstrual associated symptoms during menstruation. While there was condition which can expect an effect during palliation, the condition causing the negative effect that lowered judgment appeared.

6. Acknowledgement

The authors would like to acknowledge the volunteer subjects and their superiors for allowing the study to be performed. We would especially like to thank Ms. Keiko Moriyama for her work in obtaining the experimental data.

References