# The Relation of Psychosomatic State and Eating Behavior (Ⅱ)

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## Abstract

The purpose of this study was to investigate the relationship between psychosomatic factors and the eating behavior of female junior college students. Subjects were 250 freshmen at Shukugawa Gakuin junior College selected by simple random sampling from a pool of approximately 1,000 students enrolled in the spring of 1996. Cornell Medical Index (CMI) and eating behavior questionnaires were administered to determine the student's psychosomatic states, eating behavior and personal interest in health care. The real reply rate to the questionnaires was 158 which yielded an excellent effective rate of 63.2%. The results of the study revealed that those students diagnosed as neurotic generally demonstrated poorer eating behavior and less personal attention to their health than those judged to be normal. In addition, the above findings were confirmed by simple frequency distribution and multiple regression analysis and have been shown to support our previous research.[1]

## 1. Introduction

The study of the relationship between the psychosomatic state and food has a long history. Kanared and Marks-Kaufman have described Brillat-Savarin's investigations into this issue more than 160 years ago.[2] The above authors have also stated that human being alter their reactions according to how well or poorly they are fed. These shifts are thought to result from changes in the functioning of the nervous system whereby poor nourishment seems to influence the psychosomatic system. One influence upon behavior is that any interest in studying or obtaining further knowledge is greatly curbed. Also, there have been reported decreases in willingness, spiritual sensitivity and social interest due to bad eating habits.[3]

Research into psychosomatic factors and eating behavior has been limited in Japan. In 1989, a very simple study on this topic was reported by Nakamoto and Katsuyama. The main point obtained from this preliminary work was that eating a staple diet such as rice and side dishes, which constituted a well-balanced meal, was thought to be of utmost importance. In our previous

study, only very simple analysis was carried out so the relationship between variables was ignored. If there is a correlation between any explanatory variables either one or the other must be removed. If this procedure is not followed the final analysis might yield false or wrong results. Thus in the present study, multiple regression analysis was added in order to firmly establish the relationship between psychosomatic factors and eating behavior. Of course we have again taken simple analysis into consideration as well while at the same time confirming our findings with the more reliable multiple regression analysis.

## 2. Method

### (1) Subjects

In this research, the 250 subjects were selected by simple random sampling from students (about 1000) entered to Shukugawa Gakuin Junior College in 1996.

Generally, students had no work. Especially, 1 grade students of collage were not affected by social attributes. Also, they were released from the stress of entrance examination. So, they were generally reputed to be the best subject in this research.

### (2) Method

The Cornell Medical Index-Health Questionnaire (abbreviated CMI) and a eating-behavior questionnaire were send to objects by mail in June in 1996. CMI was shown as a help of

〈Table 1〉 The Cornell Medical Index-Health Qustionnaire

A
1. Do you need glasses to read?
2. Do you need glasses to see things at a distance?
3. Has your eyesight often blacked out completely?
4. Do your eyes continually blink or water?
5. Do you often have bad pains in your eyes?
6. Are your eyes often red or inflamed?
7. Are you hard of hearing?
8. Have you ever had a bad running ear?
9. Do you have constant noises in your ears?

B
10. Do you have to clear your throat frequently?
11. Do you often feel a choking lump in your throat?
12. Are you often troubled with bad spells of sneezing?
13. Is your nose continually stuffed up?
14. Do you suffer from a constantly running nose?
15. Have you at times had bad nose bleeds?
16. Do you often catch severe colds?
17. Do you frequently suffer from heavy chest colds?
18. When you catch a cold, do you always have to go to bed?
19. Do frequent colds keep you miserable all winter?
20. Do you get hay fever?
21. Do you suffer from asthma?
22. Are you troubled by constant coughing?
23. Have you ever coughed up blood?
24. Do you sometimes have severe soaking sweats at night?
25. Have you ever had a chronic chest condition?
26. Have you ever had T.B. (Tuberculosis)?
27. Did you ever live with anyone who had T.B.?

C
28. Has a doctor ever said your blood pressure was too high?
29. Has a doctor ever said your blood pressure was too low?
30. Do you have pains in the heart or chest?
31. Are you often bothered by thumping of the heart?
32. Does your heart often race like mad?
33. Do you often have difficulty in breathing?
34. Do you get out of breath long before alyone else?
35. Do you sometimes get out of breath just sitting still?
36. Are your ankles often badly swollen?
37. Do cold hands or feet trouble you even in hot weather?
38. Do you suffer from frequent cramps in your legs?
39. Has a doctor ever said you had heart trouble?
40. Does heart trouble run in your family?

D
41. Have you lost more than half your teeth?
42. Are you troubled by bleeding gums?
43. Have you often had severe toothaches?
44. Is your tongue usually badly coated?
45. Is your appetite always poor?
46. Do you usually eat sweets or other food between meals?
47. Do you always gulp your food in a hurry?
48. Do you often suffer from an upset stomach?
49. Do you usually feel bloated after eating?
50. Do you usually belch a lot after eating?
51. Are you often sick to your stomach?
52. Do you suffer from indigestion?
53. Do severe pains in the stomach often double you up?
54. Do you suffer from constant stomach trouble?
55. Does stomach trouble run in your family?
56. Has a doctor ever said you had stomach ulcers?
57. Do you suffer from frequent loose bowel movements?
58. Have you ever had severe bloody diarrhea?
59. Were you ever troubled with intestinal worms?
60. Do you constantly suffer from bad constipation?
61. Have you ever had piles (rectal hemorrhoids)?
62. Have you ever had jaundice (yellow eyes and skin)?
63. Have you ever had serious liver or gall bladder trouble?

E
64. Are your joints often painfully swollen?
65. Do your muscles and joints constantly feel stiff?
66. Do you usually have severe pains in the arms or legs?
67. Are you crippled with severe rheumatism (arthritis)?
68. Does rheumatism (arthritis) run in your family?
69. Do weak or painful feet make your life miserable?
70. Do pains in the back make it hard for you to keep up with your work?
71. Are you troubled with a serious bodily disability or deformity?

F
72. Is your skin very sensitive or tender?
73. Do cuts in your skin usually stay open a long time?
74. Does your face often get badly flushed?
75. Do you sweat a great deal even in cold weather?
76. Are you often bothered by severe itching?
77. Does your skin often break out in a rash?
78. Are you often troubled with boils?

G
79. Do you suffer badly from frequent severe headaches?
80. Does pressure or pain in the head often make life miserable?
81. Are headaches common in your family?
82. Do you have hot or cold spells?
83. Do you often have spells of severe dizziness?
84. Do you frequently feel faint?
85. Have you fainted more than twice in your life?
86. Do you have constant numbness or tingling in any part of your body?
87. Was any part of your body ever paralyzed?
88. Were you ever knocked unconscious?
89. Have you at times had a twitching of the face? head or shoulders?
90. Did you ever have a fit or convulsion (epilepsy)?
91. Has anyone in your family ever had fits or convulsions (epilepsy)?
92. Do you bite your nails badly?
93. Are you troubled by stuttering or stammering?
94. Are you a sleep walker?
95. Are you a bed wetter?
96. Were you a bed wetter between the ages of 8 and 14?

H (Men)
97. Have you ever had anything seriously wrong with your genitals (privates)?
98. Are your genitals often painful or sore?
99. Have you ever had treatment for your genitals?
100. Has a doctor ever said you had a hernia (rupture)?
101. Have you ever passed blood while urinating (passing water)?
102. Do you have trouble starting your stream when urinating?

H (Women)
97. Have your menstrual periods usually been painful?
98. Have you often felt weak or sick with your periods?
99. Have you often had to lie down when your periods came on?
100. Have you usually been tense or jumpy with your periods?
101. Have you ever had constant severe hot flashes and sweats?
102. Have you often been troubled with a vaginal discharge? (both)
103. Do you have to get up every night and urinate?
104. During the day, do you usually have to urinate frequently?
105. Do you often have severe burning pain when you urinate?
106. Do you sometimes lose control of your bladder?
107. Has a doctor ever said you had kidney or bladder disense?

I
108. Do you often get spells of complete exhaustion or fatigue?
109. Does working tire you out completely?
110. Do you usually get up tired and exhausted in the morning?
111. Does every little effort wear you out?
112. Are you constantly too tired and exhausted even to eat?
113. Do you suffer from severe nervous exhaustion?
114. Does nervous exhaustion run in your family?

J
115. Are you frequently ill?

understanding the questionnaire in Table 1. And a eating-behavior questionnaire also was shown in Table 2. The reply to these questionnaire were also send by mail. This eating-behavior questionnaire was composed privately for knowing behavior and idea of eating or diet about subjects.

CMI was a questionnaire test introduced by Professor Brodma et al[4] in Cornell University. This was a test of researching psychosomatic self-consciousness decease of object in comparably short time. In these days this was widely used all of the world. This was very useful to control health care at schools of offices. The Japanese CMI introduced to Japan by Kanehisa and Hukamati was modified a little to assist to ask clinical questions. CMI test shows the state of health. That was a judge for the CMI score falls in one of four categories. Region I was diagnosed to be normal (after this, shortly normal), region Ⅳ diagnosed to be neurotic (after this, shortly neurotic), and region Ⅱ and region Ⅲ were called doubtful regions in discriminant function. Region Ⅱ is provisionally diagnosed to be normal (after this, shortly provisional normal) and region Ⅲ provisionally diagnosed to be neurotic (after this, shortly provisional neurotic). But, for useful estimation, the number for each region were reversed. So, "4" discriminated by CMI indicates region Ⅰ, "3" indicates Ⅱ, "2" to be Ⅲ and 1 to be Ⅳ.

An eating-behavior questionnaires at first demanded frequencies per week of objects. These frequencies were required about breakfast, lunch and supper of rice, bread and noodle

116. Are you frequently confined to bed by illness?
117. Are you always in poor health?
118. Are you considered a sickly person?
119. Do you come from a sickly family?
120. Do severe pains and aches make it impossible for you to do your work?
121. Do you wear yourself out worrying about your health?
122. Are you always ill and unhappy?
123. Are you constantly made miserable by poor health?

K

124. Did you ever have scarlet fever?
125. As a child, did you have rheumatic fever, growing pains or twitching of the limbs?
126. Did you ever have malaria?
127. Were you ever treated for severe anemia (thin blood)?
128. Were you ever treated for "bad blood" (venereal disease)?
129. Do you have diabetes (sugar disease)?
130. Did a doctor ever say you had a goiter (in your neck)?
131. Did a doctor ever treat you for tumor or cancer?
132. Do you suffer from any chronic disease?
133. Are you definitely under weight?
134. Are you definitely over weight?
135. Did a doctor ever say you had varicose veins (swollen veins) in your legs?
136. Did you ever have a serious operation?
137. Did you ever have a serious injury?
138. Do you often have small accidents or injuries?

L

139. Do you usually have great difficulty in falling asleep or staying asleep?
140. Do you find it impossible to take a regular rest period each day?
141. Do you find it impossible to take regular daily exercise?
142. Do you smoke more than 20 cigarettes a day?
143. Do you drink more than six cups of coffee or tea a day?
144. Do you usually take two or more alcoholic drinks a day?

M

145. Do you sweat or tremble a lot during examinations or questioning?
146. Do you get nervous and shaky when approached by a superior?
147. Does your work fall to pieces when the boss or a superior is watching you?
148. Does your thinking get completely mixed up when you have to do things quickly?
149. Must you do things very slowly in order to do them without mistakes?
150. Do you always get directions and orders wrong?
151. Do strange people or places make you afraid?
152. Are you scared to be alone when there are no friends near you?
153. Is it always hard for you to make up your mind?
154. Do you wish you always had someone at your side to advise you?
155. Are you considered a clumsy person?
156. Does it bother you to eat anywhere except in your own home?

N

157. Do you feel alone and sad at a party?
158. Do you usually feel unhappy and depressed?
159. Do you often cry?
160. Are you always miserable and blue?
161. Does life look entirely hopeless?
162. Do you often wish you were dead and away from it all?

O

163. Does worrying continually get you down?
164. Does worrying run in your family?
165. Does every little thing get on your nerves and wear you out?
166. Are you considered a nervous person?
167. Does nervousness run in your family?
168. Did you ever have a nervous breakdown?
169. Did anyone in your family ever have a nervous breakdown?
170. Were you ever a patient in a mental hospital (for yor nerves)?
171. Was anyone in your family ever a patient in mental hospital (for their nerves)?

P

172. Are you extremely shy or sensitive?
173. Do you come from a shy or sensitive family?
174. Are your feelings easily hurt?
175. Does criticism always upset you?
176. Are you considered a touchy person?
177. Do people usually misunderstand you?

Q

178. Do you have to be on your guard even with friends?
179. Do you always do things on sudden impulse?
180. Are you easily upset or irritated?
181. Do you go to pieces if you don't constantly control yourself?
182. Do little annoyances get on your nerves and make you angry?
183. Does it make you angry to have anyone tell you what to do?
184. Do people often annoy and irritate you?
185. Do you flare up in anger if you can't have what you want right away?
186. Do you often get into a violent rage?

R

187. Do you often shake or tremble?
188. Are you constantly keyed up and jittery?
189. Do sudden noises make you jump or shake badly?
190. Do you tremble or feel weak whenever someone shouts at you?
191. Do you become scared at sudden movements or noises at night?
192. Are you often awakened out of your sleep by frightening dreams?
193. Do frightening thoughts keep coming back in your mind?
194. Do you often become suddenly scared for no good reason?
195. Do you often break out in a cold sweat?

Table 2 Eating Behavior Questionnaire

Note

1. his questionnaire concerns your eating behavior.
2. This questionnaire results will not be used to research or analysis about your psychosomatic influence by eating behavior.
3. Select the appropriate word or write the necessary answer for all questions.
4. Regard "usually " as the past one or two months.

Answer the following

1. How many times a week do you have meals with rice?
   Breakfast ( ) times a week.
   Lunch ( ) times a week.
   Supper ( ) times a week.
2. How many times a week do you have meals with bread?
   Breakfast ( ) times a week.
   Lunch ( ) times a week.
   Supper ( ) times a week.
3. How many times a week do you have meals with noodle?
   Breakfast ( ) times a week.
   Lunch ( ) times a week.
   Supper ( ) times a week.
4. Do you eat marine products? (much, mean, little)
5. Do you eat meat? (much, mean, little)
6. Do you eat white vegetable? (much, mean, little)
7. Do you eat green vegetable? (much, mean, little)
8. Do you eat dairy products? (much, mean, little)
9. Do you eat fruit? (much, mean, little)
10. Mark the following items you usually care for your health ( you can mark several items )

You always intend to eat every food. You always intend to eat with well-balance. You always intend to eat at moderate rate quantity . You always intend to eat no snack. You always intend to eat food with abundant protein.

You always intend to eat food with abundant calcium.

You always intend to eat dietary fiber food. You always intend to eat no stimulus food. You always intend to eat food with abundant vitamin and mineral.

You always intend to eat food with no pesticide and fertilizer.

You always intend to eat food with no additive.

You always intend to have meal at regular times. You always intend to have rest time. You always intend to practice sports.

You always intend to think or act with positive reaction.

individually. The following questions required how quantities the group food were also eaten. Finally, how to care for health were questioned.

At first, showing descriptive statistics, the CMI composition was understood. And also a trend of eating-behavior and CMI results were shown for knowing the reference items to CMI and confirming previous results.[1]

Further, in this paper, the multiple regression analysis was adapted for knowing the screening

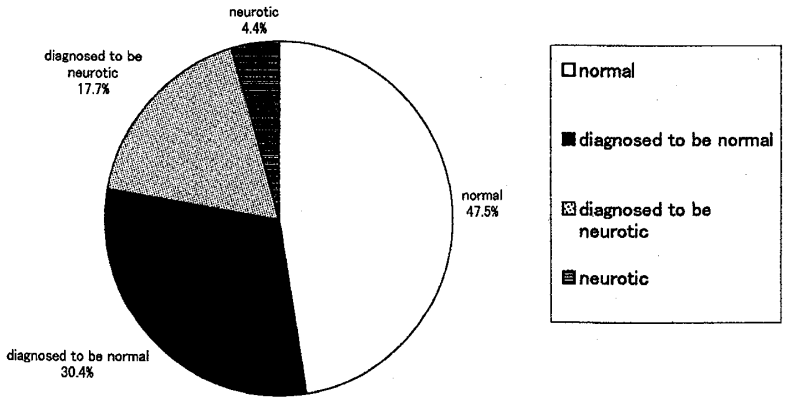
important items in relation of CMI result and eating-behavior. This multiple regression analvsis strongly helps the verifying the relationship between eating-behavior and CMI results.

In this research, many data were obtained. All of data were summarized to be tables and figures. Strictly selected tables and figures to be considered very important and typical data, were only going to be shown to help discussions. The other data were also indicated by words and sentence as possible.

## 3. Result

The numbers of reply were 158 (percents of reply was 63.2). The composition of CMI result were shown in Fig.1.

Fig. 1 Composition Rate of CMI Discrimination




The frequencies a week of rice meal of whole objects were shown in Table 3. According to this Table, from breakfast to supper, the frequencies of meal increased and the distribution center of frequencies shifted toward 7. These trends were also not shown in bread meal (breakfast average frequencies was 2.6, lunch 1.7, and supper 0.4) and noodle meal (breakfast average frequencies was 0.1, lunch 1.0, and supper 0.8).

Table 3 Frequenies of Rice Meal a Week ( All )

| | breakfast | | lunch | | supper | |
|---|---|---|---|---|---|---|
| value | frequency | rate(%) | frequency | rate(%) | frequency | rate(%) |
| 0 | 33 | 20.9 | 7 | 4.4 | 1 | 0.6 |
| 1 | 9 | 5.7 | 7 | 4.4 | 1 | 0.6 |
| 2 | 9 | 5.7 | 8 | 5.1 | 2 | 1.3 |
| 3 | 20 | 12.7 | 16 | 10.1 | 12 | 7.6 |
| 4 | 13 | 8.2 | 30 | 19.0 | 17 | 10.8 |
| 5 | 23 | 14.6 | 38 | 24.1 | 12 | 7.6 |
| 6 | 27 | 17.1 | 26 | 16.5 | 26 | 16.5 |
| 7 | 24 | 15.2 | 26 | 16.5 | 87 | 55.1 |
| mean | 3.7 | | 4.6 | | 5.9 | |
| std. dev | 2.5 | | 1.9 | | 1.5 | |

The each frequencies a week of rice meal about CMI region group were shown in Table 4. The normal group was superior to the other groups in meal frequencies per week. On the other hand, the group of neurotic and provisional neurotic indicated a few frequencies in all meal. Generally, the frequencies of supper tended to be more than the other meals. These trends also were seen in bread and noodle, but those frequencies were all very small. The frequencies of normal group's breakfast almost concentrate in 6 or 7 and so in lunch and supper. On the other hand, the frequencies of neurotic or provisional neurotic group's meals were not only very little but also the modes were 3 or 4.

**Table 4 Frequencies of Rice Meal a Week ( each CMI Region )**

| | Normal | | | | | | Provisional normal | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | breakfast | | lunch | | supper | | breakfast | | lunch | | supper | |
| value | frequency | rate(%) | frequency | rate(%) | frequency | rate(%) | frequency | rate(%) | frequency | rate(%) | frequency | rate(%) |
| 0 | 0 | 0.0 | 1 | 1.5 | 1 | 1.3 | 24 | 50.0 | 5 | 10.4 | 0 | 0.0 |
| 1 | 6 | 8.0 | 4 | 5.3 | 0 | 0.0 | 1 | 2.1 | 2 | 4.2 | 0 | 0.0 |
| 2 | 5 | 6.7 | 0 | 0.0 | 1 | 1.3 | 3 | 6.3 | 5 | 10.4 | 0 | 0.0 |
| 3 | 8 | 10.7 | 6 | 8.0 | 2 | 2.7 | 2 | 4.2 | 6 | 12.5 | 2 | 4.2 |
| 4 | 4 | 5.3 | 5 | 6.7 | 0 | 0.0 | 4 | 8.3 | 5 | 10.4 | 2 | 4.2 |
| 5 | 8 | 10.7 | 19 | 25.3 | 5 | 6.7 | 8 | 16.7 | 16 | 33.3 | 4 | 8.3 |
| 6 | 20 | 26.7 | 21 | 28.0 | 10 | 13.3 | 6 | 12.5 | 5 | 10.4 | 13 | 27.1 |
| 7 | 24 | 32.0 | 19 | 25.3 | 56 | 74.7 | 0 | 0.0 | 4 | 8.3 | 27 | 56.3 |
| mean | 5.1 | | 5.3 | | 6.5 | | 2.2 | | 3.9 | | 6.3 | |
| std. dev | 2.0 | | 1.7 | | 1.2 | | 2.4 | | 2.0 | | 1.1 | |

| | Provisional neurotic | | | | | | Neurotic | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | breakfast | | lunch | | supper | | breakfast | | lunch | | supper | |
| value | frequency | rate(%) | frequency | rate(%) | frequency | rate(%) | frequency | rate(%) | frequency | rate(%) | frequency | rate(%) |
| 0 | 9 | 32.1 | 1 | 3.6 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 1 | 2 | 7.1 | 1 | 3.6 | 1 | 3.6 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 2 | 0 | 0.0 | 1 | 3.6 | 1 | 3.6 | 1 | 14.3 | 2 | 28.6 | 0 | 0.0 |
| 3 | 8 | 28.6 | 2 | 7.1 | 2 | 7.1 | 2 | 28.6 | 2 | 28.6 | 6 | 85.7 |
| 4 | 2 | 7.1 | 17 | 60.7 | 15 | 53.6 | 3 | 42.9 | 3 | 42.9 | 0 | 0.0 |
| 5 | 7 | 25.0 | 3 | 10.7 | 3 | 10.7 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 6 | 0 | 0.0 | 0 | 0.0 | 2 | 7.1 | 1 | 14.3 | 0 | 0.0 | 1 | 14.3 |
| 7 | 0 | 0.0 | 3 | 10.7 | 4 | 14.3 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| mean | 2.5 | | 4.0 | | 4.4 | | 3.7 | | 3.1 | | 3.4 | |
| std. dev | 2.0 | | 1.5 | | 1.5 | | 1.3 | | 0.9 | | 1.1 | |

Table 5 showed the degree of food group eating about each CMI region. Neurotic group ate less marine products, white vegetable, green vegetable and dairy product. On the other hand normal group ate them more than neurotic group, but meat and fruit.

Next, the whole reply about care of health was shown in Fig 2. Eating everything, well balanced eating, regularly eating, practicing sports were very high score. Following these factors, the secondly high score factors were taking calcium, dietary fiber intake and intending to make rest time. Fig.3 showed comparison of differences in CMI region group reply to these care. In

this Fig, the tendency shown in Fig.2 was seen more in detail. Especially, eating everything, well balanced eating, taking calcium, dietary fiber intake, intending to make rest time, regularly eating and practicing sports showed a reverse reaction in normal group and neurotic group in CMI discrimination. And in each item, the scores of neurotic group were lower than normal group's.

Table 5 Intake of Food Group

| | | whole | | normal | | provisional normal | | provisonal neurotic | | neurotic | | normal group | | neurotic group | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | number | rate(%) | number | rate(%) | number | rate(%) | number | rate(%) | number | rate(%) | number | rate(%) | number | rate(%) |
| marine products | little | 28 | 17.7 | 5 | 6.7 | 9 | 18.8 | 8 | 28.6 | 6 | 85.7 | 14 | 11.4 | 14 | 79.6 |
| | natural | 85 | 53.8 | 42 | 56.0 | 28 | 58.3 | 14 | 50.0 | 1 | 14.3 | 70 | 56.9 | 15 | 85.3 |
| | more | 45 | 28.5 | 28 | 37.3 | 11 | 22.9 | 6 | 21.4 | 0 | 0.0 | 39 | 31.7 | 6 | 34.1 |
| meat | little | 8 | 5.1 | 4 | 5.3 | 4 | 8.3 | 0 | 0.0 | 0 | 0.0 | 8 | 6.5 | 0 | 0.0 |
| | natural | 99 | 62.7 | 45 | 60.0 | 34 | 70.8 | 16 | 57.1 | 4 | 57.1 | 79 | 64.2 | 20 | 113.7 |
| | more | 51 | 32.3 | 26 | 34.7 | 10 | 20.8 | 12 | 42.9 | 3 | 42.9 | 36 | 29.3 | 15 | 85.3 |
| white vegitable | little | 22 | 13.9 | 4 | 5.3 | 10 | 20.8 | 6 | 21.4 | 2 | 28.6 | 14 | 11.4 | 8 | 45.5 |
| | natural | 90 | 57.0 | 43 | 57.3 | 29 | 60.4 | 13 | 46.4 | 5 | 71.4 | 72 | 58.5 | 18 | 102.3 |
| | more | 46 | 29.1 | 28 | 37.3 | 9 | 18.8 | 9 | 32.1 | 0 | 0.0 | 37 | 30.1 | 9 | 51.2 |
| green vegitable | little | 21 | 13.3 | 1 | 1.3 | 10 | 20.8 | 6 | 21.4 | 4 | 57.1 | 11 | 8.9 | 10 | 56.9 |
| | natural | 76 | 48.1 | 31 | 41.3 | 26 | 54.2 | 16 | 57.1 | 3 | 42.9 | 57 | 46.3 | 19 | 108.0 |
| | more | 61 | 38.6 | 43 | 57.3 | 12 | 25.0 | 6 | 21.4 | 0 | 0.0 | 55 | 44.7 | 6 | 34.1 |
| dairy products | little | 30 | 19.0 | 5 | 6.7 | 12 | 25.0 | 9 | 32.1 | 4 | 57.1 | 17 | 13.8 | 13 | 73.9 |
| | natural | 70 | 44.3 | 32 | 42.7 | 24 | 50.0 | 11 | 39.3 | 3 | 42.9 | 56 | 45.5 | 14 | 79.6 |
| | more | 58 | 36.7 | 38 | 50.7 | 12 | 25.0 | 8 | 286.0 | 0 | 0.0 | 50 | 40.7 | 8 | 45.5 |
| fruit | little | 19 | 12.0 | 4 | 5.3 | 9 | 18.8 | 4 | 14.3 | 2 | 28.6 | 13 | 10.6 | 6 | 34.1 |
| | natural | 80 | 50.6 | 46 | 61.3 | 18 | 37.5 | 14 | 50.0 | 2 | 28.6 | 64 | 52.0 | 16 | 91.0 |
| | more | 59 | 37.3 | 25 | 33.3 | 21 | 43.8 | 10 | 35.7 | 3 | 42.9 | 46 | 37.4 | 13 | 73.9 |

whole number =158　　normal numbe r=75　　provisional normal number =48
provional neurotic number =28　　neurotic number =7　　normal group number =123　　neurotic group number =35

Fig. 2 Reply to Care ( All )

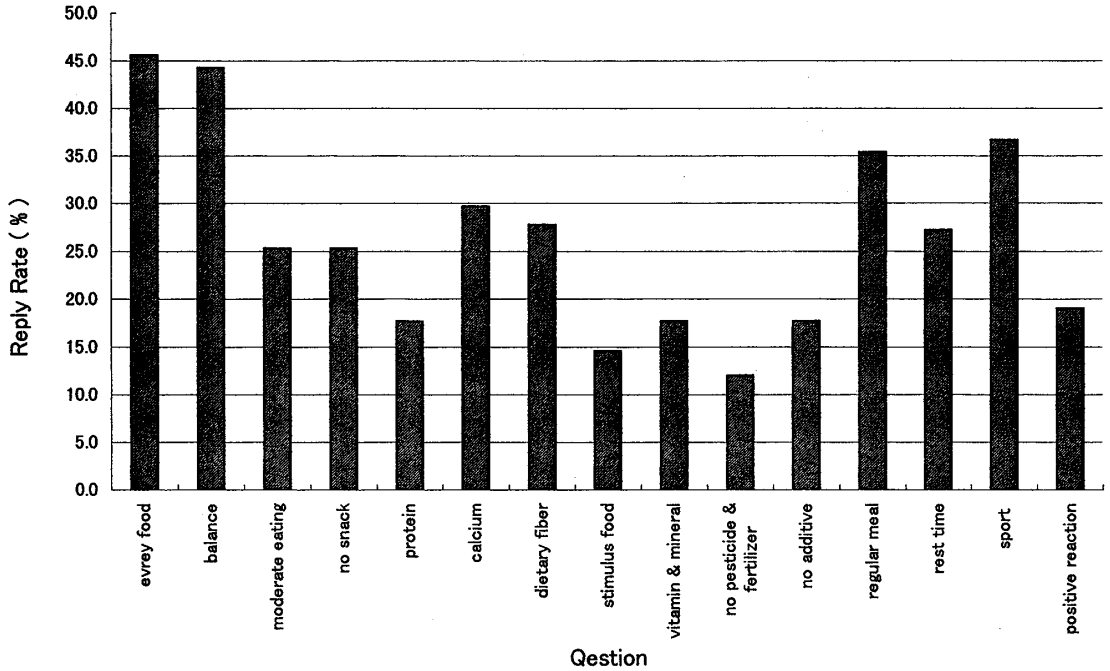


Fig. 3 Comparison of Reply for CMI Region

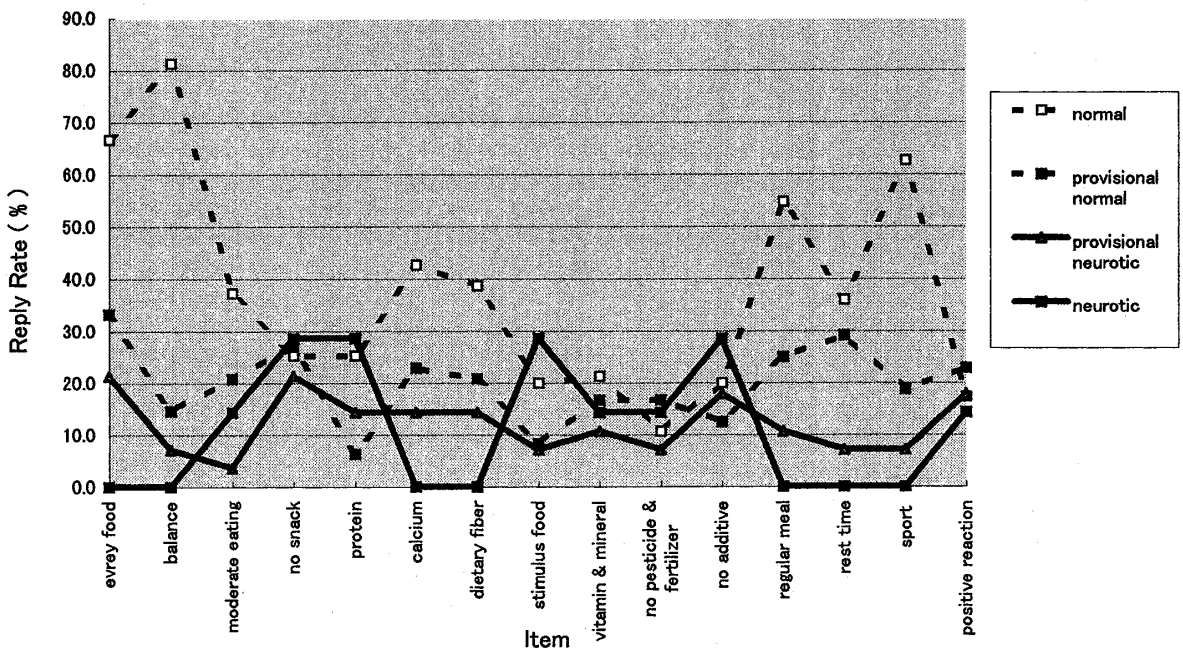



Table 6 show the correlation coefficient of multiple regression analysis about whole items to CMI. Listing up stronger seven items of correlation, those were well-balance eating (0.638), frequencies of rice supper (0.553), sports practicing (0.487), intake of green vegetable (0.441), eating every food (0.415), frequencies of rice breakfast (0.401) and having meal at regular time (0.393). Here, the figure in a parenthesis indicate each correlation coefficient with CMI result. And also, there were many pairs with comparatively strong correlation coefficient. Those were frequencies of rice breakfast {with frequencies of rice lunch (0.475) and well-balance eating (0.488)}, frequencies of rice lunch {with eating every food (0.411) and well-balance eating (0.487)}, intake of white vegetable {with intake of green vegetable (0.499)}, intake of green vegetable {with eating fruit (0.429) and eating every food (0.496)}, eating everyfood {with well-balance eating (0.412)} and well-balance eating {with eating food with no additive (0.405). Here, the figure in a parenthesis indicated each correlation coefficient with the items followed the word "with" in a bracket.

## Table 6 Correlation Coefficient in Multiple Regression

| | CMI | FRICEBF | FRICELNH | FRICESP | FBRDBF | FBRDLNH | FBRDSP | FNDLBF | FNDLLNH | FNDLSP | QUANTITY | MPRODUCT | MEAT | WHTVGTBL | GRNVGTBL | DRYPRDT | FRUIT | EVREY | BALANCE | MDRTN | NSNACK | PRTN | CA | DITRYFB | STMLS | VTMRL | NCHWCL | ADDTV | RGLMEAT | RESTTIME | SPORT | PLLS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CMI | 1.000 | .401 | .340 | .553 | -.225 | -.147 | -.352 | -.166 | -.313 | -.333 | -.040 | .356 | -.065 | .224 | .441 | .356 | .041 | .415 | .638 | .273 | .011 | .096 | .284 | .257 | .085 | .096 | .001 | .003 | .393 | .257 | .487 | -.005 |
| | . | .000 | .000 | .000 | .002 | .033 | .000 | .019 | .000 | .000 | .311 | .000 | .209 | .002 | .000 | .000 | .305 | .000 | .000 | .000 | .447 | .114 | .000 | .001 | .144 | .114 | .497 | .486 | .000 | .001 | .000 | .476 |
| FRICEBF | .401 | 1.000 | .475 | .203 | -.800 | -.373 | -.101 | -.051 | -.334 | -.451 | -.036 | .087 | .157 | .080 | .262 | .200 | .134 | .192 | .488 | .215 | -.016 | .313 | .128 | .159 | .143 | .017 | -.017 | -.030 | .311 | .063 | .332 | -.038 |
| | .000 | . | .000 | .005 | .000 | .000 | .103 | .261 | .000 | .000 | .326 | .139 | .025 | .159 | .000 | .006 | .046 | .008 | .000 | .003 | .418 | .000 | .054 | .023 | .037 | .418 | .415 | .356 | .000 | .217 | .000 | .319 |
| FRICELNH | .340 | .475 | 1.000 | .346 | -.399 | -.718 | -.089 | -.120 | -.383 | -.387 | .054 | .225 | .070 | .105 | .276 | .250 | .149 | .411 | .487 | .171 | -.031 | .245 | .223 | .109 | .186 | .085 | .162 | .192 | .242 | .026 | .232 | .082 |
| | .000 | .000 | . | .000 | .000 | .000 | .133 | .067 | .000 | .000 | .249 | .002 | .191 | .094 | .000 | .001 | .031 | .000 | .000 | .016 | .348 | .001 | .002 | .086 | .010 | .144 | .021 | .008 | .001 | .376 | .002 | .163 |
| FRICESP | .553 | .203 | .346 | 1.000 | -.076 | -.090 | -.331 | -.091 | -.313 | -.291 | .027 | .275 | -.024 | .138 | .324 | .249 | .068 | .245 | .386 | .282 | -.062 | .060 | .210 | .120 | .106 | -.027 | .136 | -.006 | .330 | .232 | .329 | .028 |
| | .000 | .005 | .000 | . | .170 | .129 | .000 | .127 | .000 | .000 | .369 | .000 | .381 | .042 | .000 | .001 | .233 | .001 | .000 | .000 | .221 | .228 | .004 | .067 | .092 | .366 | .044 | .472 | .000 | .002 | .000 | .363 |
| FBRDBF | -.225 | -.800 | -.399 | -.076 | 1.000 | .365 | .052 | .047 | .218 | .373 | .047 | .028 | -.179 | -.017 | -.235 | -.148 | -.152 | -.151 | -.357 | -.111 | .004 | -.260 | -.050 | -.108 | -.124 | .002 | .073 | .030 | -.168 | -.019 | -.277 | .014 |
| | .002 | .000 | .000 | .170 | . | .000 | .260 | .281 | .003 | .000 | .278 | .362 | .012 | .415 | .001 | .032 | .029 | .029 | .000 | .083 | .479 | .000 | .265 | .089 | .061 | .490 | .182 | .356 | .018 | .406 | .000 | .433 |
| FBRDLNH | -.147 | -.373 | -.718 | -.090 | .365 | 1.000 | .073 | .147 | .139 | .263 | -.038 | -.146 | -.071 | -.108 | -.237 | -.182 | -.134 | -.324 | -.338 | -.136 | .086 | -.158 | -.103 | -.182 | -.140 | -.048 | -.101 | -.103 | -.077 | .035 | -.116 | -.084 |
| | .033 | .000 | .000 | .129 | .000 | . | .182 | .033 | .040 | .000 | .317 | .033 | .187 | .088 | .001 | .011 | .047 | .000 | .000 | .044 | .142 | .024 | .099 | .011 | .040 | .274 | .103 | .099 | .169 | .332 | .076 | .147 |
| FBRDSP | -.352 | -.101 | -.089 | -.331 | .052 | .073 | 1.000 | .097 | .096 | .086 | .098 | -.175 | .006 | -.218 | -.280 | -.198 | -.085 | -.191 | -.244 | -.082 | .029 | .067 | -.196 | -.156 | -.043 | -.059 | -.058 | .152 | -.179 | -.101 | -.124 | -.053 |
| | .000 | .103 | .133 | .000 | .260 | .182 | . | .112 | .115 | .140 | .109 | .014 | .471 | .003 | .000 | .006 | .145 | .008 | .001 | .152 | .359 | .200 | .007 | .025 | .296 | .230 | .235 | .029 | .012 | .102 | .061 | .254 |
| FNDLBF | -.166 | -.051 | -.120 | -.091 | .047 | .147 | .097 | 1.000 | .110 | .250 | -.051 | -.090 | -.025 | -.159 | -.217 | -.189 | -.112 | -.168 | -.077 | -.050 | -.114 | -.033 | .044 | -.031 | -.047 | .113 | .015 | .040 | -.139 | .125 | -.175 | -.006 |
| | .019 | .261 | .067 | .127 | .281 | .033 | .112 | . | .084 | .001 | .261 | .130 | .378 | .023 | .003 | .009 | .081 | .018 | .169 | .266 | .077 | .342 | .291 | .351 | .278 | .080 | .425 | .309 | .041 | .059 | .014 | .469 |
| FNDLLNH | -.313 | -.334 | -.383 | -.313 | .218 | .139 | .096 | .110 | 1.000 | .544 | -.104 | -.178 | -.130 | -.123 | -.252 | -.241 | .046 | -.194 | -.450 | -.186 | .070 | -.211 | -.172 | -.060 | -.300 | -.051 | -.080 | -.196 | -.267 | -.023 | -.209 | .005 |
| | .000 | .000 | .000 | .000 | .003 | .040 | .115 | .084 | . | .000 | .097 | .013 | .052 | .062 | .001 | .001 | .264 | .007 | .000 | .010 | .192 | .004 | .015 | .227 | .000 | .264 | .159 | .007 | .000 | .389 | .004 | .476 |
| FNDLSP | -.333 | -.451 | -.387 | -.291 | .373 | .263 | .086 | .250 | .544 | 1.000 | -.070 | -.177 | .004 | -.189 | -.326 | -.264 | .014 | -.207 | -.440 | -.151 | -.006 | -.225 | -.195 | -.105 | -.148 | -.042 | -.031 | -.060 | -.345 | .005 | -.350 | -.103 |
| | .000 | .000 | .000 | .000 | .000 | .000 | .140 | .001 | .000 | . | .192 | .013 | .478 | .009 | .000 | .000 | .429 | .005 | .000 | .029 | .470 | .002 | .007 | .095 | .031 | .302 | .350 | .227 | .000 | .473 | .000 | .098 |
| QUANTITY | -.040 | -.036 | .054 | .027 | .047 | -.038 | .098 | -.051 | -.104 | -.070 | 1.000 | .031 | .011 | .102 | -.101 | -.023 | .073 | .002 | .006 | -.068 | -.068 | -.044 | .032 | .013 | .004 | .024 | .057 | .057 | .119 | -.103 | -.101 | -.081 |
| | .311 | .326 | .249 | .369 | .278 | .317 | .109 | .261 | .097 | .192 | . | .350 | .446 | .102 | .103 | .386 | .181 | .490 | .469 | .198 | .198 | .291 | .345 | .434 | .480 | .384 | .238 | .237 | .069 | .100 | .103 | .155 |
| MPRODUCT | .356 | .087 | .225 | .275 | .028 | -.146 | -.175 | -.090 | -.178 | -.177 | .031 | 1.000 | -.080 | .154 | .247 | .247 | .067 | .213 | .237 | .145 | .037 | -.025 | .123 | .114 | -.013 | .123 | .086 | .049 | .197 | .114 | .171 | .283 |
| | .000 | .139 | .002 | .000 | .362 | .033 | .014 | .130 | .013 | .013 | .350 | . | .160 | .027 | .001 | .001 | .200 | .004 | .001 | .034 | .323 | .378 | .062 | .077 | .437 | .062 | .142 | .270 | .007 | .077 | .016 | .000 |
| MEAT | -.065 | .157 | .070 | -.024 | -.179 | -.071 | .006 | -.025 | -.130 | .004 | .011 | -.080 | 1.000 | .117 | -.032 | .086 | .041 | -.014 | .069 | -.050 | -.077 | .012 | .005 | -.122 | .024 | -.079 | -.006 | .102 | .018 | -.018 | -.115 | -.005 |
| | .209 | .025 | .191 | .381 | .012 | .187 | .471 | .378 | .052 | .478 | .446 | .160 | . | .071 | .343 | .142 | .304 | .432 | .196 | .266 | .169 | .443 | .474 | .063 | .381 | .161 | .470 | .100 | .409 | .410 | .075 | .476 |
| WHTVGTBL | .224 | .080 | .105 | .138 | -.017 | -.108 | -.218 | -.159 | -.123 | -.189 | .102 | .154 | .117 | 1.000 | .499 | .256 | .119 | .280 | .267 | .112 | .067 | -.059 | .127 | .211 | -.014 | .097 | .003 | .045 | .072 | .077 | .148 | -.115 |
| | .002 | .159 | .094 | .042 | .415 | .088 | .003 | .023 | .062 | .009 | .102 | .027 | .071 | . | .000 | .001 | .068 | .000 | .000 | .080 | .203 | .233 | .056 | .004 | .431 | .112 | .483 | .286 | .183 | .167 | .032 | .075 |
| GRNVGTBL | .441 | .262 | .276 | .324 | -.235 | -.237 | -.280 | -.217 | -.252 | -.326 | -.101 | .247 | -.032 | .499 | 1.000 | .361 | .072 | .429 | .496 | .321 | -.003 | .022 | .166 | .276 | .138 | .072 | .005 | -.027 | .252 | .150 | .357 | .010 |
| | .000 | .000 | .000 | .000 | .001 | .001 | .000 | .003 | .001 | .000 | .103 | .001 | .343 | .000 | . | .000 | .186 | .000 | .000 | .000 | .486 | .390 | .018 | .000 | .042 | .186 | .473 | .369 | .001 | .030 | .000 | .452 |
| DRYPRDT | .356 | .200 | .250 | .249 | -.148 | -.182 | -.198 | -.189 | -.241 | -.264 | -.023 | .247 | .086 | .256 | .361 | 1.000 | .157 | .250 | .362 | .139 | .058 | .161 | .185 | .223 | .147 | .184 | .017 | .047 | .184 | .125 | .212 | .037 |
| | .000 | .006 | .001 | .001 | .032 | .011 | .006 | .009 | .001 | .000 | .386 | .001 | .142 | .001 | .000 | . | .024 | .001 | .000 | .041 | .233 | .022 | .010 | .002 | .033 | .010 | .416 | .281 | .010 | .059 | .004 | .320 |
| FRUIT | .041 | .134 | .149 | .058 | -.152 | -.134 | -.085 | -.112 | .046 | .014 | .073 | .067 | .041 | .119 | .072 | .157 | 1.000 | .004 | .033 | .111 | .003 | -.096 | .008 | .135 | -.071 | .076 | .125 | .125 | -.115 | .114 | -.045 | .038 |
| | .305 | .046 | .031 | .233 | .029 | .047 | .145 | .081 | .284 | .429 | .181 | .200 | .304 | .068 | .186 | .024 | . | .479 | .342 | .082 | .486 | .114 | .459 | .045 | .186 | .171 | .059 | .058 | .076 | .077 | .286 | .316 |
| EVREY | .415 | .192 | .411 | .245 | -.151 | -.324 | -.191 | -.168 | -.194 | -.207 | .002 | .213 | -.014 | .280 | .429 | .250 | .004 | 1.000 | .412 | .169 | .052 | .108 | .127 | .126 | .127 | .008 | .013 | .008 | .199 | .126 | .226 | .011 |
| | .000 | .008 | .000 | .001 | .029 | .000 | .008 | .018 | .007 | .005 | .490 | .004 | .432 | .000 | .000 | .001 | .479 | . | .000 | .017 | .269 | .089 | .055 | .058 | .056 | .460 | .434 | .460 | .006 | .058 | .002 | .447 |
| BALANCE | .638 | .488 | .487 | .386 | -.357 | -.338 | -.244 | -.077 | -.450 | -.440 | .006 | .237 | .069 | .267 | .496 | .362 | .033 | .412 | 1.000 | .301 | .067 | .187 | .284 | .285 | .174 | .153 | -.056 | .020 | .405 | .199 | .378 | -.074 |
| | .000 | .000 | .000 | .000 | .000 | .000 | .001 | .169 | .000 | .000 | .469 | .001 | .196 | .000 | .000 | .000 | .342 | .000 | . | .000 | .202 | .009 | .000 | .000 | .014 | .027 | .244 | .402 | .000 | .006 | .000 | .176 |
| MDRTN | .273 | .215 | .171 | .282 | -.111 | -.136 | -.082 | -.050 | -.186 | -.151 | -.068 | .145 | -.050 | .112 | .321 | .139 | .111 | .169 | .301 | 1.000 | .130 | .035 | .067 | .069 | .172 | -.041 | .098 | .035 | .116 | .135 | .281 | -.022 |
| | .000 | .003 | .016 | .000 | .083 | .044 | .152 | .266 | .010 | .029 | .198 | .034 | .266 | .080 | .000 | .041 | .082 | .017 | .000 | . | .052 | .332 | .202 | .194 | .015 | .302 | .110 | .332 | .073 | .046 | .000 | .392 |
| NSNACK | .011 | -.016 | -.031 | -.062 | .004 | .086 | .029 | -.114 | .070 | -.006 | -.068 | .037 | -.077 | .067 | -.003 | .058 | .003 | .052 | .067 | .130 | 1.000 | -.156 | -.092 | .036 | .007 | -.003 | -.036 | .035 | .025 | -.094 | .040 | -.171 |
| | .447 | .418 | .348 | .221 | .479 | .142 | .359 | .077 | .192 | .470 | .198 | .323 | .169 | .203 | .486 | .233 | .486 | .259 | .202 | .052 | . | .025 | .124 | .325 | .464 | .483 | .326 | .332 | .377 | .119 | .310 | .016 |
| PRTN | .096 | .313 | .245 | .060 | -.260 | -.158 | .067 | -.033 | -.211 | -.225 | -.044 | -.025 | .012 | -.059 | .022 | .161 | -.096 | .108 | .187 | .035 | -.156 | 1.000 | .133 | -.023 | .278 | -.042 | .032 | -.042 | .072 | .014 | .059 | -.013 |
| | .114 | .000 | .001 | .228 | .000 | .024 | .200 | .342 | .004 | .002 | .291 | .378 | .443 | .233 | .390 | .022 | .114 | .089 | .009 | .332 | .025 | . | .048 | .387 | .000 | .301 | .344 | .301 | .185 | .430 | .230 | .434 |
| CA | .284 | .128 | .223 | .210 | -.050 | -.103 | -.196 | .044 | -.172 | -.195 | .032 | .123 | .005 | .127 | .166 | .185 | .068 | .127 | .284 | .067 | -.092 | .133 | 1.000 | .162 | .085 | .242 | .143 | .024 | .212 | .131 | .165 | .214 |
| | .000 | .054 | .002 | .004 | .265 | .099 | .007 | .291 | .015 | .007 | .345 | .062 | .474 | .056 | .018 | .010 | .459 | .055 | .000 | .202 | .124 | .048 | . | .021 | .145 | .001 | .037 | .381 | .004 | .051 | .019 | .003 |
| DITRYFB | .257 | .159 | .109 | .120 | -.108 | -.182 | -.156 | -.031 | -.060 | -.105 | .013 | .114 | -.122 | .211 | .276 | .223 | .135 | .126 | .285 | .069 | .036 | -.023 | .162 | 1.000 | .111 | .126 | -.007 | -.060 | .112 | .105 | .301 | -.042 |
| | .001 | .023 | .086 | .067 | .089 | .011 | .026 | .351 | .227 | .095 | .434 | .077 | .063 | .004 | .000 | .002 | .045 | .058 | .000 | .194 | .325 | .387 | .021 | . | .083 | .058 | .463 | .226 | .081 | .094 | .000 | .299 |
| STMLS | .085 | .143 | .186 | .106 | -.124 | -.140 | -.043 | -.047 | -.300 | -.148 | .004 | -.013 | .024 | -.014 | .138 | .147 | -.071 | .127 | .174 | .172 | .007 | .278 | .085 | .111 | 1.000 | .137 | .013 | -.004 | .107 | .030 | .132 | -.017 |
| | .144 | .037 | .010 | .092 | .061 | .040 | .296 | .278 | .000 | .031 | .480 | .437 | .381 | .431 | .042 | .033 | .186 | .056 | .014 | .015 | .464 | .000 | .145 | .083 | . | .043 | .436 | .482 | .091 | .355 | .049 | .417 |
| VTMRL | .096 | .017 | .085 | -.027 | .002 | -.048 | -.059 | .113 | -.051 | -.042 | .024 | .123 | -.079 | .097 | .072 | .184 | .076 | .008 | .153 | -.041 | -.003 | -.042 | .242 | .126 | .137 | 1.000 | -.019 | .132 | -.067 | .089 | -.010 | .113 |
| | .114 | .418 | .144 | .366 | .490 | .274 | .230 | .080 | .264 | .302 | .384 | .062 | .161 | .112 | .186 | .010 | .171 | .460 | .027 | .302 | .483 | .301 | .001 | .058 | .043 | . | .408 | .049 | .203 | .134 | .452 | .078 |
| NCHWCL | .001 | -.017 | .162 | .136 | .073 | -.101 | -.058 | .015 | -.080 | -.031 | .057 | .086 | -.006 | .003 | .005 | .017 | .125 | .013 | -.056 | .098 | -.036 | .032 | .143 | -.007 | .013 | -.019 | 1.000 | .338 | .011 | -.007 | .001 | -.030 |
| | .497 | .415 | .021 | .044 | .182 | .103 | .235 | .425 | .159 | .350 | .238 | .142 | .470 | .483 | .473 | .416 | .059 | .434 | .244 | .110 | .326 | .344 | .037 | .463 | .436 | .408 | . | .000 | .446 | .463 | .495 | .353 |
| ADDTV | .003 | -.030 | .192 | -.006 | .030 | -.103 | .152 | .040 | -.196 | -.060 | .057 | .049 | .102 | .045 | -.027 | .047 | .125 | .008 | .020 | .035 | .035 | -.042 | .024 | -.060 | -.004 | .132 | .338 | 1.000 | .037 | -.098 | .025 | .113 |
| | .486 | .356 | .008 | .472 | .356 | .099 | .029 | .309 | .007 | .227 | .237 | .270 | .100 | .286 | .369 | .281 | .058 | .460 | .402 | .332 | .332 | .301 | .381 | .225 | .482 | .049 | .000 | . | .321 | .111 | .378 | .078 |
| RGLMEAT | .393 | .311 | .242 | .330 | -.168 | -.077 | -.179 | -.139 | -.267 | -.345 | .119 | .197 | .018 | .072 | .252 | .184 | -.115 | .199 | .405 | .116 | .025 | .072 | .212 | .112 | .107 | -.067 | .011 | .037 | 1.000 | .112 | .287 | .046 |
| | .000 | .000 | .001 | .000 | .018 | .169 | .012 | .041 | .000 | .000 | .069 | .007 | .409 | .183 | .001 | .010 | .076 | .006 | .000 | .073 | .377 | .185 | .004 | .081 | .091 | .203 | .446 | .321 | . | .081 | .000 | .283 |
| RESTTIME | .257 | .063 | .025 | .232 | -.019 | .035 | -.101 | .125 | -.023 | .005 | -.103 | .114 | -.018 | .077 | .150 | .125 | .114 | .126 | .199 | .135 | -.094 | .014 | .131 | .105 | .030 | .089 | -.007 | -.098 | .112 | 1.000 | .183 | .067 |
| | .001 | .217 | .376 | .002 | .406 | .332 | .102 | .059 | .389 | .473 | .100 | .077 | .410 | .167 | .030 | .059 | .077 | .058 | .006 | .046 | .119 | .430 | .051 | .094 | .355 | .134 | .463 | .111 | .081 | . | .011 | .203 |
| SPORT | .487 | .332 | .232 | .329 | -.277 | -.115 | -.124 | -.175 | -.209 | -.350 | -.101 | .171 | -.115 | .148 | .357 | .212 | -.045 | .226 | .378 | .281 | .040 | .059 | .165 | .301 | .132 | -.010 | .001 | .025 | .287 | .183 | 1.000 | .167 |
| | .000 | .000 | .002 | .000 | .000 | .075 | .061 | .014 | .004 | .000 | .103 | .016 | .075 | .032 | .000 | .004 | .286 | .002 | .000 | .000 | .310 | .230 | .019 | .000 | .049 | .452 | .495 | .378 | .000 | .011 | . | .018 |
| PLLS | -.005 | -.038 | .082 | .028 | .014 | -.084 | -.053 | -.006 | .005 | -.103 | -.081 | .283 | -.005 | -.115 | .010 | .037 | .038 | .011 | -.074 | -.022 | -.171 | -.013 | .214 | -.042 | -.017 | .113 | -.030 | .113 | .046 | .067 | .167 | 1.000 |
| | .476 | .319 | .153 | .363 | .433 | .147 | .254 | .469 | .476 | .098 | .155 | .000 | .476 | .075 | .482 | .320 | .316 | .447 | .176 | .392 | .016 | .434 | .003 | .299 | .417 | .078 | .353 | .078 | .283 | .203 | .018 | . |

## 4. Discussion

As mentioned above, the reply rate was 63.2 percents. This rate was very high. Generally, the reply rate of such research by mail was very low (30% or less). As seen in Fig.1, the composition of CMI discrimination was that the region Ⅰ (normal) was 47.5%, Ⅱ (provisional normal) 30.4%, Ⅲ (provisional neurotic) 17.7% and Ⅳ (provisional neurotic) 4.4%. This rate was not same as previous result,[1]but, this was thought to be reasonable result because of being allowance region proposed by T. Kanehisa and K. Hukamati[5]. So, the subjects researched were not special women student group in statistic study.

As seen in Table 3, the tendency of increase in frequencies of meal according toward breakfast to supper was same result of previous research[1] As shown in Table 4, the normal group was superior to the other groups in rice meal frequencies per week. On the other hand, the group of neurotic or provisional neurotic group indicate a few frequencies in all meal. Of course, generally, the frequencies of supper tends to be more than the other meals. These trends also were seen in bread and noodle, but those frequencies were all very small. Previous research[1] indicated that the balance of contents in meal was very important in psychosomatic health. Rice meal generally requires more side dishes than other meals (bread or noodle). It was thought that this makes a meal to be well balanced. So, as obtained the same as previous result in this categories, it suggests that a rice meal frequencies has important fluency to Psychosomatic states.

Table 5 shows the degree of food group eating about each CMI region. Neurotic group and normal group indicate very contrary reactions in eating vehaviors of marine products, white vegetable, green vegetable and dairy products, but meat and fruit. The marine products group provides good protein, vitamin A, $B_1$ (thiamin), $B_2$, calcium and so on. These nutrition lack causes many disease. Especially, it was reported that vitamin $B_1$ (thiamin) lack caused beriberi and concerned with meuropathy symptom[6),7)]. The neurotic group eats less marine products in whole than the normal group. Therefore, it seems that eating-behavior of less marine products relates to CMI result. The green vegetable provides much vitamins and minerals. Sodium and calcium were essential minerals and they work very important action in nerve conduction system. So, the luck of mineral, especially, the luck of sodium, potassium and calcium cause many symptoms of nervous system. It was thought that there was any relation between those lack and CMI result, however, in these days the lack in minerals was considered a medical rarity[8)]. As show in Table 5, normal group eat much quantity in all food group except meat and fruit. In these food group, meat was called an acid food, makes acid in human body according their resolution and also

includes much sulfur, chlorine and so on. It was well known that much intake in acid foods cause to be angry, irritated and so on. Further, fruit contains much saccharides. And these saccharides were often commonly regarded as an origin of anxiety, depression, schizoid, and many psychological problem[9] . These suggest that overtaking fruit or meat influence upon psychological factors and cause CMI discrimination results to be high score. But, in this stage, there was no clear evidence with relation between overtaking these food group and CMI result. It was noteworthy that the normal group take food group with well-balance comparably against the neurotic group. This was understood from Fig.2 and Fig.3 about the caring for health. That was, eating every food, eating with well-balanceand so on have high score and it seems to be relate each other. These results were same as previous study[1] .

The correlation coefficient of multiple regression were given in Table 6. The variables with comparable large correlation coefficient against CMI discrimination were eating with well-balance, rice supper, practicing sports, intake green vegetable and eating every foods. But, only the coefficient value of eating well-balance and rice supper were superior over 0.5.

From Table 4, the frequencies of normal group's breakfast almost concentrate in 6 or 7 and so in lunch and supper. And the frequencies of neurotic or provisional neurotic group's meals were not only very little but also the modes were 3 or 4. The most of group with many frequencies in rice meal fall in the normal region of CMI discrimination. These results were same as previous study. It has been introduced that rice meal necessarily required more side dishes than the other meal. So, rice meal makes well-balance meal in food. In this case, almost same result as previous was led. Further, the regression coefficients above mentioned also support these results.

Let's try to consider details of these results. So, multiple regression analysis was applied again to all variables, only frequencies of meal, food group only, and the variables of caring for health individually. Those results were given in Table 7, 8, 9 and 10. In each analysis, the stepwise method was used in multiple regression. The threshold value for judgment of effective variable was applied 2 which was used usually in these analysis. In stepwise method, the variable used in regression equation. In stepwise method, the value with more early used in regression equation has more stronger relation with criterion value. In the combination of the variable, the variable was selected as the contribution ratio become the highest and this variable was added to explanatory variables. Try and try these until the F value reaches to 2.

## Table 7 Multiple Regression ( All )

| | |
|---|---|
| Multiple R | .78544 |
| R Square | .61692 |
| Adjusted R Square | .59635 |
| Standard Error | .56488 |

Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 8 | 76.56391 | 9.57049 |
| Residual | 149 | 47.54369 | .31909 |

F = 29.99352 Signif F = .0000

Variables in the Equation

| Variable | B | SE B | 95% Confdnce Intrvl B | | Beta | Tolerance | VIF | T | Sig T |
|---|---|---|---|---|---|---|---|---|---|
| FRICEBF | .043204 | .021723 | 2.78457E-04 | .086130 | .122481 | .677907 | 1.475 | 1.989 | .0486 |
| FRICESP | .137572 | .034532 | .069336 | .205807 | .236494 | .729596 | 1.371 | 3.984 | .0001 |
| FBRDLNH | .077228 | .033883 | .010274 | .144182 | .131403 | .773529 | 1.293 | 2.279 | .0241 |
| FBRDSP | -.128351 | .061558 | -.249991 | -.006711 | -.113734 | .864080 | 1.157 | -2.085 | .0388 |
| FISH | .179943 | .071379 | .038897 | .320989 | .136266 | .879961 | 1.136 | 2.521 | .0128 |
| EVRY | .254143 | .103387 | .049850 | .458437 | .142813 | .761734 | 1.313 | 2.458 | .0151 |
| BALANCE | .611176 | .119802 | .374445 | .847906 | .342554 | .570235 | 1.754 | 5.102 | .0000 |
| SPORT | .339592 | .105587 | .130951 | .548233 | .184690 | .779678 | 1.283 | 3.216 | .0016 |
| (Constant) | 1.261550 | .253610 | .760414 | 1.762687 | | | | 4.974 | .0000 |

Collinearity Diagnostics

| Number | Eigenval | Cond Index | Variance Proportions Constant | FRICEBF | FRICESP | FBRDLNH | FBRDSP | FISH | EVRY | BALANCE | SPORT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.95640 | 1.000 | .00082 | .00474 | .00120 | .00464 | .00328 | .00206 | .00685 | .00561 | .00750 |
| 2 | 1.11691 | 2.309 | .00062 | .00274 | .00007 | .05509 | .29448 | .00030 | .03222 | .04224 | .02916 |
| 3 | .63117 | 3.072 | .00087 | .00806 | .00177 | .18552 | .52292 | .00221 | .01866 | .02097 | .01755 |
| 4 | .47918 | 3.526 | .00070 | .00047 | .00039 | .01133 | .00021 | .00247 | .23835 | .00236 | .69414 |
| 5 | .35152 | 4.116 | .00047 | .13936 | .00057 | .01945 | .00737 | .00059 | .52666 | .13485 | .19547 |
| 6 | .23432 | 5.042 | .00481 | .14427 | .00435 | .25552 | .05117 | .01809 | .00040 | .72060 | .00727 |
| 7 | .15449 | 6.209 | .00664 | .58774 | .02132 | .32579 | .00075 | .12418 | .17077 | .03593 | .00787 |
| 8 | .05433 | 10.471 | .03924 | .04913 | .34907 | .07962 | .00008 | .72882 | .00277 | .00125 | .00099 |
| 9 | .02167 | 16.580 | .94584 | .06349 | .62126 | .06303 | .11973 | .12128 | .00332 | .03620 | .04006 |

End Block Number 1 FIN = 2.000 Limits reached.

Table 7 shows the order in variables of used in regression equation eating well-balance, rice supper, practicing sports, intake of marine products, bread supper, eating every food, bread lunch and rice breakfast. The contribution ratio was 0.62. The matching to equation was not bad. The test static F was 29.99352 and the probability was 0.0000, so if significant level was 0.05, the multiple regression equation was thought to be useful. From the value of sig T in Table 7, used values in this case were all useful. The tolerance value were comparable large, so, the probability of linear combination with the selected variables was very small. From this, in all variables, the more important variables were also, eating with well-balance, the frequencies of rice supper, practicing sports and so on.

As doing above, in the frequencies of meal, the contribution ratio was not so good (see Table 8). And, see Table 9 about the analysis of food group. In this case, as the Table 8, the contribution ratio was bad. But, the trend supports the results from Table 5.

## Table 8 Multiple Regression ( Frequencies of Meal )

Multiple R .65555
R Square .42975
Adjusted R Square .41484
Standard Error .68012

Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 4 | 53.33549 | 13.33387 |
| Residual | 153 | 70.77211 | .46256 |

F = 28.82608 Signif F = .0000

Variables in the Equation

| Variable | B | SE B | 95% Confdnce Intrvl B | | Beta | Tolerance | VIF | T | Sig T |
|---|---|---|---|---|---|---|---|---|---|
| FRICEBF | .102915 | .022018 | .059416 | .146414 | .291755 | .956603 | 1.045 | 4.674 | .0000 |
| FRICESP | .248927 | .038327 | .173209 | .324645 | .427921 | .858588 | 1.165 | 6.495 | .0000 |
| FBRDSP | -.194011 | .073243 | -.338710 | -.049312 | -.171916 | .884820 | 1.130 | -2.649 | .0089 |
| FNDLBF | -.184170 | .119367 | -.419991 | .051650 | -.094877 | .985650 | 1.015 | -1.543 | .1249 |
| (Constant) | 1.457507 | .244944 | .973598 | 1.941415 | | | | 5.950 | .0000 |

Collinearity Diagnostics

| Number | Eigenval | Cond Index | Variance Proportions Constant | FRICEBF | FRICESP | FBRDSP | FNDLBF |
|---|---|---|---|---|---|---|---|
| 1 | 3.07618 | 1.000 | .00482 | .02515 | .00508 | .02211 | .01537 |
| 2 | .92218 | 1.826 | .00098 | .02076 | .00241 | .10983 | .71812 |
| 3 | .76369 | 2.007 | .00012 | .00760 | .00115 | .70138 | .24913 |
| 4 | .21133 | 3.815 | .03519 | .94644 | .04526 | .01746 | .00845 |
| 5 | .02662 | 10.749 | .95889 | .00005 | .94610 | .14922 | .00894 |

## Table 9 Multiple Regression ( Food Group )

Multiple R .53662
R Square .28796
Adjusted R Square .27409
Standard Error .75752

Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 3 | 35.73757 | 11.91252 |
| Residual | 154 | 88.37002 | .57383 |

F = 20.75963 Signif F = .0000

Variables in the Equation

| Variable | B | SE B | 95% Confdnce Intrvl B | | Beta |
|---|---|---|---|---|---|
| FISH | .306311 | .094117 | .120384 | .492238 | .231961 |
| GRNVGTBL | .416509 | .097329 | .224237 | .608780 | .316963 |
| DRYPRDT | .225325 | .090539 | .046466 | .404184 | .184310 |
| (Constant) | 1.134238 | .270948 | .598983 | 1.669493 | |

Variables in the Equation

| Variable | Tolerance | VIF | T | Sig T |
|---|---|---|---|---|
| FISH | .910216 | 1.099 | 3.255 | .0014 |
| GRNVGTBL | .842818 | 1.186 | 4.279 | .0000 |
| DRYPRDT | .843012 | 1.186 | 2.489 | .0139 |
| (Constant) | | | 4.186 | .0000 |

Collinearity Diagnostics

| Number | Eigenval | Cond Index | Variance Proportions Constant | FISH | GRNVGTBL | DRYPRDT |
|---|---|---|---|---|---|---|
| 1 | 3.83178 | 1.000 | .00328 | .00542 | .00453 | .00545 |
| 2 | .07374 | 7.209 | .00388 | .65535 | .05018 | .41561 |
| 3 | .05796 | 8.131 | .01771 | .10858 | .64067 | .53465 |
| 4 | .03652 | 10.244 | .97514 | .23065 | .30462 | .04430 |

End Block Number 1 FIN = 2.000 Limits reached.

## Table 10 Multiple Regression ( Care for Health )

| | |
|---|---|
| Multiple R | .72000 |
| R Square | .51840 |
| Adjusted R Square | .50256 |
| Standard Error | .62708 |

Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 5 | 64.33713 | 12.86743 |
| Residual | 152 | 59.77046 | .39323 |

F = 32.72266 Signif F = .0000

---------- Variables in the Equation ----------

| Variable | B | SE B | 95% Confdnce Intrvl B | | Beta |
|---|---|---|---|---|---|
| EVRY | .273124 | .110433 | .054943 | .491305 | .153478 |
| BALANCE | .744904 | .122958 | .501976 | .987831 | .417506 |
| RGLMEAT | .207992 | .115546 | -.020291 | .436275 | .112257 |
| RESTTIME | .193663 | .115302 | -.034137 | .421464 | .097253 |
| SPORT | .449887 | .114284 | .224096 | .675678 | .244675 |
| (Constant) | 2.462806 | .079944 | 2.304860 | 2.620752 | |

---------- Variables in the Equation ----------

| Variable | Tolerance | VIF | T | Sig T |
|---|---|---|---|---|
| EVRY | .822761 | 1.215 | 2.473 | .0145 |
| BALANCE | .667124 | 1.499 | 6.058 | .0000 |
| RGLMEAT | .814710 | 1.227 | 1.800 | .0738 |
| RESTTIME | .945068 | 1.058 | 1.680 | .0951 |
| SPORT | .820159 | 1.219 | 3.937 | .0001 |
| (Constant) | | | 30.806 | .0000 |

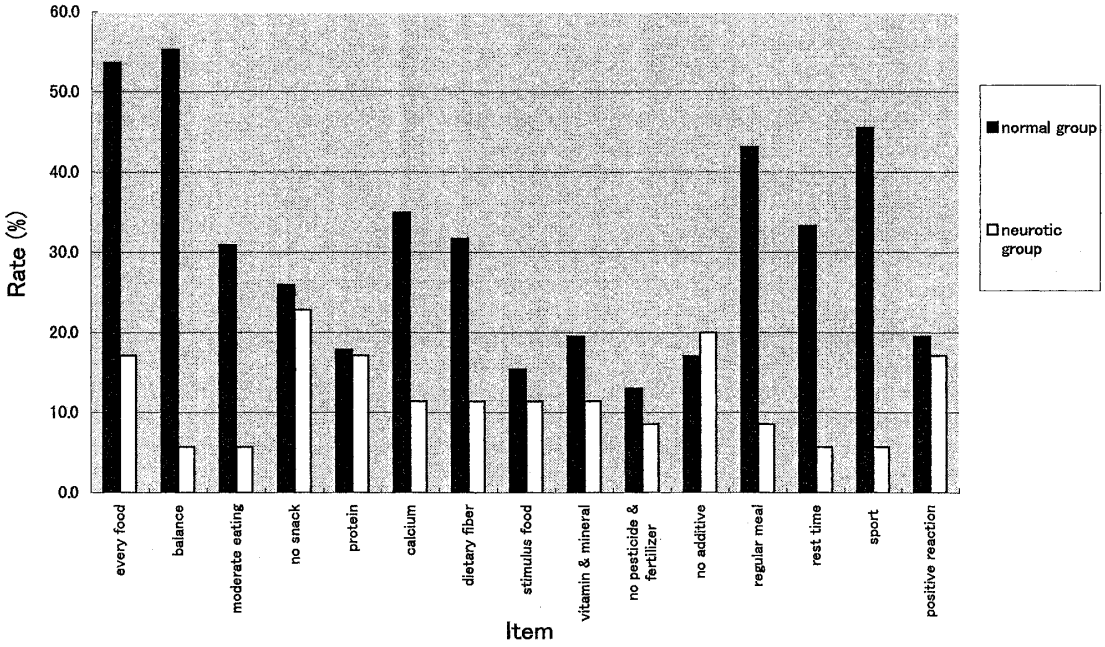
Collinearity Diagnostics

| Number | Eigenval | Cond Index | Variance Proportions Constant | EVRY | BALANCE | RGLMEAT | RESTTIME | SPORT |
|---|---|---|---|---|---|---|---|---|
| 1 | 3.80511 | 1.000 | .01982 | .02042 | .01917 | .02177 | .02079 | .02236 |
| 2 | .65356 | 2.413 | .00013 | .01363 | .01743 | .09440 | .86448 | .00838 |
| 3 | .49147 | 2.782 | .03837 | .43680 | .00277 | .36684 | .02831 | .11145 |
| 4 | .44985 | 2.908 | .00298 | .00484 | .00221 | .33744 | .02551 | .78895 |
| 5 | .32755 | 3.408 | .68864 | .02740 | .43073 | .00765 | .03236 | .00133 |
| 6 | .27246 | 3.737 | .25005 | .49691 | .52769 | .17190 | .02855 | .06753 |

End Block Number 1 FIN = 2.000 Limits reached.

Further, the results of the multiple regression analysis about how care for health was shown in Table 10. The contribution ratio was 0.518. This value was not very good, but was superior to above 2 results. From the value of sig. F, it seems that this equation was useful. The variable were eating well-balance, practicing sports, eating every food, and having at regular times in order. Tolerance was very near to 1, that was very large value, so it was not thought as the variables introduced were linear combination. Seeing about sig. F, having rest time and having at regular times were not useful variables. In this case, eating well-balance also was seemed to be very important variable. Here, practicing sports was also effective. Those means that for living without stress, eating well-balance and practice sports were required.

Fig. 4 Care for Health




At last, in Fig.4, the summaries about caring for health were shown. These results perfectly consist with the conclusion leaded from the multiple regression analysis.

## 5. Conclusion

The relation of psychosomatic state and eating behavior was researched and these data have been analyzed by the multiple regression. The following results were introduced.

(1) Diagnosed to be neurotic had generally a few frequency of meal a week.

(2) Diagnosed to be neurotic had generally a few frequency of breakfast, lunch and supper than diagnosed to be normal.

(3) Diagnosed to be neurotic had generally taken less in marine products, white vegetable, green-vegetable, dairy products than diagnosed to be normal.

(4) On the other hand, diagnosed to be neurotic had generally more meat and fruit than diagnosed to be normal.

(5) The intake of diagnosed to be neurotic in food group indicated worse balance, but the intake of diagnosed to be normal in food group very good balance.

(6) Diagnosed to be normal strongly was care for eating with well-balance.

(7) Above results were not only confirmed by simple frequency distribution but also by multiple regression analysis.

(8) Diagnosed to be normal always eat with well-balance.

(9) These results supports the previous results.

## 6. Acknowledgment

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